JOB NO.: TCS01216/21

WSD Contract No.: 3/WSD/20 -

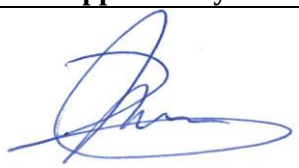
Reclaimed Water Supply to Sheung Shui and Fanling

MONTHLY ENVIRONMENTAL MONITORING & AUDIT REPORT (NO.5) – APRIL 2022

PREPARED FOR

WATER SUPPLIES DEPARTMENT

Quality Index

Date	Reference No.	Prepared By	Approved By
12 May 2022	TCS01216/21/600/R0031v2	 Martin Li Environmental Consultant	 TW Tam Environmental Team Leader

Version	Date	Description
1	10 May 2022	First Submission
2	12 May 2022	Amended against IEC's comments

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Date: 13th May 2022

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

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 2022

We refer to the monthly EM&A Report for April 2022 for WSD Contract No.: 3/WSD/20 – Reclaimed Water Supply to Sheung Shui and Fanling certified by the Environmental Team Leader on 12th May 2022. 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 2877 3122 or at 6113 2368 (vegawong@nt.com.hk).

Yours Sincerely,
For and on behalf of
Nature & Technologies (HK) Limited

Vega Wong
Independent Environmental Checker

c.c.

- ET Leader – AUES (Attn: Mr. T.W. Tam) [by Email: twtam@fordbusiness.com]
- Resident Engineer – Binnies Hong Kong Limited (Attn: Mr. Chester Chan) [by Email: chancw@binnies.com]

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 **5th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1** to **30 April 2022** (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 2022	0	0	NA

ES.09 In addition, no complaints 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 2022	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 2022	0	0	NA

REPORTING CHANGE

ES.11 No reporting change was made 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 ***7, 14, 21*** and ***25 April 2022***. No non-compliance was noted during the site inspection.

ES.13 EPD site inspection was conducted on ***26 April 2022***. IEC site inspection was conducted on 27 April 2022. No site visit was undertaken by AFCD within the Reporting Period.

FUTURE KEY ISSUES

ES.14 In coming month, piling works will be ongoing underway. Therefore, construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants or mobile noise barriers should be implemented in accordance with the EM&A requirement.

ES.15 Due to wet season has approached, the Contractor was reminded that all the works being undertaken must fulfill environmental statutory requirements and to paid attention to water quality mitigation measures to prevent surface runoff into nearby water bodies or public areas.

ES.16 Moreover, the Contractor shall fully implement mitigation measures prevent dust emission.

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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 major work of the Contract Works is to construct the Shek Wu Hui Water Reclamation Plant. Location of Shek Wu Hui Water Reclamation Plant is shown in ***Appendix A***. For the Contract Works, Shek Wu Hui Water Reclamation Plant construction 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").

1.1.3 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.

1.1.4 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***.

1.1.5 This is **5th** monthly EM&A report to presenting the monitoring results and inspection findings from ***1*** to ***30 April 2022*** of the Reporting Period.

1.2 REPORT STRUCTURE

1.2.1 The report was structured into the following sections:-

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

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 Even 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, major construction activities of the Contract Works under EP are listed in below. Moreover, a master construction program is enclosed in ***Appendix C***.
- Piling Work
- Excavation Work
- ELS Work

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 To according with the EP 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
4	Water Pollution Control Ordinance – Discharge Licence	Discharge Licence No.: WT00039707-2021	17 Nov 2021	30/11/2026

Item	Description	Licence/Permit Status		
		Ref. no.	Effective Date	Expiry Date
5	Construction Noise Permit	CNP No. GW-RN0197-22	13 Mar 2021	23 May 2022

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	B&K 4231

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 K 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.

(*) W*aterbird 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))
7-Apr-22	9:14	56.4
12-Apr-22	9:15	60.3
21-Apr-22	9:26	56.6
27-Apr-22	13:25	55.6
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
Egretta garzetta	Little Egret	小白鷺
Ardea alba	Great Egret	大白鷺
Ardea cinerea	Grey Heron	蒼鷺
Ardeola bacchus	Chinese Pond Heron	池鷺
Bubulcus coromandus	Eastern Cattle Egret	牛背鷺
Phalacrocorax carbo	Great Cormorant	普通鸕鷀

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 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 in the Reporting Month

Category	Number of Species	Abundance
All Avifauna	36	853
Waterbirds	12	192

Table 5-2-2 Total Bird Species and Abundance in the Reporting Month

Common Name	Species Name	Chinese Name	Abundance
Chinese Pond Heron	Ardeola bacchus	池鷺	30
Eastern Cattle Egret	Bubulcus coromandus	牛背鷺	18
Grey Heron	Ardea cinerea	蒼鷺	1
Great Egret	Ardea alba	大白鷺	26
Little Egret	Egretta garzetta	小白鷺	73
Great Cormorant	Phalacrocorax carbo	普通鸕鷀	0

5.2.3 The result was compared with the baseline data. While the total number of waterbirds and some representative species were slightly declined, the numbers of Chinese Pond Heron was dropped significantly.

5.2.4 A table showing the waterbirds abundance comparison with baseline data was provided in **Appendix K**. (Appendix C of the waterbirds survey report).

5.2.5 Although significant drop in number of Chinese Pond Heron was recorded, it is concluded that the drop is due to natural fluctuations or factors outside of disturbances caused by the Project.

5.2.6 It is also suggests that cumulative effects of increased disturbance at the study area and more attractive wetland habitats at Long Valley Nature Park (LVNP) may have caused waterbirds to deprioritize activities within the study area.

5.2.7 No specific instances of noise or activities from the construction site that has scared away waterbirds was observed during the survey in the Reporting Period. No action and limit level exceedance was therefore considered triggered in the Reporting Month.

5.2.8 The details of the waterbirds survey for the Reporting Month can be referred to the full waterbirds survey report provided in **Appendix K**.

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)	3.2205	-
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)	3.2205	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)	0.0024	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 ***7, 14, 21*** and ***25 April 2022*** 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
7 April 2022	• No adverse environmental issue was observed during site inspection.	NA
14 April 2022	• Accumulation of construction waste on the ground was observed. The contractor was advised to dispose it regularly.	Construction waste stored on site was removed.
21 April 2022	• No adverse environmental issue was observed during site inspection.	NA
25 April 2022	• The Contractor should store oil drum inside drip tray to prevent land contamination.	Free-standing oil drum was removed.

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 2022	0	0	NA

Table 8-1-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2022	0	0	NA

Table 8-1-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 30 April 2022	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, ecological and waste and they are summarized presented in ***Appendix J.***

9.1.2 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 generally implemented by the Main Contractor in this Reporting Month are summarized in ***Table 9-1-1***.

Table 9-1-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	• Wastewater to be treated by filtration system such as sedimentation tank and storage on-site. After Wastewater Discharge Permit is obtained to carry out dispose.
Air Quality	• Maintain damp / wet surface on access road • Keep slow speed in the sites • All vehicles must use wheel washing facility before off site • Sprayed water during breaking or excavation works • Soil stockpile greater than $50m^3$ has cover with plastic sheets
Noise	• Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants • Shut down the plants when not in used.
Waste and Chemical Management	• Follow requirements and procedures of the "Trip-ticket System" • The site was generally kept tidy and clean.

9.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

9.2.1 The construction works under the Contract Works under EP in the coming month are listed below:

- Excavation Work
- ELS Work

9.3 KEY ISSUES FOR THE COMING MONTH

9.3.1 Key issues to be considered in the coming month for the Contract Works include:

- Implementation of control measures for rainstorm;
- Regular clearance of stagnant water during wet season;
- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures

9.3.2 The Main contractor should pay special attention on noise and dust and water quality mitigation measures and fully implement according to the ISEMM of the approved Updated EM&A Manual.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

10.1.1 This is **5th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **30 April 2022**.

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 decrease in waterbirds abundance was recorded in the Reporting Period, the cause of abundance 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 ***7, 14, 21*** and ***25 April 2022***. The mitigation measures implemented was considered satisfactory. No non-compliance observed during the site inspection.

10.2 RECOMMENDATIONS

10.2.1 Due to wet season has approached, the Contractor was reminded that all the works being undertaken must fulfill environmental statutory requirements and to paid attention to water quality mitigation measures to prevent surface runoff into nearby water bodies or public areas.

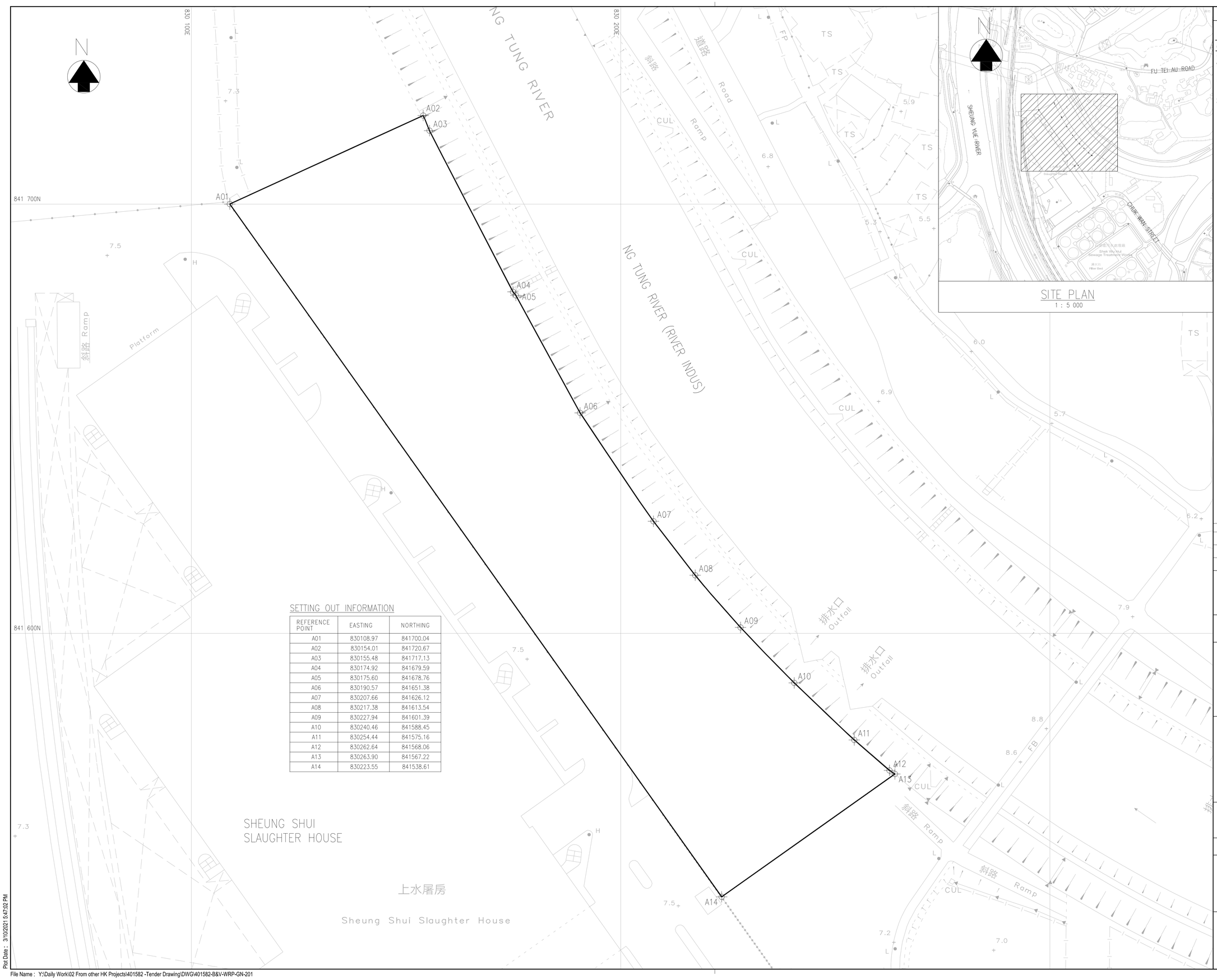
10.2.2 Construction noise would be a key environmental issue during construction work of the Contract Works. Noise mitigation measures such as using quiet plants should be implemented in accordance with the approved Updated EM&A Manual requirement.

10.2.3 All effluent discharge shall complied with discharge permits stipulation.

10.2.4 Moreover, mosquito control should be implemented to prevent mosquito breeding on site; and daily cleaning and weekly tidiness shall be properly performed.

