


MTR Corporation Limited

TUEN MUN SOUTH EXTENSION


(No. EP-615/2022)

Pre-construction Ardeid Survey Report

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MTR Corporation Limited

Consultancy Agreement No. C1502
(Variation Order No. C1502/009)

**Environmental Monitoring and Audit
(EM&A) for Tuen Mun South Extension**

Pre-Construction Ardeid Survey Report

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Version: 3 Date: 5 December 2023

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1 INTRODUCTION

1.1 Background

- 1.1.1 The Tuen Mun South Extension (TME) (hereinafter referred to as “the Project”) is one of the seven recommended railway schemes in the Railway Development Strategy 2014 (“RDS-2014”). The Project will extend the Tuen Ma Line (TML), from Tuen Mun (TUM) Station southwards by about 2.4 km, terminating at a new station near Tuen Mun Ferry Pier (i.e. Tuen Mun South (TMS) Station) with an intermediate station at Tuen Mun Area 16 (i.e. A16 Station).
- 1.1.2 An Environmental Impact Assessment (EIA) study for the Project was conducted in accordance with EIA Study Brief No. ESB-332/2020. The EIA Report and Environmental Monitoring and Audit (EM&A) Manual (Register No.: AEIAR-236/2022) were approved under the Environmental Impact Assessment Ordinance (EIAO), with an Environmental Permit (EP) granted on 18 August 2022 (EP No: EP-615/2022).
- 1.1.3 The Project extends from the existing overrun at TUM Station to southward, and its viaduct structure would be located adjacent to an ardeids night roost in Tuen Mun Park (hereafter referred to as “TMP Night Roost”). This TMP Night Roost comprises a group of mature trees (Big-leaved Fig (*Ficus virens*) and Chinese Banyan (*Ficus microcarpa*), which supported night roosting ardeids, including Little Egret (*Egretta garzetta*), Great Egret (*Ardea alba*), and Chinese Pond Heron (*Ardeola bacchus*). According to the ecological surveys conducted in 2021 during the EIA study, the abundance of night roosting ardeids at this TMP Night Roost ranged from 39 individuals in wet season to 300 individuals in dry season. The construction of the viaduct structure may result in potential disturbance and indirect impact on the night roosting ardeids.
- 1.1.4 Mitigation measures include a buffer zone at 100 m from the night roost, where the working hours of construction activities were recommended in the approved EIA Report to minimise the potential disturbance to TMP Night Roost during the construction stage.
- 1.1.5 The construction works of the Project are tentatively scheduled to commence in December 2023. A Pre-construction Ardeid Survey Plan (PASP) was submitted to Environmental Protection Department (EPD) under Condition 2.16 of EP-615/2022 and was approved by Director of Environmental Protection (DEP) on 18 August 2023. A Pre-Construction Ardeid Survey has been conducted according to the approved PASP to update and verify the ecological conditions of the TMP Night Roost prior to the commencement of construction works.
- 1.1.6 Pursuant to Conditions 2.17 of EP-615/2022, a Pre-construction Ardeid Survey Report (PASR), which, based on the survey findings, provides the details of all required measures including but not limited to the implementation party, location, timing, and environmental performance requirement, shall be prepared by qualified ecologist(s) appointed under Condition 2.5 of EP-615/2022 and shall be submitted to the DEP for approval no later than 2 months before commencement of construction works of the Project.

1.2 Objectives of this Pre-Construction Ardeid Survey Report

- 1.2.1 This PASR presents the methodologies and findings of the ecological monitoring conducted on 28 August 2023. Mitigation measures required to minimize impact on ardeid night roost during construction (e.g. implementation schedule, implementation party, location, timing, environmental performance) are included in this PASR.

