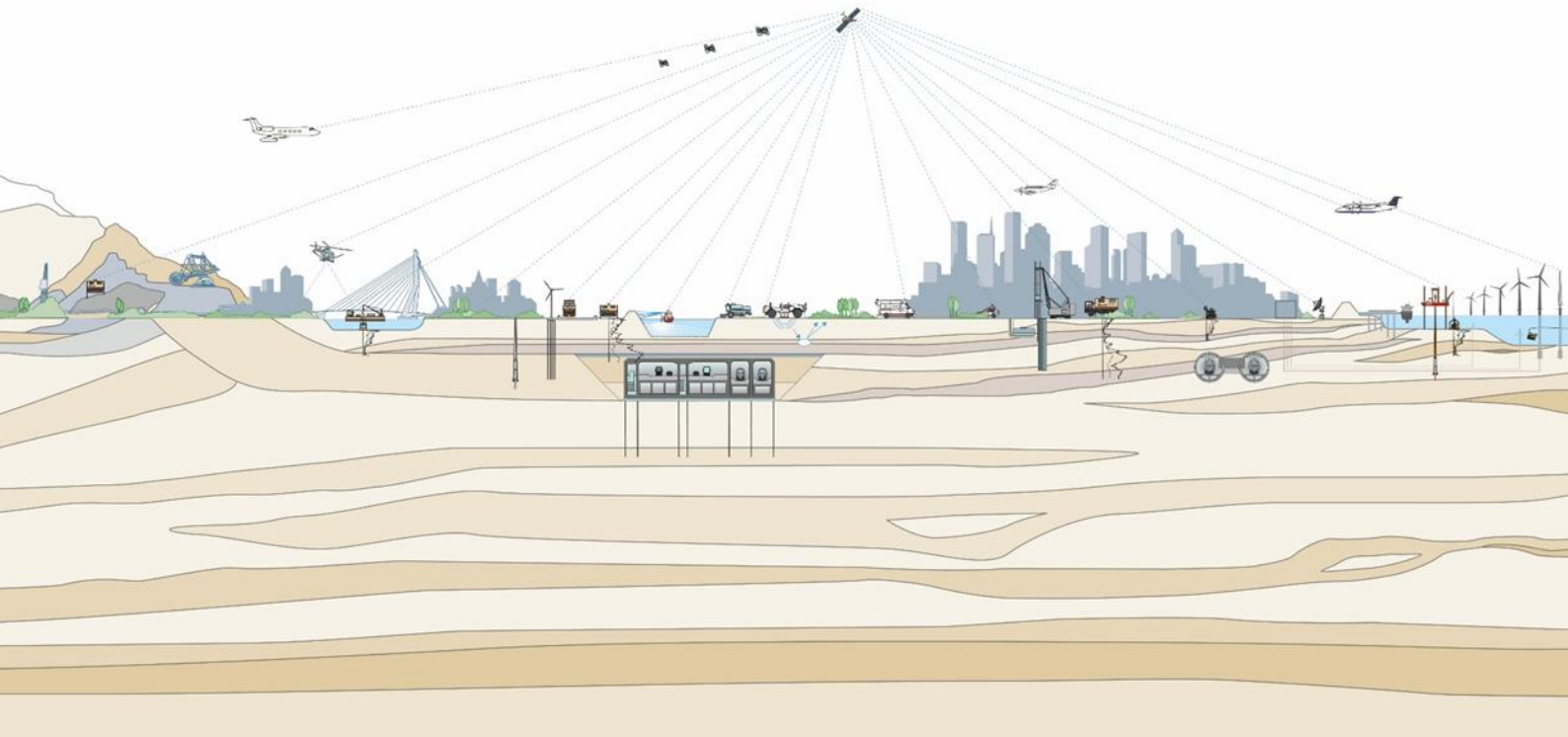
Baseline Water Quality Monitoring Report
(KTN & FLN NDA)
Part 1

Project Proponent	**:**	Civil Engineering and Development Department
Project	**:**	Contract No. NDO 14/2018 - Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas
Report No.	**:**	0032/19/ED/0258



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土木工程拓展署
Civil Engineering and Development Department

03	Final	Jimmy Lui, Wingo So	Calvin Leung	Calvin Leung	10/03/2020
Issue No.	**Status**	**Prepared and Checked by:**	**Certified by:**	**Signature:**	**Date**

ANEWR

Civil Engineering and Development Department
North Development Office
Unit 1501, Level 15, Tower I, Metroplaza
223 Hing Fong Road
Kwai Fong
New Territories

Your reference:

Our reference: HKCEDD14/50/106578

Date: 9 June 2020

Attention: Mr Ryan Chau

BY EMAIL & POST
(email: hlchau@cedd.gov.hk)

Dear Sirs

Agreement No.: NDO 16/2018
Independent Environmental Checker for
Pre-construction Environmental Monitoring and Audit Works for the Advance and
First Stage Works of Kwu Tung North and Fanling North New Development Areas
Baseline Water Monitoring Report (KTN & FLN NDA) for Contract No. NDO 14/2018

We refer to emails of 13 and 19 March 2020 attaching a revised Baseline Water Monitoring Report (KTN & FLN NDA) prepared by the Environmental Team (ET) of the captioned.

We have no further comment and hereby verify the Baseline Monitoring Report in accordance with Clause 3.3 of the Environmental Permit no. EP-466/2013, EP-467/2013/A, EP-468/2013/A, EP-469/2013, EP-470/2013, EP-473/2013/A and EP-475/2013/A.

Should you have any queries, please do not hesitate to contact the undersigned or our Ms Katherine Chu on 2618 2831.

Yours faithfully
ANEWR CONSULTING LIMITED

James Choi
Independent Environmental Checker

CPSJ/LYMA/CWKK/csym

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DOCUMENT ISSUE LOG

Issue No.	Status	Reason for Issue/Reissue	Comments on Content	Date
01	Draft	IEC 1st comments	Addressed IEC Comments and resubmitted on 10/01/2020.	10/01/2020
02	Draft	IEC 2nd comments	Addressed IEC Comments and resubmitted on 24/01/2020.	24/01/2020
03	Final	IEC 3rd comments	Addressed IEC Comments and resubmitted on 10/03/2020.	10/03/2020

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EXECUTIVE SUMMARY

I. This baseline noise monitoring report (KTN & FLN NDA) is prepared for Contract No. NDO 14/2018 - Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas in accordance with the requirements in the updated EM&A Manual.

II. The baseline water quality monitoring work was conducted in two phase, **Phase I** (FLN NDA) from 3rd August 2019 to 29th August 2019 and **Phase II** (KTN NDA) from 17th September 2019 to 12th October 2019.

III. The monitoring results are summarized in **Table I & II**,

Table I Summary of Baseline Water Quality Monitoring Results (KTN)

Monitoring Parameter					
Location / **Parameter**	KTN-CS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	7.79	6.28	6.84	6.31	6.28
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	9.4	4.59	5.33	6.44	8.78
Suspended Solid in mg/L	4	2	3	4	4
Unionized ammonia in mg/L	0.0005	0.0001	0.0003	0.0005	0.0005
Nitrate nitrogen in mg/L	0.45	0.09	0.25	0.43	0.45
Orthophosphate in mg/L	0.19	0.01	0.10	0.17	0.19

Monitoring Parameter					
Location / **Parameter**	KTN-IS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	7.31	4.71	6.72	5.00	6.09
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	7.39	4.57	5.36	6.04	7.11
Suspended Solid in mg/L	5	2	4	5	5
Unionized ammonia in mg/L	0.0006	0.0001	0.0004	0.0005	0.0006
Nitrate nitrogen in mg/L	0.40	0.09	0.26	0.39	0.40
Orthophosphate in mg/L	0.14	0.03	0.09	0.13	0.14

Table II Summary of Baseline Water Quality Monitoring Results (FLN)

Monitoring Parameter					
Location / Parameter	FLN-CS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	9.30	7.79	8.54	7.81	7.79
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	14.7	6.01	10.27	14.67	14.70
Suspended Solid in mg/L	16	3	8	16	16
Unionized ammonia in mg/L	0.0162	0.0012	0.0063	0.0133	0.0156
Nitrate nitrogen in mg/L	2.60	0.27	0.60	0.91	2.25
Orthophosphate in mg/L	0.22	0.06	0.10	0.15	0.21