Appendix A

Location of Shek Wu Hui Water Reclamation Plant



SITE PLAN
1 : 5 000

SETTING OUT INFORMATION

REFERENCE POINT	EASTING	NORTHING
A01	830108.97	841700.04
A02	830154.01	841720.67
A03	830155.48	841717.13
A04	830174.92	841679.59
A05	830175.60	841678.76
A06	830190.57	841651.38
A07	830207.66	841626.12
A08	830217.38	841613.54
A09	830227.94	841601.39
A10	830240.46	841588.45
A11	830254.44	841575.16
A12	830262.64	841568.06
A13	830263.90	841567.22
A14	830223.55	841538.61

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. THE BASE PLAN IS EXTRACTED FROM SURVEY SHEET NOS. 2-SE AND 3-SW.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	CWC	WH	SZ	GC	
Date	02/21	02/21	02/21	02/21	

Approved

Contract No.
3/WSD/20

Contract Title
RECLAIMED WATER SUPPLY TO SHEUNG SHUI AND FANLING

Drawing Title
SWHWRP
(PART 1 OF THE SITE) –
SETTING OUT PLAN

Drawing No.	Revision
401582/B&V/WRP/GN/201	–

Scale: A1 1 : 400, A3 1 : 800

水 務 署
Water Supplies Department

BINNIES HONG KONG LIMITED
賓尼斯工程顧問有限公司

Plot Date : 3/10/2021 5:47:02 PM

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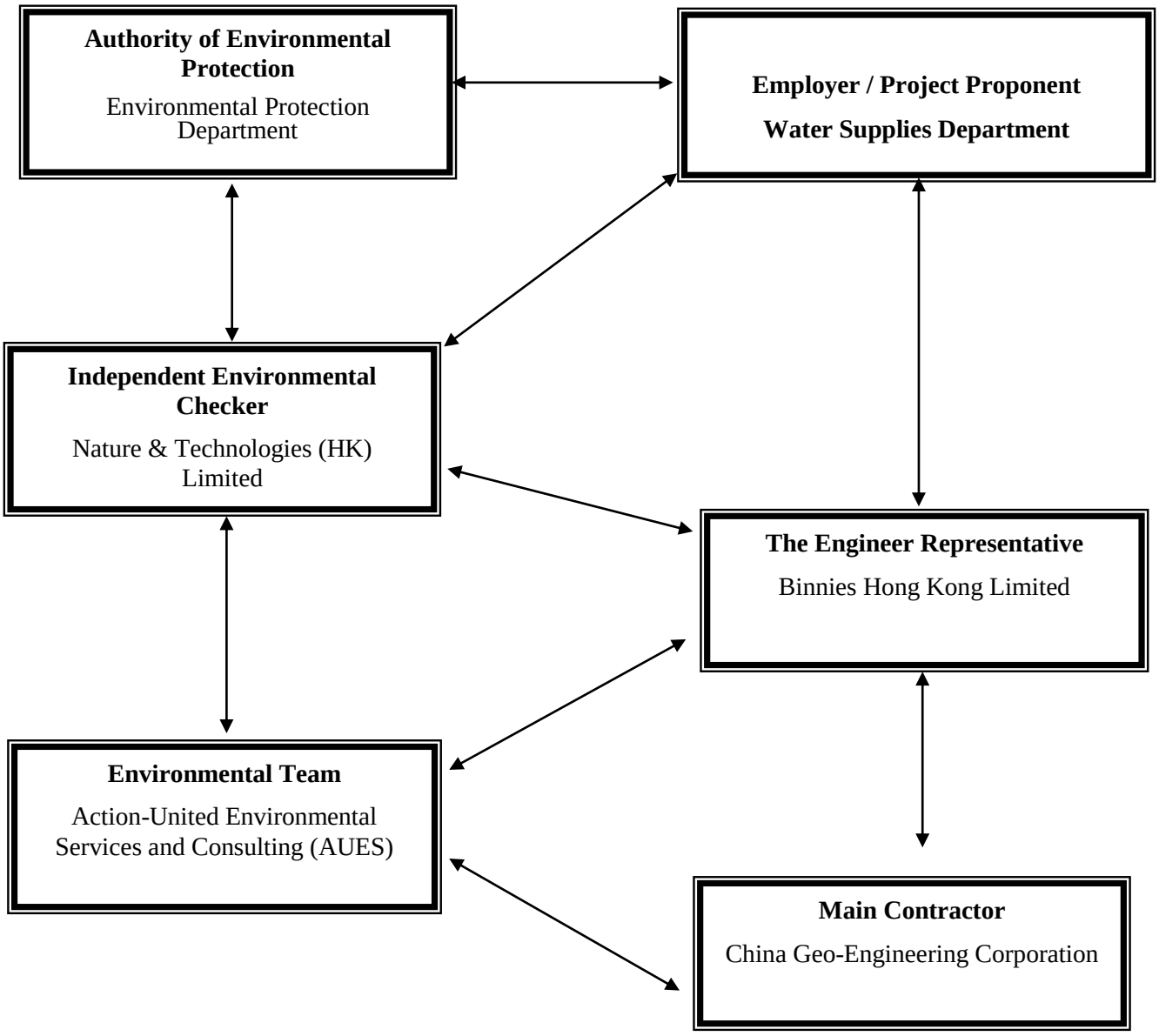
Appendix B

Project Organization

Project Organization Chart



Contact Details of Key Personnel for the Project

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
WSD	Project Proponent	Tim Wong	2829 5638	2586 1696
Binnies	Senior Resident Engineer	S.H. Chung	2608 7380	TBC
Binnies	Resident Engineer	Chester Chan,	2608 7380	TBC
N&T	Independent Environmental Checker	Vega Wong	2877 3122	2511 0922
CGC	Site Agent	Chan Tsz Kin	6874 8835	TBC
CGC	Environmental Officer	Luke Chung	6488 0975	TBC
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Martin Li	2959 6059	2959 6079
AUES	Assistant Environmental Consultant	Fai So	2959 6059	2959 6079

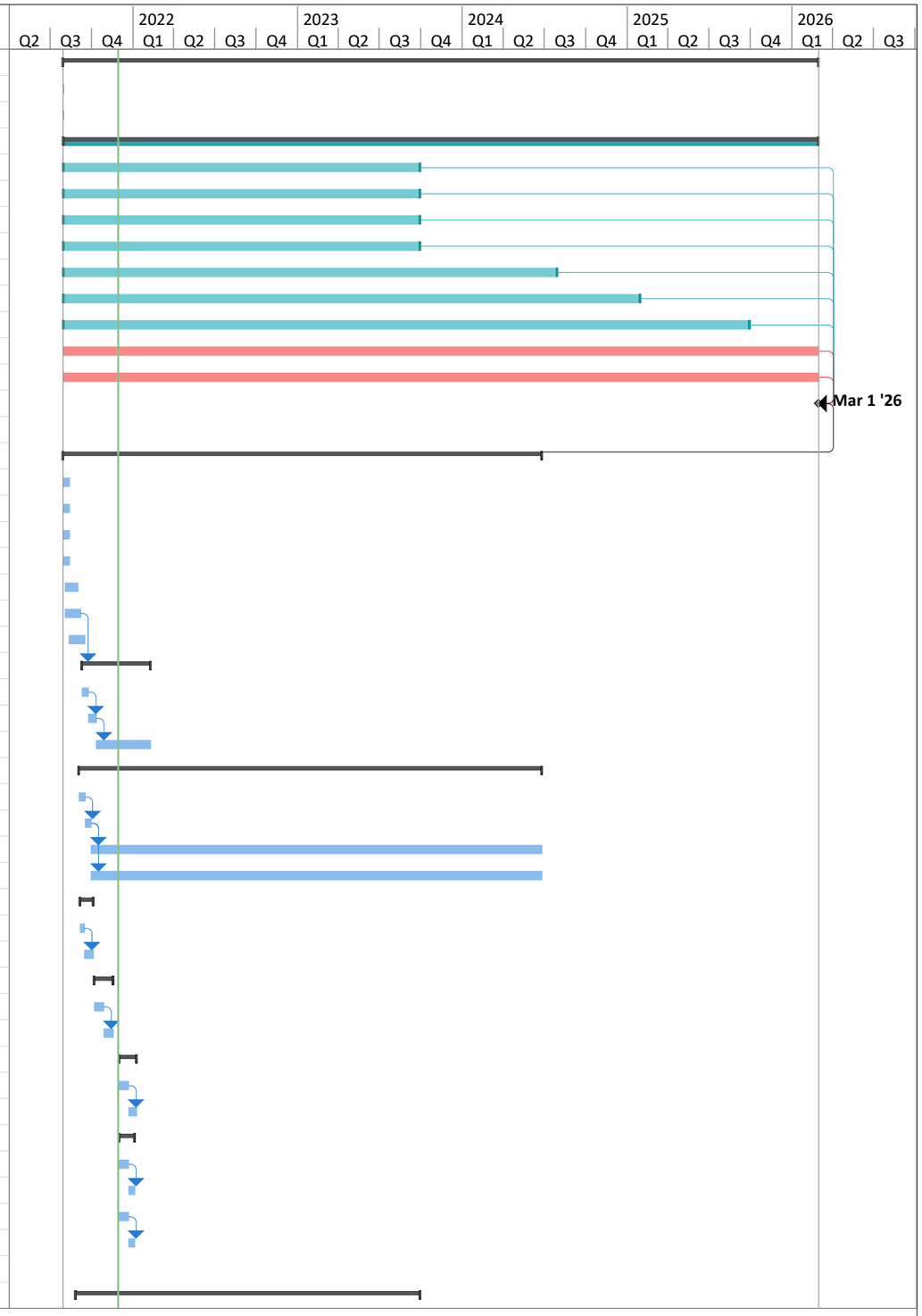
Legend:

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

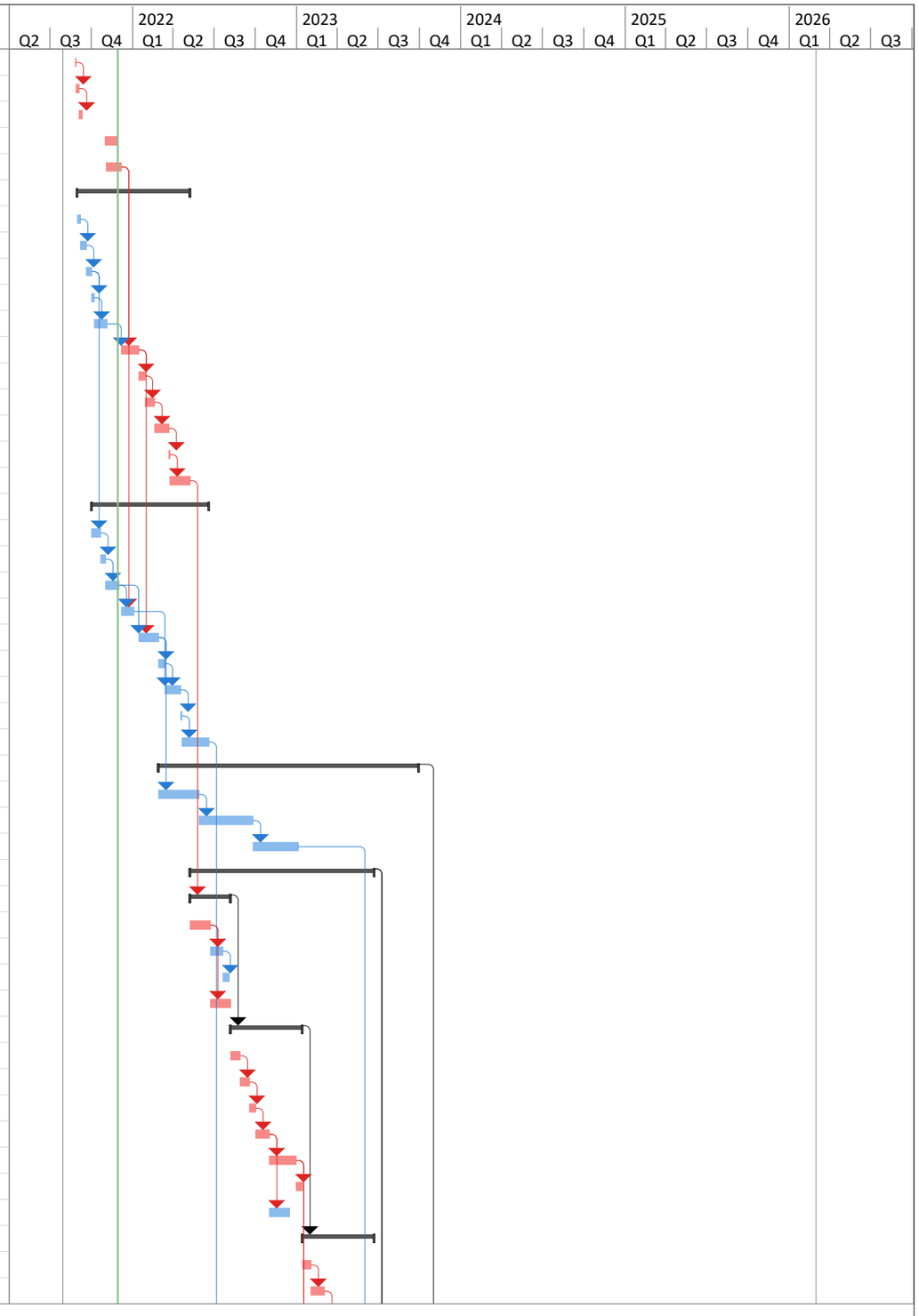
ID	Task Name	Duration	Start	Finish	TRA	Notes
1	**Contract Key Dates**	**1676 days**	**Jul 30 '21**	**Mar 1 '26**		
2	Contract Date	1 day	Jul 30 '21	Jul 30 '21		
3	Starting Date	1 day	Jul 30 '21	Jul 30 '21		
4	Contract Period	1675 days	Jul 31 '21	Mar 1 '26		
5	Section 1 - Shek Wu Hui Water Reclamation Plant (SWHWRP)	791 days	Jul 31 '21	Sep 29 '23		
6	Section 2 - Landscaping works of SWHWRP	791 days	Jul 31 '21	Sep 29 '23		
7	Section 3 - Modification of Table Hill Reclaimed Water Service Reservoir	791 days	Jul 31 '21	Sep 29 '23		
8	Section 4 - Mainlaying works in part 3 of the Site	791 days	Jul 31 '21	Sep 29 '23		
9	Section 5 - Mainlaying works in part 4 of the Site	1095 days	Jul 31 '21	Jul 29 '24		
10	Section 6 - Mainlaying works in part 5 of the Site	1279 days	Jul 31 '21	Jan 29 '25		
11	Section 7 - Mainlaying works in part 6 of the Site	1522 days	Jul 31 '21	Sep 29 '25		
12	Section 8 - Mainlaying works in part 7 of the Site & remaining WM works	1675 days	Jul 31 '21	Mar 1 '26		
13	Section 9 - Conversion works of reclaimed water	1675 days	Jul 31 '21	Mar 1 '26		
14	Contract Completion date	0 days	Mar 1 '26	Mar 1 '26		
15						
16	**Preliminary & General**	**1062 days**	**Jul 30 '21**	**Jun 25 '24**		
17	Submission of Draft Safety Plan	14 days	Jul 30 '21	Aug 12 '21		
18	Submission of Draft Environmental Management Plan	14 days	Jul 30 '21	Aug 12 '21		
19	Submission of Sub-contractor Management Plan	14 days	Jul 30 '21	Aug 12 '21		
20	Notification & request for UU record from utility undertakers	14 days	Jul 30 '21	Aug 12 '21		
21	Submission and acceptance of selection procedure for supplier	29 days	Aug 3 '21	Aug 31 '21		
22	Submission and acceptance of selection procedure for subcontractor	35 days	Aug 3 '21	Sep 6 '21		
23	Agreement on preliminary office layout	35 days	Aug 12 '21	Sep 15 '21		
24	**Provision of Project Manager's Accommodation**	**152 days**	**Sep 10 '21**	**Feb 8 '22**		
25	Submission and acceptance of subletting package	14 days	Sep 10 '21	Sep 23 '21		
26	Selection of Subcontractor	18 days	Sep 24 '21	Oct 11 '21		
27	Erection of Project Manager's Accommodation	120 days	Oct 12 '21	Feb 8 '22		
28	**Selection of Traffic Consultant**	**1027 days**	**Sep 3 '21**	**Jun 25 '24**		
29	Submission and acceptance of subletting package	14 days	Sep 3 '21	Sep 16 '21		
30	Selection of traffic consultant	13 days	Sep 17 '21	Sep 29 '21		
31	XP application for different Sections	1000 days	Sep 30 '21	Jun 25 '24		
32	TTA application for different Sections	1000 days	Sep 30 '21	Jun 25 '24		
33	**Selection of Concrete Supplier**	**29 days**	**Sep 6 '21**	**Oct 4 '21**		
34	Submission and acceptance of subletting package	9 days	Sep 6 '21	Sep 14 '21		
35	Selection of concrete supplier	20 days	Sep 15 '21	Oct 4 '21		
36	**Selection of Subcontractor for Excavation and ELS Works at SWHWRP**	**42 days**	**Oct 7 '21**	**Nov 17 '21**		
37	Submission and acceptance of subletting package	21 days	Oct 7 '21	Oct 27 '21		
38	Selection of subcontractor	21 days	Oct 28 '21	Nov 17 '21		
39	**Selection of Subcontractor for Structural Works**	**39 days**	**Dec 1 '21**	**Jan 8 '22**		
40	Submission and acceptance of subletting package	21 days	Dec 1 '21	Dec 21 '21		
41	Selection of subcontractor	18 days	Dec 22 '21	Jan 8 '22		
42	**Selection of Subcontractor for Mainlaying Works**	**35 days**	**Dec 1 '21**	**Jan 4 '22**		
43	Submission and acceptance of subletting package - open trench	21 days	Dec 1 '21	Dec 21 '21		
44	Selection of subcontractor - open trench	14 days	Dec 22 '21	Jan 4 '22		
45	Submission and acceptance of subletting package - trenchless	21 days	Dec 1 '21	Dec 21 '21		
46	Selection of subcontractor - trenchless	14 days	Dec 22 '21	Jan 4 '22		
47						
48	**Section 1 & 2 - Construction of SWHWRP and Landscaping Works**	**764 days**	**Aug 27 '21**	**Sep 29 '23**		



