

FORM 5
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

No previous application for variation of an environmental permit.
 The environmental permit was previously amended.
Application No. : VEP-595/2021

PART B DETAILS OF APPLICANT

B1. Name : (person or company)
Civil Engineering and Development Department
[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]
B2. Business Registration No. : [REDACTED]
(if applicable)
B3. Correspondence Address : [REDACTED]
B4. Name of Contact Person : [REDACTED]
B5. Position of Contact Person : [REDACTED]
B6. Telephone No. : [REDACTED]
B7. Fax No. : [REDACTED]
B8. E-mail Address : (if any) [REDACTED]

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :
Civil Engineering and Development Department
C2. Application No. of the Current Environmental Permit : VEP-595/2021
C3. The Current Environmental Permit was Issued in : month / year
08 | 2021

Important Notes : Please submit the application together with
(a) 3 copies of this completed form; and
(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation to the Environmental Protection Department at the following address :
The EIA Ordinance Register Office,
27th floor, Southorn Centre, 130 Hennessy Road,
Wan Chai, Hong Kong.

Tick (✓) the appropriate box



PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit :	D2. Proposed Variation(s) :	D3. Reason for Variation(s) :	D4. Describe the environmental changes arising from the proposed variation(s) :	D5. Describe how the environment and the community might be affected by the proposed variation(s) :	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Condition 2.7 (h) & Condition 2.7 (i) of Environmental Permit (EP-477/2013/A)	Please refer to Section 2.7 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)	Please refer to Section 2.8 to 2.30 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)	The proposed variation would not create environmental changes. Please refer to detailed assessment results under Section 3 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)	The proposed variation would not create additional environmental impact to the environment and the community Please refer to detailed assessment results under Section 3 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)	The environmental performance requirement has not been affected by the proposed changes in the Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023) Please refer to detailed assessment results under Section 3 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)	Please refer to Section 3.60 to 3.66 in Environmental Review Report for Variation to Environmental Permit (Permit No. EP-477/2013/A) (Revision 2.0) (November 2023)

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.



Signature of Applicant



Full Name in Block Letters



Position



on behalf of Civil Engineering and Development Department
Company Name and Chop (as appropriate)

4 December 2023
Date

NOTES :

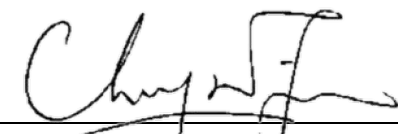
1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.
2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.

Civil Engineering and Development Department

Environmental Permit No.:
EP-477/2013/A
- Development of Lok Ma Chau Loop

Variation to Environmental Permit
(Permit No. EP-477/2013/A)
(Revision 2.0)

November 2023

Approved By	 _____ (Project Director)
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REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

WELLAB accepts no responsibility for changes made to this report by third parties.

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1. INTRODUCTION

- 1.1 The development of Lok Man Chau (LMC) Loop was one of the ten major infrastructure projects for economic growth of the Hong Kong Special Administrative Region (HKSAR) announced in the 2017 Policy Address. The HKSAR Government would work with the Shenzhen authorities to develop LMC Loop into Hong Kong-Shenzhen Innovation & Technology Park.
- 1.2 The planning and engineering study for the Loop development is a designated project (DP) classified under Item 1 Schedule 3 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). In October 2013, the EIA Report (AEIAR-176/2013) of the Project was approved by the Director of Environmental Protection pursuant to the EIA Ordinance in accordance with the EIA Study Brief (ESB-238/2011) and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The Environmental Permit (EP no.: EP-477/2013) was also granted in November 2013.
- 1.3 Pursuant to Section 13 of the EIAO, the Director of Environmental Protection amends the Environmental Permit (No. EP-477/2013) based on the Application No. VEP-595/2021 and the Environmental Permit (Permit No. EP-477/2013/A) was issued on 12th August 2021 for Development of Lok Ma Chau Loop in which Traffic Noise Mitigation Plan (TNMP) and Odour Mitigation Measures and Monitoring Plan (OMMMP) are required to be submitted under Conditions 2.13, 2.22 and 2.24.
- 1.4 According to the contract requirement, the Contractor must comply with all conditions specified in the Environmental Permit (EP no.: EP-477/2013/A) (EP) while carrying out the construction works for the Project.

Purpose of This Report

- 1.5 This Report has been prepared by Wellab Limited to assess the feasibility to carry out the construction works associated with Western Connection Road (WCR) along Ha Wan Tsuen Road (HWT Rd) during dry-season (from November to February next year) and using powered mechanical equipment outside the period 9am to 5pm for construction works of WCR along HWT Rd as well as Meander Bridge taking into account the update of current situations for WCR along HWT Rd and Meander Bridge since EIA stage and the surrounding environmental status after the establishment of Ecological Area (EA) Zone and Off-site Wetland Compensation Areas (OWCAs). The purpose of this Report is to demonstrate that no material change would be resulted from the proposed changes and the project still complies with the requirements described in the EIAO-TM.
- 1.6 This Report also aims to support the application of a Variation to Conditions 2.7 (h) and 2.7 (i) of the current EP (EP-477/2013/A).

Report Structure

- 1.7 This document contains the following section:

- Section 1 summarized the Project background and the purpose for preparation of this document
- Section 2 presents the details and reasons of the proposed variations
- Section 3 presents the justification of the proposed variations
- Section 4 presents the conclusions including the summary of the findings of environmental review/assessment associated with the proposed variations
- Section 5 Summarized the Environmental Review Report (ERR)

2. PROPOSED VARIATION OF THE ENVIRONMENTAL PERMIT REQUIREMENTS

Western Connection Road along Ha Wan Tsuen Road and Meander Bridge

- 2.1 Western Connection Road (WCR) is to provide a direct linkage between LMC Loop with the external road and highway network in San Tin Highway / Castle Peak Road formed by widening of existing Ha Wan Tsuen Road and Lok Ma Chau Road (at-grade) plus a new slip road to San Tin Interchange.
- 2.2 The section along Ha Wan Tsuen Road of about 800m long runs through an area of mostly rather small and disturbed fish ponds, all of which are abandoned or inactive. The road will then pass over old Shenzhen River meander (i.e., LMC Meander) on a bridge (i.e., Meander Bridge) about 60m.
- 2.3 The location of proposed construction works for WCR along HWT Rd and Meander Bridge is shown in **Figure 1**.
- 2.4 In accordance with the approved EIA Report, direct and indirect impact on natural habitats arising from the WCR along HWT Rd and Meander Bridge have been identified.
- 2.5 A series of mitigation measures were recommended in the approved EIA Report, Section 12.7 to mitigate the potential adverse impacts to an acceptable level and the key ecological mitigation measures are stipulated in EP Condition 2.7.
- 2.6 The concerned conditions in EP Condition 2.7 are extracted as follows: -
 - (h) carrying out outside dry-season (from November to February next year), the construction works associated with the site formation in the Ecological Area, stabilization of the bank of the old Shenzhen River meander, Western Connection Road along Ha Wan Tsuen Road, to minimise disturbances to migratory birds/water birds;
 - (i) using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas, if any;

Proposed Variations

- 2.7 The proposed Conditions 2.7(h) and 2.7(i) of the current EP (EP-477/2013/A) can be found below:

Submission and Measures to Mitigate Ecological Impact**為緩解生態影響須提交的文件及採取的措施**

2.7 To reduce the ecological impact during construction and operation stages of the Project, a series of ecological mitigation measures shall be implemented as conforming to the relevant information and recommendations, including those described in Section 12.7 (Ecological Mitigation Measures), contained in the EIA Report. The key ecological mitigation measures shall include:

為減少工程項目在建造及營辦階段對生態造成的影響，許可證持有人須實施一系列的生態緩解措施，以符合相關資料和建議，包括環評報告第 12.7 節（生態影響緩解措施）所述的資料及建議。主要生態緩解措施須包括以下各項：

- (a) conducting pre-construction search for any otter holts/dens and herpetofaunal species of conservation concern in construction sites, with remedial measures, such as setting of no works area around otter holts/dens and translocation of important species identified, if any;
施工前在建築地盤搜尋是否有任何具有保育價值的水獺巢穴／窩及爬行動物品種，並須採取補救措施，如將水獺巢穴／窩四周定為禁止施工區，以及遷移找到的重要品種（如有的話）；
- (b) creating and establishing an Ecological Area, approximately 12.78 ha in size, containing reed marsh and marsh habitat prior to total clearance of reed marsh in the LMC Loop, including a low-rise building buffer zone of 50m width from the Ecological Area, with appropriate screen-planting;
將蘆葦沼澤在落馬洲河套地區全部移除前，增設一個面積約 12.78 公頃的生態區，內有蘆葦沼澤和沼澤棲息地，並須從生態區邊界起計設置一道 50 米寬，種有合適屏障植物的低矮建築緩衝區；
- (c) stabilising the bank of the old Shenzhen River meander of the LMC Loop, approximately 3.5 km long, including re-vegetation upon completion of the works and various ecological designs, such as practicability of installation of otter holts and provision of potential feeding area and spraint locations for otters in the stabilised bank;
鞏固落馬洲河套地區的深圳河舊河曲(長約 3.5 公里)的河岸，包括在工程完成後重新栽種植物並採用多項生態設計，如研究在經鞏固後的河岸設置水獺巢穴及為水獺提供覓食及排便地點的可行性；
- (d) creating a 23 m minimum width vegetated setback at the edges of the LMC Loop along the south-western and north-eastern sections of the meander;
在落馬洲河套地區邊界沿河曲西南及東北部分設立一道最少有 23 米寬的植被後移區；
- (e) installing 3m high olive green fence around construction areas to allow or deter different animal passages where appropriate;
在建築地盤四周安裝 3 米高的橄欖綠色圍欄，以便按需要容許或阻止動物通過；

- (f) providing (i) permanent compensatory off-site wetland areas and (ii) construction stage temporary compensatory off-site wetland areas during various construction stages of the Project, in advance of any corresponding wetland loss;
在損失任何相關的濕地前，須提供(i) 永久補償性工地外濕地，以及(ii) 在工程項目不同建造階段提供臨時補償性工地外濕地；
- (g) providing at least 0.4 ha woodland compensation area by planting trees and shrubs near Horn Hill, to compensate for the loss of woodland affected by the Western Connection Road (WCR) and other works of the Project;
在牛角山附近種植樹木及灌木，以提供佔地最少 0.4 公頃的林地補償區，以補償因西面連接路及工程項目其他工程而引致的林木損失；
- (h) carrying out outside dry-season (from November to February next year), the construction works associated with the site formation in the Ecological Area, stabilization of the bank of the old Shenzhen River meander, to minimise disturbances to migratory birds/water birds;
在旱季(由十一月至下年二月)以外時間進行與生態區地盤平整工程、深圳河舊河曲的河岸鞏固工程，以盡量減少對候鳥／水禽的滋擾；
- (i) using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander (except the Meander Bridge) and other identified important ecologically sensitive areas, if any;
如要在深圳河舊河曲及其他確定為生態易受破壞的重要地區（如有的話）或其附近地方(除了跨越河曲行車橋)使用機動設備施工，時間僅限於上午 9 時至下午 5 時；
- (j) prohibiting use of direct lighting on the old Shenzhen River meander and controlling night-time lighting to reduce potential ecological impact;
為減少潛在生態影響，禁止在使用照明直接指向深圳河舊河曲，並管制夜間照明；
- (k) implementing measures to minimise magnitude of construction runoff and to avoid/minimise the potential impact of spillage events, if any; and
採取措施盡量減少施工徑流流量及避免／盡量減少溢出事件的潛在影響（如有的話）；以及
- (l) using opaque noise barriers along the proposed roads and using appropriate glass and façade treatment for buildings in the LMC Loop to minimise the mortality of fast-moving wildlife (e.g. birds).
沿擬建道路須使用不透明隔音屏，並為落馬洲河套地區內建築物的使用合適玻璃及外牆處理，以盡量減低快速移動的野生動物（例如：鳥類）的死亡率。

Four hard copies and two electronic copies of an Ecological Mitigation/Habitat Creation and Management Plan shall be, at least one month before the commencement of corresponding parts of the works of the Project, deposited with the Director. The Plan(s) shall show the design details, locations, implementation programme, maintenance and management schedules, and drawings in the scale of 1:1,000 or other appropriate scale of the ecological mitigation measures of the Project. Before submission to the Director, the Plan(s) shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report. All measures recommended in the finalised submission(s) under this Condition shall be fully and properly implemented.

許可證持有人須在工程項目的相關部分展開前，至少提早 1 個月向署長存放生態緩解/棲息地創造及管理計劃的 4 份硬複本及 2 份電子版本。計劃須顯示設計詳情、地點、實施計劃、保養及管理時間表，以及以 1:1,000 或其他合適比例繪製，展示工程項目生態緩解措施的圖則。有關計劃在提交署長前，須由環境小組組長核證及獨立環境查核人核實，證明其符合環評報告的相關資料及建議。按本條件提交的文件定稿所建議的各項措施均須徹底並妥善執行。

Reasons for Proposed Variations

(1) Implementation of Wetland Compensation Areas (i.e., EA Zone and OWCA)

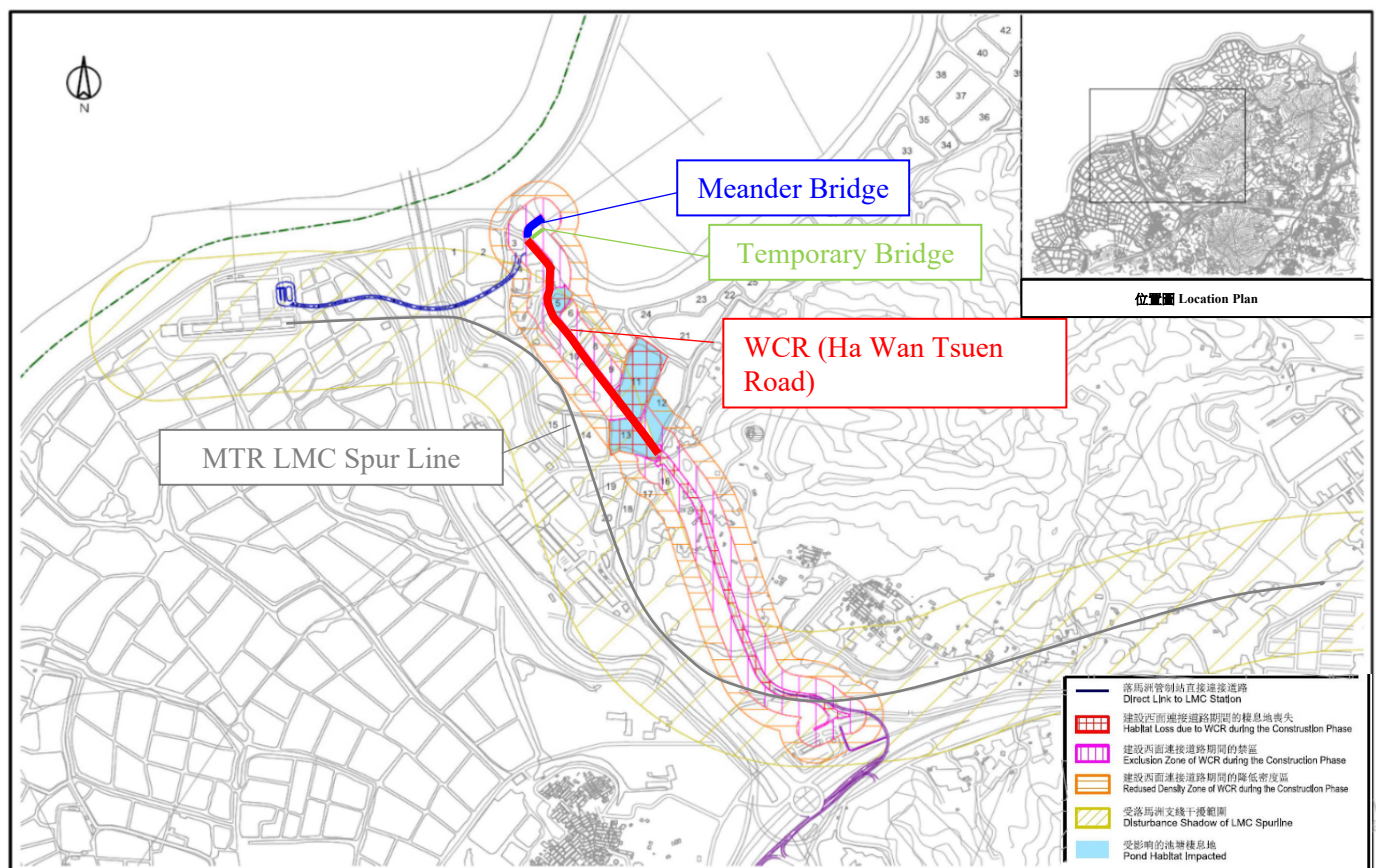
- 2.8 According to EIA Report, impacts that require compensation include habitat loss and disturbance of existing habitats and species caused by the Project. All these impacts are required to be compensated both temporarily (during construction phase) and permanently (during operation phase).
- 2.9 Mitigation measures to compensate for the reedbed habitat loss need to be carried out in advance, prior to clearance of reed marsh in the Loop. In accordance with EP Condition 2.7 (b), Ecological Area (EA) Zone along the south eastern edge of the Loop has been established since December 2022 to conserve or compensate for habitats of high conservation value, such as the reed marsh in the Loop and the existing flight line corridor of birds. A small island in the freshwater marsh cell was also created to provide a variety of habitats with a view to attracting animals like birds and Eurasian otters to settle and breed there.
- 2.10 In addition, there are three areas of existing fishpond habitat (Areas 2, 7 and 9) were proposed in the EIA Report to provide off-site compensation wetland. Construction of the Off-site Wetland Compensation Areas (OWCAs) has been completed since Oct 2022 according to EP Condition 2.7 (f) to mitigate the potential construction disturbance of the LMC Loop Project (including the WCR); in which specific habitat features to promote their user by Eurasian Otter has been constructed, including the establishment of wetlands, otter holts, floating platforms, and rock platforms. An island with 3m diameter was also created to provide potential foraging habitats for water birds.
- 2.11 Therefore, the EA Zone and OWCA offer significantly higher ecological potential and ecological value as habitat for a variety of fauna when compared to the current situations of WCR along HWT Rd and Meander Bridge in which the fish ponds

