

**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  
(14th October to 30th November 2022)**

 **Ecosystems Limited**



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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 1<sup>st</sup> Monthly Monitoring and Management Report for OWCAs, which summarizes the monitoring results in the period between 14<sup>th</sup> October and 30<sup>th</sup> November 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 OWCA's Specified in HCMP**

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

**Table 2.2: Ecological survey 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	
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
- Survey in bold are showing the reporting survey
- As the commencement of the establishment is in the middle of the October 2022, bird monitoring only conducted once in October 2022, another one will be conducted in October 2023

**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 OWCA 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 OWCA, 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 OWCA 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 once in October 2022 and twice in November 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 OWCA 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.
- 2.1.7** *Herpetofauna* – Daytime and nighttime surveys of herpetofauna species were conducted in October 2022 using transect count method (**Figure 2.1, 2.2 and 2.3**). The presence and abundance of species encountered visually or aurally on the transect were recorded. Other herpetofauna species of conservation importance sighted were reported.
- 2.1.8** Dragonfly – Presence and abundance of adult dragonfly target species were estimated using transect count method (**Figure 2.1, 2.2 and 2.3**). Survey was conducted in October 2022, when the key species are more active. Other dragonfly species of conservation importance sighted were also reported.

### **3. Monitoring Findings**

#### **3.1 General**

- 3.1.1** The target species monitoring was conducted in 25<sup>th</sup> October 2022, 10<sup>th</sup> November 2022 and 16<sup>th</sup> November 2022. Six infrared cameras were installed in OWCA 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 25<sup>th</sup> November 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** During the monitoring survey in November 2022, surveyor found that camera no.6 in Area 2 was missing. A new one was reinstalled in the vicinity of the original position where is more cryptic on 25<sup>th</sup> November 2022 (**Figure 3.1**).

**Table 3.1 Summary Table for Monitoring Activities in the Reporting Period**

Aspect	Monitoring Parameter	Date
Target Species		
Bird	Species and abundance	25/10, 10/11 and 16/11
Mammal*		25/10, 10/11 and 16/11
Dragonfly		25/10
Herpetofauna		25/10
Habitat Condition		
Vegetation	<ul style="list-style-type: none"> <li>• Species composition, coverage and plant health of marsh</li> <li>• Vegetation coverage and height within OWCA's</li> <li>• Presence and coverage of exotic plant species</li> </ul>	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 14/10 and 30/11 (14/10,21/10,28/10,4/11, 11/11,18/11,25/11)
Water quality	<ul style="list-style-type: none"> <li>• Temperature</li> <li>• pH</li> <li>• Salinity</li> <li>• Dissolved oxygen</li> <li>• BOD5</li> <li>• Nitrate and nitrite</li> <li>• Ammonia nitrogen</li> <li>• Orthophosphate</li> </ul>	25/11
Sediment quality	<ul style="list-style-type: none"> <li>• pH</li> <li>• Redox potential</li> <li>• Total organic carbon</li> <li>• Total nitrogen</li> <li>• Total phosphorus</li> </ul>	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 Japanese Pipistrelle *Pipistrellus abramus* was recorded by transect count in Area 2 during the night survey for herpetofauna in October 2022. No mammal species were recorded during the survey in November 2022 by transect count method. The total operation days of infrared cameras within the present monitoring period was 145 days. The species recorded by infrared camera is presented in **Table 3.2** below. Eurasian wild pig was the dominant species being captured by infrared cameras (**Appendix D**), followed by domestic dog (**Appendix D**). One individual of Small Indian Civet (**Appendix D**) was recorded in Area 2. Japanese Pipistrelle and Small Indian Civet are considered as species of conservation importance, but no Eurasian Otter was recorded. However, these two mammal species are not the target species. As species of conservation importance were recorded, no specific management actions are required.

**Table 3.2 Animal encounter rate through infrared camera**

Camera No.	Location	Operation Day of infrared camera*	Animal encounter rate
Cam 4	Area 9	27	/
Cam 5	Area 2	27	/
Cam 6	Area 2	27	Eurasian wild pig:20; Small Indian Civet:1; Domestic Dog:5
Cam 7	Area 7	27	Eurasian wild pig:2
Cam 9	Area 9	27	Eurasian wild pig:4
Cam 10	Area 2	10	/

\*Although a total of 48 days in the reporting period between 14<sup>th</sup> October and 30<sup>th</sup> November 2022, the operation days for each camera are less than 48 due to capacity of memory card, battery as well as security issue

### *Avifauna*

- 3.2.2** Most of the recorded bird species are common and widespread in Hong Kong. A total of 65 bird species were recorded within the OWCAs (**Appendix B**). Among all the 65 species, 4 target species which are listed in the HCMP and 27 were 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. Eurasian Wigeon *Anas penelope* was the highest recorded species in OWCAs. No breeding birds were found during the monitoring period. As target bird species and species of conservation importance were recorded, no specific management actions are required.

### *Herpetofauna*

- 3.2.3** Two reptile and 2 amphibian species were recorded within the OWCAs (**Appendix B**). No target herpetofauna were recorded. Only Indian Forest

Skink *Sphenomorphus indicus* is of conservation importance in which was recorded in Area 7. The status of Indian Forest Skink *Sphenomorphus* is present in **Table 3.3**. As herpetofauna species of conservation importance were recorded, no specific management actions are required.

### Dragonfly

**3.2.4** A total of 9 dragonfly species were recorded within the OWCAs (**Appendix B**). Among all the 9 species, only Scarlet Basker *Urothemis signata* is a target species that was recorded in Area 9. The status of Scarlet Basker *Urothemis signata* is presented in **Table 3.3** below. As target dragonfly species were recorded, no specific management actions are required.

**3.2.5** 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	Species of Conservation Importance
Mammal			
Small Indian Civet	<i>Viverricula indica</i>		Caption 170; Class 2 Protected Animal of China; Red List of China's Vertebrate: Vulnerable
Japanese Pipistrelle	<i>Pipistrellus abramus</i>		Caption 170
Avifauna (All birds are protected by Cap. 170 Wild Animals Protection Ordinance)			
Eurasian Wigeon	<i>Anas penelope</i>		Fellowes et al. (2002): RC
Mallard	<i>Anas platyrhynchos</i>		Fellowes et al. (2002): RC
Northern Shoveler	<i>Anas clypeata</i>		Fellowes et al. (2002): RC
Northern Pintail	<i>Anas acuta</i>		Fellowes et al. (2002): RC
Eurasian Teal	<i>Anas crecca</i>		Fellowes et al. (2002): RC
Tufted Duck	<i>Aythya fuligula</i>		Fellowes et al. (2002): LC
Japanese Quail	<i>Coturnix japonica</i>		Fellowes et al. (2002): LC
Little Grebe	<i>Tachybaptus ruficollis</i>		Fellowes et al. (2002): LC
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>		Fellowes et al. (2002): LC
Chinese Pond Heron	<i>Ardeola bacchus</i>		Fellowes et al. (2002): PRC
Grey Heron	<i>Ardea cinerea</i>		Fellowes et al. (2002): PRC
Purple Heron	<i>Ardea purpurea</i>		Fellowes et al. (2002): RC
Great Egret	<i>Ardea alba</i>		Fellowes et al. (2002): PRC
Little Egret	<i>Egretta garzetta</i>	✓	Fellowes et al. (2002): PRC
Great Cormorant	<i>Phalacrocorax carbo</i>	✓	Fellowes et al. (2002): PRC