2 PRE-CONSTRUCTION ARDEID SURVEY

2.1 Survey Methodology

- 2.1.1 The pre-construction ardeid survey was undertaken to confirm the location of ardeid night roost and pre-roosting site(s) of ardeids, including the identified TMP Night Roost. No new/alternative locations of night roosts were identified during the survey. Direct observation (with the aid of binoculars) of the night roosting ardeids was made from two vantage points (VR1 – VR2). The 100 m Buffer Zone of the TMP Night Roost and the agreed vantage points are shown in **Figure 1**.
- 2.1.2 Ardeid species, abundance, flight line, location, and the tree species used for night roosting ardeids were recorded as close to the night roosts as possible. Observation of the flight lines (including flight direction, flight height, and returning time of the pre-roosting and roosting ardeids) were undertaken at the agreed vantage points.
- 2.1.3 The surveys started from approximately an hour before sunset and lasted until nightfall, which was the peak period of ardeid activities at the night roost and pre-roost sites. The exact sunset time of the survey was made reference to the Hong Kong Observatory.

2.2 Survey Schedule

- 2.2.1 A pre-construction ardeid survey was conducted on 28 August 2023, prior to the commencement of construction activities. The aim of the surveys was to obtain the most updated conditions of the night roost in order to verify the findings from the approved EIA Report, and to establish the latest conditions for the purpose of subsequent monthly monitoring.

2.3 Pre-Construction Ardeid Survey Results

- 2.3.1 One active night roost, the TMP Night Roost, was observed within the survey area (**Figure 1** refers). A total of three ardeid species (i.e. Chinese Pond Heron, Great Egret, and Little Egret) were observed utilising the TMP Night Roost on a group of mature Big-leaved Fig interspersed with some Chinese Banyan at around 10 to 20 m in height in Tuen Mun Park. Representative photographs of the TMP Night Roost is shown in **Appendix A**.
- 2.3.2 A total of 126 ardeids returned to the night roost were recorded on 28 August 2023 (**Table 2.1** refers). Majority of the recorded ardeids were Little Egret, with low proportion of Great Egret and Chinese Pond Heron. Based on the observation, the peak return time was approximately 30 minutes before sunset (**Table 2.2** refers).
- 2.3.3 A total of five major ardeid flight lines to the TMP Night Roost were summarized in **Table 2.3** below and presented in **Figure 1**. The major flight lines were observed along Tuen Mun River Channel (flight lines 1 and 3), along Tuen Mun Heung Sze Wui Road (flight lines 4 and 5), and from the banks of Tuen Mun River Channel (flight line 2). About 60.9% of the observed ardeids used flight line 1 flying from south of Tuen Mun Station while flight lines 2 to 5 from northern side were used by less than 40% ardeids in total. Over 70% of the observed ardeids returning to TMP Night Roost at elevations between 10 and 20 m (**Table 2.4** refers) were observed.
- 2.3.4 Pre-roosting behaviour from some of these night-roosting ardeids was observed at the artificial lake in Tuen Mun Park (next to the TMP Night Roost). Furthermore, other ardeids such as Black Crowned Night Heron (*Nycticorax nycticorax*) and Pacific Reef Heron (*Egretta sacra*) were also recorded at the pre-roosting area, but none of them utilized the TMP Night Roost.

Table 2.1 Number and Species of Night Roosting Ardeids Recorded during Pre-Construction Ardeid Survey

Survey Date	Species Recorded				Sunset Time	Earliest Time of Return	Peak Return Time
	Chinese Pond Heron	Great Egret	Little Egret	Total			
28 August 2023	2 (1.6%)	15 (11.9%)	109 (86.5%)	126 (100%)	18:45	18:00	18:15-18:29

Remark: The numbers in this table are subject to rounding adjustments. Any discrepancies between total and sums of individual numbers listed therein are due to rounding.

Table 2.2 Time of Return of Night Roosting Ardeids Recorded during Pre-Construction Ardeid Survey

Time of Return	Percentage of Ardeids Recorded
	28 August 2023
<i>(Time of sunset during survey)</i>	18:44
17:30-17:44	-
17:45-17:59	-
18:00-18:14	12.5%
18:15-18:29	42.2%
18:30-18:44	37.5%
18:45-18:59	7.8%
19:00-19:14	-

Remark: The numbers in this table are subject to rounding adjustments. Any discrepancies between total and sums of individual numbers listed therein are due to rounding.

