

r	Contractor's Ge	neral Submis	sion For	<u>n (CC</u>	<u>3S)</u>		
Contract No.	3/WSD/15						
Project Title:	In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Advance Works						
CGS No.:	3WSD15/CGS/SEQ/ALL/JV	0721	Issue:	Α	Date:	12/10/2018	
То:	Engineer's Representative	Engineer's Representative					
Attention:	Mr. Derek K H Ng						
From:	Ming Hing – Ming Hing Civil – Vasteam Joint Venture						
Title:	EM & A Impact Monitoring Report (Sep 2018)						
Specification:							
Purpose:	☐ For Information	For Commer	it 🗌 Fo	r Appro	oval	☑ For Record	
Description of Co	entents:						
Attachment:	⊻ Yes	Number of	5 + 5 C	D			
		Copies:					
Expected reply da	ate:						
Issued By:	(ET/ml)	Pr	inted Name:		Mr	Eros To	
Designation:	Site Agent		Date:		12	Sep 2018	
Received By:	(Signature & Receiv		ceived Date:				
* Delete if not applie							
CC. JV Partner Office Master	-	(w/ encl.) (w/ encl.)					

3WSD15_CGS(2016-01-02 Rev. B)



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Your ref: Our ref:

<u>By hand</u>

Chief Engineer /Project Management Water Supplies Department 46/F., Immigration Tower 7 Gloucester Road, Wanchai (Attn: Mr. H C Wong, Heinz)

12 October, 2018

Dear Sir,

In-Situ Reprovisioning of Sha Tin Water Treatment Works – South Works Environmental Permit EP-494/2015 Submission of 31st monthly EM&A Report

In accordance with the Condition 3.4 of the Environmental Permit (No. EP-494/2015), we submit herewith 5 hard copies and 2 electronic copies of the 31st monthly Environmental Monitoring and Audit (EM&A) Report (Rev.0) for your processing. I certified and confirmed the submission of this monthly EM&A Report had complied with the requirements as set out in the approved Environmental Monitoring and Audit (EM&A) Manual of the EIA Report (Register No.: AEIAR-187/2015).

Yours faithfully,

Ir Leung, Jacky, C.H. Environmental Team Leader

c.c. Independent Environmental Checker



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Your Ref: 60479142/C/fyw1810111

By Hand & By Email

Chief Engineer/Project Management Water Supplies Department 46/F., Immigration Tower 7 Gloucester Road, Wanchai

Attn: Mr. H C Wong, Heinz

11 October 2018

Dear Sir,

Contract No.3/WSD/15q In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works <u>Submission of 31st Monthly EM&A Report for September 2018</u>

Reference is made to Environmental Team (ET)'s 31st Monthly EM&A Report for September 2018 (Rev. 0) submitted on 11 October 2018.

In accordance with the Condition 3.4 of the Environmental Permit (No.EP-494/2015), I verified and confirmed the submission of this Monthly EM&A Monitoring Report as compiled with the requirements as set in the approved Environmental Monitoring and Audit (EM&A) Manual of the EIA Report (Register No.: AEIAR-187/2015).

Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully, AECOM Asia Co. Ltd.

Y W Fung Independent Environmental Checker

c.c. Environmental Team Leader



Water Supplies Department



MONTHLY ENVIRONMENTAL MONITORING AND AUDIT

(EM&A) REPORT (NO. 31)

FOR

CONTRACT NO. 3/WSD/15 IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

(**Rev. 0**)

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (NO. 31) -

FOR

CONTRACT NO. 3/WSD/15 IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

	Name	Signature
Prepared by	Ms. Cheung, Karen, K. Y.	d.
Checked & Reviewed by	Mr. Tsui, Nelson, T. H.	24
Approved & Certified by	Ir Leung, Jacky, C. H. Environmental Team Leader (ETL)	
Verified & Confirmed by	Mr. Fung, Y. W. Independent Environmental Checker (IEC)	y

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EXECUTIVE SUMMARY

- A.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works - South Works" ("The Project").
- A.2 Under Contract No. 3/WSD/15, Ming Hing Ming Hing Civil Vasteam Joint Venture (MMVJV) is commissioned by WSD to undertake the construction of the advance works while AECOM Asia Company Limited was appointed by WSD as the Engineer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, Acumen Environmental Engineering & Technologies Company Limited was appointed by MMVJV as the Environmental Team (ET). AECOM Asia Company Limited was also employed by the WSD as the Independent Environmental Checker (IEC).
- A.3 The construction phase of the Contract commenced on 30 October 2015 for completion by 2018. The impact monitoring of the EM&A programme, including air quality, noise, water quality monitoring as well as environmental site inspections, commenced on 17 February 2016.
- A.4 This is the 31st monthly Environmental Monitoring and Audit Report for this Contract covering the period from 1 September 2018 to 30 September 2018 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- A.5 Environmental monitoring activities under the EM&A program in this reporting period are summarized below

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Air	1-Hour TSP	18
Noise	L _{eq(30mins)} Daytime	6
Water Quality	Water Sampling	12
Inspection /	ET Regular Environmental Site Inspection	4
Audit	IEC Monthly Environmental Site Audit	1

- A.6 No exceedance of air quality, noise and water quality monitoring were recorded in this reporting period.
- A.7 No environmental complaint were received via EPD in this reporting period.
- A.8 No notification of any summons and successful prosecutions was received in this reporting period.
- A.9 No reporting change was made in this reporting period.
- A.10 There was no EPD site inspection conducted in the reporting period.
- A.11 As informed by the Contractor, the major works for this Project in September 2018 will be:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1

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- Modification of valve chamber and construction of flow meter house
- Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- A.12 EM&A monitoring for the 31st reporting period has been completed. The 32nd monthly EM&A report will cover the period from 1 October 2018 to 31 October2018.

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1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) on 28 January 2015, subsequent to approval of the EIA Report (Register No. AEIAR-187/2015), to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works South Works" ("The Project").
- 1.1.2 Under Contract No. 3/WSD/15, Ming Hing Ming Hing Civil Vasteam Joint Venture (MMVJV) is commissioned by WSD to undertake the construction of the advance works while AECOM Asia Company Limited was appointed by WSD as the Engineer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, Acumen Environmental Engineering & Technologies Company Limited was appointed by MMVJV as the Environmental Team (ET). AECOM Asia Company Limited was also employed by the WSD as the Independent Environmental Checker (IEC).
- 1.1.3 The construction phase of the Contract commenced on 30 October 2015 for completion by 2018. The general layout plan of the Contract components is presented in **Appendix A**.
- 1.1.4 ET conducted below baseline monitoring at designated locations according to the EM&A Manual.
 Air quality and noise: from 21 December 2015 to 3 January 2016.
 Water quality: from 15 December 2015 to 8 January 2016.
- 1.1.5 Baseline Monitoring Report was issued by the ET and verified by the IEC on 27 January 2016 and submitted to the EPD on 2 February 2016.
- 1.1.6 The impact monitoring of the EM&A programme, including air quality, noise, water quality monitoring as well as environmental site inspections, commenced on 17 February 2016.

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1.2. ORGANIZATION STRUCTURE

1.2.1 The organization structure of the Contract is shown in **Appendix B**. Contact details of key personnel are summarized in below table:

Party	Position	Name	Telephone
Water Supplies	Engineer / Project	Mr. Chiu, Aletta C. M.	2829 5653
Department	Management		
AECOM	Senior Resident Engineer	Mr. Ng, Derek, K. H.	9717 1420
	(Civil)		
	Independent	Mr. Fung, Y. W.	3922 9366
	Environmental Checker		
	Deputy Independent	Ms. Lam, Lemon, M.	3922 9381
	Environmental Checker	С.	
Ming Hing - Ming	Project Manager	Mr. Lam, Larry, M. W.	6478-0501
Hing Civil - Vasteam	Site Agent	Mr. To, Eros, W. H.	9223 9590
Joint Venture			
Acumen Env. Eng. &	Environmental Team	Ir Dr. Lam, Gabriel, C.	2333 6823
Tech. Co. Ltd.	Leader	К.	
	Deputy Environmental	Ir Leung, Jacky, C. H.	9060 2368
	Team Leader		
	Ecologist	Mr. Liu, Vincent, W. L.	6505 5827

Table 1-1: Key Personnel Contact for Environmental Works

1.3. SCOPE OF REPORT

- 1.3.1 This is the 31st monthly EM&A Report under the Contract No. 3/WSD/15 In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works covering the period from 1 September 2018 to 30 September 2018 (the reporting period).
- 1.3.2 The EM&A requirements for impact monitoring are set out in the approved EM&A Manual. Environmental aspects such as the construction air quality, noise, water quality and ecology were identified as the key issues during the construction phase of the Project.

1.4. SUMMARY OF CONSTRUCTION WORKS

- 1.4.1 The construction phase of the Contract commenced on 30 October 2015. Latest construction programmes is shown in **Appendix C**.
- 1.4.2 As informed by the Contractor, details of the major works carried out in this reporting month are listed below:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- 1.4.3 The locations of the construction activities are shown in **Appendix D**. The Environmental Sensitive Receivers in the vicinity of the Project are shown in **Appendix E**.

2. EM&A RESULTS

2.1. EM&A BACKGROUND

2.1.1 The EM&A programme required environmental monitoring for air quality, noise, water quality and ecology as well as environmental site inspections for air quality, noise, water quality, waste management and ecology impacts. The EM&A requirements and related findings for each component are summarized in the following sections. A summary of impact monitoring programme is presented in Table 2-1.

Impact Monitoring	Sampling Parameter	Frequency
Air Quality	1-hour TSP	3 times in every 6 days when documented and valid complaint was received
Noise	$L_{eq 30 min}$, $L_{eq 5 min}$, L_{10} and L_{90} as reference.	 1 time per week: ◆ L_{eq 30 min} for normal weekdays from 0700 - 1900;
Water Quality	Duplicate in-situ measurements: Dissolved Oxygen (DO), Turbidity and pH; HOKLAS-accredited laboratory analysis: Suspended Solids (SS).	3 days per week. The interval between 2 monitoring days will be more than 36 hours.
Ecology	-	A detailed at least 6 years post-planting monitoring and maintenance programme

Table 2-1: Summary of Impact Monitoring Programme

Remark: Sampling Depth for Water Quality:

- (*i*) 3 depths: 1m below water surface, 1m above bottom and at mid-depth when the water depth exceeds 6m.
- (ii) If the water depth is between 3m and 6m, 2 depths: 1m below water surface and 1m above bottom.
- (iii) If the water depth is less than 3m, 1 sample at mid-depth is taken
- 2.1.2 A summary of the monitoring parameters is presented in Table 2-2.