Common Names	Scientific Names	Target species	Species of Conservation Importance
Western Osprey	<i>Pandion haliaetus</i>		Caption 586; China Red Data Book Status: Rare; Fellowes et al. (2002): RC
Greater Spotted Eagle	<i>Clanga clanga</i>		Caption 586; IUCN Red List: Vulnerable; China Red Data Book Status: Rare; Fellowes et al. (2002): GC; Red List of China's Vertebrates: Endangered
Black Kite	<i>Milvus migrans</i>		Caption 586; Fellowes et al. (2002): (RC)
Eastern Buzzard	<i>Buteo japonicus</i>		Caption 586
Eurasian Coot	<i>Fulica atra</i>		Fellowes et al. (2002): RC
Black-winged Stilt	<i>Himantopus himantopus</i>		Fellowes et al. (2002): RC
Common Greenshank	<i>Tringa nebularia</i>		Fellowes et al. (2002): RC
Wood Sandpiper	<i>Tringa glareola</i>		Fellowes et al. (2002): LC
White-throated Kingfisher	<i>Halcyon smyrnensis</i>		Fellowes et al. (2002): (LC)
Pied Kingfisher	<i>Ceryle rudis</i>		Fellowes et al. (2002): (LC)
Dusky Warbler	<i>Phylloscopus fuscatus</i>	✓	
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	✓	
White-cheeked Starling	<i>Spodiopsar cineraceus</i>		Fellowes et al. (2002): PRC
Daurian Starling	<i>Agropsar sturninus</i>		Fellowes et al. (2002): LC
Herpetofauna			
Indian Forest Skink	<i>Sphenomorphus indicus</i>		Fellowes et al. (2002): LC
Dragonfly			
Scarlet Basker	<i>Urothemis signata</i>	✓	Fellowes et al. (2002): LC

Notes:

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

Abbreviations:

- Conservation Status in Fellowes *et al.* (2002): LC = Local Concern, RC = Regional Concern, PGC = Potential Global Concern, PRC = Potential Regional Concern, GC = Global Concern
- 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 OWCA. *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 and hence no specific management actions are required.

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

Area	Pond	14/10	21/10	28/10	4/11	11/11	18/11	25/11
2	53/54	1.6	1.7	1.8	1.7	1.7	1.6	1.6
	57	1.4	1.5	1.6	1.5	1.5	1.4	1.4
	58	1.2	1.3	1.4	1.3	1.3	1.2	1.2
	96	0.9	1	1.1	1	1	0.9	0.9
	55	0.8	0.9	1	0.9	0.9	0.8	0.8
	56A	0.7	0.9	0.9	0.9	0.9	0.7	0.7
	56B	1.2	1.3	1.4	1.3	1.3	1.2	1.2
7	7A/7B	0.8	0.9	1	0.9	0.9	0.8	0.8
	7C	1.3	1.4	1.5	1.4	1.4	1.3	1.3
	7D/E	1.3	1.4	1.5	1.4	1.4	1.3	1.3
9	9A	1.2	1.3	1.4	1.3	1.3	1.2	1.2
	9B/C	1.8	1.9	2	1.9	1.9	1.8	1.8
	9D	1.6	1.7	1.8	1.7	1.7	1.6	1.6
	9E	1.6	1.7	1.8	1.7	1.7	1.6	1.6

#### *Water Quality*

**3.3.3** Water samples were collected and measured by Wellab Limited in each OWCA in 25 November 2022 (**Figure 2.1 to 2.3**). No surface water was found in Pond 55 of Area 2 in November 2022 and hence no water measurement was conducted for the marsh in that period. The results from the *in-situ* measurement and laboratory of November 2022 are shown in **Appendix E1 to E2**. The results of water quality monitoring during the reporting period are summarized in **Table 3.5**.

### Area 2

**3.3.4** pH value ranged between the action level 6.0 to 8.5 in all pond/marsh of Area 2, while salinity in all pond/marsh ranged below 3.0ppt.

**3.3.5** For dissolved oxygen, BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were below the action level in all pond/marsh of Area 2, except for the marsh 56B which dissolved oxygen levels was below the action level during November 2022. As the function of marsh is different from pond which requires higher dissolved oxygen level to support aquatic animals of higher trophic level (e.g. fish), no specific management actions are required due to no observable impacts to wildlife.

### Area 7

**3.3.6** pH value ranged between the action level 6.0 to 8.5 in Area 7 except Pond 7A during November 2022, while salinity in most of the pond/marsh ranged below 3.0ppt except 7A/7B in November 2022. Further investigation might be required if the salinity remains high in the subsequent monitoring months.

**3.3.7** For dissolved oxygen, BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were below the action level in all pond/marsh of Area 7, except for the marsh 7D/ 7E which dissolved oxygen levels were below the action level. As the function of marsh is different from pond which requires higher dissolved oxygen level to support aquatic animals of higher trophic level (e.g. fish), no specific management actions are required due to no observable impacts to wildlife.

### Area 9

**3.3.8** pH value ranged between the action level 6.0 to 8.5 in all pond/marsh of Area 9, while salinity in all pond/marsh ranged below 3.0ppt except 9A which was 13.8ppt in November 2022. Further investigation might be required if the salinity remains high in the subsequent monitoring months.

**3.3.9** For dissolved oxygen, BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were below the action level in all pond/marsh of Area 9.