Monitoring Parameter					
Location / Parameter	FLN-IS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	9.82	7.87	8.71	8.12	7.92
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	36.7	6.10	12.31	27.90	34.85
Suspended Solid in mg/L	9	3	6	9	9
Unionized ammonia in mg/L	0.0107	0.0011	0.0057	0.0093	0.0105
Nitrate nitrogen in mg/L	0.61	0.19	0.45	0.60	0.61
Orthophosphate in mg/L	0.53	0.08	0.14	0.35	0.49

IV. The recommended environmental performance criteria for water quality during construction phase summarized in **Table III**

Table III Recommended Action and Limit Levels of Water Quality Monitoring

Parameters	Action	Limit
DO in mg/L (depth average)#+	5 percentile of baseline data.	4 mg/L or 1 percentile of baseline data.
SS in mg/L (depth averaged)*&	95 percentile of baseline data or 120% of upstream control station.	20 mg/L or 99 percentile of baseline data or 130% of upstream control station.
Turbidity in NTU (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Unionized ammonia in mg/L (depth averaged)*~	95 percentile of baseline data or 120% of upstream control station.	0.021mg/L or 99 percentile of baseline data or 130% of upstream control station.
Nitrate nitrogen in mg/L (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Orthophosphate in mg/L (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.

Remarks:
AL of DO is 5 percentile of baseline data or level at control station at same tide of the same day (whichever lower) and LL of DO is 4.0 mg/L or level at control station at same tide of the same day (whichever lower);
+ 1 percentile of baseline data were adopted for LL for DO as those levels were greater than 4 mg/L;
* AL is 120% of control station's level at the same tide of the same day when depth average greater than 95 percentile of baseline data;
^ LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data.
~ LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data or 0.021mg/L.
& LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data or 20mg/L.

1. INTRODUCTION

1.1 Background

1.1.1 The Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDAs) are one of the important sources of land and housing supply in the medium and long term. The development of the KTN and FLN NDAs will be implemented in phase for full completion by 2031. The Phase 1 of the NDAs development, comprising the Advance Works and First Stage Works, is targeted to be implemented from the second half of 2019 progressively. The Advance and First Stage Works would include site formation, engineering infrastructure works (including roads, drainage, sewerage, waterworks, landscaping works, pumping stations, and fresh water and flushing water service reservoirs), soil remediation, reprovisioning of North District Temporary Wholesale Market, development of a nature park at Long Valley and implementation of environmental mitigation measures.

1.1.2 The Environmental Impact Assessment (EIA) report for the North East New Territories (NENT) NDAs Study, which covered the Advance Works and First Stage Works of KTN and FLN NDAs, has been submitted to Environmental Protection Department (EPD) in mid-2013. The report was subsequently approved with conditions by EPD on 19 October 2013 under Register No. AEIAR-175/2013.

1.1.3 Contract No. NDO 14/2018 is the works package consists of the Advance and First Stage Works of KTN and FLN NDAs. This Contract is governed by 7 Environmental Permits (EPs) (EP-466/2013, EP-467/2013/A, EP-468/2013/A, EP-469/2013, EP-470/2013, EP-473/2013/A and EP-475/2013/A). EP-466/2013, EP-467/2013/A, EP-468/2013/A, EP-469/2013 and EP-470/2013 belongs to KTN NDAs, while EP-473/2013/A and EP-475/2013/A belongs to FLN NDAs.

1.1.4 The scope of works under the Advance and First Stage Works comprises the following and divides into seven Contracts.

a) The Advance Works (PWP item No. 7747CL-2) consist of:

i) site formation of land (including soil remediation) in KTN and FLN NDAs for housing, community facilities and engineering infrastructure;

ii) construction of roads including the eastern section of Fanling Bypass (FLBP(E)) connecting the FLN NDA to Fanling Highway and other roads with footpaths and cycle tracks, and associated junction/ road improvements;

iii) engineering infrastructure works including drainage. Sewerage (including two sewage pumping stations), waterworks (including a fresh water service reservoir and a flushing water service reservoir in the KTN NDA), landscape works and slopeworks;

iv) part expansion and upgrading of Shek Wu Hui Sewage Treatment Works (SWHSTW);

v) reprovisioning works; and

vi) implementation of environmental mitigation measures and environmental monitoring and audit (EM&A) programme for the works mentioned in (i) to (v) above

b) The First Stage Works (PWP item No. 7759CL) consist of:

i) development of a nature park at Long Valley including provision of a visitor centre and a footbridge spanning across Sheung Yue River for connection between these two facilities;

ii) reprovisioning of two egretry sites in the FLN NDA and enhancement works to an existing egretry site in the KTN NDA;

iii) site formation of land for a village resite area and a district police station in the KTN NDA;

iv) engineering infrastructure works including roads, drainage, sewerage, waterbirds, and landscape works; and

v) implementation of environmental mitigation measures and environmental monitoring and audit (EM&A) programme for the works mentioned in (i) to (iv) above.

1.2 Purpose of Baseline Monitoring Report

1.2.1 This report is prepared for Contract No. NDO 14/2018 - Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas in accordance with the requirements in the updated EM&A Manual. This report presents the baseline monitoring requirements, methodology and results of baseline water quality monitoring at FLN NDA from 3rd August 2019 to 29th August 2019 and baseline water quality monitoring at KTN NDA 17th September 2019 to 12th October 2019.

2. WATER QUALITY MONITORING

2.1 Monitoring Requirement

2.1.1 With reference to Section 4 of the Updated EM&A Manual (0032/19/ED/0108), the baseline water quality monitoring will be conducted to determine the Dissolved Oxygen (DO), temperature, turbidity, pH, Suspended Solids (SS), unionized ammonia, nitrate nitrogen and orthophosphate at the proposed monitoring locations prior to the commencement of the construction works. At each proposed monitoring station, it will be carried out 3 days per week, for four weeks prior to the commencement of the works.

2.1.2 Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database. DO, temperature, pH and turbidity should be measured in-situ whereas SS should be determined by an accredited laboratory.

2.1.3 Other relevant data shall also be recorded, including monitoring location / position, time, water depth, weather conditions and any special phenomena or work underway at the construction site.

2.1.4 Measurements shall be taken at 3 water depths, namely, lm below water surface, mid-depth and 1m above river bed, except where the water depth is less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored.

2.2 Monitoring Locations

2.2.1 With reference to Section 4.3.2 of the Updated EM&A Manual (0032/19/ED/0108), 4 proposed water quality monitoring stations (FLN-CS1, FLN-IS1, KTN-CS1 & KTN-IS1) are proposed and summarized in **Table 2.1**. The locations of the proposed water quality stations are shown in **Figure 2.1 & Figure 2.2**

Table 2.1 Summary of Water Quality Monitoring Stations

Monitoring Station	Description	Locations	Measurment Periods
KTN NDA			
KTN-CS1	Control Station for KTN NDA	Centerline of river, upstream of the channel	During construction of channel
KTN-IS1	Impact Station for KTN NDA	Centerline of river, downstream of the channel	During construction of channel
FLN NDA			
FLN-CS1	Control Station for FLN NDA	Centerline of river, upstream of the channel	During construction of channel
FLN-IS1	Impact Station for FLN NDA	Centerline of river, downstream of the channel	During construction of channel

2.3 Monitoring Equipment and Methodology

2.3.1 **Table 2.2** summarizes the water quality monitoring equipment model being used for this project.

