



JOB No.: TCS01216/21

**WSD Contract No.: 3/WSD/20 -
Reclaimed Water Supply to Sheung Shui and Fanling**

**MONTHLY ENVIRONMENTAL MONITORING & AUDIT
REPORT (NO.17) – APRIL 2023**

**PREPARED FOR
WATER SUPPLIES DEPARTMENT**

Quality Index

Date	Reference No.	Prepared By	Approved By
9 May 2023	TCS01216/21/600/R0073v1	 Martin Li Environmental Consultant	 TW Tam Environmental Team Leader

Version	Date	Description
1	9 May 2023	First Submission



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Date: 12th May 2023

Project Manager
Water Supplies Department
Immigration Tower, 7 Gloucester Road,
Wan Chai, Hong Kong
Attn: Mr. Tim Wong

Dear Sir,

Agreement No. CE67/2017(WS)

Reclaimed Water Supply to Sheung Shi and Fanling – Investigation, Design and Construction

Independent Environmental Checker (IEC) Services for

Shek Wu Hui Water Reclamation Plant under Contract No. 3/WSD/20

Monthly EM&A Monitoring Report for April 2023

We refer to the monthly EM&A Report for April 2023 for WSD Contract No.: 3/WSD/20 – Reclaimed Water Supply to Sheung Shui and Fanling certified by the Environmental Team Leader on 9th May 2023. Please note we have no adverse comments on the captioned submission. The captioned submission is hereby verified in accordance with the requirement stipulated in Condition 3.4 of Environmental Permit No. FEP-01/470/2013.

Should you have any query, please feel free to contact the undersigned at 6113 2368.

Yours Sincerely,

Vega Wong

Independent Environmental Checker

c.c.

- ET Leader — AUES (Attn: Mr. T.W. Tam) [by Email: twtam@fordbusiness.com]
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EXECUTIVE SUMMARY

- ES.01 Water Supplies Department (WSD) is the Project Proponent and the Permit Holder of **Reclaimed Water Supply to Sheung Shui and Fanling** (hereinafter referred as “the Contract Works”), which is a Designated Project to be implemented under Further Environmental Permit number FEP-01/470/2013 (hereinafter referred as “the FEP-01/470/2013” or “the FEP”).
- ES.02 In according with the Updated EM&A Manual stipulation and the location of Contract Works, only construction noise monitoring and waterbird of ecological monitoring are required during the construction phase of the Contract Works.
- ES.03 As part of the EM&A programme, Baseline Monitoring Report which determined Action and Limit Levels (A/L Levels) based on the baseline data, has been verified by Independent Environmental Checker (IEC) and submitted to EPD endorsement on **24 November 2021**. Also, construction activities under the Contract Works were commenced on **7 December 2021**.
- ES.04 This is the **17th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1** to **30 April 2023** (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES.06 Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Table ES-1 Environmental monitoring activities in the Reporting Period

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Total Occasions during Reporting Period
Construction Noise	$L_{eq(30min)}$ Daytime	4
Ecology	Waterbirds	4
Site Inspection / Audit	ET, the Contractor and RE joint site Environmental Inspection	4

BREACH OF ACTION AND LIMIT (A/L) LEVELS

- ES.07 In the Reporting Period, no construction noise limit level exceedance construction noise was recorded and no noise complaint (i.e. Action Level) was received. No action and limit level exceedance for waterbirds survey was recorded in the Reporting Period. No Notifications of Exceedances (NOEs) was issued to the Resident Engineer (RE), IEC and the Main Contractor. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Table ES-2 Breach of Action and Limit (A/L) Levels in the Reporting Period

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	0	0
Ecology	Waterbirds Abundance	0	0	0	0	0

ENVIRONMENTAL COMPLAINT

- ES.08 No environmental complaint was recorded or received in this Reporting Month. The statistics of environmental complaint are summarized in the following table.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

- ES.09 In addition, no complaint received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.10 No environmental summons or successful prosecution was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-4 Environmental Summons Summaries in the Reporting Month

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

Table ES-5 Environmental Prosecution Summaries in the Reporting Month

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

REPORTING CHANGE

- ES.11 No report change in the reporting period.

SITE INSPECTION

- ES.12 Weekly site inspections to evaluate the site environmental performance have been carried out by the RE, ET and the Main Contractor on **6, 13, 20 and 27 April 2023**. No non-compliance was noted during the site inspection.
- ES.13 IEC inspection was conducted on **20 April 2023**.

FUTURE KEY ISSUES

- ES.14 ABWF work at ReWPS & HCF, and construction of fence wall at SWHWRP will be the major construction work in the coming month. Noise mitigation measures such as erect barrier for steel bar cutting machines were recommended to reduce noise impact generated from rebar fixing work. In addition, the Contractor should pay attention to potential water quality impact from concreting works and waste impact from ABWF Work, and implement mitigation measures according to the ISEMM.
- ES.15 As wet season has approached, the Contractor was general reminded to paid attention to water quality mitigation measures such as ensure sufficient wastewater treatment facilities capacity is provided on site and keep review on the temporary drainage system to avoid water quality impact arise from the Project.
- ES.16 Details of the future issues in the coming month are described in Section 9.4.

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1. INTRODUCTION

1.1 BACKGROUND

- 1.1.1 Water Supplies Department (WSD) is the Project Proponent of Utilization of Treated Sewage Effluent (TSE) from Shek Wu Hui Sewage Treatment Works. On 30th July 2021, China Geo-Engineering Corporation (hereinafter named as “the Main-Contractor”) was awarded WSD Contract Works 3/WSD/20 - Reclaimed Water Supply to Sheung Shui and Fanling (hereinafter referred as “the Contract Works”).
- 1.1.2 The reclaimed water supply to Sheung Shui and Fanling (SSF) comprises a Shek Wu Hui Water Reclamation Plant (SWHWRP), part of pumping water mains to Table Hill Reclaimed Water Service Reservoir (TBHRWSR), and Kwu Tung North (KTN) New Development Area (NDA) and distribution water mains to SSF area.
- 1.1.3 The SWHWRP, which comprises Hypo-Chlorination Facilities (HCF) and Reclaimed Water Pumping Station (ReWPS), will be located at a long-stripped area between Ng Tung River and Sheung Shui Slaughter House at the northwest of the Shek Wu Hui Sewage Treatment Works (SWHSTW).
- 1.1.4 The HCF, which consists of a hypo-chlorination dosing plant, a chlorine contact tank, dye dosing system, water refilling station, other post-treatment facilitates and storage areas for chemicals, would produce reclaimed water by further treatment of the treated sewage effluent (TSE) pumped from the discharge outlet of the SWHSTW. The treatment capacity of the SWHWRP will be 73,000m³/day.
- 1.1.5 The Reclaimed Water P/S, which will be located at the northwest of the HCF, will receive reclaimed water by gravity from the HCF and deliver to the TBHRWSR serving SSF areas, Kwu Tung North Flushing Water Service Reservoir (KTN FLWSR) serving KTN NDA and Fanling North Flushing Water Service Reservoir (FLN FLWSR) serving Fanling North (FLN) NDA
- 1.1.6 This Work Contract mainly comprise construction of Shek Wu Hui Water Reclamation Plant and laying of the associated water main to produce reclaimed water for supply to the Northeast New Territories areas for non-potable used. It is estimated that about 22 million cubic metres of fresh water can be saved each year ultimately.
- 1.1.7 The construction of Shek Wu Hui Water Reclamation Plant under the Work Contract is a Designated Project to be implemented under Further Environmental Permit number FEP-01/470/2013 (hereinafter referred as “the FEP-01/470/2013” or “the FEP”). Location of Shek Wu Hui Water Reclamation Plant is shown in [Appendix A](#).
- 1.1.8 The major work of the Work Contract under FEP included:
- Civil engineering construction works, including structures, foundations and earthworks for the SWHWRP and ancillary buildings;
 - Electrical and mechanical (E&M), building services, fire services installations, and treatment process system engineering work;
 - Other associated systems and facilities for the SWHWRP.
- 1.1.9 Pursuant to the FEP stipulation, the Main Contractor has commissioned Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) as Environmental Team (hereinafter referred as “ET”) perform relevant EM&A programme and as well as the associated duties.
- 1.1.10 As part of the EM&A programme, Baseline Monitoring Report which determined Action and Limit Levels (A/L Levels) based on the baseline data, has been verified by Independent Environmental Checker (IEC) and submitted to EPD endorsement on **24 November 2021**. Also, construction activities of the Contract were commencement on **7 December 2021**.

- 1.1.11 This is 17th monthly EM&A report to presenting the monitoring results and inspection findings from 1 to 30 April 2023 of the Reporting Period.

1.2 REPORT STRUCTURE

- 1.2.1 The report was structured into the following sections:-

Section 1	<i>Introduction</i>
Section 2	<i>Project Organization and Construction Progress</i>
Section 3	<i>Summary of Impact Monitoring Requirements</i>
Section 4	<i>Construction Noise Monitoring</i>
Section 5	<i>Ecology Waterbirds Monitoring</i>
Section 6	<i>Waste Management</i>
Section 7	<i>Site Inspections</i>
Section 8	<i>Environmental Complaints and Non-Compliance</i>
Section 9	<i>Implementation Status of Mitigation Measures</i>
Section 10	<i>Conclusions and Recommendations</i>

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS**2.1 PROJECT ORGANIZATION**

- 2.1.1 The project organization is shown in [Appendix B](#). The roles and responsibilities of the various parties involved in the EM&A process and the organizational structure of the organizations responsible for implementing the EM&A programme are outlined below.

Water Supplies Department (WSD)

- 2.1.2 WSD is the Project Proponent and the Permit Holder of the EP of the development of the Project and will assume overall responsibility for the project. An Independent Environmental Checker (IEC) shall be employed by WSD to audit the results of the EM&A works carried out by the ET.

Environmental Protection Department (EPD)

- 2.1.3 EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

Engineer or Engineers Representative (ER)

- 2.1.4 The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A are:

- Supervise the Contractor's activities and ensure that the requirements in the Contract Works Specific EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Employ an IEC to audit the results of the EM&A works carried out by the ET; and
- Comply with the agreed Event Contingency Plan in the event of any exceedance.

The Main Contractor

- 2.1.5 The Main Contractor is responsible perform construction works and for ensuring that the works are undertaken compliance with the specification and contract requirements. The duties and responsibilities of the Main Contractor with respect to EM&A are:

- Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- Provide assistance to ET in carrying out monitoring and auditing;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;
- Implement measures to reduce impact where Action and Limit levels are exceeded; and
- Adhere to the agreed procedures for carrying out compliant investigation.

Environmental Team (ET)

- 2.1.6 The ET is responsible perform implementation EM&A programmes of the Contract Works as stipulated in the Updated EM&A Manual ensure the works are fully compliance with environmental regulations. The duties and responsibilities of the ET with respect to EM&A are:

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyze the EM&A data and review the success of EM&A programme to cost effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive actions to pre-empt problems;
- Audit and prepare audit reports on the environmental monitoring data and site environmental conditions;
- Report on the EM&A results to the IEC, Contractor, the ER and EPD or its delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of

- Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular and ad-hoc on-site audits / inspections and report to the Contractor and the ER of any potential non-compliance; and
- Follow up and close out non-compliance actions.

Independent Environmental Checker (IEC)

2.1.7 The duties and responsibilities of IEC with respect to EM&A are:

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A reports (monthly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary;
- Report the findings of site inspections and other environmental performance reviews to ER and EPD;
- Coordinate the monitoring and auditing works for all the on-going contracts in the area in order to identify possible sources / causes of exceedances and recommend suitable remedial actions where appropriate; and
- Coordinate the assessment and response to complaints / enquires from locals, green groups, district councils or the public at large.

2.2 CONSTRUCTION PROGRESS

2.2.1 In the Reporting Period, the major construction activities of the Contract Works under FEP are listed in below. Moreover, the master construction program and site overview photo in the reporting period are enclosed in [Appendix C](#).

- Construction of R.C. Structure of ReWPS –Concreting for Wall, Beam & Column (Grid 2-4); Concreting for Slab & Parapet;
- ABWF Works at ReWPS (Basement Floor and Ground Floor)
- ABWF Works at HCF (Grid 1-3, 5-6)
- Fence Wall at SWHWRP – Rebar Fixing & Erecting Formwork

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 To according with the FEP stipulation, the required documents has submitted to EPD for retention as listed below:

- Project Location Plans;
- Updated Environmental Monitoring and Audit Manual of Project Specific (TCS01176/21/600/R0012v2); and
- Baseline Monitoring Report (TCS01216/21/600/R0017v3) for the Project.

2.3.2 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the Project is presented in **Table 2-3-1**.

Table 2-3-1 Status of Environmental Licenses and Permits

Item	Description	Licence/Permit Status		
		Ref. no.	Effective Date	Expiry Date
1	Air Pollution Control (Construction Dust) Regulation	Notification was made on 3 Aug 2021	3 Aug 2021	Till the Contract ends
2	Waste Disposal Regulation – Billing Account for Disposal of Construction Waste	Account No.: 7041397	8 Aug 2021	Till the Contract ends
3	Chemical Waste Producer Registration	Application was made on 3 Aug 2021	3 Aug 2021	Till the Contract ends

Item	Description	Licence/Permit Status		
		Ref. no.	Effective Date	Expiry Date
4	Water Pollution Control Ordinance – Discharge Licence	Discharge Licence No.: WT00039707-2021	17 Nov 2021	30 Nov 2026
5	Construction Noise Permit	CNP No. GW-RN1226-22	27 Jan 2023	26 Apr 2023
		CNP No. GW-RN0336-23	27 Apr 2023	26 Aug 2023

3. SUMMARY OF IMPACT MONITORING REQUIREMENTS**3.1 GENERAL**

- 3.1.1 According to the Updated EM&A Manual and the location of the Contract Works, only construction noise monitoring and waterbirds ecological of environmental monitoring are related the Contract Works during the construction phase. Details requirement of noise and waterbirds ecological impact monitoring are presented sub-sections as below.

3.2 REQUIREMENT OF CONSTRUCTION NOISE MONITORING

- 3.2.1 One set of $L_{eq(30min)}$ as 6 consecutive $L_{eq(5min)}$ between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), $L_{eq(5min)}$ measurement will be carried out in accordance with the CNP requirements. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

- 3.2.2 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.3 LOCATION OF CONSTRUCTION NOISE IMPACT MONITORING

- 3.3.1 According to the Updated EM&A Manual of CEDD Contract No. NDO 14/2018 - *Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas*, four noise sensitive receivers are designated on Fanling North New Development Areas for construction noise monitoring.

- 3.3.2 According to the geographic location of proposed Shek Wu Hui Water Reclamation Plant and all the recommended designated construction noise monitoring stations, only the designated noise monitoring station CP-KTN-NMS5 (prior named “CP-NMS7”) shown in [Appendix D](#), is located near the proposed Shek Wu Hui Water Reclamation Plant within 300m (distance about 110m). Therefore, the designated noise monitoring station CP-KTN-NMS5 is recommended for the Contract Works to undertake construction noise monitoring. If the recommended noise monitoring location CP-KTN-NMS5 not available, the ET shall propose alternative monitoring locations/additional monitoring locations and seek approval from the Supervisor of the proposal. When alternative/new monitoring location is proposed, the monitoring location shall be chosen based on the following criteria:

- (i) at locations close to the major site activities which are likely to have noise impacts;
- (ii) close to the noise sensitive receivers; and
- (iii) for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.

- 3.3.3 The construction noise monitoring station shall normally be at a point 1 m from the exterior of the sensitive receivers building façade and be a position 1.2m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made to the free field measurements. The ET shall agree with the Supervisor on the monitoring station that is chosen for impact monitoring.

3.4 ACTION AND LIMIT LEVEL FOR CONSTRUCTION NOISE

- 3.4.1 The Action and Limit levels for construction noise are defined in **Table 3-4-1**. Should non-compliance of the criteria occur, action in accordance with the Action Plan which shown in Section 4 of this report, shall be carried out.

Table 3-4-1 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
CP-KTN-NMS5	When one or more documented complaints are received	75 dB(A) ^{Note 1}

Note 1: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

3.5 NOISE MONITORING METHODOLOGY

Monitoring Equipment

- 3.5.1 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications was used for carrying out the noise monitoring. Noise equipment used for impact monitoring is listed in **Table 3-5-1**.

Table 3-5-1 Equipment of Noise Impact Monitoring

Equipment	Model
Integrating Sound Level Meter	Rion NL – 52
Calibrator	Rion NC – 73

Remark: Sound level meter IEC 60651:1979 (Type 1) was replaced by 60672 (Type 1) in 2002 (Ref: <https://webstore.iec.ch/publication/17086>)

- 3.5.2 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis. The valid calibration certificates of the monitoring equipment are shown in **Appendix E**.

3.6 MONITORING PROCEDURE

- 3.6.1 All noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). Leq_(30min) in six consecutive Leq_(5min) measurements was used as the monitoring parameter for the time period between 07:00-19:00 hours during the baseline monitoring.
- 3.6.2 In general, the sound level meter would be mounted on a tripod at a height of 1.2 m and placed at the assessment point and oriented such that the microphone was pointed to the site with the microphone facing perpendicular to the line of sight. The windshield would be fitted for all measurement. Where a measurement was to be carried out at a building, the assessment point would normally be at a position 1 m from the exterior of the building façade. Where a measurement was to be made for noise being received at a place other than a building, the assessment point would be at a position 1.2 m above the ground in a free-field situation, i.e. at least 3.5 m away from reflective surfaces such as adjacent buildings or walls.
- 3.6.3 Immediately prior to and following each noise measurement the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements would be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.
- 3.6.4 Noise measurements would not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed would be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.7.1 The monitoring data recorded in the equipment would be downloaded directly from the equipment at each monitoring day. The downloaded monitoring data would input into a computerized database properly maintained and handled by the ET's in-house data recording and management system.

3.8 REQUIREMENT OF WATERBIRDS ECOLOGICAL IMPACT MONITORING

3.8.1 Where development under the NDAs project is undertaken within 200m (the maximum distance at which it is predicted there may be some disturbance, and hence a reduction in numbers, of large waterbirds) of the Ng Tung, Sheung Yue and Shek Sheung Rivers and Long Valley the monitoring protocol detailed in the updated EM&A Manual Table 12.1 should be followed. A transect should be undertaken throughout the sections of the rivers where NDA construction activities are proposed; as the sensitive receivers (large waterbirds) are easily visible, the transect route needs only follow one bank of the rivers. The transect route should remain the same during the different phases in order to ensure that data are comparable. Monitoring of large waterbirds should be conducted in pre-construction, construction and operational phases of the concerned development.

3.8.2 The proposed Shek Wu Hui Water Reclamation Plant location is located less than 200m to Ng Tung River, Sheung Yue River and Shek Sheung River, waterbirds ecological monitoring included pre-construction (i.e. baseline), construction (i.e. impact) and post-construction (i.e. operating) should be requires. The detailed monitoring protocol is listed in *Table 3-8-1*.

Table 3-8-1 Monitoring of Measures to Minimize Disturbance to Waterbirds on the Ng Tung, Sheung Yue and Shek Sheung Rivers

Phase	Methodology
Pre-construction (baseline)	Weekly transect at both high and low tides to identify and enumerate all bird species utilising the river channels for 12 months prior to the commencement of construction.
Construction	Weekly transect at both high and low tides to identify and enumerate all bird species utilising the river channels and identify any sources of actual or potential disturbance to birds due to construction activities throughout the construction period.
Post-construction	Weekly transect at both high and low tides to identify and enumerate all bird species utilising the river channels and identify any sources of actual or potential disturbance to birds due to operational activities for 12 months following the completion of the construction period.

3.8.3 Waterbirds ecological baseline monitoring at Ng Tung River, Sheung Yue River and Shek Sheung River was conducted by DSD between *December 2017* and *June 2019* (total 19 months baseline monitoring), in compliance with the Updated EM&A Manual. Thus, the action and limit levels and responses to evidence of disturbance to waterbirds using in Ng Tung, Sheung Yue and Shek Sheung Rivers will be made reference during construction phase of the Project.

3.9 MONITORING METHODOLOGY FOR WATERBIRDS ECOLOGICAL IMPACT MONITORING

3.9.1 Three transects and seven point count locations were selected at the Ng Tung, Sheung Yue and Shek Sheung River. These locations are shown in Appendix L and summarized in *Table 3-9-1*.

Table 3-9-1 Ecological Monitoring Stations

Monitoring Stations	Descriptions	Influenced by Tidal Action
Transect T1	Along Ng Tung River	No
Transect T2		
Point Count Location P1		
Point Count Location P2		
Point Count Location P3		
Point Count Location P4		
Point Count Location P5	At Shek Sheung River (Low-flow Channel)	No
Transect T3	Along Shek Sheung River & Sheung Yue River	Yes
Point Count Location P6	At Shek Sheung River	Yes
Point Count Location P7	At Intersection between Sheung Yue and Shek Sheung River	Yes

- 3.9.2 Surveys will be conducted on a weekly basis at both high and low tides (it is considered high tide when tidal levels are above 1.5m and low tide when tidal level are below 1.5m at Tsim Bei Tsui Station).
- 3.9.3 All avifauna species that were seen or heard would be identified and quantified along transects and at point count locations. Survey data would be recorded continuously by the surveyor as they walk along the transects, while survey data of each point count location would be collected for 5-minutes after surveyor reaches the designated point count location.
- 3.9.4 Noticeable behaviours such as breeding, nesting, roosting, feeding and presences of recently fledged juveniles were recorded and reported. In the case which such behaviours were observed for species of conservation importance, the Resident Engineer (RE), the Contractor and the Independent Environmental Checker (IEC) would be immediately notified after the survey such that the Contractor could review the current construction programme and minimize disturbances due to construction activities.

3.10 EVENT ACTION PLAN

Noise

- 3.10.1 Should non-compliance of the construction noise criteria occur, action in accordance with the Action Plan in **Table 3-10-1** shall be carried out.

Table 3-10-1 Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level Exceedance	1. Notify the IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the monitoring data submitted by the ET; 2. Review the construction methods and proposed remedial measures by the Contractor, and advise the ET and ER if the proposed remedial measures would be sufficient; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify the Contractor; 3. Require the Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to the ER and IEC and copy to the ET; 2. Implement noise mitigation proposals.
Limit Level Exceedance	1. Identify sources. 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase the monitoring frequency; 5. Carry out analysis of the Contractor's working procedures with the ER and Contractor to determine possible mitigations to be implemented; 6. Inform IEC, ER, EPD and Contractor the causes and	1. Discuss amongst the ER, ET and Contractor on the potential remedial actions; 2. Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analyzed noise problems; 4. Ensure remedial measures are properly implemented; 5. If exceedance continues,	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial action to the ER and IEC and copy to the ET within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit

Event	Action			
	ET	IEC	ER	Contractor
	actions taken for the exceedances; 7. Assess the effectiveness of the Contractor's remedial action with the ER and keep the IEC informed of the results; 8. If exceedance stops, cease additional monitoring.		consider what portion of work is responsible and instruct the Contractor to stop that portion of works until the exceedance is abated.	proposals if problems still not under control; stop the relevant portion of works as determined by the ER until the exceedance is abated.

Waterbird of Ecological

- 3.10.2 Should any exceedance encountered during construction phase, action in accordance with the Action Plan listed in **Table 3-10-2** shall be carried out.

Table 3-10-2 Event and Action Plan of Waterbirds of Ecological

Action Level	Response	Limit Level	Response
Construction Phase			
Decline in numbers of all waterbird species relative to numbers during Baseline Monitoring such that the Action Level response is triggered.	Investigate cause and if cause identified as related to NDAs project instigate remedial action to remove or reduce source of disturbance.	Decline in numbers of all waterbird species relative to numbers during Baseline Monitoring such that the Limit Level response is triggered.	Investigate cause and if caused identified as related to NDAs project instigate remedial action. Review and adjust LVNP management measures to improve conditions for affected species.
Decline in numbers of any one waterbird species occurring in significant numbers* during Baseline Monitoring such that the Action Level response is triggered.	Investigate cause and if cause identified as related to NDAs project instigate remedial action to remove or reduce source of disturbance.	Decline in numbers of any one waterbird species occurring in significant numbers* during Baseline Monitoring such that the Limit Level response is triggered.	Investigate cause and if caused identified as related to NDAs project instigate remedial action. Review and adjust LVNP management measures to improve conditions for affected species.