Project: 3WSD20 Programme
Date: Nov 29 '21

Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress
Split	Inactive Milestone	Manual Summary	Deadline	
Milestone	Inactive Summary	Start-only	Critical	
Summary	Manual Task	Finish-only	Critical Split	
Project Summary	Duration-only	External Tasks	Progress	

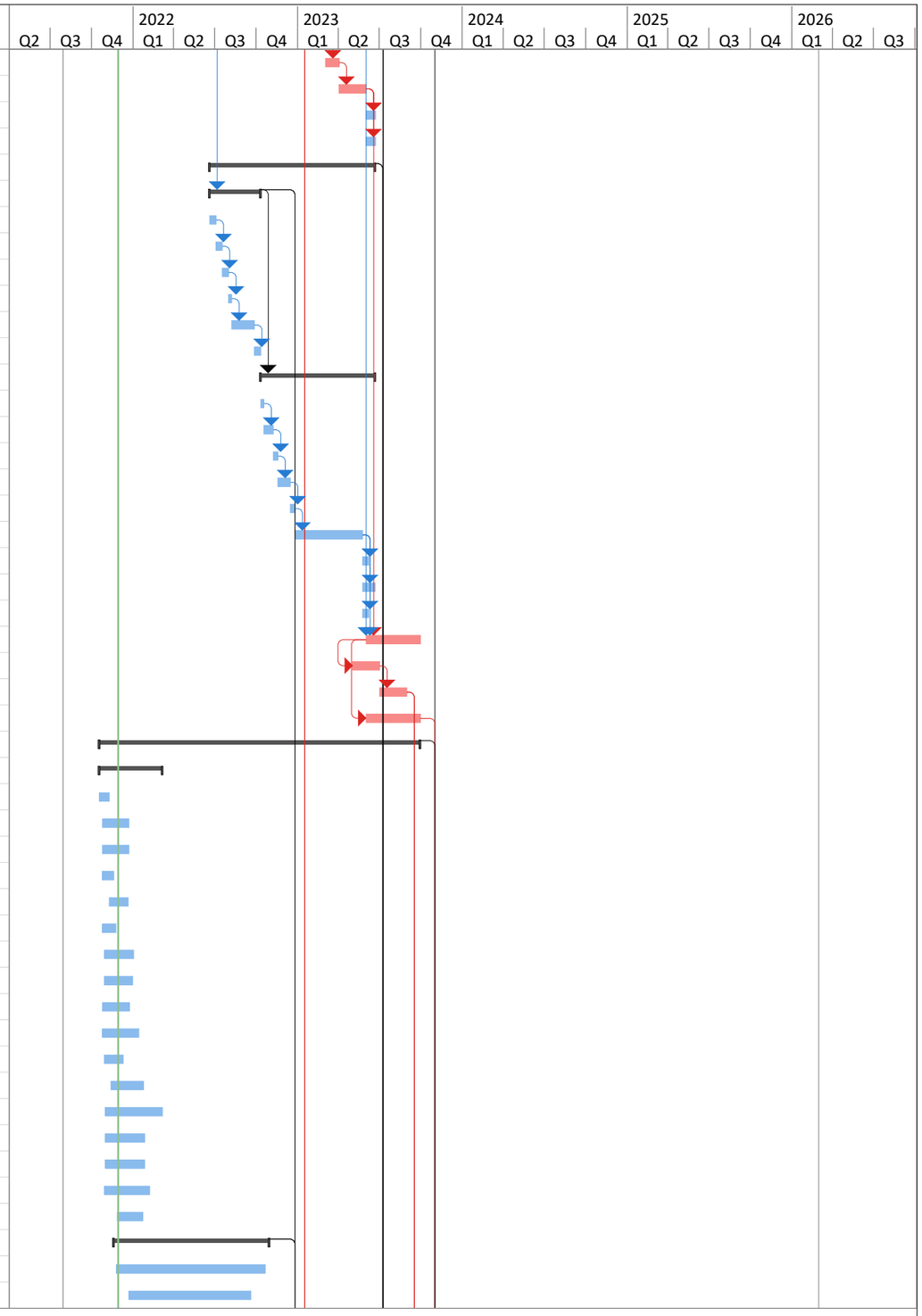
ID	Task Name	Duration	Start	Finish	TRA	Notes
49	Access Date (part 1 of the Site)	1 day	Aug 27 '21	Aug 27 '21		
50	Site clearance	7 days	Aug 28 '21	Sep 3 '21		
51	Initial survey	7 days	Sep 4 '21	Sep 10 '21		
52	Installation of monitoring instruments and take initial readings	28 days	Nov 1 '21	Nov 28 '21		
53	Environmental baseline montioring by ET	33 days	Nov 4 '21	Dec 6 '21		
54	**Foundation Works - RWPS**	**251 days**	**Aug 31 '21**	**May 8 '22**		
55	Submission and approval of subletting package for pre-drilling works	7 days	Aug 31 '21	Sep 6 '21		
56	Selection of pre-drilling subcontractor	13 days	Sep 7 '21	Sep 19 '21		
57	Pre-drilling works (15 nos.)	12 days	Sep 20 '21	Oct 1 '21		5 x 4d/hole
58	Pre-drill log report and Point Load Test	6 days	Oct 2 '21	Oct 7 '21		
59	Design review for foundation works	28 days	Oct 8 '21	Nov 4 '21		
60	Piling works (54 nos. of pre-bored H piles) - Total length = 1867m	39 days	Dec 7 '21	Jan 14 '22	7	60m/day
61	Testing of pre-bored H-pile - load test and proof drilling	14 days	Jan 15 '22	Jan 28 '22		
62	Sheet piling works for ELS - 30m(W)x26m(L)x12m(D)	21 days	Jan 29 '22	Feb 18 '22	7	20x12m Sheet Piles/day
63	Excavation works (6900m3) and ELS installation	32 days	Feb 19 '22	Mar 22 '22	7	280m3/day
64	Laying of blinding layer	2 days	Mar 23 '22	Mar 24 '22		
65	Construction of pile cap	45 days	Mar 25 '22	May 8 '22		
66	**Foundation Works - HCF**	**261 days**	**Oct 2 '21**	**Jun 19 '22**		
67	Pre-drilling works (25 nos.)	20 days	Oct 2 '21	Oct 21 '21		5 x 4d/hole
68	Pre-drill log report and Point Load Test	11 days	Oct 22 '21	Nov 1 '21		
69	Design review for foundation works	30 days	Nov 2 '21	Dec 1 '21		
70	Sheet piling works for ELS	28 days	Dec 7 '21	Jan 3 '22		
71	Piling works - HCF (56 nos. of pre-bored H piles) - Total length = 1700m	44 days	Jan 15 '22	Feb 27 '22	15	60m/day
72	Testing of pre-bored H-pile - load test and proof drilling	14 days	Feb 28 '22	Mar 13 '22		
73	Excavation works (7600m3)	35 days	Mar 14 '22	Apr 17 '22	7	280m3/day
74	Laying of blinding layer	3 days	Apr 18 '22	Apr 20 '22		
75	Construction of pile cap	60 days	Apr 21 '22	Jun 19 '22		
76	**Construction of SWHWRP**	**579 days**	**Feb 28 '22**	**Sep 29 '23**		
77	Proposal of DfMA for non-structural elements of RWPS	90 days	Feb 28 '22	May 28 '22		
78	Pre-cast of DfMA segments for non-structural elements of RWPS	120 days	May 29 '22	Sep 25 '22		
79	Installation of DfMA segments for non-structural elements of RWPS	100 days	Sep 26 '22	Jan 3 '23		
80	**Construction of RC structure of RWPS**	**410 days**	**May 9 '22**	**Jun 22 '23**		
81	**Construction of basement (below ground)**	**90 days**	**May 9 '22**	**Aug 6 '22**		
82	Construction of external wall W1,W3,W5,W7 (+0mPD to +7.2mPD)	45 days	May 9 '22	Jun 22 '22		
83	Construction of Wall W8-W15, W6 and Beams & Slabs (+0mPD to +3.6mPD)	28 days	Jun 23 '22	Jul 20 '22		
84	Construction of Wall W8-W15, W6 (+3.6mPD to +7.2mPD)	14 days	Jul 21 '22	Aug 3 '22		
85	Construction of Staircase ST1, ST2 (+0mPD to +7.2mPD)	45 days	Jun 23 '22	Aug 6 '22		
86	**Construction of Superstructure (above ground) - Grid Line 4-6**	**160 days**	**Aug 7 '22**	**Jan 13 '23**		
87	Construction of base slab (+4.45mPD to +5.95mPD & +5.6mPD to +7.1mPD)	21 days	Aug 7 '22	Aug 27 '22		
88	Construction of Columns (+5.95mPD to +13.25mPD)	21 days	Aug 28 '22	Sep 17 '22		
89	Construction of Bearing walls and Slabs (+5.95mPD to +7.2mPD)	14 days	Sep 18 '22	Oct 1 '22		
90	Construction of Beams and Slabs at +11.8mPD	30 days	Oct 2 '22	Oct 31 '22		
91	Construction of Beams and Slabs at +13.25mPD	60 days	Nov 1 '22	Dec 30 '22		
92	Construction of Parapet Walls (+13.25mPD to +14.65mPD)	14 days	Dec 31 '22	Jan 13 '23		
93	Construction of Staircase ST3 (+7.1mPD to +13.5mPD)	45 days	Nov 1 '22	Dec 15 '22		
94	**Construction of Superstructure (above ground) - Grid Line 1-4**	**160 days**	**Jan 14 '23**	**Jun 22 '23**		
95	Construction of Columns (+7.2mPD to +13.25mPD)	19 days	Jan 14 '23	Feb 1 '23		
96	Construction of Beams and Slabs at +7.2mPD	30 days	Feb 2 '23	Mar 3 '23		



Project: 3WSD20 Programme
Date: Nov 29 '21

Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress
Split	Inactive Milestone	Manual Summary	Deadline	
Milestone	Inactive Summary	Start-only	Critical	
Summary	Manual Task	Finish-only	Critical Split	
Project Summary	Duration-only	External Tasks	Progress	