Table 2.2 Water Quality Monitoring Equipment

Parameter	Equipment	Model	Range	Equipment Accuracy
Temperature, Dissolved Oxygen, salinity, pH, Turbidity	Water Quality Monitoring Device	YSI 6920V2-2-M Sonde	Temp: -5 to 50°C DO: 0-50mg/L DO%: 0-500% Sal: 0 to 70 ppt pH: 0 to 14 pH units Turb: 0-1000NTU	Temp: ±0.15°C DO: ±0.1mg/L or 1% (whichever greater) for 0-20mg/L; ±15% for 20-50mg/L Sal: ±1% or 0.1ppt (whichever greater) pH: ±0.2 units Turb: ±2% or 0.3NTU (whichever greater)
		In-situ Aqua TROLL 600	Temp: -5 to 50°C DO: 0-50mg/L DO%: 0-500% Sal: 0 to 350 psu (ppt) pH: 0 to 14 pH units Turb: 0-4000NTU	Temp: ±0.1°C DO: ±0.1mg/L for 0-8mg/L; ±0.2mg/L for 8-20mg/L; ±10% for 20-50mg/L Sal: resolution: 0.1psu (ppt) pH: ±0.1 units Turb: ±2% or ±2NTU (whichever greater)
Water Sampling	Water Sampler	Aquatic Research Transparent PC Vertical Water Sampler 2.2L / 3L / 5L	NA	NA
Water Depth	Echo Sounder	Garmin ECHO 100	0.6 to 91 m	0.1 m

2.3.2 The monitoring procedures are as follows:

Measurement Procedures

2.3.3 All in-situ monitoring instruments shall be checked, calibrated and certified and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring, or as required by the manufactures specification. Certificate(s) of Calibration specifying the instrument shall be attached to the monitoring reports.

Sampling

2.3.4 The Contractor will record all data from in situ testing and from any analysis carried out in a Field Log. All samples will be identified with a unique date /time /location /depth /sample-type code which will be attached to the sample container or written in indelible ink directly on the container. In order to avoid contamination of the samples, all containers will be new and unused and of analytical grade quality. Sources of

contamination will be isolated from the working area and any sample contaminated by local material will be discarded and the sampling repeated.

Transport of Samplers

2.3.5 All samples transferred from one sub-contractor to another will be accompanied by Chain of Custody (COC) forms. Any missing or damaged samples require notification to ET Leader following logging in the laboratory QA system. The number of samples, the parameters to be tested and the time of delivery should be clearly stated on the COC forms to ensure that samples are analyzed for the correct parameters and suitable time is provided to the analytical laboratory for provision of resources required in the analyses.

2.4 Baseline Monitoring Parameters

2.4.1 **Table 2.3** presents the baseline water quality monitoring parameters.

Table 2.3 Monitoring Parameters for Baseline Water Quality Monitoring

Parameters	Analytical method	Reporting Limit
Dissolved Oxygen (DO)	YSI 6920V2-2-M Sonde or In-situ Aqua TROLL 600	0-50mg/L
Temperature	YSI 6920V2-2-M Sonde or In-situ Aqua TROLL 600	-5 to 50°C
Turbidity	YSI 6920V2-2-M Sonde	0-1000NTU
	In-situ Aqua TROLL 600	0-4000NTU
pH	YSI 6920V2-2-M Sonde In-situ Aqua TROLL 600	0 to 14 pH units
Suspended Solid (SS)	APHA 17e 2540D	2mg/L
Ammonia as N	Inhouse method E-T-095	0.02 mg/L
Unionized ammonia	By calculation	By calculation
Nitrate	APHA 20e 4500-NO3 E&F	0.01 mg/L
Orthophosphate	Inhouse method E-T-055	0.02 mg/L

2.5 Calibration

2.5.1 Calibration procedures are as follows:

- The pH meter, DO meter and turbidimeter shall be checked and calibrated before use. DO meter and turbidimeter shall be certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at quarterly basis throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring station.

- One-point saturated air calibration for a DO probe shall be carried out prior to each field sampling. A zero check in distilled water shall be performed with the turbidity probe at least once per monitoring day. The probe shall then be calibrated with a solution of known NTU. In addition, the turbidity probe shall be calibrated at least twice per month to establish the relationship between turbidity readings (in NTU) and levels of suspended solids (in mg/L).
- For the on-site calibration of field equipment, the BS 1427:2009, Guide On-Site Test Methods for the Analysis of Waters shall be observed.
- Sufficient stocks of spare parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring could proceed uninterrupted even when some equipment is under maintenance, calibration etc.
- Relevant calibration certificates are provided in **Appendix B**.

2.6 Action and Limit Level for Water Quality Monitoring

2.6.1 **Table 2.4** summarizes the Action and Limit Levels to be used for impact water quality monitoring.

Table 2.4 Action and Limit Levels for Impact Water Quality Monitoring

Parameters	Action	Limit
DO in mg/L (depth average)	5 percentile of baseline data.	4 mg/L or 1 percentile of baseline data.
SS in mg/L (depth averaged)	95 percentile of baseline data or 120% of upstream control station.	20 mg/L or 99 percentile of baseline data or 130% of upstream control station.
Turbidity in NTU (depth averaged)	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Unionized ammonia in mg/L (depth averaged)	95 percentile of baseline data or 120% of upstream control station.	0.021mg/L or 99 percentile of baseline data or 130% of upstream control station.
Nitrate nitrogen in mg/L (depth averaged)	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Orthophosphate in mg/L (depth averaged)	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.

Notes:
1) "Depth-averaged" is calculated by taking the arithmetic mean of all three depths.
2) For DO, non-compliance occurs when monitoring results is lower than the limits.
3) For SS, turbidity, non-compliance occurs when monitoring results is larger than the limits.

2.7 Results and Observations

2.7.1 The baseline water quality monitoring work was conducted in two phase, Phase I (FLN NDA)from 3rd August 2019 to 29th August 2019 and Phase II (KTN NDA) from 17th September 2019 to 12th October 2019. The detail monitoring schedule is shown in **Appendix B.**

2.7.2 At KTN-CS1, KTN-IS2, FLN-CS1 and FLN-IS1 no water quality influencing factor was observed. No any project related construction activity in the vicinity of the monitoring stations during the baseline monitoring are noted and recorded. No any major activities being carried out on the site during the period. Rainy weather during baseline monitoring period might affect monitoring result due to riverside soil lost.

2.7.3 The monitoring data of baseline water quality are summarized in **Table 2.5 and 2.6** respectively. Detailed monitoring data are presented in **Appendix E**.

Table 2.5 Summary of Baseline Water Quality Monitoring Results (KTN)

Monitoring Parameter					
Location / **Parameter**	KTN-CS1				
DO in mg/L	Max	Min	Ave	5 Percentile	1 Percentile
	7.79	6.28	6.84	6.31	6.28
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	9.4	4.59	5.33	6.44	8.78
Suspended Solid in mg/L	4	2	3	4	4
Unionized ammonia in mg/L	0.0005	0.0001	0.0003	0.0005	0.0005
Nitrate nitrogen in mg/L	0.45	0.09	0.25	0.43	0.45
Orthophosphate in mg/L	0.19	0.01	0.10	0.17	0.19

Monitoring Parameter					
Location / **Parameter**	KTN-IS1				
DO in mg/L	Max	Min	Ave	5 Percentile	1 Percentile
	7.31	4.71	6.72	5.00	6.09
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	7.39	4.57	5.36	6.04	7.11
Suspended Solid in mg/L	5	2	4	5	5
Unionized ammonia in mg/L	0.0006	0.0001	0.0004	0.0005	0.0006
Nitrate nitrogen in mg/L	0.40	0.09	0.26	0.39	0.40
Orthophosphate in mg/L	0.14	0.03	0.09	0.13	0.14

Table 2.6 Summary of Baseline Water Quality Monitoring Results (FLN)

Monitoring Parameter					
Location / Parameter	FLN-CS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	9.30	7.79	8.54	7.81	7.79
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	14.7	6.01	10.27	14.67	14.70
Suspended Solid in mg/L	16	3	8	16	16
Unionized ammonia in mg/L	0.0162	0.0012	0.0063	0.0133	0.0156
Nitrate nitrogen in mg/L	2.60	0.27	0.60	0.91	2.25
Orthophosphate in mg/L	0.22	0.06	0.10	0.15	0.21

Monitoring Parameter					
Location / Parameter	FLN-IS1				
	Max	Min	Ave	5 Percentile	1 Percentile
DO in mg/L	9.82	7.87	8.71	8.12	7.92
	Max	Min	Ave	95 Percentile	99 Percentile
Turbidity in NTU	36.7	6.10	12.31	27.90	34.85
Suspended Solid in mg/L	9	3	6	9	9
Unionized ammonia in mg/L	0.0107	0.0011	0.0057	0.0093	0.0105
Nitrate nitrogen in mg/L	0.61	0.19	0.45	0.60	0.61
Orthophosphate in mg/L	0.53	0.08	0.14	0.35	0.49

