



Proposed Comprehensive Development at Wo Shang Wai Yuen Long

Biannual EM&A Report on Ecology for
May 2014 - Oct 2014 (Rev A)

December 2014

Heng Shung Construction Co. Ltd.

Proposed Comprehensive Development at Wo Shang Wai Yuen Long

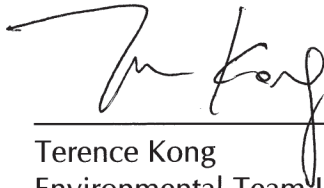
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Heng Shung Construction Co. Ltd.

**Pursuant to Condition 4.6 of Environmental Permit No. EP-311/2008/D,
this Biannual EM&A Report on ecological aspects for May to October
2014 has been reviewed, certified by the Environmental Team Leader
(ETL) and verified by the Independent Environmental Checker (IEC).**

Certified by:



Terence Kong
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Date 16 December 2014

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Date 28 Jan 2015

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1 Introduction

1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site at Wo Shang Wai in Yuen Long. An Environmental Impact Assessment (EIA) was then carried out and approved under the EIA Ordinance (EIAO), and the Environmental Permit (EP) for construction of the comprehensive development in Wo Shang Wai was first granted by Environmental Protection Department (EPD) on 9 September 2008 (EP-311/2008) and has been subsequently varied, with the current version (EP-311/2008/D) issued by EPD on 20 March 2013.

The Project involves the residential development and associated infrastructure and wetland restoration area and linear landscape area. The construction works under the Environmental Permit commenced on 12 May 2010. The site formation construction works of the Wetland Restoration Area (hereafter WRA) were completed on 15 November 2010, while the 30-month establishment period of the WRA was concluded in October 2012 – this indicated that planting works as scheduled in the approved Wetland Restoration and Creation Scheme (WRCS; Nov 2009) were completed, except along the western and southern boundaries where the planting is affected by the existing site boundary and noise barrier, and for which a Variation to Environmental Permit (EP-311/2008/C) to defer planting at the location was approved. This factor remains applicable in the current valid EP (EP-311/2008/D) which also includes specific mitigation measures to minimise certain identified noise impacts during the operation phase of the Project.

Mott MacDonald Hong Kong Ltd. (“MMHK”) has been commissioned by the Contractor, Heng Shung Construction Co. Ltd., to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long.

According to the EP Condition 4.6, the EM&A results on ecological aspects during the construction phase should be reported to the EIA Subcommittee of the Advisory Council on the Environment (ACE), EPD and Agriculture, Fisheries and Conservation Department (AFCD) on a biannual basis. This is the 9th Biannual EM&A report and it summarises the findings on EM&A results of ecological aspects during the period from 1 May 2014 to 31 October 2014. This report documents surveys and management activities conducted in the Survey Area and WRA from 1 May 2014 to 31 October 2014, which is based on ecological surveys and advices on management which were undertaken by the appointed Non-government Organisations (Green Power / Eco-Education & Resources Centre) during the reporting period.

1.2 Survey Area

Surveys were conducted within 500m of the Project area. The WRA was surveyed since early September 2010. The survey area and transect are provided in [Figure 1.1](#).

1.3 EM&A Requirements on Ecological Impact

The EM&A programme requires environmental monitoring of ecology as specified in the approved EM&A Manual. A summary of ecological impact EM&A requirements is presented in **Table 1.1**:

Table 1.1: Summary of Ecological Impact EM&A Requirements

Descriptions	Locations	Frequencies
Birds	Within the Project Area and Assessment Area of 500m	Weekly
Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during Mar and Sep to Nov, and twice per month during Apr to Aug
Herpetofauna	Within the Project Area and Assessment Area of 500m	Daytime: Once per month during Apr to Nov Night-time: Once per month during Mar to Aug
Water quality of Wetland Restoration Area (WRA)	WRA	After filling of WRA with water, monthly for in situ water quality and every six months (end of wet season and end of dry season) for laboratory testing
Site Inspections	Within the Project Area and Assessment Area of 500m	Weekly

2 Ecological Monitoring

2.1 Introduction

In accordance with the EM&A requirements, monitoring of birds, dragonflies and butterflies, and herpetofauna were carried out during the reporting period. In addition, monitoring of mammals was also conducted concurrently with other surveys and the results were reported although it is not required by the EM&A Manual. The dates of surveys are summarised in [Appendix A](#).

2.2 Monitoring of Birds

Monitoring was undertaken following the survey methodology and frequency outlined in the EM&A Manual (Table 7-1). Since September 2010, monitoring included the newly formed cells to monitor faunal usage of this area. All bird species of conservation importance and/or wetland dependent were identified and enumerated. Flying birds were not recorded unless they were foraging and/or associated with the habitat (such as swifts). Further, notable bird observations during other surveys were also recorded.

Bird surveys were conducted on a weekly basis throughout the period. A total of 57 bird species were recorded in the Survey Area (excluding the WRA) in May 2014 to October 2014, 33 of which were species of conservation importance and/or wetland-dependence. A summary of survey data is provided in [Appendix B](#).

A total of 54 species were recorded in the WRA in the survey periods, 31 of which were species of conservation importance and/or wetland-dependent species. Of all three target species (i.e. Little Egret *Egretta garzetta*, Eastern Cattle Egret *Bubulcus coromandus* and Chinese Pond Heron *Ardeola bacchus*), two of them i.e. Little Egret *Egretta garzetta* and Chinese Pond Heron *Ardeola bacchus* were recorded in the WRA. The WRA has attracted a number of species of conservation importance, including Yellow Bittern, *Ixobrychus sinensis*. This species is listed by Fellowes et al. as of "Local Concern" in 2002; Collared Crow, *Corvus torquatus*, which is listed as near threatened species on the International Union for Conservation of Nature (IUCN) Red List; and one local concern wetland dependence species, Black-crowned Night Heron, *Nycticorax nycticorax*; indicating that the WRA was effective in providing habitat suitable for species of interest.

The fish ponds to the north of the WRA are at a greater distance from the residential portion and any disturbance impact(s) from the construction works would have first affected the WRA. Further, 31 bird species of conservation importance and /or wetland dependence, were observed using the site under review, including some bird species which are highly sensitive to disturbance and three target species (i.e. Little Egret, Eastern Cattle Egret and Chinese Pond Heron). Thus, the WRA is considered to be effective both in acting as a buffer against potential disturbance impacts from the construction site, in providing suitable wetland habitats at the fringe of the Deep Bay system.

2.3 Monitoring of Herpetofauna

Monitoring was undertaken following the survey methodology in the EM&A Manual. Day-time herpetofauna surveys were conducted once a month between May 2014 and October 2014. Night-time herpetofauna

surveys were conducted once a month between May 2014 and August 2014. Further, notable herpetofauna observations during other surveys were also recorded.

Asiatic Painted Frog, *Kaloula pulchra pulchra* and Gunther's Frog, *Hylarana guentheri*, were recorded in the survey area (excluding WRA) in the reporting period. No reptile was observed in the survey area within the reporting period.

A total of three amphibian species and two reptile species were recorded in the WRA. A summary of survey data is provided in [Appendix C](#).

2.4 Monitoring of Dragonflies and Butterflies

Monitoring of dragonflies and butterflies was conducted once a month in September 2014 and October 2014 and twice-monthly from May 2014 to August 2014. Further, notable dragonfly and butterfly observations during other surveys were recorded.

A total of nine dragonfly species and six butterfly species were recorded using the ponds in the survey area (excluding WRA) in the reporting period. In the WRA, a higher diversity of dragonfly species (16 species) and butterfly species (13 species) were recorded. A summary of the survey findings is provided in [Appendix C](#).

2.5 Monitoring of Mammals

Monitoring of mammals was conducted concurrently with other surveys. No mammal was recorded in the Survey Area within the reporting period.

Japanese Pipistrelle, *Pipistrellus abramus*, was recorded in the WRA during regular survey. A summary of the survey findings is provided in [Appendix C](#).

2.6 Monitoring of Water Quality

Monthly water quality monitoring continued during the reporting period. Monitoring parameters followed that in the EM&A Manual. The pH values of all Cells in July 2014 reached the action level and monitoring frequency was doubled, but returned to acceptable level in the following month. In October 2014, the pH values of Cell 2 and Cell 4 reached the action level and the monitoring frequency was doubled. Monitoring data are presented in [Appendix D](#).

3 Ecological Issues

3.1 Vegetation Management

Removal of exotic vegetation in all cells was undertaken; these included but not limited to *Ipomoea* sp., *Mikania* sp., *Mimosa* sp., *Pennisetum* sp. and *Typha* sp..