Table 2-2: Summary of the monitoring parameters of EM&A Requirements

Environmental Issue	Parameter				
Air Quality	• 1-hour TSP Monitoring by Real-Time Portable Dust Meter				
Noise	• L _{eq (30min)} during normal working hours				
Water Quality	In-situ measurement Dissolved Oxygen (mg/L); Dissolved Oxygen Saturation (%); Turbidity (NTU); pH value; Water depth (m); and Temperature (°C) Laboratory analysis Suspended Solids (mg/L)				

- 2.1.3 Summary of determination of Action/Limit (A/L) Levels for air quality, noise and water quality are presented in **Appendix F**.
- 2.1.4 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix G**.
- 2.1.5 The impact monitoring schedules are presented in **Appendix H** and the monitoring results are detailed in the following sub-sections.

2.2. AIR QUALITY MONITORING

- 2.2.1 Impact monitoring for air quality had been carried out in accordance with Sections 2.29 of the approved EM&A Manual to determine the ambient 1-hour total suspended particulates (TSP) levels at the monitoring locations. 1-hour TSP sampling should be undertaken at least 3 times in every six-days at each monitoring station when the highest dust impacts are expected. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources had also been recorded throughout the impact monitoring period.
- 2.2.2 Two (2) designated monitoring stations, AM1 located at the L Louey and AM2 located at Hin Keng Estate Hin Wan House, were recommended in Section 2.18 of the approved EM&A Manual. In order to identify and seek for the access of the air monitoring locations designated in the EM&A Manual, site visit was conducted among ET, IEC and EPD.
- 2.2.3 During the site visit, all designated air monitoring locations were identified. Details of air monitoring stations are described in Table 2-3. The location plan of air quality monitoring stations is shown in **Appendix I**.

Air Quality Monitoring Station	Air Sensitive Receiver (ASR) ID in the approved EIA Report	Dust Monitoring Station
AM1	ASR2	The L Louey (at a platform level of about 5m above road level nearby)
AM2	ASR4	Hin Keng Estate - Hin Wan House (at the roof top)

Table 2-3: Location of the Air Quality Monitoring Stations

2.2.4 The monitoring equipment using for the air quality impact monitoring was proposed by ET and verified by IEC. 1-hour TSP levels had been measured with direct reading dust meter. It has been demonstrated its capability in achieving comparable results with high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). The details of equipment using for impact monitoring are listed in Table 2-4 as below.

Table 2-4: Air Quality Impact Monitoring Equipment

Equipment	Model
Portable dust meter – 1-hour TSP	TSI DustTrak Aerosol Monitor Model 8532
Portable Wind Speed Indicator	The Kestrel Pocket Weather Meter

- 2.2.5 The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:
 - A pump to draw sample aerosol through the optic chamber where TSP is measured;
 - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and

- A built-in data logger compatible with based program to facilitate data collection, analysis and reporting.
- 2.2.6 The 1-hour TSP meter was calibrated by the manufacturer prior to purchasing. Zero response of the instrument was checked before and after each monitoring event. Operation of the 1-hour TSP meter followed manufacturer's Operation and Service Manual. A valid calibration certificate is attached in **Appendix J**.
- 2.2.7 In this Reporting Period, a total of six (6) sampling days perform air quality monitoring at the two designated locations. The results for 1-hour TSP are summarized in Table 2-5 and Table 2-6.

	•		U	1-hour TSP (μg/m³)		
Date	Weather	Start	End	1 st	2^{nd}	3 rd
		Time	Time	Measurement	Measurement	Measurement
3/9/2018	Fine	10:36	13:36	102	90	119
7/9/2018	Fine	10:29	13:29	117	113	106
12/9/2018	Cloudy	10:05	13:05	82	73	90
17/9/2018	Cloudy	9:22	12:22	105	125	100
21/9/2018	Fine	10:36	13:36	83	95	82
26/9/2018	Sunny	9:22	12:22	84	61	90
	Average				95.4	
Range				61-125		

Table 2-5: Summary of 1-hour TSP Monitoring Results – AM1

Table 2-6: Summar	y of 1-hour TSP Monitoring	g Results – AM2
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				1-hour TSP ($\mu g/m^3$)		
Date	Weather	Start	End	1 st	2^{nd}	3 rd
		Time	Time	Measurement	Measurement	Measurement
3/9/2018	Fine	10:45	13:45	110	121	114
7/9/2018	Fine	10:41	13:41	112	136	118
12/9/2018	Cloudy	10:11	13:11	115	136	125
17/9/2018	Cloudy	9:30	12:30	103	99	97
21/9/2018	Fine	10:48	13:48	113	123	96
26/9/2018	Sunny	9:31	12:31	112	118	91
	Average				113.3	
Range				91-136		

2.2.8 In this Reporting Month, all monitoring result were below the action level. Hence, no Action or Limit Level exceedance was triggered during this month. The impact air quality monitoring results and graphical presentation are shown in **Appendix K**.

2.3. Noise Monitoring

- 2.3.1 Impact monitoring for noise levels had been measured in accordance with Sections 3.13 of approved EM&A Manual on normal weekdays at a frequency of once a week at logging interval of 30 minutes for daytime (between 0700 and 1900 hours of normal weekdays). The L_{eq} had been recorded at the specified intervals. The non-project related construction activity Sha Tin to Central Link (SCL) for Hin Keng to Diamond Hill Tunnel, in the vicinity of the monitoring stations during the impact monitoring had been noted and the source and location of this activity had been recorded.
- 2.3.2 According to Section 3.7 of the approved EM&A Manual, 3 noise sensitive receivers designated for the construction noise monitoring. The designated monitoring stations are identified and successfully granted by the premises. The details of noise monitoring stations are described in Table 2-7 and the location plan of noise monitoring stations is shown in **Appendix L**.

Noise Monitoring Station	Noise Sensitive Receiver (NSR) ID in the approved EIA Report	Identified Noise Monitoring Station		
		The L Louey (South)		
NM1	HK2	(at a platform level of		
1 1 1 1 1	11122	about 5m above road level nearby		
		- free field measurement)		
		Hin Keng Estate –		
NM2	HK5	Hin Wan House		
		(at the roof level - facade measurement)		
		C.U.H.K.F.A.A.		
NM3	HK7	Thomas Cheung School		
		(at the roof level - free field measurement)		

Table 2-7: Details of Noise Monitoring Stations

2.3.3 The monitoring equipment using for the noise impact monitoring was proposed by ET and verified by IEC. Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications has been used for carrying out the noise monitoring. The sound level meter has been checked using an acoustic calibrator. The wind speed has been checked with a portable wind speed meter capable of measuring the wind speed in m/s. The details of equipment using for impact monitoring are listed in Table 2-8 as below.

Table 2-8: Noise Impact Monitoring Equipment

Noise	
Sound Level Meter	Pulsar 43
Acoustic Calibrator	Pulsar 105 Sound Calibrator
Portable Wind Speed Indicator	The Kestrel Pocket Weather Meter

- 2.3.4 All noise measurements were the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}).
- 2.3.5 Prior to the impact noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Regular checking

In-situ Reprovisioning of Sha Tin Water Treatment Works - South Works

was conducted in impact monitoring period. The calibration level before and after the noise measurement is agreed to within 1.0 dB.

- 2.3.6 An acoustic calibrator and sound level meter using impact monitoring is within the valid period and were calibrated per year. A set of valid calibration certificates is attached in **Appendix M**.
- 2.3.7 Noise measurements should not be made in presence of fog, rain, wind with a steady speed exceeding 5 ms⁻¹ or wind with gusts exceeding 10 ms⁻¹. The wind speed was checked with a portable wind speed meter capable of measuring with speeds in ms⁻¹.
- 2.3.8 In this Reporting Period, a total six (6) occasions noise monitoring was undertaken in Reporting period. The noise monitoring results at the designated locations are summarized in Tables 2-9 to 2-11.

Date	Time		Weather	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}
3/9/2018	10:59 -	11:29	Fine	64.1	62.2	62.5	61.6	60.8	63.8	62.7
7/9/2018	10:48 -	11:18	Fine	63.1	62.9	62.0	62.8	61.7	60.6	62.3
12/9/2018	10:21 -	10:51	Cloudy	63.6	64.5	64.2	66.0	63.8	63.5	64.4
17/9/2018	9:37 -	10:07	Cloudy	63.0	64.8	65.3	65.2	65.1	64.5	64.7
21/9/2018	11:03 -	11:33	Fine	63.8	62.1	59.8	62.3	60.3	61.6	61.9
26/9/2018	9:37 -	10:07	Sunny	63.9	66.1	63.2	65.1	66.7	64.4	65.1
Limit Level >75dB(A)								Average	63.7	
								Range	61.9- 65.1	

Table 2-9: Summary of Noise Monitoring Results - NM1

Table 2-10: Summary of Noise Monitoring Results - NM2

Data	Time	Weather	1 st	2^{nd}	3 rd	4 th	5 th	6 th	Lag
Date	Inne	weather	Leq _{5min}	Leq _{30min}					
3/9/2018	11:12 - 11:42	Fine	59.2	56.3	57.7	58.5	58.8	59.4	58.4
7/9/2018	11:01 - 11:31	Fine	59.3	63.6	61.6	62.1	60.0	62.3	61.7
12/9/2018	10:30 - 11:00	Cloudy	59.4	60.4	60.2	59.6	58.6	61.2	60.0
17/9/2018	9:50 - 10:20	Cloudy	59.5	61.0	60.1	59.8	59.8	61.5	60.3
21/9/2018	11:12 - 11:42	Fine	59.3	58.7	59.9	56.8	56.8	59.5	58.7
26/9/2018	9:43 - 10:13	Sunny	59.4	60.3	59.7	59.9	59.9	59.1	59.7
Limit Level >75dB(A)								Average	60.0
								Range	58.4-
									61.7

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Date	Time	Weather	1 st	2 nd	3 rd	4 th	5 th	6 th	Lag
Date	Time	weather	Leq _{5min}	Leq _{30min}					
3/9/2018	11:24 - 11:54	Fine	58.9	61.2	61.2	60.9	60.8	62.3	61.0
7/9/2018	11:18 - 11:48	Fine	57.8	59.4	56.4	58.8	57.6	56.2	57.9
12/9/2018	10:47 - 11:17	Cloudy	58.2	56.3	57.7	56.5	55.7	57.7	57.1
17/9/2018	10:02 - 10:32	Cloudy	58.6	55.6	55.5	59.4	58.6	58.9	58.0
21/9/2018	11:27 - 11:57	Fine	57.7	57.7	57.9	56.9	60.6	60.1	58.7
26/9/2018	9:57 - 10:27	Sunny	60.4	58.2	60.8	59.3	59.0	59.1	59.6
Limit Level								Average	58.9
. ,	70dB(A) during normal teaching periods							Range	57.1-
and 65 dB(A) during examination periods								Range	61.0

Table 2-11: Summary of Noise Monitoring Results - NM3

2.3.9 As shown in the results were well below the limit level, also no complaint was received by the RE, WSD, EPD and contractor. Hence, no Action or Limit Level exceedance was triggered during this month. The impact noise quality monitoring results and graphical presentation are shown in **Appendix** N.