2.7.4 Based on the baseline monitoring results and it observbed a wide range of recorded (Turbidity, SS, Unionized ammonia, Nitrate nitrogen and Orthophosphate) in impact stations (KTN-IS1, FLN-IS1) and similar average results which comparise with control station (KTN-CS1, FLN-CS1). Moreover, seasonal change (wet season and dry season) should be taken into account during the impact monitoring period. In accordance with the water quality impact criteria in updated EM&A Manual, The recommended environmental performance criteria for water quality during construction phase are summarized as below:

Table 2.7 Recommended Action and Limit Levels of Water Quality Monitoring

Parameters	Action	Limit
DO in mg/L (depth average)#+	5 percentile of baseline data.	4 mg/L or 1 percentile of baseline data.
SS in mg/L (depth averaged)*&	95 percentile of baseline data or 120% of upstream control station.	20 mg/L or 99 percentile of baseline data or 130% of upstream control station.
Turbidity in NTU (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Unionized ammonia in mg/L (depth averaged)*~	95 percentile of baseline data or 120% of upstream control station.	0.021mg/L or 99 percentile of baseline data or 130% of upstream control station.
Nitrate nitrogen in mg/L (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.
Orthophosphate in mg/L (depth averaged)*^	95 percentile of baseline data or 120% of upstream control station.	99 percentile of baseline data or 130% of upstream control station.

Remarks:
AL of DO is 5 percentile of baseline data or level at control station at same tide of the same day (whichever lower) and LL of DO is 4.0 mg/L or level at control station at same tide of the same day (whichever lower);
+ 1 percentile of baseline data were adopted for LL for DO as those levels were greater than 4 mg/L;
* AL is 120% of control station's level at the same tide of the same day when depth average greater than 95 percentile of baseline data;
^ LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data.
~ LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data or 0.021mg/L.
& LL is 130% of control station's level at the same tide of the same day when depth average greater than 99 percentile of baseline data or 20mg/L.

2.8 Revisions for inclusion in the EM&A Manual

2.8.1 No revision is required for the updated EM&A Manual.

Figure 2.1
Baseline Water Quality Monitoring Locations (KTN)

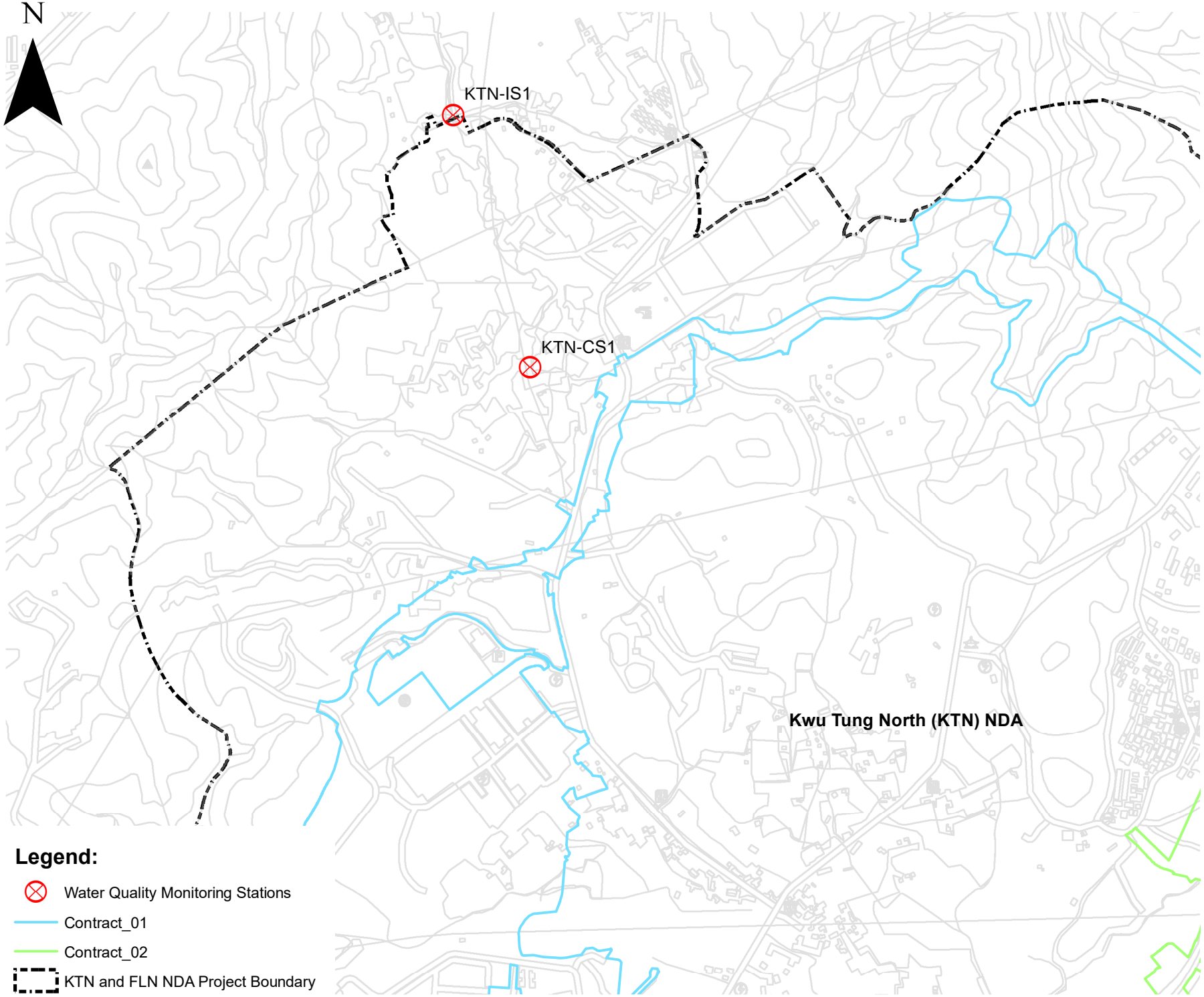

Figure 2.1
Proposed Baseline and Construction Water Quality Monitoring Locations (KTN)

FUGRO

PRE-CONSTRUCTION ENVIRONMENTAL MONITORING AND AUDIT WORKS FOR THE ADVANCE AND FIRST STAGE WORKS OF KWU TUNG AND FANLING NORTH NEW DEVELOPMENT AREAS

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

I/R	DATE	DESCRIPTION	CHK

0 6,250 12,500 25,000 37,500
Kilometers

Contract No: NDO 14/2018

Figure 2.2
Baseline Water Quality Monitoring Locations (FLN)