Vegetation management activities undertaken at the site primarily involved watering of plants, tree pruning, weeding and grass cutting.

3.2 Wildlife Management

Golden Apple Snails were removed on an “as-seen” basis.

All red fire ant nests were treated with approved pesticide and covered with overturn baskets for a week. All pesticide used was in powder form and the pesticide usage was confined to Fire Ants’ nest found on terrestrial area which were further away from the Cells to prevent the contamination of water. All treated fire ant nests were inactive within one week of treatment.

Preliminary actions have been taken to increase the WRA utilization by birds. The mitigation actions are:

- 1) Lowering the water level;
- 2) Restocking the Cell in the WRA;
- 3) Installing flooding platform ;
- 4) Controlling the vegetation

The first two measurements, aim to increase the foraging area and food sources for the target species respectively. The third measurement, aims to increase foraging ground for the target species. According to Horiuchi *et al* (2007), floating platform can gather fish in the pond and this provides opportunities for the target species to prey for the fish and they can use the platform as fishing platform. The fourth measurement, aims to maintain suitable habitat for target species.

4 Summary of Wetland Restoration Area Performance

4.1 Summary of Findings

Ecological monitoring between 1 May 2014 and 31 October 2014 was carried out following the survey methodology and frequency outlined in the EM&A Manual.

Summary of ecological monitoring in the Survey Area and WRA between May 2014 and October 2014 (**Table 4.1**):

Table 4.1: Summary of Ecological Monitoring in WRA and Survey Area

Species	Number of species recorded in Survey Area (excluding WRA)	Number of species recorded in WRA
Birds (total)	57	54
Amphibians	2	3
Reptiles	0	2
Mammals	0	1
Dragonflies	9	16
Butterflies	6	13

A total of 54 bird species, 3 amphibian species, 2 reptile species, 1 mammal species, 16 dragonfly species and 13 butterfly species were recorded in the WRA, including 31 bird species of conservation importance and/or wetland-dependence, while all dragonfly species are wetland-dependent. These findings indicate that the WRA is supporting wetland-dependent birds and other species of conservation importance.

Survey findings indicate that the WRA is attracting the three target species to varying degrees. During the survey period (i.e. May 2014 to October 2014), the site was particularly attractive to Little Egret, which was recorded on nearly-weekly basis, with monthly means ranging from 1.2 to 3.3 birds per survey. Chinese Pond Heron was also recorded every month in regular survey under review (May 2014 to October 2014) with monthly means ranging from 1.0 to 4.2 bird per survey. Eastern Cattle Egret was least attracted to the site, Eastern Cattle Egret was only recorded in May under review period (May 2014 to October 2014), outside the regular survey. A list of the bird species recorded at the WRA since completion of site formation is provided in **Appendix B (Table B4 & B5)**.

With the completion of planting as scheduled in the approved Habitat Creation and Management Plan (HCMP) in August 2012, establishment work at the WRA is considered complete (except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which an approved Variation to Environmental Permit (EP-311/2008/D) to defer planting at the location applies), and the 30 month establishment period concluded in October 2012. A review of the performance of the WRA during the review period in terms of target species attraction is provided in Section 4.2 below.

It should be noted that the high planting density was intended to ensure a rapid establishment of the site prior to occupation intake, and not intended to be maintained as a long-term tree density at the WRA. It is a standard arboricultural practice to apply appropriate horticultural/arboricultural maintenance methods in the

subsequent five or six years after initial planting to remove less desired specimens to facilitate the successful growth of those which are of higher landscape and/or ecological value. Further, some fine tuning of planting locations and tree/shrub mix is required in order to fulfill the design intent of the habitat structure at WRA after reviewing the site configuration following site formation. Vegetation management hereafter should largely consist of maintenance of planted trees and shrubs for the creation of suitable habitats for target species and long-term habitat structure of the site.

4.2 WRA Performance for the Target Species

The provision, maintenance and operation of a WRA are a requirement under the Environmental Permit for compensation for predicted ecological impacts to species of conservation importance. Three bird target species were identified during the EIA process; they are Little Egret, Eastern Cattle Egret and Chinese Pond Heron. Target levels of these species are the annual mean number recorded during the Baseline Ecological Monitoring (i.e. a mean of 5.5 Little Egret, 1.3 Eastern Cattle Egret and 1.3 Chinese Pond Heron over a 12 month period) thus, the ecological impact of the project to the species concerned is considered to have been fully compensated when the target level for each of the three species is achieved. Whilst further discussion and agreement regarding the target level is yet to be undertaken with the relevant Government departments prior to the operation of the WRA, the proposed level offers a clear reference to the effectiveness of the mitigation measures. According to the approved Wetland Creation and Restoration Scheme (Nov 2009, hereafter WCRS), the WRA is anticipated to be fully operational after an establishment period of 2.5 years (30 months).

Of all three target species, all of them were recorded using the site under the reporting period (May 2014 – October 2014). Among all target species, Little Egret and Chinese Pond Heron were recorded in all six months and Eastern Cattle Egret was recorded in one month during the six month review period.

Table 4.2: Annual Mean of the Three Bird Target Species Recorded at the WRA between May 2010 and Oct 2014

Common Name	Scientific Name	Conservation Status ⁽²⁾	Annual mean number recorded during the Baseline Ecological Monitoring	Nov 10 – Oct 11	Nov 11 – Oct 12	Nov 12 – Oct 13	Nov 13 – Oct 14*
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC, (RC)	1.3	1.6	1.9	0.9	2.4
Little Egret	<i>Egretta garzetta</i>	PRC, (RC)	5.5	1.3	0.9	1.4	2.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	(LC)	1.3	1.1	0.1	/	0.1

Note:

(1) Values in **bold** indicate that the Target Level was achieved.

(2) Conservation Status follows that of Fellowes et. al. (2002). See Appendix B (Table B3).

* The mean number of the target species was calculated in annual basis.

Based on Table 4.2 above, the target level of the Chinese Pond Heron have been achieved between November 2013 and October 2014 while the target levels for Little Egret and Eastern Cattle Egret have not been achieved.

As the Proposed Comprehensive Development at Wo Shang Wai is still under construction phase, it is considered acceptable. According to the ecological monitoring data of the survey area (excluding the WRA), Eastern Cattle Egret was observed only in one third of the regular ecological survey (i.e 10 out of 28) and the annual mean of the Eastern Cattle Egret of the survey area (excluding the WRA) is 1.2, the results indicated the number of Eastern Cattle Egret in the whole area was low and the low number of Eastern Cattle Egret in the WRA is considered acceptable. However, should this situation continue, a review of the management of the WRA and adaptive management steps will be required.

In addition, though the target levels for Little Egret and Eastern Cattle Egret have not been achieved between May 2014 to October 2014, the WRA continues to attract wetland dependent species. Among all the wetland dependent species, Little Grebe, *Tachybaptus ruficollis*, Great Egret, *Ardea alba*, Yellow Bittern, *Ixobrychus sinensis*, and Common King Fisher, *Alcedo atthis*, were recorded in all six months between May 2014 and October 2014. Little Grebe, *Tachybaptus ruficollis* and Yellow Bittern, *Ixobrychus sinensis*, are listed by Fellowes et al. as of "Local Concern" in 2002. The presence of these wetland dependence species indicating that the WRA was effective in providing habitat suitable for species of interest.

Although the target level for Little Egret and Eastern Cattle Egret have not been achieved between November 2013 and October 2014; based on Table 4.2 above, when comparing the annual mean of all the three target species, they have increased from 0.9 to 2.4, 1.4 to 2.6 and 0 to 0.1 from November 2012 and October 2013 to November 2013 and October 2014 for Chinese Pond Heron, Little Egret and Eastern Cattle Egret respectively. The increase of annual mean of the target species might indicate the mitigation actions taken in the WRA to increase the bird utilization showed some preliminary results. The mitigation actions will be continuous in the coming dry season and the result will be closely monitored.