2.4. WATER QUALITY MONITORING

- 2.4.1 Water Impact monitoring had been taken three days per week with sampling or measurement in accordance with Sections 4.12 of the approved EM&A Manual at all designated monitoring stations in the 2 water courses. The interval between 2 sets of monitoring had been more than 36 hours. Replicate in-situ measures had been carried out in each sampling event.
- 2.4.2 Three (3) control and two (2) impact stations were recommended in the Section 4.7 of the approved EM&A Manual to carry out water quality monitoring. In order to identify and seek for the access of the water monitoring locations designated in the approved EM&A Manual, site visit was conducted among ET, IEC and Environmental Protection Department (EPD).
- 2.4.3 During the site visit, all designated monitoring locations were identified however one more impact stations (M3) along the same water course was introduced due to the concern on multiple site effect, in particular to address the potential impact to M2 from a source at upstream of the water course. Details and coordinates of the monitoring stations are described in Table 2-12 and the location plan of water quality monitoring stations is shown in **Appendix O**.

Water Quality	Description	Co-ordinates		
Monitoring Station	Description	Easting	Northing	
C1		835110	824716	
C2	Control Stations	835403	824470	
C3		835642	824386	
M1	Immediate	835215	824827	
M2	Impact Manitaring Stations	835536	824775	
M3	Monitoring Stations	835501	824648	

Table 2-12: Details of Water Quality Monitoring Station

2.4.4 The water monitoring equipment and analysis using for the water quality monitoring were proposed by ET and verified by IEC. The details of equipment using for impact monitoring are listed in the Table 2-13 below:

Water quality							
Horiba Model U-5000 Multi-parameter Water Quality Monitoring System							
Thermometer & DO meter	The instrument is a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment is capable of measuring as included a DO level in the range of 0 - $20mg/L$ and 0 - 200% saturation; and a temperature of 0 - $45^{\circ}C$.						
pH meter	The instrument consists of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It is readable to 0.1 pH in range of 0 to 14.						
Turbidmeter	The instrument is a portable and weatherproof turbidity measuring instrument using a DC power source. It has a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.						
Laboratory Analysis							
Suspended Solids	HOKLAS-accredited laboratory (Acumen Laboratory and Testing Limited)						

Table 2-13: Monitoring Equipment Used in Impact Monitoring Program

Remark:

(i) Water samples for suspended solids (SS) have been stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).

- 2.4.5 Before the commencement of the sampling, general information such as the date and time of sampling as well as the personnel responsible for monitoring were recorded on the monitoring field data sheet.
- 2.4.6 Water temperature, turbidity, DO, pH and water depth were measured in-situ. Since water depths at C1, C2, M1, M2 and M3 were less than 3 m, all in-situ measurements and sampling conducted at one water depth such as mid-depth are performed. Moreover, C3 was recorded dry throughout the sampling period. Therefore, in-situ measurements and sampling could not be conducted at C3 in accordance with the water monitoring requirements in the approved EM&A Manual.
- 2.4.7 At each sampling point, (two) 2 consecutive measurements of temperature, DO, turbidity and pH were measured. The Multi-Parameter Water Quality Monitoring Probe were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken. The certification of the Multi-parameter Water Quality Monitoring System is showed in **Appendix P**.
- 2.4.8 All water samples were delivered to the Acumen Laboratory and Testing Limited (HOKLAS registration no.: 241). SS testing was used HOKLAS accredited Analytical method APHA 2540 D. The certification of laboratory with HOKLAS accredited analytical tests are provided in **Appendix Q**.
- 2.4.9 In this reporting period, a total of thirteen (13) sampling days perform water monitoring at the six designated locations. Monitoring results of 4 key parameters: dissolved oxygen (DO), turbidity, suspended solids and pH in this Reporting Months, are summarized in Table 2-14.

y EM&A Report (No. 31)						10
Table 2-14: Summary of Water Qual	ity Monitor	ring Result	S			
Dissolved Oxygen – Mid Depth (mg/L)	C1	C2	С3	M1	M2	M3
Average	8.56	8.55	N/A	9.13	9.17	9.33
Min.	8.24	8.28	N/A	8.97	8.97	9.17
Max.	8.82	8.83	N/A	9.27	9.32	9.58
Turbidity – Mid Depth (NTU)	C1	C2	C3	M1	M2	M3
Average	2.49	2.59	N/A	2.15	1.66	0.50
Min.	2.30	2.30	N/A	1.90	1.40	0.30
Max.	2.80	2.80	N/A	2.30	1.90	0.80
Suspended Solid – Mid depth (mg/L)	C1	C2	С3	M1	M2	M3
Average	2.40	2.50	N/A	1.86	2.73	<1
Min.	2.00	1.90	N/A	1.50	2.30	<1
Max.	2.80	3.00	N/A	2.30	3.40	<1
pH value (unit)	C1	C2	C3	M1	M2	M3
Average	7.51	7.61	N/A	7.79	7.74	7.63
Min.	7.30	7.22	N/A	7.60	7.65	7.51
Max	7.74	7.91	N/A	7.90	7.87	7.80

2.4.10 In this Reporting Month, all monitoring result were below or within the action level. Hence, no Action or Limit Level exceedance was triggered during this month. Detailed monitoring results including insitu measurements, laboratory analysis data are shown in **Appendix R**.

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2.5. ECOLOGY

- 2.5.1 Detailed Vegetation Survey Report and Woodland Compensation Plan submitted to EPD and approved on 17 February 2016. To ensure the planting works are properly implemented, bi-weekly monitoring is proposed throughout the planting phase. The frequency of monitoring is proposed to be bi-monthly during the first years of the planting stage, and then reduced to quarterly for the six (6) year post-planting period.
- 2.5.2 A 6 years post-planting review report will be submitted within a month after completion of the at least 6 years post-planting monitoring and maintenance.
- 2.5.3 Vegetation monitoring scheduled on 28 September 2018 during the Reporting Period. Detailed monitoring report (No. 49) is shown in Appendix S.
- 2.5.4 The condition of TA572 was observed in poor condition due to broken of main trunk. TA327 was also in poor condition; while already dead TA326 collapsed under Signal No. 10 typhoon Mangkhut. Tree guying cables have been installed to provide external support to the two remaining transplanted trees. Transplanted Lamb of Tartary (Cibotium barometz) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. Shelter (遮光網) was recommended to reduce the intensity of sunlight. Hong Kong Eagle's Claw (Artabotrys hongkongensis) was observed dead during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out and were recovering from transplantation. Currently, Lamb of Tartary was temporally stored in a nursery garden at Wang Toi Shan, Kam Tin. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage.
- 2.5.5 In general, all transplanted Lamb of Tartary (Cibotium barometz) were in fair condition while Hong Kong Eagle's Claw (Artabotrys hongkongensis) and one Incense Tree (Aquilaria sinensis) TA326 were observed dead during inspection on 20 August 2016 and on 10 August 2017 respectively.
- 2.5.6 In order to compensate for the loss of transplanted Hong Kong Eagle's Claw and Incense Tree, it is recommended to plant an individual of native climber species and 3 heavy standard native tree species at compensatory planting site. The suggested species in planting list would have certain ecological value in terms of plant ecology and the associated wildlife including birds.
- 2.5.7 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

2.6. WASTE MANAGEMENT STATUS

- 2.6.1 The Contractor has submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting. The Waste Producer Number to the Contractor is assigned in respect of the project site.
- 2.6.2 Wastes generated during this reporting period include mainly construction wastes (inert and non-inert). Waste flow table was prepared by the Contractor to record amount of waste generated and disposed (**Appendix T**).
- 2.6.3 The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/ recycle of C&D materials and wastes.
- 2.6.4 The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly. For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.7. DELIVERY, STORAGE AND HANDLING OF CHLORINE

2.7.1 Chlorine is delivered to Sha Tin WTW in batches of up to 6×1-tonne drums. The transport route from Sham Shui Kok dock on North Lantau is shown in **Figure 1**. The route passes along the North Lantau Expressway, around the northern edge of Tsing Yi, through Tsuen Wan and along Tai Po Road (Piper's Hill) to Sha Tin (Table 2-15).

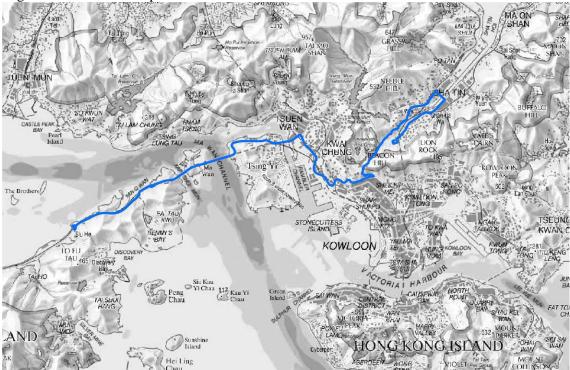
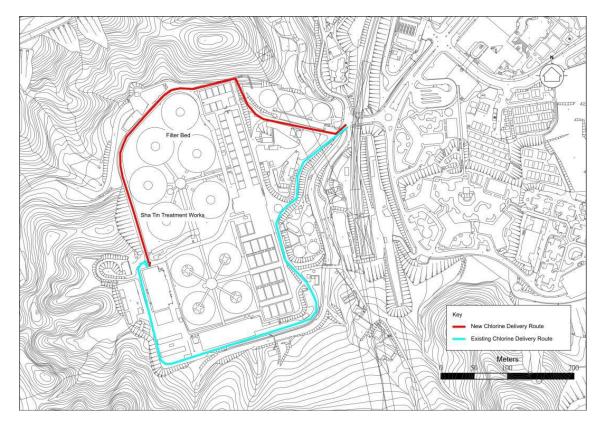


Figure 1: Chlorine Transport Route to Sha Tin Water Treatment Works

Table 2-15: Chi	Table 2-15: Chlorine Truck Transport Route							
Destination Route								
From SSK	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway							
Dock to Sha	> Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Costal road > Tsing							
Tin WTW	Tsuen Road > Tsuen Wan Road > Kwai Chung Road > Ching Cheung Road > Tai							
	Po Road > Tai Po Road (Piper's Hill) > Tai Po Road (Sha Tin Heights) > Tai Po							
	Road > Tsing Sha Highway (Sha Tin) > Tai Po Rd (Sha Tin) > Sha Tin Rural							
	Committee Rd > Tai Chung Kiu Rd > Che Kung Miu Road > Sha Tin WTW							

- 2.7.2 Unloading takes place inside the Chlorination House, with the doors closed, in a designated truck unloading bay. The movement of drums within the storage area and 'drive-through' unloading bay is carried out using a hoist/monorail system with a purpose-built lifting beam. Prior to usage, the drums are stored on cradles within the chlorine storage area.
- 2.7.3 The on-site chlorine delivery route is shown in Figure 2.