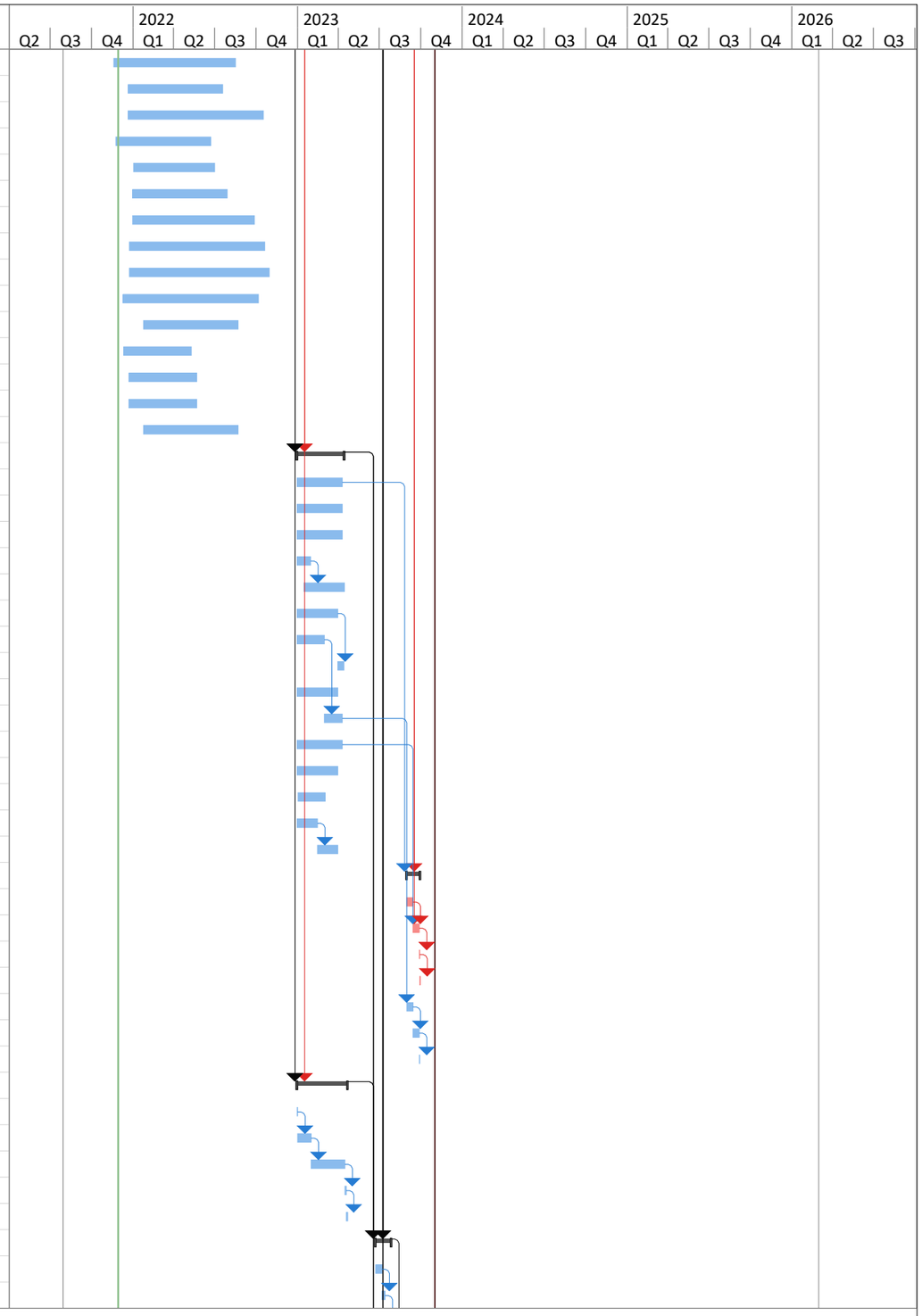
ID	Task Name	Duration	Start	Finish	TRA	Notes
97	Construction of Beams and Slabs at +9.1mPD	30 days	Mar 4 '23	Apr 2 '23		
98	Construction of Beams and Slabs at +15.2mPD	60 days	Apr 3 '23	Jun 1 '23		
99	Construction of Parapet Walls (+15.2mPD to +16.6mPD)	21 days	Jun 2 '23	Jun 22 '23		
100	Construction of Staircase ST3 (+13.5mPD to +15.45mPD)	21 days	Jun 2 '23	Jun 22 '23		
101	**Construction of RC structure of HCF**	**367 days**	**Jun 20 '22**	**Jun 21 '23**		
102	**Construction of Superstructure (above ground) - Grid Line 1-3**	**113 days**	**Jun 20 '22**	**Oct 10 '22**		
103	Construction of Columns (+5.55mPD to +13.00mPD)	14 days	Jun 20 '22	Jul 3 '22		
104	Construction of Wall W8 (+5.8mPD to +10.4mPD)	14 days	Jul 4 '22	Jul 17 '22		
105	Construction of Bearing walls and Slabs (+5.55mPD to +7.1mPD)	14 days	Jul 18 '22	Jul 31 '22		
106	Construction of Columns (+10.4mPD to +13.00mPD)	7 days	Aug 1 '22	Aug 7 '22		
107	Construction of Beams and Slabs at +13.00mPD	50 days	Aug 8 '22	Sep 26 '22		
108	Construction of Parapet Walls (+13.00mPD to +15.1mPD)	14 days	Sep 27 '22	Oct 10 '22		
109	**Construction of Superstructure (above ground) - Grid Line 3-7**	**254 days**	**Oct 11 '22**	**Jun 21 '23**		
110	Construction of Columns (+4.55mPD to +10.8mPD)	7 days	Oct 11 '22	Oct 17 '22		
111	Construction of Walls W1, W7, W19, W20, W29	21 days	Oct 18 '22	Nov 7 '22		
112	Construction of Walls W9, W13, W14, W37, W38	10 days	Nov 8 '22	Nov 17 '22		
113	Construction of Walls W2 to W6	28 days	Nov 18 '22	Dec 15 '22		
114	Construction of Walls W10, W11, W15, W16, W12, W35, W36	10 days	Dec 16 '22	Dec 25 '22		
115	Construction of Beams and Slabs at +10.4mPD and +10.8mPD	150 days	Dec 26 '22	May 24 '23		
116	Construction of Parapet Walls (+10.4mPD/+10.8mPD to +12.5mPD)	14 days	May 25 '23	Jun 7 '23		
117	Construction of Staircase ST01 (+7.1mPD to +11.35mPD)	28 days	May 25 '23	Jun 21 '23		
118	Construction of Staircase ST01 (+10.4mPD to +13.95mPD)	14 days	May 25 '23	Jun 7 '23		
119	Installation of architectural works	120 days	Jun 2 '23	Sep 29 '23		
120	Construction of roadworks (drainage, irrigation system, cable ducting, etc)	60 days	May 3 '23	Jul 1 '23		
121	Construction of EVA (road pavement, fence wall, etc)	60 days	Jul 2 '23	Aug 30 '23		
122	Landscape works	120 days	Jun 2 '23	Sep 29 '23		
123	**E&M Works of SWHWRP**	**712 days**	**Oct 18 '21**	**Sep 29 '23**		
124	**Design and Submission Stage**	**140 days**	**Oct 18 '21**	**Mar 6 '22**		
125	Submission and acceptance of Surge Analysis Report	22 days	Oct 18 '21	Nov 8 '21		
126	Submission and acceptance of Reclaimed Water Main Pumps	59 days	Oct 25 '21	Dec 22 '21		
127	Submission and acceptance of Surge Vessels and Air Compressors	59 days	Oct 25 '21	Dec 22 '21		
128	Submission and acceptance of Penstock & Stoplog	25 days	Oct 25 '21	Nov 18 '21		
129	Submission and acceptance of Chemical Dosing System & Static In-line Mixer	42 days	Nov 9 '21	Dec 20 '21		
130	Submission and acceptance of Air Blower and Air Diffuser	30 days	Oct 25 '21	Nov 23 '21		
131	Submission and acceptance of Lifting Appliances	65 days	Oct 29 '21	Jan 1 '22		
132	Submission and acceptance of Minor Mechanical Equipment	63 days	Oct 29 '21	Dec 30 '21		
133	Submission and acceptance of LV switchboard	60 days	Oct 25 '21	Dec 23 '21		
134	Submission and acceptance of DCS	81 days	Oct 25 '21	Jan 13 '22		
135	Submission and acceptance of Instrumenation & Water Monitoring Equipment	42 days	Oct 29 '21	Dec 9 '21		
136	Submission and acceptance of Misc. Electrical Items	72 days	Nov 13 '21	Jan 23 '22		
137	Submission and acceptance of Fire Services Equipment	126 days	Nov 1 '21	Mar 6 '22		
138	Submission and acceptance of MVAC Equipment	87 days	Nov 1 '21	Jan 26 '22		
139	Submission and acceptance of Plumbing & Drainage Equipment	87 days	Nov 1 '21	Jan 26 '22		
140	Submission and acceptance of General Arrangement Drawing	101 days	Oct 29 '21	Feb 6 '22		
141	Submission and acceptance of Civil Requirement Drawing	56 days	Nov 27 '21	Jan 21 '22		
142	**Procurement and Delivery of Equipment**	**345 days**	**Nov 19 '21**	**Oct 29 '22**		
143	Reclaimed Water Main Pumps (6 nos.)	330 days	Nov 25 '21	Oct 20 '22		
144	Surge Vessels and Air Compressors	270 days	Dec 23 '21	Sep 18 '22		



Project: 3WSD20 Programme
Date: Nov 29 '21

Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress
Split	Inactive Milestone	Manual Summary	Deadline	
Milestone	Inactive Summary	Start-only	Critical	
Summary	Manual Task	Finish-only	Critical Split	
Project Summary	Duration-only	External Tasks	Progress	

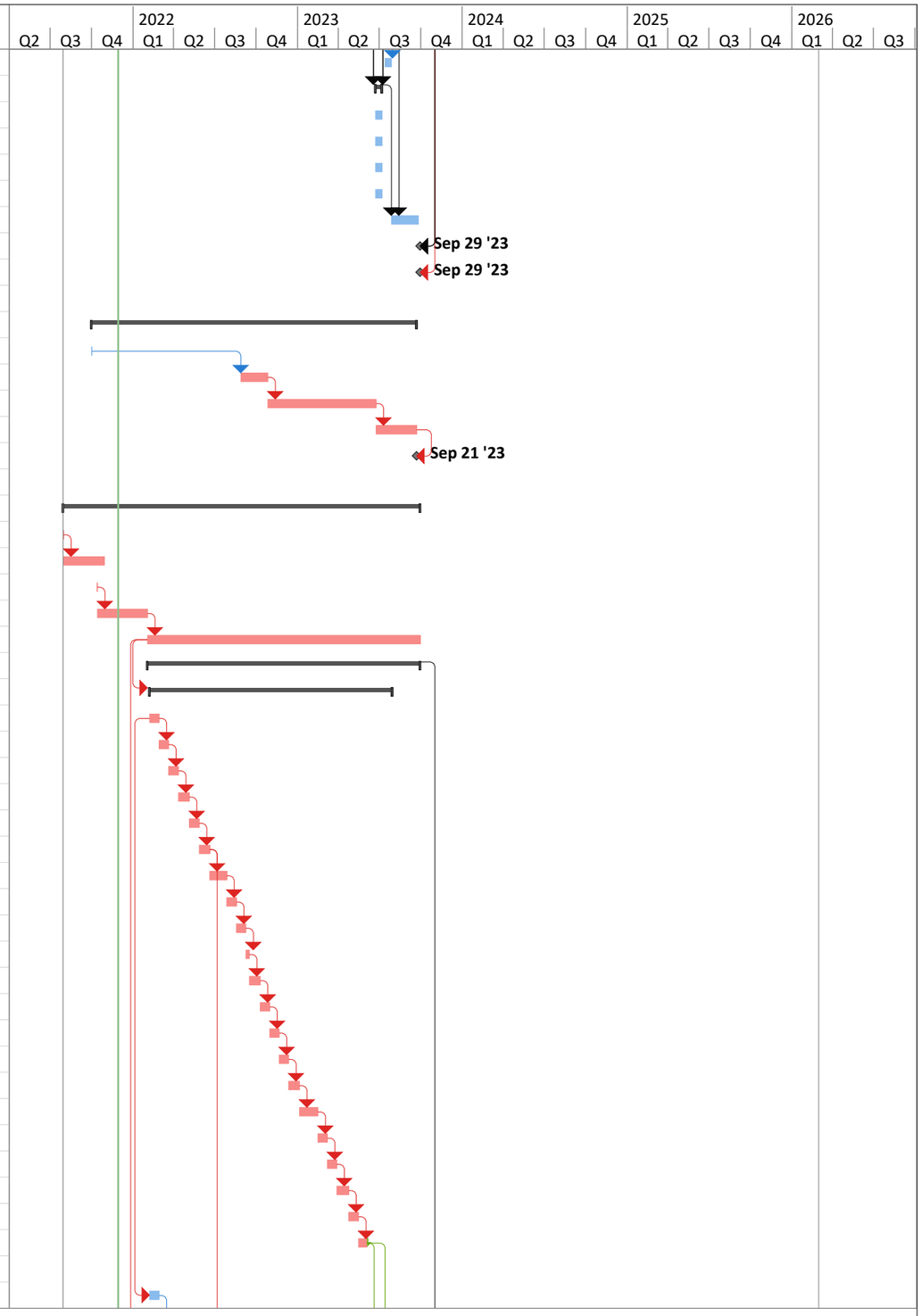
ID	Task Name	Duration	Start	Finish	TRA	Notes
145	Penstock & Stoplog	270 days	Nov 19 '21	Aug 15 '22		
146	Chemical Dosing System	210 days	Dec 21 '21	Jul 18 '22		
147	Static In-line Mixer	300 days	Dec 21 '21	Oct 16 '22		
148	Air Blower and Air Diffuser	210 days	Nov 24 '21	Jun 21 '22		
149	Lifting Appliances	180 days	Jan 2 '22	Jun 30 '22		
150	Sump Pumps	210 days	Dec 31 '21	Jul 28 '22		
151	Pipework and Valves	270 days	Dec 31 '21	Sep 26 '22		
152	LV switchboard	300 days	Dec 24 '21	Oct 19 '22		
153	DCS	310 days	Dec 24 '21	Oct 29 '22		
154	Instrumenation and Water Monitoring Equipment	300 days	Dec 10 '21	Oct 5 '22		
155	Misc. Electrical Items (PV Panel, Earthing & Cables, etc)	210 days	Jan 24 '22	Aug 21 '22		
156	Fire Services Equipment	150 days	Dec 11 '21	May 9 '22		
157	MVAC Equipment	150 days	Dec 23 '21	May 21 '22		
158	Plumbing & Drainage Equipment	150 days	Dec 23 '21	May 21 '22		
159	Misc. Electrical Items (Cables, Cable Containment, Lightings)	210 days	Jan 24 '22	Aug 21 '22		
160	**Installation Works**	**105 days**	**Dec 31 '22**	**Apr 14 '23**		
161	Installation FS Equipment	100 days	Dec 31 '22	Apr 9 '23		
162	Installation of MVAC Equipment	100 days	Dec 31 '22	Apr 9 '23		
163	Installation of BS Equipment	100 days	Dec 31 '22	Apr 9 '23		
164	Installation of Lifting Appliance (12 nos.)	30 days	Dec 31 '22	Jan 29 '23		
165	Installation of Reclaimed Water Pumps (6 Nos.)	90 days	Jan 15 '23	Apr 14 '23		
166	Installation of penstocks (10 nos.) & Stoplogs (2 nos.)	90 days	Dec 31 '22	Mar 30 '23		
167	Installation of Surge Vessel (4 Nos.) & Air Compressor (4 Nos.)	60 days	Dec 31 '22	Feb 28 '23		
168	Installation of Air Blower (2 Nos.) & Air Diffuser (1 set)	14 days	Mar 31 '23	Apr 13 '23		
169	Installation of tanks (14 nos.) & Chemical Pumps (12 nos.)	90 days	Dec 31 '22	Mar 30 '23		
170	Installation of Pipeworks (DI, Chemical pipe, Air pipe)	40 days	Mar 1 '23	Apr 9 '23		
171	Installation of Cabling, MCC & DCS	100 days	Dec 31 '22	Apr 9 '23		
172	Installation of Instrumentation and Monitoring Stations	90 days	Dec 31 '22	Mar 30 '23		
173	Installation of ELV System (CCTV & Access Control)	60 days	Jan 2 '23	Mar 2 '23		
174	Installation of Plumbing & Drainage Equipment	45 days	Dec 31 '22	Feb 13 '23		
175	Installation of PV Panels	45 days	Feb 14 '23	Mar 30 '23		
176	**FS / DG Inspection Related Items**	**30 days**	**Aug 31 '23**	**Sep 29 '23**		
177	T&C of FS Related Installation	14 days	Aug 31 '23	Sep 13 '23		
178	Submission of FS 314 & 501	14 days	Sep 14 '23	Sep 27 '23		
179	Target FS Inpsection	1 day	Sep 28 '23	Sep 28 '23		
180	Obtain Form FS172 (Fire Certificate)	1 day	Sep 29 '23	Sep 29 '23		
181	DG Design Submission	14 days	Aug 31 '23	Sep 13 '23		
182	DG Inspection	14 days	Sep 14 '23	Sep 27 '23		
183	Obtain DG License	1 day	Sep 28 '23	Sep 28 '23		
184	**Power Energization Related Items**	**112 days**	**Dec 31 '22**	**Apr 21 '23**		
185	Tx Room Ready for BS installation	1 day	Dec 31 '22	Dec 31 '22		
186	Installation of BS Equipment	30 days	Jan 1 '23	Jan 30 '23		
187	CLP to install Transformers and Cabling	75 days	Jan 31 '23	Apr 15 '23		
188	Power Energization from CLP Transformer to LVSB	3 days	Apr 16 '23	Apr 18 '23		
189	Power Energization from LVSB to All Equipment	3 days	Apr 19 '23	Apr 21 '23		
190	**Preliminary Test of Equipment**	**35 days**	**Jun 23 '23**	**Jul 27 '23**		
191	Inspection of Equipment/System with SOR	14 days	Jun 23 '23	Jul 6 '23		
192	Trial Run of Equipment/System	7 days	Jul 7 '23	Jul 13 '23		