**Table 3.5 Results of water quality monitoring in OWCA**

Monitoring Item	Action level	Nov2022		
		Area 2	Area 7	Area 9
Temperature (°C)	-	53: 23.5 54: 23.8 55:- 56A: 23.4 56B: 23.5 57: 23.5 58: 24.6 96: 23.8	7A: 25.9 7B: 25.4 7C: 25.0 7D: 24.0 7E: 23.4	9A: 24.4 9B: 25.0 9C: 24.9 9D: 25.6 9E: 25.4
pH	Outside 6.0-8.5	53: 8.3 54: 8.5 55:- 56A: 7.5 56B: 6.5 57: 8.0 58: 6.7 96: 6.6	<b>7A: 8.7</b> 7B: 8.5 7C: 7.7 7D: 7.1 7E: 6.9	9A: 8.0 9B: 8.0 9C: 8.0 9D: 7.8 9E: 8.0
Salinity(ppt)	>3	53: 1.4 54: 1.4 55:- 56A: 0.9 56B: 0.5 57: 1.2 58: 2.1 96: 1.3	<b>7A: 9.4</b> <b>7B: 8.4</b> 7C: 0.2 7D: 0.5 7E: 0.3	<b>9A: 13.8</b> 9B: 1.2 9C: 1.2 9D: 0.5 9E: 2.2
Dissolved oxygen(mg/L)	<4	53: 5.8 54: 6.5 55:- 56A: 5.5 <b>56B: 2.3</b> 57: 6.0 58: 6.8 96: 4.9	7A: 11.3 7B: 8.6 7C: 6.3 <b>7D: 2.1</b> <b>7E: 1.7</b>	9A: 8.2 9B: 7.7 9C: 7.7 9D: 6.6 9E: 5.6
BOD5 (mg/L)	>20	53: <2 54: <2 55:- 56A: <2 56B: <2 57: <2 58: <2 96: <2	7A: <2 7B: <2 7C: <2 7D: <2 7E: <2	9A: <2 9B: <2 9C: <2 9D: <2 9E: <2
Nitrate and Nitrite (mg/L)	>5	53: <0.05 54: <0.05 55:- 56A: <0.05 56B: <0.05 57: <0.05 58: 0.09 96: 0.09	7A: 0.28 7B: 0.08 7C: <0.05 7D: <0.05 7E: <0.05	9A: 0.18 9B: <0.05 9C: <0.05 9D: <0.05 9E: <0.05
Ammonia nitrogen (mg/L)	>3	53: <0.05 54: <0.05 55:- 56A: 0.20 56B: 0.16 57: 0.11 58: 0.11 96: 0.31	7A: 0.38 7B: 0.37 7C: 0.06 7D: 0.40 7E: 0.11	9A: 1.0 9B: 0.16 9C: 0.20 9D: <0.05 9E: 0.06
Orthophosphate (mg/L)	>0.3	53: <0.01 54: <0.01 55: - 56A: <0.01 56B: <0.01	7A: <0.01 7B: <0.01 7C: <0.01 7D: <0.01 7E: <0.01	9A: <0.01 9B: <0.01 9C: <0.01 9D: <0.01 9E: <0.01

Monitoring Item	Action level	Nov2022		
		Area 2	Area 7	Area 9
		57: <0.01 58: <0.01 96: <0.01		

#### 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 10<sup>th</sup> 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 November 2022.
- 4.1.3** After fish stocking in the Intensively Managed Ponds, the water level will be 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 will be resumed until another 0.5m deep water is dropped. Eventually, the water depth in the pond will be 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. *Typha angustifolia* was occasionally found in the three areas. The distribution of the other four aggressive invasive species were restricted. 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 the dominant mammal recorded by infrared camera, 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 OWCA.

## **5. Conclusion**

- 5.1.1** According to Section 1.2, 5 recorded species are the target species, and 31 species of conservation importance, including mammals, bird, herpetofauna and dragonfly. Among the three OWCA, the species richness was the highest in Area 2.

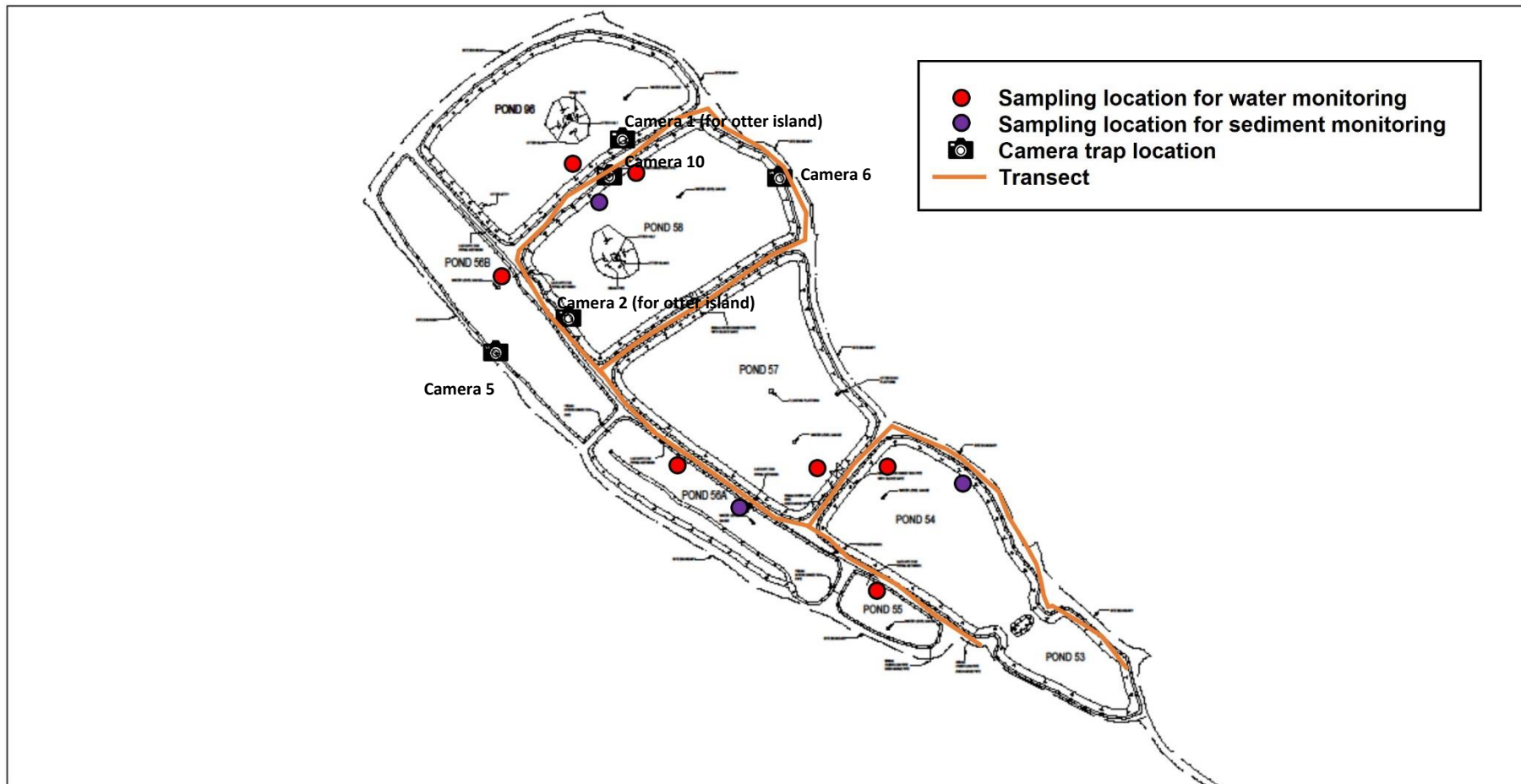
## **6. Reference**

Agriculture, Fisheries and Conservation Department (AFCD). (2022). Hong Kong Biodiversity Information Hub. Retrieved from: <https://bih.gov.hk/tc/home/index.html>