4.3 Conclusions

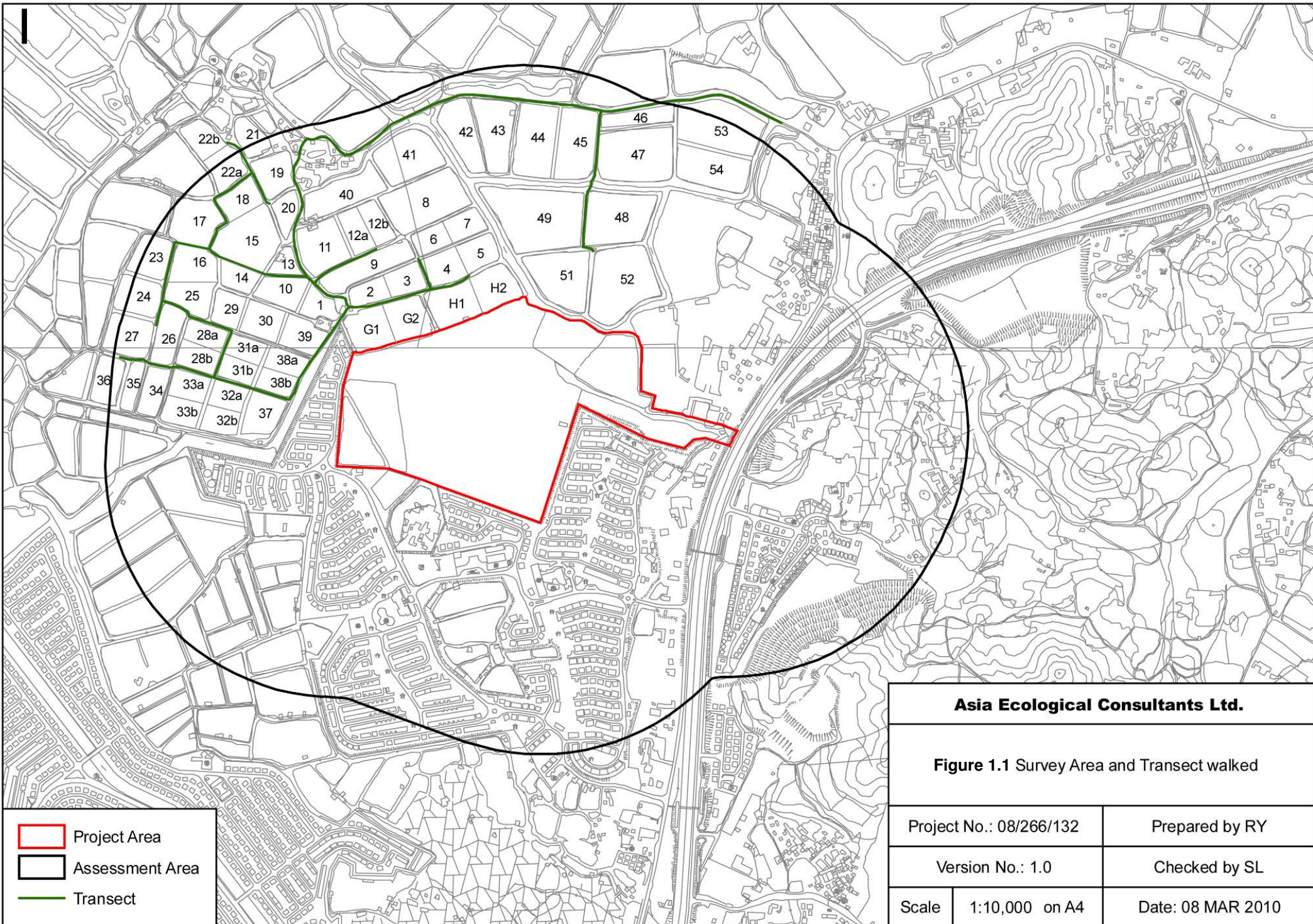
A total of 112 bird species have been recorded within the WRA since completion of site formation. Of the 112 species, 73 were species of conservation importance and/or wetland dependence - indicating that the WRA provides suitable habitat for these species despite the construction work within the residential portion of the Project Site.

The site continuously attracts bird species of conservation importance, indicated the WRA not only provides a buffer for potential disturbance during construction phase, it is also a valuable habitat for wetland dependent species and species of conservation importance

5 References

5.1 List of References

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Asia Ecological Consultants Ltd.		
Figure 1.1 Survey Area and Transect walked		
Project No.: 08/266/132		Prepared by RY
Version No.: 1.0		Checked by SL
Scale	1:10,000 on A4	Date: 08 MAR 2010

Appendix A. Schedule of Ecological Monitoring

May 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals		✓					✓						✓							✓							✓				
Birds		✓					✓						✓							✓							✓				
Herpetofauna													✓														✓				
Dragonflies & Butterflies		✓											✓														✓				
Water Quality																					✓										
Inspection Visits		✓					✓		✓				✓			✓				✓			✓				✓			✓	

June 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Mammals			✓							✓							✓							✓							
Birds			✓							✓							✓							✓							
Herpetofauna																	✓														
Dragonflies & Butterflies			✓														✓														
Water Quality																											✓				
Inspection Visits			✓			✓				✓			✓				✓			✓				✓			✓		✓		

July 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals			✓						✓							✓							✓							✓	
Birds			✓						✓							✓							✓							✓	
Herpetofauna			✓						✓																						
Dragonflies & Butterflies									✓														✓								
Water Quality																						✓									
Inspection Visits			✓		✓				✓			✓				✓							✓			✓				✓	

Proposed Comprehensive Development at Wo Shang Wai Yuen Long

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August 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Mammals		✓				✓							✓							✓							✓					
Birds		✓				✓							✓							✓							✓					
Herpetofauna																				✓												
Dragonflies & Butterflies						✓														✓												
Water Quality																													✓			
Inspection Visits		✓				✓			✓				✓			✓				✓				✓			✓				✓	

September 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Mammals		✓								✓							✓						✓								✓
Birds		✓								✓							✓						✓								✓
Herpetofauna																															✓
Dragonflies & Butterflies										✓																					
Water Quality																									✓						
Inspection Visits		✓			✓			✓		✓		✓					✓		✓				✓			✓					✓

October 2014	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals			✓				✓						✓							✓								✓			
Birds			✓				✓						✓							✓								✓			
Herpetofauna																												✓			
Dragonflies & Butterflies																												✓			
Water Quality																									✓						
Inspection Visits			✓				✓			✓			✓				✓				✓			✓				✓			✓

Note:

1. Light grey cells indicate public holidays, Saturdays or Sundays.

2. Dark cells indicate that no survey was required during the relevant month.

Appendix B. Summary of Bird Surveys

Table B1. Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) within the Survey Area (excluding the WRA)

Common Name ⁽³⁾	Scientific Name ⁽³⁾	Conservation Status ⁽¹⁾	Wetland Dependent	May Mean ⁽²⁾	Jun Mean ⁽²⁾	Jul Mean ⁽²⁾	Aug Mean ⁽²⁾	Sep Mean ⁽²⁾	Oct Mean ⁽²⁾
Little Grebe	<i>Tachybaptus ruficollis</i>	LC	✓	4.8	7.0	8.6	9.8	10.6	9.0
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC	✓						0.2
Grey Heron	<i>Ardea cinerea</i>	PRC	✓					1.2	6.4
Great Egret	<i>Ardea alba</i>	PRC, (RC)	✓	2.6	4.5	2.2	2.0	3.0	2.8
Little Egret	<i>Egretta garzetta</i>	PRC, (RC)	✓	24.0	12.3	6.4	9.5	25.0	9.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	LC	✓	1.2			1.0	3.8	1.4
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC, (RC)	✓	11.6	9.3	15.8	17.0	15.0	20.2
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	(LC)	✓	0.2	0.3	0.4	0.3	0.2	0.4
Yellow Bittern	<i>Ixobrychus sinensis</i>	LC	✓			0.2	0.3	V	0.2
Black-faced Spoonbill	<i>Platalea minor</i>	PGC	✓						V
Northern Pintail	<i>Anas acuta</i>	RC	✓						0.6
Ferruginous Duck	<i>Aythya nyroca</i>	-	✓				V		
Black Kite	<i>Milvus migrans</i>	RC	✓			V		0.2	
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	-	✓	1.2	2.8	1.4	1.3	0.6	2.0
Eurasian Coot	<i>Fulica atra</i>	-	✓				0.3		
Common Moorhen	<i>Gallinula chloropus</i>	-	✓	V			0.5	V	0.4
Black-winged Stilt	<i>Himantopus himantopus</i>	(RC)	✓					4.4	2.8
Pied Avocet	<i>Recurvirostra avosetta</i>	RC	✓						0.6
Little Ringed Plover	<i>Charadrius dubius</i>	(LC)	✓		0.3			5.2	3.2
Green Sandpiper	<i>Tringa ochropus</i>	-	✓				0.3		V
Wood Sandpiper	<i>Tringa glareola</i>	(LC)	✓						V