Project: 3WSD20 Programme
Date: Nov 29 '21

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Critical
Critical Split
Progress
Manual Progress

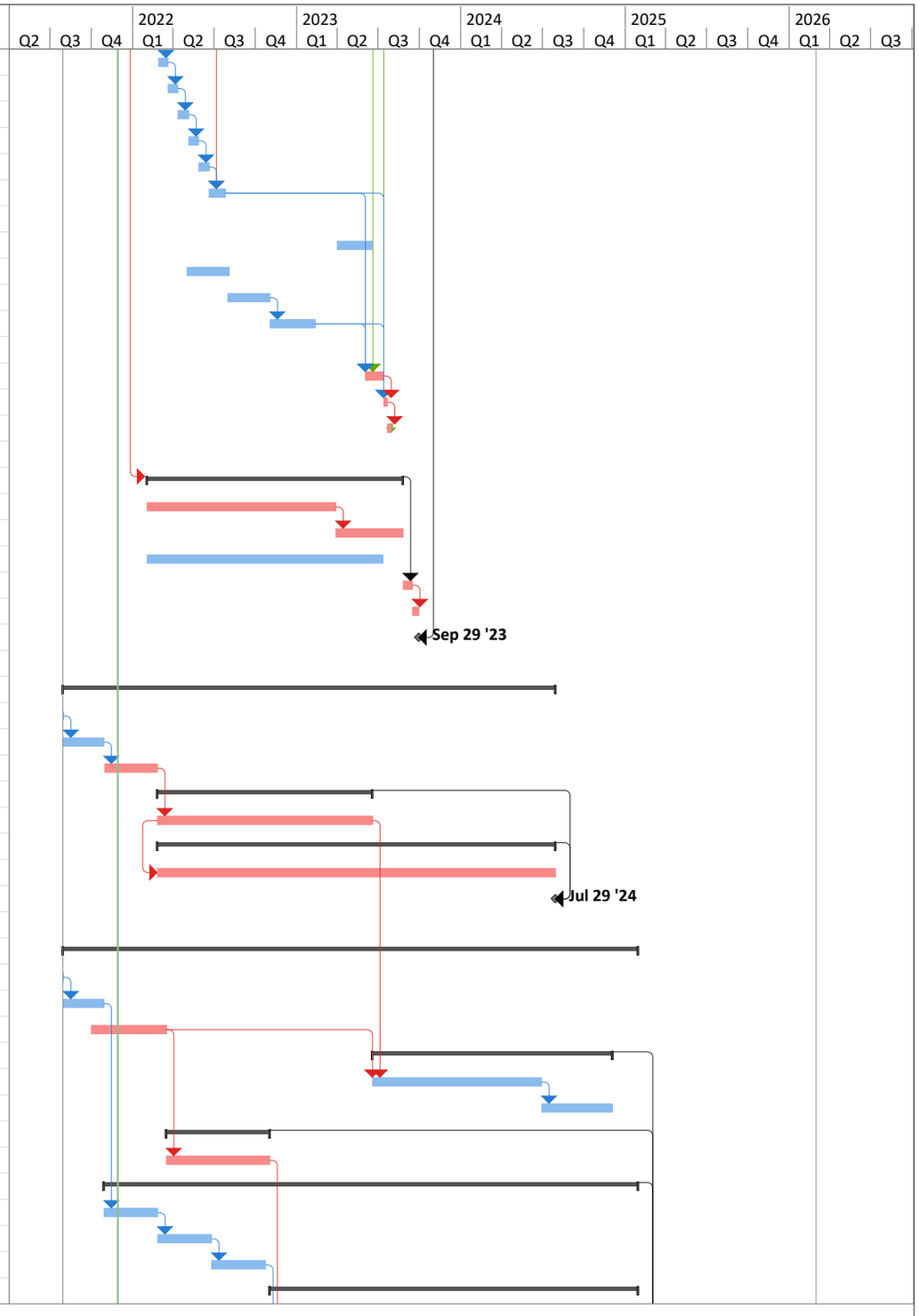
ID	Task Name	Duration	Start	Finish	TRA	Notes
193	Site Acceptance Test of Equipment/Systems with SOR	14 days	Jul 14 '23	Jul 27 '23		
194	**Submission**	**14 days**	**Jun 23 '23**	**Jul 6 '23**		
195	Submission of Testing Procedures & Commissioning Plan	14 days	Jun 23 '23	Jul 6 '23		
196	Submission of As Fitted Drawings	14 days	Jun 23 '23	Jul 6 '23		
197	Submission of Manual	14 days	Jun 23 '23	Jul 6 '23		
198	Submission of Training Material	14 days	Jun 23 '23	Jul 6 '23		
199	System Commissioning Test	60 days	Jul 28 '23	Sep 25 '23		
200	Planned completion for section 1	0 days	Sep 29 '23	Sep 29 '23		
201	Planned completion for section 2	0 days	Sep 29 '23	Sep 29 '23		
202						
203	**Section 3 - Modification of Table Hill Reclaimed Water Service Reservoir**	**721 days**	**Oct 1 '21**	**Sep 21 '23**		
204	Access Date (part 2 of the Site)	1 day	Oct 1 '21	Oct 1 '21		
205	Initial survey and condition survey	60 days	Aug 28 '22	Oct 26 '22		
206	Installation of supplementary dosing and dyeing system	240 days	Oct 27 '22	Jun 23 '23		
207	T&C of E&M equipment	90 days	Jun 24 '23	Sep 21 '23		
208	Planned completion for section 3	0 days	Sep 21 '23	Sep 21 '23		
209						
210	**Section 4 - Water main laying works in part 3 of the Site**	**792 days**	**Jul 30 '21**	**Sep 29 '23**		
211	Access Date (part 3 of the Site)	1 day	Jul 30 '21	Jul 30 '21		
212	Initial survey	90 days	Jul 31 '21	Oct 28 '21		
213	1st TMLG meeting	1 day	Oct 13 '21	Oct 13 '21		
214	Application and approval of TTA	111 days	Oct 14 '21	Feb 1 '22	14	
215	Implementation of TTA by stages	605 days	Feb 2 '22	Sep 29 '23		
216	**Mainlaying by open trench method (RW03 & RW43)**	**605 days**	**Feb 2 '22**	**Sep 29 '23**		
217	**RW03 : DN600 DI pipe - 1092m**	**538 days**	**Feb 7 '22**	**Jul 29 '23**		
218	Team A CH345-380(35m) Stage 3A	21 days	Feb 7 '22	Feb 27 '22		
219	Team A CH380-415(35m) Stage 4A	21 days	Feb 28 '22	Mar 20 '22		
220	Team A CH415-450(35m) with IT Chamber Stage 5A	22 days	Mar 21 '22	Apr 11 '22		
221	Team A CH310-345(35m) Stage 2A	24 days	Apr 12 '22	May 5 '22		
222	Team A CH275-310(35m) Stage 1A	22 days	May 6 '22	May 27 '22		
223	Team A CH450-485(35m) Stage 6A	23 days	May 28 '22	Jun 19 '22		
224	Team A CH485-520(35m) with Flow Meter Chamber Stage 7A	38 days	Jun 20 '22	Jul 27 '22		
225	Team A CH520-555(35m) Stage 8A	21 days	Jul 28 '22	Aug 17 '22		
226	Team A CH555-590(35m) Stage 9A	21 days	Aug 18 '22	Sep 7 '22		
227	Team A Pressure test CH275-590	8 days	Sep 8 '22	Sep 15 '22		
228	Team A CH590-620(30m) Stage 10A	24 days	Sep 16 '22	Oct 9 '22		
229	Team A CH620-650(30m) Stage 11A	21 days	Oct 10 '22	Oct 30 '22		
230	Team A CH650-680(30m) Stage 12A	21 days	Oct 31 '22	Nov 20 '22		
231	Team A CH680-710(30m) Stage 13A	21 days	Nov 21 '22	Dec 11 '22		
232	Team A CH710-740(30m) Stage 14A	24 days	Dec 12 '22	Jan 4 '23		
233	Team A CH740-770(30m) with IT Chamber & washed out chamber Stage 15A	41 days	Jan 5 '23	Feb 14 '23		
234	Team A CH770-800(30m) Stage 16A	21 days	Feb 15 '23	Mar 7 '23		
235	Team A CH800-830(30m) Stage 17A	21 days	Mar 8 '23	Mar 28 '23		
236	Team A CH830-860(30m) Stage 18A	26 days	Mar 29 '23	Apr 23 '23		
237	Team A CH860-890(30m) Stage 19A	22 days	Apr 24 '23	May 15 '23		
238	Team A Pressure test CH275-1092	18 days	May 16 '23	Jun 2 '23		
239						
240	Team B CH980-1010 (30m) Stage 4B	21 days	Feb 7 '22	Feb 27 '22		



Project: 3WSD20 Programme
Date: Nov 29 '21

Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress
Split	Inactive Milestone	Manual Summary	Deadline	
Milestone	Inactive Summary	Start-only	Critical	
Summary	Manual Task	Finish-only	Critical Split	
Project Summary	Duration-only	External Tasks	Progress	

