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Our Ref. : L201901202
Date : 11th December 2019

By Hand

Bouygues Travaux Publics
Room 2507-2509,
25/F., The Octagon,
No.6 Sha Tsui Road,
Tsuen Wan, Hong Kong

Dear Sir/Madam,

Contract No. DC/2018/08
Inter-Reservoir Transfer Scheme – Water Tunnel Between
Kowloon Byewash Reservoir and Lower Shing Mun Reservoir
Certification of 5th Monthly EM&A Report (Rev. 1)

I refer to the 5th Monthly EM&A Report (Rev. 1) issued on 11th December 2019. We herewith certify the captioned submission in accordance to Condition 4.3 of the Environmental Permit EP-345/2009.

Should you have any queries, please do not hesitate to contact the undersigned at 2698 6833.

Yours faithfully,

For and on behalf of
Acuity Sustainability Consulting Limited

Kevin Li
Environmental Team Leader

嘉誠管理顧問有限公司
Ka Shing management consultant Limited

Our ref: 11-12-2019

11-12-2019

By email: cre.wilsonlam@hkirts.com

Unit No. 2507-2509, 25/F, The Octagon,

No. 6 Sha Tsui Road, Tsuen Wan, N.T.

(Attn: Wilson Lam)

Dear Mr. Lam,

Re: Contract No. CM 10/2018

Independent environmental checker services for inter-reservoirs transfer scheme (IRTS)

– water tunnel between Kowloon byewash reservoir and lower shing mun reservoir

5th Monthly EM&A Report (Rev. 1)

Reference is made to the submission of the 5th Monthly EM&A Report (Rev. 1) and provided to us via email dated on 11-12-2019 for our review and comment.

Please be informed that IEC has no adverse comment on the captioned submission. IEC writes to verify the captioned submission in accordance with Condition 2.1 of the Environmental Permit No. EP-345/2009.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,

For and on behalf of

Ka Shing Management Consultant Limited

Douglas Wong

Dr. Wong

Independent Environmental Checker

Unit 2, 13/F Kai Yue Commercial Building, 2C Argyle St, Mong Kok, Kowloon
九龍旺角亞皆老街 2C 號啟如商業大廈 13 樓 2 室
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5th Monthly EM&A Report (Rev. 1)

November 2019

for

Inter-Reservoir Transfer Scheme – Water Tunnel Between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir (Contract No.: DC/2018/08)

	Prepared by:	Checked by:
Name	Nelson TSUI	Kevin LI
Position	Environmental Team	Environmental Team Leader
Signature		
Date	11 December 2019	11 December 2019

Revision History

Rev.	Description	Date
0	First Submission	9 December 2019
1	Second Submission	11 December 2019

EXECUTIVE SUMMARY

E1. Acuity Sustainability Consulting Limited (ASCL) has been commissioned by Bouygues Travaux Publics to undertake the assignment as the Environmental Team (ET) for the Designated Project of West Kowloon Drainage Improvement – Inter-reservoirs Transfer Scheme (IRTS) (the Project), with Contract No. DC/2018/08.

E2. This is the 5th Monthly Environmental Monitoring and Audit (EM&A) Report presents EM&A works undertaken in the period of 1st to 30th November 2019. EM&A works were performed in accordance with the approved EM&A Manual and conditions stipulated in the Environmental Permit EP-345/2009.

E3. According to the approved EM&A Manual, construction noise and water quality monitoring are required to be performed during the construction phase of the Project. Four (4) sessions of impact construction noise monitoring at all designated monitoring stations and thirteen (13) sessions of impact water quality monitoring at all approved monitoring points were carried out in the reporting period.

E4. No exceedance was recorded for water monitoring in the reporting period.

E5. No exceedance was recorded for noise monitoring in the reporting period.

E6. No complaint regarding environmental issue was received in the reporting period.

E7. No notification of summons nor prosecution have been received since the commencement of the Project.

E8. There was no change to be reported that may affect the on-going EM&A programme.

E9. Construction works undertaken in the reporting period include the following:

Works Area	Major Site Activities
Portion A	• Slope upgrading works (soil nail) at slope C27 & C28 • Excavation for construction of embankment bund • Construction of CLP substation • Pipe pile for tunnel portal and preparation for mined tunnel
Portion C	• Site clearance • Roof crane installation

E10. Construction works to be undertaken in the next reporting period include the following:

Works Area	Major Site Activities
Portion A	• Slope upgrading works (soil nail) at slope C27 & C28 • Installation of CLP transformer • Forming of earth bund/TBM launching platform

	• Pipe pile for tunnel portal and preparation for mined tunnel
Portion C	• Site installation • Double silt curtain installation • Breaking rock slope to formation level and slope protection • Boulder stabilization

E11. The Contractor is reminded that all works to be undertaken within the water gathering ground of Lower Shing Mun Reservoir (LSMR) and KBR must fulfill statutory environmental requirements, especially in watercourse protection.

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1. INTRODUCTION

1.1 Acuity Sustainability Consulting Limited (ASCL) has been commissioned by Bouygues Travaux Publics to undertake the assignment as the Environmental Team (ET) for the contract of West Kowloon Drainage Improvement – Inter-reservoirs Transfer Scheme (IRTS) (the Project), with Contract No. DC/2018/08. The Project comprises the following principal works elements:

- Construction of a new water tunnel, with about 2.8km in length and 3m in diameter, from KBR to LSMR;
- Construction of an intake structure at KBR and an isolation system;
- Construction of an outfall structure at LSMR with an energy dissipater; and
- All associated civil, structural, geotechnical, electrical and mechanical works, including landscaping, permanent and temporary accesses as may be necessary for the completion of the works elements listed above.

1.2 The Project site consists of the intake site at KBR and the outfall site at the Lower Shing Mun Reservoir. The layout of the Project site is presented in **Appendix A**.

1.3 This project is a Designated Project under Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). An Environmental Permit (EP), with Permit No. EP-345/2009, has been granted to the Water Supplies Department (WSD) for permitting the construction and operation of this Project.

1.4 The commencement date of construction of the Project was 12th July 2019. No major works except site clearance and preparation was performed before the commencement date of construction.

1.5 This is the 5th Monthly Environmental Monitoring and Audit (EM&A) Report presenting results and findings of all EM&A work required in the approved EM&A Manual for the period of 1st to 30th November 2019.

1.6 All project information since the commencement of work under EP including Monthly EM&A Reports is made available to the public via internet access at the website: https://www.epd.gov.hk/eia/english/register/aep/ep3452009_content.html

1.7 As part of the EM&A programme, baseline monitoring is required for determining the ambient environmental conditions. Baseline monitoring including background noise and water quality were conducted in periods from 3rd May 2019 to 22nd June 2019 in accordance to the approved EM&A Manual before commencement of construction works. The corresponding Baseline Monitoring Report has been compiled by the ET and verified by the Independent Environment Checker (IEC) prior submitting to the Environmental Protection Department.

1.8 Project organization structure is presented in Figure 1.1.

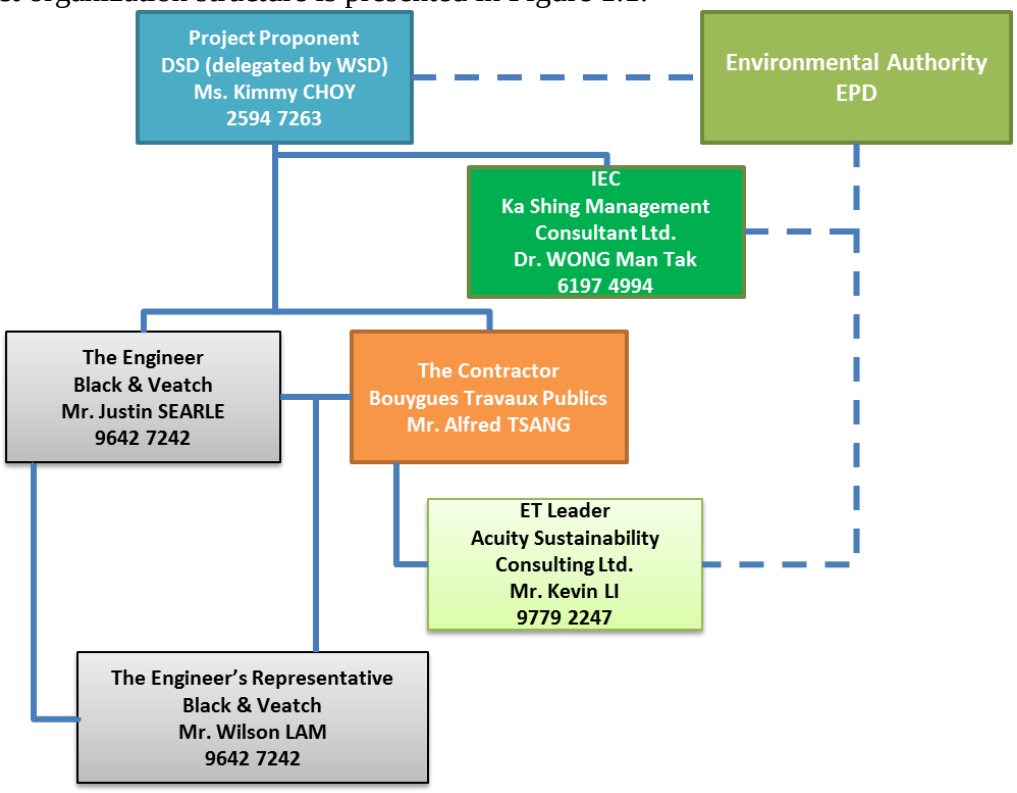


Figure 1.1 Project Organization Chart

1.9 Contact details of key personnel are presented in Table 1.1 below.

Table 1.1 Contact Details of Key Personnel

Party	Position	Name	Contact No.
Bouygues Travaux Publics	Site Agent	Mr. Alfred Tsang	3959 7317
Acuity Sustainability Consulting Limited	Environmental Team Leader	Mr. Kevin Li	2698 6833
Ka Shing Management Consultant Limited	Independent Environment Checker	Dr. Douglas Wong	2618 2166

1.10 All works were taken place in the outfall site at LSMR while no works has been taken place in the intake site at KBR. Details of major construction activities undertaken in this reporting period are shown in Table 1.2 below. The construction programme is presented in **Appendix B**.

Table 1.2 Summary of Construction Activities Undertaken in the Reporting Period

Works Area	Major Site Activities
Portion A	• Slope upgrading works (soil nail) at slope C27 & C28 • Excavation for construction of embankment bund • Construction of CLP substation • Pipe pile for tunnel portal and preparation for mined tunnel
Portion C	• Site clearance • Roof crane installation

1.11 A summary of status of environmental legislations related licences, permits and/or notifications is presented in Table 1.3.

Table 1.3 Summary of Environmental Licences and Permits of the Project

Permit/ Licence/ Notification	**Reference**	**Validity**	**Remarks**
Environmental Permit	EP-345/2009	Valid	Granted on 22 May 2009
Notification of Construction Works under Air Pollution Control (Construction Dust) Regulation	442711	Valid	Notified on 1 March 2019
Water Pollution Control Ordinance Licence for LSMR	WT00034164-2019	Valid until 31 July 2024	Applied on 4 April 2019
Chemical Waste Producer Registration	WPN5218-733-B2557-01	Valid	Registered on 22 February 2019
Billing Account for Disposal of Construction Waste	703344617	Valid	Applied on 25 February 2019
Construction Noise Permit (CNP) flor earth bund works at Portion A	GW-RN0684-19	Valid until 24 December 2019	Approved on 23 September 2019
Construction Noise Permit (CNP) for works at Portion C	GW-RN0658-19	Valid until 13 December 2019	Approved on 17 September 2019
Water Pollution Control Ordinance Licence for KBR	EPD Ref: 449639	N.A.	Under application

1.12 Contract documents required under conditions stipulated in the Environmental Permit are summarized in Table 1.4.

Table 1.4 Documents Submission Required in the Environmental Permit

Document	**EP Condition No.**	**Timeframe**	**Status**	**Remarks**
Landscape Plan	2.4 & 2.5	Submission of document shall be done no later than 6 months after commencement of construction.	Under preparation	N.A.
Condition Survey Report for Historic Structures	2.6	Document shall be deposited to the authority before commencement of construction.	The document was deposited to EPD on 3 June 2019	N.A.
Baseline Monitoring Report	4.2	Submission of document shall be done at least two weeks before commencement of construction.	The document was submitted to EPD on 28 June 2019	1st Revision was submitted to EPD on 6 August 2019

2. ENVIRONMENTAL MONITORING REQUIREMENTS AND PROGRAMME

2.1 The Environmental Monitoring and Audit requirements are set out in the approved EM&A Manual. Construction noise and water quality were identified as key environmental issues during the construction phase. A summary of the requirements for conducting impact noise and water quality monitoring is presented in the sub-sections below.

Monitoring Parameters, Time and Frequency

2.2 Impact monitoring parameters are summarized in Table 2.1 below.

Table 2.1 – Summary of Impact Monitoring Parameters

Environmental Aspect	Parameters	Frequency
Noise	• 1 no. of L_{eq}(30min) noise measurements between 0700-1900 hours on any normal weekdays • 3 nos. of consecutive L_{eq}(5min) noise measurement between 0700-1900 hours on general holidays or Sunday (if work is undertaken) • 3 nos. of consecutive L_{eq}(5min) noise measurement between 1900-2300 hours (if evening activities are undertaken) • 3 nos. of consecutive L_{eq}(5min) noise measurement between 1900-2300 hours (if there are nighttime activities)	• Once per week
Water Quality	• Dissolved Oxygen (mg/L) • Dissolved Oxygen Saturation (%) • pH Value • Turbidity (NTU) • Temperature (^{o}C) • Suspended Solids (mg/L)	• 3 times per week • Interval between two sets of monitoring shall not be less than 36 hours

Monitoring Locations

Noise

2.3 According to Section 4.4 of the approved EM&A Manual, the two most representative and affected noise sensitive receivers (NSRs) were designated as monitoring stations. Details regarding the two noise monitoring stations are shown in Table 2.2. Layout plans showing the monitoring locations are presented in **Appendix C**.

Table 2.2 – Designated Noise Monitoring Location

Location ID (ID in EM&A Manual)	Type of NSR	Location	Description
NM1 (LG)	Residential	Tower 1, Lakeview Garden	The closest NSR to the Outfall Site (LSMR)
NM2 (VH)	Residential	4 ½ Milestone, Tai Po Road	The closest NSR to the Intake Site (KBR)

Water Quality

2.4 According to Section 5.4 of the approved EM&A Manual, water quality monitoring should be performed at designated monitoring stations. Details regarding the four designated water quality monitoring stations are shown in Table 2.3.

Table 2.3 – Original Water Quality Monitoring Location

ID	Description	Location
C1	Control Point near Intake Site	Stepped channel by-passing KBR
D1	Impact Monitoring Point near Intake Site	Junction of stepped channel and overflow channel of KBR
C2	Control Point near Outfall Site	Natural Stream directing to Lower Shing Mun Reservoir
D2	Impact Monitoring Point near Outfall Site	Overflow channel of Lower Shing Mun Reservoir

2.5 As conditions of designated water quality monitoring locations have been changed since the issuing of the approved EM&A Manual, location C1, D1 and D2 are no longer feasible for conducting water quality monitoring. Therefore, the three locations were proposed to relocating to alternative monitoring locations. The proposal of alternative monitoring location was approved by EPD on 20th May 2019. Details regarding the approved water quality monitoring stations are shown in Table 2.4. Layout plans showing the original and approved monitoring locations are attached in **Appendix C**.

Table 2.4 – Approved Water Quality Monitoring Location

ID	Description	Location
C1b	Control Point near Intake Site	Overflow channel of Kowloon Reception Reservoir (KRR)
D1b	Impact Monitoring Point near Intake Site	KBR
C2	Control Point near Outfall Site	Natural Stream directing to LSMR
D2a	Impact Monitoring Point near Outfall Site	LSMR

Monitoring Equipment

Noise

2.6 As referenced to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring.

2.7 Immediately prior to and following each noise measurement the accuracy of the sound level meter should be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0dB. The acoustic calibrator to be used shall meet IEC 942, 1988 Class 1 specifications. Annual calibration of all sound level meters and acoustic calibrators shall be conducted by a laboratory in Hong Kong or the manufacturer in compliance with national standards as recommended by the manufacturer of the sound level meter and acoustic calibrator.

Water Quality

2.8 DO and water temperature should be measured in-situ by a DO/temperature meter. The equipment should be portable and weather proof using a DC power source. It should have a membrane electrode with automatic temperature compensation complete with a cable. The equipment should be capable of measuring:

- A DO level in the range of 0-20 mg/l and 0-200% saturation; and
- A temperature of between 0 and 45 degree Celsius.

2.9 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions (e.g. Orion Model 250A or an approved similar instrument) accordingly to the Standard Methods, APHA.

2.10 Turbidity should be measured in situ by the nephelometric method. The instrument should be portable and weatherproof using a DC power source complete with cable, sensor and comprehensive operation manuals. The equipment should be capable of measuring turbidity between 0-1000 NTU.

2.11 A water sampler, consisting of a transparent PVC or glass cylinder of a capacity of not less than two litres which can be effectively sealed with cups at both ends should be used.

2.12 In-situ monitoring instruments should be checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals.

Environmental Quality Performance Limits (Action/Limit Levels)

2.13 The baseline results form basis for determining the environmental acceptance criteria for the impact monitoring. Derived Action/Limit Levels for noise and water quality are summarised in Table 2.5 and 2.6 respectively.

Table 2.5 – Action / Limit Levels for Construction Noise Monitoring

Time Period	Action Level	Limit Level, dB(A)
Daytime (0700-1900) except general holidays and Sunday **Measurements in Leq (30min)*	When one documented compliant is received	75
Daytime (0700-1900) during general holidays and Sundays and all days during Evening (1900-2300 hrs) **Measurements in Leq (5min)*		60
Night-time (2300 – 0700 hrs) **Measurements in Leq (5min)*		45

Table 2.6 – Action/Limit Levels for Water Quality Monitoring

Parameter	Performance Criteria	Monitoring Location	
		D1b	**D2a**
Dissolved Oxygen (mg/L)	Action Level	6.1	6.3
	Limit Level	5.8	6.1
pH Value	Action Level	8.8	9.0
	Limit Level	≤ 6.5 **OR** ≥ 8.9	≤ 6.5 **OR** ≥ 9.2
Turbidity (NTU)	Action Level	19.5	13.1
		OR 120% of upstream control station of the same day	
	Limit Level	23.4	18.9
		OR 130% of upstream control station of the same day	
Suspended Solids (mg/L)	Action Level	9.0	22.0
		OR 120% of upstream control station of the same day	
	Limit Level	13.0	25.0
		OR 130% of upstream control station of the same day	

Remarks:

1. Non-compliance occurs when monitoring result of Dissolved Oxygen is lower than the limits.

2. Non-compliance occurs when monitoring result of pH value is higher than the Action Levels or when the result does not fall into the pH range of the Limit Levels.

3. Non-compliance occurs when monitoring results of Turbidity and Suspended Solids is higher than the limits.

Event / Action Plan

2.14 Should there be any triggering of Action Levels, or exceedance of Limit Levels, the Event / Action Plan established in the approved EM&A Manual should be followed. The Event / Action Plan is attached in **Appendix H**.

3. IMPACT MONITORING METHODOLOGY AND RESULTS

Equipment Used

3.1 Equipment used in impact noise and water quality monitoring during the reporting period is summarized in Table 3.1 below. Calibration certificates of equipment used are attached in **Appendix D**.

Table 3.1 – Equipment Used in the Reporting Period

Environmental Aspect	Equipment	Model
Noise	Sound Level Meter	Svantek SVAN 971
	Calibrator	Pulsar 105
	Portable Anemometer	Kestrel 1000
Water Quality	Multifunctional Meter	HORIBA U-53 Multiparameter Water Quality Meter
		YSI ProDSS

Monitoring Procedure

Noise

3.2 Field measurement procedures for each set of the noise level measurement are as followed:

i. Record the field condition including temperature, weather conditions, and any other potential source of interference;
ii. Turn the power of sound level meter on;
iii. Check the general condition of the sound level meter and the battery status;
iv. Mount the sound level meter onto a tripod of 1.2 m height;
v. Check the distance of the probe from closest facade;
vi. Adjust the orientation of probe so that it is facing the project site;
vii. Calibrate the sound level meter by using acoustic calibrator;
viii. Select the period of measurement to be 30 minutes;
ix. Select the appropriate displaying unit, dB(A);
x. Collect and record the sampled data;
xi. Calibrate the sound level meter by using acoustic calibrator. Repeat procedure ii. to xi. if the difference in calibration level is more than 1.0 dB.

3.3 All noise measurements were performed in the absence of fog, rain and wind with a speed exceeding 5m/s or wind with gusts exceeding 10m/s. Wind speed was checked with portable wind speed meter.

Water Quality

3.4 Field measurement procedures for each set of the water quality measurement are as followed:

i. The DO probe of the multifunctional meter is checked by wet bulb method; the pH and turbidity probes are checked against standard solutions. Record the checking result;
ii. Record the field condition including weather conditions and any other potential source of interference;
iii. Lower the sampler into water body and rinse it with water in the target water body;
iv. Fill the sampler until adequate sample is collected. Replicate sample at each monitoring location is required;
v. Rinse the bottles by the sample before transferring samples into containing bottles;
vi. Rinse the probe of multimeter with distilled water;
vii. Measure and record temperature, turbidity, pH value and DO of each bottle of sample;
viii. Bottles containing sample is stored temporarily in insulation box with ice until reaching the laboratory;

3.5 Analysis of SS was carried out in a HOKLAS accredited laboratory. Standard test method, APHA 2540 D, in accordance to American Public Health Association: Standard Methods for the Examination of Water and Wastewater APHA 21 ed was adopted.

Data Management and QA/QC

3.6 The monitoring data were handled by the ET's in-house data recording and management system. Laboratory responsible for laboratory analysis would follow QA/QC requirements as set out under HOKLAS scheme.

3.7 The in-situ monitoring data measured in the equipment were recorded by both field operators and by the equipment itself. Laboratory analysis results were directly issued by the designated laboratory. All data were then input into a computerized database which is properly maintained by the ET. Cross checking between results was performed by other personnel.

Noise Monitoring Result

3.8 Construction noise monitoring was performed at designated monitoring locations, i.e. NM1 and NM2, during the reporting period.

3.9 There was no construction works conducted in restricted hours in the reporting period. Therefore, only one number of L_{eq}(30min) noise measurements between 0700-1900 hours on any normal weekday was conducted weekly.

3.10 Four (4) sessions of construction noise monitoring were performed at each of the designated monitoring locations. The noise monitoring data is presented in **Appendix E** and results are summarized in Table 3.2.

Table 3.2 Summary of Construction Noise Monitoring Results

Monitoring Location	Time Period	L_{eq}(30min), dB(A)			Limit Level, dB(A)
		Mean	Max	Min	
NM1	0700 - 1900	48.2	57.4	41.2	75
NM2		53.5	60.3	47.6	75

3.11 No construction noise related complaint was received in the reporting period. There was no Action / Limit Levels exceedance of construction noise recorded in the reporting period.

3.12 Weather conditions during monitoring were mainly sunny. Summary of meteorological data is presented in **Appendix G**.

Water Quality Monitoring Result

3.13 Water quality monitoring was performed at approved monitoring locations, i.e. C1b, D1b, C2 and D2a, during the reporting period.

3.14 Thirteen (13) sessions of water quality monitoring were performed at each of the approved monitoring locations. The water quality monitoring data is presented in **Appendix F** and results are summarized in Table 3.3.

Table 3.3 Summary of Water Quality Monitoring Results

Parameters		C1b	D1b	C2	D2a
Dissolved Oxygen (mg/L)	**Min**	6.1	5.9	6.0	5.9
	Max	14.8	9.1	17.03	13.5
	Mean	8.4	7.1	8.5	7.8
Dissolved Oxygen Saturation (%)	**Min**	74.5	70.7	72.1	60.7
	Max	175.6	106.4	197.4	166.1
	Mean	101.1	85.2	100.5	93.0
pH Value	**Min**	7.0	7.2	6.8	6.9
	Max	9.4	8.7	9.5	9.0
	Mean	8.4	8.1	8.5	8.2
Turbidity (NTU)	**Min**	0.9	1.6	3.5	1.6
	Max	29.3	8.8	170.0	15.7
	Mean	6.1	4.0	21.6	4.7
Suspended Solids [1] (mg/L)	**Min**	2.0	2.0	2.0	2.0
	Max	44.0	17.0	3830.0	12.0
	Mean	6.0	3.9	178.6	3.6

Remarks:
1. Lower detection limit of Suspended Solids is 2.0. Data lower than such limit is regarded as 2.0 in result presentation.

3.15 No exceedance was recorded in the reporting month.

3.16 Weather conditions during monitoring were mainly cloudy with sunny intervals. Summary of meteorological data is presented in **Appendix G**.

4. WASTE MANAGEMENT

4.1 An on-site environmental coordinator, i.e. Environmental Officer, has been employed by the Contractor to coordinate and supervise the project waste management works.

4.2 Waste arisen from the construction works are classified into the followings:

- Construction and demolition (C&D) material;
- Chemical waste; and
- General refuse.