Figure 2: Chlorine Delivery Route at Sha Tin WTW



- 2.7.4 An emergency chlorine scrubbing system is installed to remove any leaked chlorine in the chlorine handling and storage areas. The system is a packed tower utilising sodium hydroxide as the neutralising agent. The plant and equipment are installed in a separate scrubber room.
- 2.7.5 On detection of chlorine at a concentration of 3 ppm or above in the chlorine handling or storage areas, the scrubbing system will activate automatically. The air/chlorine mixture in the affected areas is drawn into the scrubber by the scrubber fan via ducting connected to the normal ventilation system. An electrically-operated isolating damper is provided in the scrubber intake which opens automatically when the scrubber fan starts up.
- 2.7.6 The scrubber system is normally set at auto standby mode and is activated if the chlorine concentration rises above 3 ppm. A continuous chlorine monitor is installed at a point downstream of the packed tower

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and upstream of the vent/recycle changeover dampers to monitor the scrubber performance; a "Chlorine concentration high" alarm will be initiated if the concentration of chlorine in the tower exhaust exceeds the preset value.

- 2.7.7 According to the Fire Services Department's fire safety requirements, an emergency repair/stoppage kit for chlorine spillage/leakage is provided and maintained in good working condition at all times for use by the trained persons and stowed adjacent to but outside the store/plant room. Regular drills are conducted to train personnel on the proper use of the breathing apparatus and protective clothing.
- 2.7.8 A Hazard Assessment of the risks associated with the storage, handling and transport of chlorine at Sha Tin WTW and the off-site transport of chlorine for the Construction and Operational Phases of the reprovisioning project has been conducted in the approved EIA Report (Register No. AEIAR-187/2015).
- 2.7.9 This In-situ Reprovisioning of Sha Tin WTW is an improvement project, following its completion the chlorine-related risks levels to the general public will be lowered due to the anticipated reduction of the chlorine storage and usage levels.
- 2.7.10 Implementation of the recommended mitigation measures would be regularly audited. No specific Environmental Monitoring would be required.

2.8. EM&A SITE INSPECTION

- 2.8.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. In the reporting period, four (4) site inspections were carried out on 5,12,21 and 27 September 2018.
- 2.8.2 One joint site inspection with IEC also undertaken on 21 September 2018. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16.

Date	Environmental Observations	Follow-up Status
5 Sep,2018	 Sedimentation tank at Wall C was full and seem not working Turbidity of water color at water discharge point near wall C was high Oil drum at Wall C upper part should be put on drip tray 	 Sedimentation tank is maintained Coagulants are used in sedimentation tank, and the sediments were removed. Oil Drum is placed at drip tray
12 Sep,2018	 Oil drum at Wall C upper part should be put on drip tray Diesel oil at S1 near main building should be put on drip tray 	 Oil Drum is placed at drip tray Diesel oil is placed on trip tray
21 Sep,2018	 Chemical Waste should be properly labelled. Diesel should be put back to storage area after used. Hoard road should be watered frequently at Wall C. 	 Storage of Chemical waste is labelled Diesel is put back to storage Water spraying facility is provided in hoard road and watered frequently
27 Sep,2018	No observations and recommendations	-

Table 2-16: Site Observations

2.8.3 The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period.

2.9. ENVIRONMENTAL LICENSES AND PERMITS

2.9.1 The status of environmental license and permit is summarized in Table 2-17 below:

Table 2-17: Summary of Environmental License and Permit

License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit Holder	Remark
Environmental Permit	EP- 494/2015	28/01/2015	N/A	WSD	
Registration of Chemical Waste Producer	WPN5218-759 -M2936-01	31/12/2015	N/A	MMVJV	
Trip Ticket (Chit) Account	7023723	10/12/2015	N/A	MMVJV	
Waste Water Discharge License (Wall C)	WT0023932 -2016	01/04/2016	31/03/2021	MMVJV	
Waste Water Discharge License (Wall D)	WT0024211 -2016	10/06/2016	30/06/2021	MMVJV	

-						10
	License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit	Remark
					Holder	
	Construction Noise	GW-RN0382-18	19/07/2018	18/10/2018	MMVJV	
	Permit					

2.10. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

- 2.10.1 In response to the site audit findings, the Contractors carried out corrective actions. A summary of the environmental mitigation measures implemented by the Contractor in this Reporting Period are summarized in Table 2-18.
- 2.10.2 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (EMIS) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are showed **Appendix U**.

Issues	Environmental Mitigation Measures
	- Tarpaulin covering of any dusty materials on a vehicle leaving the site;
	- Imposition of speed controls for vehicles on site haul roads;
	- Use of regular watering to reduce dust emissions from exposed site
Air Quality	surfaces and roads;
	- Side enclosure and covering of any aggregate or stockpiling of dusty
	materials to reduce emissions;
	- Where possible, routing of vehicles and positioning of construction plant
	should be at the maximum possible distance from ASRs.
	- Good site practices to limit noise emissions at the sources;
	- Use of quite plant and working methods;
Noise	- Use of site hoarding or other mass materials as noise barrier to screen
INDISC	noise at ground level of NSRs;
	- Scheduling of construction works outside school examination period in
	critical area.
	- Drainage systems were regularly and adequately maintained;
Water	- Effluent discharged from the construction site should comply with
water	standards stipulated in the TM-DSS;
	- Open stockpiles of construction materials on sites should be covered.
General	- The site was generally kept tidy and clean.

2.10.3 The necessary mitigation measures were implemented properly for this Contract.

2.11. SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

- 2.11.1 Results for 1-hour TSP, noise and water quality monitoring complied with the Action/ Limit levels in the reporting period.
- 2.11.2 Cumulative statistics on exceedances is provided in Appendix V.

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2.12. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

2.12.1 The Environmental Complaint Handling Procedure is shown in below table:

Table 2-19: Environmental Complaint Handling Procedure

Complaint Received via Pr	oiect	Complaint Received via 1823 or							
Hotline	J	from other government departments							
MMVJV notify ER, ET and	d IEC	ER notify MMVJV, ET and IEC							
Register of the complaint.	. MMVJV	and ET to conduct investigation of							
complaint and report	t to ER ar	d IEC the investigation results							
If complaint is considered a	not valid	If complaint is found valid							
ET or ER to reply the com	plainant	MMVJV to implement necessary							
if necessary		improvement measures in							
		consultation with the IEC, ET and							
		ER. ET to check and inspect if the							
		situation is improved. ER to							
		conduct further inspection as							
		necessary.							
		ER to report the follow up actions							
		done to WSD and reply to							
		complainant is necessary.							
		If the complaint is referred by the							
		EPD, the Contractor to prepare							
		interim report on the status of the							
		complaint investigation and follow-							
		up action							
ER prepare com	plaint rep	ort for submission to WSD							
ET to record the co	mplaint c	ase in monthly EM&A report							

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- 2.12.2 No environmental complaint were received in the reporting period.
- 2.12.3 No notification of summons and prosecution was received in the reporting period.
- 2.12.4 No EPD inspection was conducted in the reporting month.
- 2.12.5 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix V.

2.13. DATA MANAGEMENT AND DATA QA/QC CONTROL

- 2.13.1 The impact monitoring data were handled by ET's in-house data recording and management system.
- 2.13.2 The monitoring data recorded in the equipment were downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data were input into computerized database properly. The laboratory results were input directly into the computerized database and checked by personnel other than those who had input the data.
- 2.13.3 For monitoring parameters that require laboratory analysis, the local laboratory had followed the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory testing.

3. FUTURE KEY ISSUES

3.1. CONSTRUCTION PROGRAMME FOR THE COMING MONTHS

- 3.1.1 As informed by the Contractor, the major works for this Project in October2018 to December 2018 will be:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House