ID	Task Name	Duration	Start	Finish	TRA	Notes
241	Team B CH1010-1040 (30m) Stage 5B	21 days	Feb 28 '22	Mar 20 '22		
242	Team B CH1040-1070 (30m) Stage 6B	22 days	Mar 21 '22	Apr 11 '22		
243	Team B CH950-980 (30m) Stage 3B	24 days	Apr 12 '22	May 5 '22		
244	Team B CH920-950 (30m) Stage 2B	22 days	May 6 '22	May 27 '22		
245	Team B CH890-920 (30m) Stage 1B	23 days	May 28 '22	Jun 19 '22		
246	Team B CH1070-1092 (22m) Stage 7B	36 days	Jun 20 '22	Jul 25 '22		
247						
248	Team C CH0-100 (100m)Stage 1C	77 days	Apr 1 '23	Jun 16 '23		
249	Team C CH100-150 (50m)Stage 2C	94 days	May 2 '22	Aug 3 '22		
250	Team C CH150-200 (50m)Stage 3C	94 days	Aug 1 '22	Nov 2 '22		
251	Team C CH200-275 (75m)Stage 4C	100 days	Nov 3 '22	Feb 10 '23		
252						
253	Estimate inclement weather	41 days	Jun 3 '23	Jul 13 '23		
254	Overall pressure test	8 days	Jul 14 '23	Jul 21 '23		
255	Pipe connection and completion	8 days	Jul 22 '23	Jul 29 '23		
256						
257	**RW43 : DN150 DI pipe - 1144m**	**570 days**	**Feb 2 '22**	**Aug 25 '23**		
258	CH180 to CH610 (430m)	420 days	Feb 2 '22	Mar 28 '23	15	45d/50m
259	CH180 to CH000 (180m)	150 days	Mar 29 '23	Aug 25 '23		60d/60m+90d
260	CH610 to CH1144 (534m)	525 days	Feb 2 '22	Jul 11 '23	30	45d/50m
261	Testing of water main	21 days	Aug 26 '23	Sep 15 '23	14	
262	Connection at RW43 - CH1144	14 days	Sep 16 '23	Sep 29 '23		
263	Planned completion for section 4	0 days	Sep 29 '23	Sep 29 '23		
264						
265	**Section 5 - Water main laying works in part 4 of the Site**	**1096 days**	**Jul 30 '21**	**Jul 29 '24**		
266	Access Date (part 4 of the Site)	1 day	Jul 30 '21	Jul 30 '21		
267	Initial survey	90 days	Jul 31 '21	Oct 28 '21		
268	Application and approval of TTA	116 days	Nov 1 '21	Feb 24 '22		
269	**Mainlaying by trenchless method (RW04)**	**479 days**	**Feb 25 '22**	**Jun 18 '23**		
270	DN450 DI pipe (6 locations , total length 237m)	479 days	Feb 25 '22	Jun 18 '23	60	
271	**Mainlaying by open trench method (RW04)**	**886 days**	**Feb 25 '22**	**Jul 29 '24**		
272	DN450 DI Pipe - 3332m	886 days	Feb 25 '22	Jul 29 '24	45	
273	Planned completion for section 5	0 days	Jul 29 '24	Jul 29 '24		
274						
275	**Section 6 - Water main laying works in part 5 of the Site**	**1280 days**	**Jul 30 '21**	**Jan 29 '25**		
276	Access Date (part 5 of the Site)	1 day	Jul 30 '21	Jul 30 '21		
277	Initial survey	90 days	Jul 31 '21	Oct 28 '21		
278	Application and approval of TTA	167 days	Oct 1 '21	Mar 16 '22		
279	**Mainlaying by trenchless method**	**534 days**	**Jun 19 '23**	**Dec 3 '24**		
280	DN400, DN300 DI pipe (2 locations , total length 126m)	376 days	Jun 19 '23	Jun 28 '24	30	
281	DN150 DI pipe (1 location , total length 33m)	158 days	Jun 29 '24	Dec 3 '24	15	
282	**Mainlaying by open trench method**	**230 days**	**Mar 17 '22**	**Nov 1 '22**		
283	DN400 DI pipe - 377m	230 days	Mar 17 '22	Nov 1 '22	30	
284	**Contractor's Design and Construction of distribution mains**	**1189 days**	**Oct 29 '21**	**Jan 29 '25**		
285	Submission and acceptance of detailed design proposal	120 days	Oct 29 '21	Feb 25 '22		
286	Site investigation and liaison with relevant parties	120 days	Feb 26 '22	Jun 25 '22		
287	Application of XP and TTA	120 days	Jun 26 '22	Oct 23 '22		
288	**Mainlaying by open trench method**	**820 days**	**Nov 2 '22**	**Jan 29 '25**		



Project: 3WSD20 Programme
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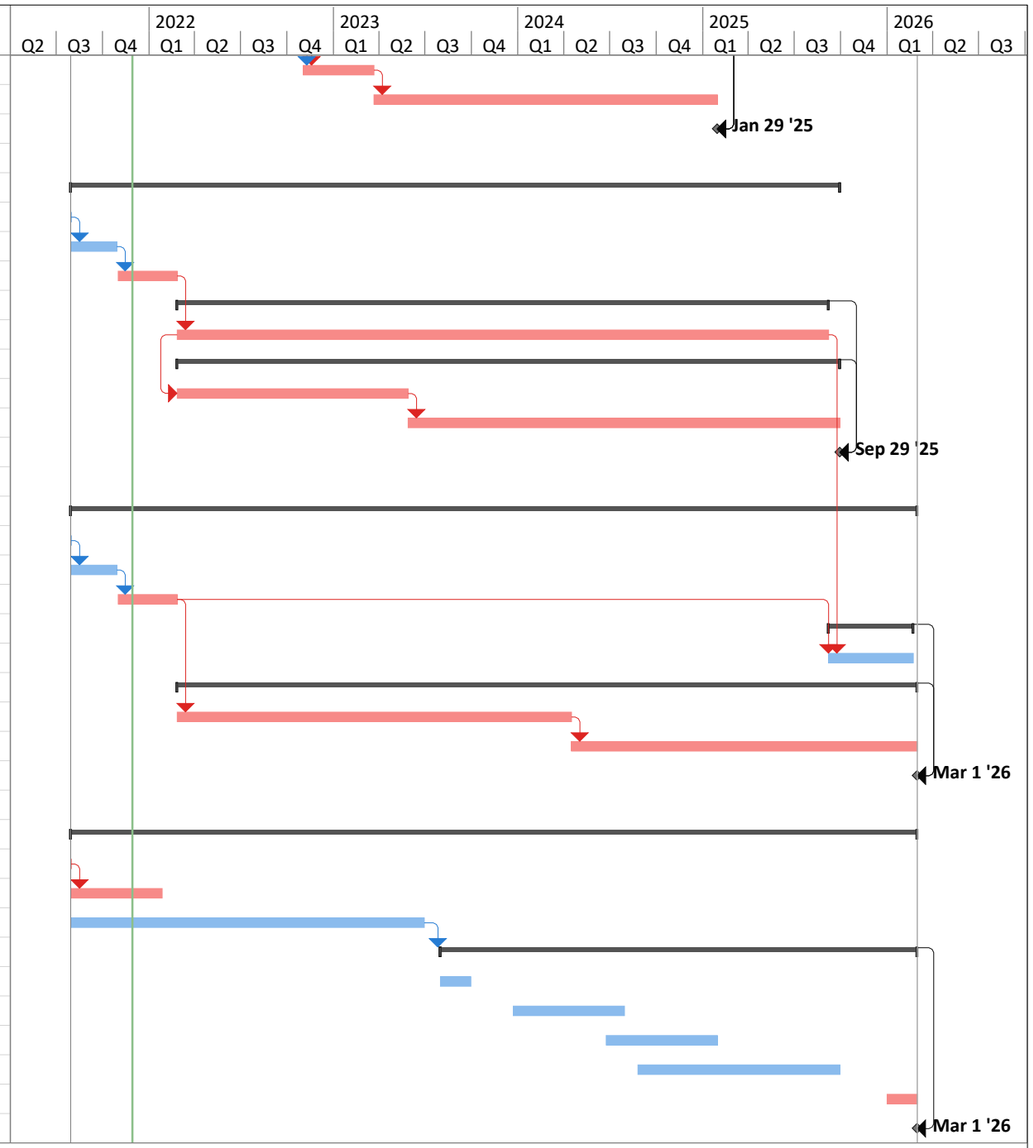
Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress	
Split	Inactive Milestone	Manual Summary	Deadline		
Milestone	Inactive Summary	Start-only	Critical		
Summary	Manual Task	Finish-only	Critical Split		
Project Summary	Duration-only	External Tasks	Progress		

ID	Task Name	Duration	Start	Finish	TRA	Notes
289	DN300 DI pipe - 220m	140 days	Nov 2 '22	Mar 21 '23	14	
290	DN150 DI pipe - 2841m	680 days	Mar 22 '23	Jan 29 '25	30	
291	Planned completion for section 6	0 days	Jan 29 '25	Jan 29 '25		
292						
293	**Section 7 - Water main laying works in part 6 of the Site**	**1523 days**	**Jul 30 '21**	**Sep 29 '25**		
294	Access Date (part 6 of the Site)	1 day	Jul 30 '21	Jul 30 '21		
295	Initial survey	90 days	Jul 31 '21	Oct 28 '21		
296	Application and approval of TTA	117 days	Nov 1 '21	Feb 25 '22		
297	**Mainlaying by trenchless method**	**1289 days**	**Feb 26 '22**	**Sep 6 '25**		
298	DN450, DN400, DN300 DI pipe (13 locations , total length 1028m)	1289 days	Feb 26 '22	Sep 6 '25	90	
299	**Mainlaying by open trench method**	**1312 days**	**Feb 26 '22**	**Sep 29 '25**		
300	DN450, DN400, DN300 DI pipe - 3225m	457 days	Feb 26 '22	May 28 '23	30	
301	DN200, DN150, DN100, DN80 DI pipe - 6574m	855 days	May 29 '23	Sep 29 '25	100	
302	Planned completion for section 7	0 days	Sep 29 '25	Sep 29 '25		
303						
304	**Section 8 - Water main laying works in part 7 of the Site**	**1676 days**	**Jul 30 '21**	**Mar 1 '26**		
305	Access Date (part 7 of the Site)	1 day	Jul 30 '21	Jul 30 '21		
306	Initial survey	90 days	Jul 31 '21	Oct 28 '21		
307	Application and approval of TTA	117 days	Nov 1 '21	Feb 25 '22		
308	**Mainlaying by trenchless method**	**168 days**	**Sep 7 '25**	**Feb 21 '26**		
309	DN300 DI pipe (1 locations , total length 58m)	168 days	Sep 7 '25	Feb 21 '26		
310	**Mainlaying by open trench method**	**1465 days**	**Feb 26 '22**	**Mar 1 '26**		
311	DN450, DN300 DI pipe - 2155m	780 days	Feb 26 '22	Apr 15 '24	45	
312	DN200, DN150 DI pipe - 2051m	685 days	Apr 16 '24	Mar 1 '26	40	
313	Planned completion for section 8	0 days	Mar 1 '26	Mar 1 '26		
314						
315	**Section 9 - Conversion works to effect the supply of reclaimed water**	**1676 days**	**Jul 30 '21**	**Mar 1 '26**		
316	Access Date	1 day	Jul 30 '21	Jul 30 '21		
317	Initial survey by stages	180 days	Jul 31 '21	Jan 26 '22		
318	Liaison, coordination and enabling work for conversion	700 days	Jul 30 '21	Jun 29 '23		
319	**Conversion works**	**944 days**	**Aug 1 '23**	**Mar 1 '26**		
320	Section 4 (Part 3) - 3 nos.	60 days	Aug 1 '23	Sep 29 '23		
321	Section 5 (Part 4) - 11 nos.	220 days	Dec 23 '23	Jul 29 '24		
322	Section 6 (Part 5) - 11 nos.	220 days	Jun 24 '24	Jan 29 '25		
323	Section 7 (Part 6) - 40 nos.	400 days	Aug 26 '24	Sep 29 '25		
324	Section 8 (Part 7) - 3 nos.	60 days	Jan 1 '26	Mar 1 '26		
325	Planned completion for section 9	0 days	Mar 1 '26	Mar 1 '26		



Project: 3WSD20 Programme
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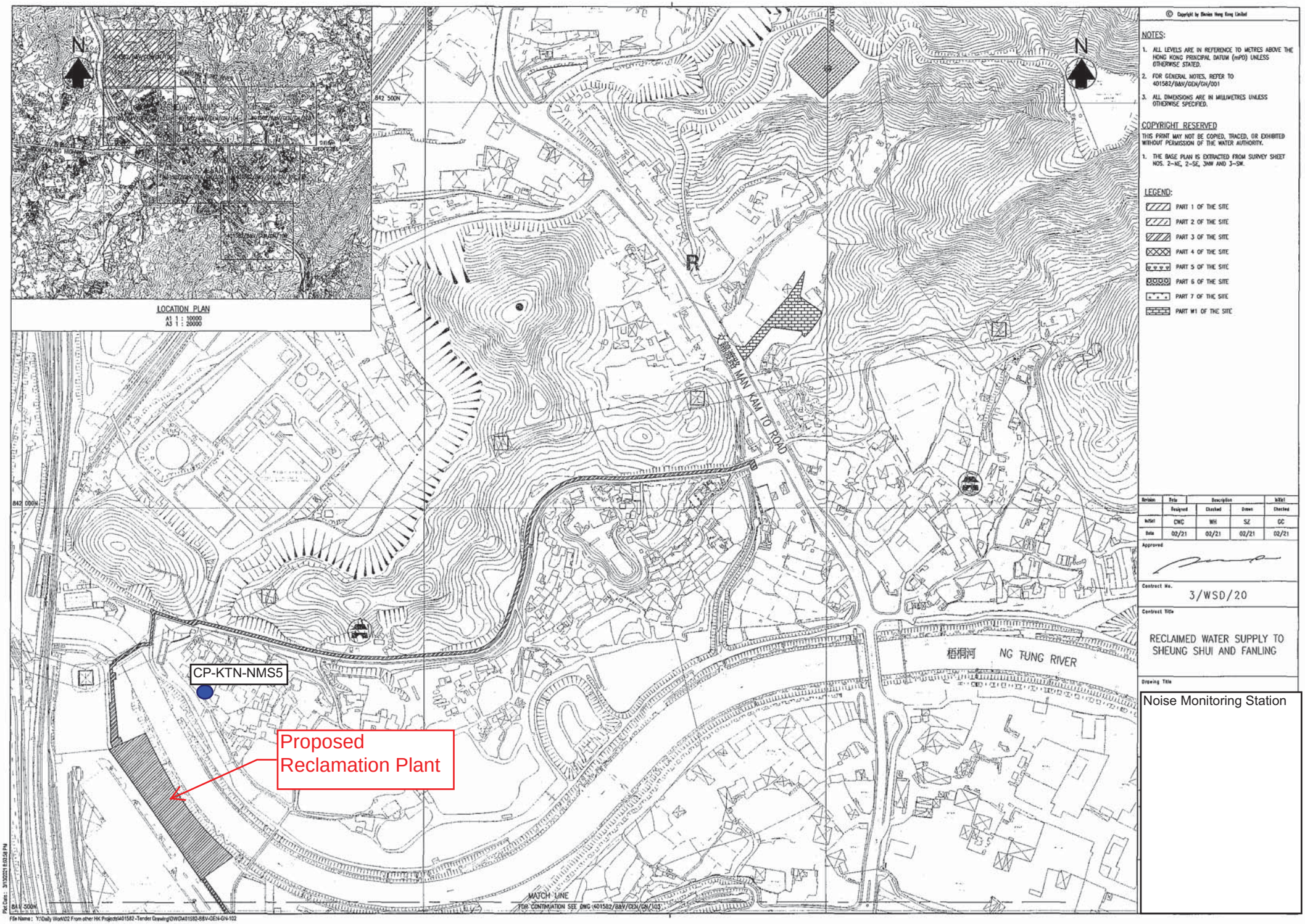
Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress	
Split	Inactive Milestone	Manual Summary	Deadline		
Milestone	Inactive Summary	Start-only	Critical		
Summary	Manual Task	Finish-only	Critical Split		
Project Summary	Duration-only	External Tasks	Progress		