Table 2.3 Usage of the Identified Major Flight Lines

Flight Line	Percentage of Ardeids Recorded
1	60.9%
2	15.6%
3	18.8%
4	3.1%
5	1.6%
Total	100%

Remark: The numbers in this table are subject to rounding adjustments. Any discrepancies between total and sums of individual numbers listed therein are due to rounding.

Table 2.4 Flight Height of Night Roosting Ardeids Recorded during Pre-Construction Ardeid Survey

Flight Height (m)	Percentage
>5-10	4.7%
>10-15	34.3%
>15-20	39.1%
>20-25	6.3%
>25-30	10.9%
>30-35	4.7%
Total	100%

Remark: The numbers in this table are subject to rounding adjustments. Any discrepancies between total and sums of individual numbers listed therein are due to rounding.

3 SUMMARY, CONCLUSION, AND RECOMMENDATION

3.1 Summary and Conclusion

- 3.1.1 Based on the findings from the pre-construction survey conducted on 28 August 2023, the condition of the TMP Night Roost and the flight patterns of the ardeids remain similar to the ecological findings in 2021 (MTRCL, 2022a). The peak return time of the ardeids to the night roost were approximately 30 minutes before sunset. Major flight lines were observed from the south of Tuen Mun River Channel, with flight height mainly at 15-20 m.
- 3.1.2 Three ardeid species including Chinese Pond Heron, Great Egret and Little Egret were observed utilizing the TMP Night Roost. To compare the present findings with the survey results obtained during the EIA study in 2021 (MTRCL, 2022a), the recorded number of ardeids observed during the wet season (April 2021 to June 2021) ranged from 39 to 76, while the present findings indicated a higher number (i.e. 126).
- 3.1.3 With the findings of pre-constriction ardeid survey, the recommended mitigation measures (e.g. establishment of buffer zone, control of construction activities, control glare/lighting etc.) in TME EIA Report (MTRCL (2022a)) based on the previous ecological findings are considered applicable during construction phase.