4.3 Waste disposal record provided by the Contractor is summarized in Table 4.1.

Table 4.1 Summary of Waste Disposal

Reporting period	Quantity					
	Inert C&D Materials (in'000m^3)	Chemical Waste (in'000kg)	Non-inert C&D Materials			
			Others, e.g. General Refuse disposed at Landfill (in'000m^3)	Recycled materials		
				Paper/card board (in'000kg)	Plastics (in'000kg)	Metals (in'000kg)
November 2019	0.1209	0	0.0036	0	0	0

4.4 The Monthly Summary Waste Flow Table is presented in **Appendix I**.

5. SITE INSPECTION

5.1 Site inspections were conducted in a weekly basis so as to monitoring the implementation of proper environmental pollution control and mitigation measures. Four (4) site inspections were performed in the reporting period.

5.2 Since there was no any construction works commenced in the intake site at KBR, all four (4) site inspections were performed in the outfall site at Lower Shing Mun Reservoir.

5.3 Inspection findings are summarized in Table 5.1.

Table 5.1 Weekly Inspection Findings

Date	Location	Observation(s)	Follow-up Status
6 November 2019	LSMR Site	1. Drip tray should be kept clear.	1. Drip tray was cleaned up.
15 November 2019	LSMR Site	No key observations.	N.A.
20 November 2019	LSMR Site	1. Sediment in drip tray should be cleaned. 2. Chemical bottles should be put on drip tray.	1. Sediment in drip tray was cleaned. 2. Chemical bottles were removed and put in designated area.
27 November 2019	LSMR Site	1. A bucket of waste was observed.	1. The bucket of waste was disposed.

5.4 The Contractor rectified all observations that had been identified in the weekly inspection timely.

6. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

6.1 No exceedance was recorded for water monitoring in the reporting period.

6.2 No exceedance was recorded for noise monitoring in the reporting period.

6.3 There was no environmental related complaint received in the reporting period.

6.4 There was no notification of summon and successful prosecution for breaches of current environmental protection/pollution control legislation in the reporting period.

7. IMPLEMENTATION STATUS OF MITIGATION MEASURES

7.1 The Contractor has been implementing environmental mitigation measures set out in the approved EM&A Manual subject to the actual site condition. The implementation schedule is presented in **Appendix J**. Mitigation measures generally implemented by the Contractor in the reporting period are summarized in Table 7.1.

Table 7.1 Implemented Environmental Mitigation Measures in the Reporting Period

Environmental Aspect	Mitigation Measures Implemented
Air Quality	• Water spraying at works area before, during and after operation • Restricting heights from which materials are to be dropped • All vehicles are washed to remove dusty materials immediately before leaving the site • Erection of hoarding of not less than 2.4m in height • Covering dusty materials stockpile entirely with impervious tarpaulin • Spraying dusty materials with water immediately prior to any loading, unloading or transfer operation
Construction Noise	• The Contractor has been submitting method statement to the Engineer Representative for the approval of working method, equipment and noise mitigation measures to be used before commencing any work • Unused equipment was switched off • Regular maintenance of plants and equipment
Water Quality	• Provision of desilting facilities within works area capable of controlling discharge of SS to comply with WPCO/TM-DSS • Preparing of Contingency Plan which detailing the response and procedures when there is accidental spillage • Provision of channels, earth bunds and sand bags barriers for directing surface runoff to desilting facilities • Existing manholes are covered • Portable chemical toilets were provided on-site and licensed contractor is employed for the collection and disposal process • Two layers of silt curtain are deployed to separate the works area from water gathering ground • Oil and grease removal materials are provided • Exposed slopes are either shotcreted or covered by impervious tarpaulin
Waste Management	• Provision of on-site coordinator for waste management • Excavated material reused on site as far as practicable to minimize off-site disposal • Sorting of waste materials into inert/non-inert type on-site

Environmental Aspect	Mitigation Measures Implemented
	• Trip Ticket System is implemented for control of C&D waste disposal • Covered bins are provided for the containment of general refuse • Toolbox talks were provided to workers for enhancing their awareness
Ecology	• Clear definition of site boundary was provided • *Pavetta hongkongensis* has been transplanted on-site • Eating, leaving food and feeding wildlife are forbidden in works area • Fishing is forbidden in works area • Litter was removed off-site regularly • Unused equipment was switched off
Landscape and Visual	• Retained trees were protected • Hoarding erected is compatible with surrounding setting
Cultural Heritage	• Condition survey was conducted prior to the commencement of construction • Vibration monitoring has been implemented in accordance with recommendations in the condition survey report

8. ENVIRONMENTAL FORECASTING

8.1 As advised by the Contractor, major construction works to be performed in the next reporting month, i.e. December 2019, include the followings:

Works Area	Major Site Activities
Portion A	• Slope upgrading works (soil nail) at slope C27 & C28 • Installation of CLP transformer • Forming of earth bund/TBM launching platform • Pipe pile for tunnel portal and preparation for mined tunnel
Portion C	• Site installation • Double silt curtain installation • Breaking rock slope to formation level and slope protection • Boulder stabilization

8.2 The Contractor is reminded to properly implement mitigation measures for each specified works. Attention should be drawn to air pollution control during soil nailing since the works area is very close to public road. The Contractor should also carefully program the drainage diversion and TBM launching platform works so as to critically protect the water gathering ground of LSMR during construction.

8.3 Tentative schedule of impact construction noise and water quality monitoring for the next reporting month, i.e. December 2019, is presented in **Appendix K**. Monitoring will be performed at same locations presented in above sections.

9. CONCLUSION AND RECOMMENDATIONS

9.1 This is the 5th Monthly Environmental Monitoring and Audit (EM&A) Report presents EM&A works undertaken in the period of 1st to 30th November 2019. EM&A works were performed in accordance with the approved EM&A Manual and conditions stipulated in the Environmental Permit EP-345/2009.

9.2 Impact monitoring for construction noise and water quality were performed in the reporting period. No exceedance was recorded for water monitoring in the reporting period.

9.3 No exceedance was recorded for noise monitoring in the reporting period.

9.4 Similar to predictions from the EIA report, no project-related exceedance was identified from the EM&A programme of the reporting month.

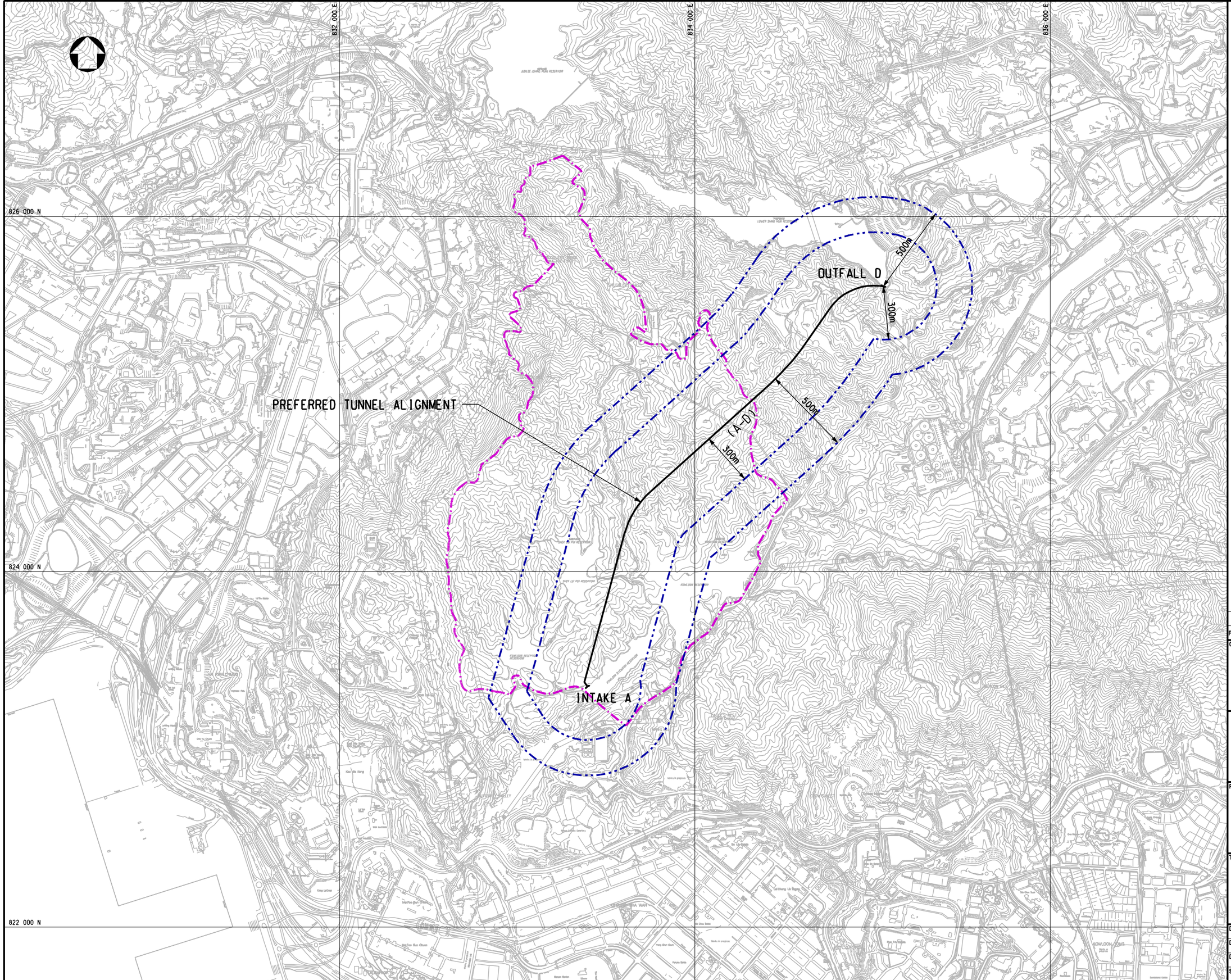
9.5 Weekly site inspections were performed during the reporting period. Observations identified in weekly inspections were rectified timely. Environmental performance of the Project was considered satisfactory.

9.6 No complaint regarding environmental issue was received in the reporting period.

9.7 No notification of summons nor prosecution have been received since the commencement of the Project.

9.8 The Contractor is reminded that all works to be undertaken within the water gathering ground of LSMR and KBR must fulfill statutory environmental requirements, especially in watercourse protection.

Appendix A
Project Site Layout Plan



LEGEND:

KAM SHAN COUNTRY PARK BOUNDARY

STUDY AREA

Rev	Date	Drawn	Description	Ch'k'd	App'd

Client

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION WATER SUPPLIES DEPARTMENT

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Project

Agreement No. CE55/2006(EP)
Inter-reservoirs Transfer Scheme (IRTS)
Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir
Environmental Impact Assessment Investigation

Title

THE PREFERRED SCHEME

Designed	HN/PW		Eng.Chk.	PW	
Drawn	VN		Coordination	PW	
Dwg.Chk.	HN		Approved	AFK	

Scale 1:10000@A1

Project 240564

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Status INF

Drawing No. FIGURE 1-1

Rev

Appendix B
Latest Construction Programme

IRTS: 3 Month Rolling Programme (Dec 19 ~ Feb 20)

Layout : IRT-Rolling Y19M12D02a
TASK filters: 3 Month Rolling, H, Level of Effort.
Data Date : 02-Dec-19

Activity ID	Activity Name	Dur	Start	Finish
IRTS - Rolling Programme Y19M12D02a				
Preliminaries and General Requirements				
PGR_1110	Procurement - Major Sub-Contract (Disposal)	60	02-Jan-20	19-Mar-20
PGR_1400-20	Preparation and Submission of Landscape Plan Proposal to EPD (6 Months after EPD Baseline Monitoring A	38	25-Nov-19 A	10-Jan-20*
PGR_1400-40	Additional Tree Removal Proposal (TRP) Approval by EPD	98	21-Aug-19 A	14-Dec-19
PGR_1820	CNP Application for TBM Operation	30	06-Jan-20	17-Feb-20
BIM Submission				
PGR_1930	Preparation and Submission BIM Combined Services Drawings *(P3)	178	31-May-19 A	31-Dec-19
PGR_1940	Preparation and Submission of Proposal for COBie Information Requirements *(P3)	30	02-Jan-20	13-Feb-20*
Procurement of Consultants and Sub-Contractors				
Sub-Contractors				
Pro_SCon_1300-10	Subcontract Pipe Pile Wall and Grouting Works for Portal (Stage 2A)	12	02-Jan-20	15-Jan-20
Pro_SCon_1300-20	Subcontract Pipe Pile Wall and Grouting Works for Outfall Structure (Stage 2B)	48	24-Jan-20	27-Mar-20
Pro_SCon_1400-10	Subcontract Supply & Installation of Strutting and Wailing System for Outfall Structure	76	24-Jan-20	06-May-20
Pro_SCon_1600	Subcontract E&M work of the electrical actuated penstocks and the automatic flow control system *(P2a)	65	16-Dec-19	11-Mar-20
Tai Po Road Site (TGLA No. TST453)				
TPR_GW-1040	General Site Storage	808	02-Jul-19 A	30-Mar-22
ARPE Submission				
Package 3 - Tunnel Works				
ARPE_P3-010z	Prepare & Submit ARPE Report	77	10-Sep-19 A	10-Dec-19
ARPE_P3-020z	Approval by WSD	12	11-Dec-19	24-Dec-19
CSD Submission				
CSD 2 - Alternative Alignment & Intake Structure				
Design Submission				
CSD_PF_2150	DDA - Review & Acceptance	56	12-Oct-19 A	16-Dec-19
CSD_PF_2160	Approval for Site Construction	0		16-Dec-19
Alternative Works (Subject to approval of alternative tunnel alignment)				
CSD_PF_2170	Preparation and Approval Method Statement and Temp. Works Design	52	02-Oct-19 A	03-Jan-20
CSD_PF_2180	Additional Tree Removal Application & Removal	77	17-Sep-19 A	17-Dec-19
CSD_PF_2190	Rock Breaking for Base Slab Formation and Slope Protection (Work Stoppage during Wet Season April to C	60	04-Jan-20	21-Mar-20
Tunneling Works				
Design Submission				
Mined Tunnel Temporary Works Design				
LSMR Mined Tunnel				
MTD_LS_3000	2nd Submission - Mined Tunnel Design Preparation & Submission with ICE	9	28-Nov-19 A	07-Dec-19
MTD_LS_4000	Review and Acceptance	7	09-Dec-19	16-Dec-19
KBR Mined Tunnel				
MTD_KB_1000	1st Submission - Mined Tunnel Design Preparation & Submission	37	09-Dec-19	23-Jan-20
MTD_KB_2000	Review and Comments	18	24-Jan-20	21-Feb-20
MTD_KB_3000	2nd Submission - Mined Tunnel Design Preparation & Submission with ICE	28	22-Feb-20	25-Mar-20
TBM Thrust Frame Design				
TTF_D_1000	1st Submission - TBM Thrust Frame Design Preparation & Submission	69	16-Sep-19 A	06-Dec-19
TTF_D_2000	Review and Comments	18	07-Dec-19	30-Dec-19
TTF_D_3000	2nd Submission - TBM Thrust Frame Design Preparation & Submission with ICE	5	31-Dec-19	06-Jan-20
TTF_D_4000	Review and Acceptance	12	07-Jan-20	20-Jan-20
TBM Procurement, Manufacture and Delivery				
TBM_Pr_1300-10	TBM Manufacturing	130	01-Aug-19 A	04-Jan-20

Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

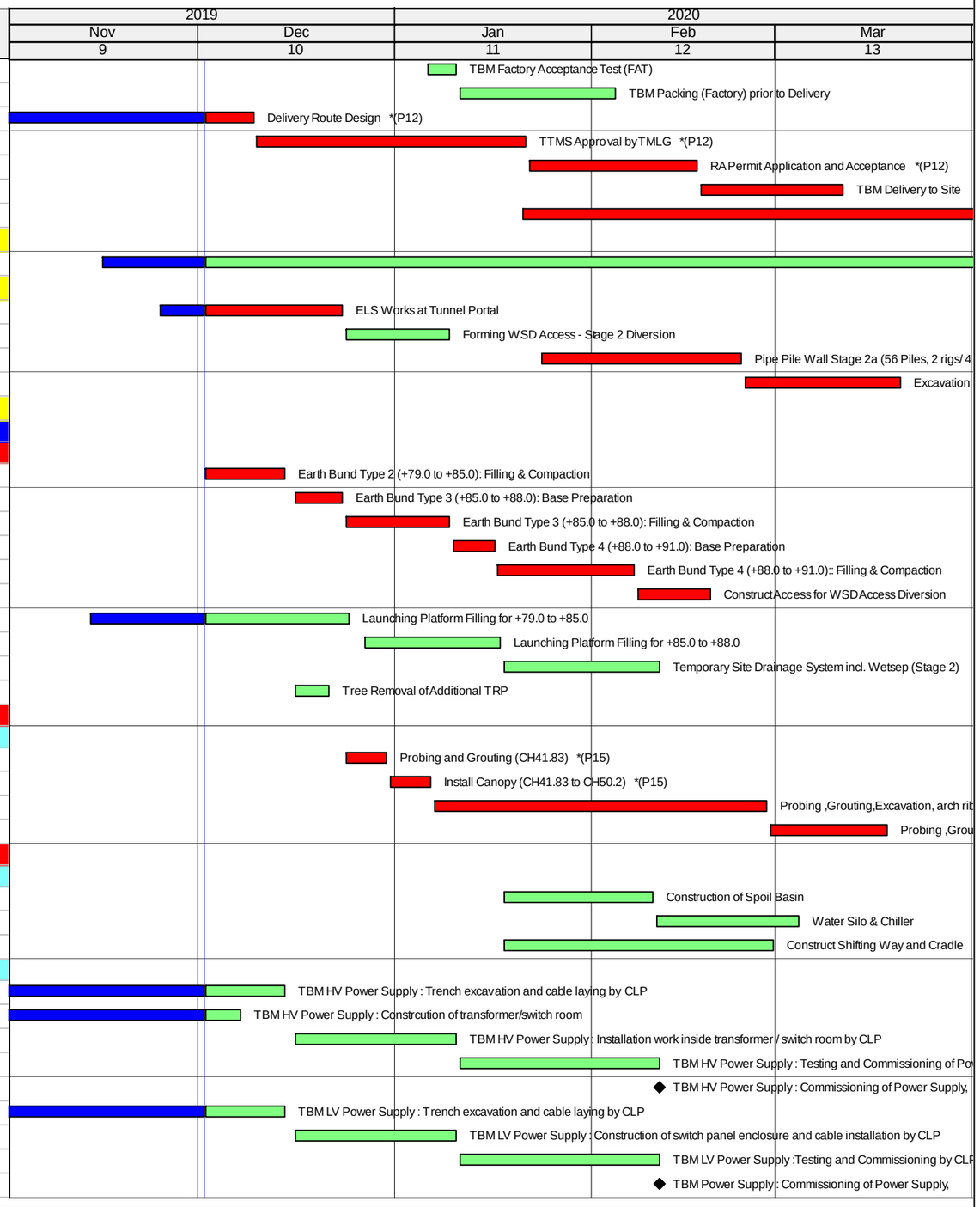
Contract No. DC/2018/08 : Inter-Reservoirs Transfer Scheme
Water Tunnel Between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir

Date	Revision	Checked	Approved
02-Dec-19	Rolling Y19M12D02a	EChu	

IRTS: 3 Month Rolling Programme (Dec 19 ~ Feb 20)

Layout : IRT-Rolling Y19M12D02a
TASK filters: 3 Month Rolling, H, Level of Effort.
Data Date : 02-Dec-19

Activity ID	Activity Name	Dur	Start	Finish
TBM_Pr_1300-20	TBM Factory Acceptance Test (FAT)	5	06-Jan-20	10-Jan-20
TBM_Pr_1300-30	TBM Packing (Factory) prior to Delivery	14	11-Jan-20	04-Feb-20
TBM_Pr_1310	Delivery Route Design *(P12)	93	21-Aug-19 A	09-Dec-19
TBM_Pr_1320	TTMS Approval by TMLG *(P12)	34	10-Dec-19	21-Jan-20
TBM_Pr_1330	RA Permit Application and Acceptance *(P12)	16	22-Jan-20	17-Feb-20
TBM_Pr_1400	TBM Delivery to Site	20	18-Feb-20	11-Mar-20
TBM_Pr_1410	Thrust Fame pruchasing & Manufacturing	72	21-Jan-20	25-Apr-20
Lining Mould Procurement, Manufacture and Delivery				
TBM_Ln_1400	1st Batch : Segment Fabrication & Delivery to site in batches = 848 rings	144	16-Nov-19 A	20-May-20
LSMR - Site Preparation				
TBM_SPr_2000	ELS Works at Tunnel Portal	19	25-Nov-19 A	23-Dec-19
TBM_SPr_2060	Forming WSD Access - Stage 2 Diversion	12	24-Dec-19	09-Jan-20
TBM_SPr_2100	Pipe Pile Wall Stage 2a (56 Piles, 2 rigs/ 4 piles/day+ 6d setup)	20	24-Jan-20	24-Feb-20
TBM_SPr_2110	Excavation to Form TBM Assembling Space	22	25-Feb-20	20-Mar-20
Site Works				
LSMR (North Portal) & TBM				
LSMR : Excavation & Portal Formation				
NP_1000-40	Earth Bund Type 2 (+79.0 to +85.0): Filling & Compaction	12	02-Dec-19 A	14-Dec-19
NP_1000-50	Earth Bund Type 3 (+85.0 to +88.0): Base Preparation	7	16-Dec-19	23-Dec-19
NP_1000-60	Earth Bund Type 3 (+85.0 to +88.0): Filling & Compaction	12	24-Dec-19	09-Jan-20
NP_1000-70	Earth Bund Type 4 (+88.0 to +91.0): Base Preparation	6	10-Jan-20	16-Jan-20
NP_1000-80	Earth Bund Type 4 (+88.0 to +91.0):: Filling & Compaction	12	17-Jan-20	07-Feb-20
NP_1000-90	Construct Access for WSD Access Diversion	10	08-Feb-20	19-Feb-20
NP_1100-20	Launching Platform Filling for +79.0 to +85.0	35	14-Nov-19 A	24-Dec-19
NP_1100-30	Launching Platform Filling for +85.0 to +88.0	18	27-Dec-19	17-Jan-20
NP_1100-40	Temporary Site Drainage System incl. Wetsep (Stage 2)	14	18-Jan-20	11-Feb-20
NP_1360	Tree Removal of Additional TRP	6	16-Dec-19	21-Dec-19
LSMR : Mined Tunnel				
Mined Tunnel (CH 41.83 to CH62.04)				
NP_MT_1000	Probing and Grouting (CH41.83) *(P15)	6	24-Dec-19	30-Dec-19
NP_MT_1100	Install Canopy (CH41.83 to CH50.2) *(P15)	6	31-Dec-19	06-Jan-20
NP_MT_1200	Probing ,Grouting,Excavation, arch rib installation and Shotcereting(CH41.83 to CH50.2) *(P15)	46	07-Jan-20	28-Feb-20
NP_MT_1400	Probing ,Grouting,Excavation, Rock Bolt installation and Shotcereting(CH50.2 to CH62.04) *(P15)	16	29-Feb-20	18-Mar-20
LSMR : TBM Tunnel Excavation				
LSMR : Civil Provision for TBM Launching				
TBM_Cv_1000	Construction of Spoil Basin	13	18-Jan-20	10-Feb-20
TBM_Cv_1010	Water Silo & Chiller	20	11-Feb-20	04-Mar-20
TBM_Cv_1100	Construct Shifting Way and Cradle	30	18-Jan-20	29-Feb-20
LSMR : TBM Power and Water Supply				
TBM_PoS_1110	TBM HV Power Supply : Trench excavation and cable laying by CLP	199	18-Apr-19 A	14-Dec-19
TBM_PoS_1200	TBM HV Power Supply : Constrcution of transformer/switch room	90	23-Aug-19 A	07-Dec-19
TBM_PoS_1300	TBM HV Power Supply : Installation work inside transformer / switch room by CLP	20	16-Dec-19	10-Jan-20
TBM_PoS_1400	TBM HV Power Supply : Testing and Commissioning of Power Suppply by CLP	20	11-Jan-20	11-Feb-20
TBM_PoS_1500	TBM HV Power Supply : Commissioning of Power Supply	0		11-Feb-20
TBM_PoS_1700	TBM LV Power Supply : Trench excavation and cable laying by CLP	198	18-Apr-19 A	14-Dec-19
TBM_PoS_1800	TBM LV Power Supply : Construction of switch panel enclosure and cable installation by CLP	20	16-Dec-19	10-Jan-20
TBM_PoS_1900	TBM LV Power Supply :Testing and Commissioning by CLP	20	11-Jan-20	11-Feb-20
TBM_PoS_2000	TBM Power Supply : Commissioning of Power Supply	0		11-Feb-20



Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

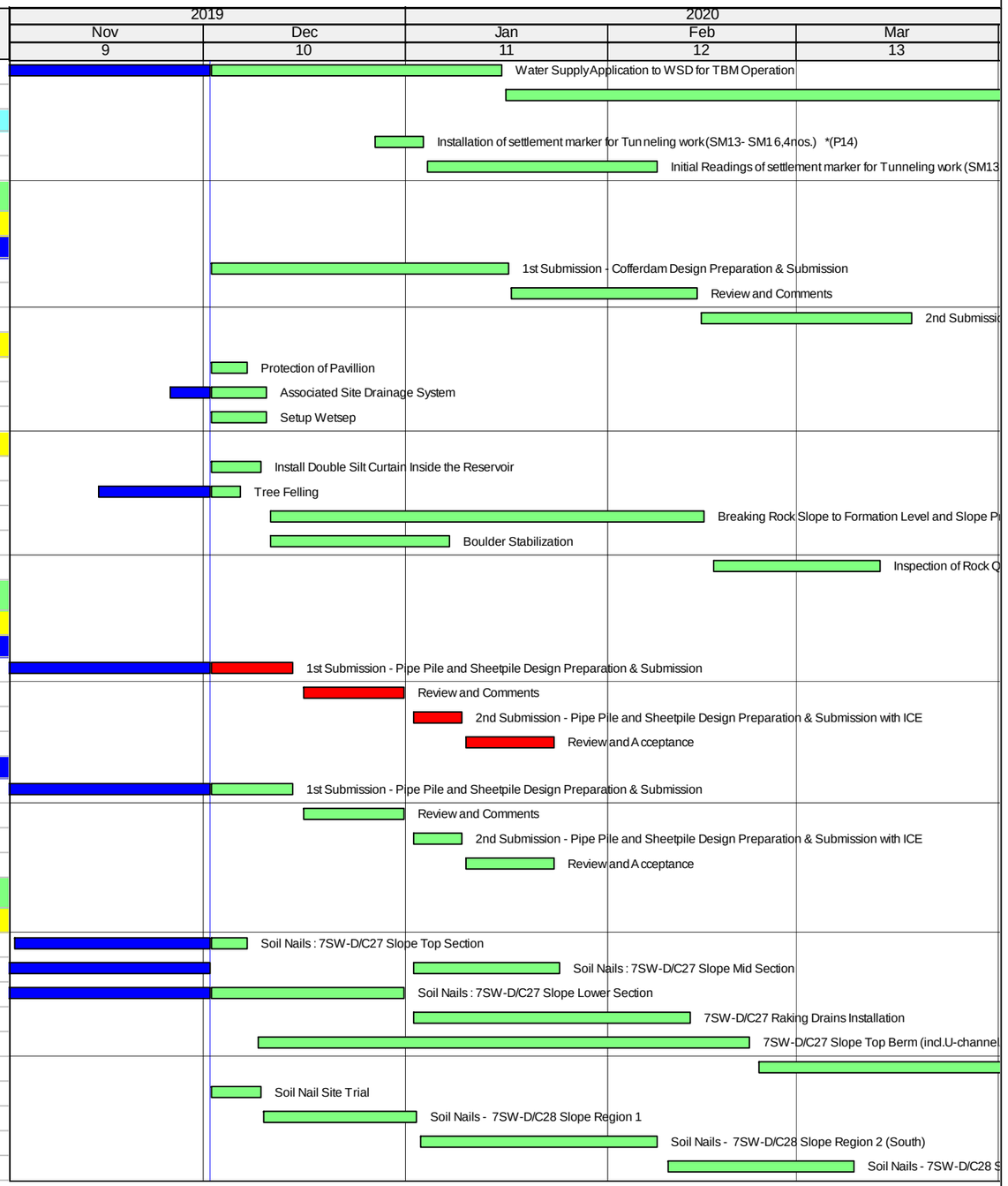
Contract No. DC/2018/08 : Inter-Reservoirs Transfer Scheme
Water Tunnel Between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir

Date	Revision	Checked	Approved
02-Dec-19	Rolling Y19M12D02a	EChu	

IRTS: 3 Month Rolling Programme (Dec 19 ~ Feb 20)

Layout : IRT-Rolling Y19M12D02a
TASK filters: 3 Month Rolling, H, Level of Effort.
Data Date : 02-Dec-19

Activity ID	Activity Name	Dur	Start	Finish
TBM_WtrS_2100	Water Supply Application to WSD for TBM Operation	216	30-Apr-19 A	15-Jan-20
TBM_WtrS_2200	Installation of Water Supply by WSD	90	16-Jan-20	14-May-20
TBM Excavation				
TBM_Exc_0100	Installation of settlement marker for Tunneling work (SM13- SM16,4nos.) *(P14)	6	27-Dec-19*	03-Jan-20
TBM_Exc_1000	Initial Readings of settlement marker for Tunneling work (SM13- SM16,4nos.) *P14)	24	04-Jan-20	08-Feb-20
Intake Structure at Kowloon Byewash Reservoir				
KBR Intake : Design Submission				
KBR Intake : Cofferdam Design				
KBR_ISD_1400	1st Submission - Cofferdam Design Preparation & Submission	37	02-Dec-19	16-Jan-20
KBR_ISD_1500	Review and Comments	18	17-Jan-20	14-Feb-20
KBR_ISD_1600	2nd Submission - Cofferdam Design Preparation & Submission with ICE	28	15-Feb-20	18-Mar-20
KBR : Site Setup and Access				
KB_ISW_1300	Protection of Pavillion	6	02-Dec-19	07-Dec-19
KB_ISW_1700	Associated Site Drainage System	13	26-Nov-19 A	10-Dec-19
KB_ISW_1800	Setup Wetsep	8	02-Dec-19	10-Dec-19
KBR : Intake Structure				
KB_ISW_1900	Install Double Silt Curtain Inside the Reservoir	7	02-Dec-19	09-Dec-19
KB_ISW_2000	Tree Felling	19	15-Nov-19 A	06-Dec-19
KB_ISW_2100	Breaking Rock Slope to Formation Level and Slope Protection	48	11-Dec-19	15-Feb-20
KB_ISW_2205	Boulder Stabilization	21	11-Dec-19	07-Jan-20
KB_ISW_2300	Inspection of Rock Quality, Slope Access Installation, and Drainage System	23	17-Feb-20	13-Mar-20
Outfall Structure at Lower Shing Mun Reservoir (Conforming Design)				
LSMR Outfall : Design Submission				
LSMR Outfall : Stage 2A Pipe Pile Wall for Outfall				
LSM_OSD_0910	1st Submission - Pipe Pile and Sheetpile Design Preparation & Submission	82	09-Sep-19 A	14-Dec-19
LSM_OSD_0920	Review and Comments	12	16-Dec-19	31-Dec-19
LSM_OSD_0930	2nd Submission - Pipe Pile and Sheetpile Design Preparation & Submission with ICE	7	02-Jan-20	09-Jan-20
LSM_OSD_0940	Review and Acceptance	12	10-Jan-20	23-Jan-20
LSMR Outfall : Stage 2B Pipe Pile Wall for Outfall				
LSM_OSD_1000	1st Submission - Pipe Pile and Sheetpile Design Preparation & Submission	84	06-Sep-19 A	14-Dec-19
LSM_OSD_1100	Review and Comments	12	16-Dec-19	31-Dec-19
LSM_OSD_1200	2nd Submission - Pipe Pile and Sheetpile Design Preparation & Submission with ICE	7	02-Jan-20	09-Jan-20
LSM_OSD_1300	Review and Acceptance	12	10-Jan-20	23-Jan-20
Slope Upgrading Works				
LSMR Slope Stabilization Works				
LSM_Slp_1200-10	Soil Nails : 7SW-D/C27 Slope Top Section	31	02-Nov-19 A	07-Dec-19
LSM_Slp_1200-20	Soil Nails : 7SW-D/C27 Slope Mid Section	90	09-Oct-19 A	24-Jan-20
LSM_Slp_1200-30	Soil Nails : 7SW-D/C27 Slope Lower Section	103	29-Aug-19 A	31-Dec-19
LSM_Slp_1210	7SW-D/C27 Raking Drains Installation	30	02-Jan-20	13-Feb-20
LSM_Slp_1600	7SW-D/C27 Slope Top Berm (incl.U-channel/ Step Channel/ Maintenance Access)	56	09-Dec-19	22-Feb-20
LSM_Slp_1700	7SW-D/C27 Slope Mid Berm (incl.U-channel/ Step Channel/ Maintenance Access)	56	24-Feb-20	05-May-20
LSM_Slp_2060	Soil Nail Site Trial	7	02-Dec-19	09-Dec-19
LSM_Slp_2110-10	Soil Nails - 7SW-D/C28 Slope Region 1	18	10-Dec-19	02-Jan-20
LSM_Slp_2110-20	Soil Nails - 7SW-D/C28 Slope Region 2 (South)	25	03-Jan-20	08-Feb-20
LSM_Slp_2110-30	Soil Nails - 7SW-D/C28 Slope Region 2 (Mid)	25	10-Feb-20	09-Mar-20

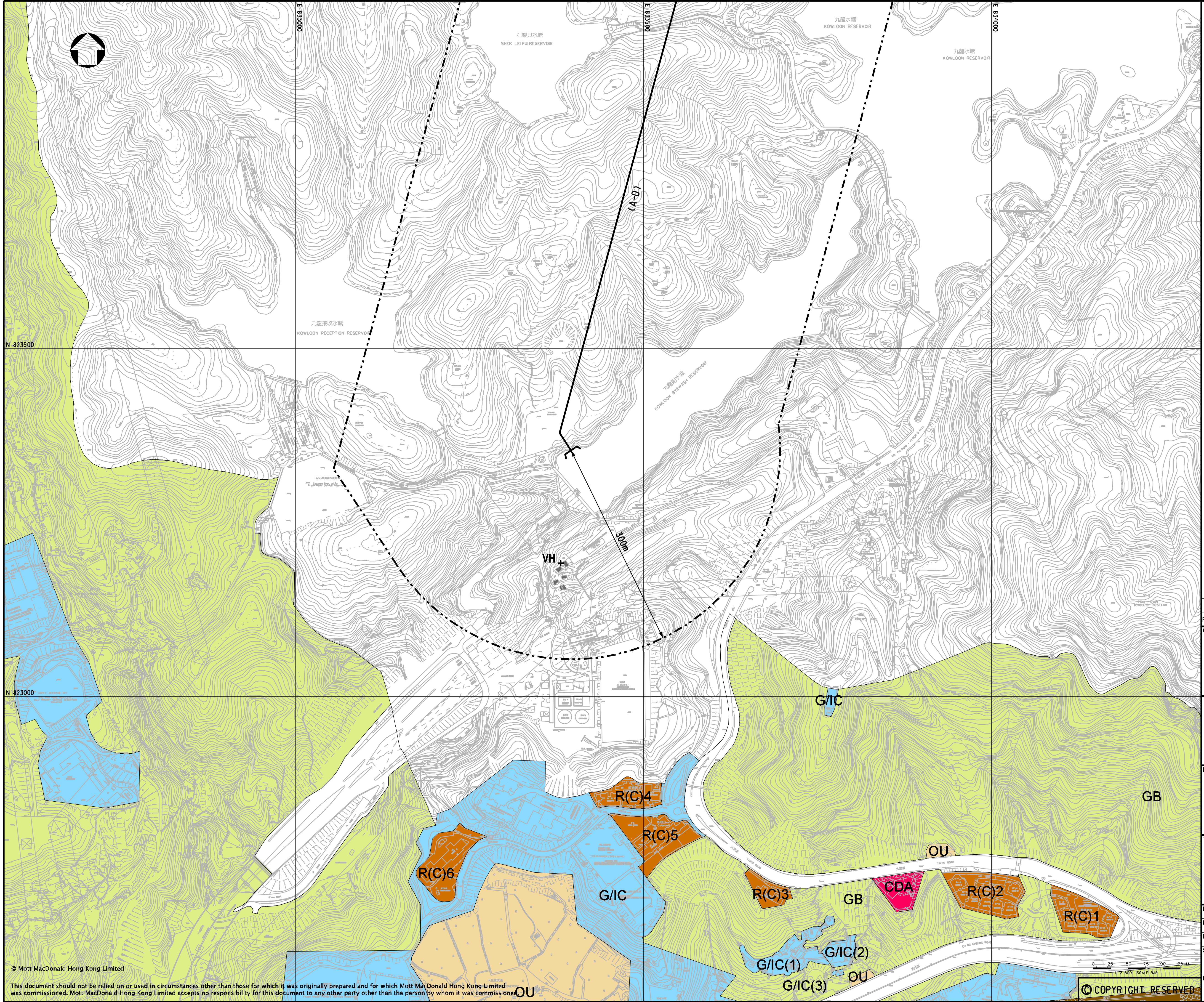


Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Contract No. DC/2018/08 : Inter-Reservoirs Transfer Scheme
Water Tunnel Between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir

Date	Revision	Checked	Approved
02-Dec-19	Rolling Y19M12D02a	EChu	

Appendix C
Monitoring Locations



LEGEND:

— · · —	STUDY AREA BOUNDARY
——	PREFERRED TUNNEL ALIGNMENT
+	NOISE SENSITIVE RECEIVER
C	COMMERCIAL
CDA	COMPREHENSIVE DEVELOPMENT AREA
G/IC	GOVERNMENT/INSTITUTION/COMMUNITY
GB	GREEN BELT
I	INDUSTRIAL
O	OPEN SPACE
OU	OTHER SPECIFIED USES
R(A)	RESIDENTIAL (GROUP A)
R(B)	RESIDENTIAL (GROUP B)
R(C)	RESIDENTIAL (GROUP C)
R(E)	RESIDENTIAL (GROUP E)
V	VILLAGE TYPE DEVELOPMENT

Rev	Date	Drawn	Description	Ch'k'd	App'd

Client

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Project

Agreement No. CE55/2006(EP)
Inter-reservoirs Transfer Scheme (IRTS) Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir Environmental Impact Assessment Investigation

Title

THE STUDY AREA AND REPRESENTATIVE NSRs (INTAKE END)

Designed	HN/PW		Eng.Chk.	PW	
Drawn	VN		Coordination	PW	
Dwg.Chk.	HN		Approved	AFK	

Scale 1:2500@A1	Project 240564	Status INF
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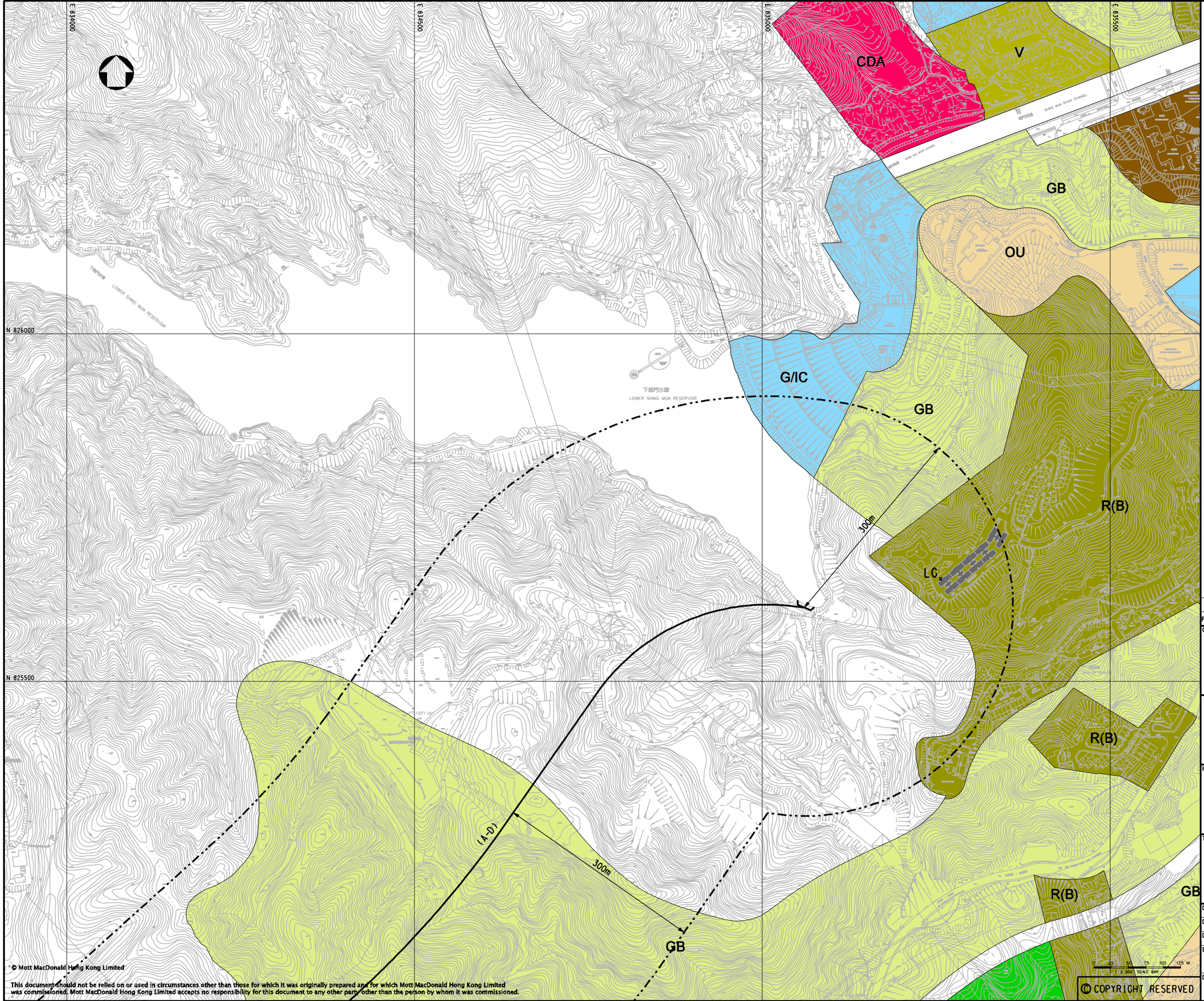
Drawing No. FIGURE 4-1		Rev



Rev	Date	Drawn	Description	Ch'k'd	App'd

Client

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION WATER SUPPLIES DEPARTMENT

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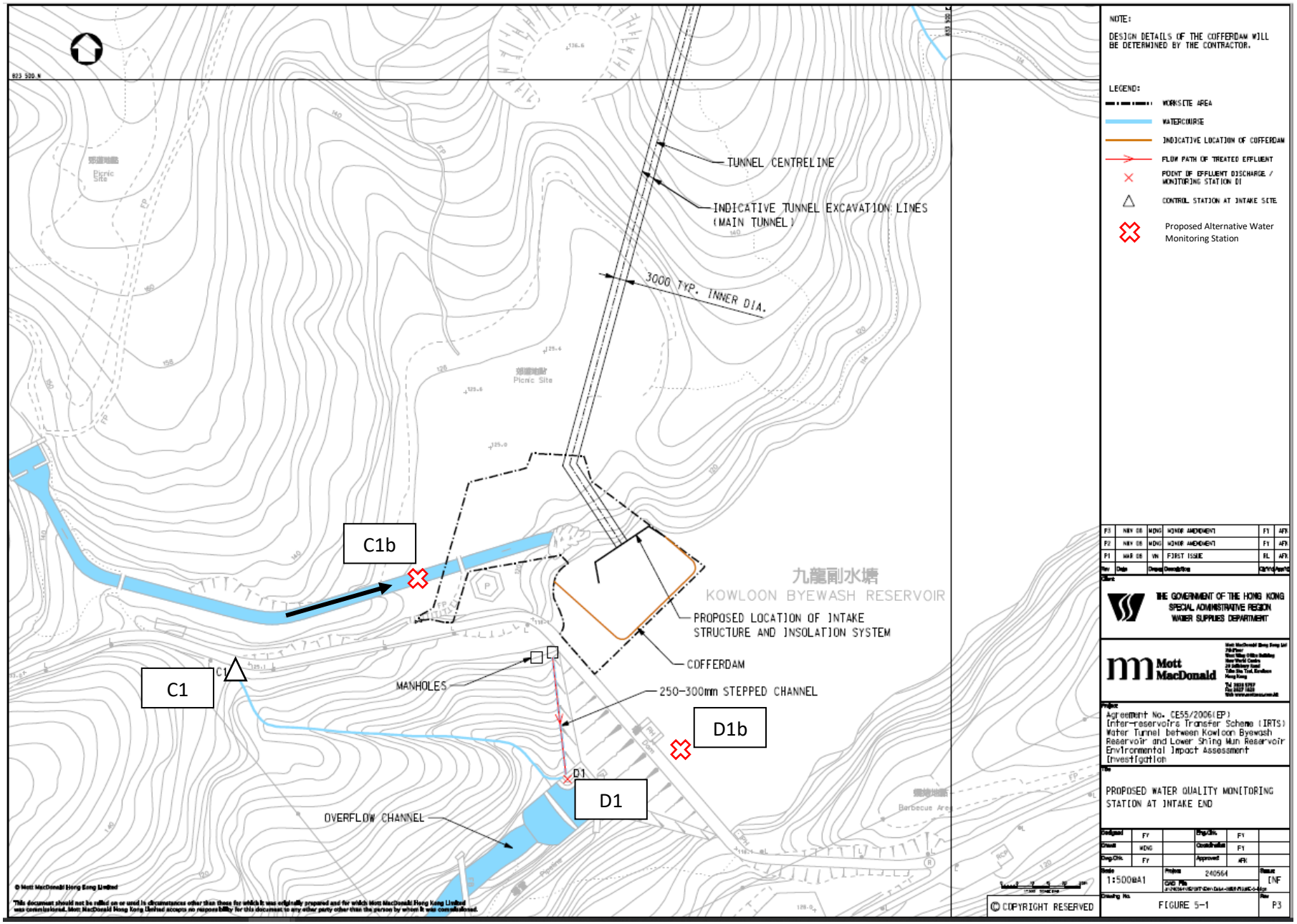
Project

Agreement No. CE55/2006(EP)
Inter-reservoirs Transfer Scheme (IRTS)
Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir
Environmental Impact Assessment Investigation

Title

PROPOSED LOCATION OF NOISE MONITORING STATION AT OUTFALL END

Designed	HN/PW		Eng.Chk.	PW	
Drawn	VN		Coordination	PW	
Dwg.Chk.	HN		Approved	AFK	
Scale	1:2500@A1	Project	240564		Status INF
		CAD File	j:\240564\report\env\em&a-0812\FIGURE-4-2.dgn		
Drawing No.	FIGURE 4-2				Rev


NOTE:
DESIGN DETAILS OF THE COFFERDAM WILL BE DETERMINED BY THE CONTRACTOR.
LEGEND:
WORKSITE AREA
WATERCOURSE
INDICATIVE LOCATION OF COFFERDAM
FLOW PATH OF TREATED EFFLUENT
POINT OF EFFLUENT DISCHARGE / MONITORING STATION D1
CONTROL STATION AT INTAKE SITE
Proposed Alternative Water Monitoring Station
TUNNEL CENTRELINE
INDICATIVE TUNNEL EXCAVATION LINES (MAIN TUNNEL)
3000 TYP. INNER DIA.
C1b
C1
九龍副水塘
KOWLOON BYEWASH RESERVOIR
PROPOSED LOCATION OF INTAKE STRUCTURE AND INSOLATION SYSTEM
COFFERDAM
MANHOLES
250-300mm STEPPED CHANNEL
D1b
D1
OVERFLOW CHANNEL
Picnic Site
Barbecue Area
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
WATER SUPPLIES DEPARTMENT
Mott MacDonald
Agreement No. CE55/2006(EP)
Inter-reservoirs Transfer Scheme (IRTS)
Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir
Environmental Impact Assessment
Investigation
PROPOSED WATER QUALITY MONITORING STATION AT INTAKE END
1:5000@A1
240564
FIGURE 5-1
P3
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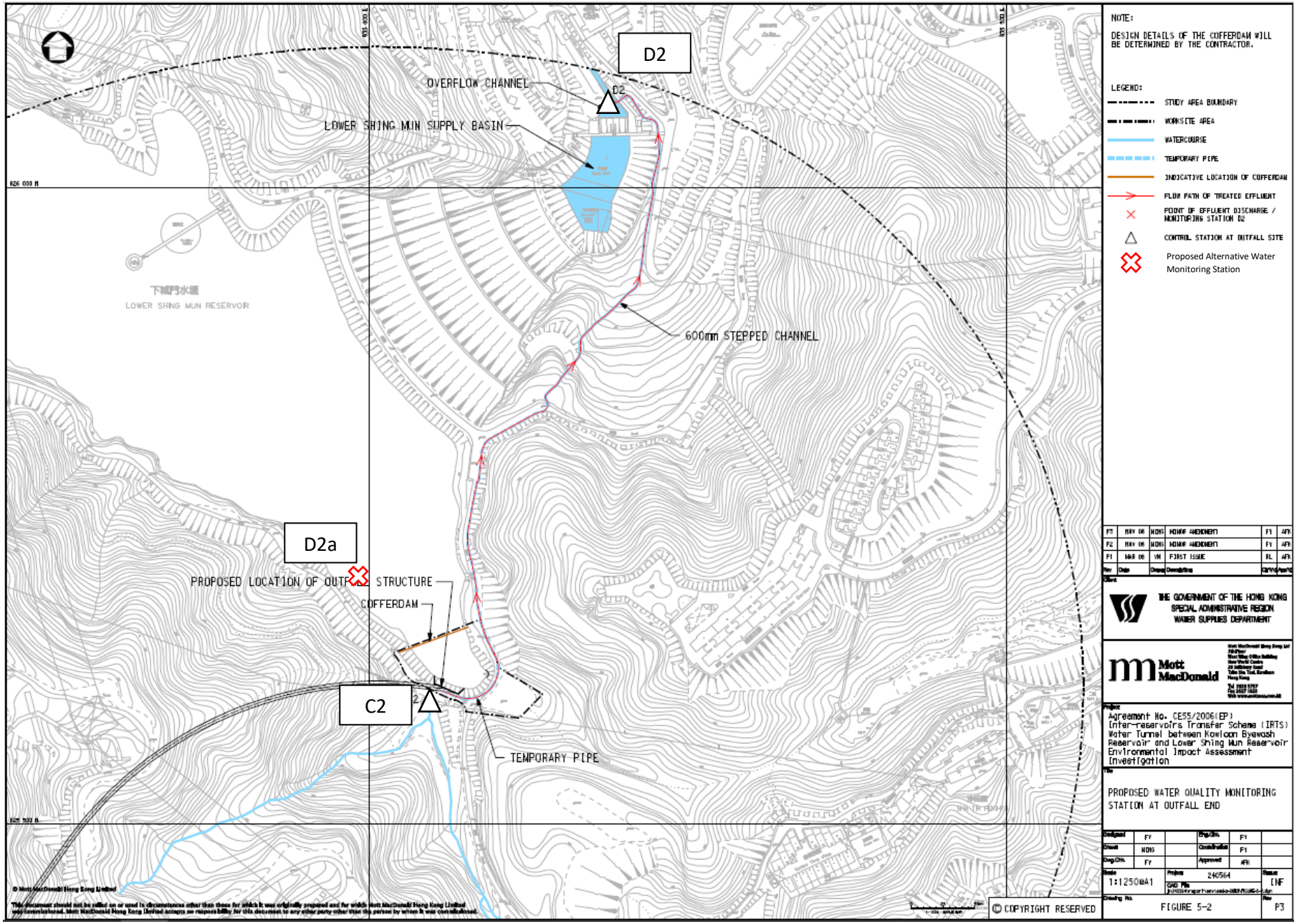
D2
OVERFLOW CHANNEL
D2
LOWER SHING MUN SUPPLY BASIN
下城門水塘
LOWER SHING MUN RESERVOIR
600mm STEPPED CHANNEL
D2a
PROPOSED LOCATION OF OUTFALL STRUCTURE
COFFERDAM
C2
TEMPORARY PIPE
NOTE:
DESIGN DETAILS OF THE COFFERDAM WILL BE DETERMINED BY THE CONTRACTOR.
LEGEND:
STUDY AREA BOUNDARY
WORKSITE AREA
WATERCOURSE
TEMPORARY PIPE
INDICATIVE LOCATION OF COFFERDAM
FLOW PATH OF TREATED EFFLUENT
POINT OF EFFLUENT DISCHARGE / MONITORING STATION D2
CONTROL STATION AT OUTFALL SITE
Proposed Alternative Water Monitoring Station
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
WATER SUPPLIES DEPARTMENT
Mott MacDonald
Agreement No. CE55/2006(EP)
Inter-reservoirs Transfer Scheme (IRTS) Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir
Environmental Impact Assessment Investigation
PROPOSED WATER QUALITY MONITORING STATION AT OUTFALL END
1:1250@A1
240564
FIGURE 5-2
P3
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Appendix D
Calibration Certificates of Equipment Used