Appendix D

Location of Designated Noise Monitoring Station CP-KTN-NMS5



NOTES:

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

1. THE BASE PLAN IS EXTRACTED FROM SURVEY SHEET NOS. 2-NC, 2-SE, JNW AND J-SW.

LEGEND:

- PART 1 OF THE SITE
- PART 2 OF THE SITE
- PART 3 OF THE SITE
- PART 4 OF THE SITE
- PART 5 OF THE SITE
- PART 6 OF THE SITE
- PART 7 OF THE SITE
- PART W1 OF THE SITE

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	CWC	WH	SZ		CC
Date	02/21	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

Plot Date: 3/3/2021 8:03:58 PM
File Name: T:\Daily Work\22 From other HK Projects\401582 -Tender Drawing\DWG\401582-B&V-GEN-GN-102

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. : C216479
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-2189) Date of Receipt / 收件日期 : 25 October 2021

Description / 儀器名稱 : Sound Level Meter (EQ016)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00464681
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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 9 November 2021

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 : Cheuk
K P Cheuk
Project Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 10 November 2021

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 - 校正及檢測實驗所
c/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. : C216479
證書編號

1. 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.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C210084
CL281	Multifunction Acoustic Calibrator	AV210017

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	93.6	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L_A	A	Fast	94.00	1	93.6 (Ref.)
				104.00		103.6
				114.00		113.6

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 (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	93.6	Ref.
			Slow			93.6	± 0.3

Certificate of Calibration
校正證書

Certificate No. : C216479
證書編號

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	67.3	-26.2 ± 1.5
					125 Hz	77.4	-16.1 ± 1.5
					250 Hz	84.9	-8.6 ± 1.4
					500 Hz	90.4	-3.2 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	94.8	+1.2 ± 1.6
					4 kHz	94.6	+1.0 ± 1.6
					8 kHz	92.6	-1.1 (+2.1 ; -3.1)
					16 kHz	85.7	-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	92.7	-0.8 ± 1.5
					125 Hz	93.4	-0.2 ± 1.5
					250 Hz	93.6	0.0 ± 1.4
					500 Hz	93.6	0.0 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	93.5	-0.2 ± 1.6
					4 kHz	92.8	-0.8 ± 1.6
					8 kHz	90.7	-3.0 (+2.1 ; -3.1)
					16 kHz	83.7	-8.5 (+3.5 ; -17.0)

Certificate of Calibration
校正證書

Certificate No. : C216479
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 17434

- 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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C214361
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-1345) Date of Receipt / 收件日期 : 8 July 2021

Description / 儀器名稱 : Sound Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 24 July 2021

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 : K P Cheuk
Project Engineer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 26 July 2021

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 - 校正及檢測實驗所
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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. : C214361
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C213954
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C201309

4. Test procedure : MA100N.

5. 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	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : 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.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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Appendix F

Monitoring Schedule of the Reporting Month and Coming Month

The Reporting Monitoring Schedule (April 2022)

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

✓	Monitoring Day
	Sunday or Public Holiday

The Coming Month Monitoring Schedule (May 2022)

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

Note:

Ecology monitoring dates are tentative and are subject to change

✓	Monitoring Day
	Sunday or Public Holiday

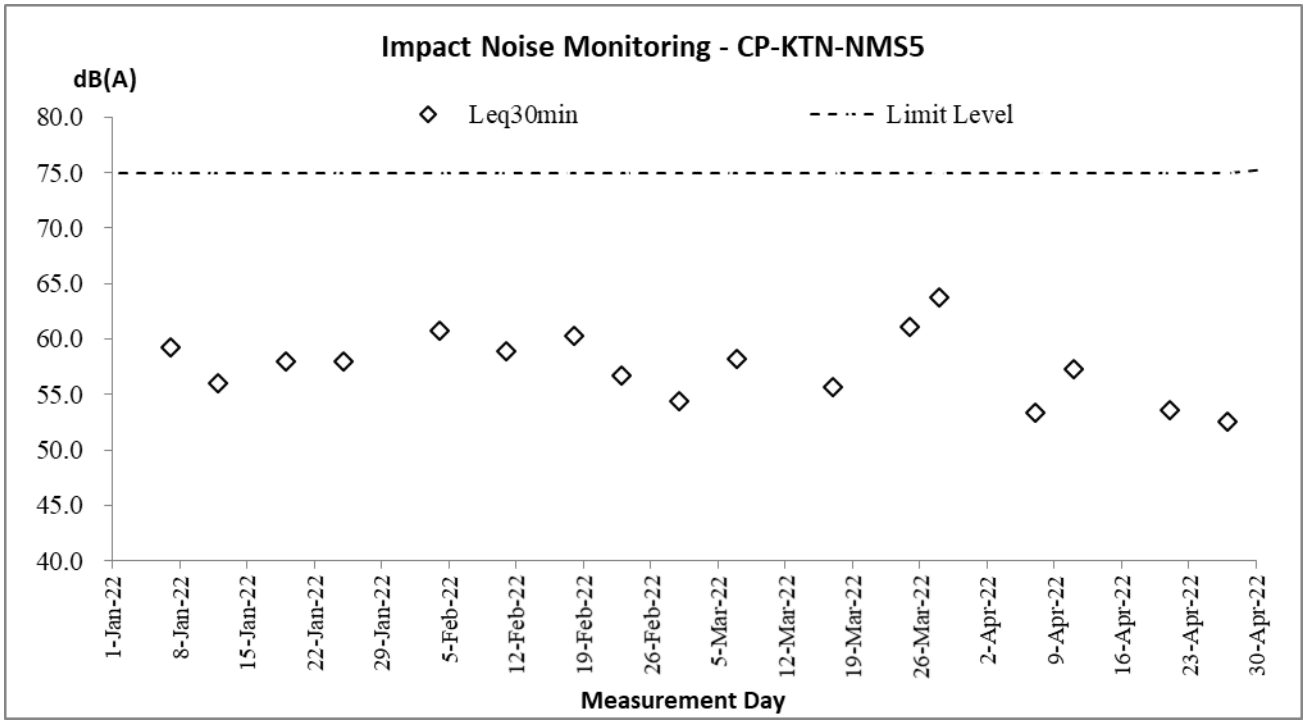
Appendix G

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)		
7-Apr-22	9:14	53.4	55.6	50.5	54.6	57.1	51.4	52.1	54.2	49.9	53.0	55.2	50.1	53.8	55.6	51.3	53.1	54.7	50.1	53.4	56.4
11-Apr-22	9:15	55.8	57.5	50.1	56.6	58.1	50.5	58.5	61.0	50.5	58.6	61.8	51.3	57.1	60.8	49.9	56.6	60.6	50.5	57.3	60.3
21-Apr-22	9:26	53.8	54.2	50.5	53.2	55.3	51.5	53.5	55.4	50.6	53.6	55.8	50.8	54.8	57.7	51.8	52.6	54.8	50.1	53.6	56.6
27-Apr-22	13:25	52.6	54.4	48.5	54.0	57.0	47.8	51.1	53.8	48.5	52.3	54.4	48.9	54.0	55.6	48.8	50.4	51.7	47.8	52.6	55.6

Appendix H

Graphical Plots for Monitoring Result


Impact Noise Monitoring - CP-KTN-NMS5
dB(A)
Leq30min
Limit Level
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
1-Jan-22
8-Jan-22
15-Jan-22
22-Jan-22
29-Jan-22
5-Feb-22
12-Feb-22
19-Feb-22
26-Feb-22
5-Mar-22
12-Mar-22
19-Mar-22
26-Mar-22
2-Apr-22
9-Apr-22
16-Apr-22
23-Apr-22
30-Apr-22
Measurement Day

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 _2022___ (year)

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	0.3031	0	0	0	0.3031	0	0	0	0	0	0.0016
Feb	0.5411	0	0	0	0.5411	0	0	0	0	0	0.0019
Mar	0.8459	0	0	0	0.8459	0	0	0	0	0	0.0014
Apr	3.2205	0	0	0	3.2205	0	0	0	0	0	0.0024
May											
June											
Sub-total	4.9106	0	0	0	4.9106	0	0	0	0	0	0.0073
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	4.9106	0	0	0	4.9106	0	0	0	0	0	0.0073

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
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)
25.472	5.386	0	0	25.472	0	0	0	0	0	0.3885

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) Boken 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/m2 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	Following dust suppression measures should also be incorporated by the Contractor to control the dust nuisance throughout the construction phase: • 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 be 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?
		• 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: • 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	Construction Runoff 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. **Storm Water Pollution Control Plan** • 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?
		where the influent is pumped. • 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?
		during storm events. • 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	**Sewage from Workforce** • 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	Waste Reduction Measures 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: • 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	**Good Site Practice** The following good site practices are recommended throughout the construction activities: • 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	**Storage of Waste** The following recommendation should be implemented to minimize the impacts:	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?
		• 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: • 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: • 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	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TCW No. 19/2005
S7.6	WM8	**Chemical Waste** • 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	• 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** • 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	• Waste Disposal Ordinance
S7.6	WM10	**Sewage** • 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	• 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	• 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 – Exiting 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?
		undertaking any works adjacent to all retained trees, including trees in Contractor's works areas. 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.			the Preliminary Layout Plan		
S.12.9 MM5	LV7	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. 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. 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.	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	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. 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. Compensatory planting for shrubs should be considered in suitable locations. Native species such as *Melastoma malabathricum, Diospyros vaccinioides, Gardenia jasminoides, Ixora chinensis, Ligustrum sinense, Litsea rotundifolia, Melastoma dodecandrum, Atalantia buxifolia, Rhodomyrtus tomentosa, Rhaphiolepis indica,* and *Rhododendron simsii* are suggested.	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	NDAs	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

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 2022
(Issue 1)

Job Ref.: 21/2063/582 AUES-SWHTSE
Date: 5th May 2022

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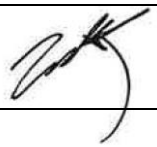
WSD Contract No. 3/WSD/20 - Reclaimed Water Supply to Sheung Shui and Fanling - Provision of EM&A (Ecological) Monitoring

Monthly Report for April 2022

(Issue 1)

May 2022

	Name	Signature
Prepared by:	**Nicholas Tam**	
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1 INTRODUCTION

1.1 According to the 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 2022.

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 follows Figure 1 of the approved Baseline Monitoring Report (Ecology) (Version 1).

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 number 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	*Ardeola bacchus*	池鷺
Eastern Cattle Egret	*Bubulcus coromandus*	牛背鷺
Grey Heron	*Ardea cinerea*	蒼鷺
Great Egret	*Ardea alba*	大白鷺
Little Egret	*Egretta garzetta*	小白鷺
Great Cormorant	*Phalacrocorax carbo*	普通鸕鷀

3.2 Survey data from each month is compared to the baseline monitoring data. 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.

3.3 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 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 all waterbird species relative to 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 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.

3.4 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 April 2022

High Tide				Low Tide			
Date	**Time**	**Tide (m)**	**Weather**	**Date**	**Time**	**Tide (m)**	**Weather**
4-Apr-22	9:00	1.7	Sunny	8-Apr-22	8:00	1.23	Sunny
11-Apr-22	9:00	1.5	Sunny	15-Apr-22	14:30	1	Sunny
18-Apr-22	11:00	2	Cloudy	22-Apr-22	7:00	1.25	Sunny
25-Apr-22	9:00	1.76	Sunny	29-Apr-22	15:00	1	Sunny

4.2 Abundance and diversity of key species are summarized in **Table 5** and **Table 6.** 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	36	853
Waterbirds	12	192

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

Common Name	Species Name	Chinese Name	Abundance
Chinese Pond Heron	*Ardeola bacchus*	池鷺	30
Eastern Cattle Egret	*Bubulcus coromandus*	牛背鷺	18
Grey Heron	*Ardea cinerea*	蒼鷺	1
Great Egret	*Ardea alba*	大白鷺	26
Little Egret	*Egretta garzetta*	小白鷺	73
Great Cormorant	*Phalacrocorax carbo*	普通鸕鷀	0

5 ANALYSIS

5.1 The result 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	-0.012	6	0.496			-0.303	3	0.391		
Chinese Pond Heron	-2.395	10	0.019	*		-4.515	5	0.003	*	*
Eastern Cattle Egret	-0.792	10	0.223			No decline				
Grey Heron	No decline					-0.781	15	0.224		
Great Egret	No decline					No decline				
Little Egret	-1.016	8	0.170			-1.046	4	0.177		
Great Cormorant	No decline					No decline				

* = level triggered

5.2 While the total number of waterbirds and some representative species have declined compared to the baseline data, action levels were not triggered this month. The only species that had dropped in numbers significantly was Chinese Pond Heron.