3.2 Recommended Measures during the Construction of the Project

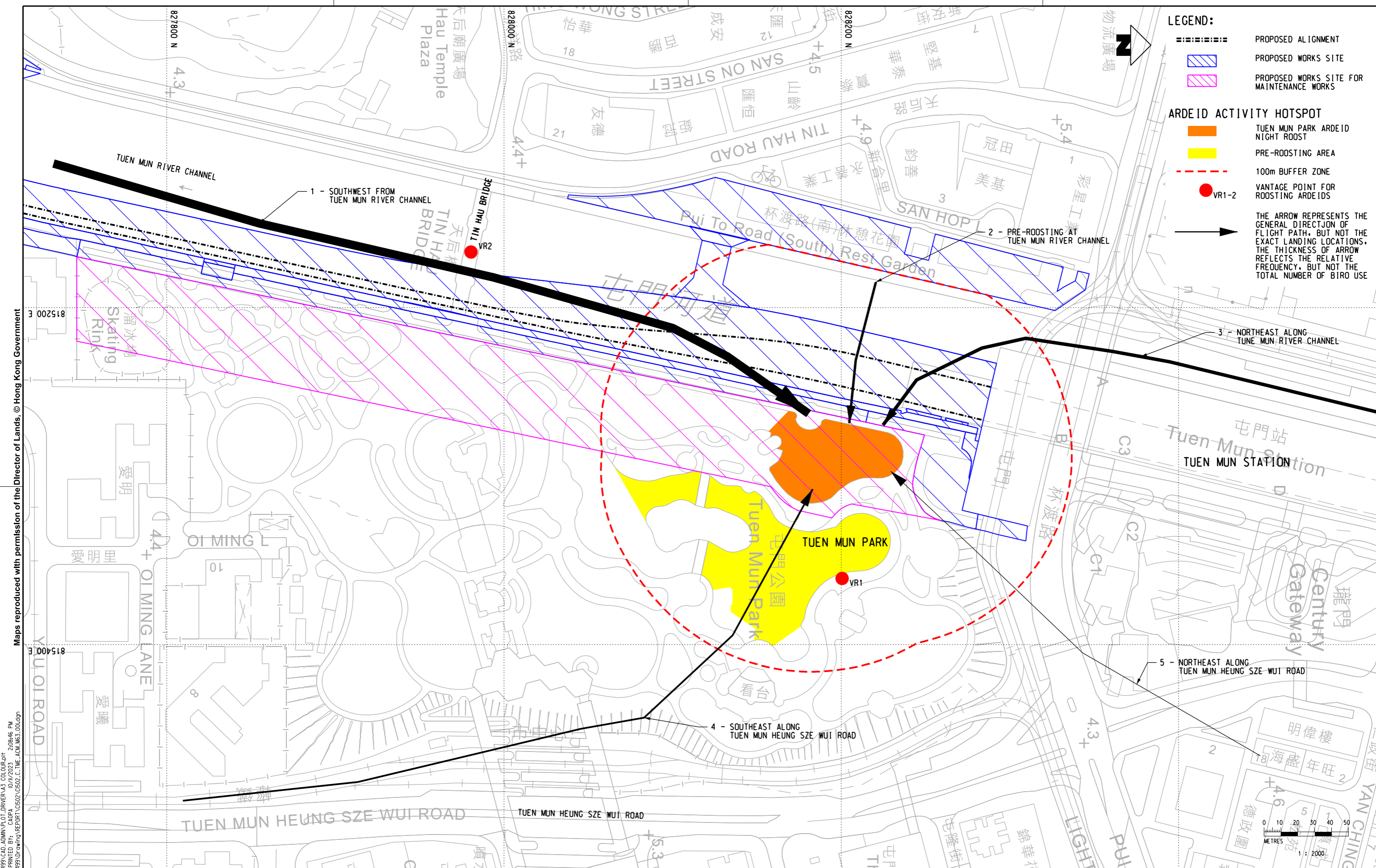
- 3.2.1 To minimise the potential impact on the night roosting ardeids at the TMP Night Roost during construction phase, the Contractor should follow the mitigation measures recommended in Sections 8.9.3 to 8.9.5 of the approved EIA Report (MTRCL, 2022a) and Sections 7.3.2 to 7.3.4 of the approved EM&A Manual (MTRCL, 2022b). Mitigation measures would be reviewed regularly and updated in the monthly EM&A report as appropriate according to the monitoring findings (e.g. ardeid usage at the night roost, or returning time of the ardeids) obtained during EM&A period. Details of these mitigation measures implementation party, location, timing, and environmental performance requirement are listed in **Appendix B** of this PASR.

4 REFERENCES

MTR Corporation Limited (MTRCL) (2022a). Tuen Mun South Extension – Environmental Impact Assessment Report (Register No.: AEIAR-236/2022).

MTR Corporation Limited (MTRCL) (2022b). Tuen Mun South Extension – Environmental Monitoring and Audit Manual (Register No.: AEIAR-236/2022).

Figure



- LEGEND:**
- PROPOSED ALIGNMENT
 - PROPOSED WORKS SITE
 - PROPOSED WORKS SITE FOR MAINTENANCE WORKS
- ARDEID ACTIVITY HOTSPOT**
- TUEN MUN PARK ARDEID NIGHT ROOST
 - PRE-ROOSTING AREA
 - 100m BUFFER ZONE
 - VANTAGE POINT FOR ROOSTING ARDEIDS
- THE ARROW REPRESENTS THE GENERAL DIRECTION OF FLIGHT PATH, BUT NOT THE EXACT LANDING LOCATIONS. THE THICKNESS OF ARROW REFLECTS THE RELATIVE FREQUENCY, BUT NOT THE TOTAL NUMBER OF BIRO USE

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ORIGINATOR AECOM				SCALE 1 : 2000 (A3)				FIGURE NO. C1502/C/TME/ACM/M63/001						
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Appendices

Appendix A

Representative Photographs taken on Site



VR1



VR2



TMP Night Roost



Pre-roosting site at the artificial lake in Tuen Mun Park (next to the TMP Night Roost)



Consultancy Agreement No. C1502 -
Environmental Monitoring and Audit (EM&A)
for Tuen Mun South Extension
Pre-Construction Ardeid Survey Report

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Representative Photographs Taken on Site

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Appendix A

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Appendix B

Implementation Schedule of Proposed Mitigation Measures related to TMP Night Roost