(*) *Waterbird numbers refer to combined numbers using the channels*

4. CONSTRUCTION NOISE MONITORING

4.1 GENERAL

4.1.1 The noise monitoring schedule is presented in [Appendix F](#) and the monitoring results are presented in the following sections.

4.2 RESULTS OF NOISE MONITORING

4.2.1 In the Reporting Period, a total of **4** occasions noise monitoring were carried out at the designated location CP-KTN-NMS5. The sound level meter was set in free-field situation, and therefore, façade correction (+3dB) is added according to acoustical principles and EPD guidelines. The noise monitoring results at the designated locations are summarized in **Tables 4-2-1**. The detailed noise monitoring data is presented in [Appendix G](#) and the relevant graphical plot shown in [Appendix H](#).

Table 4-2-1 Summaries of Noise Monitoring Results of CP-KTN-NMS5

Date	Start Time	L _{Aeq30min} (dB(A))
4-Apr-23	9:36	60
14-Apr-23	11:19	59
20-Apr-23	15:22	61
26-Apr-23	13:20	59
Limit Level		75 dB(A)

Note: façade correction +3dB has added according to acoustical principles and EPD guidelines

4.2.2 During construction noise monitoring, no rain was encountered and wind speed is below 5m/s and gusts not exceeding 10m/s.

4.2.3 As shown in **Table 4-2-1**, the noise level measured at the designated monitoring location was below 75dB(A). Furthermore, there were no noise complaints (Action Level exceedance) received by the RE, Contractor, WSD or EPD in the Reporting Period. Therefore, no Action or Limit Level exceedance was triggered and no corrective action was therefore required.

4.2.4 During the reporting period, no construction work was carried out during restricted hours.

5. ECOLOGY WATERBIRD MONITORING**5.1 GENERAL**

- 5.1.1 Ecological monitoring for waterbirds shall be performed as transects and point count surveys along Ng Tung River, Sheung Yue River and Shek Sheung River in accordance with general surveying practices.
- 5.1.2 The surveying shall be undertaken by a qualified ecologist and he/she shall be a member of the ET. Throughout the construction period, weekly transect shall be conducted at both high and low tides to identify and enumerate all bird species utilising the river channels and identify any sources of actual or potential disturbance to birds due to construction activities.
- 5.1.3 Since occurrence of waterbirds has distinctive seasonal pattern, the construction phase data for all waterbirds and representative waterbirds shall be compared with the baseline data for the respective month and season. Total number of Waterbirds and six representative Waterbird species are used as an indicator of the level disturbance to water birds at each of the survey location. The representatives of waterbirds are listed in *Table 5-1-1*.

Table 5-1-1 Representative Waterbirds

Species Name	Common Name	Chinese Name
<i>Egretta garzetta</i>	Little Egret	小白鷺
<i>Ardea alba</i>	Great Egret	大白鷺
<i>Ardea cinerea</i>	Grey Heron	蒼鷺
<i>Ardeola bacchus</i>	Chinese Pond Heron	池鷺
<i>Bubulcus coromandus</i>	Eastern Cattle Egret	牛背鷺
<i>Phalacrocorax carbo</i>	Great Cormorant	普通鸕鶿

5.2 RESULTS OF WATERBIRDS SURVEY

- 5.2.1 *Four (4)* occasion of waterbirds survey were conducted in the Reporting Month.
- 5.2.2 Abundance and diversity of total bird species and key waterbirds species in the Reporting Month are summarized in **Table 5-2-1** and **Table 5-2-2**.

Table 5-2-1 Total Bird Species and Abundance at Point Count Locations in the Reporting Month

Category	Number of Species	Abundance
All Avifauna	42	570
Waterbirds	15	171

Table 5-2-2 Abundance of Representative Waterbirds at Point Count Locations in the Reporting Month

Common Name	Species Name	Chinese Name	Abundance
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	26
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	牛背鷺	19
Grey Heron	<i>Ardea cinerea</i>	蒼鷺	7
Great Egret	<i>Ardea alba</i>	大白鷺	7
Little Egret	<i>Egretta garzetta</i>	小白鷺	53
Great Cormorant	<i>Phalacrocorax carbo</i>	普通鸕鶿	1

- 5.2.3 The result was compared with the baseline data (both April average and Winter average) and decline in abundance of Chinese Pond Heron and Little Egret were recorded. A table showing the waterbirds abundance comparison with baseline data was provided in **Appendix L**. (Appendix C of the waterbirds survey report).

- 5.2.4 The decline of individual waterbird species should not be the result of increased disturbances from the Project or its surrounding on-going projects, as increased disturbance would discourage multiple waterbird species from foraging near the transect and point count locations instead. Thus it is concluded that the decline in Chinese Pond Heron and Little Egret is not related to the construction works of the Project.
- 5.2.5 According to surveyors, the construction works by other Projects around the survey transects observed in previous month are still active during the reporting month.
- 5.2.6 Concrete blocks laying work was observed across Ng Tung River at P2 and P3 by other Project since November 2022. It was observed during the survey in the reporting period that these works are still in process. The water level of Ng Tung River along T1 (P1 and P2 included) is higher than the baseline survey due to the concrete blocks damming the flow of water, and may reduce the foraging area at P1 and/or P2 and attract less waterbirds to forage at these two points.
- 5.2.7 A playback device for bird calls was seen to be installed and in operation near the pond in T1 during the survey on 3rd April 2023 by other Project. It is assumed to be part of the enhancement measure of the pond and to attract more egrets to forage at the pond. This may directly lower the number of waterbirds and representative waterbirds visiting P1 and P2 as the birds would be incentivized to forage away from these two points and in the pond instead. However, the playback device was observed to be turned off on all other surveys in the Reporting Month.
- 5.2.8 Road enhancement works by other Project was also observed along T2 near P3, and large vehicles producing noise were seen to enter and leave the site. This may be a potential source of disturbance that discourages waterbirds from foraging at P3. In addition, the construction work by other Project near P7 was observed active throughout the entire reporting month..
- 5.2.9 The details of the waterbirds survey for the Reporting Month can be referred to the full waterbirds survey report provided in **Appendix L**.

6. WASTE MANAGEMENT

6.1 GENERAL WASTE MANAGEMENT

- 6.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

6.2 RECORDS OF WASTE QUANTITIES

- 6.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

- 6.2.2 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 6-2-1* and *6-2-2* and the Monthly Summary Waste Flow Table is shown in *Appendix I*. Whenever possible, materials were reused on-site as far as practicable.

Table 6-2-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity	Disposal Location
C&D Materials (Inert) (in '000m ³)	0.9450	-
Reused in this Contract (Inert) (in '000 m ³)	0	-
Reused in other Contracts/ Projects (Inert) (in '000 m ³)	0	-
Disposal as Public Fill (Inert) (in '000 m ³)	0.9450	TM38

Table 6-2-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity	Disposal Location
Recycled Metal ('000kg)	0	-
Recycled Paper / Cardboard Packing ('000kg)	0	-
Recycled Plastic ('000kg)	0	-
Chemical Wastes ('000kg)	0	-
General Refuses ('000m ³)	0.0130	SENT

7. SITE INSPECTION**7.1 REQUIREMENTS**

- 7.1.1 According to the approved Updated EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

7.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

- 7.2.1 In the Reporting Month, weekly regular site inspection by the RE, the Main Contractor and ET was carried out on **6, 13, 20 and 27 April 2023** to evaluate site environmental performance of the Contract Works. During the site inspections, no non-compliance was noted.

- 7.2.2 The findings/deficiencies of the Contract Works observed that during the weekly site inspection are listed in **Table 7-2-1**.

Table 7-2-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
6 April 2023	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	NA
13 April 2023	<ul style="list-style-type: none"> Opened cement bag and stockpile of cement bags should be properly covered with impervious sheet to avoid dust impact. (Near HCF) 	Opened cement bag was removed and stockpile of cement bags was properly covered.
20 April 2023	<ul style="list-style-type: none"> Chemical waste containers should be disposed separately from construction waste. Debris and general refuse at existing drainage channel should be cleaned. 	<p>Construction waste and chemical waste was disposed properly within site area.</p> <p>Existing drainage channel was maintained regularly.</p>
27 April 2023	<ul style="list-style-type: none"> The Contractor was advised to provide sheltered area for any cement grouting activities to avoid dust emission. 	The grouting machine was removed from site.

8. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE**8.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION**

- 8.1.1 For the Contract Works, no environmental complaint, summons and prosecution was received in the Reporting Period. The statistical summary table of environmental complaint is presented in *Tables 8-1-1, 8-1-2 and 8-1-3*.

Table 8-1-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

Table 8-1-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

Table 8-1-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2023	0	0	NA

9. IMPLEMENTATION STATUS OF MITIGATION MEASURES

9.1 GENERAL REQUIREMENTS

- 9.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved Updated EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in [Appendix J](#).

9.2 IMPLEMENTATION STATUS OF THE MITIGATION MEASURES IN THE REPORTING PERIOD

- 9.2.1 The Contract Works shall be implementing the required environmental mitigation measures according to the approved Updated EM&A Manual as subject to the site condition. Environmental mitigation measures implemented by the Main Contractor in this Reporting Month are summarized in **Table 9-1-1**. An as-built drawing of site temporary drainage is shown in [Appendix K](#).

Table 9-1-1 Environmental Mitigation Measures Implemented in the Reporting Period

Issues	Environmental Mitigation Measures
Air Quality	<ul style="list-style-type: none"> All vehicles must be washed before leaving the site; Sprayed water during excavation works; Stockpile of dusty material was covered entirely with impervious sheeting or sprayed with water so as to maintain the entire surface wet; Water spraying on haul road and dry site area was provided regularly; and Where a vehicle leaving the works site is carrying a load of dusty materials, the load has covered entirely with clean impervious sheeting;
Constriction Noise	<ul style="list-style-type: none"> Keep all vehicles/plants in good condition to minimize noise impact; Shut down the plants when not in used; Provided quiet powered mechanical equipment to use onsite; Avoided using multiple vehicles at the same time as far as practicable
Water Quality	<ul style="list-style-type: none"> All the surface runoff are collected to sedimentation pit and tanks for sedimentation prior discharged Sand bag bund was provided along the boundary of the site area near Ng Tung River to divert the surface runoff to sedimentation pit and avoid direct discharge of surface runoff. Standby water pumps were provided on site to pump the runoff water collected at pit to the sedimentation tank for sedimentation. Standby sedimentation tanks were provided on site to ensure sufficient sedimentation capacity. Complied with the requirement under the discharge license. Avoid spilt concrete during concreting works Haul road was hard paved to reduce muddy runoff during rainy days.
Waste and Chemical Management	<ul style="list-style-type: none"> Disposal of C&D wastes to any designated public filling facility and/or landfill followed a trip ticket system; Debris and refuse generated on-site collected regularly; Oils and fuels were stored in designated areas; Kept the site tidy and clean.

9.3 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

- 9.3.1 The tentative construction works schedule of the Contract Works under FEP in the coming month are listed below:
- ABWF Works at ReWPS (Basement and Ground Floor) – Wall & Ceiling, Watertightness Test
 - EM& Works at ReWPS and HCF
 - ABWF Works at HCF (Grid 1-3, 5-6)
 - Fence Wall at SWHWRP - Rebar fixing and concreting work

9.4 KEY ISSUES FOR THE COMING MONTH

- 9.4.1 Key issues to be considered in the coming month for the Contract Works under FEP include:

ABWF Work at ReWPS and HCF

- Proper management and storage of chemicals used for the ABWF Work to avoid land contamination.
- Chemical label for chemical container should be regularly checked and provided.
- Sufficient secondary containment for chemical containers should be provided at work area.

Fence Wall at SWHWRP (Rebar fixing and concreting work)

- Collect spilt cement/concrete washings during concreting works to avoid water quality impact
- Erect barrier for steel bar cutting machine to reduce noise impact;
- Restrict operation time of PME from 07:00 to 19:00 on any working day;

General

- Ensure the sand bag bund at site boundary near the Ng Tung River is properly maintained to avoid muddy discharge during heavy rain;
- Ensure sufficient capacity of sedimentation pit and tanks for wastewater sedimentation;
- Ensure all surface runoff are diverted to sedimentation pit and tanks properly;
- Sufficient stock of standby pump should be available on site for pumping the runoff water/wastewater to the sedimentation tank.
- Cover the dusty stockpile on site to reduce potential fugitive dust quality impact;
- Spraying water at dry haul road more frequently to reduce dust generation;
- All the vehicles should be properly washed prior leaving the site;
- Use Quiet powered mechanical equipment (QPME) whenever applicable;
- Minimize the number of plants used at the same time to reduce cumulative noise impact;
- Proper management of general refuse and chemical waste generated on site.
- Keep review the temporary drainage system on site during rainy reason

10. CONCLUSIONS AND RECOMMENDATIONS**10.1 CONCLUSIONS**

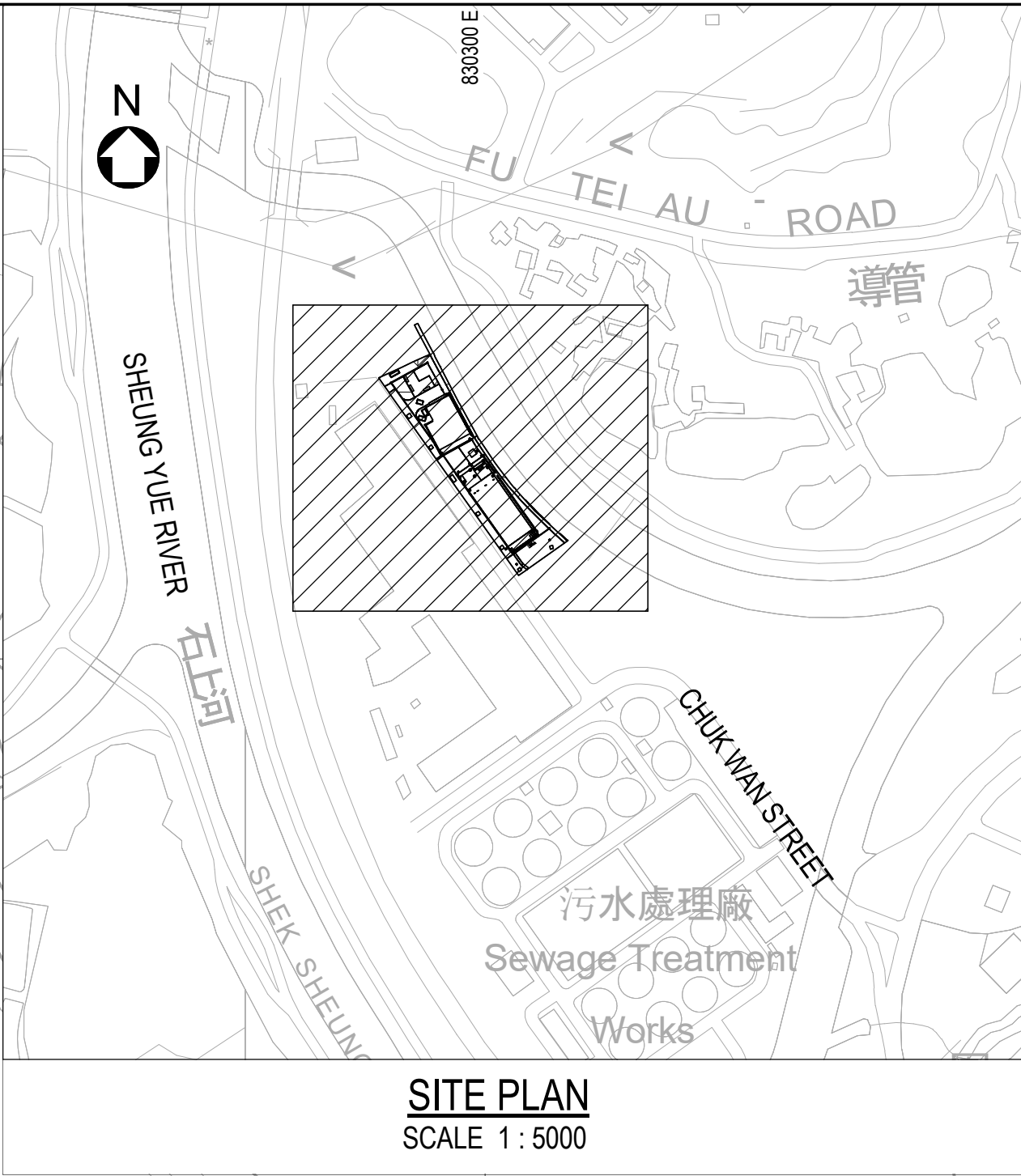
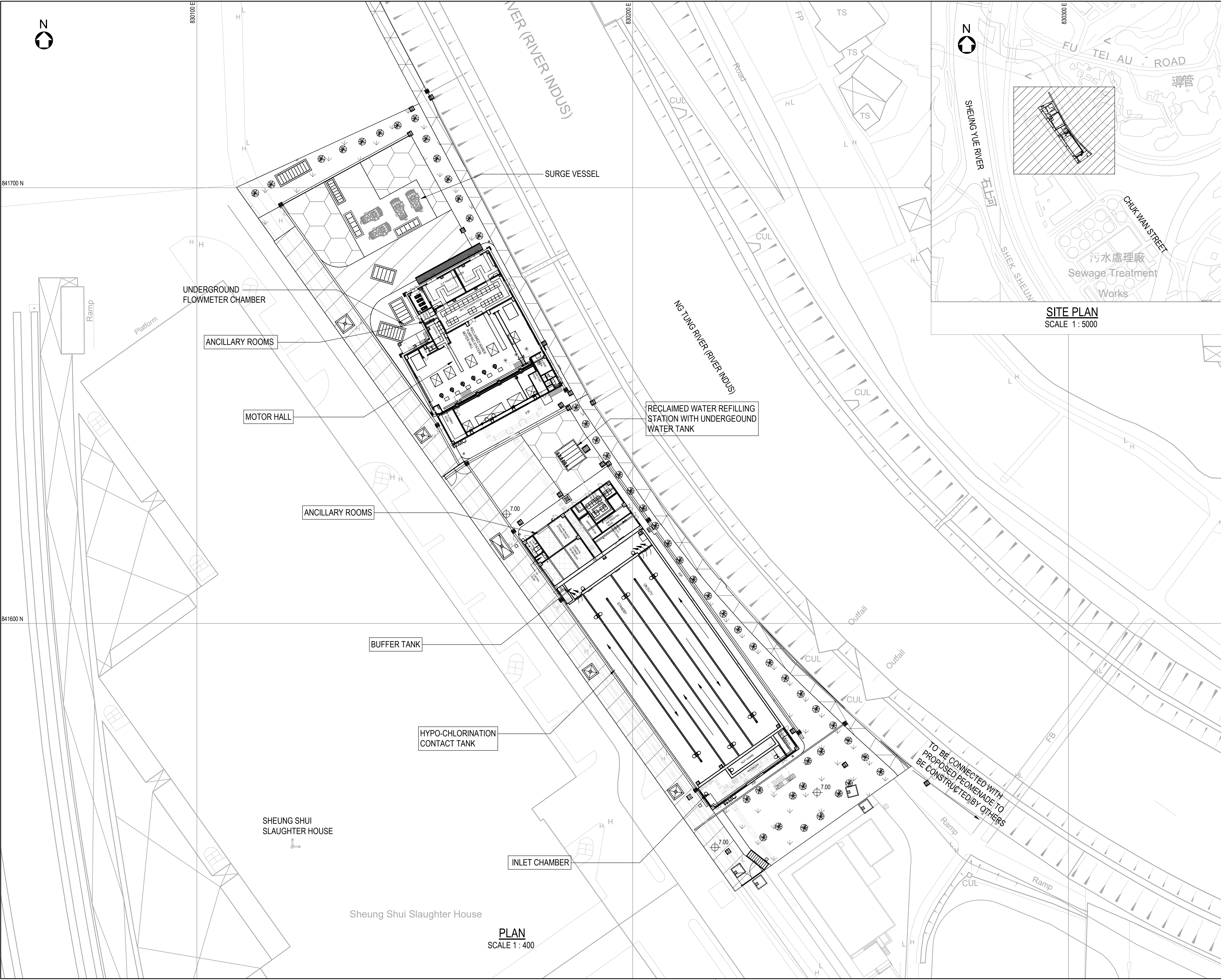
- 10.1.1 This is **17th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **30 April 2023**.
- 10.1.2 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Period. No NOEs or the associated corrective actions were therefore issued.
- 10.1.3 Four (4) occasions of the weekly waterbirds survey has been taken in the Reporting Period. Although decline in waterbirds were recorded in the Reporting Period, the cause of decline was considered unlikely due to the Project. No action and limit level exceedance was considered triggered in the Reporting Month.
- 10.1.4 No documented complaint, notification of summons or successful prosecution was received by either the RE or WSD or the Main Contractor.
- 10.1.5 Weekly site inspection by the RE, ET and the Main Contractor had carried out on **6, 13, 20** and **27 April 2023**. The mitigation measures implemented was considered satisfactory. No non-compliance observed during the site inspection.

10.2 RECOMMENDATIONS

- 10.2.1 ABWF work at ReWPS & HCF, and construction of fence wall at SWHWRP will be the major construction work in the coming month. Noise mitigation measures such as erect barrier for steel bar cutting machines were recommended to reduce noise impact generated from rebar fixing work. In addition, the Contractor should pay attention to potential water quality impact from concreting works and waste impact from ABWF Work, and implement mitigation measures according to the ISEMM.
- 10.2.2 As wet season has approached, the Contractor was general reminded to paid attention to water quality mitigation measures such as ensure sufficient wastewater treatment facilities capacity is provided on site and keep review on the temporary drainage system to avoid water quality impact arise from the Project.
- 10.2.3 The Contractor was reminded to pay attention to the key issues for the coming month mentioned in Section 9.4.

Appendix A

Location of Shek Wu Hui Water Reclamation Plant





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NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
- THE BASE PLAN IS EXTRACTED FROM SURVEY SHEET NOS. 2-SE ADN 3-SW.
- TOP SLABS OF STRUCTURES ARE NOT SHOWN FOR CLARITY.