Range: **Low**; Steady level nominal result = 60dB

Result	Detector	Duration [ms]	1000	500	200	100	50	20	10	5	2	1	0.5
MAX	Fast	Indication [dB]	60.1	60.0	59.1	57.5	55.3	51.8	48.9	46.0	42.0	39.0	36.0
		Error [dB]	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	-0.0	-0.0	-0.1
	Slow	Indication [dB]	58.0	56.0	52.6	49.8	46.9	42.9	40.0	37.0	32.9	-	-
		Error [dB]	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-	-
SEL	-	Indication [dB]	60.1	57.1	53.1	50.1	47.1	43.1	40.1	37.1	33.1	30.1	27.0
		Error [dB]	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0

Range: **Low**; Steady level nominal result = 35dB

Result	Detector	Duration [ms]	1000	500	200
MAX	Fast	Indication [dB]	35.1	35.0	34.1
		Error [dB]	-0.0	-0.0	0.0
	Slow	Indication [dB]	33.0	31.0	27.6
		Error [dB]	-0.1	-0.0	-0.1
SEL	-	Indication [dB]	35.1	32.1	28.1
		Error [dB]	-0.0	-0.0	0.0

Range: **High**; Steady level nominal result = 134dB

Result	Detector	Duration [ms]	1000	500	200	100	50	20	10	5	2	1	0.5	0.25
MAX	Fast	Indication [dB]	134.1	134.0	133.1	131.5	129.3	125.8	122.9	120.0	116.0	113.0	110.0	107.0
		Error [dB]	-0.0	0.0	0.0	0.0	-0.0	-0.0	-0.1	0.0	-0.0	-0.0	-0.1	-0.1
	Slow	Indication [dB]	132.0	130.0	126.6	123.8	120.9	117.0	114.0	111.0	107.0	-	-	-
		Error [dB]	-0.1	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-	-	-
SEL	-	Indication [dB]	134.1	131.1	127.1	124.1	121.1	117.1	114.1	111.1	107.1	104.0	101.0	98.0
		Error [dB]	0.0	-0.0	0.0	0.0	-0.0	0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1

Range: **High**; Steady level nominal result = 54dB

Result	Detector	Duration [ms]	1000	500	200	100	50
MAX	Fast	Indication [dB]	54.1	54.0	53.1	51.5	49.3
		Error [dB]	0.0	0.0	0.0	0.0	-0.0
	Slow	Indication [dB]	52.1	50.0	46.6	43.9	40.9
		Error [dB]	-0.0	-0.0	-0.1	-0.1	-0.1
SEL	-	Indication [dB]	54.1	51.1	47.1	44.1	41.1
		Error [dB]	0.0	0.0	0.0	0.0	0.0

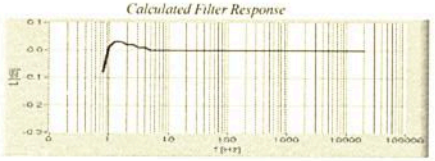
Range: **High**; Steady level nominal result = 45dB

Result	Detector	Duration [ms]	1000	500	200
MAX	Fast	Indication [dB]	45.2	45.1	44.2
		Error [dB]	0.0	0.0	0.0
	Slow	Indication [dB]	43.1	41.0	37.7
		Error [dB]	-0.0	-0.0	-0.1
SEL	-	Indication [dB]	45.2	42.2	38.2
		Error [dB]	0.0	0.0	0.1

4. FREQUENCY RESPONSE* (electrical)

LEVEL METER function; Characteristic: Z; Range: Low; Input signal =120 dB;

Calculated Filter Response



Measured Filter Response with Preamplifier SV18 (f-frequency, L-level)

f [Hz]	L [dB]	f [Hz]	L [dB]	f [Hz]	L [dB]
10	-0.1	63	0.0	4000	0.0
12.5	0.0	125	0.0	8000	0.0
16	0.0	250	0.0	16000	0.0
20	0.0	500	0.0	20000	0.0
25	0.0	1000	0.0		
31.5	0.0	2000	0.0		

All frequencies are nominal center values for the 1/3 octave bands

5. INTERNAL NOISE LEVEL* (electrical - compensated)

LEVEL METER function; Range: Low; (Back-light – off) ; Calibration factor: 0dB

Characteristic	Z	A	C
Level [dB]	≤20	≤12	≤12

* measured with preamplifier SVANTEK type SV18 No. 78763.

6. INTERNAL NOISE LEVEL (acoustical - compensated)

LEVEL METER function; Characteristic: A; (Backlight – off)

Range	Low	High
Indication [dB]	≤15	19.8

Noise measured in special chamber, with reference microphone G.R.A.S type 40AN No. 73421

ENVIRONMENTAL CONDITIONS

Temperature	Relative humidity	Ambient pressure
23 °C	25%	1016 hPa

TEST EQUIPMENT

Item	Manufacturer	Model	Serial no.	Description
1.	SVANTEK	SVAN 401	87	Signal generator
2.	SVANTEK	SVAN 912A	6120	Sound &Vibration Analyser
3.	RIGOL	DM3068	DM30155100773	Digital multimeter
4.	SVANTEK	SV33	48878	Acoustic calibrator
5.	SVANTEK	ST02	-	Microphone equivalent electrical impedance (18pF)

CONFORMITY & TEST DECLARATION

1. Herewith Svantek company declares that this instrument has been calibrated and tested in compliance with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them.

2. The acoustic calibration was performed using the Sound Calibrator and is traceable to the GUM (Central Office of Measures) reference standard - sound level calibrator type 4231 No 2292773.

3. The information appearing on this sheet has been compiled specifically for this instrument. This form is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.

4. This calibration sheet shall not be reproduced except in full, without written permission of the SVANTEK Ltd.

Calibration specialist: Krzysztof Czachor .....

Test date: 2019-02-06

SVANTEK

ISO9001 certified

FACTORY CALIBRATION DATA OF THE *SVAN 971 No. 77731*

with preamplifier SVANTEK type SV18 No. 78763 and with microphone ACO type 7052E No. 72681

1. CALIBRATION* (acoustical)

LEVEL METER function; Range: Low; Reference frequency: 1000Hz; Sound Pressure Level: **113.97** dB.

Characteristic	Correct value [dB]	Indication [dB]	Error [dB]
Z	113.97	114.01	0.04
A	113.97	114.01	0.04
C	113.97	114.01	0.04

Calibration measured with the microphone ACO type 7052E No. 72681. Calibration factor: -0.20 dB.

2. LINEARITY TEST* (electrical)

LEVEL METER function; Range: Low; Characteristic: A; f_{set}= 31.5 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	83.0
Error [dB]	0.1	0.0	0.0	0.0	-0.0	0.0	0.0	0.0

LEVEL METER function; Range: Low; Characteristic: A; f_{set}= 1000 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	80.0	100.0	123.0
Error [dB]	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0

LEVEL METER function; Range: Low; Characteristic: A; f_{set}= 8000 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	80.0	100.0	122.0
Error [dB]	-0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0

LEVEL METER function; Range: High; Characteristic: A; f_{set}= 31.5 Hz

Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	97.0
Error [dB]	0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	0.0

LEVEL METER function; Range: High; Characteristic: A; f_{set}= 1000 Hz

Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	100.0	120.0	137.0
Error [dB]	0.1	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0

LEVEL METER function; Range: High; Characteristic: A; f_{set}= 8000 Hz

Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	100.0	120.0	136.0
Error [dB]	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0

1/3 OCTAVE (1kHz); Range: Low; f_{set}= 1000 Hz

Nominal result [dB]	25.0	30.0	40.0	60.0	80.0	100.0	120.0	123.0
Error [dB]	0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0	-0.0

3. TONE BURST RESPONSE*

LEVEL METER function; Characteristic: A; f_{set}= 4000 Hz; Burst duration: 2s

Range: **Low**; Steady level nominal result = 120dB

Result	Detector	Duration [ms]	1000	500	200	100	50	20	10	5	2	1	0.5	0.25
MAX	Fast	**Indication** [dB]	120.1	120.0	119.1	117.5	115.2	111.8	108.9	106.0	102.0	99.0	96.0	93.0
		Error [dB]	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	-0.0	-0.0	-0.1	-0.1
	Slow	**Indication** [dB]	118.0	115.9	112.6	109.8	106.8	102.9	99.9	96.9	93.0	-	-	-
		Error [dB]	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-	-	-
SEL	-	**Indication** [dB]	120.1	117.1	113.1	110.1	107.1	103.1	100.1	97.0	93.1	90.0	87.0	83.9
		Error [dB]	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.1	-0.1

SVANTEK

1/2" Prepolarized Condenser Microphone

Calibration Chart

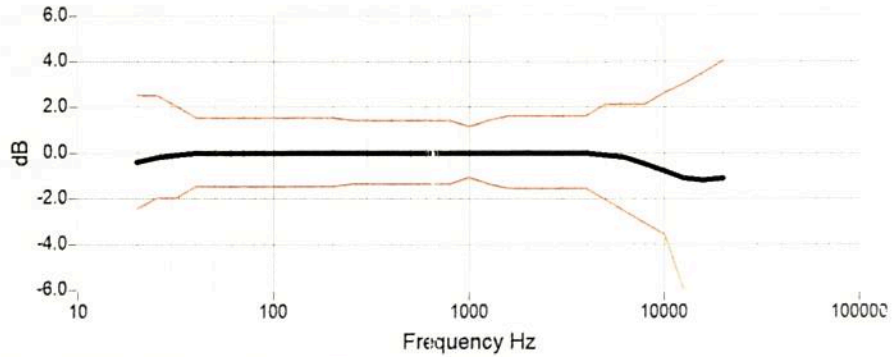
Type: ***7052E*** Serial No: ***72681***

Measured sensitivity: **35.41 mV/Pa**

Manufacturer: ***ACO PACIFIC***

Date: **2019-01-21** Signature: .....

Measured Free-Field Frequency Response



Environmental Calibration Conditions: **22 °C 28 % 1010 hPa**

MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue	28-Sep-2019	**Certificate Number**	MLCN192490S

Customer Information

Company Name	Acuity Sustainability Consulting Limited
Address	Unit 1908, Nos. 301-305 Castle Peak Road, Kwai Chung, N.T.

Equipment-under-Test (EUT)

Description	Acoustic Calibrator
Manufacturer	Pulsar
Model Number	105
Serial Number	63705
Equipment Number	--

Calibration Particular

Date of Calibration	28-Sep-2019		
Calibration Equipment	4231(MLTE008) / AV180068 / 13-May-20 1357(MLTE190) / MLEC19/05/02 / 26-May-20		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	Not applicable
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages. Calibration result was out of EUT specification.		

Approved By & Date

For K.O. Lo 28-Sep-2019

Statements

* Calibration equipment used for this calibration are traceable to national / international standards.
* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.

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MaxLab Calibration Centre Limited
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Unit B2, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk

MAXLAB

Certificate No. MLCN192490S

Calibration Data				
EUT Setting	**Standard Reading**	**EUT Error from Setting**	**Calibration Uncertainty**	**EUT Specification**
94 dB	93.8 dB	-0.2 dB	0.20 dB	± 0.2 dB

- END -

Calibrated By : Dan
Date : 28-Sep-19

Checked By : K.O. Lo
Date : 28-Sep-19

萬儀校正中心有限公司
MaxLab Calibration Centre Limited
香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室
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CALIBRATION CERTIFICATE

Certificate Information

Date of Issue	20-Jun-2019	**Certificate Number**	MLCN191363S

Customer Information

Company Name	Acuity Sustainability Consulting Limited
Address	Unit 1908, Nos. 301-305 Castle Peak Road, Kwai Chung, N.T.

Equipment-under-Test (EUT)

Description	Pocket Weather Meter
Manufacturer	Kestrel
Model Number	1000
Serial Number	2145043
Equipment Number	--

Calibration Particular

Date of Calibration	20-Jun-2019		
Calibration Equipment	WT4401S(MLTE143A) / 021606 / 6-Aug-2019 DPG409-10WDWU(MLTE208) / MLEC18/09/05 / 17-Sep-2019		
Calibration Procedure	MLCG00		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages.		

Approved By & Date

K.O. Lo 20-Jun-2019

Statements

* Calibration equipment used for this calibration are traceable to national / international standards.
* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
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Certificate No. MLCN191363S

Calibration Data

Function	Range	EUT Reading	Standard Reading	EUT Error (% of Rdg)	Calibration Uncertainty (% of Rdg)
Air Velocity	0.6 to 40 m/s	5.0 m/s	5.12 m/s	-2.4%	3%
		10.0 m/s	10.08 m/s	-0.7%	3%
		15.0 m/s	14.91 m/s	0.6%	3%
		20.4 m/s	20.02 m/s	1.9%	3%

- END -

Calibrated By : Dan
Date : 20-Jun-2019

Checked By : K.O. Lo
Date : 20-Jun-2019

萬儀校正中心有限公司
MaxLab Calibration Centre Limited
香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室
Unit B2, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk

專 業 化 驗 有 限 公 司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

AMENDMENT CALIBRATION REPORT

Amendment Test Report No.	:	AI100146A
Amendment Test Report Date of Issue	:	13 November 2019
Superseded Test Report No.	:	*AI100146*
Superseded Test Report Date of Issue	:	*23 October 2019*
Page No.	:	1 of 3

PART A – CUSTOMER INFORMATION

Acuity Sustainability Consulting Limited
Unit 1908, Nos. 301-305
Castle Peak Road, Kwai Chung
N.T., HK
Attn: Mr. Nelson TSUI

PART B – CHANGE OF INFORMATION

This amendment report supersedes any previous report number AI100146 dated 23 October 2019 with this reference, the details as indicated below in the selected checkbox:

☐ Supersede relevant page(s) of previous report by the attached:

_____(page no)

☒ Supersede whole previous report by the attached amendment test report.

The superseded pages or the superseded report become invalid. Please destroy them immediately or return to our office for cancelation

Amendment detail(s):

No.	Description of the amendment	Reason of the amendment
1	Name of Equipment	Typo
2	Serial Number	Typo

~ CONTINUED ON NEXT PAGE ~

FUNG Yuen-ching Aries
Laboratory Manager

專 業 化 驗 有 限 公 司
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AMENDMENT CALIBRATION REPORT

Amendment Test Report No.	:	AI100146A
Amendment Test Report Date of Issue	:	13 November 2019
Superseded Test Report No.	:	*AI100146*
Superseded Test Report Date of Issue	:	*23 October 2019*
Page No.	:	2 of 3

PART C – DESCRIPTION

Name of Equipment	:	Multi Water Quality Checker U-53
Manufacturer	:	Horiba
Serial Number	:	UHB5F2BB
Date of Received	:	Oct 15, 2019
Date of Calibration	:	Oct 23, 2019
Date of Next Calibration[a]	:	Jan 22, 2020

PART D – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Parameter	**Reference Method**
pH at 25ºC	APHA 21e 4500-H^+ B
Dissolved Oxygen	APHA 21e 4500-O G
Salinity	APHA 21e 2520 B
Turbidity	APHA 21e 2130 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure.
Oxidation-Reduction Potential	APHA 22e 2580 B

PART E – CALIBRATION RESULTS[b,c]

(1) pH at 25ºC

Target (pH unit)	Displayed Reading[d] (pH Unit)	Tolerance[e](pH Unit)	Results
4.00	4.08	0.08	Satisfactory
7.42	7.50	0.08	Satisfactory
10.01	10.02	0.01	Satisfactory

Tolerance of pH should be less than ±0.20 (pH unit)

(2) Temperature

Reading of Ref. thermometer (ºC)	Displayed Reading (ºC)	Tolerance (ºC)	Results
10.0	10.06	0.06	Satisfactory
27.1	27.23	0.13	Satisfactory
45.1	45.05	0.05	Satisfactory

Tolerance limit of temperature should be less than ±2.0 (ºC)

~ CONTINUED ON NEXT PAGE ~

Remark(s): -

[a] *The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted form relevant international standards.*
[b] *The results relate only to the calibrated equipment as received*
[c] *The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.*
[d] *"Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.*
[e] *The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.*

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AMENDMENT CALIBRATION REPORT

Amendment Test Report No. : AI100146A
Amendment Test Report Date of Issue : 13 November 2019

Superseded Test Report No. : *AI100146*
Superseded Test Report Date of Issue : *23 October 2019*

PART D – CALIBRATION RESULTS (Cont'd)

(3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
7.43	7.40	-0.03	Satisfactory
5.00	5.11	+0.11	Satisfactory
2.00	1.67	-0.33	Satisfactory
0.11	0.34	+0.23	Satisfactory

Tolerance limit of dissolved oxygen should be less than ±0.50 (mg/L)

(4) Salinity

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)	Results
10	9.68	-3.2	Satisfactory
20	19.84	0.8	Satisfactory
30	30.48	1.6	Satisfactory

Tolerance limit of salinity should be less than ±10.0 (%)

(5) Turbidity

Expected Reading (NTU)	Displayed Reading[f] (NTU)	Tolerance[g] (%)	Results
0	0.53	--	Satisfactory
10	9.40	-6.0	Satisfactory
20	18.96	-5.2	Satisfactory
100	93.9	-6.1	Satisfactory
800	751	-6.1	Satisfactory

Tolerance limit of turbidity should be less than ±10.0 (%)

(6) Oxidation-Reduction Potential

Expected Reading (mV)	Displayed Reading (mV)	Tolerance (mV)	Results
228	236	8	Satisfactory

Tolerance limit of Oxidation-Reduction Potential should be less than ±10 (mV)

~ END OF REPORT ~

Remark(s): -

[f] *"Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.*

[g] *The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.*

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REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AI100180
Date of Issue : 04 November, 2019

PART A – CUSTOMER INFORMATION

Acuity Sustainability Consulting Limited
Unit C, 11/F, Ford Glory Plaza
37-39 Wing Hong Street
Cheung Sha Wan, Kowloon, Hong Kong
Attn: Mr. Nelson TSUI

PART B – DESCRIPTION

Name of Equipment	:	YSI ProDSS Multi Parameters
Manufacturer	:	YSI (a xylem brand)
Serial Number	:	15M101091
Date of Received	:	Oct 28, 2019
Date of Calibration	:	Nov 01, 2019
Date of Next Calibration[a]	:	Feb 01, 2020

PART C – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Parameter	Reference Method
pH at 25°C	APHA 21e 4500-H^+ B
Dissolved Oxygen	APHA 21e 4500-O G
Salinity	APHA 21e 2520 B
Turbidity	APHA 21e 2130 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

PART D – CALIBRATION RESULTS[b,c]

(1) pH at 25°C

Target (pH unit)	Displayed Reading[d] (pH Unit)	Tolerance[e](pH Unit)	Results
4.00	4.05	0.05	Satisfactory
7.42	7.43	0.01	Satisfactory
10.01	10.10	0.09	Satisfactory

Tolerance of pH should be less than ±0.20 (pH unit)

(2) Temperature

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)	Results
4.0	3.9	-0.1	Satisfactory
25.1	25.1	0.0	Satisfactory
46.0	46.1	0.1	Satisfactory

Tolerance limit of temperature should be less than ±2.0 (°C)

~ CONTINUED ON NEXT PAGE ~

Remark(s): -

(a) The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted form relevant international standards.
(b) The results relate only to the calibrated equipment as received
(c) The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
(d) "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.
(e) The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.

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REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AI100180
Date of Issue : 04 November, 2019

PART D – CALIBRATION RESULTS (Cont'd)

(3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
0.10	0.22	0.12	Satisfactory
1.61	1.49	-0.12	Satisfactory
4.68	4.54	-0.14	Satisfactory
7.89	7.75	-0.14	Satisfactory

Tolerance limit of dissolved oxygen should be less than ±0.50 (mg/L)

(4) Salinity

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)	Results
10	9.98	-0.20	Satisfactory
20	20.46	2.30	Satisfactory
30	31.24	4.13	Satisfactory

Tolerance limit of salinity should be less than ±10.0 (%)

(5) Turbidity

Expected Reading (NTU)	Displayed Reading[f] (NTU)	Tolerance[g] (%)	Results
0	-0.10	--	Satisfactory
10	9.81	-1.9	Satisfactory
20	19.23	-3.9	Satisfactory
100	97.16	-2.8	Satisfactory
800	791.46	-1.1	Satisfactory

Tolerance limit of turbidity should be less than ±10.0 (%)

~ END OF REPORT ~

Remark(s): -

(f) "Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.

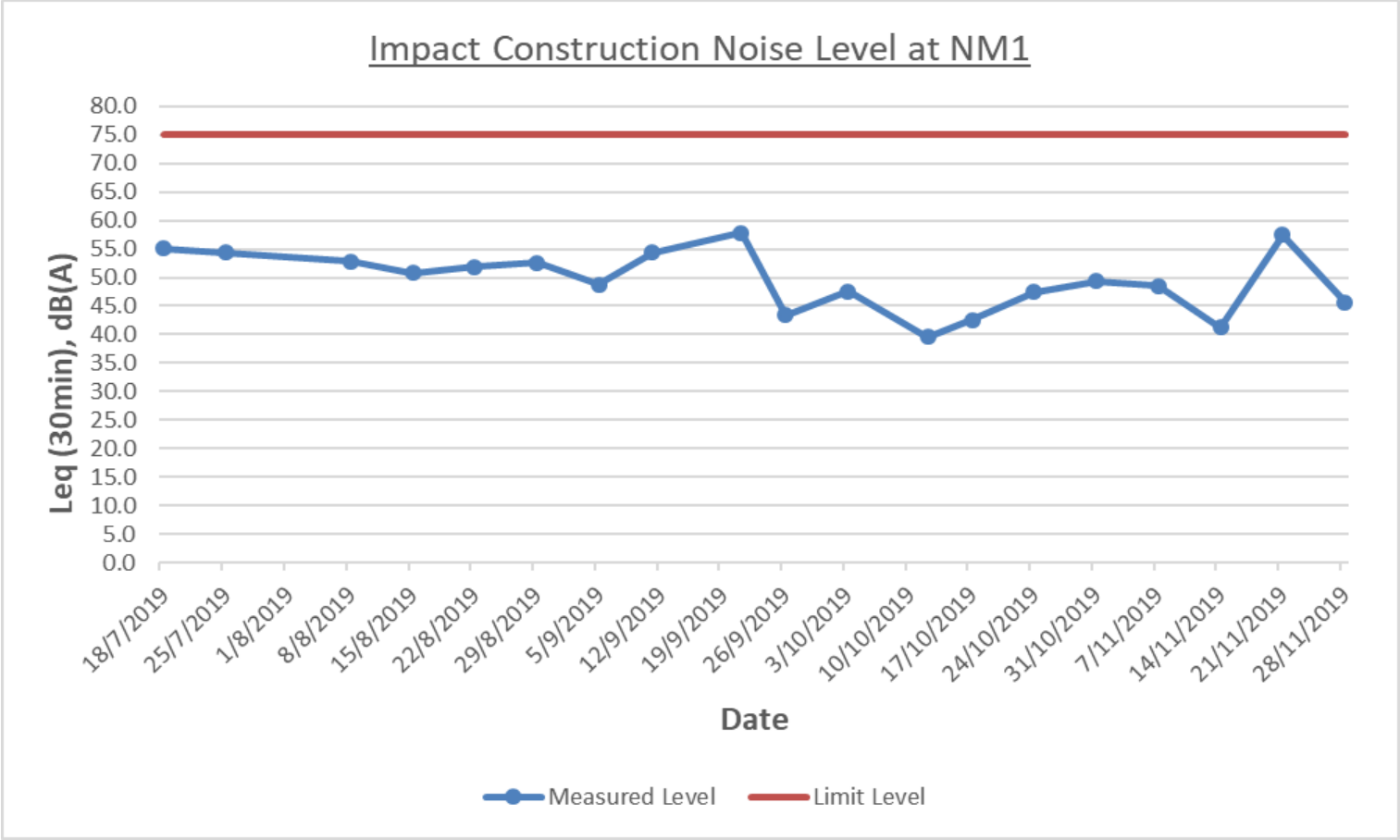
(g) The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.