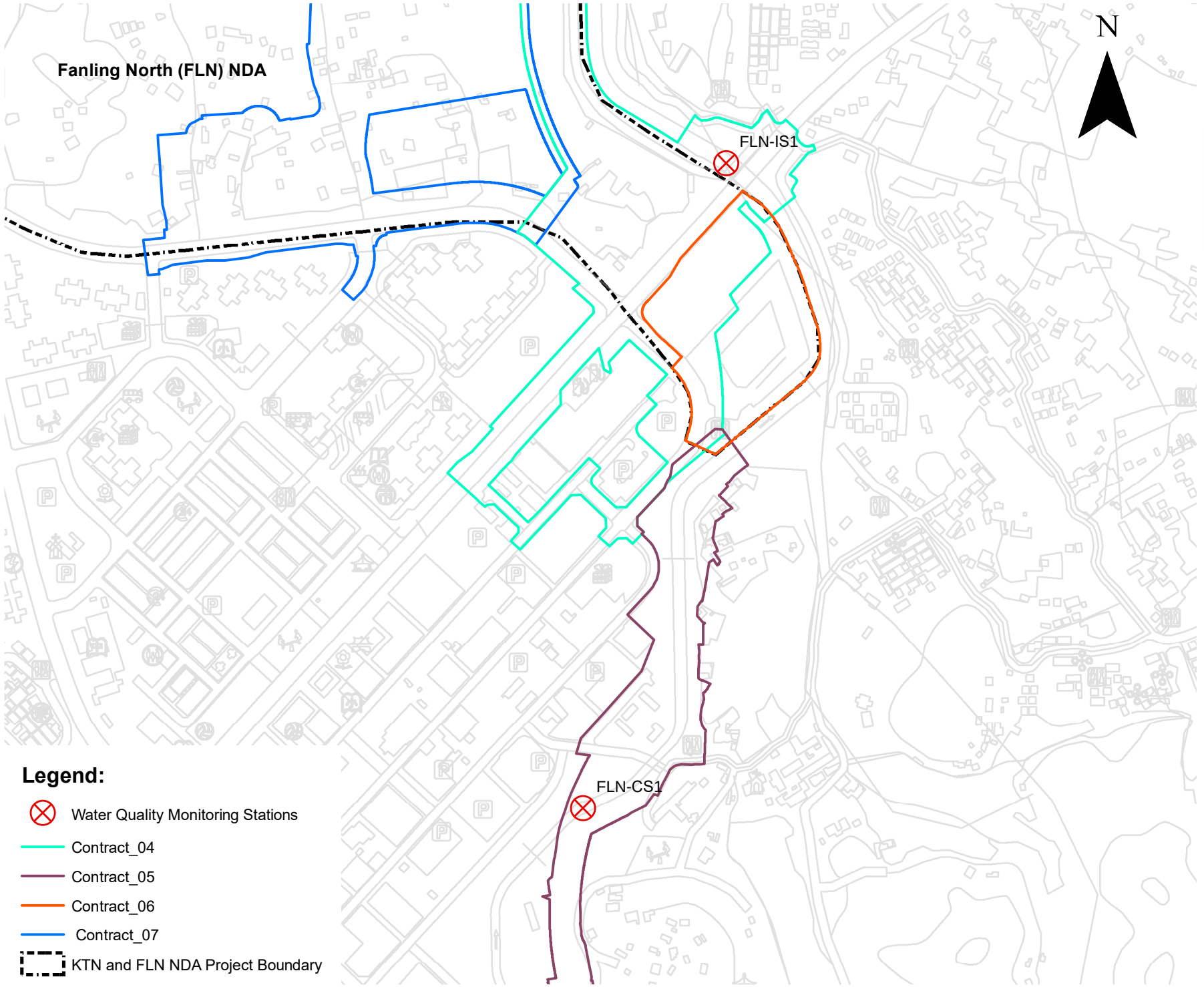

Figure 2.2
Proposed Baseline and Construction Water QualityMonitoring Locations (FLN)

FUGRO

PRE-CONSTRUCTION ENVIRONMENTAL MONITORING AND AUDIT WORKS FOR THE ADVANCE AND FIRST STAGE WORKS OF KWU TUNG AND FANLING NORTH NEW DEVELOPMENT AREAS

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

I/R	DATE	DESCRIPTION	CHK

0 4,100 8,200 16,400 24,600
Kilometers

Contract No: NDO 14/2018

APPENDICES

A. BASELINE WATER QUALITY MONITORING SCHEDULE

Project: Contract No. NDO 14/2018 - Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas

Baseline Monitoring Schedule (Water Quality_FLN)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 **August**	2	3 FLN-CS1 FLN-IS1
4	5	6 FLN-CS1 FLN-IS1	7	8 FLN-CS1 FLN-IS1	9	10 FLN-CS1 FLN-IS1
11	12	13 FLN-CS1 FLN-IS1	14	15 FLN-CS1 FLN-IS1	16	17 FLN-CS1 FLN-IS1
18	19	20 FLN-CS1 FLN-IS1	21	22 FLN-CS1 FLN-IS1	23	24 FLN-CS1 FLN-IS1
25	26	27 FLN-CS1 FLN-IS1	28	29 FLN-CS1 FLN-IS1	30	31

Remarks

1. Monitoring Location: FLN-CS1 ─Centerline of river, upstream of the channel; FLN-IS1─Centerline of river, downstream of the channel.

Project: Contract No. NDO 14/2018 - Advance and First Stage Works of Kwu Tung North and Fanling North New Development Areas

Baseline Water Monitoring Schedule (Water Quality_KLN)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
15 **September**	16	17 KTN-CS1 KTN-IS1	18	19 KTN-CS1 KTN-IS1	20	21 KTN-CS1 KTN-IS1
22	23	24 KTN-CS1 KTN-IS1	25	26 KTN-CS1 KTN-IS1	27	28 KTN-CS1 KTN-IS1
29	30	1 **October** KTN-CS1 KTN-IS1	2	3 KTN-CS1 KTN-IS1	4	5 KTN-CS1 KTN-IS1
6	7	8 KTN-CS1 KTN-IS1	9	10 KTN-CS1 KTN-IS1	11	12 KTN-CS1 KTN-IS1

Notes:

1. Monitoring Locations: KTN-CS1 — Centerline of river, upstream of the channel; KTN-IS1 —Centerline of river, downstream of the channel

B. COPIES OF CALIBRATION CERTIFICATES OF WATER QUALITY MONITORING EQUIPMENT

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MateriaLab

Report No. : 142626WA191408

Report on Calibration of YSI 69201V2-M Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One YSI 69201V2-M Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 18L104181
Test required	:	Calibration of the YSI 69201V2-M Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA191408/1
Date sample received	:	28/06/2019
Date of calibration	:	03/07/2019
Next calibration date	:	02/10/2019
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191408

Results :

A. pH calibration

pH reading at 22°C for Q.C. solution(6.86) and at 22°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.18	0.00
6.86	6.78	-0.08

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.1	+0.1	± 0.5
20	20.3	+0.3	± 1.0
30	30.2	+0.2	± 1.5
40	40.8	+0.8	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.02	8.20
2	7.99	8.13
3	7.92	8.10
Average	7.98	8.14

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 11/7/2019

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191408

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
22.2	22.13

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	0.0	0.0	± 0.5
4	4.4	+0.4	± 0.6
8	7.6	-0.4	± 0.8
40	39.7	-0.3	± 3.0
80	80.0	0.0	± 4.0

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 11/7/2019

** End of Report **

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191408(1)

Report on Calibration of YSI 69201V2-M Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One YSI 69201V2-M Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 14A102907
Test required	:	Calibration of the YSI 69201V2-M Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA191408/2
Date sample received	:	28/06/2019
Date of calibration	:	04/07/2019
Next calibration date	:	03/10/2019
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191408(1)

Results :

A. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.2	+0.2	± 0.5
20	20.9	+0.9	± 1.0
30	30.0	0.0	± 1.5
40	40.5	+0.5	± 2.0

B. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.04	7.83
2	8.11	8.28
3	8.14	8.27
Average	8.10	8.13

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 11/7/2019

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191408(1)

Results :

C. Temperature calibration

Thermometer reading, °C	Meter reading, °C
23.5	23.38

D. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	0.0	0.0	± 0.5
4	4.5	+0.5	± 0.6
8	7.7	-0.3	± 0.8
40	40.7	+0.7	± 3.0
80	80.4	+0.4	± 4.0

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 11/7/2019

** End of Report **

Note : This report refers only to the sample(s) tested.

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MateriaLab

HOKLAS 015 TEST

Report No. : 142626WA191729(3)

Report on Calibration of Aqua Troll 600 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	MateriaLab Consultants Limited
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One Aqua Troll 600 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 579950
Test required	:	Calibration of the Aqua Troll 600 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA191729/4
Date sample received	:	09/08/2019
Date of calibration	:	15/08/2019
Next calibration date	:	14/11/2019
Test method used	:	In-house comparison method

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MaterialLab

HOKLAS 015 TEST

Report No. : 142626WA191729(3)

Results :

A. pH calibration

pH reading at 25°C for Q.C. solution(6.86) and at 25°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.17	-0.01
6.86	6.88	+0.02

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.06	+0.06	± 0.5
20	20.16	+0.16	± 1.0
30	30.62	+0.62	± 1.5
40	40.88	+0.88	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	7.49	7.61
2	.7.37	7.54
3	7.39	7.55
Average	7.42	7.57

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.4 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 21/8/2019

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MateriaLab

HOKLAS 015 TEST

Report No. : 142626WA191729(3)

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
24.6	24.57

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	-	-	± 0.5
4	4.08	+0.08	± 0.6
8	8.03	+0.03	± 0.8
40	39.87	-0.13	± 3.0
80	79.31	-0.69	± 4.0

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories
Date : 21/8/2019

** End of Report **

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MateriaLab

Report No. : 142626WA191853(2)

Report on Calibration of Aqua Troll 600 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	MateriaLab Consultants Limited
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One Aqua Troll 600 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 551996
Test required	:	Calibration of the Aqua Troll 600 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA191853/3
Date sample received	:	22/08/2019
Date of calibration	:	28/08/2019
Next calibration date	:	27/11/2019
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

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MaterialLab

Report No. : 142626WA191853(2)

Results :

A. pH calibration

pH reading at 21°C for Q.C. solution(6.86) and at 22°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.17	-0.01
6.86	6.83	-0.03

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.29	+0.29	± 0.5
20	20.48	+0.48	± 1.0
30	30.00	0.00	± 1.5
40	40.51	+0.51	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.10	7.93
2	7.84	7.98
3	7.84	7.94
Average	7.93	7.95

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.4 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 04/09/2019

Note : This report refers only to the sample(s) tested.