LEGEND:

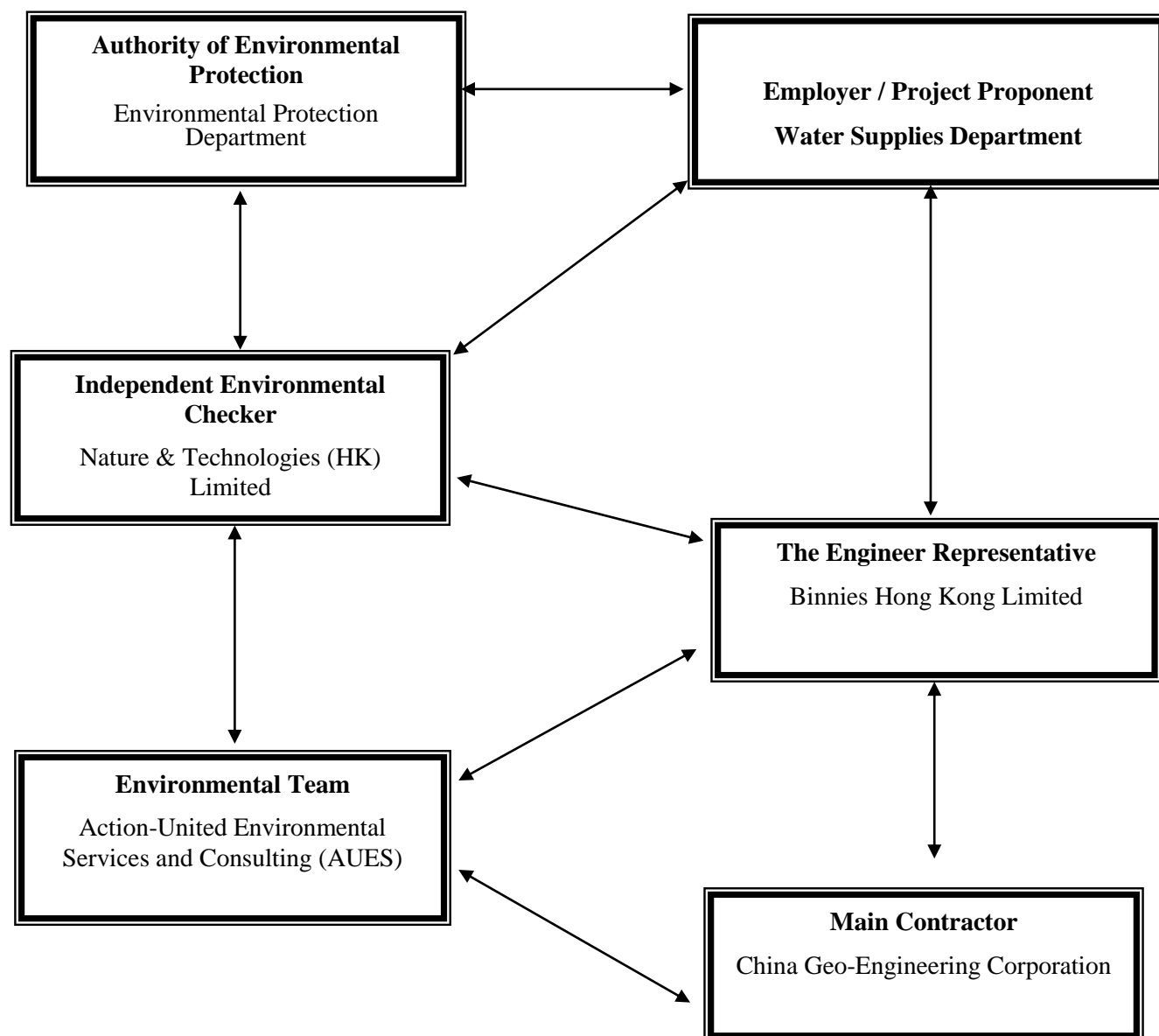
- SITE BOUNDARY OF SWHWRP
- FENCING
- EVA
- PLANTER GREENING AREA
- GRASSCRETE
- RIVERSIDE PROMENADE
- GROUND LEVEL
- TREE (INDICATIVE)
- F/P FOOTPATH
- MANHOLE/CABLE PIT
- ACCESS GATE

Revision	Date	Description	Initial
	Designed	Checked	Drawn
Initial	CWC	GC	SZ
Date	02/21	02/21	02/21
Approved			
Contract No. 3 / WSD / 20			
Contract Title			
RECLAIMED WATER SUPPLY TO SHEUNG SHUI AND FANLING			
Drawing Title			
GENERAL ARRANGEMENT OF SWHWRP - GENERAL PLAN			
Drawing No. 401582/B&V/WRP/GA/101			Revision -
Scale AS SHOWN			
 水務署 Water Supplies Department			
 BINNIES HONG KONG LIMITED 賓尼斯工程顧問有限公司			

Appendix B

Project Organization

Project Organization Chart



Contact Details of Key Personnel for the Project

Organization	Project Role	Name of Key Staff	Tel No.	Email
WSD	Project Proponent	Tim Wong	2829 5638	tim_cw_wong@wsd.gov.hk
Binnies	Senior Resident Engineer	S.H. Chung	2608 7380	sre.3wsd20@gmail.com
Binnies	Resident Engineer	Chester Chan,	2608 7380	chancw@binnies.com
N&T	Independent Environmental Checker	Vega Wong	2877 3122	vegawong@nt.com.hk
CGC	Site Agent	Wong Fai	9785 2545	3wsd20@gmail.com
CGC	Environmental Officer	Leo Wong	9337 2420	3wsd20.so1@gmail.com
AUES	Environmental Team Leader	T. W. Tam	2959 6059	twtam@fordbusiness.com
AUES	Environmental Consultant	Martin Li	2959 6059	martinli@fordbusiness.com
AUES	Assistant Environmental Consultant	Fai So	2959 6059	faiso@fordbusiness.com

Legend:*WSD (Employer) – Water Supplies Department**Binnies (Engineer Representative) – Binnies Hong Kong Limited**CGC (Main Contractor) – China Geo-Engineering Corporation**N&T (IEC) – Nature & Technologies (HK) Limited**AUES (ET) – Action-United Environmental Services and Consulting (AUES)*

Appendix C

Master Construction Program and Site Overview Photo in the Reporting Period

SITE OVERVIEW PHOTO IN THE REPORTING PERIOD



R.C. Structure of ReWPS - Concreting work



Fence wall at SWHWRP – Rebar fixing and Concreting work

D	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022				2023				2024				2025				2026	
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
222	Construction of Walls and Columns (+7.2mPD/+9.1mPD to +12.2mPD)	24 days	Feb 15 '23	Mar 10 '23		207,218,201	226																		
223	Scaffolding erection and Formwork erection	8 days	Feb 15 '23	Feb 22 '23			224																		
224	Rebar fixing and Formwork erection	9 days	Feb 23 '23	Mar 3 '23		223	225																		
225	Concreting	7 days	Mar 4 '23	Mar 10 '23		224																			
226	Construction of Walls and Columns (+12.2mPD to +15.2mPD)	13 days	Mar 11 '23	Mar 23 '23		222	241																		
227	Scaffolding erection and Formwork erection	3 days	Mar 11 '23	Mar 13 '23			228																		
228	Rebar fixing and Formwork erection	3 days	Mar 14 '23	Mar 16 '23		227	229																		
229	Concreting	7 days	Mar 17 '23	Mar 23 '23		228																			
230	Construction of Staircase ST1, ST2 (+0mPD to +3.6mPD)	19 days	Feb 17 '23	Mar 7 '23		212	235																		
231	Scaffolding and falsework erection	7 days	Feb 17 '23	Feb 23 '23			232																		
232	Formwork erection	4 days	Feb 24 '23	Feb 27 '23		231	233																		
233	Rebar fixing	4 days	Feb 28 '23	Mar 3 '23		232	234																		
234	Concreting	4 days	Mar 4 '23	Mar 7 '23		233																			
235	Construction of Staircase ST1, ST2 (+3.6mPD to +7.2mPD)	16 days	Mar 8 '23	Mar 23 '23		230	240																		
236	Scaffolding and falsework erection	4 days	Mar 8 '23	Mar 11 '23			237																		
237	Formwork erection	4 days	Mar 12 '23	Mar 15 '23		236	238																		
238	Rebar fixing	4 days	Mar 16 '23	Mar 19 '23		237	239																		
239	Concreting	4 days	Mar 20 '23	Mar 23 '23		238																			
240	Re-instatement of falsework at Staircase below +7.2mPD	4 days	Mar 24 '23	Mar 27 '23		235	245																		
241	Construction of Beams and Slabs at +15.2mPD	28 days	Mar 24 '23	Apr 20 '23		226	251,256,257																		
242	Construction of Beams	15 days	Mar 24 '23	Apr 7 '23																					
243	Falsework and formwork erection for beam	3 days	Mar 24 '23	Mar 26 '23			244																		
244	Rebar fixing for beam	5 days	Mar 27 '23	Mar 31 '23		243	245																		
245	Concreting and curing of concrete for beam	7 days	Apr 1 '23	Apr 7 '23		244,240,217	247																		
246	Construction of Slabs	13 days	Apr 8 '23	Apr 20 '23																					
247	Installation of precast segments (65 nos.)	3 days	Apr 8 '23	Apr 10 '23		245	248																		
248	Formwork erection for half slab	1 day	Apr 11 '23	Apr 11 '23		247	249																		
249	Rebar fixing for half slab	2 days	Apr 12 '23	Apr 13 '23		248	250																		
250	Concreting for half slab and curing of concrete	7 days	Apr 14 '23	Apr 20 '23		249																			
251	Construction of Parapet Walls (+15.2mPD to +16.6mPD)	26 days	Apr 21 '23	May 16 '23		241																			
252	Scaffolding erection	7 days	Apr 21 '23	Apr 27 '23			253																		
253	Rebar fixing	10 days	Apr 28 '23	May 7 '23		252	254																		
254	Formwork erection	7 days	May 8 '23	May 14 '23		253	255																		
255	Concreting	2 days	May 15 '23	May 16 '23		254																			
256	Removal of formwork and falsework below +15.2mPD	7 days	Apr 21 '23	Apr 27 '23		241	260,529																		
257	Installation of water proofing system below ground (below +7.2mPD & +9.1mPD)	14 days	Apr 21 '23	May 4 '23		241	258,265,260																		
258	Watertightness test (G.L. 2-3, below +9.1mPD)	21 days	May 5 '23	May 25 '23		257																			
259	Detailed Design for Internal Façade Treatment for Assess Road and Interior Fitting for Internal Rooms	60 days	Feb 20 '23	Apr 20 '23			260																		
260	Installation of internal finishing works above ground (above +7.2mPD & 9.1mPD)	28 days	May 5 '23	Jun 1 '23		256,259,257																			
261	Plaster and paint at wall and soffit	14 days	May 5 '23	May 18 '23			262																		
262	Epoxy painting on floor finish	7 days	May 19 '23	May 25 '23		261	263,264																		
263	Chequer plate system at cable trench	7 days	May 26 '23	Jun 1 '23		262																			
264	SS door and aluminum louver	7 days	May 26 '23	Jun 1 '23		262																			
265	Installation of internal finishing works (G.L. 3-4, below +7.2mPD)	28 days	May 5 '23	Jun 1 '23		257																			
266	Construction of Superstructure (above ground) - Grid Line 4-6	220 days	Nov 8 '22	Jun 15 '23		198																			
267	Construction of base slab (+4.45mPD to +5.95mPD & +5.6mPD to +7.1mPD)	41 days	Nov 8 '22	Dec 18 '22			275																		
268	Open-cut excavation to formation level	10 days	Nov 8 '22	Nov 17 '22			269																		
269	Welding of pile head capping plate (11 nos.)	3 days	Nov 18 '22	Nov 20 '22		268	270																		
270	Laying of blinding layer	2 days	Nov 21 '22	Nov 22 '22		269	271																		
271	Installation of water proofing system and testing	2 days	Nov 23 '22	Nov 24 '22		270	272																		
272	Formwork erection	3 days	Nov 25 '22	Nov 27 '22		271	273																		
273	Rebar fixing	14 days	Nov 28 '22	Dec 11 '22		272	274																		
274	Concreting	7 days	Dec 12 '22	Dec 18 '22		273																			
275	Construction of Bearing walls and Slabs (+5.95mPD to +7.2mPD)	37 days	Dec 19 '22	Jan 24 '23		267	279																		
276	Formwork erection and Rebar fixing	15 days	Dec 19 '22	Jan 2 '23			277																		
277	Formwork erection	15 days	Jan 3 '23	Jan 17 '23		276	278																		
278	Concreting	7 days	Jan 18 '23	Jan 24 '23		277																			
279	Backfilling of pile cap edge	14 days	Jan 25 '23	Feb 7 '23		275	280,305FS+14																		
280	Construction of Columns, Walls, Beams & Slabs (+7.2mPD to +11.8mPD)	37 days	Feb 8 '23	Mar 16 '23		279	284																		
281	Scaffolding erection and formwork erection	15 days	Feb 8 '23	Feb 22 '23			282																		
282	Rebar fixing and formwork erection	15 days	Feb 23 '23	Mar 9 '23		281	283																		
283	Concreting	7 days	Mar 10 '23	Mar 16 '23		282																			
284	Construction of Columns, Walls, Beams & Slabs (+11.8mPD to +13.25mPD)	35 days	Mar 17 '23	Apr 20 '23		280	294,304																		
285	Construction of Columns, Walls and Beams (+11.8mPD to +13.05mPD)	23 days	Mar 17 '23	Apr 8 '23																					
286	Falsework and formwork erection	8 days	Mar 17 '23	Mar 24 '23			287																		
287	Rebar fixing	8 days	Mar 25 '23	Apr 1 '23		286	288																		
288	Concreting and curing of concrete	7 days	Apr 2 '23	Apr 8 '23		287	290																		
289	Construction of Slabs at +13.25mPD	12 days	Apr 9 '23	Apr 20 '23																					
290	Installation of precast segments (22 nos.)	2 days	Apr 9 '23	Apr 10 '23		288	291																		
291	Formwork erection for half slab	1 day	Apr 11 '23	Apr 11 '23		290	292																		
292	Rebar fixing for half slab	2 days	Apr 12 '23	Apr 13 '23		291	293																		
293	Concreting for half slab	7 days	Apr 14 '23	Apr 20 '23		292																			
294	Construction of Parapet Walls (+13.25mPD to +14.65mPD)	28 days	Apr 21 '23	May 18 '23		284	312,299																		
295	Scaffolding erection	7 days	Apr 21 '23	Apr 27 '23			296																		
296	Rebar fixing	7 days	Apr 28 '23	May 4 '23		295	297																		
297	Formwork erection	7 days	May 5 '23	May 11 '23		296	298																		
298	Concreting	7 days	May 12 '23	May 18 '23		297																			
299	Construction of Staircase ST3 (+7.1mPD to +15.45mPD)	28 days	May 19 '23	Jun 15 '23		294	312																		
300	Scaffolding and falsework erection	7 days	May 19 '23	May 25 '23			301																		
301	Formwork erection	7 days	May 26 '23	Jun 1 '23		300	302																		
302	Rebar fixing	7 days	Jun 2 '23	Jun 8 '23		301	303																		
303	Concreting	7 days	Jun 9 '23	Jun 15 '23		302																			
304	Removal of formwork and falsework below +11.8mPD & +13.25mPD	7 days	Apr 21 '23	Apr 27 '23		284	306,529																		
305	Detailed Design for Internal Façade Treatment for Assess Road and Interior Fitting for Internal Rooms	60 days	Feb 22 '23	Apr 22 '23		279FS+14 days	306																		
306	Installation of internal finishing works for Grid Line 4-6	28 days	Apr 28 '23	May 25 '23		304,305	548																		
307	Plaster and paint at wall and soffit	14 days	Apr 28 '23	May 11 '23			308																		
308	Epoxy																								

ID	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>																								
								Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2	Q3	Q4	2024	Q1	Q2	Q3	Q4	2025	Q1	Q2	Q3	Q4	2026	Q1	Q2
332	Formwork erection for half slab	1 day	Feb 25 '23	Feb 25 '23		331	333																									
333	Rebar fixing for half slab	2 days	Feb 26 '23	Feb 27 '23		332	334																									
334	Concreting for half slab	7 days	Feb 28 '23	Mar 6 '23		333																										
335	Construction of Bearing walls and Slabs (+5.55mPD to +7.1mPD)	35 days	Mar 7 '23	Apr 10 '23		325																										
336	Formwork erection	14 days	Mar 7 '23	Mar 20 '23			337																									
337	Rebar fixing and formwork erection	14 days	Mar 21 '23	Apr 3 '23		336	338																									
338	Concreting	7 days	Apr 4 '23	Apr 10 '23		337																										
339	Construction of Parapet Walls (+13.00mPD to +15.1mPD)	14 days	Mar 7 '23	Mar 20 '23		325	395,403,345,4																									
340	Scaffolding erection	2 days	Mar 7 '23	Mar 8 '23			341																									
341	Rebar fixing	2 days	Mar 9 '23	Mar 10 '23		340	342																									
342	Formwork erection	3 days	Mar 11 '23	Mar 13 '23		341	343																									
343	Concreting	7 days	Mar 14 '23	Mar 20 '23		342																										
344	Detailed Design for Internal Façade Treatment for Assess Road and Interior Fitting for Internal Rooms	60 days	Mar 9 '23	May 7 '23			345																									
345	Installation of internal finishing works for Grid Line 1-3	35 days	May 8 '23	Jun 11 '23		344,339	547																									
346	Waterproofing system at slabs	7 days	May 8 '23	May 14 '23			347																									
347	Plaster and paint at wall and soffit	14 days	May 15 '23	May 28 '23		346	348																									
348	Epoxy painting on floor finish	7 days	May 29 '23	Jun 4 '23		347	349,350,351																									
349	Chequer plate system at cable trench and aerator room	7 days	Jun 5 '23	Jun 11 '23		348																										
350	Steel grating floor system at chemical storage rooms	7 days	Jun 5 '23	Jun 11 '23		348																										
351	SS door and aluminum louver	7 days	Jun 5 '23	Jun 11 '23		348																										
352	Construction of Superstructure (above ground) - Grid Line 3-7	268 days	Aug 29 '22	May 23 '23		146																										
353	Construction of Walls W2, W3, W5, W6 and columns within G.L. 3-5	46 days	Aug 29 '22	Oct 13 '22			358																									
354	Scaffolding erection and Formwork erection	18 days	Aug 29 '22	Sep 15 '22			355																									
355	Rebar fixing and Formwork erection	21 days	Sep 16 '22	Oct 6 '22		354	356FS-7 days																									
356	Concreting of walls W2, W3 and Columns	7 days	Sep 30 '22	Oct 6 '22		355FS-7 days	357																									
357	Concreting of walls W5, W6 and Columns	7 days	Oct 7 '22	Oct 13 '22		356																										
358	Construction of remaining walls and columns within G.L. 3-5	21 days	Oct 14 '22	Nov 3 '22		353	362																									
359	Scaffolding erection and Formwork erection	7 days	Oct 14 '22	Oct 20 '22			360																									
360	Rebar fixing and Formwork erection	7 days	Oct 21 '22	Oct 27 '22		359	361																									
361	Concreting	7 days	Oct 28 '22	Nov 3 '22		360																										
362	Construction of walls and columns within G.L. 5-7 (+4.55mPD to +9.2mPD)	27 days	Nov 4 '22	Nov 30 '22		358																										
363	Scaffolding erection and Formwork erection	14 days	Nov 4 '22	Nov 17 '22			364,367																									
364	Rebar fixing and Formwork erection	12 days	Nov 18 '22	Nov 29 '22		363	365																									
365	Concreting	1 day	Nov 30 '22	Nov 30 '22		364	368																									
366	Construction of walls and columns within G.L. 5-7 (+9.2mPD to +10.8mPD)	25 days	Nov 18 '22	Dec 12 '22			370																									
367	Scaffolding erection and Formwork erection	7 days	Nov 18 '22	Nov 24 '22		363	368																									
368	Rebar fixing and Formwork erection	5 days	Dec 1 '22	Dec 5 '22		365,367	369																									
369	Concreting	7 days	Dec 6 '22	Dec 12 '22		368																										
370	Construction of Beams and Slabs at +10.4mPD and +10.8mPD	73 days	Dec 13 '22	Feb 23 '23		366	380																									
371	Construction of Beams	42 days	Dec 13 '22	Jan 23 '23																												
372	Falsework and formwork erection for beam	21 days	Dec 13 '22	Jan 2 '23			373																									
373	Rebar fixing for beam	14 days	Jan 3 '23	Jan 16 '23		372	374																									
374	Concreting and curing of concrete	7 days	Jan 17 '23	Jan 23 '23		373	376																									
375	Construction of Slabs	31 days	Jan 24 '23	Feb 23 '23																												
376	Installation of precast segments (156 nos.)	15 days	Jan 24 '23	Feb 7 '23		374	377																									
377	Formwork erection for half slab	3 days	Feb 8 '23	Feb 10 '23		376	378																									
378	Rebar fixing for half slab	6 days	Feb 11 '23	Feb 16 '23		377	379																									
379	Concreting for half slab	7 days	Feb 17 '23	Feb 23 '23		378																										
380	Construction of Parapet Walls (+10.4mPD/+10.8mPD to +12.5mPD)	25 days	Feb 24 '23	Mar 20 '23		370	395,410,385,4																									
381	Scaffolding erection	7 days	Feb 24 '23	Mar 2 '23			382																									
382	Rebar fixing	7 days	Mar 3 '23	Mar 9 '23		381	383																									
383	Formwork erection	4 days	Mar 10 '23	Mar 13 '23		382	384																									
384	Concreting	7 days	Mar 14 '23	Mar 20 '23		383																										
385	Construction of Staircase ST01 (+7.1mPD to +11.35mPD)	33 days	Mar 21 '23	Apr 22 '23		380	390																									
386	Scaffolding and falsework erection	14 days	Mar 21 '23	Apr 3 '23			387																									
387	Rebar fixing	7 days	Apr 4 '23	Apr 10 '23		386	388																									
388	Formwork erection	5 days	Apr 11 '23	Apr 15 '23		387	389																									
389	Concreting	7 days	Apr 16 '23	Apr 22 '23		388																										
390	Construction of Staircase ST02 (+10.4mPD to +13.95mPD)	31 days	Apr 23 '23	May 23 '23		385																										
391	Scaffolding and falsework erection	14 days	Apr 23 '23	May 6 '23			392																									
392	Rebar fixing	7 days	May 7 '23	May 13 '23		391	393																									
393	Formwork erection	3 days	May 14 '23	May 16 '23		392	394																									
394	Concreting	7 days	May 17 '23	May 23 '23		393																										
395	Backfilling of general fill material up to +7.2mPD, and removal of ELS	8 days	Mar 21 '23	Mar 28 '23		380,339																										
396	Watertightness test in stages	56 days	Mar 21 '23	May 15 '23		380	402,404																									
397	Inlet Channel and Outlet Channel	14 days	Mar 21 '23	Apr 3 '23			398																									
398	On duty contact tank	14 days	Apr 4 '23	Apr 17 '23		397	399																									
399	Standby contact tank	14 days	Apr 18 '23	May 1 '23		398	400																									
400	Overall water retaining structure at HCF	14 days	May 2 '23	May 15 '23		399																										
401	Detailed Design for Internal Façade Treatment for Assess Road and Interior Fitting for Internal Rooms	60 days	Feb 21 '23																													