3.2. KEY ISSUES FOR COMING MONTH

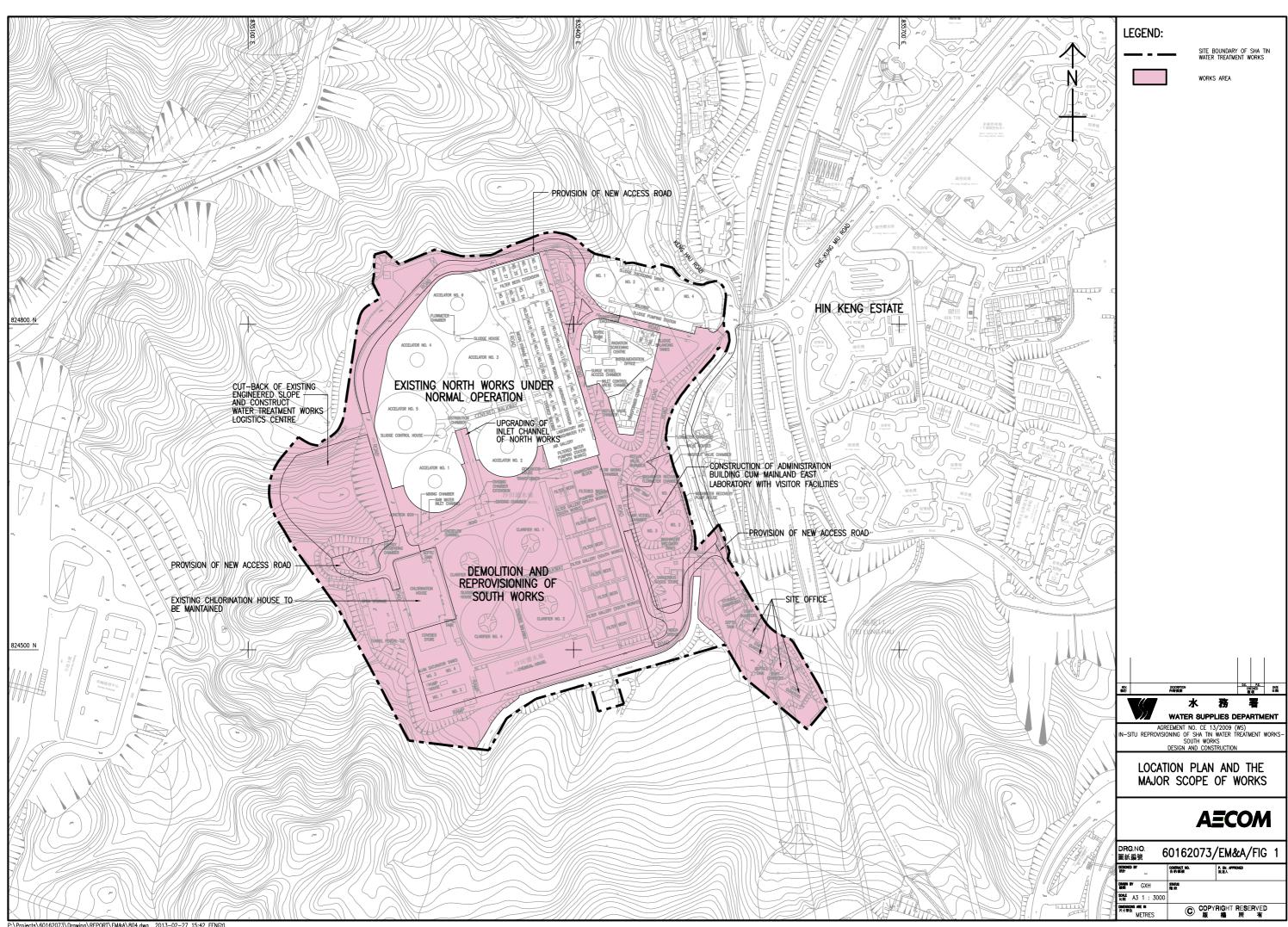
- 3.2.1 Potential environmental impacts arising from the above upcoming construction activities in October 2018 are mainly associated with dust, noise, water quality issues and waste management issues.
- 3.2.2 Particular issues to be considered in the coming month include:
 - Implementation of dust suppression measures at all times.
 - Implementation of adequate measures to prevent discharge of site effluent to the nearby water bodies
 - Desilting tanks and catch-pits should be regularly maintained.
 - Implementation of construction noise preventative control measures.
 - Avoidance of accumulation of stagnant water
- 3.2.2 The tentative monitoring schedule for October 2018 to December 2018 can be found in Appendix W.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. SUMMARY

- 4.1.1 Air quality (including 1-hour TSP), noise, water quality and ecology impact monitoring were carried out in the reporting period. All monitoring results are satisfactory and no NOEs or associated corrective action was therefore issued.
- 4.1.2 Four (4 nos.) environmental site inspection were conducted during the reporting period. Joint site inspection with IEC were carried out on 21 September 2018. Minor deficiencies were observed during site inspection and were rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.
- 4.1.3 To control the site performance on waste management, the contractor shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge licence and the chemical waste producer registration. Contractor is also reminded to implement the recommended environmental mitigation measures according to the Environmental Monitoring and Audit Manual.
- 4.1.4 No environmental complaint were received in the reporting period.
- 4.1.5 No notification of summons or prosecution was received since commencement of the Contract.
- 4.1.6 The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A General Layout Plan



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Appendix B Project Organization

Project Organization Chart JV Board Head Office Site Office Project Manager Larry Lam **Deputy Project Manager** Simon Wong Site Agent Eros To E&M Team Environmental Team(ET) **Environmental Officer** Team Leader Michael Leung (96080054) Mr. Leung, Chung Ho Jacky (Tel: 2333 6823) Ecologist Coordinator **Environmental Supervisor** Mr. Colin Chan Mr. Vincent Liu TBC (Tel: 6506 5827) (Tel: 2608 7361) Project Engineer Mr. Tsui Tsz Ho Nelson (Tel: 2333 6823) Field Team Laboratory Acumen Environmental Engineering & Technologies

Update Date 6/11/2017

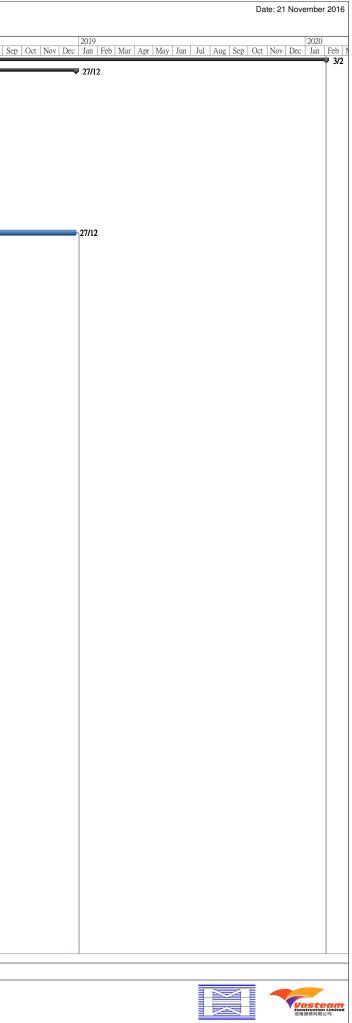
Appendix C Latest Construction Programme

Contract No.: 3/WSD/15 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works

Master Programme (Ver.03)

ID	Task Name	Duration	Start	Finish	2016 2017 2018 Oct Nov Dec Jan Feb Mar Apr May Jun Jun
P000	3/WSD/15 Master Programme Preliminaries Works		Fri 30/10/15	Mon 3/2/20 Thu 27/12/18	
P000 P001		30 days	Fri 30/10/15 Fri 30/10/15	Sat 28/11/15	0/10 28/11
P002	Renovation of RE office	150 days	Fri 30/10/15	Sun 27/3/16	0/10
P003	Erection of site office	150 days	Fri 30/10/15	Sun 27/3/16	0/10) 27/3
P004	Wheels wash facilities	120 days	Fri 30/10/15	Fri 26/2/16	0/10) 26/2
P005 P006	Initial survey	100 days	Fri 30/10/15	Sat 6/2/16	0/10) 6/2 0/10) 6/2
P006 P007	UU detection Tree and vegetation survey	100 days 78 days	Fri 30/10/15 Fri 30/10/15	Sat 6/2/16 Fri 15/1/16	0/10/ 0/10
P007 P008		0 days	Fri 15/1/16	Fri 15/1/16	\bullet 15 h
P009	· ·	21 days	Sat 16/1/16	Fri 5/2/16	
P010	Environmental Impact baseline monitoring	100 days	Fri 30/10/15	Sat 6/2/16	0/10
P011		0 days	Fri 15/1/16	Fri 15/1/16	
P012		0 days	Sat 6/2/16	Sat 6/2/16	
P013 P014	Pre-condition survey	100 days	Fri 30/10/15	Sat 6/2/16	0/10) 6/2
P014 P015	Tree transplanting works Tree Protection	90 days	Sun 7/2/16 Fri 30/10/15	Fri 6/5/16 Thu 27/12/18	0/10) 6/5
D000	Contractor's Design Submission	680 days	Fri 30/10/15	Fri 8/9/17	
D100	General	680 days	Fri 30/10/15	Fri 8/9/17	
D101	Project Design Plan	680 days	Fri 30/10/15	Fri 8/9/17	0/10 V V V V V V V V V V V V V V V V V V V
D102	AIP-01 - Addition GI Plan	147 days	Fri 6/11/15	Thu 31/3/16	6/11 31/3
D103	DDA-01 - Geotechnical Assessment if necessary	125 days	Fri 1/4/16	Wed 3/8/16	3/8
D104		88 days	Fri 6/11/15	Mon 1/2/16	
D105 D106	DDA-02 - Basis of Design if necessary AIP-04 - P&ID	184 days 152 days	Tue 2/2/16 Thu 7/1/16	Wed 3/8/16 Mon 6/6/16	
D106 D107		152 days 237 days	Wed 6/7/16	Mon 6/6/16 Mon 27/2/17	
D107	DDA-04-2 - Pumping System & Pipework Design	151 days	Mon 15/8/16	Thu 12/1/17	
D109	DDA-04-3 - Pipe Support Design	150 days	Mon 13/6/16	Wed 9/11/16	13/6 9/11
D110	DDA-04-4 - Testing & Commissioning	152 days	Thu 21/7/16	Mon 19/12/16	21/7 19/12
D111	AIP-05 - Intrumentation, Control and Automation (DCS / Control Philosophy)	176 days	Mon 1/2/16	Mon 25/7/16	257
D112	DDA-05-1 - DCS (General)	143 days	Mon 25/4/16	Wed 14/9/16	25/4>14/9
D113	DDA-05-2 - DCS (Functional Design Specification)	150 days	Mon 25/4/16	Wed 21/9/16	
D114 D115	DDA-05-3 - DCS (Control Loop Diagrams) AIP-06 - Communication Network	150 days 151 days	Mon 25/4/16 Mon 22/2/16	Wed 21/9/16 Thu 21/7/16	25/4
D115 D116	DDA-06 - Communication Network	181 days	Thu 7/7/16	Tue 3/1/17	
D110 D117	AIP-07 - Automatic Irrigation System	163 days	Thu 26/5/16	Fri 4/11/16	
D118	DDA-07 - Automatic Irrigation System	181 days	Fri 21/10/16	Wed 19/4/17	21/10
D119	AIP-08 - Electrical Power Supply System	166 days	Thu 7/1/16	Mon 20/6/16	
D120	DDA-08-1 - Electrical Power Supply System	151 days	Mon 25/7/16	Thu 22/12/16	25/722/12
D121	DDA-08-2 - Earthing Design	153 days	Tue 21/6/16	Sun 20/11/16	
D122	DDA-08-3 - Fault Calculation & Protection Setting for Electrical System	151 days	Mon 25/7/16	Thu 22/12/16	25/7 22/12
D123	DDA-08-4 - Harmonic Analysis	151 days	Mon 25/7/16	Thu 22/12/16	22/12
D124	DDA-08-5 - Electrical Typical Design	153 days	Wed 22/6/16	Mon 21/11/16	22/6 21/11
D125	DDA-08-6 - Modification of Existing Administration	153 days	Wed 21/9/16	Mon 20/2/17	21/9 20/2
	Building				
D126	AIP-10A - Process Piping - Civil	82 days	Thu 10/12/15	Mon 29/2/16	10/12 29/2
D127 D128	DDA-10A - Process Piping - Civil AIP-10B - Process Piping - E&M (Pipe Trench E&M	135 days 106 days	Wed 18/5/16 Thu 11/2/16	Thu 29/9/16 Thu 26/5/16	29/9
D120	Design)	100 days	1110 11/2/10	1110 20/5/10	
D129		91 days	Tue 22/3/16	Mon 20/6/16	22/3 20/6
	Design)				
D130	AIP-19 - Sitewide E&M Design	152 days	Thu 10/3/16	Mon 8/8/16	10/3
D131	DDA-19-1 - Sitewide E&M Design (General) (including Cable Duct Routes / Cable Routes)	150 days	Tue 9/8/16	Thu 5/1/17	9/8 5/1
D132	DDA-19-2 - Modification of North Works Air Gallery	199 days	Mon 13/6/16	Wed 28/12/16	
D132 D133		150 days	Mon 13/6/16	Wed 9/11/16	
D155	Filter and Sludge Handling	150 duys	101011 15/0/10	Wed 9/11/10	
D200	WTW Logistics Centre, Alum Saturation Tank, and Hydro	322 days	Tue 1/12/15	Mon 17/10/16	1/12
	Turbine House				
D201	AIP-11A - Design Concept	106 days	Tue 1/12/15	Tue 15/3/16	1/12) 29/2) 17/10
D202	DDA-11A - Architectural Design Development (DAP stage 2 submission to ASD)	232 days	Mon 29/2/16	Mon 17/10/16	29/2
D300	wTW Logistics Centre	544 days	Thu 17/12/15	Mon 12/6/17	17/12 2/12/6
D300 D301	AIP-12A - Architectural Design including GA, Interior	145 days	Thu 17/12/15	Mon 9/5/16	
	Design and Non-Structural Element				
D302	DDA-12A - Architectural Design including GA, Interior	205 days	Thu 21/4/16	Fri 11/11/16	
	Design and Non-Structural Element				
D303		90 days	Thu 17/12/15	Tue 15/3/16	
D304 D305	DDA-12B - Foundation & Structural Design AIP-12C - Building Services Design	159 days 143 days	Mon 29/2/16 Mon 22/2/16	Fri 5/8/16 Wed 13/7/16	29/2
D305	DDA-12C - Building Services Design	143 days 197 days	Mon 26/9/16	Mon 10/4/17	202 10/4
D307	AIP-12D - Electrical & Mechanical Design	344 days	Thu 17/12/15	Thu 24/11/16	17/12
D308	DDA-12D - Electrical & Mechanical Design	200 days	Fri 25/11/16	Mon 12/6/17	25/11
D400		544 days	Thu 17/12/15	Mon 12/6/17	17/12 🖵 👘 🧊 12/6
D401	AIP-13A - Architectural Design including GA, Interior	145 days	Thu 17/12/15	Mon 9/5/16	17/12
D 402	Design and Non-Structural Element	267 1	Thu: 01/4/17	Thu: 10/1/17	
D402	DDA-13A - Architectural Design including GA, Interior Design and Non-Structural Element	267 days	Thu 21/4/16	Thu 12/1/17	
D403	AIP-13B - Foundation & Structural Design	90 days	Thu 17/12/15	Tue 15/3/16	
D403 D404	DDA-13B - Foundation & Structural Design	90 days 159 days	Mon 29/2/16	Fri 5/8/16	29/2
D404 D405		145 days	Thu 17/12/15	Mon 9/5/16	<u>17/12</u> <u>9/5</u>
D406	DDA-13C - Building Services Design		Mon 26/9/16	Mon 10/4/17	26/9
	Critical Split Task		Milestone	•	Summary Manual Summary Critical