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MateriaLab

Report No. : 142626WA191853(2)

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
22.7	22.45

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	-	-	± 0.5
4	4.11	+0.11	± 0.6
8	8.30	+0.30	± 0.8
40	39.56	-0.44	± 3.0
80	79.51	-0.49	± 4.0

F. Conductivity calibration

Conductivity, umhos/cm			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
1408	1372	-35	± 70
6668	6699	+31	± 400
12860	12524	-336	± 700
24820	25033	+213	± 1200

Certified by :
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 04/09/2019

** End of Report **

Note : This report refers only to the sample(s) tested.

C. BASELINE WATER QUALITY MONITORING DATA

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Nitrogen content in mg/L		Nitrate nitrogen in mg/L		Unionized ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
FLN-CS1	3-Aug-19	Cloudy	1.2	10:59	1	7.12	7.12	26.79	26.80	100.1	100.1	7.91	7.91	70.5	70.1	60	55.5	0.20	0.2	0.05	0.05	0.0022	0.0022	0.15	0.15	NA
					2	7.12		26.80		100.1		7.91		69.6		51		0.20		0.05		0.0022		0.15		
FLN-IS1			1.1	11:15	1	7.14	7.14	26.64	26.67	98.8	98.9	7.83	7.84	80.5	88.2	70	66.5	0.21	0.2	0.05	0.05	0.0024	0.0024	0.16	0.16	NA
					2	7.14		26.69		99.1		7.84		95.9		63		0.21		0.05		0.0024		0.16		
FLN-CS1	6-Aug-19	Cloudy	1.2	12:06	1	7.40	7.40	27.38	27.38	96.4	96.4	7.79	7.79	12.7	12.7	7	8.0	0.38	0.3	0.59	0.52	0.0028	0.0032	0.07	0.07	NA
					2	7.39		27.38		96.4		7.79		12.8		9		0.29		0.45		0.0035		0.07		
FLN-IS1			1.2	13:34	1	6.89	6.87	25.82	25.87	98.2	98.1	8.14	8.13	8.3	8.3	9	8.0	0.43	0.4	0.19	0.19	0.0035	0.0040	0.12	0.12	NA
					2	6.85		25.91		98.0		8.12		8.3		7		0.46		0.19		0.0044		0.11		
FLN-CS1	8-Aug-19	Sunny	1.2	11:28	1	7.55	7.55	31.08	31.08	115.7	115.7	8.47	8.47	14.7	14.7	6	6.0	0.21	0.2	0.54	0.54	0.0032	0.0042	0.07	0.07	NA
					2	7.55		31.08		115.7		8.47		14.7		6		0.21		0.54		0.0053		0.06		
FLN-IS1			1.1	11:48	1	7.53	7.53	31.08	31.08	116.7	116.7	8.55	8.55	27.9	27.9	7	7.0	0.19	0.2	0.61	0.61	0.0055	0.0057	0.09	0.09	NA
					2	7.53		31.08		116.7		8.55		27.9		7		0.19		0.60		0.0058		0.09		
FLN-CS1	10-Aug-19	Fine	1.0	10:20	1	7.61	7.62	30.44	30.44	111.1	111.3	8.62	8.64	6.9	6.8	3	3.5	0.18	0.2	0.45	0.43	0.0021	0.0025	0.07	0.07	NA
					2	7.63		30.44		111.5		8.65		6.8		4		0.24		0.40		0.0028		0.07		
FLN-IS1			0.9	10:42	1	7.73	7.73	30.32	30.32	128.1	128.1	9.53	9.53	10.2	10.2	3	3.0	0.25	0.2	0.37	0.37	0.0030	0.0035	0.08	0.09	NA
					2	7.73		30.31		128.1		9.52		10.3		3		0.21		0.37		0.0040		0.09		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Nitrogen content in mg/L		Nitrate nitrogen in mg/L		Unionized ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
FLN-CS1	13-Aug-19	Fine	1.2	10:18	1	7.62	7.62	29.88	29.88	123.4	123.5	9.25	9.27	14.1	14.1	16	16.0	0.19	0.20	0.48	0.47	0.0086	0.0085	0.09	0.09	NA
					2	7.61		29.87		123.7		9.28		14.1		16		0.20		0.45		0.0083		0.09		
FLN-IS1			1.2	10:37	1	7.78	7.78	30.21	30.21	128.0	128.0	9.47	9.65	8.9	9.0	7	6.5	0.17	0.18	0.43	0.43	0.0083	0.0083	0.08	0.09	NA
					2	7.78		30.20		128.1		9.82		9.0		6		0.18		0.42		0.0083		0.09		
FLN-CS1	15-Aug-19	Fine	1.1	10:39	1	7.78	7.77	29.57	29.62	111.7	117.9	8.39	8.85	13.9	13.7	16	16.0	0.34	0.34	0.93	0.76	0.0094	0.0085	0.11	0.11	NA
					2	7.76		29.66		124.1		9.30		13.4		16		0.34		0.58		0.0075		0.11		
FLN-IS1			1.2	11:08	1	7.76	7.65	29.56	28.25	119.7	109.8	9.00	8.44	12.5	24.6	7	6.5	0.38	0.37	0.55	0.55	0.0084	0.0084	0.11	0.11	NA
					2	7.53		26.93		99.9		7.87		36.7		6		0.35		0.54		0.0084		0.10		
FLN-CS1	17-Aug-19	Fine	1.2	09:30	1	7.79	7.92	29.85	29.98	110.3	110.5	8.25	8.29	6.3	6.3	5	5.0	0.31	0.31	2.60	1.60	0.0069	0.0071	0.10	0.11	NA
					2	8.04		30.10		110.8		8.32		6.3		5		0.30		0.60		0.0073		0.11		
FLN-IS1			1.1	10:47	1	7.79	7.80	29.85	29.93	110.3	112.4	8.25	8.33	6.4	6.4	5	4.5	0.24	0.24	0.56	0.56	0.0094	0.0101	0.11	0.11	NA
					2	7.80		30.01		114.6		8.41		6.4		4		0.24		0.55		0.0107		0.10		
FLN-CS1	20-Aug-19	Fine	1.1	14:55	1	7.93	7.94	30.32	30.34	117.7	117.9	8.73	8.75	8.1	8.0	6	6.0	0.20	0.21	0.46	0.45	0.0034	0.0038	0.10	0.10	NA
					2	7.94		30.36		118.2		8.77		7.9		6		0.21		0.44		0.0042		0.10		
FLN-IS1			1.1	15:19	1	7.92	7.92	30.09	30.11	117.8	117.9	8.73	8.74	12.2	12.3	7	7.0	0.27	0.29	0.44	0.44	0.0055	0.0052	0.14	0.14	NA
					2	7.91		30.12		118.1		8.74		12.4		7		0.31		0.43		0.0049		0.14		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Nitrogen content in mg/L		Nitrate nitrogen in mg/L		Unionized ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
FLN-CS1	22-Aug-19	Fine	0.9	13:17	1	7.83	7.84	30.36	30.38	106.3	106.4	8.13	8.14	6.6	6.7	7	7.5	0.24	0.24	0.54	0.53	0.0135	0.0148	0.10	0.16	NA
					2	7.84		30.40		106.5		8.15		6.7		8		0.24		0.52		0.0162		0.22		
FLN-IS1			1.0	13:31	1	7.86	7.86	30.33	30.36	120.3	120.8	8.93	8.96	7.1	7.1	8	8.0	0.31	0.30	0.51	0.51	0.0029	0.0030	0.53	0.34	NA
					2	7.85		30.39		121.3		8.99		7.2		8		0.28		0.51		0.0031		0.14		