Appendix B Implementation Schedule of Proposed Mitigation Measures related to TMP Night Roost

EP Condition / EIA Ref.	Recommended Mitigation Measures	Objective of the Measures	Implementation & Maintenance Party	Implementation Location	Implementation Time	Environmental Performance required for Implementation of the Measures
EIA S8.9.3, EIA Table 8.17	<p>Maintenance Works at Tuen Mun Park (TMP)</p> <ul style="list-style-type: none"> • Tree felling at the Tuen Mun Park should be avoided. • Maintenance works should only be limited to necessary pruning works, at overgrown tree branches that may pose safety issue to the public, or obstruction of construction within the works site and subsequent of railway operation. • Pruning of trees of the ardeids night roost should only be conducted when no ardeids are perching on the trees. 	To avoid direct impact on the TMP night roost	Contractor	Works sites adjoining to and within Tuen Mun Park	Construction Phase	No direct loss of the roosting substratum at TMP
EP Condition 2.22, EIA S8.9.4 to S 8.9.5, EIA Table 8.17	<p>TUM Overrun Modification Works</p> <ul style="list-style-type: none"> • 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). • 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. • Proper construction planning would also be implemented to arrange night-time activities in wet season as far as practicable. Where possible, these activities will also be scheduled on non-consecutive days to avoid continuous disturbance on the night roost. <p><u>Modification works that does not require the use of Powered Mechanical Equipment (PME):</u></p> <ul style="list-style-type: none"> • Night-time activities should be avoided as far as practicable. • Daytime construction activities within buffer zone should follow control of working hours (Table A1 refers). 	To avoid/minimise disturbance to the night roost through control of construction works / activities within 100m from Ardeid Night Roost	Contractor	Works sites within 100m from the Ardeid Night Roost as shown in Figure No. C1502/C/TME/A CM/M63/001	Construction Phase	Monthly ardeid monitoring findings within the range of survey findings taken in the EIA stage