(EOT for Claim no. 009)



Ta	ask Name	Duration	Start	Finish	Oct Nov	2016 Dec Jan	Feb Mar Apr May Jun Ju	ul Aug Sen	Oct Nov De	2017 cc Jan Feb Mar	Apr Ma	y Jun Jul Aug Sen Oct	2018 Nov Dec Jan F	eb Mar Anr M	ay Jun Jul Aug Sep Oct Nov E	2019 Dec Jan Feb Mar Apr May	Jun Jul Aug Sen Oct Nov I
	AIP-13D - Electrical & Mechanical Design	260 days	Thu 17/12/15	Thu 1/9/16	17/		Teo Mai Tipi May Jun Je	1/9	T				THOY Dec Sun 1				Jun Jun Hug bep oet Hov h
	DDA-13D - Electrical & Mechanical Design	200 days	Fri 25/11/16	Mon 12/6/17					25/11			12/6					
	Hydro Turbine House		Mon 16/11/15		16/11 🕶					■ 31/1							
	AIP-14A - Architectural Design including GA, Interior Design and Non-Structural Element (incl. MEICA and BS	108 days	Mon 16/11/15	Wed 2/3/16	16/11		2/3										
	design)																
2		142 days	Thu 3/3/16	Fri 22/7/16			3/3	_ −22 <mark>/</mark> 7									
	Design and Non-Structural Element (incl. MEICA and BS																
	design)	100.1	N 160105	Th. 04/0/14			24/2										
3	AIP-14B - Foundation & Structural Design DDA-14B - Foundation & Structural Design	130 days 123 days	Mon 16/11/15 Fri 22/1/16	Thu 24/3/16 Mon 23/5/16	16/11	22/	24/3										
5	AIP-14C - Building Services Design	81 days	Mon 22/2/16	Thu 12/5/16			12/5										
6	DDA-14C - Building Services Design	74 days	Tue 17/5/16	Fri 29/7/16			17/5	29/7									
7	AIP-14D - Electrical & Mechanical Design (incl. Hydraulic		Tue 1/12/15	Fri 29/7/16	1/12			29/7									
	study)																
8	DDA-14D - Electrical & Mechanical Design (incl. Hydrauli	c 186 days	Sat 30/7/16	Tue 31/1/17			30/	7		31/1							
0	study) North Works Temporary Power House	409 days	Mon 16/11/15	Wed 28/12/16	16/11 🕶					28/12							
1	AIP-15A - Architectural Design including GA, Interior	93 days	Thu 17/12/15	Fri 18/3/16	1011 17	12	18/3			20/12							
	Design and Non-Structural Element																
)2		141 days	Fri 22/1/16	Fri 10/6/16		22/1	10/6		ו								
	Design and Non-Structural Element																
)3	AIP-15B - Foundation & Structural Design	130 days	Mon 16/11/15	Thu 24/3/16		22/1	24/3										
)4)5	DDA-15B - Foundation & Structural Design AIP-15C - Building Services Design	109 days 74 days	Fri 22/1/16 Mon 22/2/16	Mon 9/5/16 Thu 5/5/16			2/2]								
)6	DDA-15C - Building Services Design	74 days 88 days	Fri 6/5/16	Mon 1/8/16			6/5				↓						
)7	AIP-15D - Electrical & Mechanical Design	221 days	Tue 1/12/15	Fri 8/7/16	1/12			8/7									
8	DDA-15D - Electrical & Mechanical Design	153 days	Fri 29/7/16	Wed 28/12/16				n 🚽		28/12							
00	Temporary Washwater Recovery Tank	190 days	Thu 11/2/16	Thu 18/8/16		11/2		18/8									
01	AIP-16A - Galvanized Steel Platforms, Walkways and	106 days	Thu 11/2/16	Thu 26/5/16		11/	26/5										
02	Footing Design DDA-16A - Galvanized Steel Platforms, Walkways and	102 days	Mon 9/5/16	Thu 18/8/16				18/8	Ц								
20	DDA-16A - Galvanized Steel Platforms, Walkways and Footing Design	102 days	1011 2/3/10	1 IIU 10/0/10			9/3/	18/8									
03	AIP-16B - Lighting Design	74 days	Mon 22/2/16	Thu 5/5/16			2/2										
04	DDA-16B - Lighting Design	105 days	Wed 16/3/16	Tue 28/6/16			16/3	<i>;</i> /6									
)5	AIP-16C - Electrical & Mechanical Design	106 days	Thu 11/2/16	Thu 26/5/16		11/	26/5										
)6	DDA-16C - Electrical & Mechanical Design	140 days	Thu 31/3/16	Wed 17/8/16			31/3	17/8									
)0)1	Flowmeter House		Tue 1/12/15	Mon 4/9/17	1/12							4/9					
)1	AIP-17A - Architectural Design including GA, Interior Design and Non-Structural Element	91 days	Tue 1/12/15	Mon 29/2/16	1/1Z		29/2										
02	DDA-17A - Architectural Design including GA, Interior	138 days	Thu 11/2/16	Mon 27/6/16		11/	27	//6									
	Design and Non-Structural Element																
03	AIP-17B - Foundation & Structural Design	91 days	Tue 1/12/15	Mon 29/2/16	1/12		29/2										
04	DDA-17B - Foundation & Structural Design	106 days	Thu 11/2/16	Thu 26/5/16		11/	26/5										
05 06	AIP-17C - Electrical & Mechanical Design	259 days	Tue 1/12/15	Mon 15/8/16	1/12			15/8									
307	DDA-17C - Electrical & Mechanical Design AIP-17D - Building Services Design	235 days 75 days	Fri 13/1/17 Thu 31/3/16	Mon 4/9/17 Mon 13/6/16			31/3		1	3/1		4/9					
308	DDA-17D - Building Services Design	135 days	Fri 13/5/16	Sat 24/9/16			1245		24/9								
00	Valve Chamber	627 days	Fri 18/12/15	Mon 4/9/17	18/	12			F II'			4/9					
01	AIP-18A - Foundation, Civil & Structural Design	89 days	Fri 18/12/15	Tue 15/3/16	18	12	15/3										
02	DDA-18A - Foundation, Civil & Structural Design	123 days	Mon 29/2/16	Thu 30/6/16			29/2>	0/6									
03 04	AIP-18B - Electrical & Mechanical Design	151 days	Mon 15/8/16	Thu 12/1/17				15/8	1	12/1		40					
04	DDA-18B - Electrical & Mechanical Design AIP-18C - Building Services Design	235 days 75 days	Fri 13/1/17 Thu 31/3/16	Mon 4/9/17 Mon 13/6/16			31/3			5/1		4/7					
06	DDA-18C - Building Services Design	135 days	Fri 13/5/16	Sat 24/9/16			13/5		24/9								
00	Section Programme		Fri 30/10/15	Mon 3/2/20	/10	_									-		
00	Section 1		Fri 30/10/15	Wed 31/1/18	/10									31/1			
01	Section 1 Commencement	1 day	Fri 30/10/15	Fri 30/10/15	→ 30/	10											
00 01	North Works Temporary Power House Excavation of trial pit for earthing test	793 days 25 days	Tue 1/12/15 Wed 17/2/16	Wed 31/1/18 Sat 12/3/16	1/12	1	12/3							31/1			
01	Ground Investigation Wroks	25 days 10 days	Sun 13/3/16	Tue 22/3/16			13/3 22/3										
02	Additational drilling for in planting earthing log	30 days	Wed 23/3/16	Thu 21/4/16			23/3 21/4		11								
04	Excavation and installation of ELS	50 days	Mon 3/10/16	Mon 21/11/16				3/10-	21/1	1							
05	Installation of earth mat	20 days	Tue 22/11/16	Sun 11/12/16					22/11 📥								
06	Foundation	35 days	Mon 12/12/16	Sun 15/1/17					12/12 🖷	15/1							
07 08	Structural for North Works Tempoary Power House	76 days	Mon 16/1/17 Mon 16/1/17	Sat 1/4/17						10/1 ******							
00	Laying of cable ducts, construction of draw pits and installation of cable trays	76 days	Mon 16/1/17	Sat 1/4/17					· [] ·	10/1	117						
09	Confirmation of cable routing with CLP and WSD	0 days	Mon 3/10/16	Mon 3/10/16					♣ 3/10								
10	Design 6.6kv / 11kv working platform	120 days	Mon 3/10/16	Mon 30/1/17				3/10	1 · · ·	30/1							
11	Construction of 6.6kv / 11kv working platform	60 days	Tue 31/1/17	Fri 31/3/17						31/1 -	1,31/3						
12	Cable tray construction	30 days	Sat 1/4/17	Sun 30/4/17						1/4	30						
13	Laying 6.6kv / 11 kv cable by CLP	30 days	Mon 1/5/17	Tue 30/5/17								CNR -					
14	Completion of concrete structure of North Works Temporary Power House	1 day	Sun 2/4/17	Sun 2/4/17													
15	Plumbing and Drainage installation	100 days	Mon 3/4/17	Tue 11/7/17						3/4		11/7					
16	MVAC installation	100 days	Mon 3/4/17	Tue 11/7/17						24		11/7					
17	Fire Services installation	100 days	Mon 3/4/17	Tue 11/7/17						3//		11/7					
18	Electrical installation	100 days	Mon 3/4/17	Tue 11/7/17						3/4		11/7					
119	Section 1 Site Works For E & M Works		Tue 1/12/15	Wed 31/1/18	1/12									31/1			
120	North Works Temporary Power House_NWTPH	463 days	Tue 1/12/15	Tue 7/3/17	1/12					<i>7/</i>							
21	NWTPH- Electrical Equipment Procurement	21 days	Tue 1/12/15	Mon 21/12/15	1/12	21/12											
	Critical Split Task		Milestone		Summa	ry	Manual Summ	nary 🛡	Critic	cal 🗖		•					
nent Date:	30 Oct 2015								Page 2								
									1								
Date: 3 Fe	2020																