alongside HWT Rd are generally long inactive with a profile unfavourable to waterbird access and already considerably disturbed by the Spur Line, traffic, human activity as well as the unavoidable construction works which has been assessed in the EIA Report under the Project.

(2) Update of Current Situations of WCR along HWT Rd and Meander Bridge

2.12 According to Section 12.6.2 of approved EIA Report, the ponds to the south of LMC Loop between MTR LMC Spur Line and LMC Meander and alongside HWT Rd are already considerably disturbed by the Spur Line, traffic and human activity, and are also screened by trees along the edge of the Meander, it is considered that the construction disturbance impact in this area would not be considered of high significance (See Figure A below).

Figure A – Construction Impact arising from WCR and Disturbance Shadow of LMC Spurline



2.13 As described above, the construction for widening of existing HWT Road and construction of about 60 m long viaduct over the old Shenzhen River meander (i.e., Meander Bridge) has been commenced since September 2021 and August 2022 respectively under Development of Lok Ma Chau Loop – Main Works Package 1 – site formation and infrastructure works. The magnitude of disturbance has been increased since the commencement of the construction works.

2.14 Since July 2023, Ha Wan Tsuen East Road has been closed with temporary traffic arrangements implemented for the construction of the proposed Western Connection

- Road. Consequently, the road has undergone a transformation into an active construction site, encompassing various essential activities such as slope works, retaining wall construction and road drainage. These specific tasks are deemed necessary and urgent to ensure the overall stability of the construction site and safety of the others, including private landowners and the general public, and to protect the fish ponds nearby from the construction runoff.
- 2.15 Moreover, a 6m wide temporary bridge with intermediate support has also been established at southeast of Meander Bridge since April 2021 to facilitate access to the Loop prior to the commencement of Development of Lok Ma Chau Loop – Main Works Package 1 – site formation and infrastructure works, the surrounding habitat is considered anthropogenic and disturbed already.
- 2.16 In addition, construction of WCR along HWT Rd and Meander Bridge requires clearance of the riparian shrubs and trees on the bank of the Meander.
- 2.17 The temporary platforms for permanent Meander Bridge have also been established on both sides of the river bank to facilitate the construction of the bridge deck. The piling works have been completed. The remaining construction activities primarily involve reinforcement fixing, formwork installation, falsework placement, and concreting works. It is worth noting that these activities are considered to be less noisy.
- 2.18 According to Section 12.6.2.2 of approved EIA Report, Pond 12 supported higher numbers of both roosting and foraging large waterbirds (i.e., Great Cormorants and Black-faced Spoonbills). The adjacent Pond 11 was the second most important to waterbirds at HWT Rd. Based on the site observation before commencement of WCR along HWT Rd, the habitat type of Pond 12 has been changed from Pond to Reed Marsh and most of the ponds including Pond 11 alongside HWT Rd have been wholly or partially drained to facilitate construction.
- 2.19 Therefore, the current situations for WCR along HWT Rd and Meander Bridge are significantly different from the EIA stage where the general area has been substantially disturbed by the unavoidable construction works which has been assessed in the EIA Report under the Project.

(3) Relatively less disturbing Nature of the Road Works and Meander Bridge

Construction Works and Programme

- 2.20 The works area boundary as assessed in the approved EIA Report remains unchanged.
- 2.21 According to the construction programme as shown in **Appendix A1**, the remaining work comprises drainage, watermain and other utilities works, slope stabilization works, retaining wall, road and cycle track works, construction works for Meander Bridge including Deep Cement Mixing (DCM) Ground Treatment Works. No noisy construction works (such as rock breaking and piling works) would be required.
- 2.22 Powered mechanical equipment (PME) for each activity are provided in **Appendix A2**, along with sound power levels (SWLs) for individual PME.

Mitigation Measures

Quality Powered Mechanical Equipment

- 2.23 Quality Powered Mechanical Equipment (QPME) items are construction equipment that are new, notably quieter, more environmentally friendly and efficient. In order to mitigate construction noise levels at NSRs, quiet PME items including generator, and excavator are selected from the QPME system listed under webpages of EPD as mitigation measures. SWLs of these QPME items are adopted for the assessment of mitigated scenario. An inventory of the PME (**Appendix A2**) used for this mitigated scenario has been confirmed by the Project Engineer.

Noise Barrier

- 2.24 Noise barrier along HWT Rd and surrounding the works area of Meander Bridge facing the nearby LMC Meander would be erected to minimize the noise impact arising from the works. According to Technical Memorandum (TM) on Noise from Construction Work Other Than Percussive Piling, a typical construction noise barrier can achieve a noise reduction of 5 – 10 dB(A).
- 2.25 In view of the limited scale of construction area for WCR along HWT Rd and Meander Bridge, no noisy construction works (such as rock breaking and piling works) would be undertaken and implementation of appropriate noise control measures, adverse impact arising from construction works of WCR along HWT Rd and Meander Bridge are assessed as of low significance in compare with large-scale LMC Loop development works in the Loop and significant ecological barrier provided by San Sham Road and the MTR LMC Spur Line viaduct nearby. The detailed noise assessment is presented in Section 3.41 to 3.48 below.

Summary

- 2.26 In view of the update of surrounding environmental status after the establishment of EA Zone and OWCA and current situations for WCR along HWT Rd and Meander Bridge, assess whether the restriction for construction of WCR along HWT Rd during dry-season (from November to February next year) in *EP Condition 2.7 (h) “carrying out outside dry-season (from November to February next year), the construction works associated with the site formation in the Ecological Area, stabilization of the bank of the old Shenzhen River meander, Western Connection Road along Ha Wan Tsuen Road, to minimise disturbances to migratory birds/water birds”* is deemed reasonable.
- 2.27 Moreover, *EP condition 2.7(i) specifies “using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas, if any”*. However, there was no clear definition for the location of “at and near the old Shenzhen River meander (i.e. the LMC Meander)” in the EP. So, making the location of “at and near the old Shenzhen River meander” explicit is considered necessary to facilitate the implementation of such mitigation requirement in an efficient way.
- 2.28 So, the concerned EP Condition 2.7(h) and 2.7(i) under Permit No. EP-477/2013/A should be further reviewed and adjusted to facilitate the implementation of those

mitigation requirement in an efficient way.

- 2.29 The update of the construction period restriction for the construction works associated with WCR along HWT Rd and Meander Bridge would allow higher efficiency of the construction works of the Project and to increase the likelihood that the works will be completed according to the construction programme. Avoidance of prolonged construction programme is important that the disturbance to wildlife would cease.
- 2.30 There is a critical need for the Project to vary the EP condition 2.7 (h) & (i) for the construction works of WCR along HWT Rd and Meander Bridge. Otherwise, the project will be stalled or severely delayed and the overall environmental impacts will be made more adverse than those as predicted in the EIA Report.

Material Change to a Designated Project

- 2.31 There is no environmental concern for air quality, noise, water quality, sewerage and sewerage treatment implications, waste management implications, land contamination, hazard to life, cultural heritage, landscape & visual, fisheries, landfill gas hazard, food safety implications due to the proposed variations. The potential impacts are comparable to that predicted in the approved EIA Report.
- 2.32 Based on the assessment results presented in this ERR, the potential environmental impacts to construction noise and ecology are considered acceptable and are comparable to that predicted in the approved EIA Report. The proposed variation would not constitute extra impact to the environment and community.
- 2.33 There is no material change to a designated project based on the assessment to EIAO-TM Section 6.

3. DETAILED JUSTIFICATION FOR EP CONDITION 2.7 (H) AND (I)

Review of the EIA Report and relevant document

AEIAR-176/2013 - Development of Lok Ma Chau Loop

Identification of Potential Ecological Impacts

- 3.1 Clearly, the aim of the EP Condition 2.7 (h) is to mitigate the potential disturbance arising from the construction works on Flight Line Corridor during the dry-season as this is the period when most birds including migratory birds use the flight line. For EP Condition 2.7 (i) which is to mitigate the temporary disturbance impacts from construction works involving the use of mechanical plant to minimise disturbance to birds using the flight line corridor before 0900h, or after 1700h during an important activity period of mammals. The EIA Report has identified the potential impacts on flight line corridor and mammals associated with the construction of WCR along HWT Rd including Meander Bridge which are summarized in **Table 3.1** below.

Table 3.1 Summary on Potential Ecological Construction Phase Impact assessed in the approved EIA Report

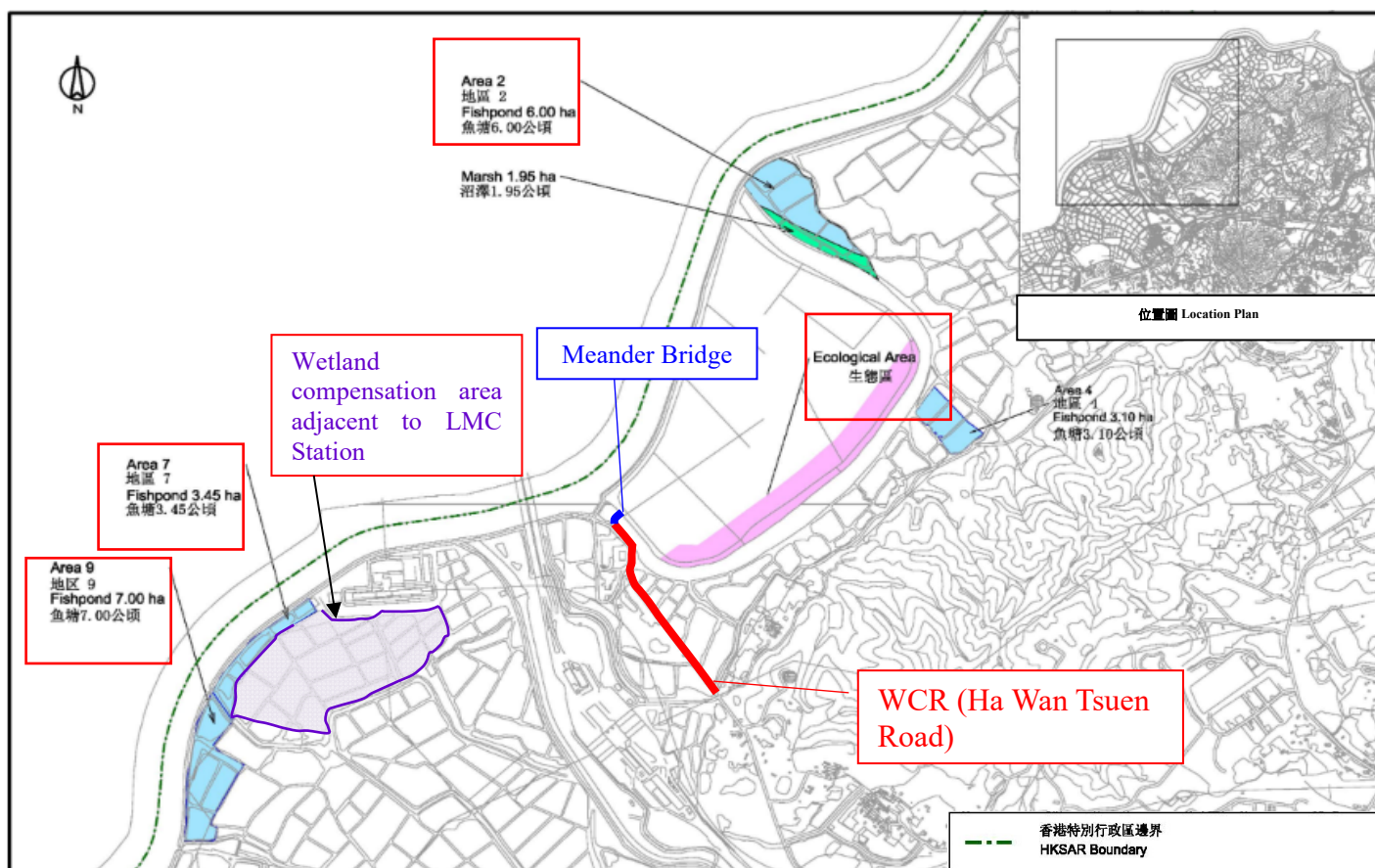
Section in the approved EIA Report	Summary of Descriptions	
Ecological Impact	<u>WCR along HWT Rd</u>	<u>Meander Bridge</u>
	<p data-bbox="566 261 730 288"><u>Direct Impact</u></p> <ul data-bbox="504 293 1346 459" style="list-style-type: none"> - Impacts on ponds along WCR comprise minor permanent habitat loss (0.92ha), relating primarily to Pond 10 (0.89ha). In addition, a significantly larger area (3.51ha) of temporary loss will occur during the construction phase, when ponds 5, 11 and 13 will be wholly drained. <p data-bbox="566 496 763 523"><u>Indirect Impacts</u></p> <ul data-bbox="504 528 1346 1031" style="list-style-type: none"> - Construction phase disturbance to LMC Meander is not predicted to result from work along Ha Wan Tsuen Road due to the relatively small-scale nature of the work and the distance from the watercourse. - Potential construction disturbance impacts are not considered of high significance, as these ponds along WCR are of lower ecological value than elsewhere in the area and are already disturbed by adjacent land uses (e.g., existing traffic and adjacent land uses, visible human activity). - Potential impacts on the flight line corridor for many birds enters the LMC Loop area over the ponds. - Pond 12 supported higher numbers of both roosting and foraging large waterbirds. - Pond 11 will be temporarily drained, and thus disturbance impacts are not relevant at that time. 	<p data-bbox="1433 261 1597 288"><u>Direct Impact</u></p> <ul data-bbox="1370 293 2101 459" style="list-style-type: none"> - The total area of the Meander River bed lost (approximately 80-160m²). - Permanent loss of a small area (approximately 0.15ha) of riparian shrubs and trees on the bank of the Meander - Small area of marsh (0.07ha) will be permanently lost. <p data-bbox="1433 496 1630 523"><u>Indirect Impacts</u></p> <ul data-bbox="1370 528 2101 970" style="list-style-type: none"> - Limited disturbance impact on roosting/foraging large waterbirds, as relatively few use the Meander. - The densely-vegetated and steep-sided banks are not favourable to waterbird access for foraging, and only very small numbers of large waterbirds were recorded roosting in trees in this area. - With regard to Eurasian Otter, it appears that the existing barrier between LMC Meander and Shenzhen River does not allow passage of mammals, and thus it appears unlikely that this route is used by otters as a means of moving from the LMC area to the wetlands at HHW. So, disturbance impacts during construction phase potentially of low to moderate magnitude.