ID	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>															
								2022	2023	2024	2025	2026											
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
551	CLP's Inspection and Acceptance for Transformer Room(ReWPS), CLP Room(HCF), draw pit and associated cable ducts	48 days	Jun 12 '23	Jul 29 '23		547,548	552																
552	Handover of Transformer Room to CLP	1 day	Jul 30 '23	Jul 30 '23		551	554,553																
553	Lead time for CLP installation works	14 days	Jul 31 '23	Aug 13 '23		552	554																
554	CLP to install Transformers and Cabling	7 days	Aug 24 '23	Aug 30 '23		552,553,424	555																
555	Lead time for power energization	42 days	Aug 31 '23	Oct 11 '23		554	556																
556	Power Energization from CLP Transformer to LVSB	3 days	Oct 12 '23	Oct 14 '23		555	557																
557	Power Energization from LVSB to All Equipment	3 days	Oct 15 '23	Oct 17 '23		556																	
558	FS / DG Inspection Related Items	518 days	Aug 1 '22	Dec 31 '23																			
559	VAC Desgin Submission to FSD	60 days	Aug 1 '22	Sep 29 '22																			
560	FS related statutory submission to FSD	60 days	Aug 1 '22	Sep 29 '22			561																
561	T&C of FS Related Installation (Integrated Test & Rehearsal)	14 days	Nov 12 '23	Nov 25 '23		429,530,546,561	562,566																
562	Submission of FSI 314 & 501	7 days	Nov 26 '23	Dec 2 '23		561	563																
563	Target FS Inpection	15 days	Dec 3 '23	Dec 17 '23		562	564																
564	Obtain FSD approval letter (Form FS172 Fire Certificate)	14 days	Dec 18 '23	Dec 31 '23		563																	
565	DG Design Submission to FSD	30 days	Sep 18 '22	Oct 17 '22			566																
566	DG Inspection	30 days	Nov 26 '23	Dec 25 '23		540,561,565	567																
567	Obtain DG License	1 day	Dec 26 '23	Dec 26 '23		566																	
568	Preliminary Test of Equipment	14 days	Oct 18 '23	Oct 31 '23		529,546	577																
569	Inspection of Equipment/System with SOR	3 days	Oct 18 '23	Oct 20 '23			570																
570	Trial Run of Equipment/System	4 days	Oct 21 '23	Oct 24 '23		569	571																
571	Site Acceptance Test (SAT) of Equipment/Systems with SOR	7 days	Oct 25 '23	Oct 31 '23		570																	
572	Submission	180 days	Jun 1 '23	Nov 27 '23																			
573	Submission of Testing Procedures & Commissioning Plan	45 days	Jun 1 '23	Jul 15 '23			577																
574	Submission of As Fitted Drawings	14 days	Oct 15 '23	Oct 28 '23		529	575,576SS																
575	Submission of Manual	30 days	Oct 29 '23	Nov 27 '23		574																	
576	Submission of Training Material	14 days	Oct 15 '23	Oct 28 '23		574SS																	
577	System Commissioning Test	60 days	Nov 1 '23	Dec 30 '23		568,573	589SS																
578	Planned completion for section 1	0 days	Dec 31 '23	Dec 31 '23		175FF,456FF																	
579	Planned completion for section 2	0 days	Dec 31 '23	Dec 31 '23		449FF																	
580																							
581	Section 3 - Modification of Table Hill Reclaimed Water Service Reservoir	821 days	Oct 1 '21	Dec 30 '23																			
582	Access Date (part 2 of the Site)	1 day	Oct 1 '21	Oct 1 '21																			
583	Initial survey and condition survey	45 days	Feb 7 '22	Mar 23 '22			584FS+117 day																
584	Design submission and acceptance of the supplementary dosing and dyeing system (E&M)	141 days	Jul 19 '22	Dec 6 '22		583FS+117 days	585FS-45 days																
585	Submission and acceptance of method statement for supplementary dosing and dyeing system	60 days	Oct 23 '22	Dec 21 '22		584FS-45 days	586																
586																							
586	Selection of sub-contractor	60 days	Dec 22 '22	Feb 19 '23		585	587																
587	Construction of chemical room	160 days	Feb 20 '23	Jul 29 '23		586	588																
588	Installation of supplementary dosing and dyeing system	90 days	Jul 30 '23	Oct 27 '23		587	589																
589	T&C of E&M equipment	60 days	Nov 1 '23	Dec 30 '23		588,577SS	590FF																
590	Planned completion for section 3	0 days	Dec 30 '23	Dec 30 '23		589FF																	
591																							
592	Section 4 - Water main laying works in part 3 of the Site	880 days	Jul 30 '21	Dec 26 '23																			
593	Access Date (part 3 of the Site)	1 day	Jul 30 '21	Jul 30 '21			594																
594	Initial survey (utility survey, condition survey, initial photo)	90 days	Jul 31 '21	Oct 28 '21		593																	
595	1st TMLG meeting	1 day	Nov 15 '21	Nov 15 '21			596																
596	Application and approval of XP and TTA, including local consultation	122 days	Nov 16 '21	Mar 17 '22		595	597,602																
597	Implementation of TTA by stages	465 days	Mar 18 '22	Jun 25 '23		596																	
598	Procurement and Delivery of pipes, fittings and related materials	60 days	Feb 10 '22	Apr 10 '22																			
599	Submission and acceptance of method statement and material	60 days	Feb 10 '22	Apr 10 '22																			
600	Excavation of Inspection Pit	396 days	Sep 1 '22	Oct 1 '23																			
601	Mainlaying by open trench method (RW03 & RW43)	688 days	Feb 7 '22	Dec 26 '23			1027FF																
602	RW03 : DN600 DI pipe - 1092m (XP ID: 1301128, 1301129)	573.5 days	Mar 18 '22	Oct 12 '23		596																	
603	Team A : CH000 - CH550	453 days	Mar 18 '22	Jun 13 '23			791																
604	CH450 - CH550 (100m)	178 days	Mar 18 '22	Sep 11 '22			620																
605	TTA establishment	3 days	Mar 18 '22	Mar 20 '22			606																
606	CE-041 _ Inclement Weather in March 2022	4.5 days	Mar 21 '22	Mar 25 '22		605	607																
607	Hard material excavation and disposal	4 days	Mar 25 '22	Mar 29 '22		606	608																
608	Soil excavation , laying sheetpile and disposal	14 days	Mar 29 '22	Apr 12 '22		607	609																
609	Obstruction of unchart 900mm pipe	10 days	Apr 12 '22	Apr 22 '22		608	610																
610	Pending for setting out of DSD	14 days	Apr 22 '22	May 6 '22		609	611																
611	Amendment of ELS	28 days	May 6 '22	Jun 3 '22		610	612																
612	CE-052 _ Inclement Weather in May 2022 (under assessment)	6 days	Jun 3 '22	Jun 9 '22		611	613																
613	Treatment of bedding	21 days	Jun 9 '22	Jun 30 '22		612	614																
614	CE-053 _ Inclement Weather in June 2022 (under assessment)	6.5 days	Jun 30 '22	Jul 6 '22		613	615																
615	Pipe laying D.I. & PE (DSD's pipe)	36 days	Jul 7 '22	Aug 11 '22		614	616																
616	CE-054 _ Inclement Weather in July 2022 (under assessment)	4 days	Aug 12 '22	Aug 15 '22		615	617																
617	Backfilling sand/aggregate, concurrent bend block/chambers	11 days	Aug 16 '22	Aug 26 '22		616	618																
618	Reinstatement	1 day	Aug 27 '22	Aug 27 '22		617	619																
619	CE-068 _ Inclement Weather in August 2022	15 days	Aug 28 '22	Sep 11 '22		618																	
620	CH420 - CH450 (30m)	43 days	Sep 12 '22	Oct 24 '22		604	628																
621	TTA establishment	1 day	Sep 12 '22	Sep 12 '22			622																
622	Hard material excavation and disposal	1 day	Sep 13 '22	Sep 13 '22		621	623																
623	Soil excavation , laying sheetpile and disposal	14 days	Sep 14 '22	Sep 27 '22		622	624																
624	Treatment of bedding	1 day	Sep 28 '22	Sep 28 '22		623	625																
625	Pipe laying D.I.	10 days	Sep 29 '22	Oct 8 '22		624	626																
626	Backfilling sand/aggregate, concurrent bend block/chambers	14 days	Oct 9 '22	Oct 22 '22		625	627																
627	Reinstatement	2 days	Oct 23 '22	Oct 24 '22		626																	
628	CH390 - CH420 (30m)	83 days	Oct 25 '22	Jan 15 '23		620	636																
629	TTA establishment	1 day	Oct 25 '22	Oct 25 '22			630																
630	Hard material excavation and disposal	1 day	Oct 26 '22	Oct 26 '22		629	631																
631	Soil excavation , laying sheetpile and disposal	45 days	Oct 27 '22	Dec 10 '22		630	632																
632	Treatment of bedding	7 days	Dec 11 '22	Dec 17 '22		631	633																
633	Pipe laying D.I.	14 days	Dec 18 '22	Dec 31 '22		632	634																
634	Backfilling sand/aggregate, concurrent bend block/chambers	14 days	Jan 1 '23	Jan 14 '23		633	635																

ID	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022				2023				2024				2025				2026	
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
772	Backfilling sand/aggregate, concurrent bend block/chambers (CH550 - CH600)	14 days	Jun 26 '23	Jul 10 '23	771	773																			
773	Reinstatement	2 days	Jul 10 '23	Jul 12 '23	772																				
774	CH1010 - CH1040 (30m)	30 days	Jul 12 '23	Aug 11 '23	760	782																			
775	TTA establishment	1 day	Jul 12 '23	Jul 13 '23		776																			
776	Hard material excavation and disposal	1 day	Jul 13 '23	Jul 14 '23	775	777																			
777	Soil excavation , laying sheetpile and disposal	7 days	Jul 14 '23	Jul 21 '23	776	778																			
778	Treatment of bedding	2 days	Jul 21 '23	Jul 23 '23	777	779																			
779	Pipe laying D.I.	4 days	Jul 23 '23	Jul 27 '23	778	780																			
780	Backfilling sand/aggregate, concurrent bend block/chambers	14 days	Jul 27 '23	Aug 10 '23	779	781																			
781	Reinstatement	1 day	Aug 10 '23	Aug 11 '23	780																				
782	CH1040 - CH1090 (50m)	47 days	Aug 11 '23	Sep 27 '23	774	790																			
783	TTA establishment	1 day	Aug 11 '23	Aug 12 '23		784																			
784	Hard material excavation and disposal	2 days	Aug 12 '23	Aug 14 '23	783	785																			
785	Soil excavation , laying sheetpile and disposal	7 days	Aug 14 '23	Aug 21 '23	784	786																			
786	Treatment of bedding	7 days	Aug 21 '23	Aug 28 '23	785	787																			
787	Pipe laying D.I.	14 days	Aug 28 '23	Sep 11 '23	786	788																			
788	Backfilling sand/aggregate, concurrent bend block/chambers	14 days	Sep 11 '23	Sep 25 '23	787	789																			
789	Reinstatement	2 days	Sep 25 '23	Sep 27 '23	788																				
790	Pressure test, swabbing and CCTV	15 days	Sep 27 '23	Oct 12 '23	782																				
791	Overall pressure test	15 days	Oct 12 '23	Oct 27 '23	603,699	792																			
792	Pipe connection and completion	30 days	Oct 27 '23	Nov 26 '23	791																				
793	RW43 : DN150 DI pipe - 1144m (XP ID: 1301130, 1301131)	643 days	Feb 7 '22	Nov 11 '23																					
794	CH370 to CH850 (480m)	491 days	Feb 10 '22	Jun 15 '23		1025																			
795	Team A CH640 to CH680 (40m)	179.5 days	Feb 10 '22	Aug 8 '22		1013																			
796	Pending for IIB of pipe fittings	99 days	Feb 10 '22	May 19 '22		797																			
797	TTA establishment	1 day	May 20 '22	May 20 '22	796	798																			
798	Hard material excavation and disposal	2 days	May 21 '22	May 22 '22	797	799																			
799	CE-052 _ Inclement Weather in May 2022 (under assessment)	6 days	May 23 '22	May 28 '22	798	800																			
800	Soil excavation , laying sheetpile and disposal	7 days	May 29 '22	Jun 4 '22	799	801																			
801	Treatment of bedding	2 days	Jun 5 '22	Jun 6 '22	800	802																			
802	CE-053 _ Inclement Weather in June 2022 (under assessment)	6.5 days	Jun 7 '22	Jun 13 '22	801	803																			
803	Pipe laying D.I.	7 days	Jun 13 '22	Jun 20 '22	802	804																			
804	CE-054 _ Inclement Weather in July 2022 (under assessment)	4 days	Jun 20 '22	Jun 24 '22	803	805																			
805	Works suspended by Sheung Shui Heung	30 days	Jun 24 '22	Jul 24 '22	804	806																			
806	Backfilling general fill and compaction	14 days	Jul 24 '22	Aug 7 '22	805	807																			
807	Reinstatement	1 day	Aug 7 '22	Aug 8 '22	806	809																			
808	Team A CH420 to CH450 (35m)	38 days	Aug 8 '22	Sep 15 '22																					
809	TTA establishment	1 day	Aug 8 '22	Aug 9 '22	807	810																			
810	Hard material excavation and disposal	1 day	Aug 9 '22	Aug 10 '22	809	811																			
811	CE-068 _ Inclement Weather in August 2022	15 days	Aug 10 '22	Aug 25 '22	810	812																			
812	Soil excavation , laying sheetpile and disposal	3 days	Aug 25 '22	Aug 28 '22	811	813																			
813	Treatment of bedding	1 day	Aug 28 '22	Aug 29 '22	812	814																			
814	Pipe laying D.I.	2 days	Aug 29 '22	Aug 31 '22	813	815																			
815	Backfilling general fill and compaction	14 days	Aug 31 '22	Sep 14 '22	814	816																			
816	Reinstatement	1 day	Sep 14 '22	Sep 15 '22	815	818																			
817	Team A CH410 to CH420 (10m)	13 days	Sep 15 '22	Sep 28 '22																					
818	TTA establishment	1 day	Sep 15 '22	Sep 16 '22	816	819																			
819	Hard material excavation and disposal	1 day	Sep 16 '22	Sep 17 '22	818	820																			
820	Soil excavation , laying sheetpile and disposal	1 day	Sep 17 '22	Sep 18 '22	819	821																			
821	Treatment of bedding	1 day	Sep 18 '22	Sep 19 '22	820	822																			
822	Pipe laying D.I.	1 day	Sep 19 '22	Sep 20 '22	821	823																			
823	Backfilling general fill and compaction	7 days	Sep 20 '22	Sep 27 '22	822	824																			
824	Reinstatement	1 day	Sep 27 '22	Sep 28 '22	823	826																			
825	Team A CH450 to CH500 (50m)	19 days	Sep 28 '22	Oct 17 '22																					
826	TTA establishment	1 day	Sep 28 '22	Sep 29 '22	824	827																			
827	Hard material excavation and disposal	2 days	Sep 29 '22	Oct 1 '22	826	828																			
828	Soil excavation , laying sheetpile and disposal	4 days	Oct 1 '22	Oct 5 '22	827	829																			
829	Treatment of bedding	1 day	Oct 5 '22	Oct 6 '22	828	830																			
830	Pipe laying D.I.	3 days	Oct 6 '22	Oct 9 '22	829	831																			
831	Backfilling general fill and compaction	7 days	Oct 9 '22	Oct 16 '22	830	832																			
832	Reinstatement	1 day	Oct 16 '22	Oct 17 '22	831	834																			
833	Team A CH400 to CH410 (10m)	23 days	Oct 17 '22	Nov 9 '22																					
834	TTA establishment	1 day	Oct 17 '22	Oct 18 '22	832	835																			
835	Hard material excavation and disposal	1 day	Oct 18 '22	Oct 19 '22	834	836																			
836	Soil excavation , laying sheetpile and disposal	4 days	Oct 19 '22	Oct 23 '22	835	837																			
837	Treatment of bedding	1 day	Oct 23 '22	Oct 24 '22	836	838																			
838	Pipe laying D.I.	1 day	Oct 24 '22	Oct 25 '22	837	839																			
839	Backfilling general fill and compaction	14 days	Oct 25 '22	Nov 8 '22	838	840																			
840	Reinstatement	1 day	Nov 8 '22	Nov 9 '22	839	842																			
841	Team A CH370 to CH400 (30m)	28 days	Nov 9 '22	Dec 7 '22																					
842	TTA establishment	1 day	Nov 9 '22	Nov 10 '22	840	843																			
843	Hard material excavation and disposal	1 day	Nov 10 '22	Nov 11 '22	842	844																			
844	Soil excavation , laying sheetpile and disposal	7 days	Nov 11 '22	Nov 18 '22	843	845																			
845	Treatment of bedding	1 day	Nov 18 '22	Nov 19 '22	844	846																			
846	Pipe laying D.I.	3 days	Nov 19 '22	Nov 22 '22	845	847																			
847	Backfilling general fill and compaction	14 days	Nov 22 '22	Dec 6 '22	846	848																			
848	Reinstatement	1 day	Dec 6 '22	Dec 7 '22	847	850																			
849	Team A CH500 to CH550 (50m)	30 days	Dec 7 '22	Jan 6 '23																					
850	TTA establishment	1 day	Dec 7 '22	Dec 8 '22	848	851																			
851	Hard material excavation and disposal	2 days	Dec 8 '22	Dec 10 '22	850	852																			
852	Soil excavation , laying sheetpile and disposal	7 days	Dec 10 '22	Dec 17 '22	851	853																			
853	Treatment of bedding	2 days	Dec 17 '22	Dec 19 '22	852	854																			
854	Pipe laying D.I.	2 days	Dec 19 '22	Dec 21 '22	853	855																			
855	Backfilling general fill and compaction	14 days	Dec 21 '22	Jan 4 '23	854	856																			
856	Reinstatement	2 days	Jan 4 '23	Jan 6 '23	855	858																			
857	Team A CH550 to CH580 (30m)	29 days	Jan 6 '23	Feb 4 '23																					
858	TTA establishment	1 day	Jan 6 '23	Jan 7 '23	856	859																			
859	Hard material excavation and disposal	2 days	Jan 7 '23	Jan 9 '23	858	860																			

Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022					2023				2024				2025				2026		
							Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
994	Backfilling gernal fill and compaction	14 days	Feb 8 '23	Feb 22 '23	993	995																				
995	Reinstatement	3 days	Feb 22 '23	Feb 25 '23	994	997																				
996	Team B CH150 to CH190 (40m)	37 days	Feb 25 '23	Apr 3 '23																						
997	TTA establishment	1 day	Feb 25 '23	Feb 26 '23	995	998																				
998	Hard material excavation and disposal	2 days	Feb 26 '23	Feb 28 '23	997	999																				
999	Soil excavation , laying sheetpile and disposal	14 days	Feb 28 '23	Mar 14 '23	998	1000																				
1000	Treatment of bedding	2 days	Mar 14 '23	Mar 16 '23	999	1001																				
1001	Pipe laying D.I.	3 days	Mar 16 '23	Mar 19 '23	1000	1002																				
1002	Backfilling general fill and compaction	14 days	Mar 19 '23	Apr 2 '23	1001	1003																				
1003	Reinstatement	1 day	Apr 2 '23	Apr 3 '23	1002	1005																				
1004	Team B CH340 to CH370 (30m)	98 days	Apr 3 '23	Jul 10 '23																						
1005	TTA establishment	7 days	Apr 3 '23	Apr 10 '23	1003	1006																				
1006	Hard material excavation and disposal	14 days	Apr 10 '23	Apr 24 '23	1005	1007																				
1007	Soil excavation , laying sheetpile and disposal	21 days	Apr 24 '23	May 15 '23	1006	1008																				
1008	Treatment of bedding	14 days	May 15 '23	May 29 '23	1007	1009																				
1009	Pipe laying D.I.	21 days	May 29 '23	Jun 19 '23	1008	1010																				
1010	Backfilling general fill and compaction	14 days	Jun 19 '23	Jul 3 '23	1009	1011																				
1011	Reinstatement	7 days	Jul 3 '23	Jul 10 '23	1010	1012																				
1012	Pressure test, swabbing and CCTV	15 days	Jul 10 '23	Jul 25 '23	1011																					
1013	CH710 to CH970 (260m) -within the scope of Shueng Shui Hueng	399 days	Aug 8 '22	Sep 11 '23	795	1025																				
1014	CE-068 _ Inclement Weather in August 2022	15 days	Aug 8 '22	Aug 23 '22		1015																				
1015	Pending agreement of Shueng Shui Hueng villagers	120 days	Aug 23 '22	Dec 21 '22	1014	1017,1016SS+1																				
1016	XP application for alternative alignment of watermain	120 days	Sep 6 '22	Jan 4 '23	1015SS+14 days	1017																				
1017	TTA establishment	14 days	Jan 4 '23	Jan 18 '23	1015,1016	1018																				
1018	Hard material excavation and disposal	28 days	Jan 18 '23	Feb 15 '23	1017	1019																				
1019	Soil excavation , laying sheetpile and disposal	90 days	Feb 15 '23	May 16 '23	1018	1020																				
1020	Treatment of bedding	30 days	May 16 '23	Jun 15 '23	1019	1021																				
1021	Pipe laying D.I.	14 days	Jun 15 '23	Jun 29 '23	1020	1022																				
1022	Backfilling general fill and compaction	45 days	Jun 29 '23	Aug 13 '23	1021	1023																				
1023	Reinstatement	14 days	Aug 13 '23	Aug 27 '23	1022	1024																				
1024	Pressure test, swabbing and CCTV	15 days	Aug 27 '23	Sep 11 '23	1023																					
1025	Overall pressure testing	15 days	Nov 12 '23	Nov 26 '23	794,941,1013,9	1026																				
1026	Pipe connection and completion	30 days	Nov 27 '23	Dec 26 '23	1025																					
1027	Planned completion for section 4	0 days	Dec 26 '23	Dec 26 '23	601FF																					
1028																										
1029	Section 5 - Water main laying works in part 4 of the Site	1096 days	Jul 30 '21	Jul 29 '24																						
1030	Access Date (part 4 of the Site)	1 day	Jul 30 '21	Jul 30 '21		1031																				
1031	Initial survey (utility survey, condition survey, initial photo)	90 days	Jul 31 '21	Oct 28 '21	1030	1032																				
1032	Application and approval of XP and TTA	116 days	Nov 1 '21	Feb 24 '22	1031	1038																				
1033	Procurement and Delivery of pipes, fittings and related materials	100 days	Feb 28 '22	Jun 7 '22		1038																				
1034	Submission and acceptance of method statement and material	120 days	Apr 11 '22	Aug 8 '22																						
1035	Submission and acceptance of method statement and temp work design for trenchless works	30 days	Dec 31 '22	Jan 29 '23		1038																				
1036	Excavation of Inspection Pit	600 days	Sep 1 '22	Apr 22 '24																						
1037	Mainlaying by trenchless method (RW04)	519 days	Jan 30 '23	Jul 1 '24		1249																				
1038	RW04 : DN450 DI pipe (trenchless)	519 days	Jan 30 '23	Jul 1 '24	60	1032,1033,1035																				
1039	Wo Tai Street (70m) - TBM Method	127 days	Jan 30 '23	Jun 5 '23																						
1040	TTA implementation	1 day	Jan 30 '23	Jan 30 '23		1041																				
1041	Contruction of jacking pit and receiving pit	45 days	Jan 31 '23	Mar 16 '23	1040	1042																				
1042	Trenchless works and pipe laying	45 days	Mar 17 '23	Apr 30 '23	1041	1043																				
1043	Manhole / Chamber construction	21 days	May 1 '23	May 21 '23	1042	1044																				
1044	Backfilling and compaction	14 days	May 22 '23	Jun 4 '23	1043	1045																				
1045	Reinstatement	1 day	Jun 5 '23	Jun 5 '23	1044	1047FS-30 day																				
1046	Ma Sik Road (70m) - TBM Method	128 days	May 7 '23	Sep 11 '23																						
1047	TTA implementation	1 day	May 7 '23	May 7 '23	1045FS-30 days	1048																				
1048	Contruction of jacking pit and receiving pit	45 days	May 8 '23	Jun 21 '23	1047	1049																				
1049	Trenchless works and pipe laying	45 days	Jun 22 '23	Aug 5 '23	1048	1050																				
1050	Manhole / Chamber construction	21 days	Aug 6 '23	Aug 26 '23	1049	1051																				
1051	Backfilling and compaction	14 days	Aug 27 '23	Sep 9 '23	1050	1052																				
1052	Reinstatement	2 days	Sep 10 '23	Sep 11 '23	1051	1054FS-30 day																				
1053	Luen Chit Street (70m) - TBM Method	128 days	Aug 13 '23	Dec 18 '23																						
1054	TTA implementation	1 day	Aug 13 '23	Aug 13 '23	1052FS-30 days	1055																				
1055	Contruction of jacking pit and receiving pit	45 days	Aug 14 '23	Sep 27 '23	1054	1056																				
1056	Trenchless works and pipe laying	45 days	Sep 28 '23	Nov 11 '23	1055	1057																				
1057	Manhole / Chamber construction	21 days	Nov 12 '23	Dec 2 '23	1056	1058																				
1058	Backfilling and compaction	14 days	Dec 3 '23	Dec 16 '23	1057	1059																				
1059	Reinstatement	2 days	Dec 17 '23	Dec 18 '23	1058	1061FS-30 day																				
1060	Luen Sum Road (70m) - TBM Method	128 days	Nov 19 '23	Mar 25 '24																						
1061	TTA implementation	1 day	Nov 19 '23	Nov 19 '23	1059FS-30 days	1062																				
1062	Contruction of jacking pit and receiving pit	45 days	Nov 20 '23	Jan 3 '24	1061	1063																				
1063	Trenchless works and pipe laying	45 days	Jan 4 '24	Feb 17 '24	1062	1064																				
1064	Manhole / Chamber construction	21 days	Feb 18 '24	Mar 9 '24	1063	1065																				
1065	Backfilling and compaction	14 days	Mar 10 '24	Mar 23 '24	1064	1066																				
1066	Reinstatement	2 days	Mar 24 '24	Mar 25 '24	1065	1068FS-30 day																				
1067	Fanling Lau Road (70m) - TBM Method	128 days	Feb 25 '24	Jul 1 '24																						
1068	TTA implementation	1 day	Feb 25 '24	Feb 25 '24	1066FS-30 days	1069																				
1069	Contruction of jacking pit and receiving pit	45 days	Feb 26 '24	Apr 10 '24	1068	1070																				
1070	Trenchless works and pipe laying	45 days	Apr 11 '24	May 25 '24	1069	1071																				
1071	Manhole / Chamber construction	21 days	May 26 '24	Jun 15 '24	1070	1072																				
1072	Backfilling and compaction	14 days	Jun 16 '24	Jun 29 '24	1071	1073																				
107																										