Contract No : 3/WSD/15

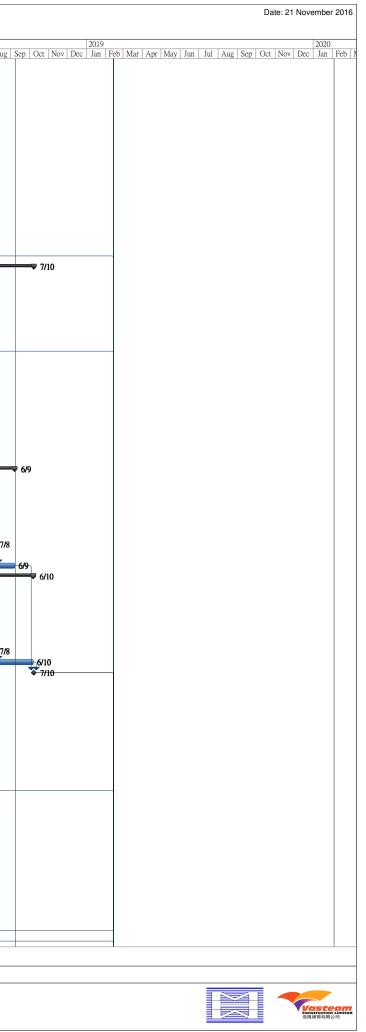
Master Programme (Ver 03)