Mitigation for Impacts on Flight Line Corridor and Mammals of Western Connection Road Along Ha Wan Tsuen Road and Meander Bridge

- 3.2 A review was conducted for the mitigation measures proposed in the EIA Report for both direct and indirect impact as summarized in **Table 3.1**.
- 3.3 For the direct impacts of habitat loss of wetland habitats due to the construction of WCR, Off-site creation and establishment of wetland compensation areas prior to commencement of substantive works associated with any element of the Project for which wetland compensation is required.
- 3.4 Regarding the indirect impacts during construction phase, the following mitigation measures were recommended in the EIA Report for WCR along HWT Rd.
- a) no construction activities involving the use of mechanical plant to be carried out before 0900h in order to minimise disturbance to birds using the flight line corridor, or after 1700h during an important activity periods of mammals;
 - b) construction work will be restricted to the wet season (April to October);
 - c) A 3m visual/noise barrier and dense tree and shrub screening in the crucial open areas between ponds 3 and 5 and adjacent to ponds 11 and 12, and retention or reinstatement of the dense natural tree screening between ponds 5 and 9. Such barriers should be erected in the construction phase as part of normal procedure, as visual and noise disturbance will temporarily reduce bird activity in the area.
- 3.5 For the construction of meander bridge which will result in minor loss of trees, shrubs and the natural bank of the Meander totalling 0.15ha. The small scale of these impacts, is predicted to be of low significance, and mitigation is considered unnecessary according to EIA Report.

Wetland Compensation Areas

- 3.6 According to the direct impact due to the habitat loss in **Table 3.1** above, mitigation for loss of habitat includes mainly on-site habitat compensation of reed marsh “Ecological Area” (EA) and the associated habitat enhancement in the EA; and off-site mitigation of creation and establishment of wetland compensation areas (i.e., Area 2, 7 & 9). EA Zone along the southeastern edge of the Loop has been established since Dec 2022 and OWCA is currently under establishment. The location of the wetland compensation areas is shown in the following **Figure B**.

Figure B – Location of Wetland Compensation Areas

3.7 The specific habitat features for otter and waterbirds are presented in **Appendix B**.

Review of Ecological Monitoring Results under EM&A Requirement

3.8 According to Section 11.4.2.1 of Environmental Monitoring and Audit Manual (EM&A Manual), the flight line corridor use by large waterbirds should be monitored to identify any impacts from construction activities. Same as the flight line survey for LMP Loop as presented in Section 11.4.1.1 of EM&A Manual, the main concern is the number and species composition of birds using the flight line. Should significant impacts on the flight line be recorded, measures to minimise or reduce these shall be devised, where possible.

3.9 With regard to Pond 12 which regularly supported 20-40 roosting Great Cormorants in the winter period, and which, in early 2012, supported a foraging flock of up to 15 Black-faced Spoonbills during EIA Stage, it is recommended to monitor the numbers of birds using the pond during construction to ensure that no impacts greater than predicted are occurring. Weekly counts of the number and species of birds using the pond should be carried out both before construction work commences each day and 1 hour after it begins. This would enable an assessment to be made of the impact of construction activities on bird use of the pond.

Avifauna Monitoring – Flight Line Survey*Methodology*

- 3.10 Flight lines of birds through the area shall be surveyed once monthly at Lok Ma Chau Lookout, adjacent to the Loop.
- 3.11 Observations shall be carried out at Lok Ma Chau Lookout for two hours from 30 minutes before sunrise in the early morning. The location at Lok Ma Chau Lookout is shown in **Figure 2**.
- 3.12 During the survey, the surveyor shall mark on a standard map for the estimated location of the flight path used by waterbird species, birds of prey or other larger species of conservation interest passing through the area. Flights involving short hops from point to point shall not be recorded. The focus shall be on the flight line corridor over the Loop or the southwest section of old Shenzhen River meander.
- 3.13 During the survey, species generally commensal with man (e.g. Black-collared Starling), common and widespread in HK (e.g. Crested Myna) or small in size and not prone to following flight lines en masse (e.g. Barn Swallow) shall be ignored in order to concentrate on species of conservation interest and/or those prone to using flight lines (e.g. large waterbirds).
- 3.14 For each observation of birds in flight, the number, the species and their height above the ground shall be recorded. Height above the ground shall be estimated in relation to the level of the Loop and adjacent fish pond area, and/or the location of the observer.
- 3.15 Given the difficulty of accurately measuring height above ground from a distance, three height classes shall be used: 10m, 20m and 30m or above. In practice, this means birds shall be assigned to ranges of 5-15m (10m height class), 15-25m (20m height class) and 25m or above (30m height class). Approximate heights of observation points is 40m at Lok Ma Chau Lookout.
- 3.16 Flight line locations shall be marked on the maps and then overlain with a 100m grid, each square having a unique number.
- 3.17 The number of birds of each species passing through each 100m grid (the number of “bird-flights”) and their height above ground shall be entered into an Excel spreadsheet. These data shall be mapped, and on the figures produced a greater intensity of colour indicated a higher number of birds.

Data Collection

- 3.18 The flight line corridor survey has been carried out since Jan 2019 on a monthly basis. A total of 57 survey days were collected, from January 2019 to September 2023. Surveys commenced at least 30 minutes before sunset and continued for 2 hours after sunset. Sunset times were obtained from the Hong Kong Observatory (<http://www.hko.gov.hk/content.htm>). The observers at a vantage point, situated on the Lok Ma Chau Lookout, was used throughout the surveys. Binoculars were used to confirm numbers and identification of waterbird species. Parameters recorded included the time, numbers, species and their height using flight lines corridor from areas to the

south of LMC Spur Line railway and San Sham Road to Hoo Hok Wai (HHW).

Results

- 3.19 From 57 survey days, the majority of waterbirds passed over the LMC Spur Line railway and San Sham Road as well as HWR Rd on their approach to the Shenzhen River and LMC Meander as well as adjacent area (i.e., EA Zone) and then to fishpond area outside. **Figure 3** shows the overall summary map (both dry and wet season) indicates flight line corridor were located over LMC Meander and adjacent area (i.e., EA Zone) and unaffected Shenzhen River. The entry point for most large waterbirds including migratory waterbirds (e.g., Great Cormorant and Black-faced Spoonbill) lies over Ha Wan Tsuen Road and then across the abandoned ponds near LMC Meander as well as alongside of unaffected Shenzhen River.
- 3.20 **Figure 3a** and **3b** indicates flight line corridor during the wet and dry season respectively. There is no significant difference in the overall distribution of flight lines between wet and dry season apart from more records of birds using flightline along the Shenzhen River during dry season. It is considered that the majority of Great Cormorants using this flight line during this period as they are not present in HK in the summer (i.e., wet season). LMC Meander and adjacent areas, comprising the southeast edge of LMC Loop up to a width of approximately 150m and fish ponds up to width of approximately 50m as well as EA Zone and Shenzhen River are still the important flight line corridor for large waterbirds / migratory birds to travel between wetlands to the southwest of LMC Loop and the fishponds at HHW.
- 3.21 The birds were generally following the same route when returning to LMC. No collisions of waterbirds with traffic (LMC Spur Line railway and San Sham Road) and construction plants equipment at the site area of WCR including Meander Bridge were observed during the surveys.

Flight Line Census counts

- 3.22 **Table 3.3(a-b)** provides the comparison of the results of early morning counts made from LMC Lookout of the number of birds using the flight line corridor with EIA. The period November to February was treated as the dry season, while March to October was regarded as the wet season.

Table 3.3a Comparison of Counts of large waterbirds at LMC Lookout, Jan 2019-Sept 2023 with EIA (Wet Season)

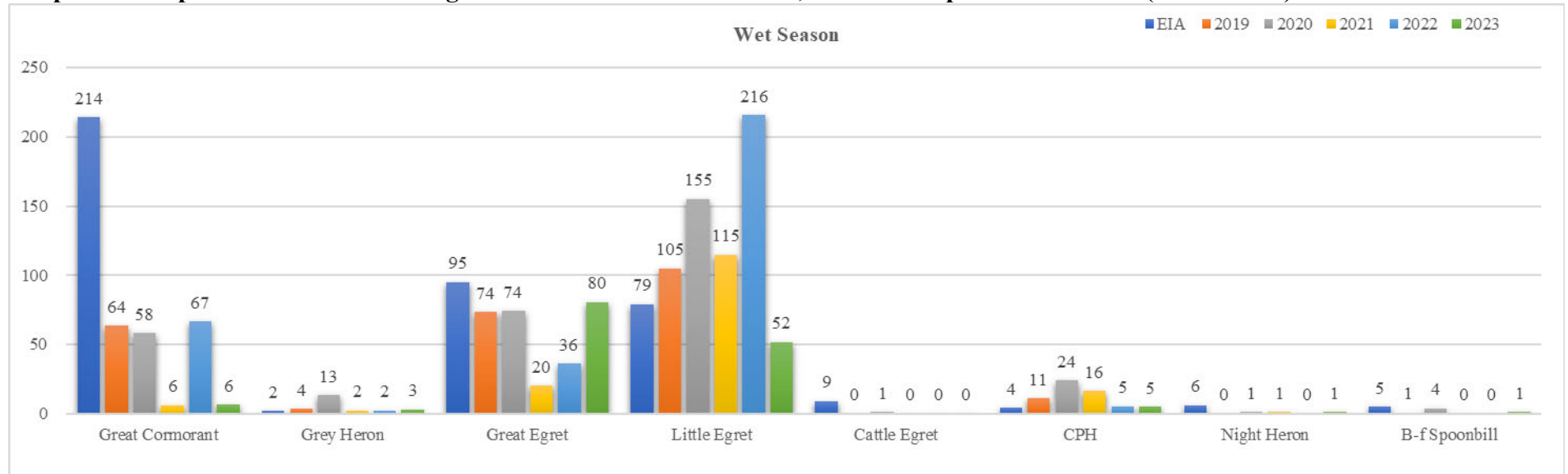
Species	Counts of Large Waterbirds (Average)					
	EIA	2019	2020	2021	2022	2023
Great Cormorant	214	64	58	6	67	6
Grey Heron	2	4	13	2	2	3
Great Egret	95	74	74	20	36	80
Little Egret	79	105	155	115	216	52
Cattle Egret	9	0	1	0	0	0
CPH	4	11	24	16	5	5
Night Heron	6	0	1	1	0	1
B-f Spoonbill	5	1	4	0	0	1

Table 3.3b Comparison of Counts of large waterbirds at LMC Lookout, Jan 2019-Sept 2023 with EIA (Dry Season)

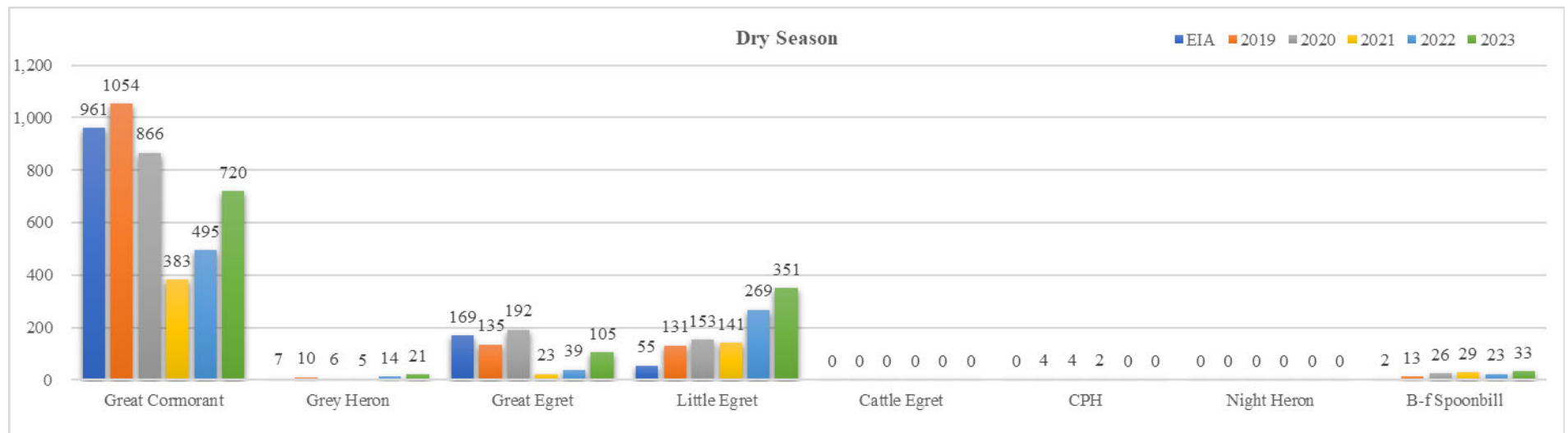
Species	Counts of Large Waterbirds (Average)					
	EIA	2019	2020	2021	2022	2023
Great Cormorant	961	1054	866	383	495	720
Grey Heron	7	10	6	5	14	21
Great Egret	169	135	192	23	39	105
Little Egret	55	131	153	141	269	351
Cattle Egret	0	0	0	0	0	0
CPH	0	4	4	2	0	0
Night Heron	0	0	0	0	0	0
B-f Spoonbill	2	13	26	29	23	33

3.23 The graphical presentation of flight line census counts is shown in **Graph 1** and **Graph 2** below.

Graph 1 - Comparison of Counts of large waterbirds at LMC Lookout, Jan 2019-Sept 2023 with EIA (Wet Season)



Graph 2 - Comparison of Counts of large waterbirds at LMC Lookout, Jan 2019-Sept 2023 with EIA (Dry Season)



- 3.24 Compared to EIA results, there is no change in the species composition of birds using the flight line in the flightline surveys during construction phase (Jan 2019-Sept 2023). The species composition of birds including Great cormorant, Grey Heron, Great Egret, Little Egret Cattle Egret, Chinese Pond Heron (CPH), Night Heron and Black-faced Spoonbill (B-f Spoonbill). Flights involving short hops from point to point were not recorded for the analysis of the impact on flight line corridor.
- 3.25 According to the survey results during construction phase(**Graph 1** and **Graph 2**), there were also no obvious changes in bird counts over the survey years. Great Cormorant and B-f Spoonbill are the migratory birds arrive in Hong Kong in the winter season (i.e., dry season). The higher number of Great Cormorant and B-f Spoonbill recorded in the wet season during EIA stage is considered due to the counts recorded in the month of March and October, which is a transitional month between dry and wet seasons.
- 3.26 Lower number of Grey Heron, Cattle Egret, CPH and Night Herons were recorded using the flightline corridor which is similar to the results during EIA.
- 3.27 Based on the census of the numbers of each species using the flight line, carried out from LMC Lookout, no significant impact on the flight line corridor was observed.