Proposed Comprehensive Development at Wo Shang Wai Yuen Long

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Common Name ⁽³⁾	Scientific Name ⁽³⁾	Conservation Status ⁽¹⁾	Wetland Dependent	May Mean ⁽²⁾	Jun Mean ⁽²⁾	Jul Mean ⁽²⁾	Aug Mean ⁽²⁾	Sep Mean ⁽²⁾	Oct Mean ⁽²⁾
Common Sandpiper	<i>Actitis hypoleucos</i>	-	✓	1.6			1.3	4.0	3.6
Common Snipe	<i>Gallinago gallinago</i>	-	✓						2.0
Whiskered Tern	<i>Chlidonias hybrid</i>	LC	✓	2.8				3.3	3.6
Pied Kingfisher	<i>Ceryle rudis</i>	(LC)	✓	0.2			0.8		0.2
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	LC	✓	V		V	0.3	0.4	1.2
Common Kingfisher	<i>Alcedo atthis</i>	-	✓	0.6	1.3	0.4	2.8	0.8	3.2
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	-	✓	5.4				0.4	1.4
Grey Wagtail	<i>Motacilla cinerea</i>	-	✓						0.2
White Wagtail	<i>Motacilla alba</i>	-	✓	7.4	0.8	1.0	4.0	4.4	10.8
Richard's Pipit	<i>Anthus richardi</i>	-	✓						V
Red-billed Starling	<i>Spodiopsar sericeus</i>	-	✓	1.0	3.3	2.2		V	
Collared Crow	<i>Corvus torquatus</i>	LC	✓	V	V	0.2	0.5	0.4	0.8
			No. of species recorded	17	11	13	18	21	29

Note:

(1) Conservation status follows that of Fellowes et al. (2002) and BirdLife International listing (2010). See Table B3.

(2) Refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA).

(3) Follows HK bird list (dated 2014-6-9).

"V" Indicates the species is recorded outside regular surveys.

Table B2. Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) in the WRA

Common Name ⁽³⁾	Scientific Name ⁽³⁾	Conservation Status ⁽¹⁾	Wetland Dependent	May	Jun	Jul	Aug	Sep	Oct
				Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾
Little Grebe	<i>Tachybaptus ruficollis</i>	LC	✓	0.8	2.0	3.2	1.8	1.6	1.4
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC	✓						V
Grey Heron	<i>Ardea cinerea</i>	PRC	✓					1.0	1.6
Great Egret	<i>Ardea alba</i>	PRC, (RC)	✓	V	0.5	V	V	0.2	V
Intermediate Egret	<i>Egretta intermedia</i>	RC	✓						V
Little Egret	<i>Egretta garzetta</i>	PRC, (RC)	✓	1.2	3.3	1.8	1.3	2.6	1.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	LC	✓	V					
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC, (RC)	✓	1.6	1.0	1.4	1.5	4.2	1.4
Yellow Bittern	<i>Ixobrychus sinensis</i>	LC	✓	0.4	1.3	1.0	0.8	0.2	0.2
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	(LC)	✓	V					V
Black Kite	<i>Milvus migrans</i>	RC	✓	0.6	0.3	0.6			0.4
Eastern Buzzard	<i>Buteo japonicus</i>	-	x						V
Eurasian Hobby	<i>Falco subbuteo</i>	LC	✓				V		
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	-	✓	0.2	V	1.4	0.5	0.5	0.2
Black-winged Stilt	<i>Himantopus himantopus</i>	(RC)	✓					V	V
Little Ringed Plover	<i>Charadrius dubius</i>	(LC)	✓		0.3				1.2
Common Greenshank	<i>Tringa nebularia</i>	LC	✓						V
Green Sandpiper	<i>Tringa ochropus</i>	-	✓				V		V
Wood Sandpiper	<i>Tringa glareola</i>	(LC)	✓			0.4	0.3		0.2
Common Sandpiper	<i>Actitis hypoleucos</i>	-	✓	0.4	V	V	0.3	2.6	4.4
Temminck's Stint	<i>Calidris temminckii</i>	LC	✓						0.6
Pied Kingfisher	<i>Ceryle rudis</i>	(LC)	✓			V			
White-thorated Kingfisher	<i>Halcyon smyrnensis</i>	LC	✓			V			
Common Kingfisher	<i>Alcedo atthis</i>	-	✓	1.2	1.8	0.6	1.3	1.4	1.8
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	-	✓					0.6	0.2
White Wagtail	<i>Motacilla alba</i>	-	✓	0.6	1.2	0.8	1.8	1.8	3.2

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Common Name ⁽³⁾	Scientific Name ⁽³⁾	Conservation Status ⁽¹⁾	Wetland Dependent	May	Jun	Jul	Aug	Sep	Oct
				Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾	Mean ⁽²⁾
Richard's Pipit	<i>Anthus richardi</i>	-	✓	V					V
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	-	✓					V	
Red-billed Starling	<i>Spodiopsar sericeus</i>	-	✓	V				V	
White-shouldered Starling	<i>Sturnia sinensis</i>	(LC)	✓		V		V		V
Collared Crow	<i>Corvus torquatus</i>	LC	✓	0.4		0.6		0.4	V
			No. of species recorded	15	12	14	13	15	25

Note:

(1) Conservation status follows that of Fellowes et al. (2002) and BirdLife International listing (2010). See Table B3.

(2) Refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA)

(3) Follows HK bird list (dated 2014-6-9)

V Indicates the species is recorded outside regular surveys.

Table B3. Conservation Status Categories of Bird Species

Code	Category	Brief/Description	Source
GC	Global Concern	Habitat loss/damage in Hong Kong would pose significant threat to global survival	Fellowes <i>et al.</i> (2002)
RC	Regional Concern	Habitat loss/damage in Hong Kong would pose significant threat to regional survival.	
LC	Local Concern	Habitat loss/damage in Hong Kong would pose significant threat to local survival.	
PGC	Potential Global Concern	Large, secure population in Hong Kong is of global significance.	
PRC	Potential Regional Concern	Large, secure population in Hong Kong is of regional significance.	
CR	Critically Endangered	Best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.	BirdLife International (2010)
EN	Endangered	Best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.	
VU	Vulnerable	Best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.	
NT	Near Threatened	Does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.	

Table B4. Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean between September 2010 and October 2012

Common name	Scientific name	Conservation status	Wetland Dependent	Sep -10	Oct -10	Nov -10	Dec -10	Jan-11	Feb-11	Mar-11	Apr-11	May -11	Jun-11	Jul-11	Aug -11	Sep -11	Oct-11	Nov -11	Dec -11	Jan-12	Feb-12	Mar-12	Apr-12	May -12	Jun-12	Jul-12	Aug -12	Sep -12	Oct-12	
Little Grebe	<i>Tachybaptus ruficollis</i>	LC	✓					0.5						1.0	3.8	0.8	0.5	0.5		0.6		1.4	1.6	0.8	1.0	1.3	0.2		0.2	
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC	✓					0.8									0.3	0.3	0.4	1.2	0.7	0.2								
Grey Heron	<i>Ardea cinerea</i>	PRC	✓			1.0	1.6	2.0	2.0	0.4							1.0	2.5	1.8	0.8	2.3	0.8				0.3			0.4	
Purple Heron	<i>Ardea purpurea</i>	RC	✓														0.3	0.3												
Great Egret	<i>Ardea alba</i>	PRC	✓				0.4	14.0	2.0	0.2	0.5	0.3	0.5	0.3		1.5	1.8	0.8	1.2	0.6	0.7	0.6	0.6	1.0	0.3		0.4	0.5	1.5	
Intermediate Egret	<i>Egretta intermedia</i>	RC	✓					1.7	0.8	0.2						1.5	1.5	1.5	1.0	0.6	0.7	0.6	0.6				0.3	0.9		
Little Egret	<i>Egretta garzetta</i>	PRC	✓				1.8	8.0	2.0	0.4	0.5	0.8	0.3	0.3	1.0	1.0	0.5	1.5	1.6	1.4	2.0	1.6				0.8	0.3	1.2		
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	(LC)	✓										0.3	11.8		1.3	0.3			0.4					0.3		0.2			
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC	✓			1.0	0.2				0.3	0.3	0.3	1.5	4.2	7.8	4.5	5.3	2.4	0.3	2.3	2.6	1.4	0.8	1.0	0.8	2.0	1.8	2.2	
Yellow Bittern	<i>Ixobrychus sinensis</i>	(LC)	✓														0.3	0.3												
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LC	✓																											
Eurasian Spoonbill	<i>Platalea leucorodia</i>	LC	✓																											
Black-faced Spoonbill	<i>Platalea minor</i>	PGC, EN	✓					0.3	10.3											0.4										
Mandarin Duck	<i>Aix galericulata</i>	-	✓														0.3													
Eurasian Wigeon	<i>Anas penelope</i>	RC	✓				1.6	2.5																						
Eurasian Teal	<i>Anas crecca</i>	RC	✓					1.0																						
Northern Pintail	<i>Anas acuta</i>	RC	✓				0.2	7.0																						
Northern Shoveler	<i>Anas clypeata</i>	RC	✓																											
Tufted Duck	<i>Aythya fuligula</i>	LC	✓																											
Garganey	<i>Anas querquedula</i>	-	✓																											
Western Osprey	<i>Pandion haliaetus</i>	RC	✓				0.2																							
Black Kite	<i>Milvus migrans</i>	(RC)	x					0.8	0.3	0.2		0.3				0.3				0.2			0.2	0.5					0.4	
Crested Serpent Eagle	<i>Spilornis cheela</i>	(LC)	x																											
Eastern Buzzard	<i>Buteo japonicus</i>	-	x							0.2																				
Common Kestrel	<i>Falco tinnunculus</i>	-	x			1.0	0.4	1.0	0.3	0.4																				
Eurasian Hobby	<i>Falco subbuteo</i>	(LC)	✓																											
Peregrine Falcon	<i>Falco peregrinus</i>	-	x																											
Imperial Eagle	<i>Aquila heliaca</i>	-	x																											
Japanese Quail	<i>Coturnix japonica</i>	LC	✓																											
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	-	✓									0.5	0.8	1.3	2.6	1.3	1.5	0.3			0.4				0.5	1.0	0.5			
Common Moorhen	<i>Gallinula chloropus</i>	-	✓																							0.2				
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC	✓															0.3												
Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC	✓								0.5																			