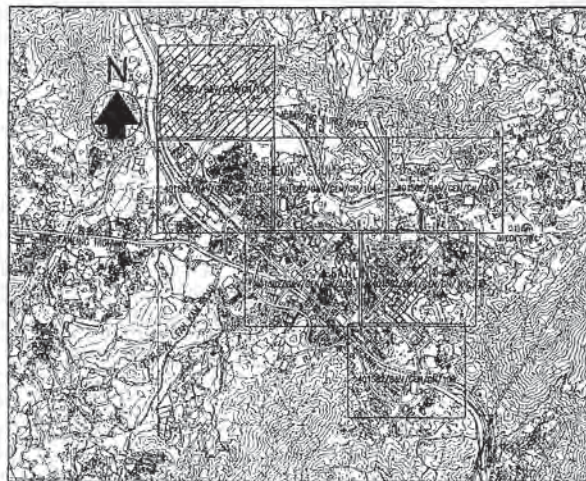
ID	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022				2023				2024				2025				2026	
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
1104	CH1920 to CH1950 (30m)	30 days	Dec 5 '22	Jan 3 '23																					
1105	TTA establishment	1 day	Dec 5 '22	Dec 5 '22			1106																		
1106	Hard material excavation and disposal	2 days	Dec 6 '22	Dec 7 '22		1105	1107																		
1107	Soil excavation , laying sheetpile and disposal	7 days	Dec 8 '22	Dec 14 '22		1106	1108																		
1108	Treatment of bedding	2 days	Dec 15 '22	Dec 16 '22		1107	1109																		
1109	Pipe laying D.I.	3 days	Dec 17 '22	Dec 19 '22		1108	1110																		
1110	Backfilling general fill and compaction	14 days	Dec 20 '22	Jan 2 '23		1109	1111																		
1111	Reinstatement	1 day	Jan 3 '23	Jan 3 '23		1110	1113																		
1112	CH1950 to CH1990 (40m)	29 days	Jan 4 '23	Feb 1 '23																					
1113	TTA establishment	1 day	Jan 4 '23	Jan 4 '23		1111	1114																		
1114	Hard material excavation and disposal	1 day	Jan 5 '23	Jan 5 '23		1113	1115																		
1115	Soil excavation , laying sheetpile and disposal	7 days	Jan 6 '23	Jan 12 '23		1114	1116																		
1116	Treatment of bedding	2 days	Jan 13 '23	Jan 14 '23		1115	1117																		
1117	Pipe laying D.I.	3 days	Jan 15 '23	Jan 17 '23		1116	1118																		
1118	Backfilling general fill and compaction	14 days	Jan 18 '23	Jan 31 '23		1117	1119																		
1119	Reinstatement	1 day	Feb 1 '23	Feb 1 '23		1118	1121																		
1120	CH1990 to CH2020 (30m)	37 days	Feb 2 '23	Mar 10 '23																					
1121	TTA establishment	1 day	Feb 2 '23	Feb 2 '23		1119	1122																		
1122	Hard material excavation and disposal	2 days	Feb 3 '23	Feb 4 '23		1121	1123																		
1123	Soil excavation , laying sheetpile and disposal	14 days	Feb 5 '23	Feb 18 '23		1122	1124																		
1124	Treatment of bedding	2 days	Feb 19 '23	Feb 20 '23		1123	1125																		
1125	Pipe laying D.I.	3 days	Feb 21 '23	Feb 23 '23		1124	1126																		
1126	Backfilling general fill and compaction	14 days	Feb 24 '23	Mar 9 '23		1125	1127																		
1127	Reinstatement	1 day	Mar 10 '23	Mar 10 '23		1126	1128																		
1128	CH1790 to 2180 (390m)	450 days	Mar 11 '23	Jun 2 '24	60	1127																			
1129	Ma Sik Road CH2180 to CH2400 (220m) (XP ID: 1301142, 1301146, 1301149)	450 days	Oct 24 '22	Jan 16 '24																					
1130	CH2210 to CH2240 (30m)	30 days	Oct 24 '22	Nov 22 '22																					
1131	TTA establishment	1 day	Oct 24 '22	Oct 24 '22			1132																		
1132	Hard material excavation and disposal	2 days	Oct 25 '22	Oct 26 '22		1131	1133																		
1133	Soil excavation , laying sheetpile and disposal	7 days	Oct 27 '22	Nov 2 '22		1132	1134																		
1134	Treatment of bedding	2 days	Nov 3 '22	Nov 4 '22		1133	1135																		
1135	Pipe laying D.I.	3 days	Nov 5 '22	Nov 7 '22		1134	1136																		
1136	Backfilling general fill and compaction	14 days	Nov 8 '22	Nov 21 '22		1135	1137																		
1137	Reinstatement	1 day	Nov 22 '22	Nov 22 '22		1136	1139																		
1138	CH2240 to CH2270 (30m)	30 days	Nov 23 '22	Dec 22 '22																					
1139	TTA establishment	1 day	Nov 23 '22	Nov 23 '22		1137	1140																		
1140	Hard material excavation and disposal	2 days	Nov 24 '22	Nov 25 '22		1139	1141																		
1141	Soil excavation , laying sheetpile and disposal	7 days	Nov 26 '22	Dec 2 '22		1140	1142																		
1142	Treatment of bedding	2 days	Dec 3 '22	Dec 4 '22		1141	1143																		
1143	Pipe laying D.I.	3 days	Dec 5 '22	Dec 7 '22		1142	1144																		
1144	Backfilling general fill and compaction	14 days	Dec 8 '22	Dec 21 '22		1143	1145																		
1145	Reinstatement	1 day	Dec 22 '22	Dec 22 '22		1144	1146																		
1146	CH2270 to CH2400 (130m)	390 days	Dec 23 '22	Jan 16 '24	60	1145																			
1147	Ma Sik Road CH2400 to CH2600 (200m) (XP ID: 1301142, 1301146, 1301149)	360 days	Jan 3 '23	Dec 28 '23																					
1148	Tin Ping Road (1377m) (XP ID: 1309070, 1310475)	547 days	Jan 2 '23	Jul 1 '24																					
1149	CH450 to CH480 (30m)	22 days	Jan 2 '23	Jan 23 '23																					
1150	TTA establishment	1 day	Jan 2 '23	Jan 2 '23			1151																		
1151	Hard material excavation and disposal	1 day	Jan 3 '23	Jan 3 '23		1150	1152																		
1152	Soil excavation , laying sheetpile and disposal	3 days	Jan 4 '23	Jan 6 '23		1151	1153																		
1153	Treatment of bedding	1 day	Jan 7 '23	Jan 7 '23		1152	1154																		
1154	Pipe laying D.I.	1 day	Jan 8 '23	Jan 8 '23		1153	1155																		
1155	Backfilling general fill and compaction	14 days	Jan 9 '23	Jan 22 '23		1154	1156																		
1156	Reinstatement	1 day	Jan 23 '23	Jan 23 '23		1155	1158																		
1157	CH480 to CH510 (30m)	22 days	Jan 24 '23	Feb 14 '23																					
1158	TTA establishment	1 day	Jan 24 '23	Jan 24 '23		1156	1159																		
1159	Hard material excavation and disposal	1 day	Jan 25 '23	Jan 25 '23		1158	1160																		
1160	Soil excavation , laying sheetpile and disposal	3 days	Jan 26 '23	Jan 28 '23		1159	1161																		
1161	Treatment of bedding	1 day	Jan 29 '23	Jan 29 '23		1160	1162																		
1162	Pipe laying D.I.	1 day	Jan 30 '23	Jan 30 '23		1161	1163																		
1163	Backfilling general fill and compaction	14 days	Jan 31 '23	Feb 13 '23		1162	1164																		
1164	Reinstatement	1 day	Feb 14 '23	Feb 14 '23		1163	1166																		
1165	CH510 to CH540 (30m)	22 days	Feb 15 '23	Mar 8 '23																					
1166	TTA establishment	1 day	Feb 15 '23	Feb 15 '23		1164	1167																		
1167	Hard material excavation and disposal	1 day	Feb 16 '23	Feb 16 '23		1166	1168																		
1168	Soil excavation , laying sheetpile and disposal	3 days	Feb 17 '23	Feb 19 '23		1167	1169																		
1169	Treatment of bedding	1 day	Feb 20 '23	Feb 20 '23		1168	1170																		
1170	Pipe laying D.I.	1 day	Feb 21 '23	Feb 21 '23		1169	1171																		
1171	Backfilling general fill and compaction	14 days	Feb 22 '23	Mar 7 '23		1170	1172																		
1172	Reinstatement	1 day	Mar 8 '23	Mar 8 '23		1171	1174																		
1173	CH540 to CH570 (30m)	22 days	Mar 9 '23	Mar 30 '23																					
1174	TTA establishment	1 day	Mar 9 '23	Mar 9 '23		1172	1175																		
1175	Hard material excavation and disposal	1 day	Mar 10 '23	Mar 10 '23		1174	1176																		
1176	Soil excavation , laying sheetpile and disposal	3 days	Mar 11 '23	Mar 13 '23		1175	1177																		
1177	Treatment of bedding	1 day	Mar 14 '23	Mar 14 '23		1176	1178																		
1178	Pipe laying D.I.	1 day	Mar 15 '23	Mar 15 '23		1177	1179																		
1179	Backfilling general fill and compaction	14 days	Mar 16 '23	Mar 29 '23		1178	1180																		
1180	Reinstatement	1 day	Mar 30 '23	Mar 30 '23		1179	1182																		
1181	CH570 to CH610 (30m)	22 days	Mar 31 '23	Apr 21 '23																					
1182	TTA establishment	1 day	Mar 31 '23	Mar 31 '23		1180	1183																		
1183	Hard material excavation and disposal	1 day	Apr 1 '23	Apr 1 '23		1182	1184																		
1184	Soil excavation , laying sheetpile and disposal	3 days	Apr 2 '23	Apr 4 '23		1183	1185																		
1185	Treatment of bedding	1 day	Apr 5 '23	Apr 5 '23		1184	1186																		
1186	Pipe laying D.I.	1 day	Apr 6 '23	Apr 6 '23		1185	1187																		
1187	Backfilling general fill and compaction	14 days	Apr 7 '23	Apr 20 '23		1186	1188																		
1188	Reinstatement	1 day	Apr 21 '23	Apr 21 '23		1187	1190																		
1189	CH610 to CH640 (30m)	22 days	Apr 22 '23	May 13 '23																					
1190	TTA establishment	1 day	Apr 22 '23																						

D	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022				2023				2024				2025				2026	
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
1215	CH3580 to CH3550 (30m)	23 days	Mar 1 '23	Mar 23 '23																					
1216	TTA establishment	1 day	Mar 1 '23	Mar 1 '23			1217																		
1217	Hard material excavation and disposal	1 day	Mar 2 '23	Mar 2 '23		1216	1218																		
1218	Soil excavation , laying sheetpile and disposal	3 days	Mar 3 '23	Mar 5 '23		1217	1219																		
1219	Treatment of bedding	1 day	Mar 6 '23	Mar 6 '23		1218	1220																		
1220	Pipe laying D.I.	2 days	Mar 7 '23	Mar 8 '23		1219	1221																		
1221	Backfilling general fill and compaction	14 days	Mar 9 '23	Mar 22 '23		1220	1222																		
1222	Reinstatement	1 day	Mar 23 '23	Mar 23 '23		1221	1224																		
1223	CH3550 to CH3520 (30m)	22 days	Mar 24 '23	Apr 14 '23																					
1224	TTA establishment	1 day	Mar 24 '23	Mar 24 '23		1222	1225																		
1225	Hard material excavation and disposal	1 day	Mar 25 '23	Mar 25 '23		1224	1226																		
1226	Soil excavation , laying sheetpile and disposal	3 days	Mar 26 '23	Mar 28 '23		1225	1227																		
1227	Treatment of bedding	1 day	Mar 29 '23	Mar 29 '23		1226	1228																		
1228	Pipe laying D.I.	1 day	Mar 30 '23	Mar 30 '23		1227	1229																		
1229	Backfilling general fill and compaction	14 days	Mar 31 '23	Apr 13 '23		1228	1230																		
1230	Reinstatement	1 day	Apr 14 '23	Apr 14 '23		1229	1232																		
1231	CH3520 to CH3490 (30m)	22 days	Apr 15 '23	May 6 '23																					
1232	TTA establishment	1 day	Apr 15 '23	Apr 15 '23		1230	1233																		
1233	Hard material excavation and disposal	1 day	Apr 16 '23	Apr 16 '23		1232	1234																		
1234	Soil excavation , laying sheetpile and disposal	3 days	Apr 17 '23	Apr 19 '23		1233	1235																		
1235	Treatment of bedding	1 day	Apr 20 '23	Apr 20 '23		1234	1236																		
1236	Pipe laying D.I.	1 day	Apr 21 '23	Apr 21 '23		1235	1237																		
1237	Backfilling general fill and compaction	14 days	Apr 22 '23	May 5 '23		1236	1238																		
1238	Reinstatement	1 day	May 6 '23	May 6 '23		1237	1239																		
1239	Remaining Section of Sha Tau Kok Road	422 days	May 7 '23	Jul 1 '24		1238																			
1240	Interface coordination with Contract ND/2019/04	90 days	Nov 1 '22	Jan 29 '23			1242																		
1241	CH2600 to CH2800 (200m)	22 days	Jan 30 '23	Feb 20 '23																					
1242	TTA establishment	1 day	Jan 30 '23	Jan 30 '23		1240	1243																		
1243	Hard material excavation and disposal	1 day	Jan 31 '23	Jan 31 '23		1242	1244																		
1244	Soil excavation , laying sheetpile and disposal	3 days	Feb 1 '23	Feb 3 '23		1243	1245																		
1245	Treatment of bedding	1 day	Feb 4 '23	Feb 4 '23		1244	1246																		
1246	Pipe laying D.I.	1 day	Feb 5 '23	Feb 5 '23		1245	1247																		
1247	Backfilling general fill and compaction	14 days	Feb 6 '23	Feb 19 '23		1246	1248																		
1248	Reinstatement	1 day	Feb 20 '23	Feb 20 '23		1247																			
1249	Overall testing	21 days	Jul 2 '24	Jul 22 '24		1037,1074	1253																		
1250	Swabbing	7 days	Jul 2 '24	Jul 8 '24			1251																		
1251	CCTV	7 days	Jul 9 '24	Jul 15 '24		1250	1252																		
1252	Hydrostatic pressure test	7 days	Jul 16 '24	Jul 22 '24		1251																			
1253	Pipe connection and completion	7 days	Jul 23 '24	Jul 29 '24		1249	1254FF																		
1254	Planned completion for section 5	0 days	Jul 29 '24	Jul 29 '24		1253FF																			
1255																									
1256	Section 6 - Water main laying works in part 5 of the Site	1280 days	Jul 30 '21	Jan 29 '25																					
1257	Access Date (part 5 of the Site)	1 day	Jul 30 '21	Jul 30 '21			1258																		
1258	Initial survey (utility survey, condition survey, initial photo)	90 days	Jul 31 '21	Oct 28 '21		1257	1260																		
1259	Application and approval of XP and TTA	167 days	Oct 1 '21	Mar 16 '22			1260																		
1260	Procurement and Delivery of pipes, fittings and related materials	30 days	May 30 '22	Jun 28 '22		1258,1259	1261																		
1261	Submission and acceptance of method statement and material	30 days	Jun 29 '22	Jul 28 '22		1260	1262																		
1262	Excavation of Inspection Pit	800 days	Oct 3 '22	Dec 10 '24		1261	1311																		
1263	Mainlaying by trenchless method	154 days	Aug 1 '24	Jan 1 '25			1306																		
1264	RW06 : DN300 DI pipe (trenchless)	154 days	Aug 1 '24	Jan 1 '25																					
1265	Jockey Club Road (100m) - TBM Method	154 days	Aug 1 '24	Jan 1 '25																					
1266	TTA implementation	3 days	Aug 1 '24	Aug 3 '24			1267																		
1267	Contruction of jacking pit and receiving pit	45 days	Aug 4 '24	Sep 17 '24		1266	1268																		
1268	Trenchless works and pipe laying	60 days	Sep 18 '24	Nov 16 '24		1267	1269																		
1269	Manhole / Chamber construction	21 days	Nov 17 '24	Dec 7 '24		1268	1270																		
1270	Backfilling and compaction	21 days	Dec 8 '24	Dec 28 '24		1269	1271																		
1271	Reinstatement	4 days	Dec 29 '24	Jan 1 '25		1270																			
1272	Contractor's Design and Construction of distribution mains	218 days	May 16 '22	Dec 19 '22																					
1273	Submission and acceptance of detailed design proposal	180 days	May 16 '22	Nov 11 '22			1274																		
1274	Site investigation and liaison with relevant parties	38 days	Nov 12 '22	Dec 19 '22		1273	1275																		
1275	Mainlaying by open trench method (XP ID: 1301135, 1301136)	741 days	Dec 20 '22	Dec 29 '24		1274,61	1306																		
1276	RW41 (DN150) - Sheung Shui Tung Hing Road (288m)	510 days	Mar 1 '23	Jul 22 '24																					
1277	RW42 (DN150) - No name road in Sheung Shui Heung (210m)	240 days	May 1 '24	Dec 26 '24																					
1278	RW71 (DN150) - Jockey Club Road (308m)	480 days	Aug 1 '23	Nov 22 '24																					
1279	RW44 (DN150) - Jockey Club Road (38m)	60 days	Jun 1 '23	Jul 30 '23																					
1280	RW11 (DN150) - Fung Nam Road (480m)	673 days	Feb 24 '23	Dec 27 '24	30																				
1281	RW46 (DN150) - Fung Nam Lane (38m)	60 days	Sep 1 '24	Oct 30 '24																					
1282	RW06 (DN300) - Lung Sum Avenue (290m)	450 days	Jun 1 '23	Aug 23 '24																					
1283	RW05 (DN400) - Jockey Club Road (377m)	600 days	Dec 20 '22	Aug 10 '24	15																				
1284	RW15 (DN150) - Sun Fung Road / Sun Shing Road (390m)	240 days	Dec 20 '22	Aug 16 '23																					
1285	RW18 (DN150) - San Hong Street (464m)	620 days	Dec 20 '22	Aug 30 '24																					
1286	RW20 (DN150) - Sun Wing Street (52m)	90 days	Mar 8 '23	Jun 5 '23		1287																			
1287	RW45 (DN150) - Tsun Fu Street (82m)	78 days	Dec 20 '22	Mar 7 '23			1286																		
1288	CH000 - CH040	39 days	Dec 20 '22	Jan 27 '23			1296																		
1289	TTA establishment	1 day	Dec 20 '22	Dec 20 '22			1290																		
1290	Hard material excavation and disposal	2 days	Dec 21 '22	Dec 22 '22		1289	1291																		
1291	Soil excavation , laying sheetpile and disposal	7 days	Dec 23 '22	Dec 29 '22		1290	1292																		
1292	Treatment of bedding	7 days	Dec 30 '22	Jan 5 '23		1291	1293																		
1293	Pipe laying D.I.	7 days	Jan 6 '23	Jan 12 '23		1292	1294																		
1294	Backfilling general fill and compaction	14 days	Jan 13 '23	Jan 26 '23		1293	1295																		
1295	Reinstatement	1 day	Jan 27 '23	Jan 27 '23		1294																			
1296	CH040 - CH082	39 days	Jan 28 '23	Mar 7 '23		1288																			
1297	TTA establishment	1 day	Jan 28 '23	Jan 28 '23			1298																		
1298	Hard material excavation and disposal	2 days	Jan 29 '23	Jan 30 '23		1297	1299																		
1299	Soil excavation , laying sheetpile and disposal	7 days	Jan 31 '23	Feb 6 '23		1298	1300																		
1300	Treatment of bedding	7 days	Feb 7 '23	Feb 13 '23		1299	1301																		
1301	Pipe laying D.I.	7 days	Feb 14 '23	Feb 20 '23		1																			