Appendix E
Impact Noise Monitoring Data

Impact Noise Monitoring Data

NM1 – Lakeview Garden

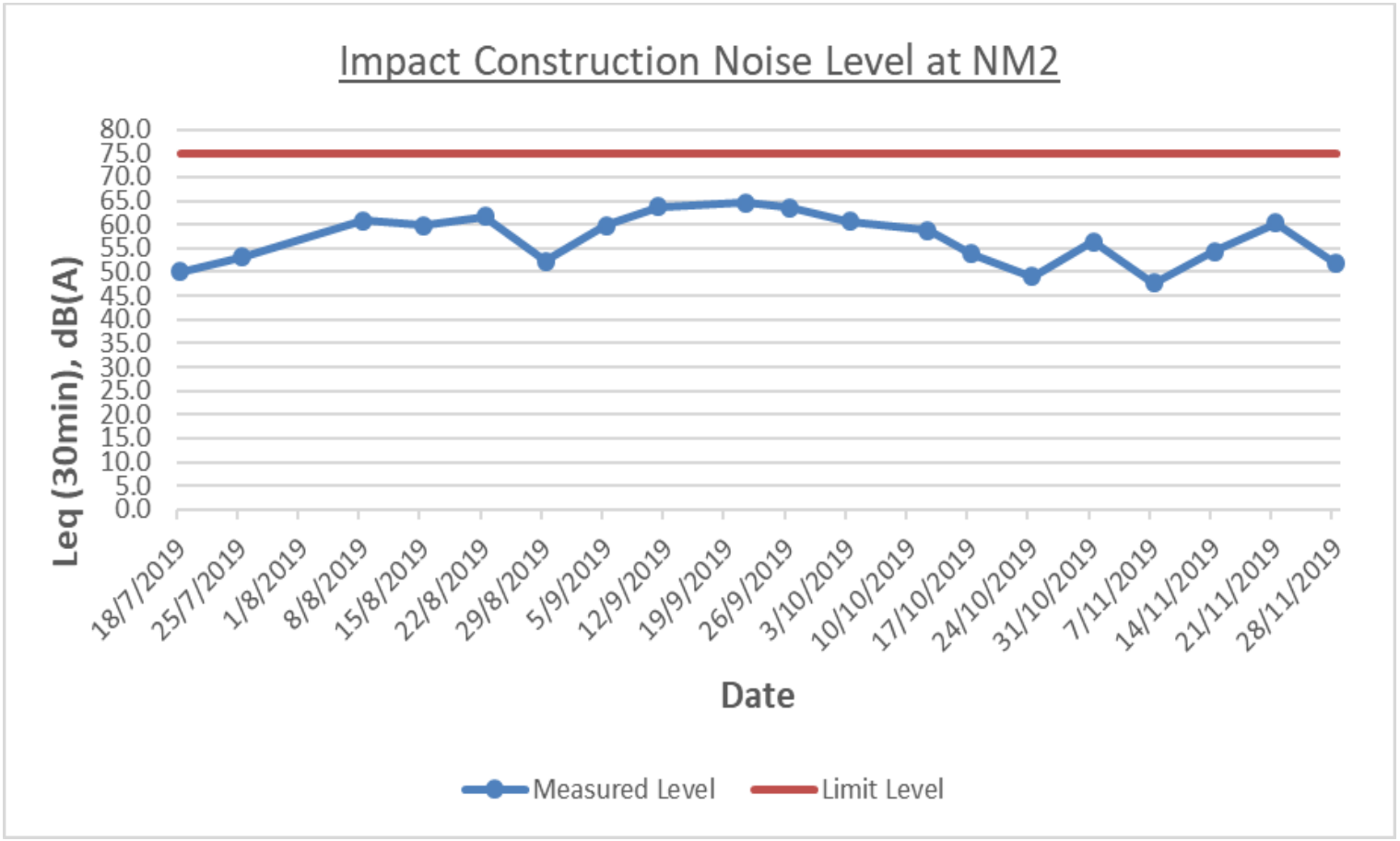
Date	Location	Time			Weather	Leq (30min)	L10	L90	Remarks
7/11/2019	NM1	14:54	-	15:24	Sunny	48.5	50.1	46.4	N.A.
14/11/2019	NM1	10:33	-	11:03	Sunny	41.2	43.8	37.0	N.A.
21/11/2019	NM1	13:43	-	14:13	Sunny	57.4	57.6	45.3	N.A.
28/11/2019	NM1	13:43	-	14:13	Sunny	45.6	47.2	42.1	N.A.



Impact Noise Monitoring Data

NM2 – 4 ½ Milestone, Tai Po Road

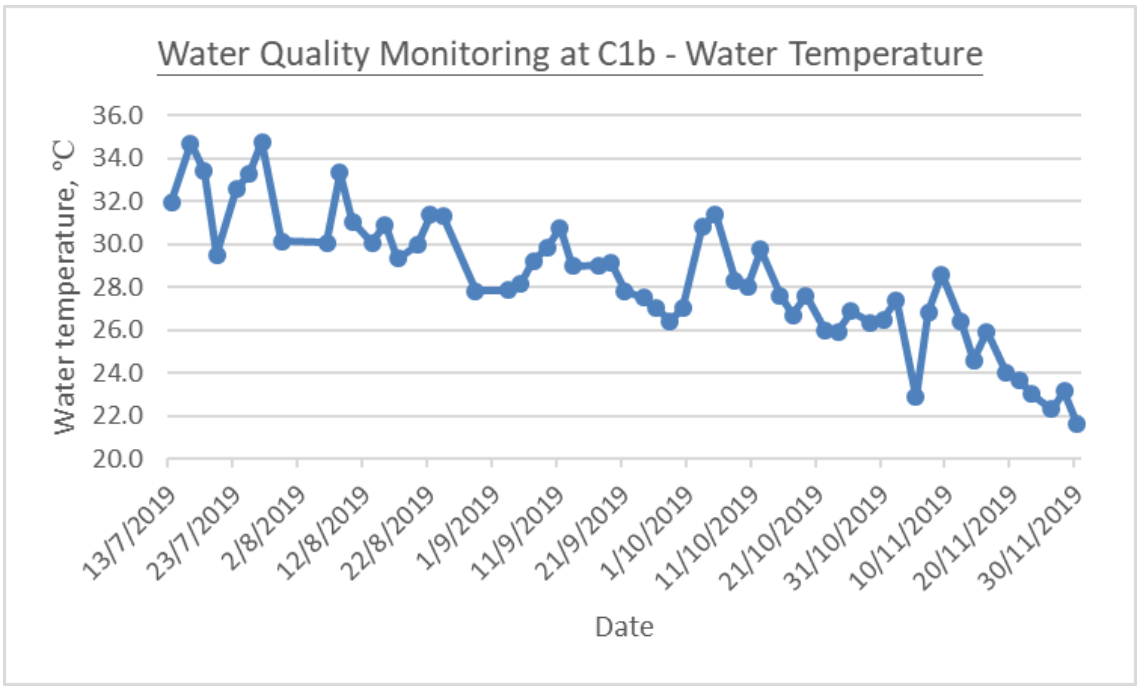
Date	Location	Time			Weather	Leq (30min)	L10	L90	Remarks
7/11/2019	NM2	15:44	-	16:14	Sunny	47.6	50.0	41.2	N.A.
14/11/2019	NM2	11:28	-	11:58	Sunny	54.3	61.0	50.2	N.A.
21/11/2019	NM2	14:38	-	15:08	Sunny	60.3	63.3	51.0	N.A.
28/11/2019	NM2	14:38	-	15:08	Sunny	51.8	53.5	49.3	N.A.

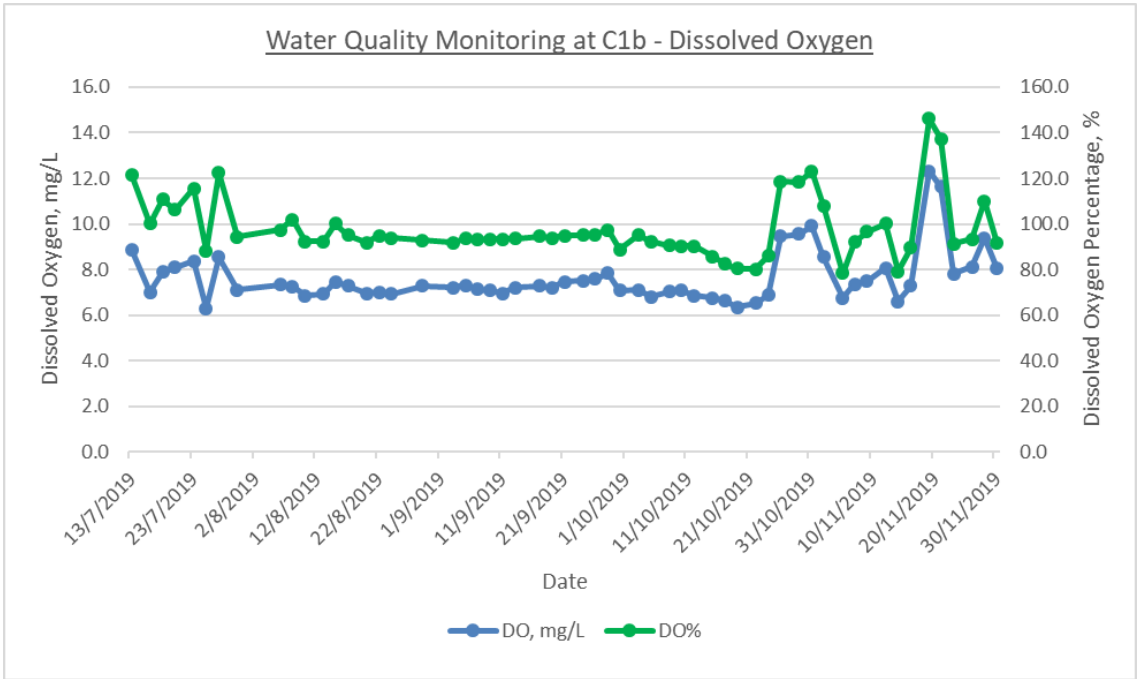


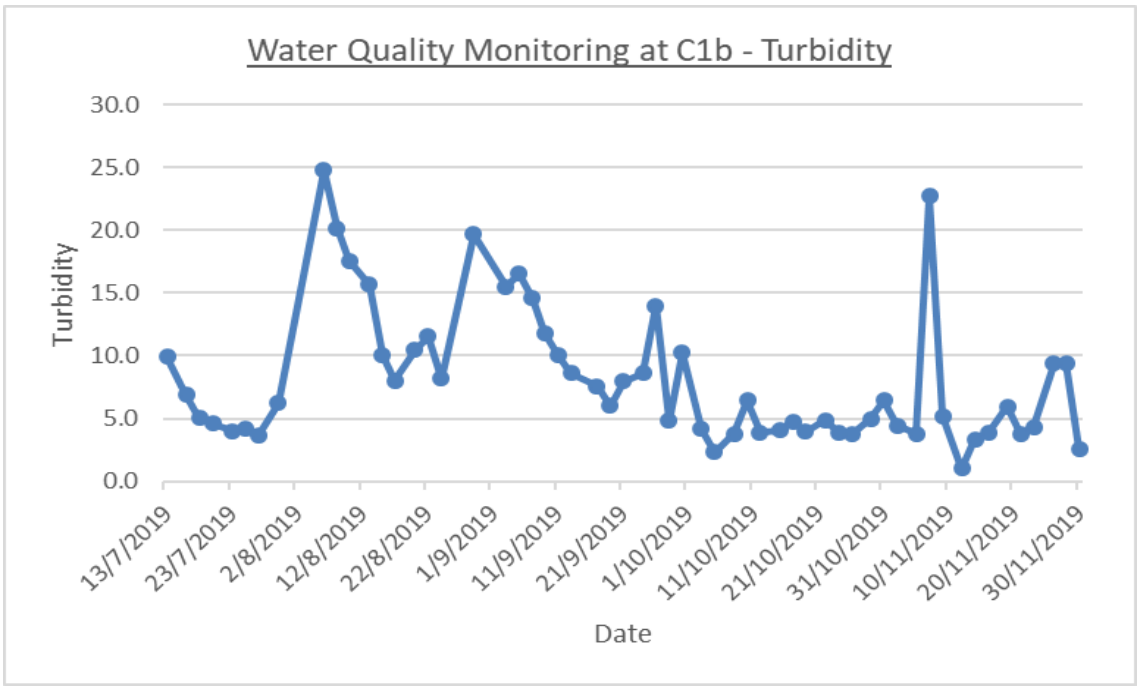
Appendix F
Impact Water Quality Monitoring Data

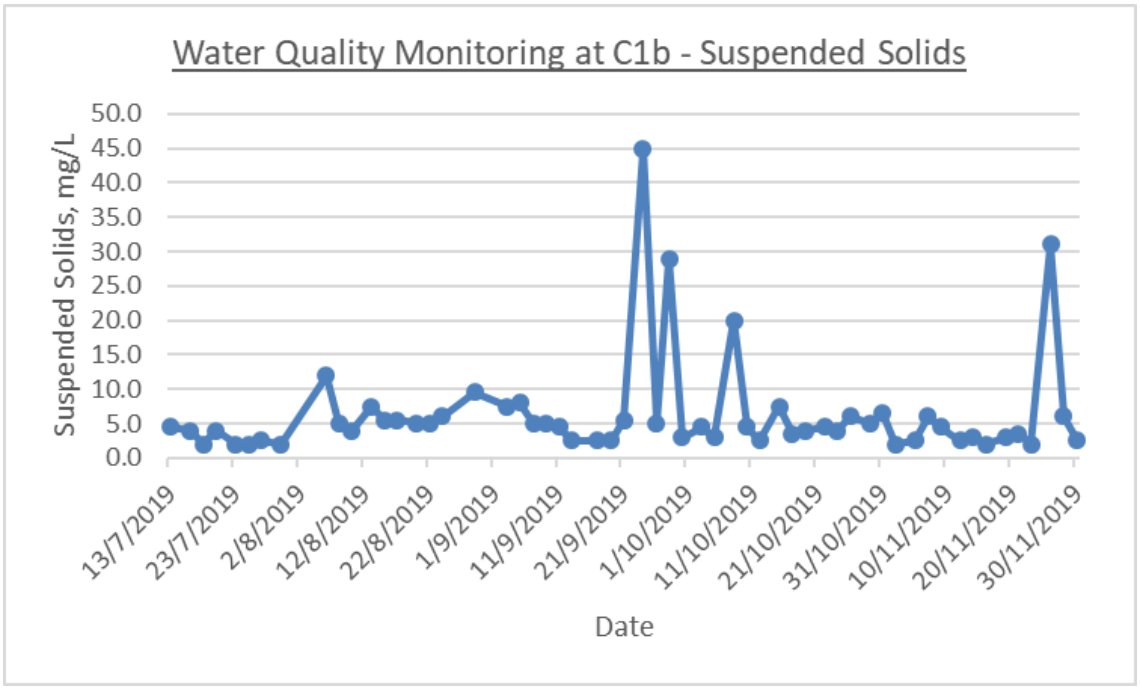
Location	Sample ID	Date	Time	DO (mg/L)	DO%	pH	Temp (ºC)	Turbidity (NTU)	SS (mg/L)
C1b	C1b	2/11/2019	12:06	9.0	113.9	9.4	27.4	4.6	2
	C1b#	2/11/2019	12:07	8.1	102.0	8.6	27.4	4.3	2
	C1b	5/11/2019	11:22	7.1	82.5	9.0	22.8	3.6	3
	C1b#	5/11/2019	11:22	6.4	74.5	8.8	23.0	3.9	<2
	C1b	7/11/2019	15:56	8.6	107.4	8.7	26.8	29.3	7
	C1b#	7/11/2019	15:57	6.1	76.6	8.4	26.9	16.1	5
	C1b	9/11/2019	16:01	7.9	101.6	8.1	28.6	5.2	4
	C1b#	9/11/2019	16:02	7.1	91.7	8.0	28.6	5.2	5
	C1b	12/11/2019	11:16	8.9	110.7	8.8	26.4	1.1	3
	C1b#	12/11/2019	11:16	7.2	89.6	8.6	26.4	0.9	2
	C1b	14/11/2019	11:41	6.6	79.7	7.7	24.5	3.5	3
	C1b#	14/11/2019	11:42	6.6	78.8	7.6	24.6	3.2	3
	C1b	16/11/2019	10:49	7.6	93.6	8.6	25.9	4.4	2
	C1b#	16/11/2019	10:50	7.0	85.6	8.4	25.9	3.3	2
	C1b	19/11/2019	12:01	14.8	175.6	9.0	23.9	6.3	4
	C1b#	19/11/2019	12:01	9.8	117.0	8.7	24.0	5.6	<2
	C1b	21/11/2019	14:43	13.9	164.4	9.2	23.6	3.9	4
	C1b#	21/11/2019	14:44	9.4	110.5	8.9	23.7	3.7	3
	C1b	23/11/2019	15:01	7.8	91.2	8.6	23.0	4.5	<2
	C1b#	23/11/2019	15:02	7.8	91.2	8.4	23.0	4.1	<2
	C1b	26/11/2019	16:21	8.1	93.4	7.7	22.3	9.5	44
	C1b#	26/11/2019	16:21	8.1	93.3	7.7	22.3	9.3	18
	C1b	28/11/2019	14:50	9.2	108.3	7.0	23.1	9.3	3
	C1b#	28/11/2019	14:51	9.5	111.7	7.4	23.2	9.5	9
	C1b	30/11/2019	9:44	8.1	91.5	8.0	21.6	2.6	3
	C1b#	30/11/2019	9:44	8.1	91.4	8.0	21.6	2.5	2

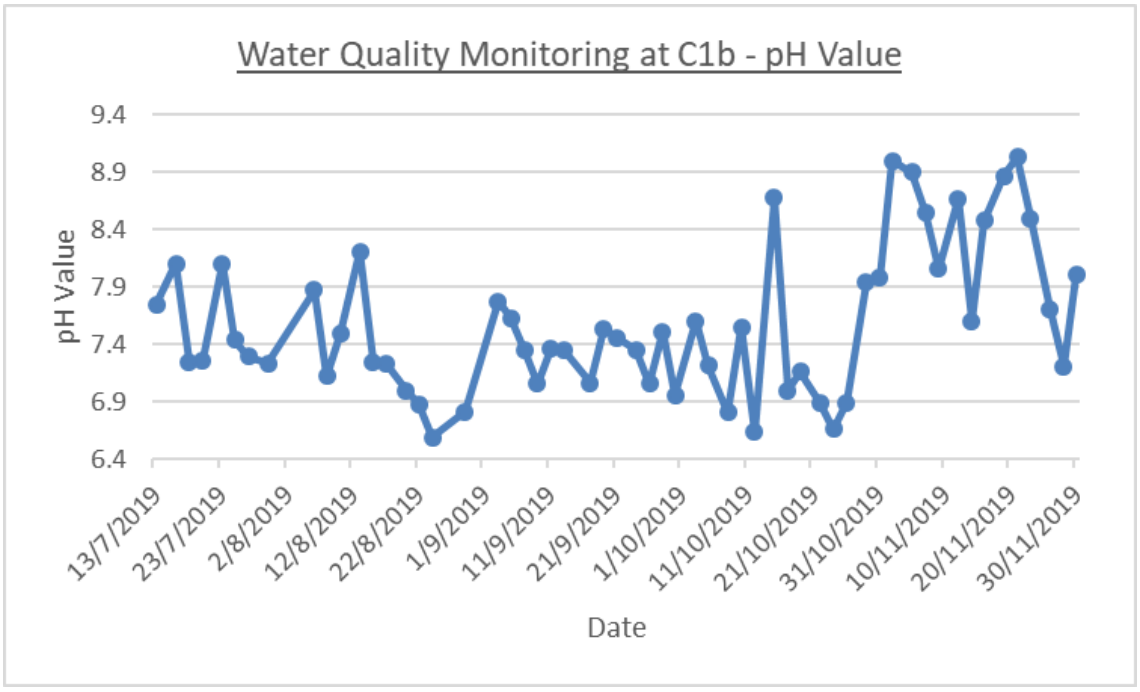
Location	Sample ID	Date	Time	DO (mg/L)	DO%	pH	Temp (ºC)	Turbidity (NTU)	SS (mg/L)
D1b	D1b	2/11/2019	12:18	6.9	86.9	8.0	26.7	6.7	<2
	D1b#	2/11/2019	12:19	6.0	75.3	7.9	27.1	6.2	<2
	D1b	5/11/2019	11:37	6.4	73.8	8.5	22.4	2.2	<2
	D1b#	5/11/2019	11:38	6.2	70.7	8.4	22.2	2.3	<2
	D1b	7/11/2019	15:59	8.3	103.8	8.1	27.1	3.9	2
	D1b#	7/11/2019	16:00	6.9	87.0	8.2	27.5	2.9	2
	D1b	9/11/2019	16:23	7.3	94.5	8.3	28.4	2.3	2
	D1b#	9/11/2019	16:23	8.2	105.4	8.1	28.5	2.3	3
	D1b	12/11/2019	11:34	6.7	83.7	8.4	26.6	2.3	2
	D1b#	12/11/2019	11:34	5.9	73.2	8.3	26.8	1.9	2
	D1b	14/11/2019	11:58	7.9	94.0	8.0	24.2	3.7	3
	D1b#	14/11/2019	12:00	6.3	75.5	7.7	24.4	3.3	2
	D1b	16/11/2019	11:12	6.8	83.8	8.3	26.1	2.0	3
	D1b#	16/11/2019	11;13	5.9	72.3	8.2	26.1	1.6	3
	D1b	19/11/2019	12:19	7.7	92.2	8.5	24.3	3.4	<2
	D1b#	19/11/2019	12:20	6.5	77.8	8.3	24.3	3.2	<2
	D1b	21/11/2019	14:58	6.3	76.2	8.7	24.9	4.6	4
	D1b#	21/11/2019	14:58	5.9	70.9	8.6	25.1	4.3	2
	D1b	23/11/2019	15:18	7.1	83.5	7.7	23.8	1.8	<2
	D1b#	23/11/2019	15:18	7.0	82.5	7.7	23.8	1.8	<2
	D1b	26/11/2019	16:40	7.9	92.0	7.9	22.7	8.8	6
	D1b#	26/11/2019	16:40	8.0	92.7	8.0	22.8	8.6	17
	D1b	28/11/2019	14:47	9.1	106.4	7.2	23.3	6.1	4
	D1b#	28/11/2019	14:47	9.0	105.8	7.2	23.5	5.3	4
	D1b	30/11/2019	10:06	6.8	77.9	8.2	21.9	6.0	5
	D1b#	30/11/2019	10:06	6.8	77.2	8.5	22.0	5.7	4