Common name	Scientific name	Conservation status	Wetland Dependent	Sep -10	Oct- 10	Nov -10	Dec -10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May -11	Jun- 11	Jul- 11	Aug -11	Sep -11	Oct- 11	Nov -11	Dec -11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May -12	Jun- 12	Jul- 12	Aug -12	Sep -12	Oct- 12
Black-winged Stilt	<i>Himantopus himantopus</i>	RC	✓	8.0													1.0												
Pied Avocet	<i>Recurvirostra avosetta</i>	RC	✓				0.2															0.2							
Oriental Pratincole	<i>Glareola maldivarum</i>	LC	✓								2.5																		
Little Ringed Plover	<i>Charadrius dubius</i>	LC	✓	3.0		24.5	7.4	3.8	9.0	6.8	10.5	5.5	0.5		0.2						1.0	0.6							
Kentish Plover	<i>Charadrius alexandrinus</i>	RC	✓																										
Spotted Redshank	<i>Tringa erythropus</i>	RC	✓																										
Common Redshank	<i>Tringa totanus</i>	RC	✓																										
Marsh Sandpiper	<i>Tringa stagnatilis</i>	RC	✓																										
Common Greenshank	<i>Tringa nebularia</i>	RC	✓			0.5												0.3	0.8	0.2									
Green Sandpiper	<i>Tringa ochropus</i>	-	✓			1.0	0.4	0.5	0.5	0.4				0.3							0.2		0.2	0.4			0.2		
Wood Sandpiper	<i>Tringa glareola</i>	LC	✓						0.5	1.2											0.8	0.3					0.6		
Common Sandpiper	<i>Actitis hypoleucos</i>	-	✓	1.0		0.5	1.0		0.5	0.6	1.0	0.3			0.2								0.4	0.2				0.9	
Eurasian Woodcock	<i>Scolopax rusticola</i>	-	✓																										
Pintail/Swinhoe's Snipe*	<i>Gallinago stenura/G. megala</i>	LC*,	✓			0.5											0.3												
Common Snipe	<i>Gallinago gallinago</i>		✓						0.3	0.2																			
Red-necked Stint	<i>Calidris ruficollis</i>	LC	✓	3.0																									
Temminck's Stint	<i>Calidris temminckii</i>	LC	✓			0.5			2.5	0.4	1.3																		
Long-toed Stint	<i>Calidris subminuta</i>	LC	✓																		0.3								
Whiskered Tern	<i>Chlidonias hybrida</i>	-	✓																					1.3					
Domestic Pigeon	<i>Columba livia</i>	-	x												DS														
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	-	x													0.2													
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	-	x																										
Spotted Dove	<i>Spilopelia chinensis</i>	-	x																DS		DS	DS		DS			DS		0.6
Asian Koel	<i>Eudynamis scolopaceus</i>	-	x																										
Greater Coucal#	<i>Centropus sinensis</i>	-	x																										
Eurasian Eagle Owl	<i>Bubo bubo</i>	RC	x																										
Savanna Nightjar	<i>Caprimulgus affinis</i>	-	x																										
Pacific Swift	<i>Apus pacificus</i>	(LC)	x								0.3																		
House Swift	<i>Apus nipalensis</i>	-	x	10.0						0.2											DS	DS							
Pied Kingfisher	<i>Ceryle rudis</i>	(LC)	✓				0.2	0.3	0.5	0.2			0.3										0.2			0.5			
Common Kingfisher	<i>Alcedo atthis</i>	-	✓				0.4	0.5	0.3		0.3	0.5	1.0	0.3	1.0	0.8	0.5	0.8	1.0	0.4		0.8				0.6		0.4	
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	(LC)	x														0.3								0.3				
Barn Swallow	<i>Hirundo rustica</i>	-	x	25.0						1.5												DS	DS		DS		DS	DS	3.0

Common name	Scientific name	Conservation status	Wetland Dependent	Sep -10	Oct- 10	Nov -10	Dec -10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May -11	Jun- 11	Jul- 11	Aug -11	Sep -11	Oct- 11	Nov -11	Dec -11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May -12	Jun- 12	Jul- 12	Aug -12	Sep -12	Oct- 12
Red-rumped Swallow	<i>Hirundo daurica</i>	-	x																										
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	-	✓			14.5	10.2	15.0	23.5	8.2	11.8	1.8			0.2	0.8	1.5	2.0	1.2	0.6		4.0	1.0						
Grey Wagtail	<i>Motacilla cinerea</i>	-	✓				0.2		0.3	0.2						0.3													
White Wagtail	<i>Motacilla alba</i>	-	✓	3.0			1.8											DS	DS	DS	DS	DS				DS	1.8	3.2	
Richard's Pipit	<i>Anthus richardi</i>	-	✓			1.5	0.8	0.5	1.0	1.0	1.8	0.5					0.3		DS		DS	DS	DS						
Olive-backed Pipit	<i>Anthus hodgsoni</i>	-	x			0.5													DS										
Red-throated Pipit	<i>Anthus cervinus</i>	LC	x		2.0	2.5	1.2	0.5	0.5	0.2													0.4						0.7
Buff-bellied Pipit	<i>Anthus rubescens</i>	LC	x		1.0	1.5																							
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	-	x																										
Chinese Bulbul	<i>Pycnonotus sinensis</i>	-	x																			DS		DS		DS			
Long-tailed Shrike	<i>Lanius schach</i>	-	x																	DS	DS					DS	DS		
Oriental Magpie Robin	<i>Copsychus saularis</i>	-	x																		DS								
Daurian Redstart	<i>Phoenicurus aureus</i>	-	x																										
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	-	x		3.0	0.5	1.0	1.0	0.8	0.2	0.3						1.0		DS	DS		DS							
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	-	x																							DS			
Lanceolated Warbler	<i>Locustella lanceolata</i>	-	✓														0.3												
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	LC	✓														0.3												
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	-	✓														0.3												
Zitting Cisticola	<i>Cisticola juncidis</i>	LC	x							0.2	1.5	2.5	2.5	1.0	0.4		0.3	0.8	1.8	0.2	0.3	0.6					0.2		
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	-	x																	DS		DS		DS		DS	DS	0.8	0.4
Plain Prinia	<i>Prinia inornata</i>	-	x																		DS		DS		DS	DS	DS		
Dusky Warbler	<i>Phylloscopus fuscatus</i>	-	x														0.5		DS										
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	-	x																										1.4
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	RC	✓																			1.2	0.2						
Japanese White-eye	<i>Zosterops japonica</i>	-	x																										
Little Bunting	<i>Emberiza pusilla</i>	-	x			0.5																							
Black-faced Bunting	<i>Emberiza spodocephala</i>	-	x								0.5																		
Chinese Grosbeak	<i>Eophona migratoria</i>	LC	x														0.3												
Scaly-breasted Munia	<i>Lonchura punctulata</i>	-	x	20.0				2.5		15.0	7.5													DS		DS	DS	1.5	
Eurasian Tree Sparrow	<i>Passer montanus</i>	-	x																				DS		DS		DS		