FLN-CS1	24-Aug-19	Hazy	1.1	10:13	1	8.63	8.64	28.86	28.83	114.5	114.6	8.71	8.73	11.1	11.0	6	6.5	0.18	0.18	0.49	0.50	0.0050	0.0049	0.10	0.10	NA
					2	8.64		28.80		114.8		8.75		10.9		7		0.17		0.50		0.0047		0.10		
FLN-IS1			1.2	10:29	1	7.57	7.57	28.61	28.60	109.3	109.6	8.38	8.39	6.1	6.1	6	6.0	0.21	0.21	0.49	0.48	0.0047	0.0047	0.12	0.12	NA
					2	7.56		28.59		109.8		8.40		6.2		6		0.21		0.47		0.0047		0.12		
FLN-CS1	27-Aug-19	Fine	1.2	14:51	1	7.69	7.69	30.31	30.34	110.9	110.8	8.22	8.21	12.9	12.9	8	7.5	0.25	0.28	0.61	0.59	0.0101	0.0102	0.15	0.15	NA
					2	7.69		30.37		110.8		8.20		12.9		7		0.30		0.56		0.0104		0.14		
FLN-IS1			1.2	15:11	1	7.76	7.75	30.29	30.33	110.5	110.6	8.19	8.20	17.3	17.2	6	6.0	0.33	0.34	0.54	0.54	0.0086	0.0087	0.36	0.26	NA
					2	7.74		30.37		110.8		8.21		17.1		6		0.35		0.54		0.0089		0.15		
FLN-CS1	29-Aug-19	Cloudy	1.1	11:10	1	7.82	7.82	30.08	30.08	119.2	119.2	8.87	8.87	6.1	6.1	8	8.0	0.29	0.30	0.27	0.27	0.0014	0.0013	0.10	0.10	NA
					2	7.82		30.08		119.2		8.87		6.0		8		0.30		0.27		0.0012		0.10		
FLN-IS1			1.0	11:30	1	7.74	7.74	29.60	29.60	119.8	119.8	8.99	8.99	6.4	6.4	8	8.5	0.31	0.32	0.27	0.27	0.0011	0.0011	0.12	0.12	NA
					2	7.74		29.60		119.8		8.99		6.4		9		0.32		0.27		0.0011		0.11		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Notrogen content in mg/L		Nitrate Nitrogen content in mg/L		Unionized Ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
KTN-CS1	17-Sep-19	Rainy	0.8	14:00	1	6.87	6.88	27.45	27.44	87.7	87.4	6.56	6.54	72.4	72.0	74	72.0	0.20	0.19	0.51	0.52	0.0004	0.0004	0.13	0.13	NA
					2	6.89		27.42		87.2		6.52		71.5		70		0.17		0.52		0.0004		0.12		
KTN-IS1			0.7	14:45	1	7.10	7.08	26.44	26.47	101.7	101.7	8.08	8.07	44.6	44.6	35	35.0	0.20	0.20	0.57	0.57	0.0004	0.0005	0.13	0.13	NA
					2	7.05		26.49		101.7		8.05		44.6		35		0.20		0.56		0.0005		0.13		
KTN-CS1	19-Sep-19	Fine	0.8	11:00	1	6.83	6.84	27.43	27.44	87.2	87.4	6.83	6.80	5.5	5.1	<3	3.0	0.45	0.44	0.45	0.4	0.0005	0.0004	0.08	0.09	NA
					2	6.85		27.44		87.6		6.77		4.7		<3		0.43		0.43		0.0004		0.09		
KTN-IS1			0.7	11:38	1	6.85	6.85	28.12	28.12	61.0	69.9	4.71	5.39	5.3	5.1	5	5.0	0.39	0.40	0.39	0.4	0.0005	0.0005	0.07	0.08	NA
					2	6.84		28.11		78.8		6.07		4.9		5		0.40		0.40		0.0005		0.08		
KTN-CS1	21-Sep-19	Fine	0.9	11:00	1	7.05	7.04	28.01	28.00	76.5	76.4	6.29	6.29	5.0	5.1	4	3.5	0.08	0.08	0.41	0.41	0.0006	0.0005	0.07	0.07	NA
					2	7.03		27.98		76.2		6.28		5.1		3		0.07		0.40		0.0004		0.07		
KTN-IS1			0.8	11:40	1	7.14	7.14	27.56	27.59	79.5	79.6	6.57	6.58	5.0	5.0	5	4.5	0.09	0.09	0.39	0.38	0.0005	0.0005	0.08	0.08	NA
					2	7.13		27.62		79.7		6.58		5.0		4		0.09		0.37		0.0005		0.08		
KTN-CS1	24-Sep-19	Fine	0.9	11:40	1	6.91	6.87	26.72	26.73	83.8	83.7	6.99	6.99	5.1	5.0	<3	3.0	0.08	0.08	0.41	0.41	0.0004	0.0004	0.19	0.18	NA
					2	6.82		26.74		83.6		6.99		4.9		<3		0.07		0.40		0.0003		0.17		
KTN-IS1			0.7	12:10	1	6.92	6.91	27.70	27.71	86.8	85.6	7.15	7.09	6.1	5.9	4	4	0.09	0.09	0.39	0.38	0.0005	0.0004	0.08	0.08	NA
					2	6.90		27.72		84.4		7.02		5.8		4		0.09		0.37		0.0004		0.07		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Notrogen content in mg/L		Nitrate Nitrogen content in mg/L		Unionized Ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
KTN-CS1	26-Sep-19	Fine	0.8	11:21	1	6.83	6.82	26.18	26.17	84.6	84.1	7.12	7.09	4.6	4.7	<3	3.0	0.07	0.07	0.19	0.21	0.0003	0.0002	0.09	0.10	NA
					2	6.80		26.16		83.6		7.06		4.9		<3		0.06		0.22		0.0002		0.10		
KTN-IS1			0.7	11:54	1	6.88	6.86	29.03	28.59	88.2	87.3	7.06	7.06	7.4	6.5	4	4.0	0.08	0.08	0.24	0.25	0.0003	0.0003	0.07	0.08	NA
					2	6.83		28.14		86.3		7.06		5.5		4		0.07		0.26		0.0004		0.08		
KTN-CS1	28-Sep-19	Fine	0.8	11:43	1	6.99	6.92	26.56	26.44	93.2	90.7	7.79	7.60	5.0	5.7	4	3.5	0.06	0.06	0.39	0.38	0.0001	0.0001	0.10	0.11	NA
					2	6.85		26.31		88.3		7.41		6.5		3		0.05		0.37		0.0001		0.11		
KTN-IS1			0.7	12:12	1	6.95	6.90	27.10	27.04	89.0	87.7	7.31	7.24	5.8	5.3	3	3.5	0.06	0.07	0.39	0.39	0.0002	0.0001	0.11	0.11	NA
					2	6.85		26.98		86.4		7.17		4.8		4		0.07		0.38		0.0001		0.11		
KTN-CS1	1-Oct-19	Fine	0.9	10:10	1	7.08	7.09	26.82	26.83	83.3	83.2	6.85	6.85	5.0	4.9	2	2.0	<0.02	0.02	0.13	0.13	0.0002	0.0003	0.02	0.02	NA
					2	7.09		26.84		83.0		6.84		4.8		<2		<0.02		0.12		0.0004		<0.01		
KTN-IS1			0.8	10:32	1	7.13	7.12	26.52	26.51	85.0	84.9	6.99	6.99	5.0	4.8	<2	2.0	0.06	0.06	0.25	0.25	0.0003	0.0002	0.04	0.04	NA
					2	7.10		26.49		84.8		6.98		4.6		<2		0.05		0.25		0.0002		0.03		
KTN-CS1	3-Oct-19	Fine	0.9	12:09	1	6.89	6.87	28.13	28.04	84.6	84.7	6.88	6.90	9.4	7.8	4	4.0	0.05	0.07	0.19	0.19	0.0003	0.0003	0.12	0.12	NA
					2	6.84		27.94		84.8		6.92		6.2		4		0.08		0.18		0.0003		0.12		
KTN-IS1			0.8	12:30	1	6.77	6.76	28.23	28.21	84.0	84.1	6.82	6.83	5.9	5.8	4	4.0	0.06	0.06	0.22	0.22	0.0004	0.0004	0.11	0.11	NA
					2	6.75		28.18		84.1		6.83		5.8		4		0.05		0.22		0.0003		0.10		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