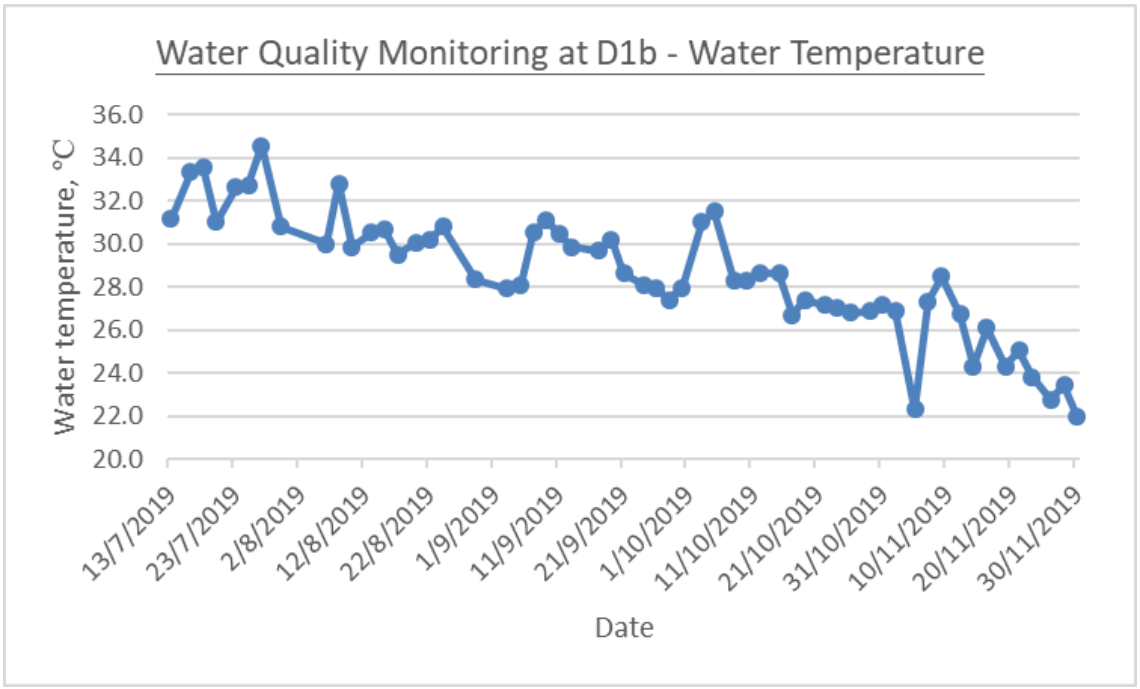

Water Quality Monitoring at C1b - Water Temperature
Water temperature, °C
36.0
34.0
32.0
30.0
28.0
26.0
24.0
22.0
20.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

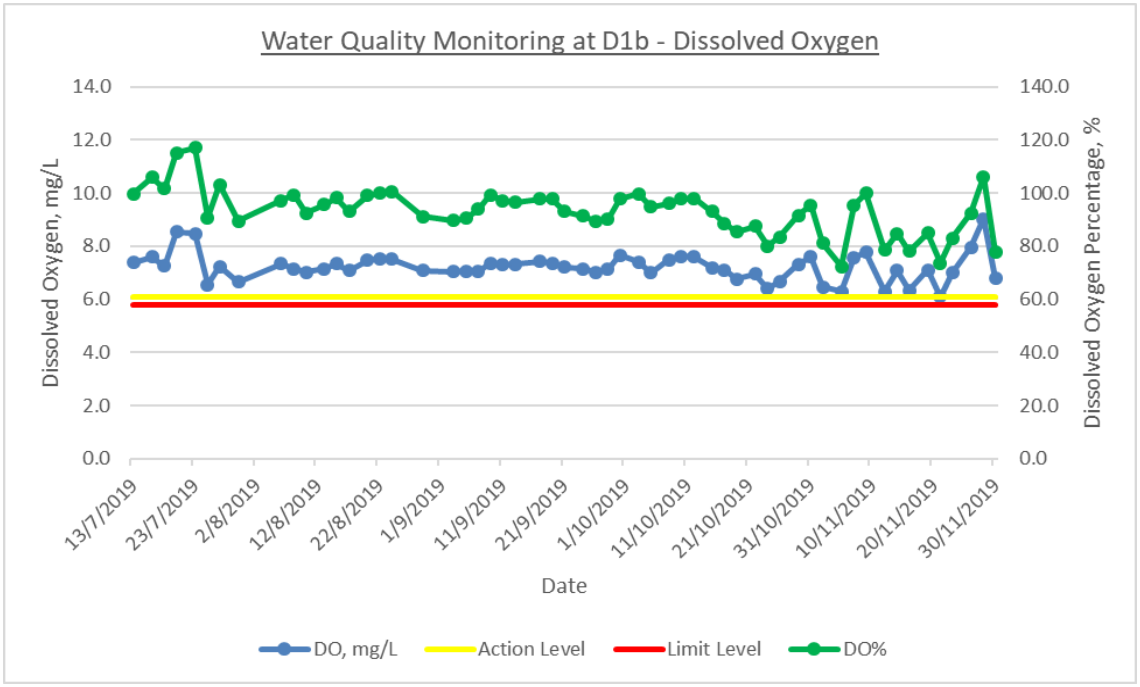

Water Quality Monitoring at C1b - Dissolved Oxygen
Dissolved Oxygen, mg/L
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Dissolved Oxygen Percentage, %
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
DO, mg/L
DO%

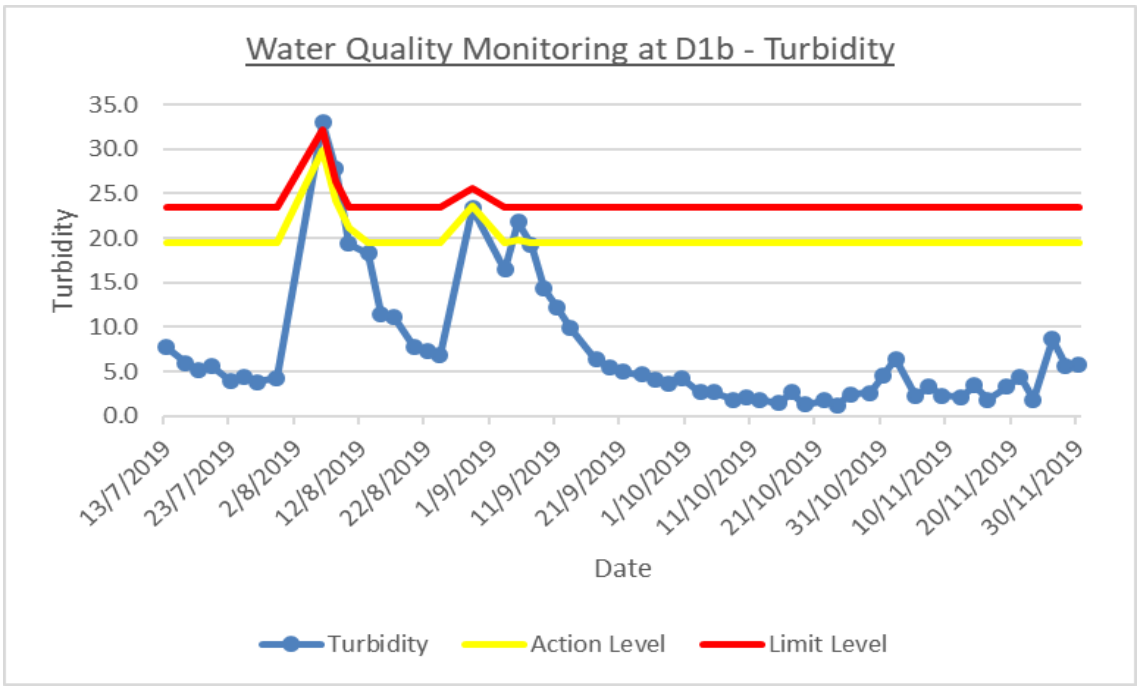

Water Quality Monitoring at C1b - Turbidity
Turbidity
30.0
25.0
20.0
15.0
10.0
5.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

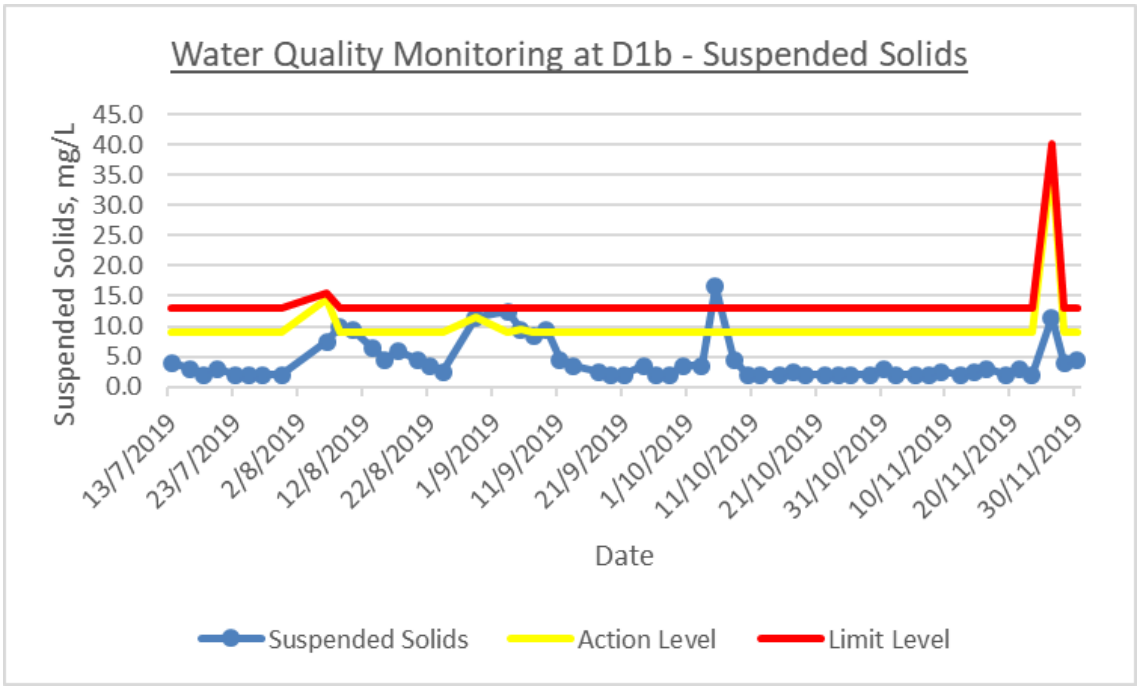

Water Quality Monitoring at C1b - Suspended Solids
Suspended Solids, mg/L
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

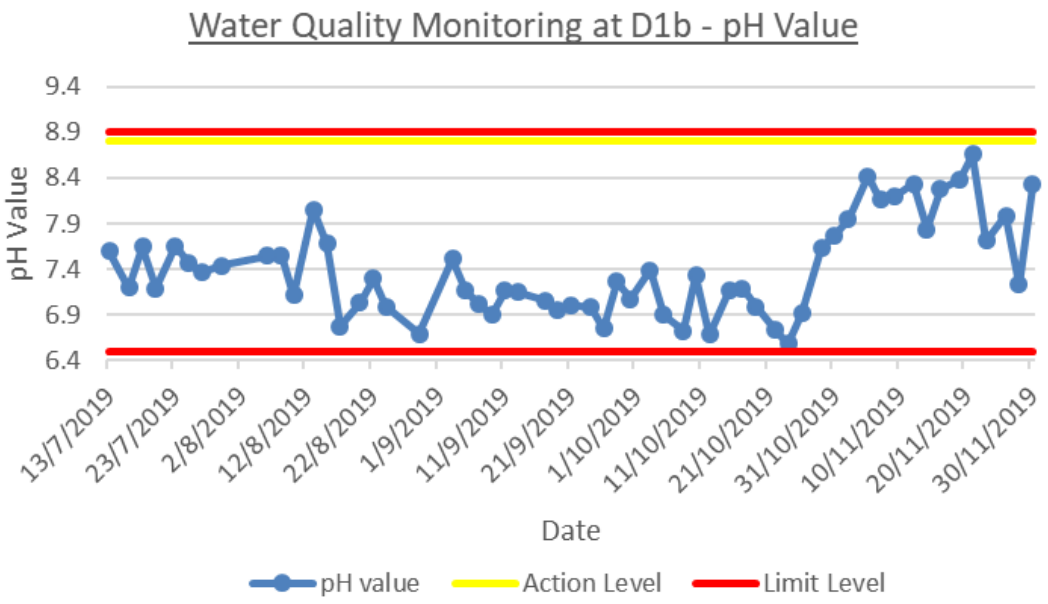

Water Quality Monitoring at C1b - pH Value
9.4
8.9
8.4
7.9
7.4
6.9
6.4
pH Value
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date


Water Quality Monitoring at D1b - Water Temperature
Water temperature, °C
36.0
34.0
32.0
30.0
28.0
26.0
24.0
22.0
20.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date


Water Quality Monitoring at D1b - Dissolved Oxygen
Dissolved Oxygen, mg/L
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Dissolved Oxygen Percentage, %
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
DO, mg/L
Action Level
Limit Level
DO%

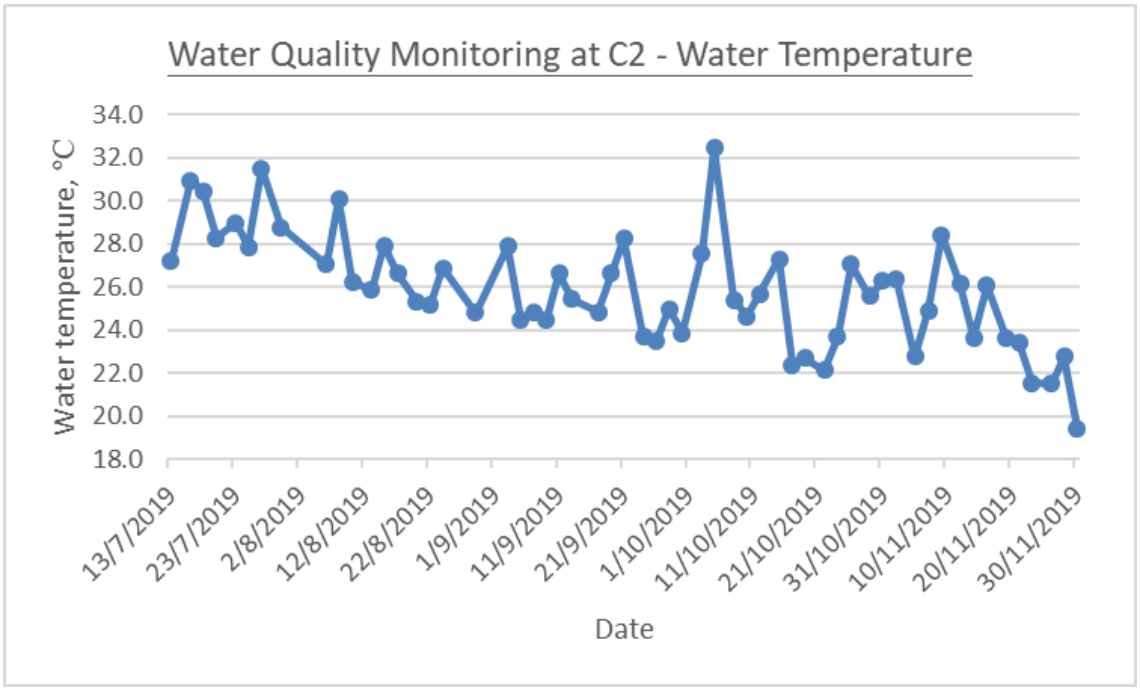

Water Quality Monitoring at D1b - Turbidity
Turbidity
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
Turbidity
Action Level
Limit Level

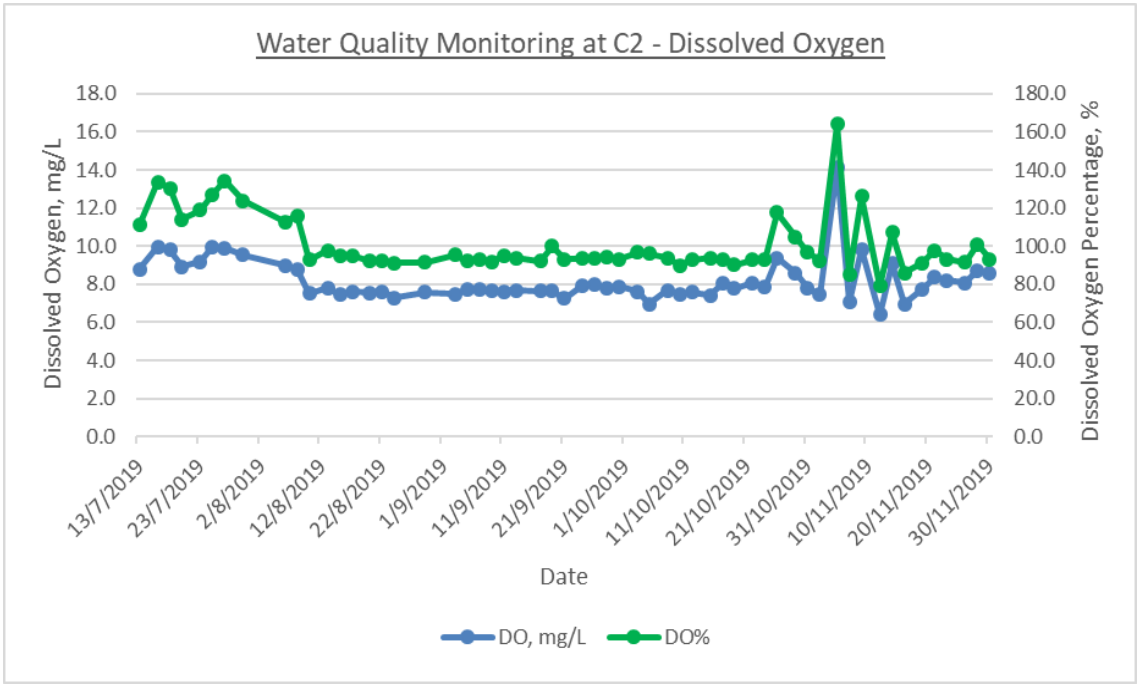

Water Quality Monitoring at D1b - Suspended Solids
Suspended Solids, mg/L
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
Suspended Solids
Action Level
Limit Level

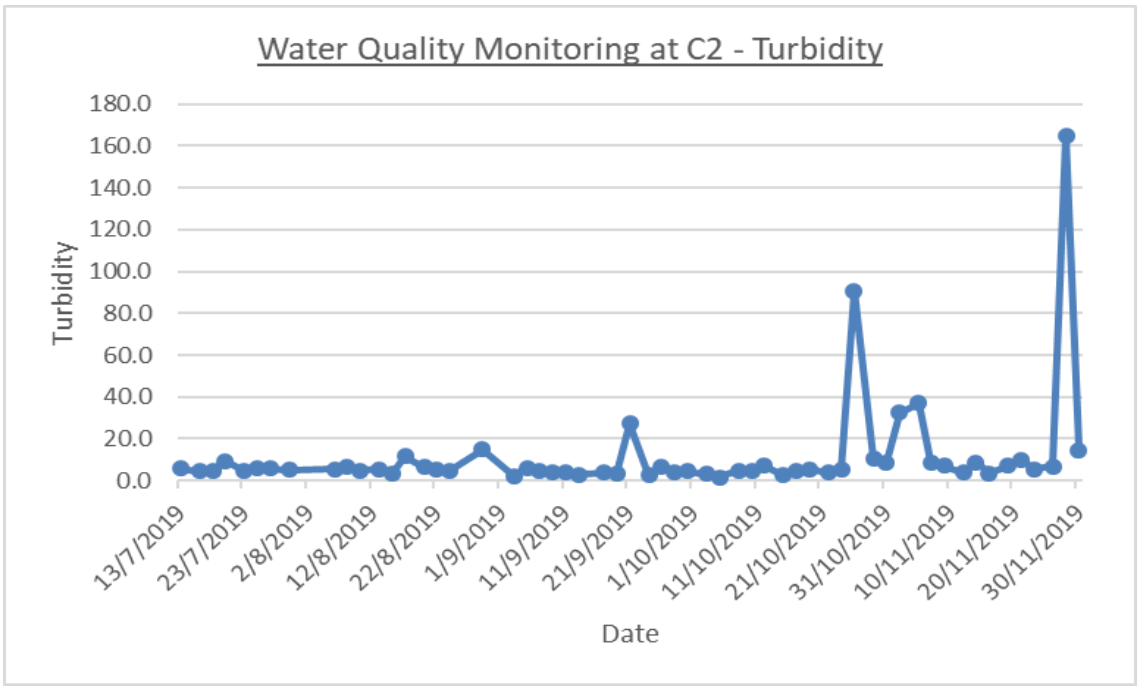

Water Quality Monitoring at D1b - pH Value
9.4
8.9
8.4
7.9
7.4
6.9
6.4
pH Value
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
pH value
Action Level
Limit Level

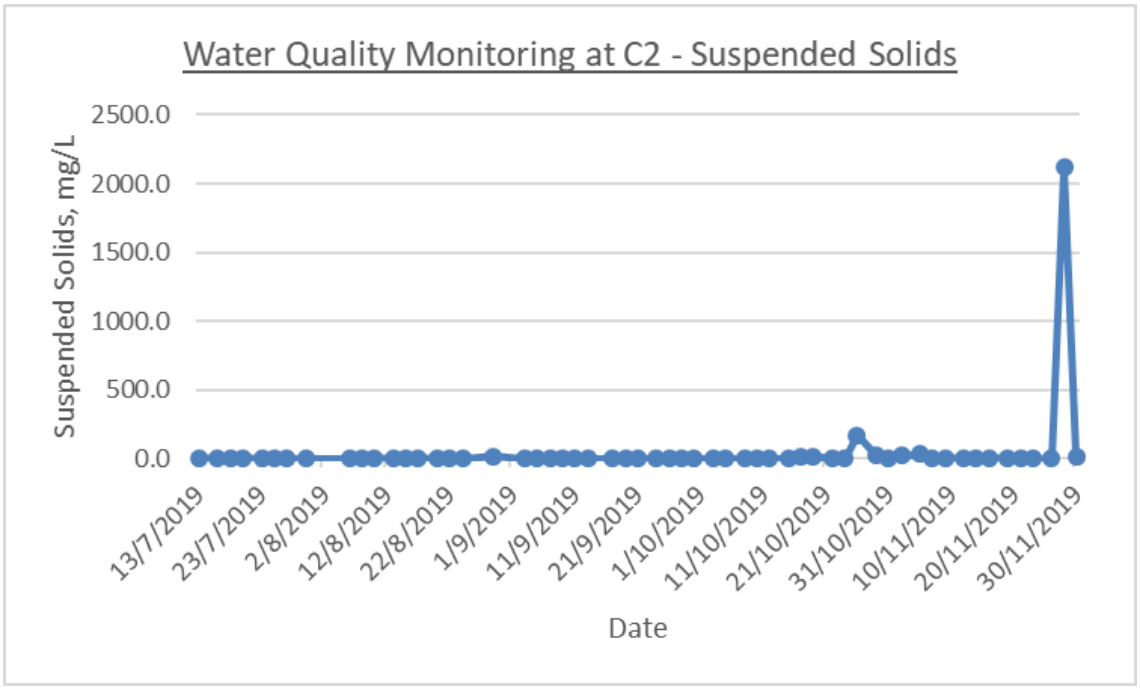
Location	Sample ID	Date	Time	DO (mg/L)	DO%	pH	Temp (ºC)	Turbidity (NTU)	SS (mg/L)
C2	C2	2/11/2019	11:25	7.9	98.2	8.1	26.6	32.6	24
	C2#	2/11/2019	11:25	7.0	86.7	8.1	26.1	32.2	22
	C2	5/11/2019	10:16	17.0	197.4	9.3	22.7	37.8	34
	C2#	5/11/2019	10:17	11.2	130.5	9.3	22.9	36.4	36
	C2	7/11/2019	15:15	8.2	98.2	8.8	24.8	9.2	4
	C2#	7/11/2019	15:17	6.0	72.1	8.4	25.1	8.4	5
	C2	9/11/2019	15:28	10.8	137.7	9.5	28.9	6.7	9
	C2#	9/11/2019	15:28	8.9	114.3	9.1	28.0	7.3	3
	C2	12/11/2019	10:10	6.5	80.4	8.1	26.0	4.0	4
	C2#	12/11/2019	10:11	6.3	78.0	8.1	26.3	3.7	3
	C2	14/11/2019	10:49	9.5	112.0	8.8	23.6	9.2	8
	C2#	14/11/2019	10:50	8.7	102.5	8.4	23.7	8.6	6
	C2	16/11/2019	9:49	7.3	90.7	8.4	26.1	3.7	2
	C2#	16/11/2019	9:50	6.6	80.9	8.4	26.1	3.5	3
	C2	19/11/2019	11:07	8.6	102.0	8.3	23.9	7.4	2
	C2#	19/11/2019	11:08	6.8	80.2	8.5	23.3	6.9	9
	C2	21/11/2019	13:59	9.1	106.4	8.8	23.7	10.3	11
	C2#	21/11/2019	14:00	7.6	89.0	9.0	23.2	9.7	10
	C2	23/11/2019	14:12	8.2	93.2	8.9	21.6	5.5	2
	C2#	23/11/2019	14:13	8.2	93.1	8.9	21.5	5.5	3
	C2	26/11/2019	15:31	8.1	91.5	8.6	21.5	6.8	2
	C2#	26/11/2019	15:31	8.1	91.2	8.4	21.5	6.9	<2
	C2	28/11/2019	13:56	9.4	109.2	6.8	23.4	170.0	3840
	C2#	28/11/2019	13:57	8.1	92.7	8.5	22.2	160.0	403
	C2	30/11/2019	10:20	8.6	93.0	7.9	19.4	14.9	15
	C2#	30/11/2019	10:21	8.6	93.0	7.9	19.4	14.1	14