Common name	Scientific name	Conservation status	Wetland Dependent	Sep -10	Oct- 10	Nov -10	Dec -10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May -11	Jun- 11	Jul- 11	Aug -11	Sep -11	Oct- 11	Nov -11	Dec -11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May -12	Jun- 12	Jul- 12	Aug -12	Sep -12	Oct- 12
Red-billed Starling	<i>Spodiopsar sericeus</i>	GC	x													0.3		0.8	1.6	6.6	39.0	17.4							
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	PRC	x												6.6														
Black-collared Starling	<i>Gracupica nigricollis</i>	-	x																DS	DS	DS	DS					DS		
White-shouldered Starling	<i>Sturnia sinensis</i>	(LC)	x									0.3		0.5	2.4														
Common Myna	<i>Acridotheres tristis</i>	-	✓																		DS								
Crested Myna	<i>Acridotheres cristatellus</i>	-	x	3.0															DS				DS			DS		V	
Black-napped Oriole	<i>Oriolus chinensis</i>	LC	x												1.0														
Black Drongo	<i>Dicrurus macrocercus</i>	-	x																							DS	DS		
Azure-winged Magpie	<i>Cyanopica cyanus</i>	-	x																										
Eurasian Magpie	<i>Pica pica</i>	-	x																			DS				DS	0.3		
Large-billed Crow	<i>Corvus macrorhynchos</i>	-	x				0.4			0.2																			
Collared Crow	<i>Corvus torquatus</i>	LC, NT	x				0.2	0.3			0.5		0.3		0.8	0.8	0.8	0.5						0.8					
No. of species recorded	108																												

Note: Conservation Status follows that of Fellowes et. al. (2002)
 * Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.
 V Indicates the species is recorded outside regular surveys.
 DS Indicates species recorded during survey.
 # Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected under terrestrial wildlife state protection (category II).

Table B5. Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean between November 2012 and April 2014

Common name	Scientific name	Conservation status	Wetland Dependent	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
Little Grebe	<i>Tachybaptus ruficollis</i>	LC	✓	1.0	1.0	1.2	0.4	0.6	0.4	1.5	0.5		0.6	0.5	1.2	0.6	2.2	1.8	5.3	4.5	2.4	0.8	2.0	3.2	1.8	1.6	1.4
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC	✓	0.8	3.2	0.8	1.0	0.0	0.0						0.2	V	0.4	0.6	0.5								V
Grey Heron	<i>Ardea cinerea</i>	PRC	✓	0.8	1.4	0.8	1.4	0.0	0.0					V	1.0	2.8	2.6	1.6	2.5							1.0	1.6
Purple Heron	<i>Ardea purpurea</i>	RC	✓																								
Great Egret	<i>Ardea alba</i>	PRC	✓	1.4	0.6	1.0	0.8	0.2	0.6		0.8	0.6			0.6	0.6	2.4	1.2	1.8	0.8	0.2	V	0.5	V	V	0.2	V
Intermediate Egret	<i>Egretta intermedia</i>	RC	✓	0.2	0.0	0.0	0.0	0.0	0.0										V								V
Little Egret	<i>Egretta garzetta</i>	PRC	✓	0.8	2.0	2.2	1.4	0.6	1.2	0.6	1.8	0.4	3.4	0.5	2.2	1.4	2.4	4.4	4.0	3.8	3.2	1.2	3.3	1.8	1.3	2.6	1.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	(LC)	✓																		1.6	V					
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC	✓	1.6	2.2	2.4	0.4	0.0	0.0			0.8	2.0	0.5	1.4	1.4	2.6	6.8	3.5	2.5	1.0	1.6	1.0	1.4	1.5	4.2	1.4
Yellow Bittern	<i>Ixobrychus sinensis</i>	(LC)	✓						V	1.0	2.5	0.2	1.4	1.3	0.8	0.4	0.2			V	V	0.4	1.3	1.0	0.8	0.2	0.2
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LC	✓	V			0.2				0.3				V					V		V					V
Eurasian Spoonbill	<i>Platalea leucorodia</i>	LC	✓																								
Black-faced Spoonbill	<i>Platalea minor</i>	PGC, EN	✓																V	V							
Mandarin Duck	<i>Aix galericulata</i>	-	✓																								
Eurasian Wigeon	<i>Anas penelope</i>	RC	✓																								
Eurasian Teal	<i>Anas crecca</i>	RC	✓																								
Northern Pintail	<i>Anas acuta</i>	RC	✓																								
Northern Shoveler	<i>Anas clypeata</i>	RC	✓			V											1.2	7.0	5.5	V							
Tufted Duck	<i>Aythya fuligula</i>	LC	✓			V																					
Garganey	<i>Anas querquedula</i>	-	✓																								
Western Osprey	<i>Pandion haliaetus</i>	RC	✓																								
Black Kite	<i>Milvus migrans</i>	(RC)	x	0.0	0.2	0.0	0.0	0.6	0.0	0.2	0.3		1.2	0.8	0.2	0.2		V	0.5	0.8	0.4	0.6	0.3	0.6		0.4	
Crested Serpent Eagle	<i>Spilornis cheela</i>	(LC)	x																V								
Eastern Buzzard	<i>Buteo japonicus</i>	-	x																								V
Common Kestrel	<i>Falco tinnunculus</i>	-	x																								
Eurasian Hobby	<i>Falco subbuteo</i>	(LC)	✓																						V		
Peregrine Falcon	<i>Falco peregrinus</i>	-	x		V												V										
Imperial Eagle	<i>Aquila heliaca</i>	-	x			V																					
Japanese Quail	<i>Coturnix japonica</i>	LC	✓												V												
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	-	✓	0.2		0.2	0.0	0.4	0.2	V	1.8	0.2	0.2	V	0.8	0.4				V	0.2	0.2	V	1.4	0.5	0.5	0.2
Common Moorhen	<i>Gallinula chloropus</i>	-	✓																	V	0.2						
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC	✓																								
Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC	✓	0.2	0.0	0.0	0.0	0.0	0.0																		
Black-winged Stilt	<i>Himantopus himantopus</i>	RC	✓									0.2	0.6	V	0.2	V										V	V
Pied Avocet	<i>Recurvirostra avosetta</i>	RC	✓	0.0	0.2	0.0	0.0	0.0	0.0																		