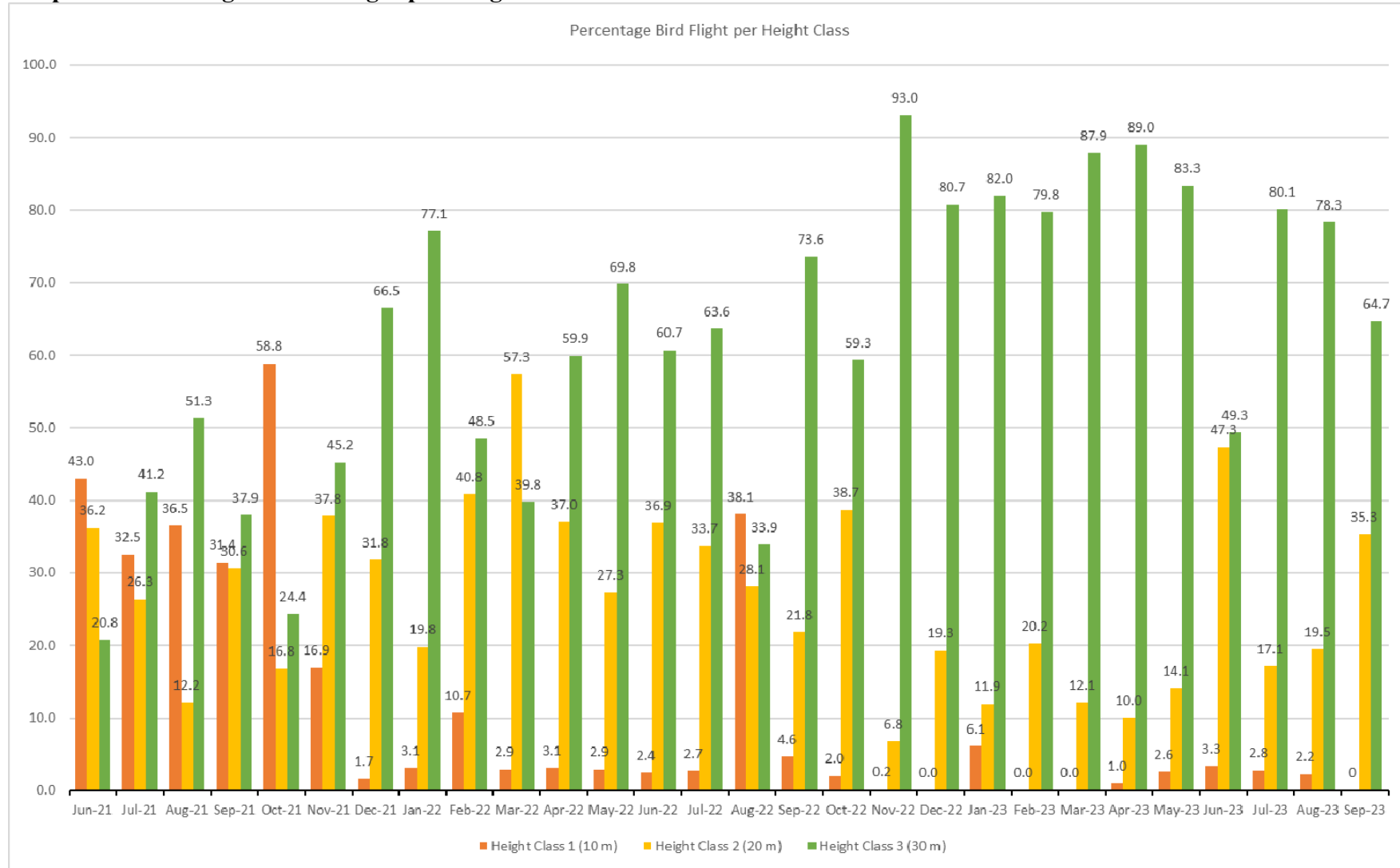
Height of flight

- 3.28 In accordance with the flightline survey results in the Appendix 12-3 of EIA Report, 30m flight lines are concentrated in the area near Ha Wan Tsuen. The concentration of 30m flight lines appears to be related to the presence of other disruptions to the flight line to the south, including the LMC Spur Line railway and San-Sham Road leading to LMC BCP, as well as taller trees, which together cause birds to enter the LMC Loop area at a greater height.
- 3.29 Based on the available flight height results since June 2021, the height of flight is generally similar and consistent to those of surveys in the EIA that 30m flight lines are concentrated in the area near Ha Wan Tsuen (See **Table 3.4** and **Graph 3**). In addition, such phenomenon becomes apparent since April 2022 (after the construction of Emergency Hospital in Lok Ma Chau Loop in March 2022) besides the majority records due to the migratory birds which usually fly at high altitude in the dry season (Nov-Feb 2022). It demonstrates that the large waterbirds appeared behaviourally adaptable to flew over LMC Spur Line railway, San Sham Road, HWT Rd as well as the new development (i.e., LMC Emergency Hospital) that intersected their approach to HHW.

Table 3.4 Summary Results of Flight Height

Month	Number of Bird-Flights			Height Class 1	Height Class 2	Height Class 3
	Height Class 1 (10 m)	Height Class 2 (20 m)	Height Class 3 (30 m)	% HC10	% HC20	% HC30
Jun-21	120	101	58	43.0	36.2	20.8
Jul-21	243	197	308	32.5	26.3	41.2
Aug-21	564	188	793	36.5	12.2	51.3
Sep-21	631	615	761	31.4	30.6	37.9
Oct-21	679	194	281	58.8	16.8	24.4
Nov-21	631	1410	1686	16.9	37.8	45.2
Dec-21	134	2536	5306	1.7	31.8	66.5
Jan-22	209	1348	5248	3.1	19.8	77.1
Feb-22	705	2700	3208	10.7	40.8	48.5
Mar-22	132	2629	1826	2.9	57.3	39.8
Apr-22	54	650	1052	3.1	37.0	59.9
May-22	88	830	2123	2.9	27.3	69.8
Jun-22	33	504	828	2.4	36.9	60.7
Jul-22	19	234	442	2.7	33.7	63.6
Aug-22	145	107	129	38.1	28.1	33.9
Sep-22	71	334	1127	4.6	21.8	73.6
Oct-22	260	5084	7797	2.0	38.7	59.3
Nov-22	16	620	8482	0.2	6.8	93.0
Dec-22	0	2332	9755	0.0	19.3	80.7
Jan-23	924	1812	12466	6.1	11.9	82.0
Feb-23	0	2665	10506	0.0	20.2	79.8
Mar-23	0	164	1190	0.0	12.1	87.9
Apr-23	20	202	1792	1.0	10.0	89.0
May-23	20	110	650	2.6	14.1	83.3
Jun-23	20	284	296	3.3	47.3	49.3
Jul-23	42	260	1219	2.8	17.1	80.1
Aug-23	36	313	1258	2.2	19.5	78.3
Sep-23	0	916	1679	0	35.3	64.7

Graph 3 – Percentage of Bird Flight per Height Class



Ad hoc Flight Line Survey during Construction Works

- 3.30 In order to further review the disturbance impact arising from the construction works of WCR along HWT Rd on the flightline corridor, additional ad hoc flight line survey has been conducted by Ecologist within the first two hours of construction works at HWT Rd (from 0900 to 1100) on 8/8/2023. According to the results, more than 50% of the flight lines during the working period from 0900 to 1100 were passed through the area south of Pond 11, and approximately 38% of the recorded flight lines during the same period were over the area where construction activities were taking place.
- 3.31 Another additional flightline survey was also conducted within the first hour of construction works at HWT Rd (from 0800 to 0900) on 22/9/2023. About 45% of the flight lines during the working period from 0800 to 0900 were passed over near Pond 11, and all waterbird as both individuals and in flocks during the same period were flying over the on-going construction activities along HWT Rd. No erratic flight behaviour when they approached or crossed over the area where construction activities were taking place. The waterbirds kept flying at a higher attitude to HWT Rd after passing over the LMC Spur Line railway and San-Sham Road.
- 3.32 These findings suggest that the on-going construction activities along HWT Rd may not have any significant impact to the use of the flight line corridor by waterbird during wet season. Considering the migratory birds would also fly higher when traversing the flight line to and from foraging areas and birds on flight lines to and from foraging areas are generally less sensitive to disturbance than when foraging or roosting, adverse impact arising from construction works of WCR along HWT Rd are assessed as of low significance as the site area of WCR along HWT Rd is small and narrow in size in compare with the significant ecological barrier provided by San Sham Road and the MTR LMC Spur Line viaduct nearby.

Avifauna Monitoring – Pond 12*Methodology*

- 3.33 As required under Section 11.4.2.1 of EM&A Manual, weekly counts of the number and species of bird using Pond 12 shall be conducted from the beginning of work until 12 months after the establishment of the Ecological Area or completion of work on the Western Connection Road, whichever is the later. Location of Pond 12 is shown in **Figure 2**.
- 3.34 The purpose of the survey is to identify the number and species composition of birds using Pond 12 to ensure there would be no impacts greater than predicted from construction works.

Data Collection

- 3.35 The weekly counts of the number and species of bird using Pond 12 has been carried out since March 2022 after commencement of WCR along HWT Rd. A total of 62 survey days were collected, from March 2022 to August 2023. The monitoring commenced before construction work and 1 hour after it begins. The observers at a vantage point, situated at Pond 12, was used throughout the monitoring. Binoculars were used to confirm numbers and identification of waterbird species. Parameters

recorded included the time, the abundance and species of the identified birds.

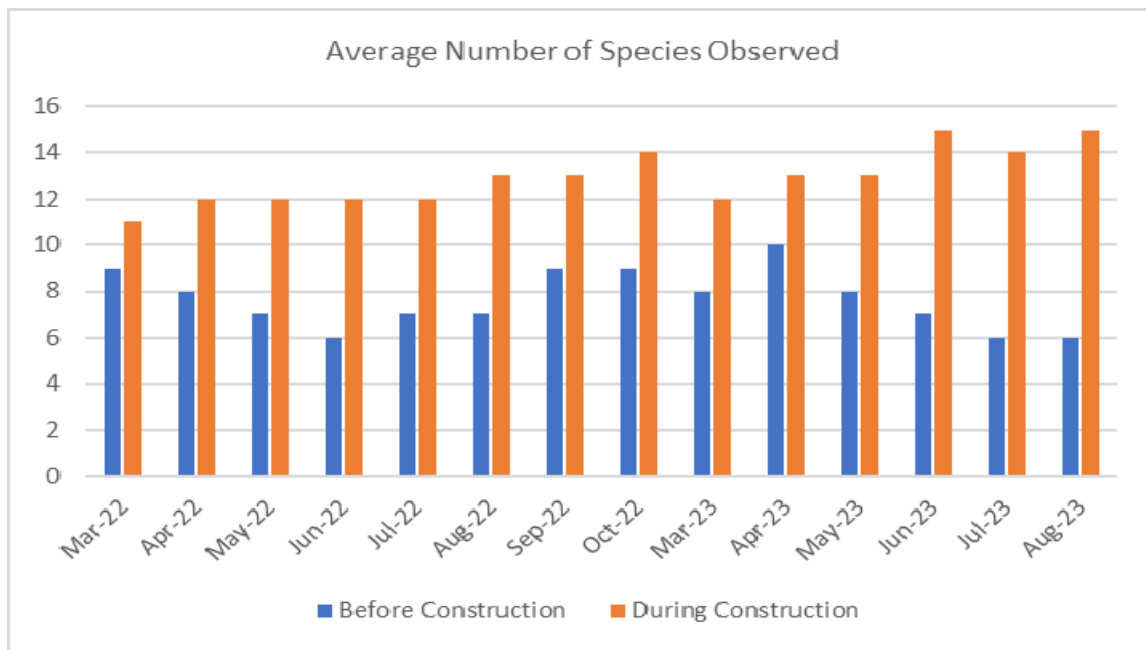
Results

- 3.36 The construction works recorded nearby are drainage, watermain and other utilities works involving the operation of excavator, vibration plant, crane lorry, dump truck, concrete lorry mixer, roller and generator.
- 3.37 Summary of the bird survey results at Pond 12 is shown in **Table 3.5** and **Graphs 4 & 5**.

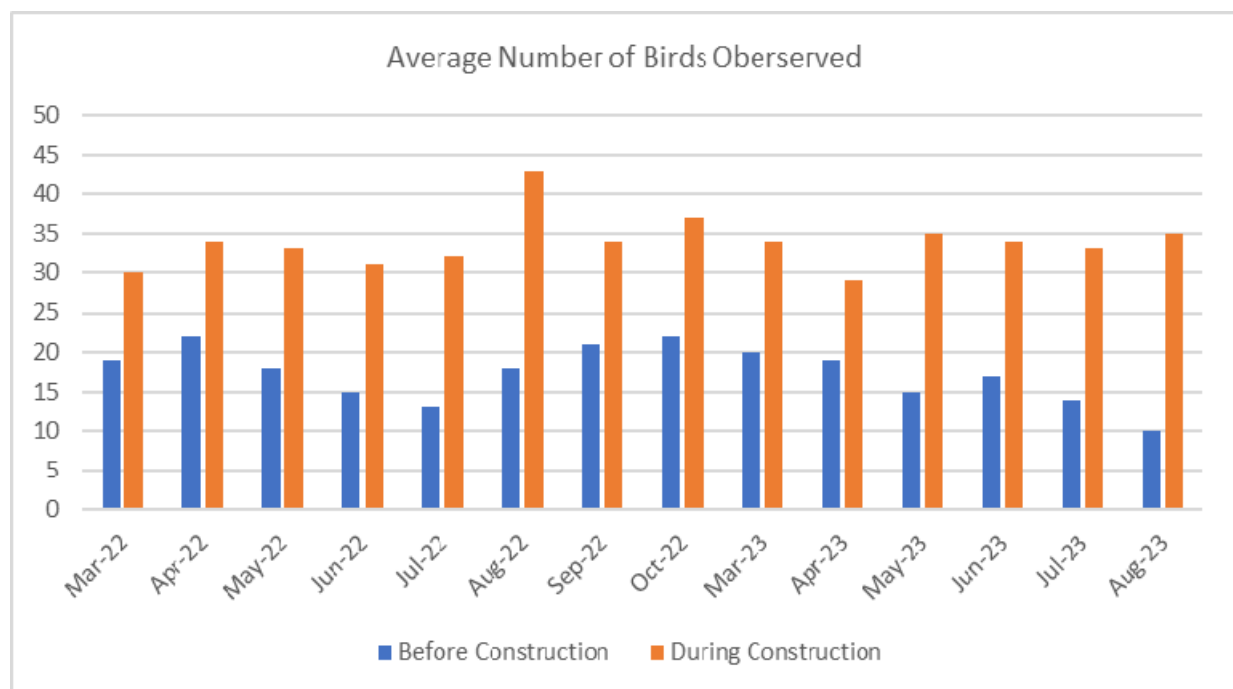
Table 3.5 Summary of Pond 12 Bird Survey Results

Month / Year	Monthly average			
	No of Species		No of Birds	
	Before Construction	During Construction	Before Construction	During Construction
Mar-22	9	11	19	30
Apr-22	8	12	22	34
May-22	7	12	18	33
Jun-22	6	12	15	31
Jul-22	7	12	13	32
Aug-22	7	13	18	43
Sep-22	9	13	21	34
Oct-22	9	14	22	37
Mar-23	8	12	20	34
Apr-23	10	13	19	29
May-23	8	13	15	35
Jun-23	7	15	17	34
Jul-23	6	14	14	33
Aug-23	6	15	10	35

Graph 4 – Average Number of Species Observed at Pond 12



Graph 5 – Average Number of Birds Observed at Pond 12



3.38 According to Section 12.6.2.2 of EIA Report, Pond 12 provides regular daytime roost site for small numbers of Great Cormorants and a few large waterbirds, including foraging Black-faced Spoonbills in early 2012. However, the habitat type of Pond 12 has been changed from Pond to Reed Marsh before commencement of WCR along HWT Rd. The condition during EIA and current condition of this pond are illustrated in **Photo 1** and **2** below.