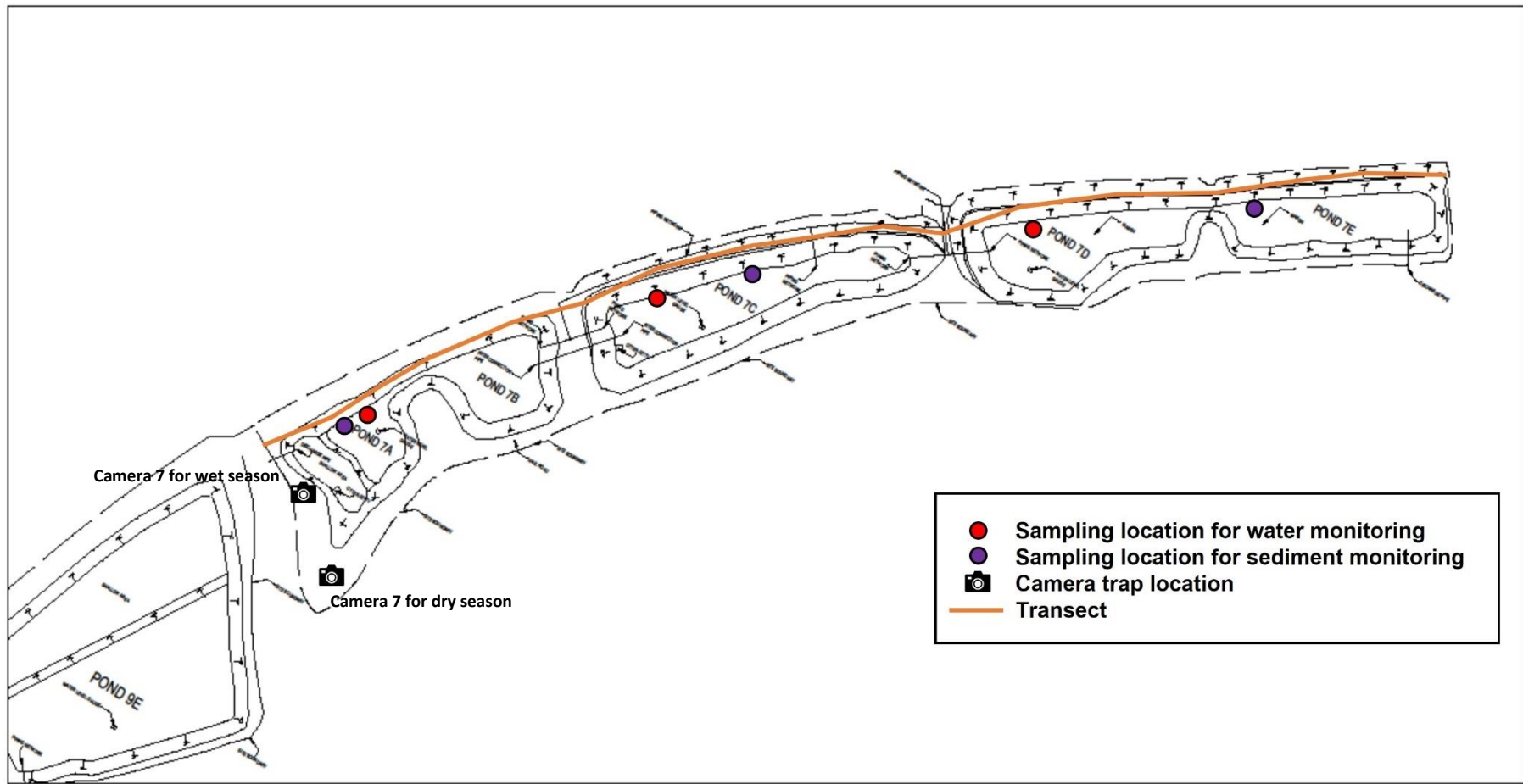
BirdLife International (2019). Inner Deep Bay and Shenzhen River Catchment Area. Available at: [http://datazone.birdlife.org/site/factsheet/inner-deep-bay-and-shenzhen-river-catchment-area-iba-hong-kong-\(china\)](http://datazone.birdlife.org/site/factsheet/inner-deep-bay-and-shenzhen-river-catchment-area-iba-hong-kong-(china))