Common name	Scientific name	Conservation status	Wetland Dependent	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
Oriental Pratincole	<i>Glareola maldivarum</i>	LC	✓																								
Little Ringed Plover	<i>Charadrius dubius</i>	LC	✓	0.0	0.0	0.4	1.0	0.2	0.0						V	0.4		V	0.5	0.8			0.3				1.2
Kentish Plover	<i>Charadrius alexandrinus</i>	RC	✓									0.8				V											
Spotted Redshank	<i>Tringa erythropus</i>	RC	✓												V												
Common Redshank	<i>Tringa totanus</i>	RC	✓																								
Marsh Sandpiper	<i>Tringa stagnatilis</i>	RC	✓																								
Common Greenshank	<i>Tringa nebularia</i>	RC	✓	V	V	V		V									V	V		V							V
Green Sandpiper	<i>Tringa ochropus</i>	-	✓						0.2						1.0	0.6	V			0.5					V		V
Wood Sandpiper	<i>Tringa glareola</i>	LC	✓		V		V	V							V	V	V	V	V	V				0.4	0.3		0.2
Common Sandpiper	<i>Actitis hypoleucos</i>	-	✓	0.2					0.2	0.2		V	0.6	V	0.8	1.6	0.2	V	0.3	1.3	0.2	0.4	V	V	0.3	2.6	4.4
Eurasian Woodcock	<i>Scolopax rusticola</i>	-	✓																								
Pintail/Swinhoe's Snipe*	<i>Gallinago stenura/G. megala</i>	LC*	✓													V											
Common Snipe	<i>Gallinago gallinago</i>	-	✓		V				V																		
Red-necked Stint	<i>Calidris ruficollis</i>	LC	✓																								
Temminck's Stint	<i>Calidris temminckii</i>	LC	✓																								0.6
Long-toed Stint	<i>Calidris subminuta</i>	LC	✓																								
Whiskered Tern	<i>Chlidonias hybrida</i>	-	✓																								
Domestic Pigeon	<i>Columba livia</i>	-	X																								
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	-	X																								V
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	-	X																								
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	-	X																								
Spotted Dove	<i>Spilopelia chinensis</i>	-	X	0.4	1.2	0.4		0.2	0.2	0.4	0.5	0.8	2.8	2.0	2.6	2.6	3.0	6.2	2.3	2.0	1.0	0.6	1.6	1.2	1.3	2.2	3.6
Asian Koel	<i>Eudynamis scolopaceus</i>	-	X																		V						
Greater Coucal#	<i>Centropus sinensis</i>	-	X							0.2	0.3	0.2	0.2		0.2	0.2					0.4	0.8	0.3	0.8	0.5	0.2	0.2
Eurasian Eagle Owl	<i>Bubo bubo</i>	RC	X												V		V			V							
Savanna Nightjar	<i>Caprimulgus affinis</i>	-	X				V				V									V							
Pacific Swift	<i>Apus pacificus</i>	(LC)	X																								
House Swift	<i>Apus nipalensis</i>	-	X		0.4	V												V	0.5								
Pied Kingfisher	<i>Ceryle rudis</i>	(LC)	✓						V				V				0.4	V	0.3	V				V			
Common Kingfisher	<i>Alcedo atthis</i>	-	✓	0.2	0.2	0.5	0.4	0.2	0.2	0.6	0.3	0.4	0.4	0.8	1.0	2.0	1.6	1.2	2.3	0.8	1.0			V			
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	(LC)	X													V	0.2					1.2	1.8	0.6	1.3	1.4	1.8
Barn Swallow	<i>Hirundo rustica</i>	-	X	0.2	1.0		0.2	9.2	23.0	11.2		1.4	1.8	1.0		V			0.5	7.8	15.4	18.0	1.5	1.0	1.5	0.4	V
Red-rumped Swallow	<i>Hirundo daurica</i>	-	X	1.2	1.2													0.6									
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	-	✓	0.2	0.2	1.4	2.8	2.2	2.2	0.2					0.4	0.2	0.6	0.6	1.0	0.3	0.2				0.6	0.2	
Grey Wagtail	<i>Motacilla cinerea</i>	-	✓	0.6	0.0	0.0	0.0	0.0																			

Common name	Scientific name	Conservation status	Wetland Dependent	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
White Wagtail	<i>Motacilla alba</i>	-	✓	2.6	1.0	1.0	3.0	4.8	2.0	1.0		1.2	0.4	3.5	2.8	3.6	2.6	1.2	1.3	2.5	1.6	0.6	1.2	0.8	1.8	1.8	3.2
Richard's Pipit	<i>Anthus richardi</i>	-	✓	0.2	0.4	1.2	0.4	0.4									0.4	0.8	2.0	2.3	3.0	V					V
Olive-backed Pipit	<i>Anthus hodgsoni</i>	-	x				0.6	1.2	1.4												0.2						
Red-throated Pipit	<i>Anthus cervinus</i>	LC	x																								
Buff-bellied Pipit	<i>Anthus rubescens</i>	LC	x																								
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	-	x						0.2		0.3		0.2		V		0.8	1.3	0.3	0.2			0.2	0.3	1.2		
Chinese Bulbul	<i>Pycnonotus sinensis</i>	-	x		0.2	2.0	0.2	0.2	3.2	2.0	3.8		2.4	3.5	0.2	1.8	4.0	3.8	0.5	0.8	1.6	1.8	2.3	2.2	2.3	0.4	4.6
Bull-headed Shrike	<i>Lanius bucephalus</i>	-	x																								V
Long-tailed Shrike	<i>Lanius schach</i>	-	x	0.2		0.4			0.2		V	0.4	0.2	0.3	0.2		0.2	V	0.3			0.2	0.3	0.4	0.5	V	
Oriental Magpie Robin	<i>Copsychus saularis</i>	-	x		0.2					0.2	0.5		0.2	0.3	V	0.2	0.2	0.4			0.2		0.3	V	V	V	
Daurian Redstart	<i>Phoenicurus aureoreus</i>	-	x			0.2										0.2	0.2	0.4									V
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	-	x	0.4	0.4	0.8			0.6						V	0.2	0.2	0.4	0.5	0.3	V	0.2					0.4
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	-	x					0.6	1.2					1.0			0.4	0.8	V	0.5	0.2	0.2	0.5	V	1.5	0.8	
Lanceolated Warbler	<i>Locustella lanceolata</i>	-	✓																								
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	LC	✓																								
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	-	✓																								V
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	-	✓	0.2	0.0	0.0	0.0	0.0	0.0																		
Common Tailorbird	<i>Orthotomus sutorius</i>	-	x																								0.2
Zitting Cisticola	<i>Cisticola juncidis</i>	LC	x		0.2			V										0.4		0.3	0.2						
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	-	x		0.8	0.6	0.8	1.4	4.6	4.4	5.0	2.4	1.8	3.0	2.4	0.8	1.0	0.8	1.3	2.8	0.8	0.8	0.4			0.4	
Plain Prinia	<i>Prinia inornata</i>	-	x	1.2	0.4	V	1.4	0.2	0.2	0.2	0.5	0.8	0.4	0.3		0.4		0.2	V	0.8	2.0	1.0		2.6	4.3	3.4	
Dusky Warbler	<i>Phylloscopus fuscatus</i>	-	x												V	0.4		0.4	0.8	1.5	V					V	V
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	-	x	0.8	0.6																		0.8	0.5			V
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	RC	✓														V		4.5	V							
Japanese White-eye	<i>Zosterops japonica</i>	-	x															0.2			0.6			V			
Little Bunting	<i>Emberiza pusilla</i>	-	x																								
Black-faced Bunting	<i>Emberiza spodocephala</i>	-	x																	V							
Chinese Grosbeak	<i>Eophona migratoria</i>	LC	x																								
Scaly-breasted Munia	<i>Lonchura punctulata</i>	-	x				1.0	2.2	1.0			2.0	0.4	0.3			1.8	1.8	V	1.8	V	3.2	5.8	0.8	1.5	1.3	
Eurasian Tree Sparrow	<i>Passer montanus</i>	-	x												0.8	V									V	8.8	3.6
Red-billed Starling	<i>Spodiopsar sericeus</i>	GC	x																V		V					V	

Common name	Scientific name	Conservation status	Wetland Dependent	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	PRC	x																								
Black-collared Starling	<i>Gracupica nigricollis</i>	-	x			0.8	0.4	0.2	0.2	0.2				0.8		0.8	1.6	0.8	0.5	1.8	0.2	0.2	V	1.0	1.0	1.2	1.4
White-shouldered Starling	<i>Sturnia sinensis</i>	(LC)	x									0.2											V		V		V
Common Myna	<i>Acridotheres tristis</i>	-	✓																						V		
Crested Myna	<i>Acridotheres cristatellus</i>	-	x	0.6						0.2	0.3	0.8	0.2			2.0	1.8	1.4	0.5	1.3	1.0	0.6	1.0	1.2	3.5	0.2	1.8
Black-naped Oriole	<i>Oriolus chinensis</i>	LC	x																								
Black Drongo	<i>Dicrurus macrocercus</i>	-	X											0.3	0.4	V									1.5		0.2
Azure-winged Magpie	<i>Cyanopica cyanus</i>	-	X													V											
Eurasian Magpie	<i>Pica pica</i>	-	X								0.3				V		0.8	V	0.3	0.2							
Large-billed Crow	<i>Corvus macrorhynchos</i>	-	x								1.0												0.3				
Collared Crow	<i>Corvus torquatus</i>	LC, NT							V						0.2	0.2			V	0.5	0.8	0.4		0.6		0.4	V
No. of species recorded		111																									

Note: Conservation Status follows that of Fellowes et. al. (2002)

* Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.

V Indicates the species is recorded outside regular surveys.

DS Indicates species recorded during survey.

Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected under terrestrial wildlife state protection (category II).

Appendix C. Summary of Herpetofauna Monitoring, Mammals and Insects Surveys

Table C1. Summary of herpetofauna monitoring within the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
Amphibians								
Asiatic Painted Frog	<i>Kaloula pulchra pulchra</i>	-		V				
Gunther's Frog	<i>Hylarana guentheri</i>	-	1.0		1.0	2.0		
		No. of Species Recorded	1	1	1	1	0	0
Reptiles								
No reptile was recorded during the survey period	-	-	-	-	-	-	-	0
		No. of Species Recorded	0	0	0	0	0	0

- (1) Conservation status follows that of Fellowes et al. (2002), Chan et al. (2005) and Karsen et al. (1998).
 (2) Refers to the mean number of individuals recorded in the reporting period (excluding the WRA)
 V Indicates the species is recorded outside regular surveys.