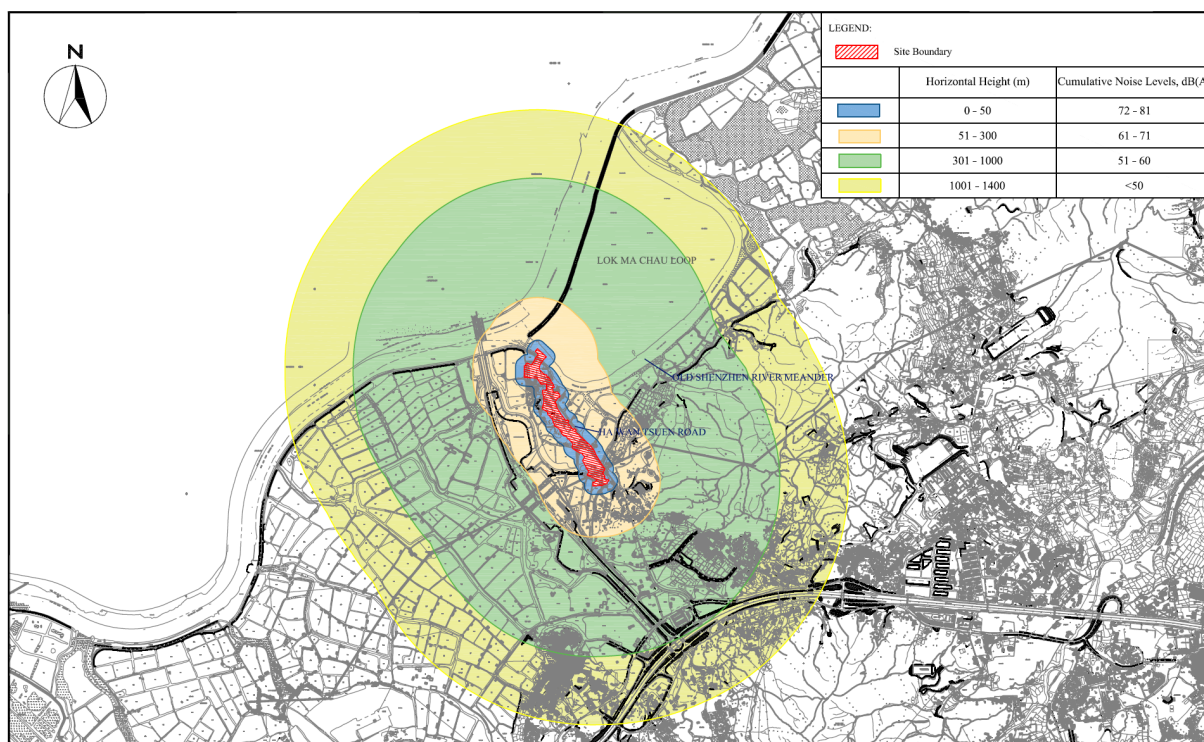


- 3.39 Based on the updated condition of Pond 12 since the commencement of monitoring, the bird species recorded from the 62 survey events are mainly Reed Marsh-dependent birds (e.g., Yellow Bittern, White-breasted Waterhen, Pied Kingfisher, Common Kingfisher, White-throated Kingfisher, Plain Prinia, Yellow-bellied Prinia, Scaly-breasted Munia etc.) and common and widespread species (e.g., Eurasian Tree Sparrow, doves, bulbuls, Black-collared Starling, White-shouldered Starling Masked Laughingthrush, Swinhoe's White-eye etc.), instead of large waterbirds use of the Pond 12. Smaller number of waterbirds (e.g., Great Egret, Little Egret and Chinese Pond Herons) were recorded fly over Pond 12 and “hopping” from pond to pond.
- 3.40 In view of the habitat condition of Pond 12 has been changed since the commencement of WCR along HWT Rd and no longer as preferred habitat to support the target migratory birds (Great Cormorants and Black-faced Spoonbills) and waterbirds for foraging and roosting; and the Pond 12 survey results have demonstrated that the construction works at WCR along HWT Rd has no significant disturbance impact on the birds currently utilize Pond 12, thus, it is predicted that impacts to the target migratory birds, Great Cormorants and Black-faced Spoonbills as identified in EIA are negligible.

Noise Assessment Results

- 3.41 Machinery and works activities during construction can cause potential impact on birds. The construction noise assessment to predict the maximum noise levels arising from the construction of WCR along HWT Rd and Meander Bridge has been carried out in accordance with updated construction programmes provided by the Contractor.
- 3.42 According to the flight line survey results above, the majority of waterbirds passed over HWR Rd at above 30m on their approach to the Shenzhen River and LMC Meander as well as adjacent area (i.e., EA Zone) and then to fishpond area outside. The contours show the noise due to construction of WCR along HWT Rd and Meander Bridge to 30m flight line corridor during normal working hours are show in the **Figure C** below.

Figure C - Noise contours for day-time construction at WCR (including Meander Bridge) at 30m Vertical Height



- 3.43 As shown in the noise contours, the highest predicted noise level due to construction in WCR along HWT Rd and Meander Bridge is 81 dBA and reducing to <52 dBA at horizontal distance of 300m (vertical distance at 30m) away from site.
- 3.44 According to the ad hoc flight line surveys on 8 Aug 2023 and 22 Sept 2023, road works, drilling works, retaining wall construction, excavation & backfilling works and DCM works involving backhoe, vibration hammer, concrete lorry mixer, DCM Rig, generator, grout station, water pump were operated for associated works at WCR along HWT Rd and Meander Bridge. The estimated noise levels are approximately 82dB(A) at 30m vertical height arising from notional noise source of WCR along HWT Rd and Meander Bridge. As mentioned in Section 3.31 that no erratic flight behaviour when they approached or crossed over the area where construction activities were taking place (approx. 82dB(A)). The waterbirds kept flying at a higher attitude to HWT Rd after passing over the LMC Spur Line railway and San-Sham Road.
- 3.45 In accordance with the EIA Report, birds on flight lines to and from foraging areas which are generally less sensitive to disturbance than when foraging or roosting. Therefore, the remaining construction works is not predicted to impose significant disturbance impacts on flight lines to and from foraging areas across WCR along HWT Rd and Meander Bridge based on the noise assessment results and ad hoc flight line survey results as discussed above.
- 3.46 In addition, the construction works recorded during the Pond 12 surveys are similar to the remaining construction works which involving the operation of excavator, vibration plant, crane lorry, dump truck, concrete lorry mixer, roller, generator, vibrating poker and welding machine. Thus, no significant disturbance impact on the birds currently

utilize Pond 12 due to the remaining construction works with reference to Pond 12 survey results.

- 3.47 However, construction noise permit has been applied and obtained for the construction works during the restricted hours (i.e., all days during evening (1900 to 2300 hours), and general holidays (including Sundays) during the day-time and evening (0700 to 2300 hours) and all days during the night-time (2300 to 0700 hours)). The noise criteria during the restricted hours for CNP Application is shown in **Table 3.6**.

Table 3.6 Noise Criteria During Restricted Hours for CNP Application

Item	Time Period	Noise Criteria (dB(A))
Restricted Hour (CNP required)	0700 to 1900 (general holidays (including Sundays))	60
	1900 to 2300 hours (all days)	60
	2300 to 0700 hours (all days)	45

- 3.48 Construction activities between 1900 to 0700 hours would be considerably reduced compared to the day-time activities. As such, night-time noise levels would be considerably lower.

Mammals Monitoring

- 3.49 No construction phase mammal monitoring is required for WCR along HWT Rd and Meander Bridge according to EM&A Manual.
- 3.50 The direct and indirect impact as well as the construction phase mitigation measures for Eurasian Otter and other mammals related to WCR along HWT Rd and Meander Bridge has been discussed in Section 3.1 to 3.5 which are summarized in the **Table 3.7**.

Table 3.7 Potential Direct and Indirect Impact on Mammals and Proposed Mitigation

Type	Impact	Mitigation
Habitat (loss) Impacts	<ul style="list-style-type: none"> Loss of wetland habitat associated with Western Connection Road (WCR). Loss of natural bank and riparian vegetation along topmost part of the bank on 3 sides of LMC Meander. Loss of LMC meander channel permanently for WCR. 	<ul style="list-style-type: none"> On-site habitat compensation of reed marsh "Ecological Area" (EA) and the associated habitat enhancement in the EA. Off-site mitigation of creation and establishment of wetland compensation areas. (i.e., OWCA's - Area 2, 7.9).
Secondary Impacts	<ul style="list-style-type: none"> Disturbance on use of LMC Meander. Disturbance impact from dogs associated with construction site. Secondary impacts on prey species via deterioration in water quality. Fragmentation impact as a result of road or bridge construction. 	<ul style="list-style-type: none"> EP condition 2.7(i), which requires "using powered mechanical equipment (PME) for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive

Type	Impact	Mitigation
		<p>areas, if any”.</p> <ul style="list-style-type: none"> • Minimum 1m clearance between WCR bridge over Meander and water surface, except at times of extreme flooding. • Erection of 3m high, dull green site boundary fence to all construction areas to minimise disturbance to wetland habitats caused by human activity. This includes a fence around existing reed marsh to minimise disturbance and prevent access by dogs. • No lighting directed at Meander. • Standard measures to minimise run-off and impacts of spillage events (see Sections 12.7.2.5 and 12.7.2.6 of EIA Report). • Pre-construction surveys for otter holts or dens. • No works within 150m of any natal den in use, or within 30m of any holt. • Restrict access to areas containing holts or dens.

Occurrence Records of Eurasian Otter

- 3.51 According to the EIA Report, a single Eurasian Otter was heard from the reed marsh inside the LMC Loop on 12th October 2009, and a local fish pond operator stated in questionnaire interview that it occurred in the reedbed and associated small marshy areas and the last record of Eurasian Otter was found in early 2010, one was seen swimming in LMC Meander towards the southern margin of the Loop, where it landed. SI activities took place in the Loop.
- 3.52 After the EIA Study, there was no record of Eurasian Otter except the additional baseline survey in 2018/19 recorded at Area 2. The surveys and findings of Eurasian Otter are presents in **Table 3.8**.

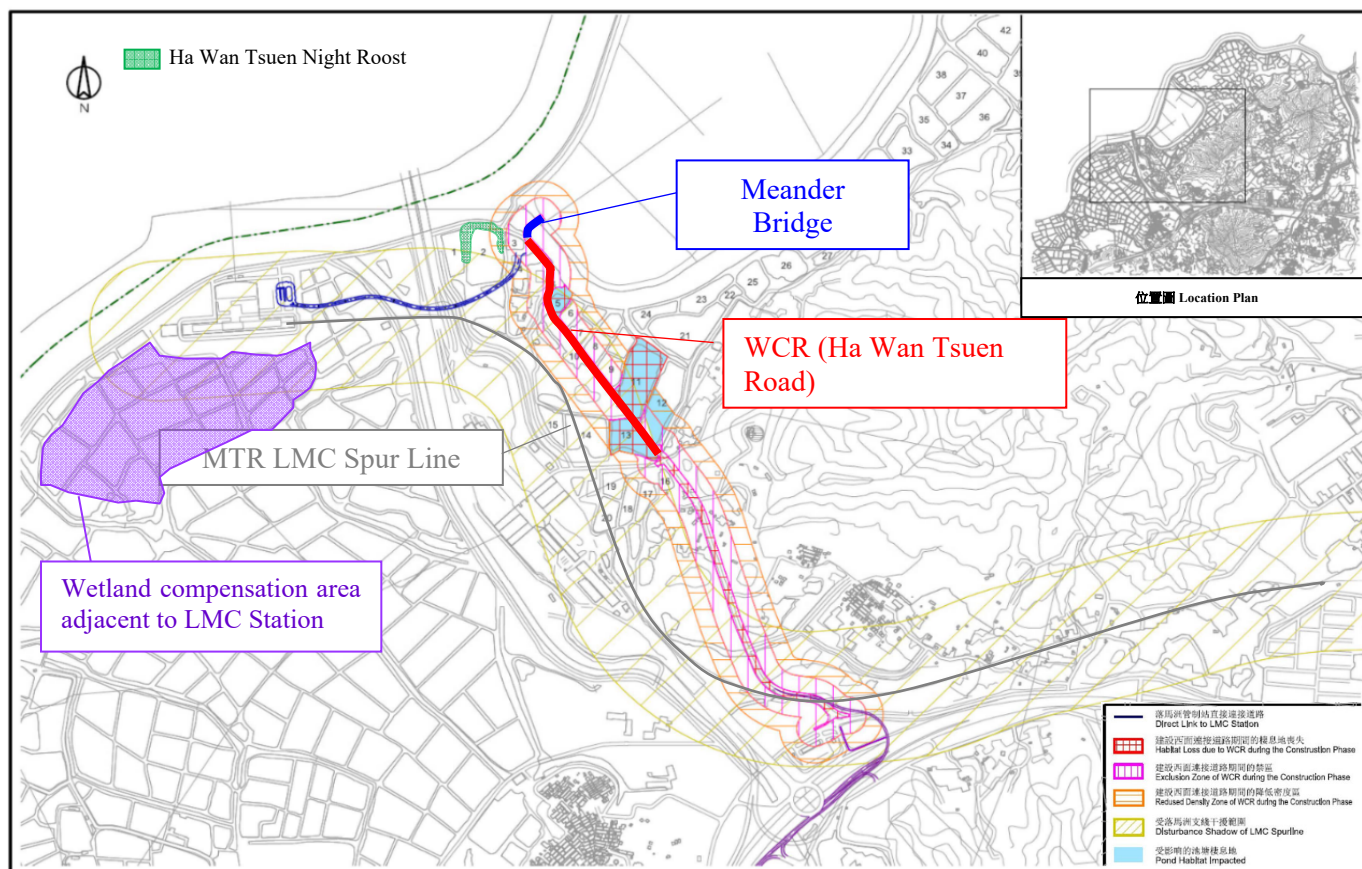
Table 3.8 Summary of Eurasian Otter Survey Findings (After the EIA Study)

Surveys	Period	Location	Presence of Eurasian Otter
Pre-construction baseline survey (Contract No. YL/2017/03)	August 2014 to June 2015	LMC Loop, LMC Meander	X
Pre-construction search survey (Contract No. YL/2017/03)	November 2018	LMC Loop, LMC Meander	X

Surveys	Period	Location	Presence of Eurasian Otter
Additional baseline survey (Agreement No. CE5/2018)	October 2018 to June 2019	OWCAs	✓ (Area 2) X (Area 7 & 9)
Pre-construction search survey (Agreement No. CE5/2018)	May 2021 to June 2021	OWCAs	X
	June 2021 to July 2021	LMC Loop, WCR sites	X
Ecology monitoring (mammal) under the EM&A programme	March 2019 to February 2022	LMC Loop, including EA	X

Potential Impact on Other Fauna Groups (Ha Wan Tsuen Night Roost)

- 3.53 Other than flight line corridor and Eurasian Otter, the potential impact of proposed adjustment in EP Condition 2.7 (h) & (i) to Ha Wan Tsuen Night Roost was also examined. As the recommended change in mitigation measures will not pose any additional habitat loss, only secondary impacts are discussed in the current section.
- 3.54 As communicated with AFCD, Ha Wan Tsuen Night Roost was firstly identified in January 2022 during ecological surveys. The location of Ha Wan Tsuen Night Roost is shown in **Figure D**. As shown in **Figure D**, part of the Ha Wan Tsuen Night Roost is within the Reduced Density Zone (RDZ). According to Table 12.7 of approved EIA Report of Lok Ma Chau Development, the permanent impacts on wetland habitats for RDZ has already been compensated in the OWCAs.

Figure D – Location of Ha Wan Tsuen Night Roost

3.56 As Ha Wan Tsuen Night Roost was not recorded under the approved EIA Report of Lok Ma Chau Development and its location outside the Project boundary, there is no timing control requirement on the use of powered mechanical equipment for construction works within the 100m buffer zone from the active night roosting sites under the Project of Lok Ma Chau Development. Therefore, Ha Wan Tsuen Night Roost was already subjected high level of anthropogenic disturbance due to its location next to the construction site area of Lok Ma Chau Development.