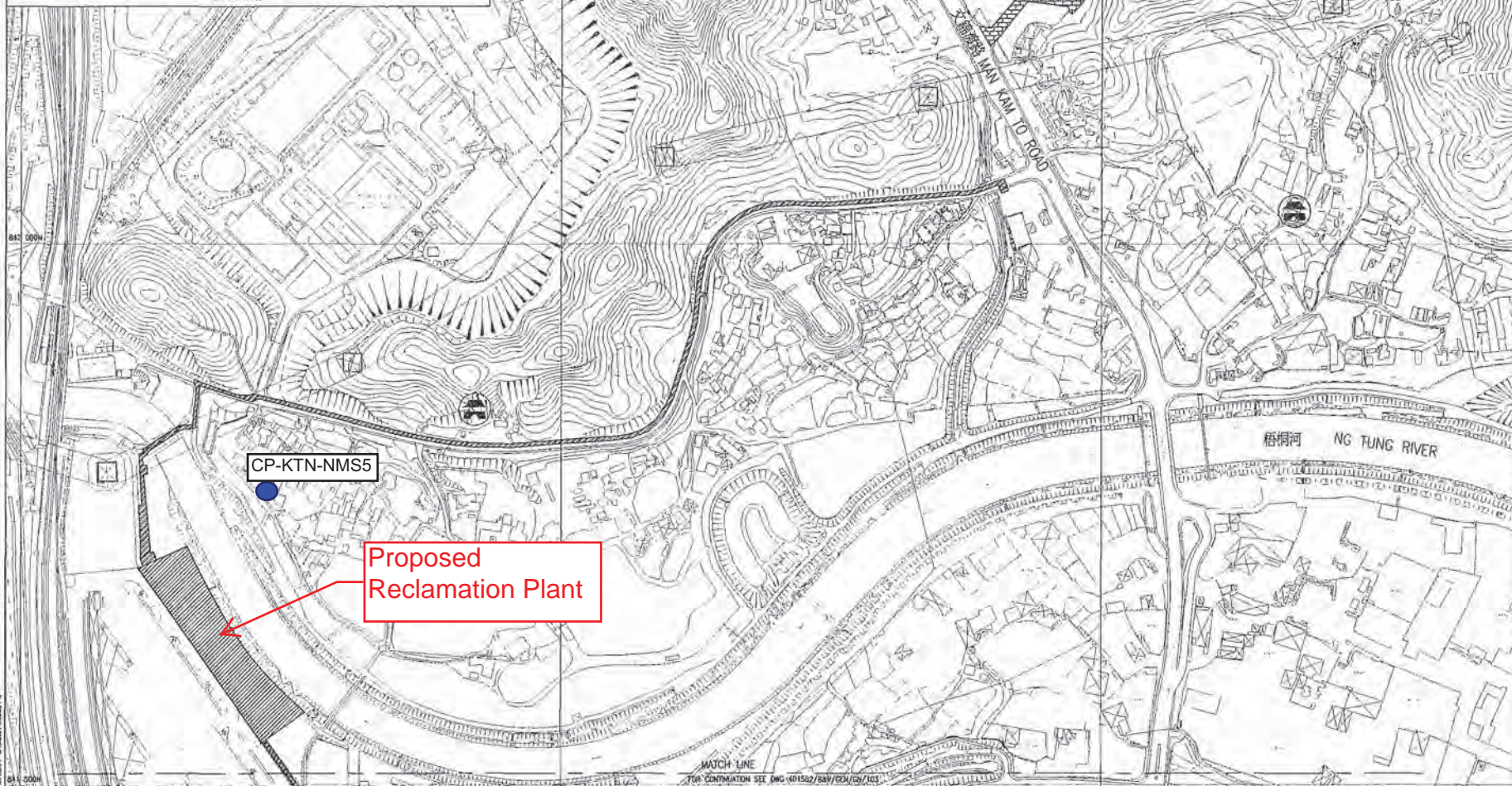
ID	Task Name	Duration	Start	Finish	TRA	Predecessors	Successors	2022				2023				2024				2025				2026	
								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
1548	Pipe laying D.I.	1 day	Apr 27 '23	Apr 27 '23	1547	1549																			
1549	Backfilling general fill and compaction	14 days	Apr 28 '23	May 11 '23	1548	1550																			
1550	Reinstatement	1 day	May 12 '23	May 12 '23	1549																				
1551	CH110 to CH140 (30m)	26 days	May 13 '23	Jun 7 '23	1543	1559																			
1552	TTA establishment	1 day	May 13 '23	May 13 '23		1553																			
1553	Hard material excavation and disposal	1 day	May 14 '23	May 14 '23	1552	1554																			
1554	Soil excavation , laying sheetpile and disposal	7 days	May 15 '23	May 21 '23	1553	1555																			
1555	Treatment of bedding	1 day	May 22 '23	May 22 '23	1554	1556																			
1556	Pipe laying D.I.	1 day	May 23 '23	May 23 '23	1555	1557																			
1557	Backfilling general fill and compaction	14 days	May 24 '23	Jun 6 '23	1556	1558																			
1558	Reinstatement	1 day	Jun 7 '23	Jun 7 '23	1557																				
1559	CH080 to CH110 (30m)	37 days	Jun 8 '23	Jul 14 '23	1551	1567																			
1560	TTA establishment	2 days	Jun 8 '23	Jun 9 '23		1561																			
1561	Hard material excavation and disposal	2 days	Jun 10 '23	Jun 11 '23	1560	1562																			
1562	Soil excavation , laying sheetpile and disposal	14 days	Jun 12 '23	Jun 25 '23	1561	1563																			
1563	Treatment of bedding	2 days	Jun 26 '23	Jun 27 '23	1562	1564																			
1564	Pipe laying D.I.	2 days	Jun 28 '23	Jun 29 '23	1563	1565																			
1565	Backfilling general fill and compaction	14 days	Jun 30 '23	Jul 13 '23	1564	1566																			
1566	Reinstatement	1 day	Jul 14 '23	Jul 14 '23	1565																				
1567	Remaining Section of On Lok Mun Street (840m)	926 days	Jul 15 '23	Jan 25 '26	1559																				
1568	RW35 (DN150) - On Chuen Street (720m) (XP ID: 1301294, 1311241)	992 days	Sep 1 '22	May 19 '25																					
1569	CH590 to CH610 (30m)	26 days	Sep 1 '22	Sep 26 '22																					
1570	TTA establishment	1 day	Sep 1 '22	Sep 1 '22		1571																			
1571	Hard material excavation and disposal	1 day	Sep 2 '22	Sep 2 '22	1570	1572																			
1572	Soil excavation , laying sheetpile and disposal	7 days	Sep 3 '22	Sep 9 '22	1571	1573																			
1573	Treatment of bedding	1 day	Sep 10 '22	Sep 10 '22	1572	1574																			
1574	Pipe laying D.I.	1 day	Sep 11 '22	Sep 11 '22	1573	1575																			
1575	Backfilling general fill and compaction	14 days	Sep 12 '22	Sep 25 '22	1574	1576																			
1576	Reinstatement	1 day	Sep 26 '22	Sep 26 '22	1575	1578																			
1577	CH560 to CH590 (30m)	26 days	Sep 27 '22	Oct 22 '22																					
1578	TTA establishment	1 day	Sep 27 '22	Sep 27 '22	1576	1579																			
1579	Hard material excavation and disposal	1 day	Sep 28 '22	Sep 28 '22	1578	1580																			
1580	Soil excavation , laying sheetpile and disposal	7 days	Sep 29 '22	Oct 5 '22	1579	1581																			
1581	Treatment of bedding	1 day	Oct 6 '22	Oct 6 '22	1580	1582																			
1582	Pipe laying D.I.	1 day	Oct 7 '22	Oct 7 '22	1581	1583																			
1583	Backfilling general fill and compaction	14 days	Oct 8 '22	Oct 21 '22	1582	1584																			
1584	Reinstatement	1 day	Oct 22 '22	Oct 22 '22	1583	1586																			
1585	CH530 to CH560 (30m)	50 days	Oct 23 '22	Dec 11 '22																					
1586	TTA establishment	1 day	Oct 23 '22	Oct 23 '22	1584	1587																			
1587	Hard material excavation and disposal	2 days	Oct 24 '22	Oct 25 '22	1586	1588																			
1588	Soil excavation , laying sheetpile and disposal	14 days	Oct 26 '22	Nov 8 '22	1587	1589																			
1589	Treatment of bedding	2 days	Nov 9 '22	Nov 10 '22	1588	1590																			
1590	Pipe laying D.I.	2 days	Nov 11 '22	Nov 12 '22	1589	1591																			
1591	Backfilling general fill and compaction	28 days	Nov 13 '22	Dec 10 '22	1590	1592																			
1592	Reinstatement	1 day	Dec 11 '22	Dec 11 '22	1591	1594																			
1593	CH500 to CH530 (30m)	26 days	Dec 12 '22	Jan 6 '23																					
1594	TTA establishment	1 day	Dec 12 '22	Dec 12 '22	1592	1595																			
1595	Hard material excavation and disposal	1 day	Dec 13 '22	Dec 13 '22	1594	1596																			
1596	Soil excavation , laying sheetpile and disposal	7 days	Dec 14 '22	Dec 20 '22	1595	1597																			
1597	Treatment of bedding	1 day	Dec 21 '22	Dec 21 '22	1596	1598																			
1598	Pipe laying D.I.	1 day	Dec 22 '22	Dec 22 '22	1597	1599																			
1599	Backfilling general fill and compaction	14 days	Dec 23 '22	Jan 5 '23	1598	1600																			
1600	Reinstatement	1 day	Jan 6 '23	Jan 6 '23	1599	1602																			
1601	CH230 to CH260 (30m)	26 days	Jan 7 '23	Feb 1 '23																					
1602	TTA establishment	1 day	Jan 7 '23	Jan 7 '23	1600	1603																			
1603	Hard material excavation and disposal	1 day	Jan 8 '23	Jan 8 '23	1602	1604																			
1604	Soil excavation , laying sheetpile and disposal	7 days	Jan 9 '23	Jan 15 '23	1603	1605																			
1605	Treatment of bedding	1 day	Jan 16 '23	Jan 16 '23	1604	1606																			
1606	Pipe laying D.I.	1 day	Jan 17 '23	Jan 17 '23	1605	1607																			
1607	Backfilling general fill and compaction	14 days	Jan 18 '23	Jan 31 '23	1606	1608																			
1608	Reinstatement	1 day	Feb 1 '23	Feb 1 '23	1607	1610																			
1609	CH200 to CH230 (30m)	26 days	Feb 2 '23	Feb 27 '23																					
1610	TTA establishment	1 day	Feb 2 '23	Feb 2 '23	1608	1611																			
1611	Hard material excavation and disposal	1 day	Feb 3 '23	Feb 3 '23	1610	1612																			
1612	Soil excavation , laying sheetpile and disposal	7 days	Feb 4 '23	Feb 10 '23	1611	1613																			
1613	Treatment of bedding	1 day	Feb 11 '23	Feb 11 '23	1612	1614																			
1614	Pipe laying D.I.	1 day	Feb 12 '23	Feb 12 '23	1613	1615																			
1615	Backfilling general fill and compaction	14 days	Feb 13 '23	Feb 26 '23	1614	1616																			
1616	Reinstatement	1 day	Feb 27 '23	Feb 27 '23	1615	1618																			
1617	CH170 to CH200 (30m)	36 days	Feb 28 '23	Apr 4 '23																					
1618	TTA establishment	1 day	Feb 28 '23	Feb 28 '23	1616	1619																			
1619	Hard material excavation and disposal	2 days	Mar 1 '23	Mar 2 '23	1618	1620																			
1620	Soil excavation , laying sheetpile and disposal	14 days	Mar 3 '23	Mar 16 '23	1619	1621																			
1621	Treatment of bedding	2 days	Mar 17 '23	Mar 18 '23	1620	1622																			
1622	Pipe laying D.I.	2 days	Mar 19 '23	Mar 20 '23	1621	1623																			
1623	Backfilling general fill and compaction	14 days	Mar 21 '23	Apr 3 '23	1622	1624																			
1624	Reinstatement	1 day	Apr 4 '23	Apr 4 '23	1623	1626																			
1625	CH000 to CH060 (60m)	26 days	Apr 5 '23	Apr 30 '23																					
1626	TTA establishment	1 day	Apr 5 '23	Apr 5 '23	1624	1627																			
1627	Hard material excavation and disposal	1 day	Apr 6 '23	Apr 6 '23	1626	1628																			
1628	Soil excavation , laying sheetpile and disposal	7 days	Apr 7 '23	Apr 13 '23	1627	1629																			
1629	Treatment of bedding	1 day	Apr 14 '23	Apr 14 '23	1628	1630																			
1630	Pipe laying D.I.	1 day	Apr 15 '23	Apr 15 '23	1629	1631																			
1631	Backfilling general fill and compaction	14 days	Apr 16 '23	Apr 29 '23	1630	1632																			
1632	Reinstatement	1 day	Apr 30 '23	Apr 30 '23	1631	1633																			
1633	Remaining Section of On Chuen Street (630m)	750 days	May 1 '23	May 19 '25	60	1632																			
1634	Coordination with ND/2019/04	90 days	Mar 1 '23	May 29 '23																					

Appendix D

Location of Designated Noise Monitoring Station CP-KTN-NMS5



LOCATION PLAN
A1 1:10000
A3 1:20000



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NOTES:

1. ALL LEVELS ARE IN REFERENCE TO METRES ABOVE THE HONG KONG PRINCIPAL DATUM (HKPD) UNLESS OTHERWISE STATED.
2. FOR GENERAL NOTES, REFER TO 401582/BAW/GEN/CH/001
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

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1. THE BASE PLAN IS EXTRACTED FROM SURVEY SHEET NOS. 2-NE, 2-SG, 3AW AND 3-SH.

LEGEND:

[Pattern]	PART 1 OF THE SITE
[Pattern]	PART 2 OF THE SITE
[Pattern]	PART 3 OF THE SITE
[Pattern]	PART 4 OF THE SITE
[Pattern]	PART 5 OF THE SITE
[Pattern]	PART 6 OF THE SITE
[Pattern]	PART 7 OF THE SITE
[Pattern]	PART 11 OF THE SITE

Rev.	Revision		Date	By
	Revised	Checked		
1	CWC	WH	02/21	02/21
2	WH	02/21	02/21	02/21

Approved: _____

Contract No. 3/WSD/20

Contract Title: RECLAIMED WATER SUPPLY TO SHEUNG SHUI AND FANLING

Drawing Title: Noise Monitoring Station

Appendix E

Valid Calibration Certificates of Monitoring Equipment



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C224779

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-1539)

Date of Receipt / 收件日期 : 4 August 2022

Description / 儀器名稱 : Sound Level Calibrator (EQ085)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NC-73

Serial No. / 編號 : 10655561

Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 20 August 2022

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification & user's specified acceptance criteria.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By

測試

H T Wong

Assistant Engineer

Certified By

核證

K C Lee

Engineer

Date of Issue

簽發日期

23 August 2022

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

1/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C224779
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C223647
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C221750

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	User's Spec.	Uncertainty of Measured Value (Hz)
1	0.953	1 kHz $\pm 6\%$	± 1

Remarks : - The user's specified acceptance criteria (user's spec.) is a customer pre-defined operating tolerance of the UUT, suitable for one's own intended use.

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

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c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

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Certificate of Calibration

校正證書

Certificate No. : C226779

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2282) Date of Receipt / 收件日期 : 8 November 2022

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2022

TEST RESULTS / 測試結果

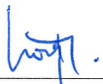
The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

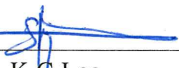
Tested By
測試

:


H T Wong
Assistant Engineer

Certified By
核證

:


K C Lee
Engineer

Date of Issue
簽發日期

:

21 November 2022

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.8
				114.00		113.7

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.5	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.6	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					16 kHz	85.8	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.6	-0.2 ± 1.5
					250 Hz	93.8	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					16 kHz	83.9	-8.5 (+3.5 ; -17.0)

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Remarks : - UUT Microphone Model No. : UC-59 & S/N : 20044

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Appendix F

Monitoring Schedule of the Reporting Month and Coming Month

The Reporting Monitoring Schedule (April 2023)

Date		Noise Monitoring (Leq30min)	Ecology Monitoring (Water Bird)
Sat	1-Apr-23		
Sun	2-Apr-23		
Mon	3-Apr-23		✓ (High Tide)
Tue	4-Apr-23	✓	✓ (Low Tide)
Wed	5-Apr-23		
Thu	6-Apr-23		
Fri	7-Apr-23		
Sat	8-Apr-23		
Sun	9-Apr-23		
Mon	10-Apr-23		
Tue	11-Apr-23		✓ (Low Tide)
Wed	12-Apr-23		✓ (High Tide)
Thu	13-Apr-23		
Fri	14-Apr-23	✓	
Sat	15-Apr-23		
Sun	16-Apr-23		
Mon	17-Apr-23		
Tue	18-Apr-23		✓ (High Tide)
Wed	19-Apr-23		
Thu	20-Apr-23	✓	✓ (Low Tide)
Fri	21-Apr-23		
Sat	22-Apr-23		
Sun	23-Apr-23		
Mon	24-Apr-23		
Tue	25-Apr-23		✓ (Low Tide)
Wed	26-Apr-23	✓	
Thu	27-Apr-23		
Fri	28-Apr-23		✓ (High Tide)
Sat	29-Apr-23		
Sun	30-Apr-23		

✓	Monitoring Day
	Sunday or Public Holiday

The Coming Month Monitoring Schedule (May 2023)

Date		Noise Monitoring (Leq30min)	Ecology Monitoring (Water Bird) ^{Note}
Mon	1-May-23		
Tue	2-May-23	✓	
Wed	3-May-23		✓
Thu	4-May-23		
Fri	5-May-23		
Sat	6-May-23		
Sun	7-May-23		
Mon	8-May-23	✓	
Tue	9-May-23		✓
Wed	10-May-23		
Thu	11-May-23		
Fri	12-May-23		
Sat	13-May-23		
Sun	14-May-23		
Mon	15-May-23		
Tue	16-May-23		
Wed	17-May-23		
Thu	18-May-23		
Fri	19-May-23	✓	
Sat	20-May-23		✓
Sun	21-May-23		
Mon	22-May-23		
Tue	23-May-23		✓
Wed	24-May-23	✓	
Thu	25-May-23		
Fri	26-May-23		
Sat	27-May-23		
Sun	28-May-23		
Mon	29-May-23		✓
Tue	30-May-23	✓	
Wed	31-May-23		

*Note:**Ecology monitoring dates are tentative and are subject to change*

✓	Monitoring Day
	Sunday or Public Holiday

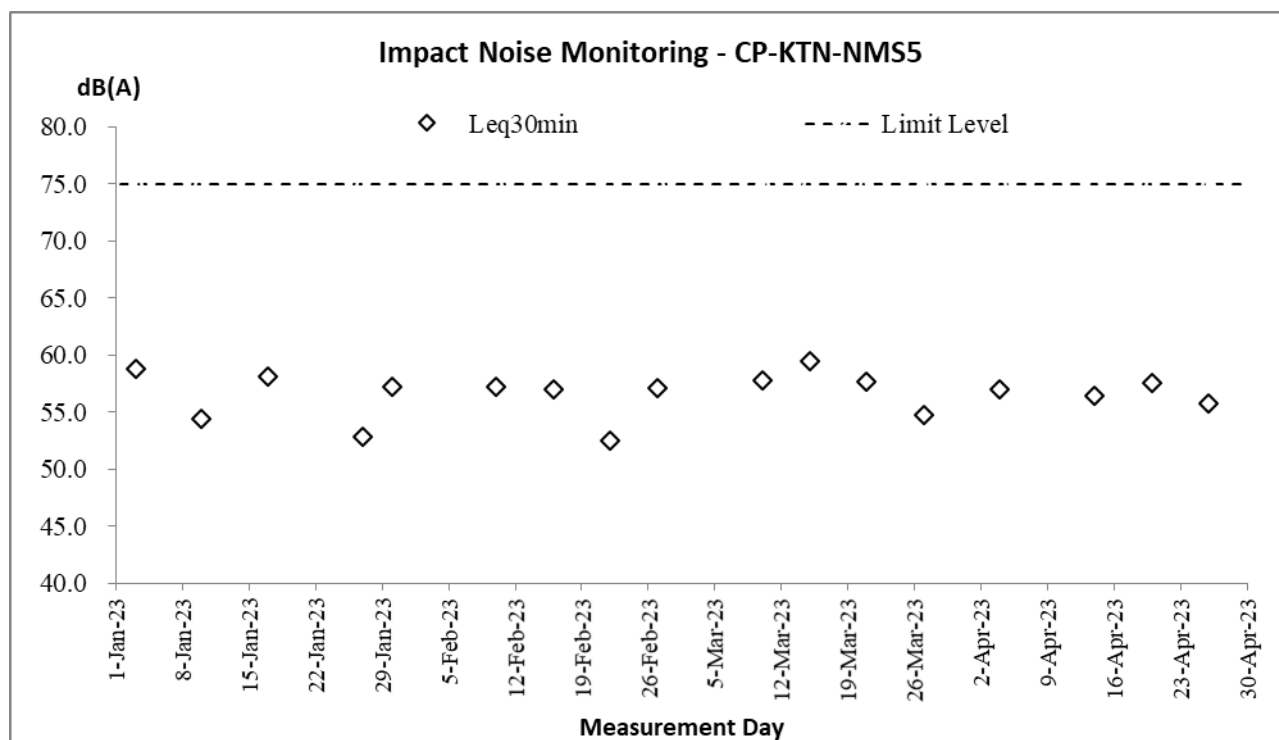
Appendix G

Database of Monitoring Result

Daytime Noise Measurement Results (dB) at CP-KTN-NMS5																					
Date	Start Time	1st Leq (5min)			2nd Leq (5min)			3rd Leq (5min)			4th Leq (5min)			5th Leq (5min)			6th Leq (5min)			Leq30min, dB(A)	Corrected Leq30min dB(A)
		Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)	Leq, dB(A)	L10, dB(A)	L90, dB(A)		
4-Apr-23	9:36	56.3	58.1	52.2	55.9	58.0	51.9	57.2	59.3	53.6	57.5	59.8	53.2	56.9	58.8	53.4	57.6	59.1	52.9	56.9	59.9
14-Apr-23	11:19	57.9	59.2	51.0	57.0	60.0	51.5	56.9	59.7	51.1	57.3	60.7	49.8	54.4	57.3	50.0	52.7	54.0	51.0	56.4	59.4
20-Apr-23	15:22	58.9	60.8	53.2	58.4	60.4	54.1	56.0	58.9	53.7	57.9	61.2	55.1	56.4	60.3	54.3	57.1	61.9	56.3	57.6	60.6
26-Apr-23	13:20	54.3	58.6	49.8	50.9	52.3	49.4	55.0	58.0	51.4	58.9	60.5	54.2	56.6	60.3	52.5	54.7	57.5	50.2	55.7	58.7

Appendix H

Graphical Plots for Monitoring Result



Appendix I

Monthly Summary Waste Flow Table

Contract No. : 3/WSD/20

Contact Name: Reclaimed Water Supply to Sheung Shui and Fanling**Monthly Summary Waste Flow Table for 2023**

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	0.1842	0	0	0	0.1842	0	0	0	0	0	0.0034
Feb	0.2990	0	0	0	0.2990	0	0	0	0	0	0.0170
Mar	0.1300	0	0	0	0.1300	0	0	0	0	0	0.0300
Apr	0.9450	0	0	0	0.9450	0					0.0130
May											
June											
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	1.558	0	0	0	1.558	0	0	0	0	0	0.0643

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 - (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
 - (3) The quantities of C&D material indicated in the half-yearly status report should be in tonnes. If the project offices do not have information on the densities of the material for the time being, they could initially adopt the following conversion factors for reporting purpose: insitu densities of rock and soil to be 2.5 tonnes/m³ and 2.0 tonnes/m³ respectively; and densities of imported rock and soil to be 2.0 tonnes/m³ and 1.8 tonnes/m³ respectively.
 - (4) Broken concrete and bitumen = 2.4 tonnes/m³
 - (5) Conversion to 1000m³ for general refuse is weight in 1000kg multiply by 0.002

Appendix J

Implementation Schedule for Environmental Mitigation Measures (ISEMM)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
Common Mitigation Measures (Applicable to ALL Project Components, including DPs and Non-DPs)							
Construction Dust Impact							
S3.8	D1	Mitigation measures in form of regular watering under a good site practice should be adopted. Watering once per hour on exposed worksites and haul road is proposed to achieve dust removal efficiency of 92.1%. While the above watering frequencies are to be followed, the extent of watering may vary depending on actual site conditions but should be sufficient to maintain an equivalent intensity of no less than 1.7 L/m ² to achieve the respective dust removal efficiencies.	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	APCO To control the dust impact to meet HKAQO and TM-EIAO
S3.8	D2	The Contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation.	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	APCO To control the dust impact to meet HKAQO and TM-EIAO
S3.8	D3	<p>Following dust suppression measures should also be incorporated by the Contractor to control the dust nuisance throughout the construction phase:</p> <ul style="list-style-type: none"> Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; A stockpile of dusty material should not extend beyond the pedestrian barriers, fencing or traffic cones; The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hard cores; When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; 	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	APCO To control the dust impact to meet HKAQO and TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		<ul style="list-style-type: none"> The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; Any skip hoist for material transport should be totally enclosed by impervious sheeting; and Every stock of more than 20 bags of cement or dry pulverized fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. 					
Noise Impact (Construction Phase)							
S4.9	N1	Implement the following good site management practices: <ul style="list-style-type: none"> only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; and material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	Control construction airborne noise	Contractor	All construction sites	Construction phase	Annex 5, TM-EIAO
S4.9	N2	Install temporary site hoarding (approx. 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level	Contractor	All construction sites	Construction phase	Annex 5, TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
			zone of NSRs through partial screening.				
S4.9	N3	Install movable noise barriers, full enclosure and acoustic mat, screen the noisy plants including air compressor and generator.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites	Construction phase	Annex 5, TM-EIAO
S4.9	N4	Use of "Quiet" Plant and Working Methods	Reduce the noise levels of plant items	Contractor	All construction sites	Construction phase	Annex 5, TM-EIAO
S4.9	N5	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites	Construction phase	Annex 5, TM-EIAO
Water Quality Impact (Construction Phase)							
S5.7	W1	<p>Construction Runoff</p> <p>In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94), construction phase mitigation measures should be provided and the Storm Water Pollution Control Plan is given below.</p> <p>Storm Water Pollution Control Plan</p> <ul style="list-style-type: none"> At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the Contractor prior to the commencement of construction. Diversion of natural stormwater should be provided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipment in order to avoid or minimize polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8m³ capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications 	Control construction runoff	Contractor	All construction sites	Construction phase	WPCO, EIAO, TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		<p>where the influent is pumped.</p> <ul style="list-style-type: none"> • The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a silt/sediment trap. The silt/sediment traps should be incorporated in the permanent drainage channels to enhance deposition rates. • The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction. • Construction works should be programmed to minimize surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means. • All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas. • Measures should be taken to minimize the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, it should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. • All open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50m³ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. • Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers. • Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff 					