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Table C2. Summary of herpetofauna monitoring in the WRA

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
Amphibians								
Asian Common Toad	<i>Bufo melanostictus</i>	-	V					
Brown Tree Frog	<i>Polypedates megacephalus</i>	-		1.0				
Gunther's Frog	<i>Hylarana guentheri</i>	-					V	
		No. of Species Recorded	1	1	0	0	1	0
Reptiles								
Changeable Lizard	<i>Calotes versicolor</i>	-	V					
Chinese Skink	<i>Plestiodon chinensis chinensis</i>	-	V					
		No. of Species Recorded	2	0	0	0	0	0

(1) Conservation status follows that of Fellowes et al. (2002), Chan et al. (2005) and Karsen et al. (1998).

(2) Refers to the mean number of individuals recorded in the reporting period (excluding the WRA)

V indicates the species is recorded outside regular surveys.

Table C3. Summary of mammal monitoring in the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
No mammal was recorded during the survey period	-	-	0	0	0	0	0	0
		No. of Species Recorded	0	0	0	0	0	0

(1) Conservation status follows that of Fellowes et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month in the survey area (excluding WRA).

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Table C4. Summary of mammal monitoring in the WRA

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
Japanese Pipistrelle	<i>Pipistrellus abramus</i>	LC		V	V		V	V
No. of Species Recorded			0	1	1	0	1	1

(1) Conservation status follows that of Fellowes et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month in the survey area (excluding WRA)

V indicates the species is recorded outside regular surveys

Table C5. Summary of dragonfly and butterfly monitoring in the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
Odonate								
Asian Amberwing	<i>Brachythemis contaminata</i>	-				2.5		
Common Bluetail	<i>Ischnura senegalensis</i>	-	13.3					
Common Flangetail	<i>Ictinogomphus pertinax</i>	-	0.3	2.0	3.0	1.5	1.0	
Evening Skimmer	<i>Tholymis tillarga</i>	-				0.5		
Green Skimmer	<i>Orthetrum sabina sabina</i>	-	3.0	0.5	4.0	6.0	2.0	
Indigo Dropwing	<i>Trithemis festiva</i>	-	0.3					
Saddlebag Glider	<i>Tramea virginia</i>	-	2.0		2.0		3.0	
Variiegated Flutterer	<i>Rhyothemis variegata arria</i>	-	10.0	6.0	5.3	2.0	2.0	
Wandering Glider	<i>Pantala flavescens</i>	-	1.0		0.3	33.0	3.0	
No. of Species Recorded			7	3	5	6	5	0
Butterfly								
Common Grass Yellow	<i>Eurema hecabe hecabe</i>	-	0.3	0.5	1.0			
Common Mormon	<i>Papilio polytes polytes</i>	-	0.7				3.0	
Great Egg-fly	<i>Hypolimnas bolina kezia</i>	-					1.0	

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Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
Indian Cabbage White	<i>Pieris canidia canidia</i>	-	3.7	1.5				
Mottled Emigrant	<i>Catopsilia pyranthe pyranthe</i>	-		0.5				
Pale Grass Blue	<i>Pseudaonotaria maha serica</i>	-	6.3	0.5				
		No. of Species Recorded	4	4	1	0	2	0

(1) Conservation status follows that of Fellowes et al. (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) refers to the mean number of individuals recorded in each month in the survey area (excluding the WRA)

Table C6. Summary of dragonfly and butterfly monitoring in the WRA

Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
			May	Jun	Jul	Aug	Sep	Oct
Asian Amberwing	<i>Brachythemis contaminata</i>	-	2.0	1.7			1.0	1.0
Blue Dasher	<i>Brachydiplax chalybea flavovittata</i>	-	2.0	2.3	1.3	0.5		
Blue Sprite	<i>Pseudagrion microcephalum</i>	-	0.3					
Common Bluetail	<i>Ischnura senegalensis</i>	-	46.3	21.0	0.7			
Common Flangetail	<i>Ictinogomphus pertinax</i>	-	2.0	2.3	5.3	2.5	10.0	
Crimson Darter	<i>Crocothemis servilia servilia</i>	-			1.0	0.5	1.0	
Green Skimmer	<i>Orthetrum sabina sabina</i>	-	3.7	5.0	6.0	12.0	8.0	2.0
Indigo Dropwing	<i>Trithemis festiva</i>	-					1.0	
Lesser Emperor	<i>Anax parthenope julius</i>	-				0.5	1.0	
Orange-tailed Sprite	<i>Ceriagrion auranticum ryukyuanum</i>	-	3.0	1.0				
Pied Percher	<i>Neurothemis tullia tullia</i>	-	2.3	0.7	1.0		2.0	
Pied Skimmer	<i>Pseudothemis zonata</i>	-	0.7	2.3		1.0	3.0	
Russet Percher	<i>Neurothemis fulvia</i>	-				0.5		
Saddlebag Glider	<i>Tramea virginia</i>	-	3.3	0.7	4.0	4.0	1.0	2.0
Variiegated Flutterer	<i>Rhyothemis variegata arria</i>	-	17.7	20.3	8.0	11.5	9.0	5.0
Wandering Glider	<i>Pantala flavescens</i>	-	4.3	2.3	0.3	13.0		14.0
No. of Species Recorded			12	11	9	10	10	5
Butterfly			May	Jun	Jul	Aug	Sep	Oct
Common Grass Yellow	<i>Eurema hecabe hecabe</i>	-	1.7	5.7	3.3	0.5	1.0	1.0
Common Mapwing	<i>Cyrestis thyodamas chinensis</i>	-	0.3					
Common Mormon	<i>Papilio polytes polytes</i>	-			0.7			1.0
Common Palmfly	<i>Elymnias hypermnestra hainana</i>	-			0.3			
Dark Brand Bush Brown	<i>Mycalesis mineus mineus</i>	-				0.5		

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Common Name	Scientific Name	Conservation Status ⁽¹⁾	Mean ⁽²⁾					
Great Egg-fly	<i>Hypolimnas bolina kezia</i>	-			0.3			
Indian Cabbage White	<i>Pieris canidia canidia</i>	-	1.7	0.7				
Lemon Emigrant	<i>Catopsilia pomona pomona</i>	-	0.3	0.7	0.3			
Long-tailed Blue	<i>Lampides boeticus</i>	-	0.3					
Mottled Emigrant	<i>Catopsilia pyranthe pyranthe</i>	-		1.0	0.3		1.0	
Pale Grass Blue	<i>Pseudozizeeria maha serica</i>	-	1.0	1.3				
Red Ring Skirt	<i>Hestina assimilis assimilis</i>	-			0.7			
Tawny Rajah	<i>Charaxes bernardus bernardus</i>	-			0.3			
	No. of Species Recorded		6	5	8	2	2	2

(1) Conservation status follows that of Fellowes et al. (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) Refers to the mean number of individuals recorded in each month in the survey area (excluding the WRA)

Appendix D. Summary of Water Quality Monitoring

Table D1. Water quality at WRA

May 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	27.5	8.00	0.46	7.4	6.5
2	27.4	8.00	0.42	7.8	6.7
3	27.5	7.90	0.33	8.5	6.8
4	27.5	8.00	0.34	8.9	6.9

June 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	26.4	7.93	0.55	8.5	6.2
2	26.3	7.88	0.51	8.9	6.4
3	26.4	7.86	0.42	9.6	6.5
4	26.4	7.93	0.43	9.3	6.6

July 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	29.4	8.01	0.60	26.5	5.8
2	30.4	8.11	0.47	12.2	6.2
3	30.1	8.05	0.47	10.4	5.9
4	30.6	8.18	0.64	11.9	6.5

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August 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	33.6	7.62	0.35	13.2	4.8
2	33.2	7.63	0.40	8.9	4.7
3	32.2	7.80	0.41	13.8	6.7
4	32.1	7.74	0.46	5.6	7.0

September 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	26.1	7.76	0.56	13.1	7.4
2	26.3	7.82	0.70	10.3	6.7
3	26.2	7.91	0.69	12.5	7.1
4	25.9	7.87	0.57	11.8	6.5

October 2014

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	25.1	7.99	0.45	7.6	8.1
2	25.3	8.05	0.44	8.2	7.9
3	25.6	7.94	0.32	6.4	8.0
4	25.4	8.01	0.35	8.1	7.9

Notes: Values **Bold** indicate Action Level exceedance.
 Values **Underlined and Bold** indicate Limit Level exceedance.