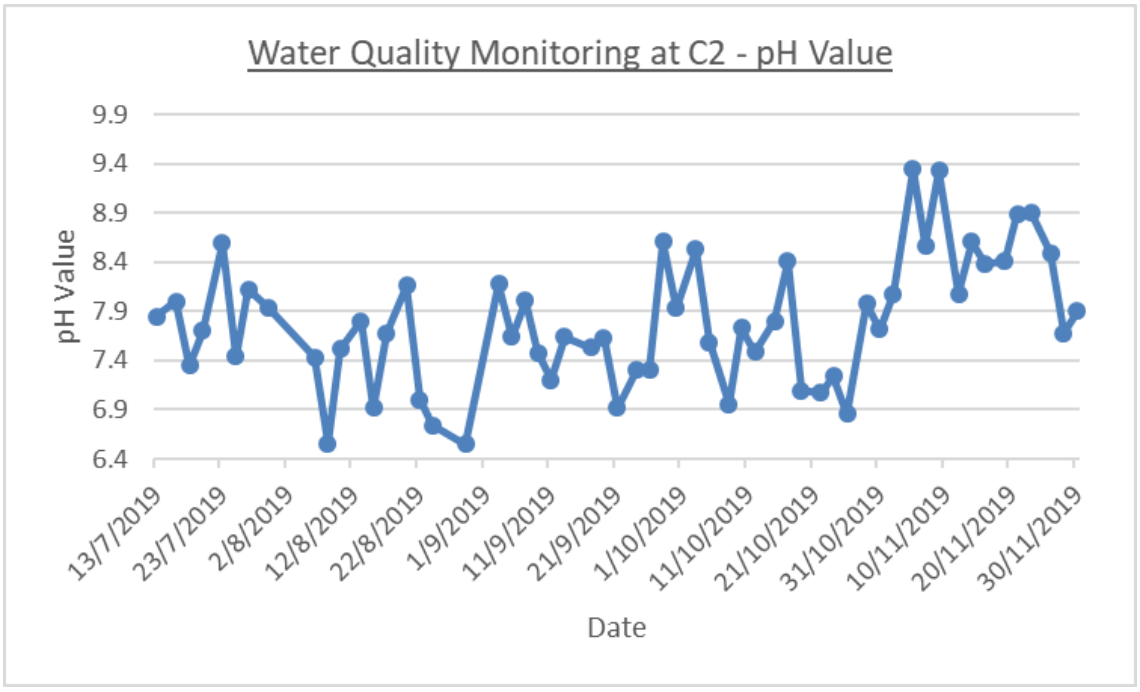
Location	Sample ID	Date	Time	DO (mg/L)	DO%	pH	Temp (ºC)	Turbidity (NTU)	SS (mg/L)
D2a	D2a	2/11/2019	11:41	6.2	78.4	7.8	27.3	3.1	<2
	D2a#	2/11/2019	11:42	6.5	75.8	7.8	27.4	3.1	<2
	D2a	5/11/2019	10:39	6.8	78.6	8.8	22.4	9.1	2
	D2a#	5/11/2019	10:40	8.3	96.3	8.9	22.6	9.5	2
	D2a	7/11/2019	15:01	8.3	104.9	9.0	27.2	5.1	4
	D2a#	7/11/2019	15:02	8.0	101.0	8.0	27.4	4.4	2
	D2a	9/11/2019	15:00	7.8	100.6	8.8	28.2	4.6	3
	D2a#	9/11/2019	15:01	6.7	85.6	8.5	28.4	4.5	2
	D2a	12/11/2019	10:41	6.5	79.4	8.0	26.3	2.9	4
	D2a#	12/11/2019	10:42	6.2	75.5	8.0	25.8	2.8	3
	D2a	14/11/2019	11:14	6.7	68.5	7.6	24.4	2.9	3
	D2a#	14/11/2019	11:15	6.1	60.7	7.7	24.4	2.9	2
	D2a	16/11/2019	10:21	8.9	109.1	8.9	25.5	2.3	2
	D2a#	16/11/2019	10:22	7.9	97.1	8.9	25.5	2.2	3
	D2a	19/11/2019	11:33	7.9	95.3	8.3	24.8	2.8	2
	D2a#	19/11/2019	11:34	8.6	103.3	8.3	24.9	2.8	2
	D2a	21/11/2019	14:22	13.5	166.1	7.7	25.8	3.9	2
	D2a#	21/11/2019	14:23	9.5	116.5	8.0	25.9	3.3	3
	D2a	23/11/2019	14:37	7.7	92.3	9.0	24.3	1.6	<2
	D2a#	23/11/2019	14:37	7.7	91.7	9.0	24.3	1.7	<2
	D2a	26/11/2019	15:47	8.0	94.1	8.1	23.3	5.1	8
	D2a#	26/11/2019	15:48	8.0	94.1	8.0	23.3	5.3	<2
	D2a	28/11/2019	13:54	5.9	69.6	6.9	24.1	15.1	12
	D2a#	28/11/2019	13:54	8.1	96.0	7.5	24.1	15.7	8
	D2a	30/11/2019	10:51	8.1	93.5	7.8	22.8	3.1	4
	D2a#	30/11/2019	10:52	8.1	93.5	7.8	22.8	2.8	3

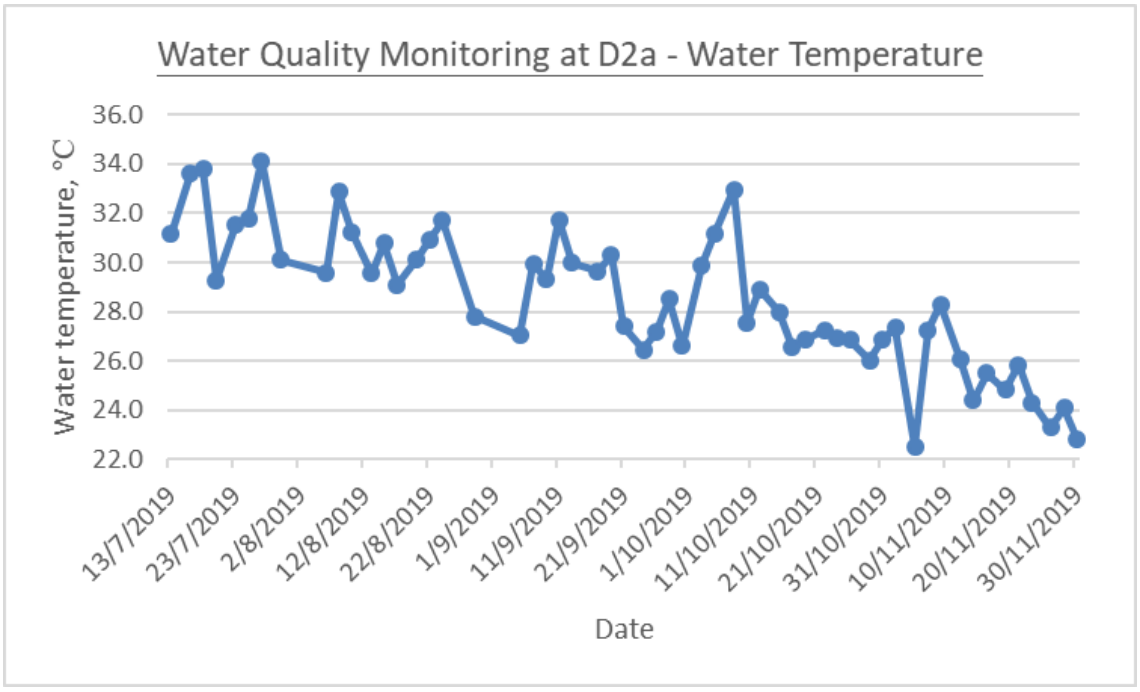

Water Quality Monitoring at C2 - Water Temperature
Water temperature, °C
34.0
32.0
30.0
28.0
26.0
24.0
22.0
20.0
18.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

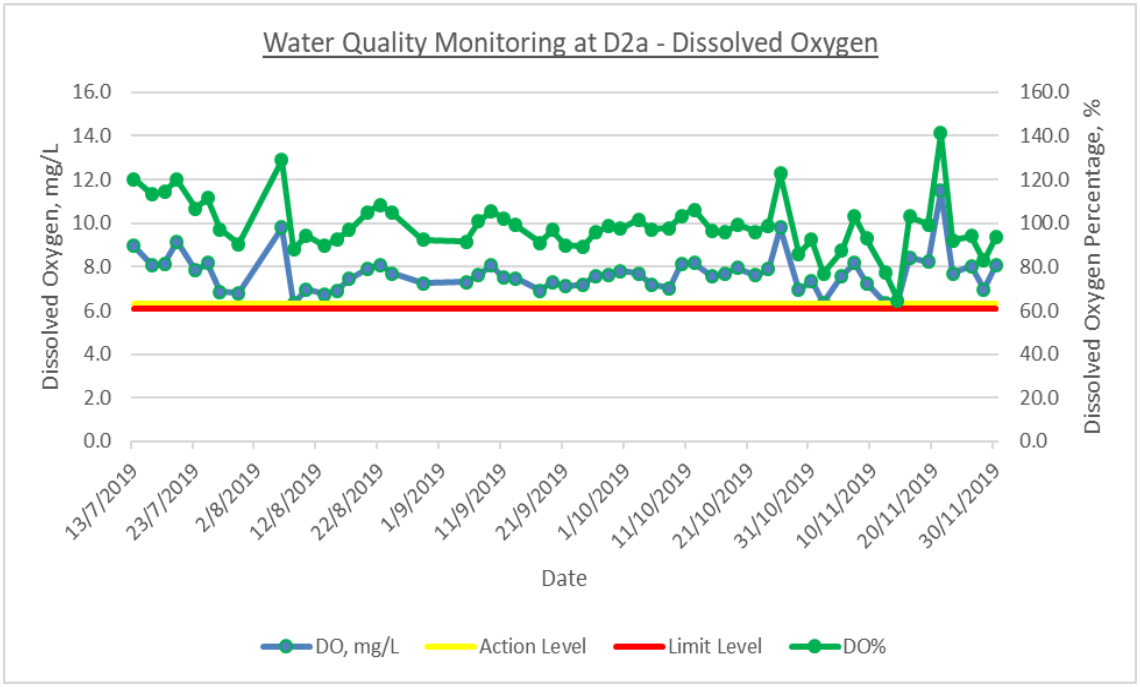

Water Quality Monitoring at C2 - Dissolved Oxygen
Dissolved Oxygen, mg/L
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Dissolved Oxygen Percentage, %
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
DO, mg/L
DO%

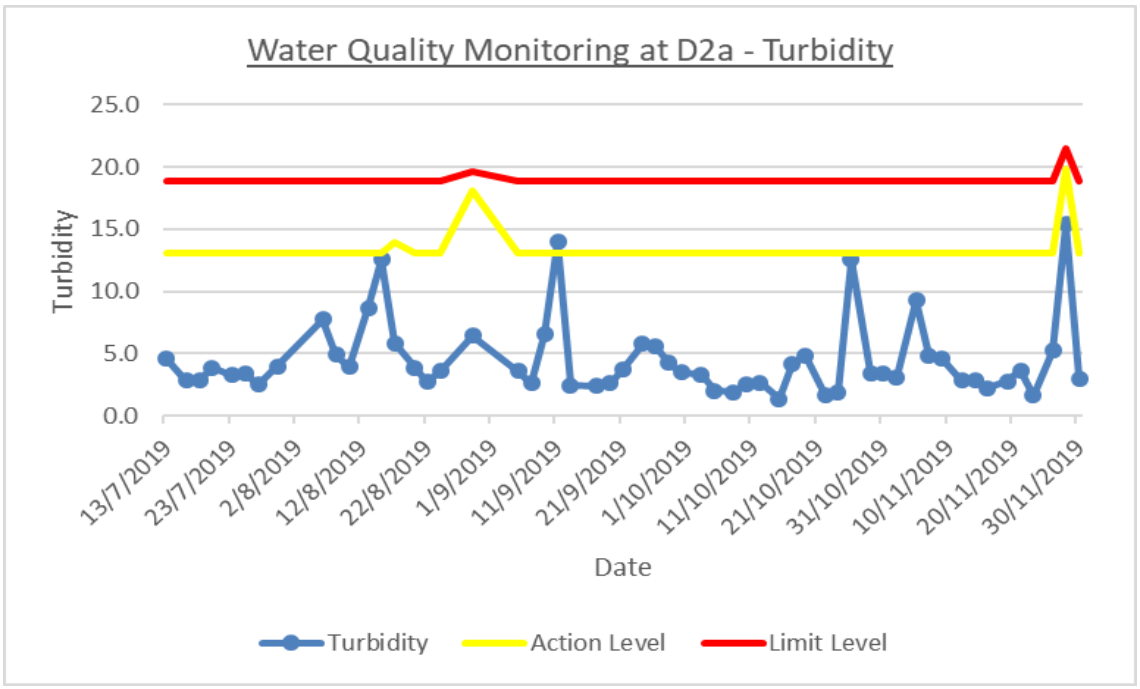

Water Quality Monitoring at C2 - Turbidity
Turbidity
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

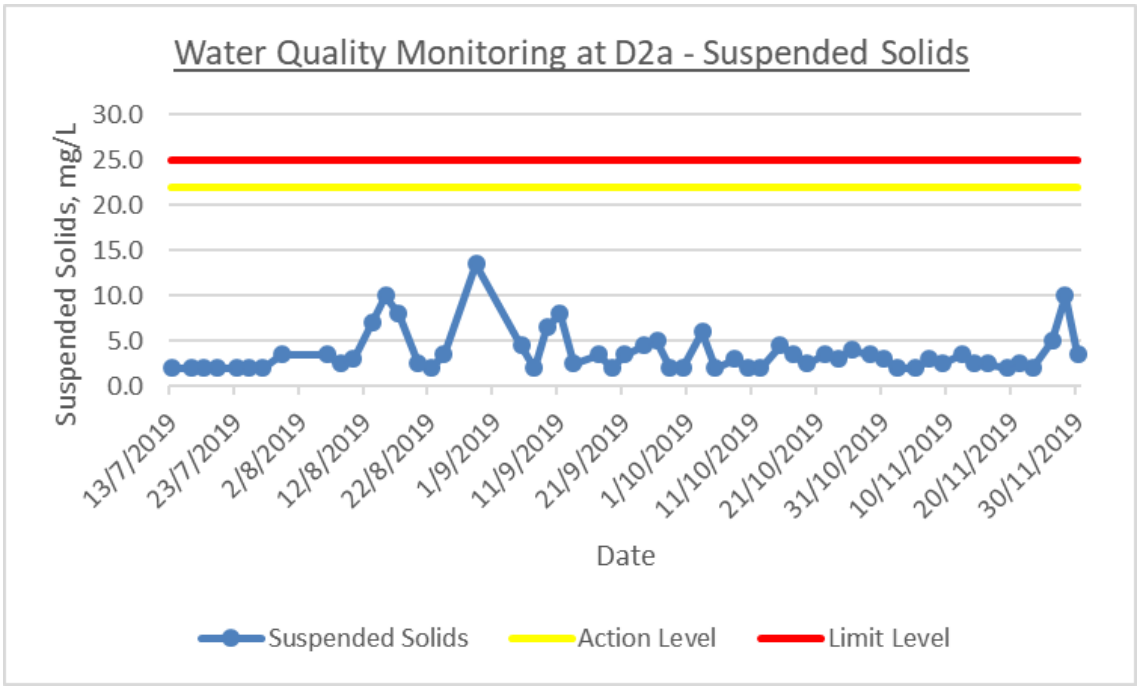

Water Quality Monitoring at C2 - Suspended Solids
Suspended Solids, mg/L
2500.0
2000.0
1500.0
1000.0
500.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date

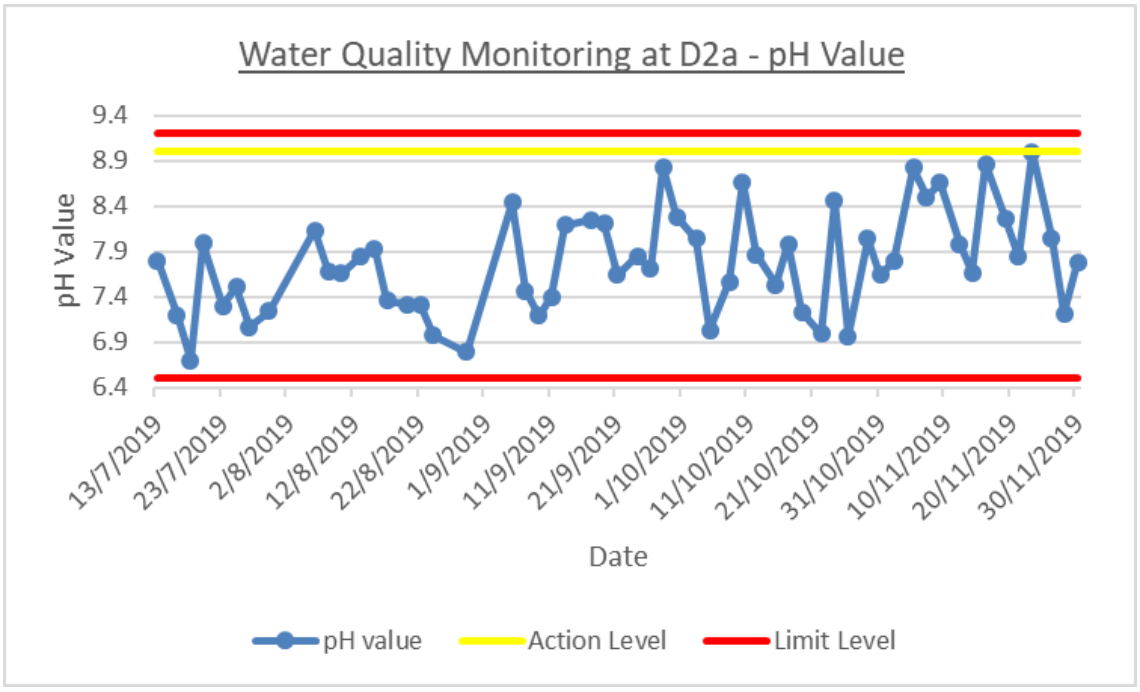

Water Quality Monitoring at C2 - pH Value
9.9
9.4
8.9
8.4
7.9
7.4
6.9
6.4
pH Value
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date


Water Quality Monitoring at D2a - Water Temperature
Water temperature, °C
36.0
34.0
32.0
30.0
28.0
26.0
24.0
22.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date


Water Quality Monitoring at D2a - Dissolved Oxygen
Dissolved Oxygen, mg/L
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Dissolved Oxygen Percentage, %
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
DO, mg/L
Action Level
Limit Level
DO%


Water Quality Monitoring at D2a - Turbidity
25.0
20.0
15.0
10.0
5.0
0.0
Turbidity
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
Turbidity
Action Level
Limit Level


Water Quality Monitoring at D2a - Suspended Solids
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Suspended Solids, mg/L
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
Suspended Solids
Action Level
Limit Level


Water Quality Monitoring at D2a - pH Value
9.4
8.9
8.4
7.9
7.4
6.9
6.4
pH Value
13/7/2019
23/7/2019
2/8/2019
12/8/2019
22/8/2019
1/9/2019
11/9/2019
21/9/2019
1/10/2019
11/10/2019
21/10/2019
31/10/2019
10/11/2019
20/11/2019
30/11/2019
Date
pH value
Action Level
Limit Level

Appendix G
Supplementary Meteorological Data

The Weather of November 2019

3 December 2019

With the dominance of dry northeast monsoon over southern China for most of the time in the month, November 2019 was marked by prolonged dry and sunny weather in Hong Kong. The monthly total sunshine duration amounted to 263.0 hours, 46 percent above the normal of 180.1 hours and the fourth highest on record for November. Only traces of rainfall were recorded in the month, making it one of the driest Novembers since records began in 1884. However, the accumulated rainfall this year up to November was 2382.7 millimetres, slightly more than the normal figure of 2371.7 millimetres for the same period. November 2019 was also much warmer than usual. The monthly mean maximum temperature was 26.1 degrees, 2.0 degrees above the normal figure of 24.1 degrees and one of the second highest on record for November. The monthly mean temperature of 23.0 degrees was 1.2 degrees above the normal figure of 21.8 degrees and one of the sixth highest on record for November. Moreover, the autumn mean temperature in Hong Kong for the period from September to November 2019 reached 26.1 degrees and was 1.1 degrees above the normal of 25.0 degrees, making it one of the warmest autumns on record.

Under the prevalence of the dry northeast monsoon, the weather in Hong Kong was fine and dry on 1 – 11 November. With plenty of sunshine, the maximum temperature at the Observatory rose to 29.3 degrees on 1 November, the highest of the month. Following the moderation of the northeast monsoon, it was mainly cloudy with sunny intervals on 12 November. A cold front formed over the northern part of southern China on 13 November and moved across the coastal areas that night. The associated northeast monsoon brought generally fine and slightly cooler weather to Hong Kong on 14 – 17 November.

Meanwhile, another cold front formed over central China edging southwards gradually on 17 November and moved across the south China coast on the night of 18 November. Locally, apart from some haze, the weather in Hong Kong remained fine and dry on 18 November. The northeast monsoon behind the cold front brought cooler mornings to the territory with the minimum temperatures staying below 20 degrees in the next four days. As the northeast monsoon weakened, local temperature recovered gradually on 23 and 24 November.

The strengthening of the northeast monsoon brought windy weather to Hong Kong on 25 November. After a cloudy day on 26 November, the weather turned fine again on the next day. With the replenishment of the northeast monsoon reaching the south China coast on 28 November, it was fine and dry with cool mornings in Hong Kong on 28 – 30 November. The lowest temperature of the month, 17.0 degrees, was recorded on the morning of 29 November.

Six tropical cyclones occurred over the South China Sea and the western North Pacific in November 2019.

Details of issuance and cancellation of various warnings/signals in the month are summarized in Tables 1.1 to 1.2. Monthly meteorological figures and departures from normal for November are tabulated in Table 2.

Warnings and Signals issued in November 2019

Table 1.1 Strong Monsoon Signal

Beginning Time		Ending Time	
Day/Month	HKT	Day/Month	HKT
25 / 11	1130	27 / 11	0745

Table 1.2 Fire Danger Warnings

Colour	Beginning Time		Ending Time	
	Day/Month	HKT	Day/Month	HKT
Yellow	3 / 11	0600	3 / 11	1930
Red	4 / 11	0600	4 / 11	2200
Red	5 / 11	0730	5 / 11	2145
Red	7 / 11	0600	9 / 11	1930
Yellow	10 / 11	0600	10 / 11	1900
Yellow	17 / 11	0600	17 / 11	1800
Red	19 / 11	0600	19 / 11	1800
Red	21 / 11	1350	21 / 11	1945
Red	22 / 11	0645	22 / 11	1945
Yellow	24 / 11	0600	24 / 11	1800
Red	28 / 11	0600	29 / 11	1900
Yellow	30 / 11	0600	30 / 11	1845

Table 2 Figures and Departures from Normal - November 2019

Meteorological Element	Figure of the Month	Departure from Normal*
Mean Daily Maximum Air Temperature	26.1 degrees C	2.0 degrees above normal
Mean Air Temperature	23.0 degrees C	1.2 degrees above normal
Mean Daily Minimum Air Temperature	21.0 degrees C	1.2 degrees above normal
Mean Dew Point Temperature	16.8 degrees C	0.8 degree above normal
Mean Relative Humidity	69 %	2 % below normal
Mean Cloud Amount	37 %	17 % below normal
Total Rainfall	Trace	37.6 mm below normal
Number of hours of Reduced VisibilityΔ	19 hours	102.7 hours below normal§
Total Bright Sunshine Duration	263.0 hours	82.9 hours above normal
Mean Daily Global Solar Radiation	16.48 Megajoule / square metre	4.2 Megajoule above normal
Total Evaporation	106.0 mm	6.5 mm above normal

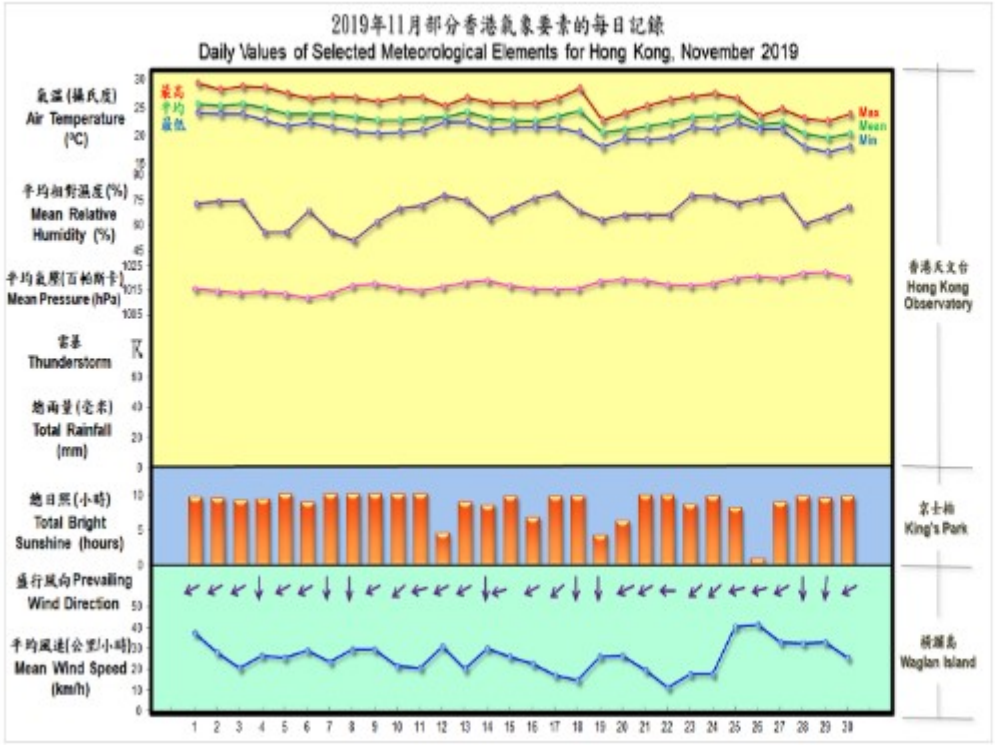
Remarks : All measurements were made at the Hong Kong Observatory except sunshine, solar radiation and evaporation which were recorded at King's Park Meteorological Station and visibility which was observed at the Hong Kong International Airport.