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

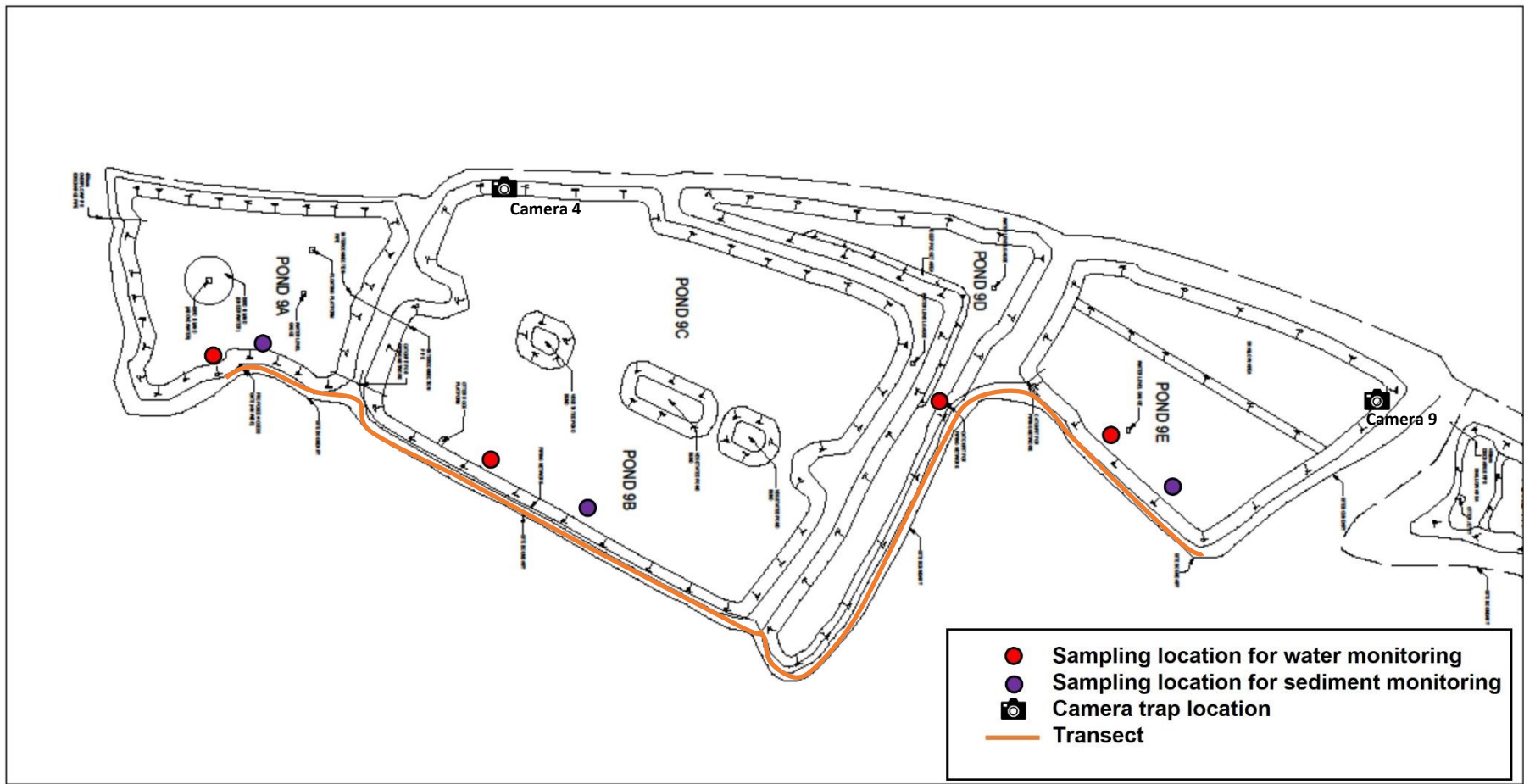








Figure 2.3 Transect and Location of Infrared Camera in Area 9



**Figure 3.1 Re-installed Camera 6**



**Appendix A: Site Photos of Reporting Period in each OWCA**

	
<p>Area 2 Pond 58</p>	<p>Area 2 Pond 56A</p>
	
<p>Area 7 Pond 7E</p>	<p>Area 7 Pond 7D</p>
	
<p>Area 9 9E</p>	<p>Area 9 Pond 9D</p>

## Appendix B: Fauna Species List Recorded in OWCA in October and November 2022

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
Mammal												
Eurasian Wild Pig*	<i>Sus scrofa</i>	Widely distributed in forested areas throughout Hong Kong.	-	20*			2*			4*		
Japanese Pipistrelle	<i>Pipistrellus abramus</i>	Widely distributed throughout Hong Kong.	Caption 170	4								
Small Indian Civet*	<i>Viverricula indica</i>	Widely distributed in forested areas throughout Hong Kong, except Lantau Island.	Caption 170; Class 2 Protected Animal of China; Red List of China's Vertebrate: Vulnerable	1*								
Avifauna												
Eurasian Wigeon	<i>Mareca Penelope*</i>	Winter visitor. Found in Deep Bay area, Tai Lam Chung.	Fellowes et al. (2002): RC								37	27
Mallard	<i>Anas platyrhynchos</i>	Uncommon winter visitor. Found in Deep Bay area, Tai Lam Chung, Hok Tau Reservoirs, Tolo Harbour, Nam Chung, Long Valley, Kam Tin	Fellowes et al. (2002): RC									2
Northern Shoveler	<i>Spatula clypeata*</i>	Abundant winter visitor. Found in Deep Bay area.	Fellowes et al. (2002): RC								7	6
Northern Pintail	<i>Anas acuta</i>	Abundant winter visitor. Found in Deep Bay area,	Fellowes et al. (2002): RC		4							6



Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		Shuen Wan, Long Valley, Kam Tin.										
Eurasian Teal	<i>Anas crecca</i>	Common winter visitor. Found in Deep Bay area, Shuen Wan, Tai Lam Chung Reservoir, Victoria Harbour, Urban Park.	Fellowes et al. (2002): RC									5
Ferruginous Duck	<i>Aythya nyroca</i>	Occasional visitor. Found in Mai Po.				1						
Tufted Duck	<i>Aythya fuligula</i>	Uncommon winter visitor. Found in Deep Bay area, Nam Chung, Starling Inlet	Fellowes et al. (2002): LC								1	2
Japanese Quail	<i>Coturnix japonica</i>	Scarce passage migrant and winter visitor. Found in Long Valley, Mai Po, Kam Tin, Lam Tsuen, Tin Shui Wai.	Fellowes et al. (2002): LC			1						
Little Grebe	<i>Tachybaptus ruficollis</i>	Common resident. Found in Deep Bay area.	Fellowes et al. (2002): LC	4	8	4			2	3	7	5
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Common resident and winter visitor. Widely distributed in Hong Kong.	Fellowes et al. (2002): LC									1
Chinese Pond Heron	<i>Ardeola bacchus</i>	Common resident. Common resident. Widely distributed in Hong Kong.	Fellowes et al. (2002): PRC	7	5	2	1	2			1	4
Grey Heron	<i>Ardea cinerea</i>	Common winter visitor. Found in Deep Bay area, Starling Inlet,	Fellowes et al. (2002): PRC	1	1	1					2	

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		Kowloon Park, Cape D'Aguilar.										
Purple Heron	<i>Ardea purpurea</i>	Uncommon passage migrant. Found in Deep Bay area.	Fellowes et al. (2002): RC		1	1						
Great Egret	<i>Ardea alba</i>	Common resident and winter visitor. Widely distributed in Hong Kong.	Fellowes et al. (2002): PRC	1								1
Little Egret	<i>Egretta garzetta</i>	Common resident. Widely distributed in coastal area throughout Hong Kong.	Fellowes et al. (2002): PRC	1				2				1
Great Cormorant	<i>Phalacrocorax carbo</i>	Common winter visitor. Widely distributed in coastal areas throughout Hong Kong.	Fellowes et al. (2002): PRC	5		2		13	5	2	12	11
Western Osprey	<i>Pandion haliaetus</i>	Common winter visitor. Widely distributed in coastal areas throughout Hong Kong	Caption 586; China Red Data Book Status: Rare; Fellowes et al. (2002): RC		2							
Greater Spotted Eagle	<i>Clanga clanga</i>	Scarce winter visitor. Found in Deep Bay area.	Caption 586; IUCN Red List: Vulnerable; China Red Data Book Status: Rare; Fellowes et al. (2002): GC; Red List of China's Vertebrates: Endangered								1	1
Black Kite	<i>Milvus migrans</i>	Common resident and winter visitor.	Caption 586; Fellowes et al. (2002): (RC)	1								

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		Widely distributed in Hong Kong.										
Eastern Buzzard	<i>Buteo japonicus</i>	Common winter visitor. Widely distributed in Hong Kong.	Caption 586		1					2		
White-breasted Waterhen	<i>Amauormis phoenicurus</i>	Common resident. Widely distributed in wetland throughout Hong Kong.						1		3		
Common Moorhen	<i>Gallinula chloropus</i>	Common resident. Found in Deep Bay area, Shuen Wan, Starling Inlet.									12	
Eurasian Coot	<i>Fulica atra</i>	Common winter visitor. Found in Deep Bay area, Plover Cove Reservoir, Shuen Wan.	Fellowes et al. (2002): RC		3						28	27
Black-winged Stilt	<i>Himantopus himantopus</i>	Common passage migrant. Found in Deep Bay area, Long Valley, Kam Tin.	Fellowes et al. (2002): RC							6		
Common Snipe	<i>Gallinago gallinago</i>	Common passage migrant and winter visitor. Found in Long Valley, Chau Tau, Sai Kung.		1								
Common Greenshank	<i>Tringa nebularia</i>	Abundant passage migrant and winter visitor. Found in Deep Bay area.	Fellowes et al. (2002): RC								3	1