5.3 Although limit level had been triggered by Chinese Pond Heron, its decline in number is likely due to natural fluctuations or factors outside of disturbances caused by the Project. If significant disturbance is caused by surrounding anthropogenic activities, Chinese Pond Heron would not be the only bird to experience as significant decline. Moreover, 30 to 40 individuals of Chinese Pond Heron were recorded in transects instead of point count locations, suggesting that the number of Chinese Pond Herons within the study area is higher than the number indicated by Point Count. Thus, moving forward, triggering of action levels of one to two representative species should be considered less alerting, and would not be highlighted unless multiple warning signs occurs simultaneously.

5.4 Compared to last month where "all waterbirds" and most representative species have triggered action and limit levels in the context of monthly and seasonal data, the number of waterbirds this month is much more similar to the level reported from the baseline data.

5.5 Objectively, while the number of Grey Heron and Great Cormorant have dropped (as expected due to these two species being Winter visitors that will move away from Hong Kong from March onwards) all other representative species has increased in numbers when compared to the last month of the current study. Some species such as Little Egrets have increased significantly from 36 to 73 individuals. As there have been no significant changes in the site condition for waterbird attraction between March and April, the increase could once again only be accounted by natural fluctuations.

5.6 In conclusion, the general number of waterbirds recorded this month have increased compared to last month's survey, but have slightly decreased compared to the baseline study from three years ago. Under the assumption that both data sets are not affected significantly by natural fluctuations, the hypothesis that cumulative effects of increased disturbances at the study area and more attractive wetland habitats at LVNP may have caused waterbirds to deprioritize activities within the study area still stands. Thus it is still suggested that the construction site should continue keeping the best site practice in noise control to minimize disturbance caused to waterbirds.

6 OBSERVATIONS

6.1 Waterbird behavior observed during ecological monitoring is listed below:

- Flying
- Resting
- Foraging

6.2 The anthropogenic activities observed during ecological monitoring is listed in **Table 8**

Table 8 Observations during the Ecological Monitoring in the Reporting Month

Location	Observations
T1 (PC1, PC2)	Fishing, Remote Boating
T2 (PC3, PC4)	Fishing
T3 (PC6, PC7)	Fishing

7 REFERENCES

Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. 2001. The Avifauna of Hong Kong. Hong Kong Bird Watching Society, Hong Kong.

Cinotech Consultants Limited. 2019. Shek Wu Hui Effluent Polishing Plant Baseline Monitoring Report (Ecology). Accessed from https://shekwuhui.cinotech.hk/?page_id=24 in Jan 2022.

Cinotech Consultants Limited. 2019. Contract No. SPW 08/2019 Shek Wu Hui Effluent Polishing Plant – Main Works Stage 1 Baseline Monitoring Report (Ecology) (Version 1). Accessed from https://shekwuhui.cinotech.hk/?page_id=24 in Jan 2022.

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

Common Name	Chinese Name	Scientific Name	Waterbird	Point Count Abundance	Transect Abundance
Chinese Pond Heron	池鷺	*Ardeola bacchus*	Y	30	++++
Eastern Cattle Egret	牛背鷺	*Bubulcus coromandus*	Y	18	+++++
Grey Heron	蒼鷺	*Ardea cinerea*	Y	1	+
Great Egret	大白鷺	*Ardea alba*	Y	26	+++
Little Egret	小白鷺	*Egretta garzetta*	Y	73	+++++
Crested Serpent Eagle	蛇鵰	*Spilornis cheela*	N		+
Black Kite	黑鳶	*Milvus migrans*	N		+
White-breasted Waterhen	白胸苦惡鳥	*Amaurornis phoenicurus*	Y	1	+
Black-winged Stilt	黑翅長腳鷸	*Himantopus himantopus*	Y	18	+++
Common Snipe	扇尾沙錐	*Gallinago gallinago*	Y		+
Common Sandpiper	磯鷸	*Actitis hypoleucos*	Y	9	++
Marsh Sandpiper	澤鷸	*Tringa stagnatilis*	Y	1	
Wood Sandpiper	林鷸	*Tringa glareola*	Y		+
Common Greenshank	青腳鷸	*Tringa nebularia*	Y	11	++
Spotted Dove	珠頸斑鳩	*Spilopelia chinensis*	N	53	+++++
Greater Coucal	褐翅鴉鵑	*Centropus sinensis*	N		+
Asian Koel	噪鵑	*Eudynamys scolopaceus*	N	43	++++
Plaintive Cuckoo	八聲杜鵑	*Cacomantis merulinus*	N	2	+
Large Hawk-cuckoo	大鷹鵑	*Hierococcyx sparverioides*	N	3	+
House swift	小白腰雨燕	*Apus nipalensis*	N	17	+
White-throated Kingfisher	白胸翡翠	*Halcyon smyrnensis*	Y	3	+
Pied Kingfisher	斑魚狗	*Ceryle rudis*	Y	1	+
Eurasian Hoopoe	戴勝	*Upupa epops*	N		+
Hair-crested Drongo	髮冠卷尾	*Dicrurus hottentottus*	N		+
Red-billed Blue Magpie	紅嘴藍鵲	*Urocissa erythroryncha*	N	1	+
Oriental Magpie	喜鵲	*Pica serica*	N	8	+
Collared Crow	白頸鴉	*Corvus torquatus*	Y		+
Large-billed Crow	大嘴烏鴉	*Corvus macrorhynchos*	N	1	+
Cinereous Tit	蒼背山雀	*Parus cinereus*	N	15	++
Red-whiskered Bulbul	紅耳鵯	*Pycnonotus jocosus*	N	22	+++++
Chinese Bulbul	白頭鵯	*Pycnonotus sinensis*	N	33	+++
Barn Swallow	家燕	*Hirundo rustica*	N	51	+++++
Yellow-browed Warbler	黃眉柳鶯	*Phylloscopus inornatus*	N	6	++
Yellow-bellied Prinia	黃腹鷦鶯	*Prinia flaviventris*	N	64	+++++
Common Tailorbird	長尾縫葉鶯	*Orthotomus sutorius*	N	17	++
Masked Laughingthrush	黑臉噪鶥	*Pterorhinus perspicillatus*	N	19	++++
Swinhoe's white-eye	暗綠繡眼鳥	*Zosterops simplex*	N	39	+++++
Crested Myna	八哥	*Acridotheres cristatellus*	N	169	+++++
Black-collared Starling	黑領椋鳥	*Gracupica nigricollis*	N	62	+++++
White-shouldered Starling	灰背椋鳥	*Sturnia sinensis*	N	1	
Oriental Magpie Robin	鵲鴝	*Copsychus saularis*	N	10	+

Common Name	Chinese Name	Scientific Name	Waterbird	Point Count Abundance	Transect Abundance
Stejneger's Stonechat	黑喉石(即鳥)	*Saxicola stejnegeri*	N		+
Eurasian Tree Sparrow	樹麻雀	*Passer montanus*	N	1	+
Scaly-Breasted Munia	斑文鳥	*Lonchura punctulata*	N		++
Eastern Yellow Wagtail	東黃鶺鴒	*Motacilla tschutschensis*	N		+
White Wagtail	白鶺鴒	*Motacilla alba*	N	21	++
Olive-backed Pipit	樹鷚	*Anthus hodgsoni*	N	3	+
Red-throated Pipit	紅喉鷚	*Anthus cervinus*	N		+
		Total Point Count Abundance		853	
		Total Waterbirds		192	

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	4-Apr-22	9:00	High	19	72
	8-Apr-22	8:00	Low	53	
2	11-Apr-22	9:00	High	12	38
	15-Apr-22	14:30	Low	26	
3	18-Apr-22	11:00	High	19	48
	22-Apr-22	7:00	Low	29	
4	25-Apr-22	9:00	High	11	34
	29-Apr-22	15:00	Low	23	
				Survey Average	48
				April Average	48.13
				Summer Average	45.34

Appendix C Abundance of Representative Waterbirds from Point Count

Representative Species		Recorded Abundance						Baseline	
Common Name	**Species Name**	**Week 1**	**Week 2**	**Week 3**	**Week 4**		**Average**	**April Average**	**Summer Average**
Chinese Pond Heron	*Ardeola bacchus*	7	3	9	11		7.5	14.25	16.18
Eastern Cattle Egret	*Bubulcus coromandus*	9	2	7	0		4.5	7.35	3.32
Grey Heron	*Ardea cinerea*	1	0	0	0		0.25	0	5.55
Great Egret	*Ardea alba*	8	5	7	6		6.5	2.5	2.61
Little Egret	*Egretta garzetta*	23	20	16	14		18.25	21.13	20.53
Great Cormorant	*Phalacrocorax carbo*	0	0	0	0		0	0	0

Figure 1

Transect and Point Count Location

P4
P1
P3
P2
T1
P7
T2
P5
T3
P6

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

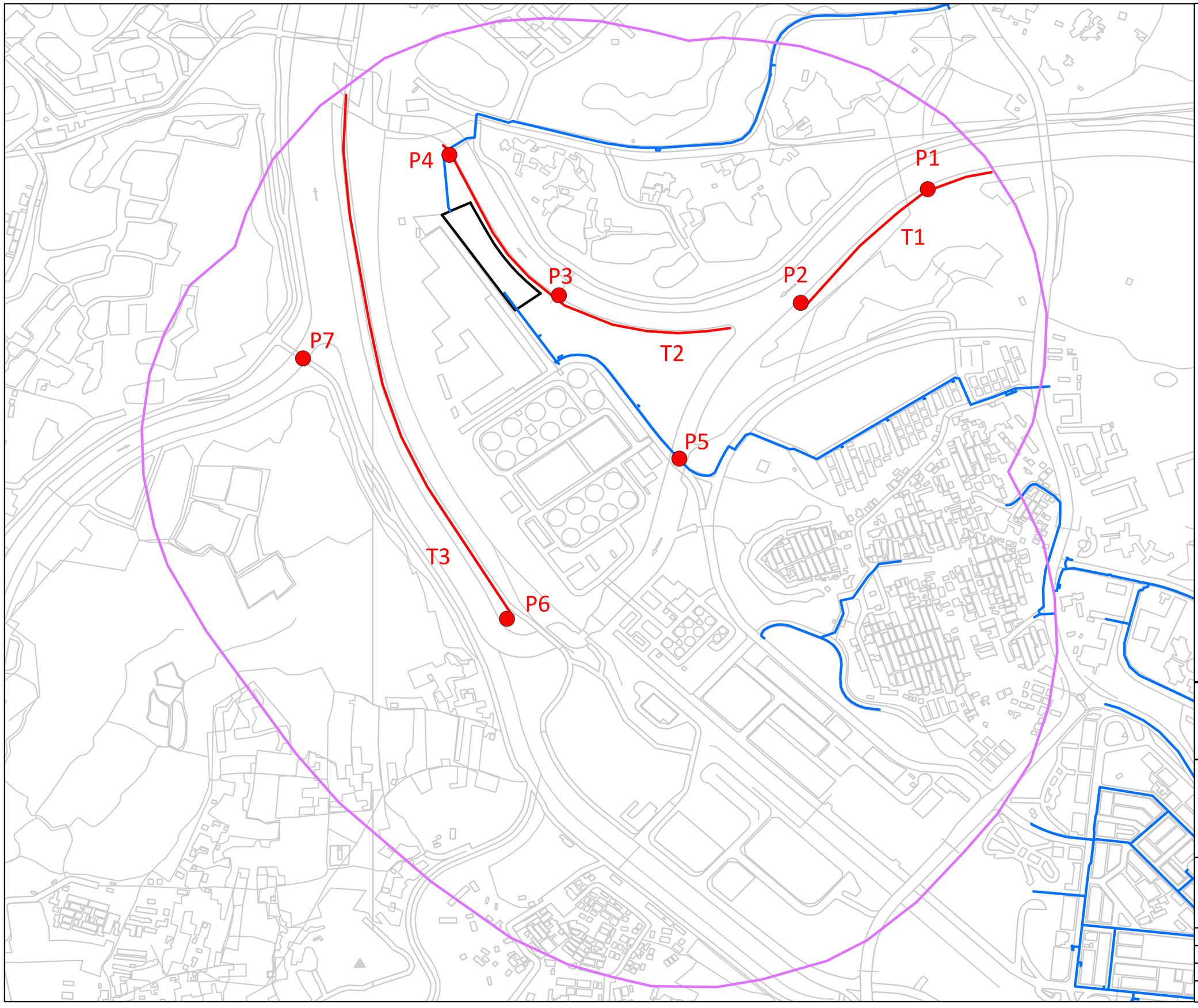
Figure Title:

Transect and Point Count Locations

Drawn by:	JH	Scale:	1:14,500 on A3
Checked By:	NT	Date:	11 Mar 2022
Approved by:	IY		
Figure Number:	Figure 1	Revision:	1

Figure 1a

Transect and Point Count Locations (Zoomed In)



Proposed Shek Wu Hui Water Reclamation Plant

500m Survey Boundary

Proposed Retained Water Mains

Walk Transect

Point Count Locations

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landscape
aec

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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:	JH	Scale:	1:6,000 on A3
Checked By:	NT	Date:	11 Mar 2022
Approved by:	IY		
Figure Number:	Figure 1a	Revision:	1