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		<p>during storm events.</p> <ul style="list-style-type: none"> All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain. Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts. All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby. Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the meander, wetlands and fish ponds. 					
S5.7	W2	<p>Sewage from Workforce</p> <ul style="list-style-type: none"> Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed Contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on the construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the Project would not cause water quality impact after undertaking all required measures. 	Handling of site sewage	Contractor	All construction sites	Construction phase	WPCO, EIAO, TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
Waste Management (Construction Waste)							
S7.6	WM1	<p>Waste Reduction Measures</p> <p>Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction:</p> <ul style="list-style-type: none"> • segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; • proper storage and site practices to minimize the potential for damage and contamination of construction materials; • plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; • sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); and • provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling. 	Reduce waste generation	Contractor	All construction sites where practicable	Prior to the commencement of construction	Waste Disposal Ordinance
S7.6	WM2	Prepare Waste Management Plan and submit to the Engineer for approval	Minimize waste generation during construction	Contractor	All construction sites	Construction phase	Waste Disposal Ordinance
S7.6	WM3	<p><u>Good Site Practice</u></p> <p>The following good site practices are recommended throughout the construction activities:</p> <ul style="list-style-type: none"> • nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; • provision of sufficient waste disposal points and regular collection for disposal; • appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; 	Minimize waste generation during construction	Contractor	All construction sites	Construction phase	Waste Disposal Ordinance
S7.6	WM4	<p><u>Storage of Waste</u></p> <p>The following recommendation should be implemented to minimize the impacts:</p>	Minimize waste from storage impacts	Contractor	All construction	Construction phase	Waste Disposal Ordinance

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		<ul style="list-style-type: none"> waste such as soil should be handled and stored well to ensure secure containment; stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; different locations should be designated to stockpile each material to enhance reuse; 			sites		
S7.6	WM5	Collection and Transportation of Waste The following recommendation should minimize the impacts: <ul style="list-style-type: none"> remove waste in timely manner; employ the trucks with cover or enclosed containers for waste transportation; obtain relevant waste disposal permits from the appropriate authorities; and disposal of waste should be done at licensed waste disposal facilities. 	Minimize waste from storage impacts	Contractor	All construction sites	Construction phase	Waste Disposal Ordinance
S7.6	WM6	Excavated and C&D Material Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at public filling areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials: <ul style="list-style-type: none"> maintain temporary stockpiles and reuse excavated fill material for backfilling; carry out on-site sorting; deliver surplus artificial hard materials to Tuen Mun Area 38 recycling plant or its successor for recycling into subsequent useful products; make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; implement a recording system for the amount of waste generated, recycled and disposed of for checking; Standard formwork should be used as far as practicable in order to minimize the arising of C&D waste. The use of more durable formwork (e.g. metal hoarding) or plastic facing should be encouraged in order to enhance the possibility of recycling. The purchasing of construction materials should be carefully planned in order to avoid over ordering and wastage. Wheel wash facilities have to be provided at the site entrance before the trucks leaving the works area.	Minimize waste impacts from excavated and C&D materials	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETWB TCW No. 19/2005
S7.6	WM8	Chemical Waste <ul style="list-style-type: none"> If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producers. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste Contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical 	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal (Chemical Waste) General Regulation Code of Practice on the Packaging, Labelling and

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					Storage of Chemical Waste
S7.6	WM9	General Waste <ul style="list-style-type: none"> General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. A reputable waste collector should be employed to remove general refuse on a daily basis. 	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.6	WM10	Sewage <ul style="list-style-type: none"> The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability, site condition and activities. Regularly collection by licensed collectors should be arranged to minimize potential environmental impacts. 	Minimize production of sewage impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.6	WM11	Topsoil reuse – Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical. This is considered a general measure for good site practice.	Good site practice	Contractor / Project Proponent	Onsite	Construction Phase	<ul style="list-style-type: none"> ETWB Technical Circular (Works) No.29/2004
Landscape and Visual (Construction)							
S.12.9 MM3	LV5	Open Space Provision - the principles adopted in the RODP planning ensure that public open space systems are incorporated. All requirements for open space areas stipulated in the planning documents for the formulation of the Preliminary Layout Plan should be adhered to.	Reprovision of open space. Enhance visual amenity of the area and improve the overall landscape character	Government Developer / Detailed Design Consultant / Contractor	Onsite as stipulated in the planning documents for the formulation of the Preliminary Layout Plan	Prior to Construction and Construction Phase	Hong Kong Planning Standards and Guidelines (HKPSG) issued by the Planning Department (As at Aug 2011); Sustainable Building Design Guidelines
S.12.9 MM4	LV6	Tree Protection & Preservation – Existing trees to be retained within the Project Site should be carefully protected during construction. In particular OVTs will be preserved according to ETWB Technical Circular (Works) No. 29/2004. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to	Protect and Preserve Trees	Government Developer / Detailed Design Consultant / Contractor	Onsite as stipulated in the planning documents for the formulation of	Prior to Construction and Construction Phase	ETWB Technical Circular Works (TCW) No. 29/2004 and 3/2006

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
		<p>undertaking any works adjacent to all retained trees, including trees in Contractor's works areas.</p> <p>A detailed tree survey will be carried out for the Tree Removal Application (TRA) process which will be carried out at the later detailed design stage of the Project. The detailed tree survey will propose which trees should be retained, transplanted or felled and will include details of tree protection measures for those trees to be retained.</p>			the Preliminary Layout Plan		
S.12.9 MM5	LV7	<p>Tree Transplantation – Trees unavoidably affected by the Project works should be transplanted where practical. Trees should be transplanted straight to their final receptor site and not held in a temporary nursery as far as possible. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, where applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.</p> <p>A detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBTC 2/2004 and 3/2006 and final locations of transplanted trees should be agreed prior to commencement of the work.</p> <p>For trees associated with highways e.g. roadside planting along highways, that are unavoidably affected and should be transplanted, HyD HQ/GN/13 'Interim Guidelines for Tree Transplanting Works under Highways Department's Vegetation Maintenance Ambit' should be referred to.</p>	Transplant Trees where suitable for transplantation	Government Developer / Detailed Design Consultant / Contractor	Onsite where possible. Otherwise consider offsite locations	Prior to Construction, Construction Phase & Maintenance in Operation Phase	ETWB TCW 3/2006 and 2/2004 HyD HQ/GN/13 Interim Guidelines for Tree Transplanting Works under Highways Department's Vegetation Maintenance Ambit
S.12.9 MM7	LV9	<p>Compensatory Planting – Compensatory tree planting for felled trees shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Removal Application process under ETWBTC 3/2006.</p> <p>Compensatory planting is proposed at the potential open areas such as open spaces, amenity areas, open areas of the streetscapes, as well as the open areas within development lots.</p> <p>Compensatory planting for shrubs should be considered in suitable locations. Native species such as <i>Melastoma malabathricum</i>, <i>Diospyros vaccinioides</i>, <i>Gardenia jasminoides</i>, <i>Ixora chinensis</i>, <i>Ligustrum sinense</i>, <i>Litsea rotundifolia</i>, <i>Melastoma dodecandrum</i>, <i>Atalantia buxifolia</i>, <i>Rhodomyrtus tomentosa</i>, <i>Rhaphiolepis indica</i>, and <i>Rhododendron simsii</i> are suggested.</p>	Compensate for trees and shrubs lost due to the Project.	Government Developer / Detailed Design Consultant / Contractor	Onsite where possible. Otherwise consider offsite locations	Prior to Construction, Construction Phase & Maintenance in Operation Phase	ETWB TCW 3/2006 and 2/2004
S.12.9 MM9	LV11	Vertical Greening – Planting of climbers to grow up vertical surfaces were appropriate (e.g. building edges, piers).	Soften hard surfaces and	Project Proponent /	On appropriate	Prior to Construction,	ETWB TCW No. 11/2004 – Cyber

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
			facilities	Detailed Design Consultant / Contractor / Maintenance Authority	structures	Construction Phase & Maintenance in Operation Phase	Manual for Greening
S.12.9 MM10	LV12	Green Roof – Roof greening where appropriate should be established on proposed buildings as per the guidelines stated. These guidelines provide further details including information regarding structural loading, design, maintenance, etc. considerations as well as providing information on what types of plants might be suitable.	Reduce exposure to untreated concrete surfaces and particularly mitigate visual impact to VSRs at high levels. Provide greening.	Project Proponent / Detailed Design Consultant / Contractor / Maintenance Authority	On appropriate buildings	Prior to Construction, Construction Phase & Maintenance in Operation Phase	CIBSE HK Branch, Technical Guidelines for Green Roof Systems in Hong Kong (2011); ArchSD/Urbis Study on Green Roof Application in HK (2007)
S.12.9 MM11	LV13	Screen Planting – Tall screen/buffer trees and shrubs should be planted. This measure may additionally form part of the compensatory planting.	To screen proposed structures such as roads and buildings. Improve compatibility with the surrounding environment and create a pleasant pedestrian environment	Government / Developer / Detailed Design Consultant / Contractor	Along roads, around suitable built structures, or around VSRs to contain their view out to the NDA Maintenance and create a pleasant Contractor structures	Prior to Construction, Construction Phase & Maintenance in Operation Phase	ETWBTC 3/2006
S12.9 MM14.5	LV20	Screen Hoarding – Screen hoarding shall be erected along areas of the construction works site boundary where the works site borders publically accessible routes and/or is close to visually sensitive receivers (VSRs). It is proposed that the screening be compatible with the surrounding environment and where possible, nonreflective, recessive colours be used. Any works areas near the ecological sensitive areas should erect 2m high dull green site boundary fence. Details can refer to the ecological impact assessment (Chapter 13 of the EIA report).	To screen undesirable views of the works site.	Contractor	Throughout NDAs	Construction Phase	
S12.9	LV21	Light Control – Construction day and night time lighting should be controlled to	To minimize glare	Government /	Throughout	Construction	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the Measures?	Location of the measures	When to implement the Measures?	What requirements or standards for the measures to achieve?
MM14.6		minimize glare impact to adjacent VSRs during the Construction phase. Street and night time lighting shall also be controlled to minimize glare impact to adjacent VSRs during the operation phase.	impact to adjacent VSRs	Developer / Contractor	NDA's	and Operation Phases	
Ecology (Construction Phase)							
S.13.9	E13	Review design and construction methods for bridges, especially those on the Sheung Yue and tidal Ng Tung Rivers, and adopt measures which minimize impacts on rivers and disturbance and fragmentation impacts on fauna. No construction during ardeid breeding season (1 March to 31 July) along Sheung Yue River north and east of KTN area D1-5 and east of D1-9 and C2-3 and restriction of working hours on new pedestrian bridges over the Sheung Yue River and tidal Ng Tung River to 09.00 to 17.30 during the ardeid breeding season (1 March to 31 July). Provision of alternative foraging habitat along main river channels for large waterbirds.	Minimize impacts on rivers and disturbance and fragmentation impacts on fauna.	Project Proponent / Detailed Design Consultant / Contractor	Along and within the Sheung Yue, Ng Tung and Shek Sheung Rivers	Detailed design and construction phases.	TM-EIAO.
S.13.9	E16	Creation of Green Corridors along the Sheung Yue, Ng Tung and Shek Sheung Rivers, retention and provision of screen plantings where feasible; provision of Open Space areas and development areas along river corridors; Design and erection of 2m high solid dull green site barrier fence between river channel and any active works area along or adjacent to Ng Tung, Sheung Yue and Shek Sheung Rivers. Ng Tung, Sheung Yue and Shek Sheung Rivers screen planting.	Minimize disturbance to waterbirds using Ng Tung, Sheung Yue and Shek Sheung River channels.	Detailed Design Consultant / Contractor	Ng Tung, Sheung Yue and Shek Sheung Rivers	Detailed design and construction phases.	TM-EIAO.
S.13.9	E19	Use opaque, non-transparent, non-reflective noise barriers for all construction sites. Unnecessary lighting should be avoided.	Minimize mortality impacts on birds.	Contractor	All construction sites	Construction phase.	TM-EIAO.

Appendix K

As-built Drawing of Site Temporary Drainage

Legend:

- Abandoned existing u-channel
- Flow of surface runoff
- Water flow by submersible pump
- 3" submersible pump

Sedimentation Pit
5m (W) x 5m (L) x 3m (D)

Line of continuous sand bags
at site boundary near Ng Tung
River

Sedimentation Tanks
2.5m (W) x 6m (L) x 2.4m(H)
(4nos.)

Discharge
Outlet

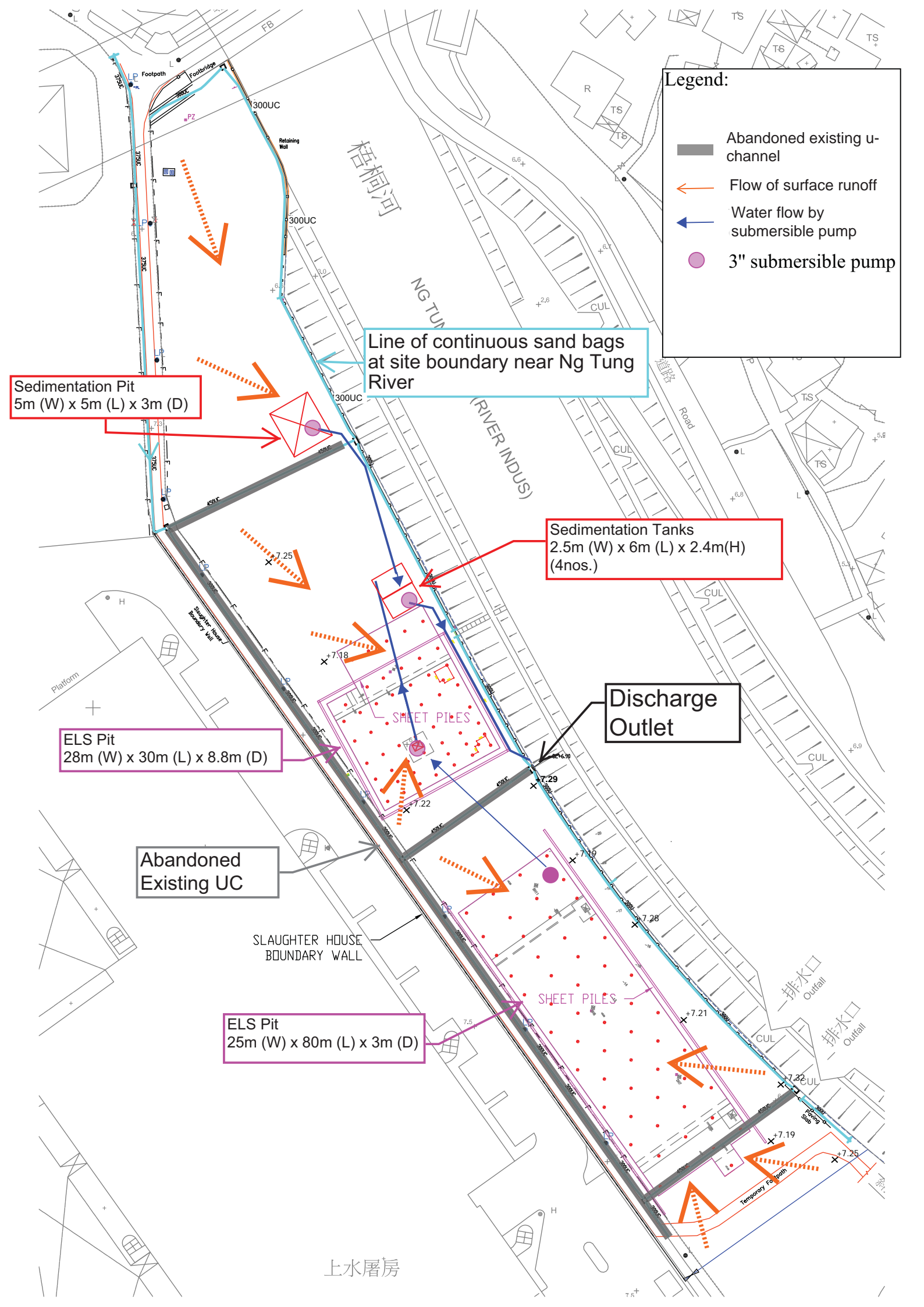
ELS Pit
28m (W) x 30m (L) x 8.8m (D)

Abandoned
Existing UC

SLAUGHTER HOUSE
BOUNDARY WALL

ELS Pit
25m (W) x 80m (L) x 3m (D)

上水屠房



Appendix L

Waterbirds Survey Report for the Reporting Month



**WSD Contract No. 3/WSD/20 - Reclaimed Water Supply to
Sheung Shui and Fanling - Provision of EM&A (Ecological)
Monitoring**

Monthly Report for April 2023
(Issue 1)


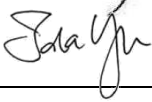
Job Ref.: 21/2063/582 AUES-SWHTSE
Date: 5th May 2023

WSD Contract No. 3/WSD/20 - Reclaimed Water Supply to Sheung Shui and Fanling - Provision of EM&A (Ecological) Monitoring

Monthly Report for April 2023

(Issue 1)

May 2023

	Name	Signature
Prepared by:	Nicholas Tam	
Reviewed by:	Ida Yu	
Date:	5th May 2023	

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1 INTRODUCTION

- 1.1 According to Section 12.3.2.5 of “Updated EM&A Manual for Advance And First Stage Works of Kwu Tung North and Fanling North New Development Areas”, monitor of measures to minimise disturbance to waterbirds on Ng Tung, Sheung Tue and Shek Sheung Rivers is required.
- 1.2 aec Ltd. has been appointed by Action-United Environmental Services & Consulting (AUES) to conduct weekly transect bird surveys at high and low tides along Ng Tung River, Sheung Yue River and Shek Sheung River; and identify sources of actual and potential disturbances to birds due to construction activities of WSD Contract No. 3/WSD/20 – Reclaimed Water Supply to Sheung Shui and Fanling. As instructed by the Contractor, the commencement date of the survey was in the week of 10th January 2022. This monthly report summarises the monitoring findings in April 2023.

2 MONITORING METHODOLOGY

- 2.1 The survey methodology references the methodology stated in approved Baseline Monitoring Report (Ecology) (Version 1) (prepared by Cinotech Consultants Limited (2019)) under “Contract No. SPW 08/2019 – Shek Wu Hui Effluent Polishing Plant – Main Works Stage 1”. Three transects and seven point count locations were selected within the 500m boundary of Ng Tung, Sheung Yue and Shek Sheung River. These locations are shown in **Figure 1** and summarized in **Table 1**.

Table 1 Ecological Monitoring Stations

Monitoring Stations	Descriptions	Influenced by Tidal Action
Transect T1	Along Ng Tung River	No
Transect T2		
Point Count Location P1		
Point Count Location P2		
Point Count Location P3		
Point Count Location P4		
Point Count Location P5	At Shek Sheung River (Low-flow Channel)	No
Transect T3	Along Shek Sheung River & Sheung Yue River	Yes
Point Count Location P6	At Shek Sheung River	Yes
Point Count Location P7	At Intersection between Sheung Yue and Shek Sheung River	Yes

- 2.2 Surveys were conducted on a weekly basis at both high and low tides (it is considered high tide when tidal levels are above 1.5m and low tide when tidal level are below 1.5m at Tsim Bei Tsui Station).
- 2.3 All avifauna species that were seen or heard were identified and quantified along transects and at point count locations. Survey data would be recorded continuously by the surveyor as they walk along the transects, while survey data of each point count location would be collected for 5-minutes after surveyor reaches the designated point count location. During the surveys, the utilisation of Ng Tung River, Sheung Yue River and Shek Shui River and their immediate environs/habitats by waterbirds will be focused. For comparison and data analysis, the transect routes and point count locations followed Figure 1 of the approved Baseline Monitoring Report (Ecology) (Version 1). Locations of T1, T2, and P1 to P4 were adjusted to the opposite side of Ng Tung River as the original transects were inaccessible due to various construction projects.

- 2.4 Noticeable behaviours such as breeding, nesting, roosting, feeding and presence of recently fledged juveniles were recorded and reported. In the case which such behaviours were observed for species of conservation importance, the Resident Engineer (RE), the Contractor and the Independent Environmental Checker (IEC) would be immediately notified after the survey such that the Contractor could review the current construction programme and minimize disturbances due to construction activities.
- 2.5 Weather conditions, tidal information, time of the survey and other noticeable activities occurring within the vicinity of the survey area were recorded.

3 ANALYTICAL METHODOLOGY

- 3.1 Total numbers of waterbirds and six representative waterbird species (listed in **Table 2**) are used as an indicator of the level disturbance to waterbirds at each of the survey location. Species listed as wetland-dependant according to Carey *et al.* (2001) are defined as waterbirds. A significant decline in the abundance of all or representative waterbirds would indicate a high level of disturbance.

Table 2 Representative Waterbirds

Common Name	Species Name	Chinese Name
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	牛背鷺
Grey Heron	<i>Ardea cinerea</i>	蒼鷺
Great Egret	<i>Ardea alba</i>	大白鷺
Little Egret	<i>Egretta garzetta</i>	小白鷺
Great Cormorant	<i>Phalacrocorax carbo</i>	普通鸕鶿

Survey data from each month is compared to the baseline monitoring data. Baseline monitoring data was downloaded and extracted from the Baseline Monitoring Report retrieved from the following hyperlink (the extracted summer dataset of the baseline monitoring data is shown in **Appendix D**): <https://www.epd.gov.hk/eia/register/english/permit/fep1792018/documents/blmrev1/pdf/blmrev1.pdf>. When a decline in the total number of Waterbirds or the number of the representative Waterbird species is recorded the survey data would be compared to the baseline data (from Shek Wu Hui Effluent Polishing Plant Baseline Monitoring Report (Ecology) by Cinotech Consultants Limited, 2019) using a two-sample one-tailed Student's t-test assuming unequal variance to analyse whether the decline is significant.

- 3.2 If the collected data for the reporting month shows a significant difference at the 95% confidence level, the action level will be triggered. If the collected data for the reporting month shows a significant difference at the 99% confidence level, the limit level is triggered and corresponding suggestions would be given to minimize the disturbances according to **Table 3**.

Table 3 Action and Limit Levels and Responses to Evidence of Disturbance to Waterbirds using Ng Tung, Sheung Yue and Shek Sheung Rivers during Construction Phase

Action Level	Response	Limit Level	Response
Decline in numbers of all waterbird species relative to numbers during Baseline	Investigate cause(s) and if cause(s) identified as related to NDAs project instigate remedial action	Decline in numbers of all waterbird species relative to numbers during Baseline Monitoring such that the	Investigate cause(s) and if cause(s) identified as related to the NDAs project instigate remedial action.

Action Level	Response	Limit Level	Response
Monitoring such that the Action Level response is triggered.	to remove or reduce source of disturbance.	Limit Level response is triggered.	Review and adjust project's Long Valley Nature Park (LVNP) management measures to improve conditions for affected species.
Decline in numbers of any one Waterbird species occurring in significant numbers* during Baseline Monitoring such that the Action Level response is triggered.	Investigate cause(s) and if cause(s) identified as related to NDAs project instigate remedial action to remove or reduce source of disturbance.	Decline in numbers of any one Waterbird species occurring in significant numbers* during Baseline Monitoring such that the Limit Level response is triggered.	Investigate cause(s) and if cause(s) identified as related to the NDAs project instigate remedial action. Review and adjust project's LVNP management measures to improve conditions for affected species.

Note: Whether numbers are significant depend on species and season after collection and evaluation of baseline survey data.

- 3.3 In order to increase the sample size and reduce the random error on each survey day, survey data would be collectively analysed on a monthly basis. The collective data of each month is also compared to the baseline data of the respective month and season instead of the entire data set, to account for the seasonal variation in the abundance of waterbirds. In this study, the winter season is defined as October to March, while the summer season is defined as April to September.

4 RESULTS

- 4.1 The weather conditions and tide levels on the survey dates are listed in the table below.

Table 4 Weather Conditions and Tidal Information of Survey Dates in the Reporting Month

High Tide				Low Tide			
Date	Time	Tide (m)	Weather	Date	Time	Tide (m)	Weather
3-Apr-23	9:45	1.83	Cloudy	4-Apr-23	15:30	0.87	Cloudy
12-Apr-23	10:00	1.65	Sunny	11-Apr-23	7:00	1.09	Sunny
18-Apr-23	8:30	1.89	Sunny	20-Apr-23	15:30	0.86	Cloudy
28-Apr-23	16:00	2	Cloudy	25-Apr-23	6:05	1.3	Rainy

- 4.2 Abundance and diversity of total bird species and key species are summarized in **Tables 5** and **6** respectively. Detailed list of avifauna recorded is provided in **Appendix A**.