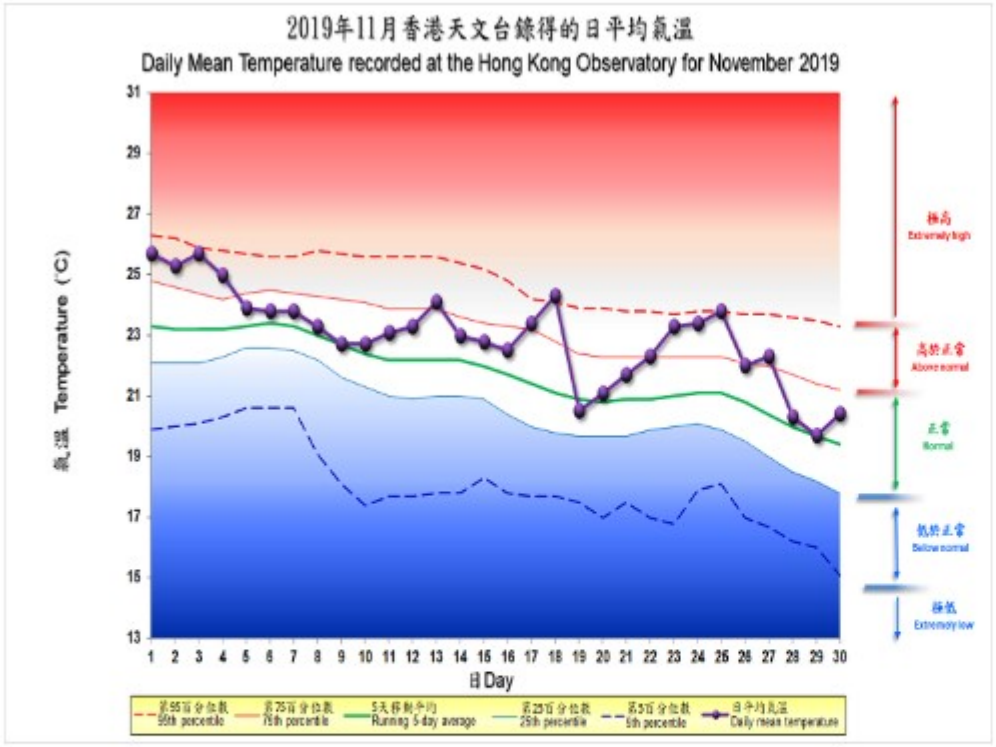
Δ The visibility readings at the Hong Kong International Airport are based on hourly observations by professional meteorological observers in 2004 and before, and average readings over the 10-minute period before the clock hour of the visibility meter near the middle of the south runway from 2005 onwards. The change of the data source in 2005 is an improvement of the visibility assessment using instrumented observations following the international trend.
Before 10 October 2007, the number of hours of reduced visibility at the Hong Kong International Airport in 2005 and thereafter displayed in this web page was based on hourly visibility observations by professional meteorological observers. Since 10 October 2007, the data have been revised using the average visibility readings over the 10-minute period before the clock hour, as recorded by the visibility meter near the middle of the south runway.

* Departure from 1981 - 2010 climatological normal, except for number of hours of reduced visibility

§ Departure from mean value between 1997 and 2018

Trace means rainfall less than 0.05 mm


2019年11月部分香港氣象要素的每日記錄
Daily Values of Selected Meteorological Elements for Hong Kong, November 2019
氣溫(攝氏度)
Air Temperature (°C)
最高
平均
最低
Max
Mean
Min
平均相對濕度(%)
Mean Relative Humidity (%)
平均氣壓(百帕斯卡)
Mean Pressure (hPa)
雷暴
Thunderstorm
總雨量(毫米)
Total Rainfall (mm)
總日照(小時)
Total Bright Sunshine (hours)
盛行風向 Prevailing Wind Direction
平均風速(公里/小時)
Mean Wind Speed (km/h)
香港天文台
Hong Kong Observatory
京士柏
King's Park
橫瀾島
Waglan Island
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



Remarks : Extremely high: above 95th percentile
Above normal: between 75th and 95th percentile
Normal: between 25th and 75th percentile
Below normal: between 5th and 25th percentile
Extremely low: below 5th percentile
Percentile and 5-day running average values are computed based on the data from 1981 to 2010

Appendix H
Event / Action Plans

Table B-1 Event/ Action Plan for Noise Impact

Event and Action Plan for Noise Impact				
Event	**Action**			
	ET Leader	**IEC**	**ER**	**Contractor**
Action Level is reached	1. Notify IEC and Contractor 2. Carry out investigation 3. Report the results of the investigation to the IEC and Contractor 4. Discuss with the Contractor and formulate remedial measures	1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Ensure remedial measures are properly implemented 5.	1. Submit noise mitigation proposal to IEC 2. Implement noise mitigation proposals
Limit Level is reached	1. Notify IEC, ER, EPD and Contractor 2. Identify source 3. Repeat measurement to confirm findings 4. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 5. Inform IEC, ER and EPD the causes & actions taken for the exceedances 6. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results 7. If exceedance stops cease additional monitoring	1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion or work until the exceedance is abated	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

Table B-2 Event/ Action Plan for Water Quality Impact

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings and repeat measurement on next day of exceedance being recorded; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor;	1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly;	1. Confirm receipt of notification of failure in writing 2. Discuss with IEC, ET and Contractor on the proposed mitigation. 3. Request Contractor to view the working methods. 4. Ensure mitigation measures are properly implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3 Check all plant and equipment and consider changes of working methods; 4. Discuss with ET, IEC and ER and propose mitigation measures to ER and IEC within 3 working days; 5. Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings and repeat measurement on next day of exceedance being recorded; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency	1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Supervise the implementation of mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Take immediate action to avoid further exceedance 2. Discuss with ET, IEC and ER and propose mitigation measures to ER and IEC; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

	to daily until no exceedance of Limit level for two consecutive days.			

Appendix I
Monthly Waste Flow Table

Contract No.: DC/2018/08
Contract Title: Inter-Reservoirs Transfer Scheme – Water Tunnel between Kowloon Byewash Reservoir and Lower Shing Mun Reservoir

Monthly Summary Waste Flow Table for 2019 (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	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 '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Feb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mar	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Apr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
May	0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0120
June	0.1876	0.0000	0.0000	0.0000	0.1650	0.0000	0.0000	0.0000	0.0000	0.0226
Sub-total	0.1996	0.0000	0.0000	0.0000	0.1650	0.0000	0.0000	0.0000	0.0000	0.0346
July	0.0175	0.0000	0.0000	0.0000	0.0149	0.0000	0.0000	0.0000	0.0000	0.0026
Aug	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0102
Sept	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056
Oct	0.1932	0.0000	0.0000	0.0000	0.1890	0.0000	0.0000	0.0000	0.0000	0.0042
Nov	0.1245	0.0000	0.0000	0.0000	0.1209	0.0000	0.0000	0.0000	0.0000	0.0036
Dec										
Total	0.5506	0.0000	0.0000	0.0000	0.4898	0.0000	0.0000	0.0000	0.0000	0.0608

Notes: (1) Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil.
(2) Broken concrete for recycling into aggregates.
(3) Plastic refer to plastic bottles/ containers, plastic sheets/ foam from packaging material.
(4) C&D materials include metals, paper/ cardboard packaging waste, chemical waste and other wastes such as general refuse.

Appendix J
Implementation Schedule of Recommended Mitigation Measures

Table A-1 Air Quality Impact – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S.3.5.9	S.3.2.2	All the dust control measures as recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, should be implemented. Typical dust control measures include:	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ Restricting heights from which materials are to be dropped, as far as practicable to minimise the fugitive dust arising from unloading/ loading	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ Erection of hoarding of not less than 2.4 m high from ground level along the site boundary, where appropriate	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 4 sides	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.5.9	S.3.2.2	▪ All dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet	Air Quality (fugitive dust) Control during Construction Phase	Contractors	Ditto	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
Operational Phase						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A-2 Noise Impact – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S.4.8.2	S.4.8.1	▪ The Contractor shall adopt the Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ The Contractor shall observe and comply with the statutory and non-statutory requirements and guidelines	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ Before commencing any work, the Contractor shall submit to the Engineer Representative for approval the method of working, equipment and noise mitigation measures intended to be used at the site	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ The Contractor shall devise and execute working methods to minimise the noise impact on the surrounding sensitive uses, and provide experienced personnel with suitable training to ensure that those methods are implemented	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ Noisy equipment and noisy activities should be located as far away from the NSRs as is practical	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ Unused equipment should be turned off. PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ Regular maintenance of all plant and equipment	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
S.4.8.2	S.4.8.1	▪ Material stockpiles and other structures should be effectively utilised as noise barriers, where practicable	Noise control during construction	Contractors	Ditto	Annex 5 of EIAO-TM
Operational Phase						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A-3 Water Quality Impact – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S.5.10.1 -5.10.2	S.5.8.2 -5.8.3	Construction for the desilting facilities at intake and outfall portals should be carried out behind a temporary cofferdam which is watertight enclosure built in the reservoirs and pumped dry to expose the bottom.	Point Pollution Control	Contractors	Before construction of intake and outfall portals and remain on site until completion of intake and outfall portals and tunnel construction	Water Pollution Control Ordinance
S.5.10.3	S.5.8.4	The cofferdams should be regularly inspected and maintained to ensure no spillage of waste or wastewater into the reservoirs.	Point Pollution Control	Contractors	Before construction of intake and outfall portals and remain on site until completion of intake and outfall portals and tunnel construction	Water Pollution Control Ordinance
S. 5.10.4	S. 5.8.5	Construction of desilting facilities within works areas capable of controlling discharge of SS to comply with WPCO/TM-DSS	Point and Non-point Pollution Control	Contractors	At all construction areas of the site during the entire construction period	Water Pollution Control Ordinance
S.5.10.5	S.5.8.6	Construction runoff will be managed as per the Practice Note for Professional Persons ProPECC PN1/94 - Construction Site Drainage and the conditions of working within Water Gathering Grounds stipulated by WSD	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance Water Gathering Ground control by WSD
S.5.10.6	S. 5.8.7	A Drainage Management Plan should be prepared by the Contractor for approval by the Engineer for each of the works areas, detailing the facilities and measures to manage pollution arising from surface runoff from those works areas	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance Water Gathering Ground control by WSD
S. 5.10.7	S. 5.8.8	An Emergency Contingency Plan should also be prepared by the Contractor, detailing the response and procedures to contain and remove any accidental spillage along the temporary and permanent roads and at the site at short notice to prevent or minimize the quantities of contaminants from reaching the reservoirs and local streams leading to the reservoirs. The Emergency Contingency Plan should be submitted to the Engineer for approval	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance Water Gathering Ground control by WSD
S. 5.10.8	S. 5.8.9	▪ Surface run-off and effluent from the construction sites at	Stormwater and Non-point	Contractors	Ditto	Water Pollution Control

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		the intake at Kowloon Byewash Reservoir and outfall at the Lower Shing Mun Reservoir will be directed towards adequately designed sand/silt removal facilities such as sand/silt traps and sediment basins to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO before discharging to discharge points downstream of the Kowloon Byewash Reservoir Dam and Lower Shing Mun Reservoir Dam respectively. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be 5 minutes under maximum flow conditions. Sizes may vary depending upon the flow rate, but for a flow rate of 0.1m3/s a sedimentation basin of 30m^3 would be required and for a flow rate of 0.5m^3/s the basin would be 150m^3. The detailed design of the sand/silt traps should be undertaken by the contractor prior to the commencement of construction	Source Pollution Control			Ordinance
S. 5.10.8	S. 5.8.9	▪ Channels, earth bunds or sand bag barriers will be provided on-site to properly direct stormwater to the above-mentioned facilities	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Existing on-site silt removal facilities, channels and manholes, if any, will be maintained and the deposited silt and grit will be removed regularly, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Other manholes, if any, including any newly constructed ones will be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Open stockpiles of materials on site will be avoided within water gathering grounds as far as practicable. All surplus spoil will be removed from water gathering grounds as soon as possible Measures will be taken to prevent the washing away of construction materials, soil, silt or debris	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Where possible, works entailing soil excavation will be minimized during the rainy season (i.e. April to September). If excavation in soil could not be avoided in these months or	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporary exposed slope surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest/edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm				
S. 5.10.8	S. 5.8.9	▪ Where applicable, final earthworks surfaces/ slopes will be well compacted and hydro-seeded following completion to prevent erosion	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Where surface runoff or construction effluent is likely to be contaminated with oil, properly designed and maintained petrol interceptor will be provided to meet the WPCO/TM-DSS requirements. Oil leakage or spillage shall be contained and cleaned up immediately. Detailed design of the petrol interceptor shall be provided by the Contractor before commencement of construction	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Sewage arising from the construction workers on site should be collected by temporary sanitary facilities e.g. portable chemical toilets. Portable toilets should be used coupled with tankering away services provided by a licensed collector	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ All site discharges within Inland Waters Group A must comply with the terms and conditions of a valid discharge licence issued by EPD	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Vehicle wheel washing facilities should be provided, where applicable, at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S. 5.10.8	S. 5.8.9	▪ Vehicle washing facilities should be drained into desilting facilities before discharge. The water should be recycled on site wherever possible. It is suggested that the wash water from the wheel wash basin is either reused for site watering or pumped to the on-site desilting facilities for treatment	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	• Desilting facilities should be checked and the deposited silt and grit should be removed regularly to ensure they are working properly at all times	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	• To minimize water quality impact, recycled water should be used at the cutter face for cooling purposes. Used water should be collected and discharged to settling tank for settlement	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	• Excess water from the settling tank would be transferred to the desilting facilities for treatment before discharge. The Contractor should ensure that the discharge water from the desilting facilities and treated spent effluent arising from tunnel boring from the desilting facilities comply with the WPCO/TM-DSS requirements before discharge	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Existing on-site silt removal facilities, channels and manholes, if any, would be maintained such that the deposited silt and grit will be removed regularly, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times;	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ Desilting facilities should be checked and the deposited silt and grit should be removed regularly to ensure they are working properly at all times;	Stormwater and Non-point Source Pollution Control	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ The project may occasionally involve the handling of fuel and generates chemical wastes. It must be ensured that all fuel tanks and chemical storage are sited on sealed and bunded areas, provided with locks and located outside water gathering grounds as far as practicable	Protection Against Accidental Spillage	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	▪ The storage areas will be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent accidentally spilled oil, fuel or chemicals from reaching the receiving waters	Protection Against Accidental Spillage	Contractors	Ditto	Water Pollution Control Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S. 5.10.8	S. 5.8.9	• Oil and grease removal facilities will be provided where appropriate, for example, in area near plant workshop/ maintenance areas, if any	Protection Against Accidental Spillage	Contractors	Ditto	Water Pollution Control Ordinance
S. 5.10.8	S. 5.8.9	• Chemical waste arising from the site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation	Protection Against Accidental Spillage	Contractors	Ditto	Waste Disposal (Chemical Waste) (General) Regulation
Operational Phase						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A-4 Waste Management Implication – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S.6.7.1		Given the potential for secondary environmental impacts (dust, noise, water quality and visual impacts), mitigation measures are required to ensure proper handling, storage, transportation and disposal of materials at the outset and throughout the construction phase of the project	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ An on-site environmental co-ordinator employed by the Contractor should be identified at the outset of the works. The co-ordinator shall prepare a Waste Management Plan ("WMP") in accordance with the requirements set out in the ETWB TCW No. 19/2005, Waste Management on Construction Sites. The WMP shall include monthly and yearly Waste Flow Tables ("WFT") that indicate the amounts of waste generated, recycled and disposed of (including final disposal site), and which should be regularly updated	Waste management during construction	Contractors	Ditto	ETWB TCW No. 19/2005, Waste Management on Construction Sites
S.6.7.2	S. 6.2.5	▪ The reuse/ recycling of all materials on site shall be investigated and exhausted prior to treatment/ disposal off-site	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ Good site practices shall be adopted from the commencement of works to avoid the generation of waste, reduce cross contamination of waste and to promote waste minimisation	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ All waste materials shall be sorted on-site into inert and non-inert C&D materials, and where the materials can be recycled or reused, they shall be further segregated. Inert material, or public fill will comprise stone, rock, concrete and soil which is suitable for land reclamation and site formation whilst non-inert materials include all other wastes generated from the construction process such as plastic packaging and vegetation (from site clearance)	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ The Contractor shall be responsible for identifying what materials can be recycled/ reused, whether on-site or off-site. In the event of the latter, the Contractor shall make	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		arrangements for the collection of the recyclable materials. Any remaining non-inert waste shall be collected and disposed of to the public fill reception facilities whilst any inert C&D materials shall be re-used on site as far as possible. Alternatively, if no use of the inert material can be found on-site, the materials can be delivered to a public fill reception facilities after obtaining the appropriate licence				
S.6.7.2	S. 6.2.5	▪ In order to monitor the disposal of C&D material and solid wastes at public fill reception facilities and landfills, and control fly-tipping, a trip-ticket system shall be implemented by the Contractor, in accordance with the contract and the requirements of WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material"	Waste management during construction	Contractors	Ditto	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material"
S.6.7.2	S. 6.2.5	▪ Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants and paints are generated on site. Only licensed chemical waste collectors shall be employed to collect any chemical waste generated at site. The handling, storage, transportation and disposal of chemical wastes shall be conducted in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme both published by EPD	Waste management during construction	Contractors	Ditto	Waste Disposal (Chemical Waste) (General) Regulation
S.6.7.2	S. 6.2.5	▪ A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to the sensitive surroundings. These bins shall be cleared daily and the collected waste disposed of to the refuse transfer station. Further to the issue of ETWB TCW No. 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness, the Contractor is required to maintain a clean and hygienic site throughout the project works	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ All chemical toilets, if any, shall be regularly cleaned and the night-soil collected and transported by a licensed contractor to a Government Sewage Treatment Works facility for disposal	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.6.7.2	S. 6.2.5	▪ Toolbox talks should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
S.6.7.2	S. 6.2.5	▪ The Contractor shall comply with all relevant statutory requirements and guidelines and their updated versions that may be issued during the course of project construction	Waste management during construction	Contractors	Ditto	Waste Disposal Ordinance
Operational Phase						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A-5 Ecological Impact – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S 8.8	N/A	Minimise the habitat loss of secondary woodland / plantation and grassland as far as possible	Reduce habitat and vegetation loss	Contractors	At all construction areas of the site during the entire construction period	Annex 16 of EIAO-TM
S 8.8	N/A	Disturbed secondary woodland / plantation and grassland should be reinstated after the completion of works	Reinstate disturbed habitats	Contractors	Worksite areas at the two portals / after completion of construction works	Annex 16 of EIAO-TM
S 8.8	N/A	Provide clear definition of site boundary	Prevent impact on offsite habitats	Contractors	At all construction areas of the site during the entire construction period	Annex 16 of EIAO-TM
S 8.8	N/A	Protect the protected plant *Pavetta hongkongensis* on its existing location; Transplant the *Pavetta hongkongensis* to other suitable location if onsite protection is not feasible.	Preserve the protected plant species	Contractors	On the vegetated slope along the existing vehicle access at worksite area at Lower Shing Mun Reservoir / Construction period	Annex 16 of EIAO-TM
S 8.8	N/A	Carry out compensatory planting if the individual of *Artocarpus hypargyreus* cannot be retained onsite	Mitigate the tree removal	Contractors	worksite area at Kwoloon Byewash Reservoir / Construction Period	ETWB TCW No. 3/2006
S 8.8	N/A	Workers should avoid eating and leave food in works area and avoid feeding the wildlife; Fishes observed remaining at the proposed works area during the draining down process should be translocated to the portion of the reservoir outside the cofferdam.	Avoidance of injury to wildlife	Contractors	At all construction areas of the site during the entire construction period	Annex 16 of EIAO-TM
S 8.8	N/A	Implement standard good site practices for dust suppression	Avoid dust deposition on vegetation	Contractors	At all construction areas of the site during the entire construction period	EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S 8.8	N/A	Implement standard good site practices for water quality control	Avoid site runoff to nearby habitats	Contractors	At all construction areas of the site during the entire construction period	Water Pollution Control Ordinance
S 8.8	N/A	Workers shall not disturb birds and other wildlife; Litter shall not be burned on-site but shall be removed off-site;	Avoid disturbance to wildlife	Contractors	At all construction areas of the site during the entire construction period	Annex 16 of EIAO-TM

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		Machinery not in use should be switched off to minimize the noise nuisance; No fishing is allowed in the reservoir without permission.				
Operational Phase						
S 8.8	N/A	Compensate the habitat loss (grassland and woodland) by restoration of same type of habitats to be lost. The compensatory ratio should not be less than 1:1 in terms of area.	Mitigate the temporary habitat loss	Contractors	Woodland at worksite area at Kowloon Byewash Reservoir and Grassland at worksite area at Lower Shing Mun Reservoir / Operational period	Annex 16 of EIAO-TM

Table A-6 Landscape and Visual Impact – Implementation Schedule of Recommended Mitigation Measures

Id No.	Landscape and Visual Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stage			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
LMM1	Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical	Site	WSD	Contractor	TM-EIA Annex 18		√		Throughout construction phase	To provide a viable growing medium suited to the existing conditions and reduce the need for the importation of top soil
LMM2	Existing Trees to be retained on site should be carefully protected during construction	Site	WSD	Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & ETWB TCW No. 3/2006		√		Throughout construction phase	To ensure the success of the tree preservation proposal
LMM3	Compensatory tree planting should be provided to compensate for felled trees	Site	WSD	Contractor	TM-EIA Annex 18, ETWB TCW No. 2/2004 & ETWB TCW No. 3/2006		√		Throughout design and construction phase	The planting proposal seeks to compensate for the predicted tree loss resulting form the construction, visually integrate the proposals within its existing landscape framework and provide an improved visual amenity
LMM4	Erection of decorative screen hoarding compatible with surrounding setting	Site	WSD	Contractor	TM-EIA Annex 18 and BD		√		Throughout construction phase	To integrate the construction site with the existing environment
LMM5	Locations of the site office, storage or workshops should be carefully adjusted to areas out of tree protection zones.	Site	WSD	Contractor	TM-EIA Annex 18 and BD	√			Throughout design phase	To avoid unnecessary felling of trees
LMM6	Selection of intake and outfall portals to areas enclosed by existing topography or vegetation	Site	WSD	Contractor	TM-EIA Annex 18 and BD	√			Throughout design phase	To preserve the existing topography and as many as trees as possible
LMM7	Appearance of the water intake and outfall structures	Site	WSD	Contractor	TM-EIA Annex 18 and BD	√			Throughout design phase	To reduce the apparent visual mass of water intake and outfall structures
LMM8	Reinstatement of disturbed vegetation at both portal	Site	WSD	Contractor	TM-EIA Annex 18			√	After the completion of construction	To mitigate disturbance to vegetation arising from the proposed construction

Id No.	Landscape and Visual Mitigation Measures	Location	Funding	Implementation/ Maintenance Agent	Relevant Standard or Requirement	Implementation Stage			Timing of Implementation	Objectives of the Recommended Measure and Main Concern to address
	areas								works	

Table A-7 Cultural Heritage – Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location/ Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Construction Phase						
S 10.7	S8.1.2	Condition Survey for the identified historic items and monitoring of vibration levels if required.	Prevention of structural damage to the identified historic items	Contractors	Condition survey to be undertaken prior to the construction phase and vibration monitoring to be undertaken during the construction phase if required.	None
Operational Phase						
N/A	N/A	None	None	None	None	None

Appendix K
Tentative Monitoring Schedule of Next Reporting Period

IRTS – EM&A Monitoring & Inspection Schedule						
December 2019						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
1	2	3 Impact Water Quality Monitoring	4 Weekly Site Inspection	5 Impact Water Quality & Noise Monitoring	6	7 Impact Water Quality Monitoring
8	9	10 Impact Water Quality Monitoring	11 Weekly Site Inspection	12 Impact Water Quality & Noise Monitoring	13	14 Impact Water Quality Monitoring
15	16	17 Impact Water Quality Monitoring	18 Weekly Site Inspection	19 Impact Water Quality & Noise Monitoring	20	21 Impact Water Quality Monitoring
22	23 Weekly Site Inspection	24 Impact Water Quality & Noise Monitoring	25	26	27	28 Impact Water Quality Monitoring
29	30 Weekly Site Inspection	31 Impact Water Quality Monitoring				

= General Holiday

*Remark: No construction work on 25, 26 December 2019. Water monitoring will be conducted on 24, 28 December 2019 in the week.