EP Condition / EIA Ref.	Recommended Mitigation Measures	Objective of the Measures	Implementation & Maintenance Party	Implementation Location	Implementation Time	Environmental Performance required for Implementation of the Measures												
	<p>Table A1 Proposed Time for the Control of Noisy Construction Activities</p> <table border="1" data-bbox="353 395 1061 639"> <thead> <tr> <th>Months</th> <th>Reference Time of Sunset ⁽¹⁾</th> <th>Control of Noisy Construction Activities ⁽²⁾</th> </tr> </thead> <tbody> <tr> <td>Sep – Feb</td> <td>17:38 – 18:27</td> <td>17:08 – 07:30 (on the following day)</td> </tr> <tr> <td>Mar – May</td> <td>18:27 – 19:03</td> <td>17:57 – 07:30 (on the following day)</td> </tr> <tr> <td>Jun – Aug</td> <td>18:41 – 19:11</td> <td>18:11 – 07:30 (on the following day)</td> </tr> </tbody> </table> <p>Notes: (1) Reference was made to the sunset time in year 2021 under the approved EIA Report. (2) Noisy construction activities should be ceased before the proposed time, except for contingent arrangement of concreting works due to uncontrollable issues. Such occurrence should be notified by the Contractor to Engineer/Engineer's Representative, Environmental Team Leader and Independent Environmental Checker on the same day of the occurrence.</p> <ul style="list-style-type: none"> Should night-time works be unavoidable, the following measures should be adopted: movable barrier; light control; and proper construction planning to arrange works in wet season as far as practicable. <p>Noisy modification works that require the use of PME:</p> <ul style="list-style-type: none"> Night-time activities should be avoided. Daytime construction activities within buffer zone should follow control of working hours (Table A1 above). Where use of PME is unavoidable during the specified control time (as presented in Table A1), such as after evening or during night-time, a separate detailed proposal should be prepared and agreed with relevant authorities prior to the commencement of such works to present the details (e.g. duration and frequency) and the corresponding measures. <p>Adaptive management during construction phase monitoring:</p> <ul style="list-style-type: none"> Mitigation measures would be reviewed regularly and updated in the monthly EM&A report as appropriate according to the 	Months	Reference Time of Sunset ⁽¹⁾	Control of Noisy Construction Activities ⁽²⁾	Sep – Feb	17:38 – 18:27	17:08 – 07:30 (on the following day)	Mar – May	18:27 – 19:03	17:57 – 07:30 (on the following day)	Jun – Aug	18:41 – 19:11	18:11 – 07:30 (on the following day)					
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EP Condition / EIA Ref.	Recommended Mitigation Measures	Objective of the Measures	Implementation & Maintenance Party	Implementation Location	Implementation Time	Environmental Performance required for Implementation of the Measures
	<p>monitoring findings (e.g. ardeid usage at the night roost, or returning time of the ardeids) obtained during EM&A period.</p>					
<p>EP 2.22, EIA S8.9.4 to S 8.9.5, EIA Table 8.17</p>	<p>Provision of Temporary Steel Platform</p> <ul style="list-style-type: none"> Construction activities should be conducted during daytime. Any activities with the use of PME within buffer zone should follow control of working hours (Table A1 above refers). 	<p>To avoid/minimise disturbance to the night roost through control of construction works / activities within 100m from Ardeid Night Roost</p>	<p>Contractor</p>	<p>Works sites within 100m from the Ardeid Night Roost as shown in Figure No. C1502/C/TME/A CM/M63/001</p>	<p>Construction Phase</p>	<p>Monthly ardeid monitoring findings within the range of survey findings taken in the EIA stage</p>
<p>EP 2.22, EIA S8.9.4 to S 8.9.5, EIA Table 8.17</p>	<p>Construction of Viaduct and Concreting works</p> <ul style="list-style-type: none"> Timing of the noisy construction activities should be arranged to avoid impact on the night roosting ardeids as far as possible. Any activities with the use of PME within buffer zone should follow control of working hours (Table A1 above refers). Concreting works should be limited to daytime under normal circumstances. Construction works should be properly planned for completion of the daily noisy construction works within the buffer zone 30 minutes before sunset, especially for concreting works of bored piles which should be carried out continuously to avoid the cold joint. The concreting works beyond the sunset time should be considered as contingency arrangement due to the uncontrollable issues (i.e. traffic jam, delay of concrete supply, breakdown of plant / equipment, etc). In the event of a contingency event, a notice with justification and arrangement details should be prepared and recorded in the EM&A reports. This notice should also record any change in the ardeid night roost (e.g. displacement or abandonment) observed during contingency arrangement and any mitigation measures implemented and/or to be implemented. A reporting mechanism should be developed with details stated in Environmental Monitoring and Audit (EM&A) Manual. A monthly monitoring and observation on condition of night roost should be carried out during the construction phase to monitor the impact on the night roost. 	<p>To avoid/minimise disturbance to the night roost through control of construction works / activities within 100m from Ardeid Night Roost</p>	<p>Contractor</p>	<p>Works sites within 100m from the Ardeid Night Roost as shown in Figure No. C1502/C/TME/A CM/M63/001</p>	<p>Construction Phase</p>	<p>Monthly ardeid monitoring findings within the range of survey findings taken in the EIA stage</p>

EP Condition / EIA Ref.	Recommended Mitigation Measures	Objective of the Measures	Implementation & Maintenance Party	Implementation Location	Implementation Time	Environmental Performance required for Implementation of the Measures
EIA S8.9.11	<p>Control of Glare / Lighting</p> <p>The overall reduction of glare during construction phase should also be considered. A balance between lighting for safety, and avoiding excessive lighting can be achieved through the use of directional lighting to avoid light spill into sensitive areas (e.g. the ardeid night roost), and control timing of lighting periods, particularly for the works site(s) located in proximity to the ardeid night roost in Tuen Mun Park, and during peak roosting season of ardeid (e.g. dry season), hence minimising the potential indirect impact on the community of the night-roosting ardeids.</p>	To minimise the disturbance impacts to the surrounding habitats and their associated wildlife arising from the construction activities	MTRCL, Contractor	All works sites/areas, stations, viaduct	Construction phase	Monthly ardeid monitoring findings within the range of survey findings taken in the EIA stage