3.57 Lok Ma Chau Ecological Enhancement Area (EEA) (i.e., Wetland compensation area adjacent to LMC Station) as shown in **Figure D** is situated within 600m away from Ha Wan Tsuen Night Roost where is a big night roosting site with over 3,000 Great Cormorants was recorded according to Environmental Committee Meeting for Sheung Shui to Lok Ma Chau Spur Line held in 2020.

3.58 As mentioned in Section 3.48, construction activities at near Ha Wan Tsuen Night Roost would be limited during the night-time period so that noise levels would be considerably lower than those generated during the daytime period. Activities occurring during the defined nighttime period at near Ha Wan Tsuen Night Roost (within 100m from the active night roost) would include DCM works, road works and construction works for Meander Bridge. With the implementation of associated mitigation measures for the ardeid night roost and taking into account of a big night roosting site situated nearby, the impact of night-time construction activities to Ha Wan Tsuen Night Roost are assessed as of low significance.

3.59 Based on literature review, it was noted that some ardeid roosting site is rather unstable and the change in night roosting location could happen naturally. It is expected that the relatively small roosting population in Ha Wan Tsuen Night Roost in compare with LMC EAA would relocate to another suitable habitat with lower anthropogenic disturbance for night roosting. A change of night roosting site would cause a temporary change in behaviour but would not affect the survival rate. The influence on behavioural level would make the roosting ardeids to adopt the new night roost. Considering that the disturbance will not cause a significant impact on the survival and reproductive success, the change of behaviour would not lead to a decline in population and therefore not to be considered as significant from a conservation perspective.

Minimisation of Disturbances

3.60 For the construction activities occur in close proximity of the night roost, careful arrangement of work programme should be adopted as far as practicable to avoid disturbances from construction activities near the night-roost (such as noise, light and other human disturbance), especially during dry season (when ardeids are at relatively higher abundance). In addition, mitigation measures such as movable noise enclosures and movable barriers should be adopted to mitigate the noise and light from the night-time construction activities and to minimise disturbance to the night roosting ardeids, where necessary.

3.61 Mitigation measures should be implemented to minimise the disturbance impacts (e.g., noise and glare) to the night roosting sites arising from the construction activities at WCR along HWT Rd and Meander Bridge, including but not limited to the following:

- No noisy construction works (such as rock breaking and piling works) would be conducted;
- Noise mitigation measures by effective placing of temporary 3m noise / visual barriers where practicable as screening;
- shut down of machines and plants that are in intermittent use, and the use of quality PME to limit noise emissions at source as far as practicable;
- Glare reduction measures such as visual barrier provision, night-time lighting control and avoidance of any directional lightings to the adjoining habitats and roosts to minimise the impact to nearby nocturnal fauna especially avifauna.

Control of Glare / Lighting

3.62 Artificial light could affect sleep, so the ardeids sleeping at sites with higher light pollution should be disturbed more often. On the other hand, the higher light pollution probably increases the chance of seeing potential predator and such place could be safer.

3.63 So, avoiding excessive lighting through the use of directional lighting to avoid light spill into sensitive areas (e.g., the ardeid night roost), hence minimising the potential indirect impact on the community of the night-roosting ardeids.

3.64 To minimize the potential disturbance from construction works during night-time period, provision of 3m noise / visual barriers around the construction area adjoining to

the ardeid night roost. The provision of this non-transparent barriers would be able to provide a shielding effect. With the inclusion of this barrier, the potential disturbance (e.g. noise and glare / visual disturbance) from the construction works on the adjacent ardeid night roost would be reduced and minimised.

Environmental Monitoring and Audit

- 3.65 With the implementation of mitigation measures proposed above, potential impact on night roosting ardeids would be minimised. An EM&A programme would be conducted to ensure the proper implementation of the aforementioned mitigation measures.
- 3.66 For the Ha Wan Tsuen night roosting ardeids, monthly monitoring of the ardeid night roost will be conducted during the course of construction works within 100m of the night roost during the dry season (i.e., November to February). Criteria to be monitored include the status, location and extent of the ardeid night roost, the condition of trees used as the night roost, the species, abundance and the returning time of the roosting ardeids.

4. CONCLUSION

EP Condition 2.7 (h)

EP Condition 2.7 (h) carrying out outside dry-season (from November to February next year), the construction works associated with the site formation in the Ecological Area, stabilization of the bank of the old Shenzhen River meander, Western Connection Road along Ha Wan Tsuen Road, to minimise disturbances to migratory birds/water birds.

Summary of Findings

- 4.1 WCR along HWT Rd is about 800m long in which the work sites along HWT Rd were not identified as ecologically sensitive areas as it has been disturbed by the unavoidable construction works. The ponds to the south of LMC Loop between MTR LMC Spur Line and LMC Meander and alongside HWT Rd are already considerably disturbed by the Spur Line, traffic and human activity, all of which are abandoned or inactive. In addition, some ponds have been wholly or partially drained to facilitate construction. The exception relates to pond 12, which as justified above, the habitat condition of Pond 12 has been changed since the commencement of WCR along HWT Rd and no longer as preferred habitat to support the target migratory birds (Great Cormorants and Black-faced Spoonbills) and waterbirds for foraging and roosting; and the Pond 12 survey results have demonstrated that the construction works at WCR along HWT Rd has no significant disturbance impact on the birds currently utilize Pond 12, thus, it is predicted that impacts to the target migratory birds, Great Cormorants and Black-faced Spoonbills as identified in EIA / water birds are negligible.
- 4.2 According to the flight line survey results, no significant impact on the flight line corridor was observed. The majority of waterbirds passed over the LMC Spur Line railway and San Sham Road as well as HWR Rd on their approach to the Shenzhen River and LMC Meander as well as adjacent area (i.e., EA Zone) and then to fishpond area outside. The entry point for most large waterbirds including migratory waterbirds (e.g., Great Cormorant and Black-faced Spoonbill) lies over 30m or higher in the area of Ha Wan Tsuen Road and then across the abandoned ponds near LMC Meander as well as alongside of unaffected Shenzhen River.
- 4.3 It is revealed from the noise assessment results and ad hoc flight line survey results that the on-going construction activities along HWT Rd may not have any significant impact to the use of the flight line corridor by waterbird during wet season and migratory birds during dry season as migratory birds usually fly at higher altitude when traversing the flight line to and from foraging areas. Moreover, birds on flight lines to and from foraging areas which are generally less sensitive to disturbance than when foraging or roosting, adverse impact arising from construction works of WCR along HWT Rd are assessed as of low significance as the site area of WCR along HWT Rd is small and narrow in size in compare with the significant ecological barrier provided by San Sham Road and the MTR LMC Spur Line viaduct nearby. In addition, the large waterbirds appeared behaviourally adaptable to flew over LMC Spur Line railway, San Sham Road, HWT Rd as well as the new development (i.e., LMC Emergency Hospital) that intersected their approach to HHW.
- 4.4 In view of the current site situation, the established EA and the LMC Meander would

add up to an undisturbed, semi-natural habitats of around 150m wide that forms the core part of flight line corridor. This core part of flight line together with the unaffected Shenzhen River are considered sufficient in retaining the flight line corridor between the areas to the south and east of LMC Loop. No significant impact to migratory birds/water birds arising from construction works associated with Western Connection Road along Ha Wan Tsuen Road during dry-season (from November to February next year) is estimated to have occurred based on the current situations of WCR along HWT Rd and Meander and updated environmental status as well as the noise assessment results and avifauna monitoring results.

- 4.5 For Ha Wan Tsuen Night Roost, the impact of night-time construction activities nearby is assessed as of low significance with the implementation of associated mitigation measures for the ardeid night roost and taking into account of a big night roosting site in LMC EAA.
- 4.6 Therefore, the construction work period of Western Connection Road along Ha Wan Tsuen Road restricted to the wet season (March to October) is proposed to be deleted in EP Condition 2.7(h).

EP Condition 2.7 (i)

EP Condition 2.7 (i) using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas, if any.

Summary of Findings

WCR along HWT Rd

- 4.7 The work sites along HWT Rd were not identified as ecologically sensitive areas in the EIA Report as those ponds to the south of LMC Loop between MTR LMC Spur Line and LMC Meander and alongside HWT Rd ponds are generally small in size, disturbed, support less habitat diversity, generally long inactive with a profile unfavourable to waterbird access. In addition, some ponds have been wholly or partially drained to facilitate construction in which the permanent and temporary habitat loss area have already been compensated in OWCAAs.
- 4.8 According to the current site situation and updated environmental status, WCR along HWT Rd has been disturbed by the unavoidable construction works and EA Zone along the southeastern edge of the Loop has been established since Dec 2022 and OWCAAs is currently under establishment to mitigate the potential construction disturbance of the LMC Loop Project (including the WCR); in which specific habitat features to promote their user by Eurasian Otter has been constructed, including the establishment of wetlands, otter holts, floating platforms, and rock platforms. An island with 3m diameter was also created to provide potential foraging habitats for water birds. When compared to the existing conditions of WCR along HWT Rd, the naturalness and ecological niches available in the EA Zone and OWCAAs offer significantly higher ecological potential and ecological value as habitat for the Eurasian Otter and other mammals and waterbirds / migratory birds. Therefore, the Eurasian Otters tend to use the specific habitat features in EA and OWCAAs. In compared with Eurasian Otter, disturbance impacts on other mammals (Leopard Cat and Small Indian Civet) are less

significant than that on Eurasian Otter. Therefore, given that the potential impact on Eurasian Otter considered a low significant as discussed above, the disturbance impact to other mammals is also predicted to be low.

- 4.9 In addition, construction phase disturbance to LMC Meander is not predicted to result from works of WCR along HWT Rd due to the relatively small-scale nature of the work and the distance from the watercourse (~45m). For the section of WCR along HWT Rd (~100m) lie adjacent to the old Shenzhen River meander (i.e., LMC Meander) where is a small area of village edge habitat has been impacted and therefore the section is not predicted to impose significant disturbance impacts due to the low ecological value of adjacent habitats, and mitigation is not required for this. Moreover, the section impacted is relatively short in length compared with the total length of riparian habitats along LMC Meander. The location of this 100m section of WCR along HWT Rd is situated at least 100m away from the nearest edge of EA Zone. It is deemed that such distance would not cause significant disturbance on Eurasian Otter taken into account of the location of artificial otter holts and resting sites for otter as shown in **Appendix B**. Same as the results findings presented in Section 4.2 to 4.5 above, no significant impact to birds using the flight line corridor is estimated to have occurred based on the updated environmental status of WCR along HWT Rd.
- 4.10 As such, the EP condition 2.7 (i) does not apply to WCR along HWT Rd based on the current site situation and surrounding environmental status as elaborated above.

Meander Bridge

- 4.11 In accordance with the EIA Report, there are relatively few uses of the Meander by large waterbirds as the densely-vegetated and steep-sided banks are not favourable to waterbird access for roosting/foraging. This section impacted is relatively small in compared with the area of the core part of flight line together as mentioned in Section 3.5.
- 4.12 With regard to Eurasian Otter, it appears that the existing barrier between LMC Meander and Shenzhen River does not allow passage of mammals, and thus it appears unlikely that this route is used by otters as a means of moving from the LMC area to the wetlands at HHW. As such, the significance of temporary disturbance arising from construction of a bridge with intermediate support is reduced.
- 4.13 Besides, in view of the current site situation that a 6m wide temporary bridge with intermediate support has been established at southeast of Meander Bridge, the habitat is anthropogenic and disturbed already. When compared to the existing conditions at the area of Meander Bridge, the naturalness and ecological niches available in the EA Zone and OWCA offer significantly higher ecological potential and ecological value as habitat for the Eurasian Otter and other mammals and waterbirds / migratory birds.
- 4.14 Moreover, the level of the bottom of the bridge above the water surface will be much more than 1m at most times, though the exact difference depends on water levels according to EIA Report. Therefore, passage of otters should not be impeded, except perhaps during extreme flooding events, when the gap may be less than 1m.
- 4.15 In addition, Eurasian Otter appears not to be as disturbance-sensitive as large waterbirds, except when breeding. Breeding sites are the most sensitive to disturbance. Thus, 30m

protection zone for an otter holt (used for resting) was recommended in the EIA Report, whereas a natal den requires a 150m protection zone.

- 4.16 For the above reason, the construction works of Meander Bridge above the water and the location of Meander Bridge is situated at least 200m away from the nearest edge of EA Zone is considered sufficient in mitigating the disturbance impacts associated with construction activities of Meander Bridge.
- 4.17 For Ha Wan Tsuen Night Roost, it was already subjected high level of anthropogenic disturbance due to its location next to the construction site area of Lok Ma Chau Development. The impact of night-time construction activities nearby is assessed as of low significance with the implementation of associated mitigation measures for the ardeid night roost and taking into account of a big night roosting site in LMC EAA.
- 4.18 As discussed above, “EP Condition 2.7 (i) using powered mechanical equipment for construction works only during the period 9am to 5pm at and near the old Shenzhen River meander and other identified important ecologically sensitive areas, if any.” does not apply to the construction works for WCR along HWT Rd and Meander Bridge above the water.