Monitoring Location	Date	Weather	Water Depth (m)	Time	Replicate	In-situ Measurement										Laboratory Analysis										Remarks
						pH		Temperature (ºC)		DO Saturation (%)		DO (mg/L)		Turbidity (NTU)		Total suspeded solids dried at 103 - 105 (ºC), mg/L		Ammonia Notrogen content in mg/L		Nitrate Nitrogen content in mg/L		Unionized Ammonia in mg/L		* Reactive phosphorus content in mg/L		
						Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	Value	Ave.	
KTN-CS1	5-Oct-19	Fine	0.8	10:15	1	6.74	6.79	28.12	28.04	84.4	84.5	6.68	6.71	5.4	5.4	<3	3.0	0.06	0.06	0.20	0.20	0.0002	0.0002	0.11	0.11	NA
					2	6.84		27.96		84.6		6.73		5.4		<3		0.05		0.19		0.0002		0.11		
KTN-IS1			0.9	10:50	1	6.73	6.76	28.33	28.40	84.1	84.6	6.54	6.61	5.7	5.7	<3	3.0	0.07	0.07	0.22	0.22	0.0003	0.0003	0.09	0.09	NA
					2	6.78		28.46		85.2		6.68		5.7		3		0.06		0.22		0.0003		0.09		
KTN-CS1	8-Oct-19	Fine	0.9	10:16	1	7.03	7.04	28.13	28.17	84.1	84.2	6.65	6.66	4.8	4.9	4	4.0	0.07	0.07	0.20	0.20	0.0003	0.0004	0.14	0.14	NA
					2	7.04		28.21		84.2		6.66		4.9		4		0.07		0.19		0.0004		0.14		
KTN-IS1			0.8	10:33	1	7.12	7.12	28.22	28.23	84.4	84.5	6.68	6.69	4.9	5.0	5	5.0	0.09	0.09	0.21	0.21	0.0006	0.0006	0.14	0.14	NA
					2	7.11		28.24		84.5		6.69		5.0		5		0.09		0.20		0.0005		0.13		
KTN-CS1	10-Oct-19	Fine	0.9	10:17	1	7.06	7.06	28.13	28.10	84.3	84.4	6.66	6.67	4.9	4.9	3	3.0	0.06	0.07	0.09	0.09	0.0002	0.0002	0.09	0.09	NA
					2	7.05		28.07		84.4		6.67		5.0		3		0.07		0.09		0.0003		0.08		
KTN-IS1			0.9	10:35	1	7.12	7.13	28.19	28.28	84.6	84.7	6.69	6.70	4.8	4.9	4	4.0	0.09	0.10	0.11	0.11	0.0003	0.0003	0.07	0.07	NA
					2	7.13		28.37		84.7		6.70		5.0		4		0.10		0.11		0.0004		0.07		
KTN-CS1	12-Oct-19	Fine	0.8	10:15	1	7.06	7.07	28.16	28.17	85.1	85.2	6.73	6.74	5.1	5.1	4	4.0	0.05	0.06	0.09	0.09	0.0003	0.0004	0.12	0.13	NA
					2	7.07		28.17		85.2		6.74		5.1		4		0.06		0.09		0.0004		0.13		
KTN-IS1			0.7	10:32	1	7.13	7.13	28.19	28.25	85.5	85.5	6.77	6.78	5.1	5.1	3	3.5	0.09	0.09	0.10	0.10	0.0003	0.0003	0.12	0.12	NA
					2	7.12		28.30		85.4		6.78		5.1		4		0.09		0.09		0.0003		0.11		

Note: 1. ND: Not Detected
2. NA: Not Applicable

* As confirmed by laboratory, Reactive phosphorus content is same as Orthophosphate
* Highlighted data as a outlier due to abnormal situation during water sampling

D. WEATHER AND METEOROLOGICAL CONDITIONS DURING BASELINE MONITORING PERIOD

Phase I
(FLN-CS1, FLN-IS1)

Date	Mean Pressure (hPa)	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
August 2019						
03	1002.7	27.5	26.7	25.3	91	28.4
04	1002.7	30.2	27.9	26.9	83	Trace
05	1003.1	34.5	29.7	26.5	77	0
06	1002.7	32.2	29.8	28.7	78	Trace
07	1000.7	33.6	30.1	28.0	70	0
08	998.5	33.5	30.4	27.7	74	0
09	997.2	35.1	31.3	28.1	75	0
10	999.0	33.2	30.6	29.4	83	0
11	1000.7	32.7	30.4	29.2	82	1.
12	1001.6	34.0	30.8	29.2	80	0.4
13	1001.7	33.3	30.8	28.8	79	9.2
14	1002.0	33.4	30.0	25.2	80	54.4
15	1001.9	32.4	30.0	26.5	79	5.6
16	1003.4	32.0	30.0	27.6	81	1.1
17	1005.6	30.1	28.0	25.9	87	42.2
18	1005.1	31.6	27.8	25.0	86	19
19	1003.9	31.8	28.8	26.8	83	0.1
20	1004.8	31.7	29.1	28.0	79	Trace
21	1005.9	32.8	29.5	27.6	74	0
22	1006.6	33.0	29.7	27.5	77	0
23	1006.7	31.4	29.4	28.2	80	0.7
24	1002.3	33.9	30.9	27.7	75	0
25	1000.8	32.6	27.2	25.1	89	88.4
26	1006.3	28.7	25.7	22.9	95	178.3
27	1008.1	31.4	28.6	26.9	88	2.9
28	1006.2	33.8	29.9	27.2	77	0
29	1005.6	30.7	29.0	27.8	83	5.9

Source: Hong Kong Observatory – Hong Kong Observatory

Phase II
(KTN-CS1, KTN-IS1)

Date	Mean Pressure (hPa)	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
September 2019						
17	1009.0	31.8	29.2	27.9	76	2.1
18	1010.9	32.0	28.8	25.8	79	18
19	1011.3	32.4	28.0	24.9	74	8.7
20	1008.7	32.6	29.0	26.2	52	0
21	1008.0	32.5	29.2	26.5	42	0
22	1012.2	31.3	28.3	25.9	40	0
23	1016.2	30.7	27.7	25.4	57	0
24	1017.5	30.3	27.5	26.3	70	0
25	1017.3	30.8	27.3	25.7	71	Trace
26	1017.2	30.8	27.5	25.5	71	0
27	1016.6	30.6	27.6	25.7	72	Trace
28	1015.0	32.2	28.2	25.9	71	0
29	1012.8	31.7	28.7	26.6	75	0
30	1008.8	33.4	30.1	27.2	64	0
October 2019						
01	1009.4	33.2	30.3	28.4	59	0
02	1011.2	32.1	29.5	27.9	71	0
03	1012.1	31.8	29.0	27.4	67	0
04	1012.2	31.3	28.6	26.9	70	0
05	1012.9	32.3	29.1	26.8	69	0
06	1014.7	29.1	26.3	23.1	81	46.8
07	1015.4	28.3	26.3	23.2	86	17.9
08	1015.6	30.4	27.7	25.3	79	4.8
09	1014.7	29.8	27.8	26.7	75	Trace
10	1013.5	30.3	27.9	26.6	76	0
11	1011.8	31.1	28.5	26.3	75	0
12	1011.8	31.5	28.6	27.4	78	0.3

Source: Hong Kong Observatory – Hong Kong Observatory

E. BASELINE WATER QUALITY MONITORING PHOTOS

Water Quality Monitoring

Monitoring Location No.: KTN-CS1
Description: Centerline of river, upstream of the channel

Monitoring Location No.: KTN-IS1
Description: Centerline of river, downstream of the channel

Monitoring Location No.: FLN-CS1 Description: Centerline of river, upstream of the channel

Monitoring Location No.: FLN-IS1 Description: Centerline of river, downstream of the channel