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
Wood Sandpiper	<i>Tringa glareola</i>	Common passage migrant and winter visitor. Widely distributed in wetland area throughout Hong Kong.	Fellowes et al. (2002): LC	7								
Common Sandpiper	<i>Actitis hypoleucos</i>	Common passage migrant and winter visitor. Widely distributed in wetland area throughout Hong Kong.					2			3		
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Common winter visitor and passage migrant. Widely distributed in Hong Kong.						8				
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Found in Mai Po, Tsim Bei Tsui, Fung Lok Wai.		1								
Spotted Dove	<i>Spilopelia chinensis</i>	Abundant resident. Widely distributed in Hong Kong.		9						1		
Asian Koel	<i>Eudynamys scolopaceus</i>	Common resident. Widely distributed in Hong Kong.						1				
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Common resident. Widely distributed in coastal areas throughout Hong Kong	Fellowes et al. (2002): (LC)	1				1				
Common Kingfisher	<i>Alcedo atthis</i>	Common passage migrant and winter visitor. Widely distributed in wetland habitat throughout Hong Kong.		4	1		1	1				

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9			
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	
Pied Kingfisher	<i>Ceryle rudis</i>	Uncommon resident. Widely distributed in lakes and ponds throughout Hong Kong.	Fellowes et al. (2002): (LC)		1	1		1			1	1	1
Long-tailed Shrike	<i>Lanius schach</i>	Common resident. Widely distributed in open areas throughout Hong Kong.			2								1
Black Drongo	<i>Dicrurus macrocercus</i>	Common summer visitor. Widely distributed in open area throughout Hong Kong.		7		1							
Large-billed Crow	<i>Corvus macrorhynchos</i>	Common resident. Widely distributed in Hong Kong		1									
Cinereous Tit	<i>Parus cinereus</i>	Common resident. Widely distributed in Hong Kong.								3			
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Abundant resident. Widely distributed in Hong Kong.									8		
Chinese Bulbul	<i>Pycnonotus sinensis</i>	Abundant resident. Widely distributed in Hong Kong.		9	2	6		4					14
Barn Swallow	<i>Hirundo rustica</i>	Abundant passage migrant and summer visitor. Widely distributed in Hong Kong.		1									
Dusky Warbler	<i>Phylloscopus fuscatus</i>	Common passage migrant and winter visitor. Widely distributed in shrubland and waterside vegetation throughout Hong Kong.			1	5		4		3			1

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	Common winter visitor. Found in woodland throughout Hong Kong.						1	1			1
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Common passage migrant. Widely distributed in reed beds throughout Hong Kong.				1						
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	Common resident. Widely distributed in Hong Kong.		5					1	1		
Plain Prinia	<i>Prinia inornata</i>	Common resident. Widely distributed in grassland throughout Hong Kong.		2		2					5	
Common Tailorbird	<i>Orthotomus sutorius</i>	Common resident. Widely distributed in Hong Kong.		9								
Masked Laughingthrush	<i>Pterorhinus perspicillatus*</i>	Abundant resident. Widely distributed in shrubland throughout Hong Kong.								6		
Japanese White-eye	<i>Zosterops simplex</i>	Abundant resident. Widely distributed in Hong Kong.		17			3					
Common Myna	<i>Acridotheres tristis</i>	Uncommon resident. Found in Mai Po, Sheung Uk Tsuen, Sheung Shui, Kam Tin, Shek Kong, Ping Shan, Mong Tseng.		2								
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Common winter visitor. Found in Deep Bay area,	Fellowes et al. (2002): PRC								5	

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		<b>Kam Tin, Long Valley.</b>										
Black-collared Starling	<i>Gracupica nigricollis</i>	Common resident. Widely distributed in Hong Kong.		2		7		2			10	
Daurian Starling	<i>Agropsar sturninus</i>	<b>Scarce passage migrant. Found in Mai Po, Long Valley, Kam Tin, Lam Tsuen, Tolo Harbour area, Kowloon Park, Mui Wo, Ho Chung.</b>	Fellowes et al. (2002): LC								5	
Oriental Magpie Robin	<i>Copsychus saularis</i>	Abundant resident. Widely distributed in Hong Kong.					2		1			
Daurian Redstart	<i>Phoenicurus auroreus</i>	Common winter visitor. Widely distributed in Hong Kong.			2	1		2	3			1
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	Common passage migrant and winter visitor. Widely distributed in open cultivated fields throughout Hong Kong.		5	6	8	3			3		2
Eurasian Tree Sparrow	<i>Passer montanus</i>	Abundant resident. Widely distributed in Hong Kong.		14								
Scaly-breasted Munia	<i>Lonchura punctulata</i>	Common resident. Widely distributed in Hong Kong				8					8	
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Common passage migrant and winter visitor. Widely distributed in agricultural fields and marsh edges				3						

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		throughout Hong Kong.										
Grey Wagtail	<i>Motacilla cinerea</i>	Common passage migrant and winter visitor. Widely distributed in hill streams throughout Hong Kong.				3						1
White Wagtail	<i>Motacilla alba</i>	Common passage migrant and winter visitor. Widely distributed in Hong Kong.		4	1	4	3		1	3		5
Olive-backed Pipit	<i>Anthus godlewskii</i>	Common passage migrant and winter visitor. Widely distributed in Hong Kong.						2				
Black-faced Bunting	<i>Emberiza spodocephala</i>	Common winter visitor and passage migrant. Widely distributed in Hong Kong.				1			1			
Herpetofauna												
Changeable Lizard	<i>Calotes versicolor</i>	Widely distributed throughout Hong Kong.	-								1	
Indian Forest Skink	<i>Sphenomorphus indicus</i>	<b>Distributed in woodlands in eastern and central New Territories.</b>	<b>Fellowes et al. (2002): LC</b>				1					
Asian Common Toad	<i>Duttaphrynus melanostictus</i>	Widely distributed in Hong Kong.	-	1								
Gunther's Frog	<i>Hylarana guentheri</i>	Widely distributed throughout Hong Kong.	-	4								
Dragonfly												



Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
Pale-spotted Emperor	<i>Anax guttatus</i>	Common. Widely distribute in ponds and sluggish streams throughout Hong Kong	-	2								
Russet Percher	<i>Neurothemis fulvia</i>	Common. Widely distribute in cultivated areas and streams throughout Hong Kong	-	2								
Pied Percher	<i>Neurothemis tullia</i>	Common. Widely distributed in swampy areas and marshes through out Hong Kong	-	12								
Red-faced Skimmer	<i>Orthetrum chrysis</i>	Abundant. Widely distribute in pools and marshy areas adjacent to flowing streams throughout Hong Kong.	-	2			5					
Common Blue Skimmer	<i>Orthetrum glaucum</i>	Abundant. Widely distributed in streams, conduits, drainage channels, seepages and road gutters throughout Hong Kong.	-	5			4					
Common Red Skimmer	<i>Orthetrum pruinosum</i>	Abundant. Widely distribute in slow streams, ponds, rain puddles and irrigation conduits	-	5								
Wandering Glider	<i>Pantala flavescens</i>	Abundant. Widely distribute in all wetland habitats throughout Hong Kong	-	30			2					
Variegated Flutterer	<i>Rhyothemis variegata arria</i>	Common. Widely distribute in marshes, ponds and	-	30								

Common Names <sup>1</sup>	Scientific Names <sup>1</sup>	Rarity and Distribution in Hong Kong <sup>1</sup>	Conservation status <sup>2</sup>	Area 2			Area 7			Area 9		
				Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov	Survey in Oct	1st Survey in Nov	2nd Survey in Nov
		tanks throughout Hong Kong										
Scarlet Basker	<i>Urothemis signata</i>	<b>Common. Common in areas containing abandoned fish ponds throughout Hong Kong</b>	Fellowes et al. (2002): LC								4	

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






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
- 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**

\* Camera Trap = Result from camera trapping survey

Survey Date	Total number of recorded species			
	Bird	Mammal	Dragonfly	Herpetofauna
25/10/2022	24	3	9	4
10/11/2022	26	0	-	-
16/11/2022	23	0	-	-

**Appendix C: Selected Target Species Photo**

	
<p>Greater Spotted Eagle</p>	<p>Northern Shoveler</p>
	
<p>Pied Kingfisher</p>	<p>White-throated Kingfisher</p>
	
<p>Mallard</p>	<p>Purple Heron</p>
	
<p>Eurasian Coot</p>	<p>Grey Heron</p>



Common Greenshank

### Appendix D: Photo Record of Infrared Camera



Eurasian wild pig  
(Camera 7)



Small Indian Civet  
(Camera 6)



Domestic Dog  
(Camera 6)

**Appendix E1: *In-situ* Water quality of November 2022**



**Service Contract No. WD/04/2020**

**Development of Lok Ma Chau Loop: Main Works Package 1 – Environmental Team**

**Water Quality Monitoring Results on 25 November 2022**

Location	Weather Condition	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)	
					Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
Area 2-53	Cloudy	09:52	Middle	0.3	23.5	23.5	8.3	8.3	1.4	1.4	69.3	69.2	5.8	5.8
					23.5		8.3		1.4		69.0		5.8	
Area 2-54	Cloudy	10:05	Middle	0.2	23.8	23.8	8.5	8.5	1.4	1.4	77.5	77.4	6.5	6.5
					23.8		8.5		1.4		77.2		6.5	
Area 2-56A	Cloudy	10:23	Middle	0.3	23.4	23.4	7.5	7.5	0.9	0.9	65.3	65.2	5.5	5.5
					23.4		7.5		0.9		65.1		5.5	
Area 2-56B	Cloudy	10:39	Middle	0.2	23.5	23.5	6.5	6.5	0.5	0.5	27.1	26.7	2.3	2.3
					23.5		6.5		0.5		26.2		2.2	
Area 2-57	Cloudy	10:09	Middle	0.4	23.5	23.5	8.0	8.0	1.2	1.2	71.1	70.9	6.0	6.0
					23.5		8.0		1.2		70.6		6.0	
Area 2-58	Cloudy	10:53	Middle	0.2	24.6	24.6	6.7	6.7	2.1	2.1	82.1	81.7	6.8	6.8
					24.6		6.7		2.1		81.3		6.7	
Area 2-96	Cloudy	10:48	Middle	0.2	23.8	23.8	6.6	6.6	1.3	1.3	58.7	58.5	4.9	4.9
					23.8		6.6		1.3		58.3		4.9	
Area 7-7A	Cloudy	12:14	Middle	0.2	25.9	25.9	8.7	8.7	9.4	9.4	145.8	146.4	11.3	11.3
					25.9		8.7		9.4		146.9		11.3	
Area 7-7B	Cloudy	12:09	Middle	0.2	25.4	25.4	8.5	8.5	8.4	8.4	109.3	108.8	8.6	8.6
					25.4		8.4		8.4		108.2		8.5	
Area 7-7C	Cloudy	12:04	Middle	0.2	25.0	25.0	7.7	7.7	0.2	0.2	76.2	76.1	6.3	6.3
					25.0		7.6		0.2		75.9		6.3	
Area 7-7D	Cloudy	11:57	Middle	0.2	24.0	24.0	7.1	7.1	0.5	0.5	24.5	24.0	2.1	2.1
					23.9		7.1		0.5		23.5		2.0	
Area 7-7E	Cloudy	11:49	Middle	0.2	23.4	23.4	6.9	6.9	0.3	0.3	19.7	19.3	1.7	1.7
					23.3		6.9		0.3		18.8		1.6	
Area 9-9A	Cloudy	12:53	Middle	0.2	24.4	24.4	8.0	8.0	13.8	13.8	105.8	106.0	8.2	8.2
					24.4		8.0		13.8		106.2		8.2	
Area 9-9B	Cloudy	12:42	Middle	0.2	25.0	25.0	8.0	8.0	1.2	1.2	93.8	93.6	7.7	7.7
					25.0		8.0		1.2		93.4		7.7	
Area 9-9C	Cloudy	12:48	Middle	0.1	24.9	24.9	8.0	8.0	1.2	1.2	93.7	93.6	7.7	7.7
					24.9		8.0		1.2		93.4		7.7	
Area 9-9D	Cloudy	12:35	Middle	0.2	25.6	25.6	7.8	7.8	0.5	0.5	81.5	81.2	6.6	6.6
					25.6		7.8		0.5		80.8		6.6	
Area 9-9E	Cloudy	12:27	Middle	0.2	25.4	25.4	8.0	8.0	2.2	2.2	69.2	69.0	5.6	5.6
					25.4		8.0		2.2		68.7		5.6	

**Appendix E2: Water quality laboratory test reports of November 2022**

**TEST REPORT**

**APPLICANT:** Wellab Limited (EM&A Department)  
Rm 1714, Technology Park,  
18 On Lai Street,  
Shatin, N.T.

Report No.:	37409
Date of Issue:	2022-12-06
Date Received:	2022-11-25
Date Tested:	2022-11-25
Date Completed:	2022-12-06

**ATTN:** Ms. Ivy Tam

Page: 1 of 3

**Sample Description** : 17 liquid samples as received from client said to be water  
**Laboratory No.** : 37409  
**Project No.** : WMA21009 (OWCA)  
**Project Name** : Service Contract No.: WD/04/2020  
 Development of Lok Ma Chau Loop: Main Works Package 1 – Environmental Team  
**Custody No.** : WMA21009(OWCA)/221125  
**Sampling Date** : 2022-11-25