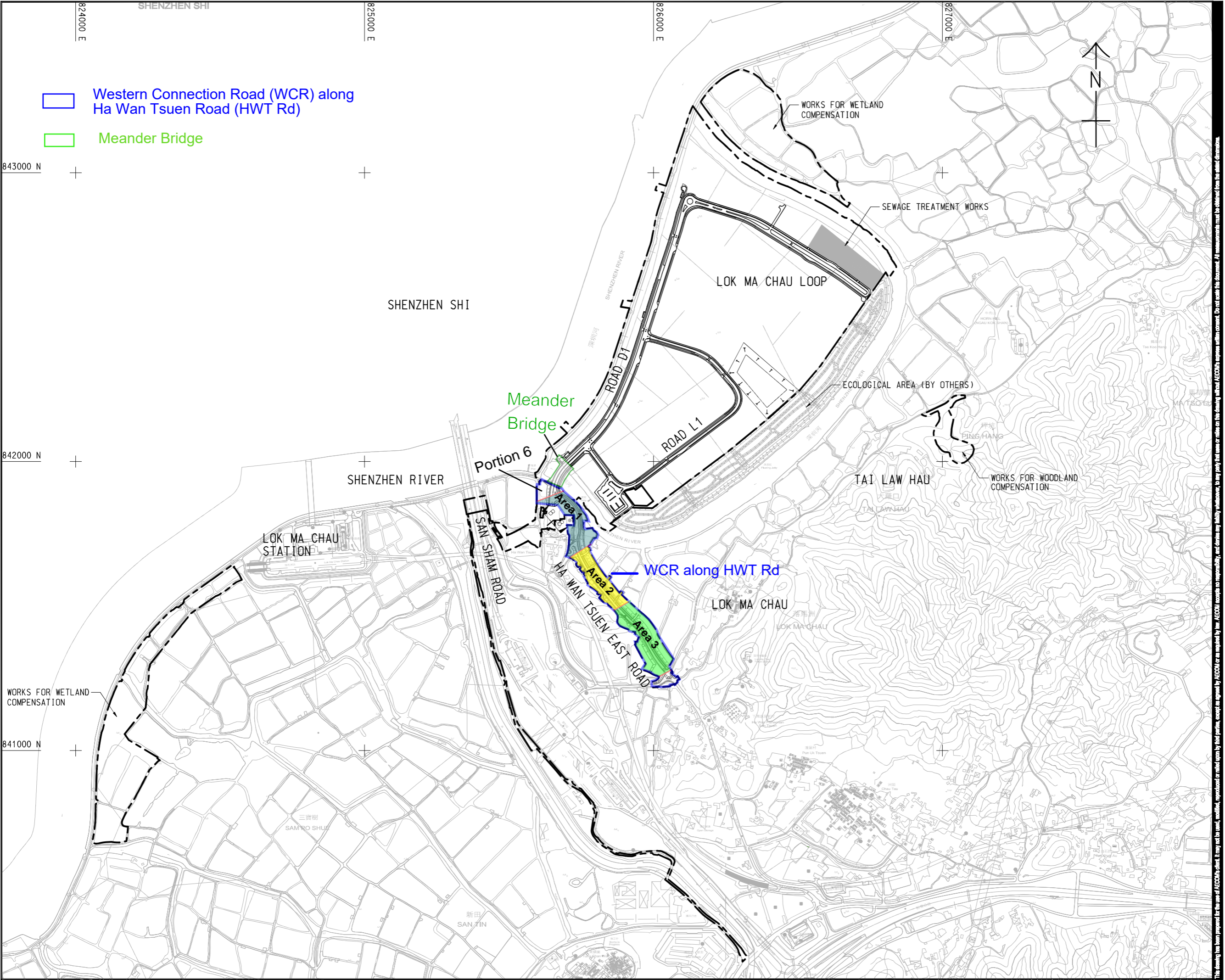
5. SUMMARY

- 5.1 A review was conducted for the potential impacts and mitigation measures proposed in the approved EIA Report for the Development of Lok Ma Chau Loop with focus on the migratory birds/water birds and Eurasian Otter. Amongst the list of recommended measures, the seasonal control and time control for the construction works as per EP condition 2.7(h) and (i) respectively were also reviewed.
- 5.2 Based on the latest construction programme, the remaining works at WCR along HWT Rd and the Meander Bridge will be of relatively less disturbing nature and no noisy construction works would be required. In addition, construction noise permit has also been applied and obtained for the construction works during the restricted hours (i.e., all days during evening (1900 to 2300 hours), and general holidays (including Sundays) during the day-time and evening (0700 to 2300 hours) and all days during the night-time (2300 to 0700 hours)) for WCR along HWT Rd and the Meander Bridge under Noise Control Ordinance (Cap. 400).
- 5.3 A review was also conducted on the ecological monitoring findings of the migratory birds/water birds and Eurasian Otter in the past decade after the EIA Study conducted. There is no significant impact arising from construction works associated with WCR along HWT Rd and the Meander Bridge to migratory birds/water birds. In addition, no Eurasian Otter was recorded in the WCR along HWT Rd and the Meander Bridge and no natal den or holt was also found in the WCR along HWT Rd and the Meander Bridge according to the pre-construction search. The absence of the Eurasian Otter means the actual impact to the Eurasian Otter in construction phase could be lower than those predicted in the EIA Study.
- 5.4 Moreover, the EA Zone and OWCA offer significantly higher ecological potential and ecological value as habitat for a variety of fauna when compared to the current situations of WCR along HWT Rd and Meander Bridge. Therefore, the proposed relaxation of seasonal control and time control for the construction works at WCR along HWT Rd and the Meander Bridge under EP condition 2.7(h) and (i) will not change the impact severity of construction disturbance associated with WCR along HWT Rd and the Meander Bridge to fauna.
- 5.5 Although Ha Wan Tsuen Night Roost was not recorded under the approved EIA Report of Lok Ma Chau Development which was already subjected high level of anthropogenic disturbance due to its location next to the construction site area of Lok Ma Chau Development, additional mitigation measures (i.e., 3m high olive-green boundary fence, temporary noise barrier and control of glare / lighting) would be implemented so that the potential disturbance (e.g. noise and glare / visual disturbance) from the construction works on the adjacent ardeid night roost would be reduced and minimised.
- 5.6 With the implementation of mitigation measures proposed above and taking into account of a big night roosting site in LMC EAA, potential impact on night roosting ardeids would be minimised. Weekly site inspection under EM&A programme would be conducted to ensure the proper implementation of the aforementioned mitigation measures.
- 5.7 The potential impact due to the proposed variation was evaluated. It is deemed that the


proposed variation would not constitute extra impact to birds/water birds and Eurasian Otter; the overall impact would remain in low severity. On the other hand, relaxation of seasonal control and time control for the construction works at WCR along HWT Rd and the Meander Bridge would allow higher efficiency of the construction works of the Project and to increase the likelihood that the works will be completed according to the construction programme. Avoidance of prolonged construction programme is important that the disturbance to wildlife would cease. It could help avoid extra impact imposed on the wildlife due to prolongation of the construction activities.

FIGURE(S)

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- Western Connection Road (WCR) along Ha Wan Tsuen Road (HWT Rd)
- Meander Bridge



PROJECT
 DEVELOPMENT OF LOK MA CHAU LOOP
 MAIN WORKS PACKAGE 1

CONTRACT TITLE
 CONTRACT 1 -
 SITE FORMATION AND
 INFRASTRUCTURE WORKS INSIDE
 LOK MA CHAU LOOP AND
 WESTERN CONNECTION ROAD
 PHASE 1

CLIENT
 土木工程拓展署
 Civil Engineering and
 Development Department

CONSULTANT
 AECOM Asia Company Ltd.
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SUB-CONSULTANTS

ISSUE/REVISION

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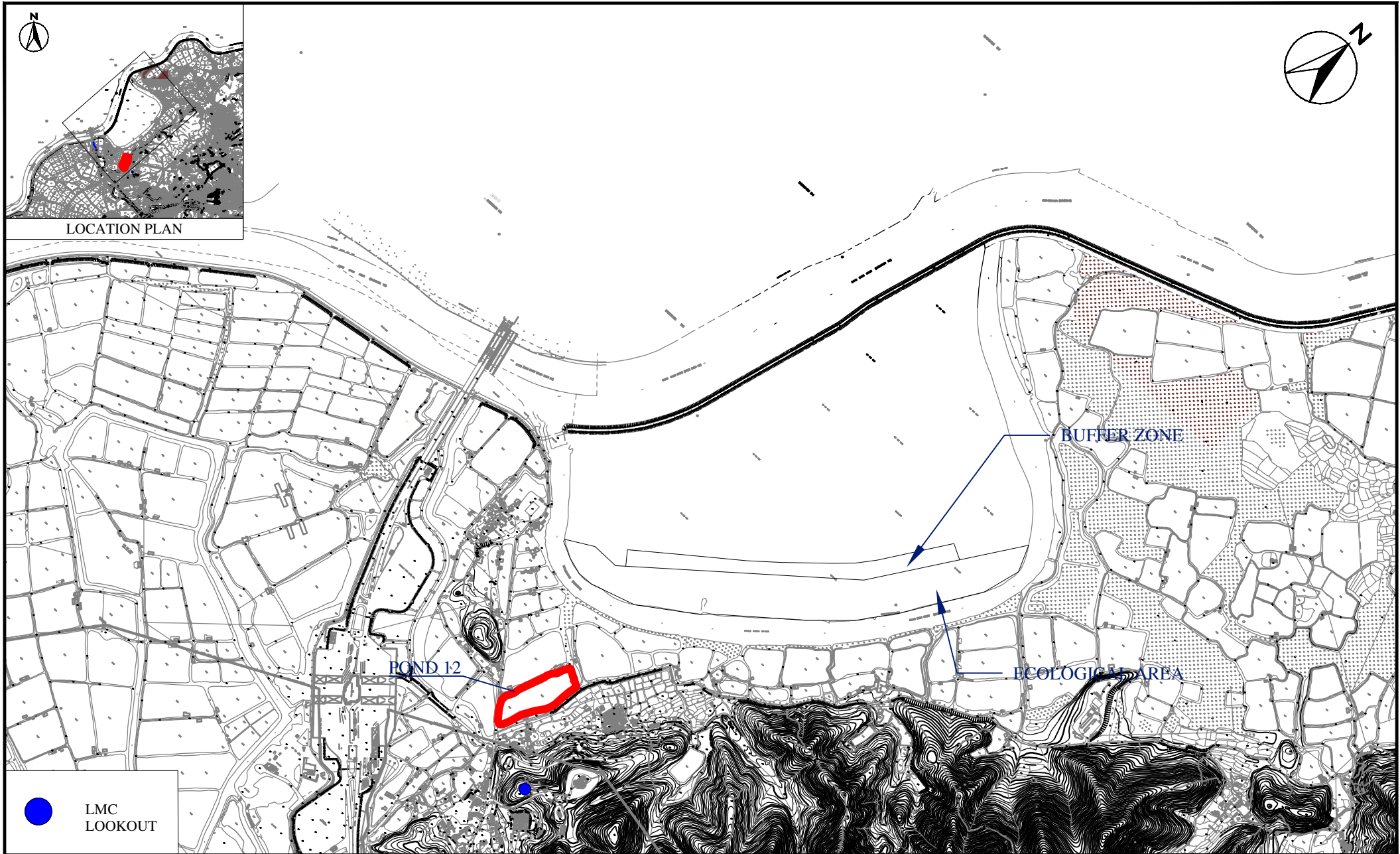
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CONTRACT NO.
 YL/2020/01

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 KEY PLAN

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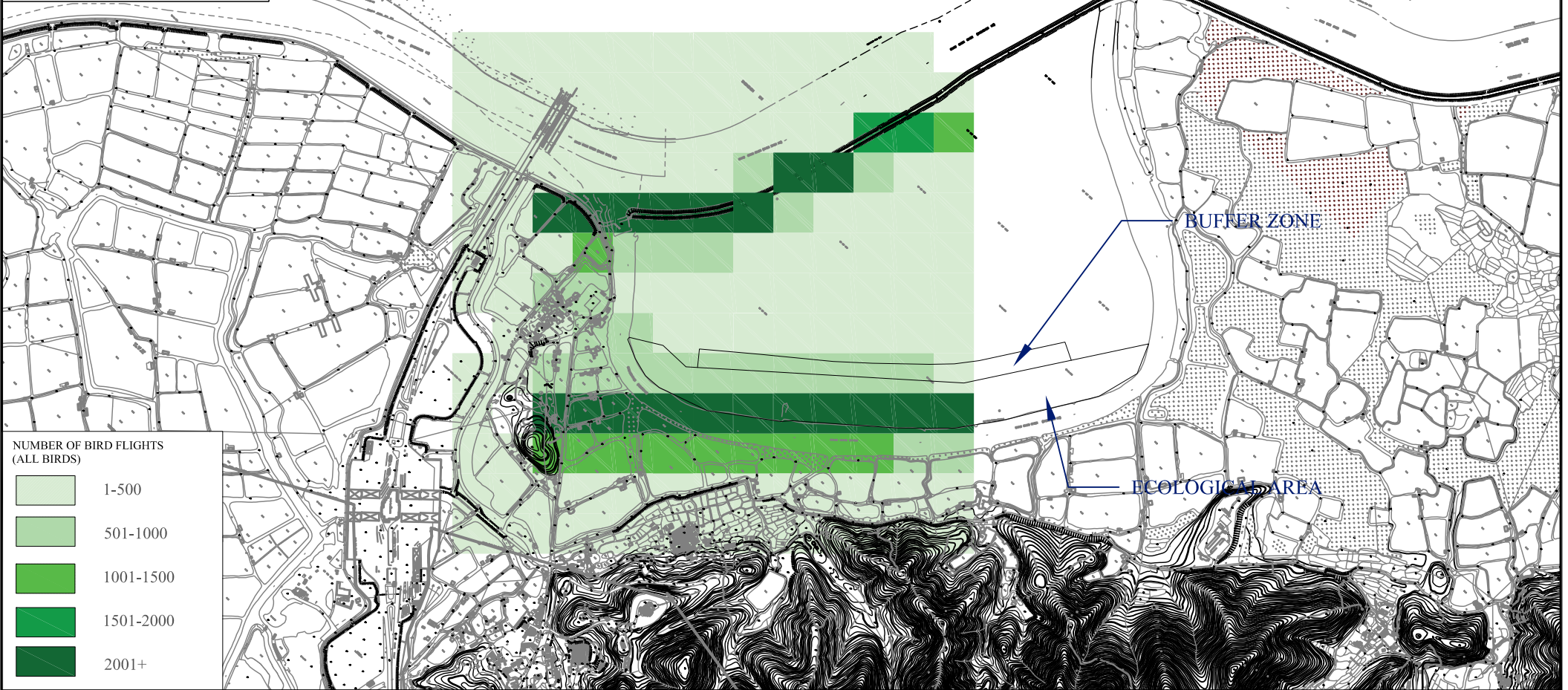


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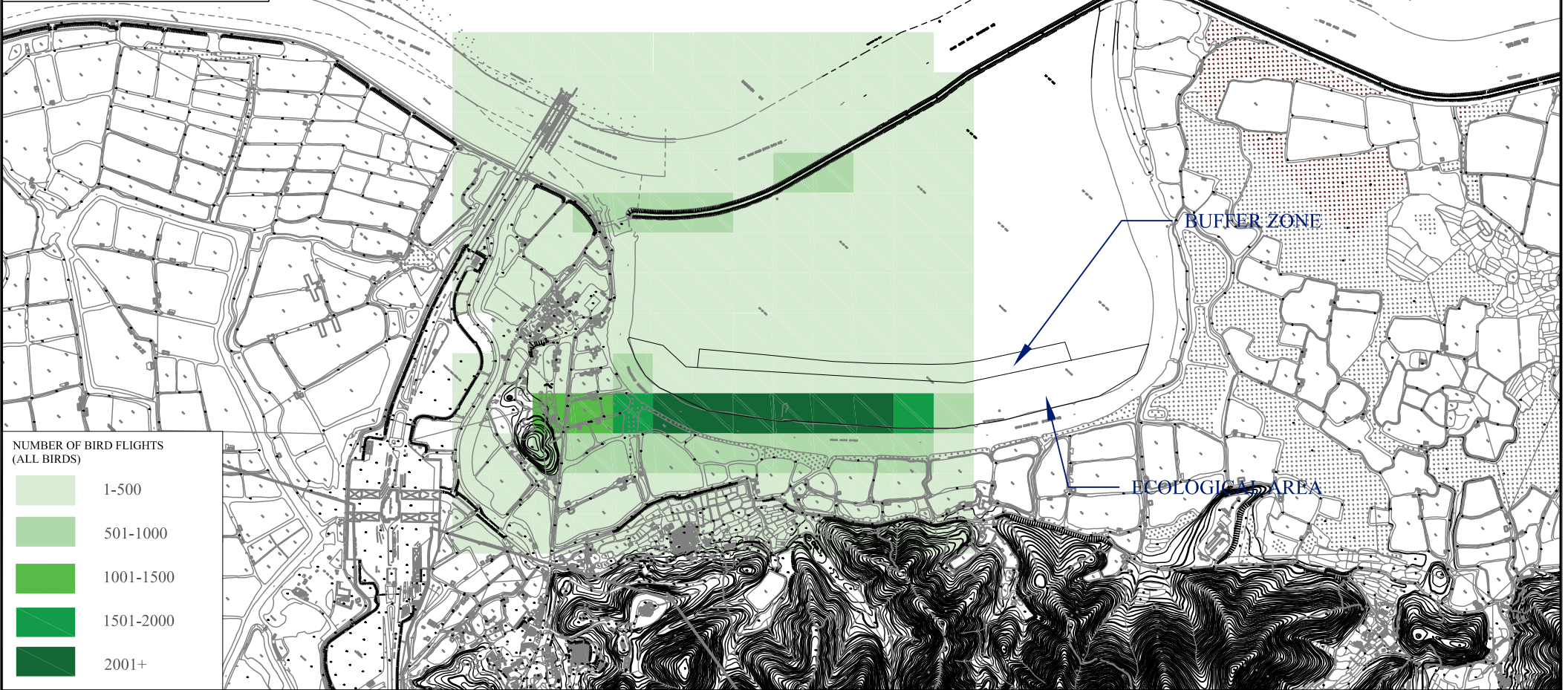
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Service Contract No. WD/04/2020
 Development of Lok Ma Chau Loop: Main Works Package 1 - Environmental Team
 Locations of Pond 12 and Lok Ma Chau Lookout