Table 5 Total Bird Species and Abundance at Point Count Locations in the Reporting Month

Category	Number of Species	Abundance
All Avifauna	42	570
Waterbirds	15	171

Table 6 Abundance of Representative Waterbirds at Point Count Locations in the Reporting Month

Common Name	Species Name	Chinese Name	Abundance
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	26
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	牛背鷺	19
Grey Heron	<i>Ardea cinerea</i>	蒼鷺	7
Great Egret	<i>Ardea alba</i>	大白鷺	7

Common Name	Species Name	Chinese Name	Abundance
Little Egret	<i>Egretta garzetta</i>	小白鷺	53
Great Cormorant	<i>Phalacrocorax carbo</i>	普通鸕鶿	1

5 ANALYSIS

- 5.1 The results of Student's t-test for all waterbirds and representative waterbirds are compiled in **Table 7** respectively. Further details are provided in **Appendices B** and **C**.

Table 7 T-test Result for Waterbirds in the Reporting Month

Category	Monthly					Seasonal				
	T-value	df	p	Action Level	Limit Level	T-value	df	p	Action Level	Limit Level
All Waterbirds	-0.671	10	0.259			-0.495	4	0.323		
Chinese Pond Heron	-3.135	9	0.006	*	*	-7.088	9	0.000	*	*
Eastern Cattle Egret	-0.682	9	0.256			No decline				
Grey Heron	No decline					No decline				
Great Egret	-0.878	10	0.200			-1.503	6	0.092		
Little Egret	-2.755	6	0.012	*		-2.699	3	0.015	*	
Great Cormorant	No decline					No decline				

* = level triggered

- 5.2 Decline in abundance of Chinese Pond Heron have triggered the limit level compared to previous data in April and Summer, while decline in abundance of Little Egret triggered the action level when compared to the April and Summer average.
- 5.3 As discussed in previous months, the decline of individual waterbird species should not be the result of increased disturbances from the Project or its surrounding on-going projects, as increased disturbance would discourage multiple waterbird species from foraging near the transect and point count locations instead. Thus it is suggested that construction of the current project did not cause the decline in Chinese Pond Heron and Little Egret.
- 5.4 However, constructions around the survey transects are still active during the reporting month and the following activities were noted:
- 5.5 Since the survey dated on 4th November 2022, surveyors have recorded inspection and maintenance works of the inflatable dam at P2, these works were determined to be as part of the North East New Territories Sewerage System Upgrade led by Drainage Services Department (DSD). It was observed during the survey on 28th April 2023 (as seen in Photo 2 of **Appendix E**) that these works are still in progress. The water level of Ng Tung River along T1 (P1 and P2 included) is higher than the baseline survey due to the concrete blocks damming the flow of water, and may reduce the foraging area at P1 and/or P2 and attract less waterbirds to forage at these two points.
- 5.6 A playback device for bird calls was seen to be installed and in operation near the pond in T1 during the survey on 3rd April 2023 by AECOM (Photo 3 of **Appendix E**). It is assumed to be part of the enhancement measure of the pond and to attract more egrets to forage at the pond. This may directly lower the number of waterbirds and representative waterbirds visiting P1 and P2 as the birds would be incentivized to forage away from these two points and in the pond instead. However, the playback device was observed to be turned off on all other surveys in the Reporting Month.

- 5.7 Road enhancement works by DSD (Photo 4 of **Appendix E**) was also observed along T2 near P3, and large vehicles producing noise were seen to enter and leave the site. This may be a potential source of disturbance that discourages waterbirds from foraging at P3.
- 5.8 The construction by Civil Engineering and Development Department (CEDD) near P7 was observed active throughout the entire reporting month (Photo 5 of **Appendix E**).
- 5.9 Monitoring work will be continued next month to evaluate any construction impact on waterbirds. The construction site should continue keeping the best site practice in noise control to minimize disturbance caused to waterbirds. No further action is advised at the moment.

6 OBSERVATIONS

- 6.1 The types of Waterbird behavior observed during ecological monitoring are listed below:
- Flying
 - Resting
 - Foraging
- 6.2 Nesting behavior by non-waterbird Black-collared Starling was observed (Photo 6 of **Appendix E**).
- 6.3 The anthropogenic activities observed during ecological monitoring are listed in **Table 8**.

Table 8 Observations of the anthropogenic activities during the Ecological Monitoring in the Reporting Month

Location	Observations	
	Project Related	Non-project Related
T1 (PC1, PC2)	/	Inflatable dam inspection and maintenance at P2 (DSD), playback device at nearby pond (AECOM)
T2 (PC3, PC4)	Use of crane, scaffolding	Fishing, laying of concrete blocks at P3 (DSD), road enhancement (DSD)
T3 (PC6, PC7)	/	Fishing, piling works at P7 (CEDD)

7 REFERENCES

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Appendix A Recorded Bird Species and their Abundance in the Reporting Month

Common Name	Chinese Name	Scientific Name	Waterbird	Point Count Abundance	Transect Abundance
Northern Shoveler	琵嘴鴨	<i>Spatula clypeata</i>	Y	4	
Chinese Pond Heron	池鷺	<i>Ardeola bacchus</i>	Y	26	++
Eastern Cattle Egret	牛背鷺	<i>Bubulcus coromandus</i>	Y	19	
Grey Heron	蒼鷺	<i>Ardea cinerea</i>	Y	7	+
Great Egret	大白鷺	<i>Ardea alba</i>	Y	7	+++
Little Egret	小白鷺	<i>Egretta garzetta</i>	Y	53	++++
Great Cormorant	普通鸕鶿	<i>Phalacrocorax carbo</i>	Y	1	
Crested Serpent Eagle	蛇鵂	<i>Spilornis cheela</i>	N		+
Black Kite	黑鷹	<i>Milvus migrans</i>	N	6	+
White-breasted Waterhen	白胸苦惡鳥	<i>Amaurornis phoenicurus</i>	Y	1	+
common moorhen	黑水雞	<i>Gallinula chloropus</i>	Y	3	
Black-winged Stilt	黑翅長腳鸕	<i>Himantopus himantopus</i>	Y	10	+
Pied Avocet	反嘴鸕	<i>Recurvirostra avosetta</i>	Y	4	
Common Sandpiper	磯鸕	<i>Actitis hypoleucos</i>	Y	11	+
Green Sandpiper	白腰草鸕	<i>Tringa ochropus</i>	Y	6	
Common Greenshank	青腳鸕	<i>Tringa nebularia</i>	Y	15	+
Spotted Dove	珠頸斑鳩	<i>Spilopelia chinensis</i>	N	35	+++
Greater Coucal	褐翅鴉鵂	<i>Centropus sinensis</i>	N	2	
Asian Koel	噪鵂	<i>Eudynamis scolopaceus</i>	N	19	++
Large Hawk-cuckoo	大鷹鵂	<i>Hierococyx sparveroides</i>	N	1	+
House swift	小白腰雨燕	<i>Apus nipalensis</i>	N	25	+
White-throated Kingfisher	白胸翡翠	<i>Halcyon smyrnensis</i>	Y	4	+
Common Kingfisher	普通翠鳥	<i>Alcedo atthis</i>	Y		+
Alexandrine Parakeet	亞歷山大鸚鵡	<i>Psittacula eupatria</i>	N	1	+
Black Drongo	黑卷尾	<i>Dicrurus macrocerus</i>	N	2	+
Red-billed Blue Magpie	紅嘴藍鸕	<i>Urocissa erythrorhyncha</i>	N		+
Oriental Magpie	喜鸕	<i>Pica serica</i>	N	3	+
Collared Crow	白頸鴉	<i>Corvus torquatus</i>	Y		+
Large-billed Crow	大嘴烏鴉	<i>Corvus macrorhynchos</i>	N	1	+
Cinereous Tit	蒼背山雀	<i>Parus cinereus</i>	N	7	++
Red-whiskered Bulbul	紅耳鶇	<i>Pycnonotus jocosus</i>	N	19	+++
Chinese Bulbul	白頭鶇	<i>Pycnonotus sinensis</i>	N	18	+
Barn Swallow	家燕	<i>Hirundo rustica</i>	N	19	++
Yellow-browed Warbler	黃眉柳鶯	<i>Phylloscopus inornatus</i>	N	5	+
Dusky Warbler	褐柳鶯	<i>Phylloscopus fuscatus</i>	N		+
Yellow-bellied Prinia	黃腹鷦鶯	<i>Prinia flaviventris</i>	N	1	+
Plain Prinia	純色鷦鶯	<i>Prinia inornata</i>	N	3	+
Common Tailorbird	長尾縫葉鶯	<i>Orthotomus sutorius</i>	N	11	+
Masked Laughingthrush	黑臉噪鶇	<i>Pterorhinus perspicillatus</i>	N	23	++++
Swinhoe's white-eye	暗綠繡眼鳥	<i>Zosterops simplex</i>	N	12	+++
Crested Myna	八哥	<i>Acridotheres cristatellus</i>	N	120	+++++

Common Name	Chinese Name	Scientific Name	Waterbird	Point Count Abundance	Transect Abundance
Common Myna	家八哥	<i>Acridotheres tristis</i>	N		+
Black-collared Starling	黑領棕鳥	<i>Gracupica nigricollis</i>	N	17	++++
White-shouldered Starling	灰背棕鳥	<i>Sturnia sinensis</i>	N	19	
Oriental Magpie Robin	鵲鵲	<i>Copsychus saularis</i>	N	4	+
Daurian Redstart	北紅尾鵲	<i>Phoenicurus aureus</i>	N	1	
Eurasian Tree Sparrow	樹麻雀	<i>Passer montanus</i>	N	13	+
White Wagtail	白鵲鵲	<i>Motacilla alba</i>	N	12	+
Olive-backed Pipit	樹鵲	<i>Anthus hodgsoni</i>	N		
Total Point Count Abundance				570	
Total Waterbirds				171	

For transect abundance, +: 1-10, ++: 11-20, +++: 21-30, ++++: 31-40, +++++: >40

Appendix B Total Waterbird Abundance from Point Count

Survey Information				Number of Waterbirds	
Week	Date	Time	Tide Level	Individuals Recorded	Total
1	3/4/2023	9:45	High	22	42
	4/4/2023	15:30	Low	20	
2	11/4/2023	7:00	Low	36	56
	12/4/2023	10:00	High	20	
3	18/4/2023	8:30	High	11	33
	20/4/2023	15:30	Low	22	
4	25/4/2023	6:05	Low	21	40
	28/4/2023	16:00	High	19	
Survey Average					42.75
Baseline				April Average	48.13
				Summer Average	45.34

Appendix C Abundance of Representative Waterbirds from Point Count

Representative Species		Recorded Abundance (Apr 2023)						Baseline	
Common Name	Species Name	Week 1	Week 2	Week 3	Week 4		Average	Apr Average	Summer Average
Chinese Pond Heron	<i>Ardeola bacchus</i>	7	6	4	9		6.50	14.25	16.18
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	9	9	1	0		4.75	7.38	3.32
Grey Heron	<i>Ardea cinerea</i>	2	2	2	1		1.75	0	0.55
Great Egret	<i>Ardea alba</i>	2	3	1	1		1.75	2.5	2.61
Little Egret	<i>Egretta garzetta</i>	12	16	17	8		13.25	21.13	20.53
Great Cormorant	<i>Phalacrocorax carbo</i>	1	0	0	0		0.25	0	0

Appendix D Baseline Survey Data Summer

* Only include data from “All Waterbirds” and the six representative waterbird species for data analysis

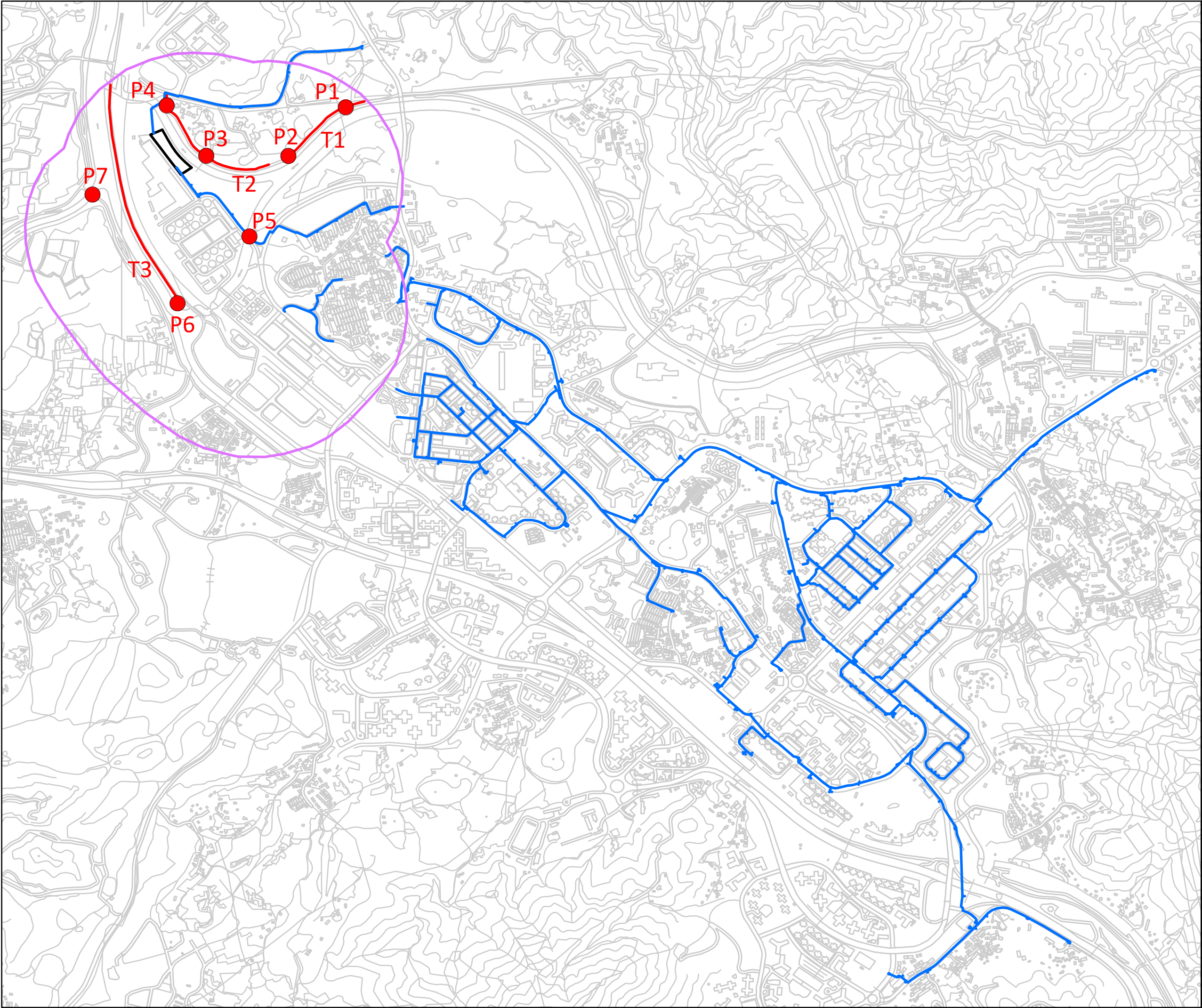
Representative Species		Recorded Abundance (Summer Baseline)							
Common Name	Species Name	06-04-18	13-04-18	19-04-18	27-04-18	04-05-18	11-05-18	17-05-18	25-05-18
All Waterbirds		37	71	78	52	59	47	48	50
Chinese Pond Heron	<i>Ardeola bacchus</i>	9	27	21	10	17	16	14	19
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	5	9	24	15	13	0	2	1
Grey Heron	<i>Ardea cinerea</i>	0	0	0	0	0	0	0	0
Great Egret	<i>Ardea alba</i>	2	6	2	5	6	5	1	2
Little Egret	<i>Egretta garzetta</i>	16	24	30	22	18	18	29	28
Great Cormorant	<i>Phalacrocorax carbo</i>	0	0	0	0	0	0	0	0
Representative Species		Recorded Abundance (Summer Baseline)							
Common Name	Species Name	01-06-18	04-06-18	15-06-18	20-06-18	26-06-18	01-07-18	13-07-18	16-07-18
All Waterbirds		68	63	55	51	50	59	40	43
Chinese Pond Heron	<i>Ardeola bacchus</i>	26	25	23	18	20	24	13	18
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	8	8	5	5	3	2	2	3
Grey Heron	<i>Ardea cinerea</i>	0	0	0	0	0	0	0	0
Great Egret	<i>Ardea alba</i>	3	4	2	5	4	3	2	2
Little Egret	<i>Egretta garzetta</i>	29	26	25	23	21	29	23	20
Great Cormorant	<i>Phalacrocorax carbo</i>	0	0	0	0	0	0	0	0
Representative Species		Recorded Abundance (Summer Baseline)							
Common Name	Species Name	27-07-18	10-08-18	13-08-18	24-08-18	27-08-18	07-09-18	10-09-18	21-09-18
All Waterbirds		47	39	41	33	35	25	48	54
Chinese Pond Heron	<i>Ardeola bacchus</i>	17	14	19	10	14	6	16	13
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	0	0	1	1	0	0	0	1
Grey Heron	<i>Ardea cinerea</i>	0	0	0	0	0	3	3	9
Great Egret	<i>Ardea alba</i>	3	2	3	0	3	3	6	4
Little Egret	<i>Egretta garzetta</i>	27	21	18	18	15	9	21	18
Great Cormorant	<i>Phalacrocorax carbo</i>	0	0	0	0	0	0	0	0
Representative Species		Recorded Abundance (Summer Baseline)							
Common Name	Species Name	26-09-18	04-04-19	10-04-19	18-04-10	22-04-19	03-05-19	08-05-19	17-05-19
All Waterbirds		48	30	30	48	39	34	28	23
Chinese Pond Heron	<i>Ardeola bacchus</i>	19	11	12	11	13	16	10	4
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	0	3	0	0	3	3	0	0
Grey Heron	<i>Ardea cinerea</i>	6	0	0	0	0	0	0	0
Great Egret	<i>Ardea alba</i>	7	1	2	2	0	0	1	0
Little Egret	<i>Egretta garzetta</i>	14	14	15	25	23	14	16	18
Great Cormorant	<i>Phalacrocorax carbo</i>	0	0	0	0	0	0	0	0
Representative Species		Recorded Abundance (Summer Baseline)							
Common Name	Species Name	20-05-19	31-05-19	05-06-19	14-06-19	18-06-19			
All Waterbirds		45	39	33	40	57			
Chinese Pond Heron	<i>Ardeola bacchus</i>	23	16	15	18	23			
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	2	0	0	0	7			
Grey Heron	<i>Ardea cinerea</i>	0	0	0	0	0			
Great Egret	<i>Ardea alba</i>	0	0	2	3	2			
Little Egret	<i>Egretta garzetta</i>	19	20	16	17	22			
Great Cormorant	<i>Phalacrocorax carbo</i>	0	0	0	0	0			

Appendix E Survey Photos

Photo 1 Works on current project at P4 (28/4/2023)	Photo 2 Inflatable dam maintenance and repair by DSD at P2 (28/4/2023)
	
Photo 3 Installation of playback device by AECOM at T1 (3/4/2023)	Photo 4 Road enhancement works by DSD at T2 (3/4/2023)
	
Photo 5 Piling at P7 by CEDD (3/4/2023)	Photo 6 Nesting Black-collared Starling at T3 (3/4/2023)
	

Figure 1

Transect and Point Count Location



- Proposed Shek Wu Hui Water Reclamation Plant
- 500m Survey Boundary
- Proposed Retained Water Mains
- Walk Transects
- Point Count Locations



Project Title:

WSD Contract No. 3/WSD/20 -
Reclaimed Water Supply to Sheung Shui and Fanling -
Provision of EM&A (Ecological) Monitoring

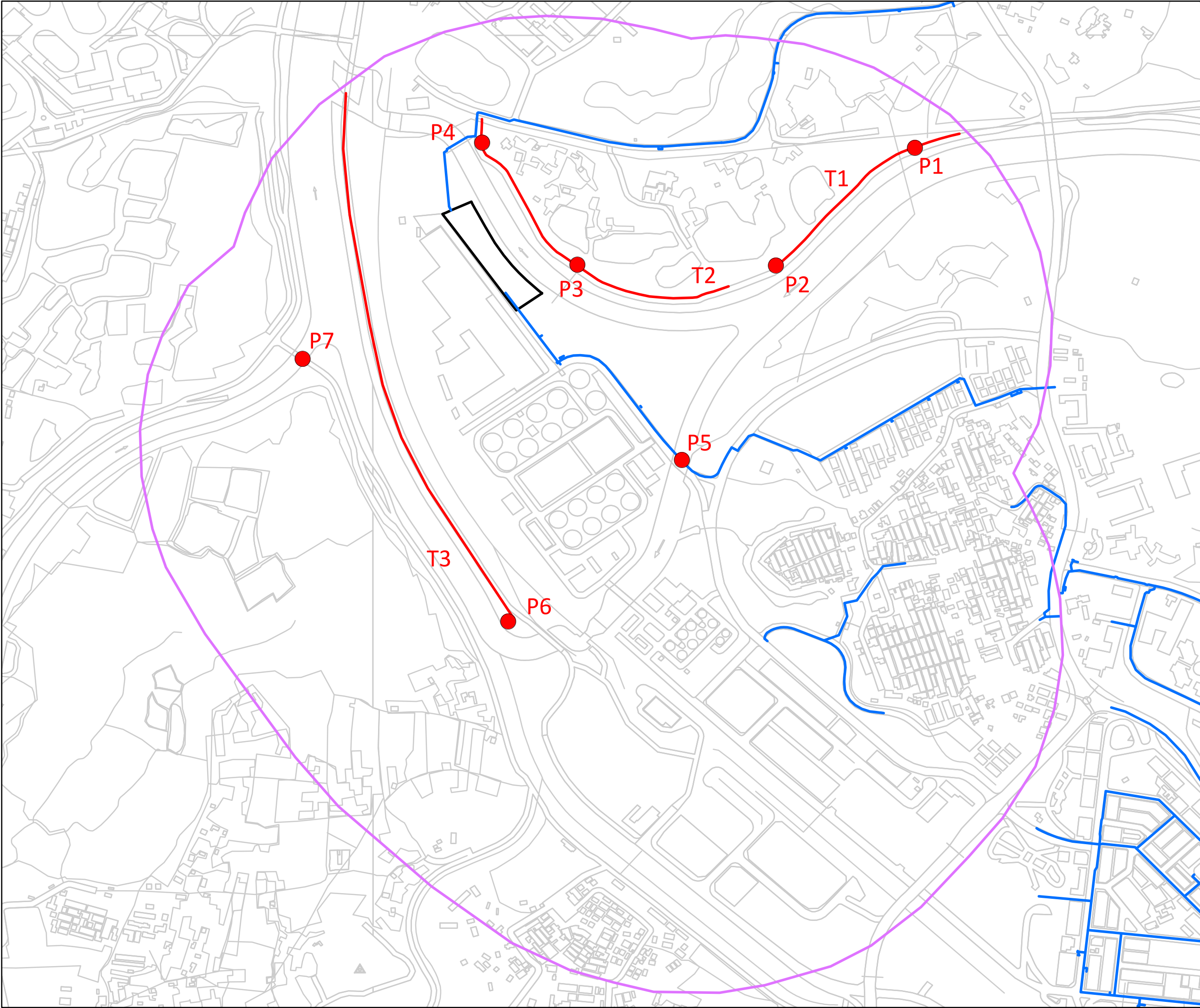
Figure Title:

Transect and Point Count Locations

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Checked By:	NT	Date:	5 July 2022	
Approved by:	IV			
Figure Number:	Figure 1			Revision: 2

Figure 1a

Transect and Point Count Location (Zoomed In)



Proposed Shek Wu Hui Water Reclamation Plant

500m Survey Boundary

Proposed Retained Water Mains

Walk Transect

Point Count Locations

ecology

biodiversity

landscape

aec

Project Title:

WSD Contract No. 3/WSD/20 -
Reclaimed Water Supply to Sheung Shui and Fanling -
Provision of EM&A (Ecological) Monitoring

Figure Title:

Transect and Point Count Locations (zoomed in)

Drawn by:

NT

Scale:

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on A3

Checked By:

NT

Date:

5 July 2022

Approved by:

IY

Figure Number:

Figure 1a

Revision:

2