**Tests Requested & Methodology:**

Item	Parameters	Ref. Method	Limit of reporting
1	Nitrogen (Total Oxidised)	In-house method SOP 056 (FIA)	0.05 mg N/L
2	Nitrogen (Ammonia)	In-house method SOP 057 (FIA)	0.05 mg NH <sub>3</sub> -N/L
3	Phosphorus (Reactive)	In house method SOP 054 (FIA)	0.01 mg PO <sub>4</sub> <sup>3-</sup> -P/L
4	Biochemical Oxygen Demand	APHA 19ed 5210 B	2 mg-O <sub>2</sub> /L

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PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**

  
**PATRICK TSE**  
 General Manager



## TEST REPORT

Report No.:	37409
Date of Issue:	2022-12-06
Date Received:	2022-11-25
Date Tested:	2022-11-25
Date Completed:	2022-12-06
Page:	2 of 3

**Results:**

Sample ID	Area 2 -53	Area 2 – 54	Area 2 – 56A
Sample No.	37409-1	37409-2	37409-4
Nitrogen (Total Oxidised) (mg N/L)	<0.05	<0.05	<0.05
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	<0.05	<0.05	0.20
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2	<2

Sample ID	Area 2 -56B	Area 2 – 57	Area 2 – 58
Sample No.	37409-5	37409-6	37409-7
Nitrogen (Total Oxidised) (mg N/L)	<0.05	<0.05	0.09
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	0.16	0.11	0.11
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2	<2

Sample ID	Area 2 -95	Area 7 – 7A	Area 7 – 7B
Sample No.	37409-8	37409-9	37409-10
Nitrogen (Total Oxidised) (mg N/L)	0.09	0.28	0.08
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	0.31	0.38	0.37
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2	<2

Sample ID	Area 7 – 7C	Area 7 – 7D	Area 7 – 7E
Sample No.	37409-11	37409-12	37409-13
Nitrogen (Total Oxidised) (mg N/L)	<0.05	<0.05	<0.05
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	0.06	0.40	0.11
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2	<2

Remark: 1) <= less than

\*\*\*\*\*

## TEST REPORT

Report No.:	37409
Date of Issue:	2022-12-06
Date Received:	2022-11-25
Date Tested:	2022-11-25
Date Completed:	2022-12-06
Page:	3 of 3

**Results:**

Sample ID	Area 9 -9A	Area 9 -9B	Area 9 -9C
Sample No.	37409-14	37409-15	37409-16
Nitrogen (Total Oxidised) (mg N/L)	0.18	<0.05	<0.05
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	1.0	0.16	0.20
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2	<2

Sample ID	Area 9 -9D	Area 9 -9E
Sample No.	37409-17	37409-18
Nitrogen (Total Oxidised) (mg N/L)	<0.05	<0.05
Nitrogen (Ammonia) (mg NH <sub>3</sub> -N/L)	<0.05	0.06
Phosphorus (Reactive) (mg PO <sub>4</sub> <sup>3-</sup> -P/L)	<0.01	<0.01
Biochemical Oxygen Demand (mg-O <sub>2</sub> /L)	<2	<2

Remark: 1) < = less than

\*\*\*\*\*END OF REPORT\*\*\*\*\*

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

**TEST REPORT**

**APPLICANT:** Wellab Limited (EM&A)  
RM 1808, Technology Park,  
18 On Lai Street,  
Shatin, N.T., Hong Kong

Test Report No.:	37139B
Date of Issue:	2022-09-25
Date Received:	2022-09-24
Date Tested:	2022-09-24 to 2022-09-25
Date Completed:	2022-09-25

**ATTN:** Miss Mei Ling Tang

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**Certificate of Calibration**

**Item for calibration:**

YSI EXO1 Multiparameter Sondes	Equipment No.:	SW-08-108
Manufacturer:	YSI Incorporated, a Xylem brand	
Description:	Model No.	Serial No.
- EXO1 Sonde, 100 meter Depth, 4 Sensor ports	599502-24	17B100681
- EXO Optical DO Sensor, Ti	599100-01	16J100992
- EXO conductivity/Temperature Sensor, Ti	599870	17H103451
- EXO Turbidity Sensor, Ti	599101-01	20J103612
- EXO pH Sensor Assembly, Guarded, Ti	599701	17B103616

**Test conditions:**

Room Temperature : 17-22 degree Celsius  
Relative Humidity : 40-70%

**Test Specifications:**

Performance checking for Conductivity, Temperature, pH, Dissolved oxygen (D.O.) and Turbidity

**Methodology:**

According to manufacturer instruction manual, APHA 20e 4500-O C

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*PREPARED AND CHECKED BY:*

For and On Behalf of **WELLAB Ltd.**

  
**PATRICK TSE**  
General Manager

## TEST REPORT

Test Report No.:	37139B
Date of Issue:	2022-09-25
Date Received:	2022-09-24
Date Tested:	2022-09-24 to 2022-09-25
Date Completed:	2022-09-25

Page: 2 of 2

### Certificate of Calibration

**Results:**

**Conductivity performance checking**

	Instrument Readings ( $\mu\text{S}/\text{cm}$ )	Acceptance Criteria	Comment
KCl stock solution (12890 $\mu\text{S}/\text{cm}$ )	12700	12246-13534	Pass

**Temperature performance checking**

	Instrument Readings ( $^{\circ}\text{C}$ )	Correction ( $^{\circ}\text{C}$ )	Comment
Reference thermometer- E431 Readings ( $^{\circ}\text{C}$ )			
20.0	19.999	+0.001	N/A

**pH performance checking**

	Instrument Readings (pH unit)	Acceptance Criteria	Comment
pH QC buffer 4.00	3.99	$4.00 \pm 0.10$	Pass
pH QC buffer 6.86	6.83	$6.86 \pm 0.10$	Pass
pH QC buffer 9.18	9.15	$9.18 \pm 0.10$	Pass

**D.O. performance checking**

	Instrument Readings (mg/L)	Acceptance Criteria	Comment
Zero DO solution	0.05	$<0.1\text{mg}/\text{L}$	Pass

	Instrument Readings (mg/L)	Acceptance Criteria	Comment
Winkler Titration value (mg/L)			
8.16	7.98	Difference between Titration value and instrument reading $<0.2\text{mg}/\text{L}$	Pass

**Turbidity performance checking**

	Instrument Readings (NTU)	Acceptance Criteria	Comment
Turbidity stock solution			
10 NTU	9.67	9.0-11.0	Pass
50 NTU	48.93	45.0-55.0	Pass
100 NTU	97.6	90.0-110.0	Pass

**Depth performance checking**

	Instrument Readings (m)	Acceptance Criteria	Comment
Water Depth			
0.5 meter	0.50	0.45-0.55	Pass

\*\*\*\*\*END OF REPORT\*\*\*\*\*