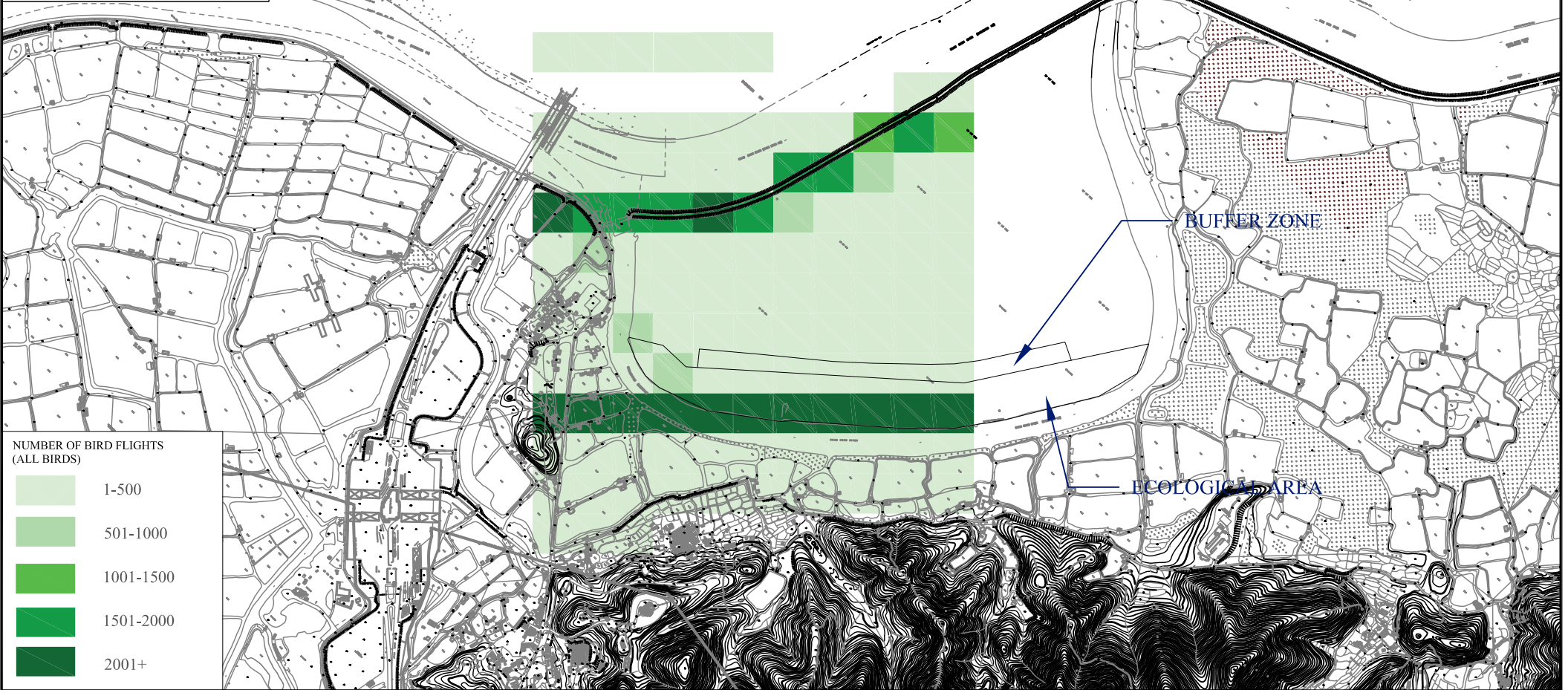
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NUMBER OF BIRD FLIGHTS
(ALL BIRDS)

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	501-1000
	1001-1500
	1501-2000
	2001+

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APPENDIX A1
CONSTRUCTION PROGRAMME

APPENDIX A2
INVENTORY OF PMES

Appendix A2 : 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
 Construction Plant Inventory (With Mitigation)

Area: Meander Bridge

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
1	RC for Bridge Deck (South Abutment to South Piers)	30/12/2023 - 14/3/2024	Crawler Crane	1	100	112	112	Barrier	-5	109
			Generator (QPME)	1	100	105	105	Barrier	-5	
			Grout Pump	2	100	99	102	Barrier	-5	
			Concrete lorry mixer	2	100	105	108	Barrier	-5	
2	RC for Bridge Deck (South Piers to North Piers)	15/3/2024 - 30/5/2024	Crawler Crane	1	100	112	112	Barrier	-5	109
			Generator (QPME)	1	100	105	105	Barrier	-5	
			Grout Pump	2	100	99	102	Barrier	-5	
			Concrete lorry mixer	2	100	105	108	Barrier	-5	
3	DCM4	1/11/2023 - 7/1/2024	DCM Rig	1	100	110	110	Barrier	-5	107
			crawler crane	1	100	103	103	Barrier	-5	
			Excavator	1	100	103	103	Barrier	-5	
4	DCM7	1/11/2023 - 7/6/2024	generator	1	100	95	95	Barrier	-5	107
			DCM Rig	1	100	110	110	Barrier	-5	
			crawler crane	1	100	103	103	Barrier	-5	
5	DCM7	1/11/2023 - 7/5/2024	Excavator	1	100	103	103	Barrier	-5	107
			generator	1	100	95	95	Barrier	-5	
			DCM Rig	1	100	110	110	Barrier	-5	
			crawler crane	1	100	103	103	Barrier	-5	107
			Excavator	1	100	103	103	Barrier	-5	
			generator	1	100	95	95	Barrier	-5	

**Appendix A2 : 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
 Construction Plant Inventory (With Mitigation)**

Area: 1

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
6	(PW1) Pipe Pile (ave 2d/pile) and Excavation	7/10/2023 - 26/3/2024	Vibration plant	1	100	115	115	Barrier	-5	114
			backhoe	1	100	101	101	Barrier	-5	
			crane lorry	1	100	105	105	Barrier	-5	
			dump truck	1	100	105	105	Barrier	-5	
			vibrating poker	1	100	113	113	Barrier	-5	
			roller	1	100	108	108	Barrier	-5	
			generator	1	100	95	95	Barrier	-5	
			concrete truck	1	100	109	109	Barrier	-5	
7	(PW1) Capping Beam and Wailing Construction	27/3/2024 - 16/4/2024	generator	1	100	95	95	Barrier	-5	110
			concrete truck	1	100	109	109	Barrier	-5	
			crane lorry	1	100	105	105	Barrier	-5	
			Bar bender and Cutter (electric)	1	100	90	90	Barrier	-5	
			Concrete corer Poker	1	100	113	113	Barrier	-5	
8	(PW2) Pipe Pile (ave 2d/pile) and Excavation	17/4/2024 - 11/6/2024	Vibration plant	1	100	115	115	Barrier	-5	114
			backhoe	1	100	101	101	Barrier	-5	
			crane lorry	1	100	105	105	Barrier	-5	
			dump truck	1	100	105	105	Barrier	-5	
			vibrating poker	1	100	113	113	Barrier	-5	
			roller	1	100	108	108	Barrier	-5	
			generator	1	100	95	95	Barrier	-5	
			concrete truck	1	100	109	109	Barrier	-5	
9	(PW2) Capping Beam and Wailing Construction	12/6/2024 - 27/6/2024	generator	1	100	95	95	Barrier	-5	110
			concrete truck	1	100	109	109	Barrier	-5	
			crane lorry	1	100	105	105	Barrier	-5	
			Bar bender and Cutter (electric)	1	100	90	90	Barrier	-5	
			Concrete corer Poker	1	100	113	113	Barrier	-5	
10	(RW2) Temporary Works and Excavation, (RW2) Retaining Wal Construction, (RW2) Backfilling	5/10/2023 - 4/5/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Welding machine	2	100	85	88	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			11	(RW3) Temporary Works and Excavation, (RW3) Retaining Wal Construction, (RW3) Backfilling	5/10/2023 - 4/5/2024	Excavator with vibration plant	1	100	112	
Excavator (QPME)	2	100				99	102	Barrier	-5	
Crane lorry	2	100				105	108	Barrier	-5	
Dump truck	1	100				105	105	Barrier	-5	
Roller	1	100				108	108	Barrier	-5	
Generator (QPME)	1	100				95	95	Barrier	-5	
Welding machine	2	100				85	88	Barrier	-5	
Concrete lorry mixer	1	100				109	109	Barrier	-5	
Vibrating poker	2	100				94	97	Barrier	-5	

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
UU & Road Construction										
12	DN700 Fresh Watermains	12/10/2023 - 20-Jul-24	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME) Welding machine Concrete lorry mixer Vibrating poker	1 1 2 1 1 1 1 1	100 100 100 100 100 100 100 100	99 105 105 108 95 85 109 94	99 105 108 108 95 85 109 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5	109
13	Drainage (approx. 52hrs manhole, 1,500m pipes)	12/8/2023 - 20/6/2024	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME) Welding machine Concrete lorry mixer Vibrating poker	4 2 1 1 1 1 1 1	100 100 100 100 100 100 100 100	99 105 105 108 95 85 109 94	105 108 105 108 95 85 109 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5	109
14	Fill Slope F4 (1,710m ³ @ 200m ³ /d)	6/9/2024 - 14/10/2024	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer	1 1 2 1	100 100 100 100	99 105 105 109	99 105 108 109	Barrier Barrier Barrier Barrier	-5 -5 -5 -5	108
15	Carriageway Construction, WCR Carriageway and 1 Footpath	12/7/2024 - 20/9/2024	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer	1 1 2 1	100 100 100 100	99 105 105 109	99 105 108 109	Barrier Barrier Barrier Barrier	-5 -5 -5 -5	108
16	Kerb Construction (footpath and cycle track), Footpath and Cycle Tra	21/8/2024 - 31/10/2024	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer	1 1 2 1	100 100 100 100	99 105 105 109	99 105 108 109	Barrier Barrier Barrier Barrier	-5 -5 -5 -5	108

Area: 2

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control[3]	Noise Reduction	Total SWL, dB(A) [2]
Retaining Walls										
17	Fill Slope F5 (102m3 @ 200m3/d)	21/10/2023 - 22/5/2024	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer Roller	1 1 2 1 1	100 100 100 100 100	99 105 105 109 108	99 105 108 109 108	Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5	109
18	(PW3) Pipe Pile (ave 2d/pile) and Excavator	21/10/2023 - 22/5/2024	Excavator (QPME) Excavator with vibration plant Crane lorry Dump truck Concrete lorry mixer Roller Generator (QPME) Welding machine Vibrating poker	1 1 1 2 1 1 1 2 1	100 100 100 100 100 100 100 100 100	99 112 105 105 109 108 95 85 94	99 112 105 108 109 108 95 88 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5 -5	111
19	(PW3) Backfilling	6/5/2024 - 22/5/2024	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer Roller Generator (QPME) Welding machine Vibrating poker	1 1 2 1 1 1 2 1	100 100 100 100 100 100 100 100	99 105 105 109 108 95 85 94	99 105 108 109 108 95 88 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5	109
20	Fill Slope F10 (749m3 @ 200m3/d)	3/7/2023 - 1/11/2023	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer Roller Generator (QPME) Welding machine Vibrating poker	1 1 2 1 1 1 2 1	100 100 100 100 100 100 100 100	99 105 105 109 108 95 85 94	99 105 108 109 108 95 88 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5	109
21	(RW4) Backfilling	11/10/2023 - 1/11/2023	Excavator (QPME) Crane lorry Dump truck Concrete lorry mixer Roller Generator (QPME) Welding machine Vibrating poker	1 1 2 1 1 1 2 1	100 100 100 100 100 100 100 100	99 105 105 109 108 95 85 94	99 105 108 109 108 95 88 94	Barrier Barrier Barrier Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5 -5 -5 -5	109
UU & Road Construction										
22	DN700 Fresh Watermains	1/3/2024 - 8/8/2024	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME)	2 2 1 1 1	100 100 100 100 100	99 105 105 108 95	102 108 105 108 95	Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5	107
23	Drainage Construction	26/9/2023 - 30/7/2024	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME)	2 2 1 1 1	100 100 100 100 100	99 105 105 108 95	102 108 105 108 95	Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5	107
24	Carriageway Construction	9/8/2024 - 31/10/2024	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME)	2 2 1 1 1	100 100 100 100 100	99 105 105 108 95	102 108 105 108 95	Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5	107
25	WCR Carriageway	24/7/2024-31/10/2024	Excavator (QPME) Crane lorry Dump truck Roller Generator (QPME)	2 2 1 1 1	100 100 100 100 100	99 105 105 108 95	102 108 105 108 95	Barrier Barrier Barrier Barrier Barrier	-5 -5 -5 -5 -5	107

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
26	Fill Slope F6 to F9	1/3/2025 - 14/5/2025	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
27	Kerb Construction (footpath and cycle track)	5/3/2025 - 8/5/2025	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
28	Footpath and Cycle Track	27/3/2025 - 30/5/2025	Excavator (QPME)	2	100	99	102	Barrier	-5	109
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			Welding machine	2	100	85	88	Barrier	-5	
29	Fill Slope F10 (749m3)	24/6/2024 - 17/7/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
30	Fill Slope F15 (1,893m3)	18/7/2024 - 1/8/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	

Area: 3

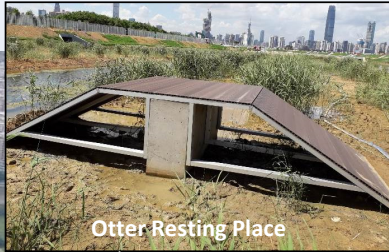
No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
UU & Road Construction										
31	(RW5) GEO Approval for CSD	17/7/2023 - 13/11/2023	Excavator with vibration plant	1	100	112	112	Barrier	-5	107
			Excavator (QPME)	2	100	99	102	Barrier	-5	
32	(RW5) Backfilling	28/10/2023 - 13/11/2023	Excavator (QPME)	1	100	99	99	Barrier	-5	109
			Crane lorry	1	100	105	105	Barrier	-5	
			Dump truck	2	100	105	108	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
33	DN700 Fresh Watermains	13/9/2023 - 22/6/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	110
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
34	Drainage Construction (30hrs, 755m pipes)	7/7/2023 - 20/5/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	110
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
35	Carriageway Construction	9/8/2024 - 21/10/2024	Excavator (QPME)	2	100	99	102	Barrier	-5	107
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
36	Fill Slope F11, 15, 16 and 17	3/10/2023 - 5/7/2024	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
37	Kerb Construction (footpath and cycle track)	10/10/2024 - 8/4/2025	Excavator with vibration plant	1	100	112	112	Barrier	-5	111
			Excavator (QPME)	2	100	99	102	Barrier	-5	
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
38	Footpath and Cycle Track	28/10/2024 - 28/4/2025	Excavator (QPME)	2	100	99	102	Barrier	-5	109
			Crane lorry	2	100	105	108	Barrier	-5	
			Dump truck	1	100	105	105	Barrier	-5	
			Roller	1	100	108	108	Barrier	-5	
			Generator (QPME)	1	100	95	95	Barrier	-5	
			Concrete lorry mixer	1	100	109	109	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			Vibrating poker	2	100	94	97	Barrier	-5	
			Welding machine	2	100	85	88	Barrier	-5	

Area: Portion 6

No.	Activities	Months	Name of PME	No. of PME	On Time %	Unit SWL, dB(A)	SWL, dB(A)	Type of Noise Control	Noise Reduction	Total SWL, dB(A)
39	Instrument Installation Type C3 (SM & SMM 66 hrs)	3/7/2023 - 14/5/2025	Crane lorry	1	100	105	105	Barrier	-5	100
40	Instrument Installation Type C4 1 rig	3/7/2023 - 18/3/2024	Crane lorry	1	100	105	105	Barrier	-5	100

**APPENDIX B
SPECIFIC HABITAT FEATURES FOR
OTTER AND WATERBIRDS**

Appendix B1 - Ecological Establishment Features in EA Zone



Appendix B2 - Ecological Establishment Features in OWCAs