		Task Name	Duration	Start	Finish	2016 2017 2018 2019	Jun Jul Aug Cor Oct M
	22		230 days	Tue 1/12/15			Jun Jui Aug Sep Oct Nov
	23		139 days	Thu 20/10/16	Tue 7/3/17		
	124					2/4	
3 3 <td>125</td> <td></td> <td>0 days</td> <td>Sun 2/4/17</td> <td></td> <td></td> <td></td>	125		0 days	Sun 2/4/17			
	1106		0.1	0 0////7	0.04417		
	1126	NWTPH-LV Supply Installation Commence at G/F	0 days	Sun 2/4/17	Sun 2/4/17		
	\$1127	NWTPH- 6.6KV/11kv Switchboard Installation at	28 days	Mon 3/4/17	Sun 30/4/17	3/4 🗯 30/4	
30 OPERATE Activity Suppression, Note on the Sole in LUSCI in LUS	S1128		· 14 days	Mon 1/5/17	Sun 14/5/17		
	G 4 4 6 G		0.1		0		
	S1129		0 days	Sun 14/5/17	Sun 14/5/17		
11 met of there yes in the second of the							
	S1130		14 days	Mon 15/5/17	Sun 28/5/17		
				24 20/5/18	0.000		
S 1 https://www.scoredit interfactory	S1131		7 days	Mon 29/5/17	Sun 4/6/17	29/5 🕊 4/6	
	S1132		7 days	Mon 5/6/17	Sun 11/6/17	56 = 146	
	01102		, aujo	11011 0707 17	5un 11/0/17		
	S1133		0 days	Sun 11/6/17	Sun 11/6/17	₩ ¹ ±1/6	
		rectification to CLP - H/O by Civil Contractor					
	S1134	NWTPH- CLP Mobilization for Supply 2 diversion	14 dave	Mon 12/6/17	Sun 25/6/17		
9 VPTTPL Lube v: 10 kp > 40 kp >			1 . augo		201011		
	S1135						
2 SVTPS Guardian Gar opera unplue Name No. 20017 No.20017 No.20017 </td <td>S1136</td> <td></td> <td>53 days</td> <td>Mon 3/7/17</td> <td>Thu 24/8/17</td> <td></td> <td></td>	S1136		53 days	Mon 3/7/17	Thu 24/8/17		
N-0.2 N-0.2 <td< td=""><td>S1137</td><td></td><td>36 dave</td><td>Fri 25/8/17</td><td>Fri 29/9/17</td><td></td><td></td></td<>	S1137		36 dave	Fri 25/8/17	Fri 29/9/17		
20 NUTHE LAW, Subjective Law	51157		Jouays	111 23/0/17	111 471 71 1 1		
63 SWTH: No-since Deep in A Space Construction No. 107 74 SWTH: Second and the deep in the Ward of the State Deep in the Ward of the Ward of the State Deep in the Ward of the State Deep in the Ward of the War	S1138	NWTPH- 6.6KV Switchboard T&C incl. CLP	7 days				
Rume_outle_family Ru	S1139	•					
- W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant <	S1140			Mon 1/5/17	Mon 1/5/17		
1 0.5 NPTH 10 NP reduce the direct in the Proceed in the maximum							
File. A Subjectionate data State (State (S1141		0 days	Sun 5/11/17	Sun 5/11/17	5/11	
2 SWTPR Documentation for Privacy 11 with 12 min of Vision 12		Filters & Sludge treatment plant - H/O by Civil					
 	01140		60.1	N. (11/17	TI 4/1/10		
44 NVPTH: 1. Altroactic WTM angles TF 4. Will you	S1142		60 days	Mon 6/11/1/	1 hu 4/1/18	0/11 - 4/1	
4 NVTPL NVT	S1143		30 days	Tue 19/12/17	Wed 17/1/18		
46 NVTTPI Free-1-EAN Works 216 day Wai 10/07 70 NVTTPI CDP 41, and 100 mm monosity 3 devices 100 mm m	S1144	NWTPH- Reroute Tx cable from 6.6 KVSB 3 to 6.6					
4 NVTP14-02 Maintaine for single 7 and 10 more marks 15 more mark	G 4 4 4 5						
21 NYTTH: Car Data of decouptions if Y regions 2 day 2 day<	S1145 S1146						
46 NVTPH-64X V Sockbord Total 2017 Total 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 91 NVTPH-64X V Sockbord Sockay Total 2017 No 2017 92 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 94 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 95 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 95 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 96 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 97 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 97 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 Sockay Total 2016	51140	Nw IPH-CLP Mobilization for Supply 5 diversion	15 days	MOI 0/11/1/	N10f1 20/11/17	0/11 - 20/11	
49 NVTTHE GAS Switchboard Engring in the 5/12/17 We 1/11/15 Sub 2/12/17 We 1/11/15 51 NVTTHE GAS Short back and	S1147	NWTPH-CLP T&C of the completed HV cables	7 days	Tue 21/11/17	Mon 27/11/17		
90 NVTP14:Low rule with Part functions with W3D for pump for Part function in the support of the support the support of the support support the support of the support of the support of	S1148						
No.9.0.0.1.1.1.1.0 for connections is we apply Intel V1/17 Intel V1/17 S1 NVTPTP1 Second State	S1149	•					
51 NVTPH-TAC (sol, the remaining 5 ares of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 33 NVTPH-TAC (sol, the remaining 5 ares of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 34 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 35 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 36 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 37 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 36 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 37 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 38 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 39 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.4 up, 10.7 if 11.2 (21.27) 30 NVTPH-CAC (sol, the remaining 6 are of 6.6 × 19.4 up, 10.4	S1150		ou days	wed 51/5/17	Sat 29/1/17		
25 NVTIPI Fue-3 - L6AI Works S2 days The 11/17 The 31/817 21 NVTIPI Fue-3 - L6AI Works S2 days The 11/17 The 31/817 23 NVTIPI Fue-46X Supplies Mailainin for complexity S4 days Sex 50/17 S4 is 16/217 25 NVTIPI Cub-45/12/2014 S4 days Sex 50/17 S4 is 16/217 25 NVTIPI Cub-45/12/2014 S4 days Sex 50/17 S4 is 16/217 26 NVTIPI Cub-45/12/2014 The 35/817 F0 32/817 27 NVTIPI-60X Subthowal T6C is 16/07 The 35/817 F0 32/817 28 NVTIPI-60X Subthowal T6C is 16/07 The 35/817 F0 32/817 29 Relation or Cobie 6/6 var opacity tabus 10/49 Sau 30/17 F0 3/817 20 NVTIPI-60X Subthowal T6C is 10/107 The 35/817 Sau 30/17 Sau 30/17 20 NVTIPI-60X Subthowal T6C is 10/107 The 35/817 Sau 30/17 Sau 30/17 20 NVTIPI-60X Subthowal T6C is 10/107 Sau 30/17 Sau 30/17 Sau 30/17 21 NVTIPI-60X Subthowal T6C is 10/107 Sau 30/17 Sau 30/17 Sau 30/17 20 NVTIP	S1151		138 days	Sun 30/7/17	Thu 14/12/17	30/7	
31 NW TYH 64.0V Supply installation intercomments 10 are 11/07.1 The 11/07.1 <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td>		*					
Calls Diversion Construction	S1152						
54 NVTTH 1998 4 - EAN Work Works 54 above So an 1977 5 - 11977 So at 16712 178 55 NVTTH-1297 K2 of the complexited IV tables 7.days So 11977 To 12977 56 NVTTH-1297 K2 of the complexited IV tables 7.days So 11977 To 12977 57 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 58 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 59 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 50 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 50 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 60 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 61 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 62 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 20517 63 NVTTH-1000 V Switchmail Energination 90 days No 15717 Su 30417 64 NVTTH-1000 V Switchmail Energination <td>S1153</td> <td></td> <td>52 days</td> <td>Tue 11///1/</td> <td>1 hu 31/8/17</td> <td></td> <td></td>	S1153		52 days	Tue 11///1/	1 hu 31/8/17		
55 NVTPH-C1P Mobilization for Supply 4 diversion 15 days Pri 15/017 56 NVTPH-C1P XC office completed IV calles 7 days Sai 16/017 Fri 22/017 57 NVTPH-C1P XC office completed IV calles 7 days Sai 23/017 Fri 22/017 57 NVTPH-C1P XC office completed IV calles 7 days Sai 23/017 Fri 22/017 58 NVTPH-C1P XC office complete halts 10 days Smi 30/017 The 20017 59 NVTPH-C2 XC fineLic Address thestallation at 8 days Mai 30/017 The 30/017 The 30/017 50 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 50 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 51 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 52 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 53 NVTPH-Calle Signers 14 days Smi 30/017 The 30/017 The 30/017 54 NVTPH-Calle Signers 14 days Smi 30/017 The 30/017 The 30/017 The 30/017	S1154		140 davs	Sun 30/7/17	Sat 16/12/17	3077 - 16/12	
71 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 230/17 Fit 200/17 58 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 61 NVTFH LVSR, T.PL CK Censet Hendlandon 48 20 days Mon 20/31/7 Sat 30/31/7 Tue 13/01/7 62 NVTFH-50KV LSS. Censet 42 days Mon 20/31/7 Tue 30/31/7 Tue 30/31/7 63 existing Admin. Building 4d days Mon 17/417 San 30/417 Tue 30/417 64 NVTFH-50KV LSS. Censet 42 days Mon 20/317 Tue 30/317 Tue 30/317 65 NVTFH-64bc Laying 14 days Mol 17/417 San 30/417 Tue 30/417 66 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 67 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 68 NVTFH-64bc Laying 10 days Mol 15/17	S1155						
71 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 230/17 Fit 200/17 58 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 61 NVTFH LVSR, T.PL CK Censet Hendlandon 48 20 days Mon 20/31/7 Sat 30/31/7 Tue 13/01/7 62 NVTFH-50KV LSS. Censet 42 days Mon 20/31/7 Tue 30/31/7 Tue 30/31/7 63 existing Admin. Building 4d days Mon 17/417 San 30/417 Tue 30/417 64 NVTFH-50KV LSS. Censet 42 days Mon 20/317 Tue 30/317 Tue 30/317 65 NVTFH-64bc Laying 14 days Mol 17/417 San 30/417 Tue 30/417 66 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 67 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 68 NVTFH-64bc Laying 10 days Mol 15/17	01156		7.1	0	E : 22/0/17		
88 NWTPH-66KV Switchboard blacrejaation 30 days Fi 1/711/17 Sui 10/21/7 99 Relocation of existing 6.40x exaction blas 66 days Mon 20X17 The 16/11/7 61 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 62 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 63 SWTPH-VEX & Ch. (mcl. 66/4 Switchbard to 30/4000 40 days Mon 20X17 The 15/617 64 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 65 NWTPH-106K Scott 40 days Mon 20X17 The 15/617 66 NWTPH-66KV/11KV to 380V The 36/177 The 36/177 66 NWTPH-62Me Trays 14 days Sup 30/177 The 30/517 66 NWTPH-62Me Trays 14 days Sup 30/177 Sup 30/517 67 NWTPH-62Me Trays 14 days Sup 30/177 Sup 30/517 68 NWTPH-62Me Trays 10 days Mon 15/177 The 30/517 70 NWTPH-62Me Trays 10 days Mon 15/216 Wed 31/178 71	S1156 S1157						
99 Relocation of existing 6.6% capacitor banks 110 days Sun 30/71/7 The 16/11/7 60 C/F Sun 30/71/7 The 16/11/7 The 16/11/7 61 WTPH-LSRN, FL/C & Genestication and Sun 30/7 Sun 30/71/7 The 13/6/1 62 NWTPH-306KV1 KV to 380V Transformers TA 28 days Mon 20/317 Sun 30/417 63 NWTPH-90C, Cut (incl. 6.6K vswitchbaardu 30 days Mon 15/17 The 30/517 64 NWTPH-160K Supports 14 days Mon 11/17 The 30/317 65 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 66 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 7 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 66 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 70 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 71 Finishing works 10 days Mon 15/216 Wed 20/417 70 NWTPH-2able Trays 10 days Mon 15/216 Wed 30/216 71 Finishing works 10 days	S1157 S1158						
00 NYTPH LSB, Tx, PLC & Genest Installation at 86 days Mon 20/3/17 The 13/0/17 61 NUTPH.6K/V11KV to 380V Transformers Tz 28 days Mon 3/4/17 Sum 30/4/17 62 NWTPH.6K/V11KV to 380V Transformers Tz 28 days Mon 20/3/17 Sum 30/4/17 62 NWTPH.1CA Ch (nic. 6.6K) witchboard to 3) days Mon 20/3/17 Two 30/3/17 Two 30/3/17 63 SWTTPH.PLC & Ch (nic. 6.6K) witchboard to 3) days Mon 3/3/17 Two 13/3/17 Two 13/3/17 64 NWTPH H-10K Two 30/3/17 Two 13/3/17 Two 13/3/17 Two 13/3/17 65 NWTPH Cable Trays 14 days Mon 3/4/17 Sum 30/4/17 Sum 30/4/17 66 NWTPH Cable Trays 14 days Mon 13/17 Two 13/3/17 Wot 3/3/17 67 NWTPH -11K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 68 NWTPH -12K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 70 NWTPH -14K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 71 Finishing works 120 days Mon 13/17 Two 20/17/17 Sum 3	\$1159	Relocation of existig 6.6kv capacitor banks	110 days			30/7	
61 NWTPH-6.6KV/11KV to 380V Transformers Tx 28 days Mon 3/4/17 Sun 30/4/17 62 NWTPH-50K VA ESS. Geneet 42 days Mon 20/4/17 Tue 30/17 63 NVTPH-50K VA ESS. Geneet 42 days Mon 20/4/17 Tue 30/17 64 NVTPH-50K VA ESS. Geneet 14 days Mon 15/4/17 Tue 30/17 65 NVTPH-120k Supports 14 days Mon 15/4/17 Tue 30/17 66 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 67 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 66 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 70 NVTPH-140k Trays 14 days Mon 15/17 Tue 30/17 70 NVTPH-140k Termination 14 days Mon 15/17 Tue 20/17 71 Finishing more training 14 days Mon 15/17 Tue 20/17 71 Finishing more training 14 days Mon 15/17 Tue 20/17 72 Completion of architectural finishes and relevant works 12 days Mon 15/17 Tue 20/17 72 Completion of architectu	S1160	NWTPH LVSB, Tx, PLC & Genset Installation at				20/3 🖛 🕂 13/6	
62 NWTPH-30KVA ESS. Genset 42 days Mon 20/3/17 Sun 30/4/17 63 NWTPH-CR CWT, (ncl. 6.6 KV switchboard to susting Admin. Building) 14 days Mon 1/5/17 Tue 30/5/17 64 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 65 NWTPH-Cable Supports 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 70 NWTPH-TaC 30 days Mon 1/5/17 Tue 30/5/17 70 NWTPH-TaC 30 days Mon 1/5/17 Tue 30/5/17 71 Finishing works 120 days Mon 15/2/16 Wed 31/1/18 71 Finishing admin de external 10 days Mon 15/2/16 Wed 31/1/18 72 Completion of architectural finishes and relevant works 1ay 1ay 23/2 23/2 72 Jata	S1161		28 days	Mon 2/4/17	Sup 30/4/17		
63 NVTPH-PLC & Ct. (incl. 6.6K vswitchboard to 90 days Mon 1/5/17 Tu 20/5/17 64 NVTPH-Battery Room 14 days Wed 3/15/17 Tu 20/5/17 Wed 3/15/17 Tu 20/5/17 64 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 30/4/17 65 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 20/5/17 66 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 67 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 68 NVTPH-Cable Termination 14 days Sun 9/4/17 Tu 20/5/17 Tu 20/5/17 69 NVTPH-Tacc 30 days Mon 1/5/17 Tu 20/5/17 Tu 20/5/17 Tu 20/5/17 70 NVTPH-Cable Termination 14 days Sun 9/5/17 Tu 20/5/17 Tu 20/5/17 71 Finishig works 120 days Mon 15/2/16 Wed 31/5/17 Tu 20/5/17 72 Completion of architectural finishes and relevant was 140 Yes 20/2 Yes 20/2 Yes 20/2 71 Gristal Split	31101	INWIPH-0.0KV/IIKV to 380V Transformers Tx	∠o days	Mon 3/4/1/	5uii 50/4/1/		
63 NVTPH-PLC & Ct. (incl. 6.6K vswitchboard to 90 days Mon 1/5/17 Tu 20/5/17 64 NVTPH-Battery Room 14 days Wed 3/15/17 Tu 20/5/17 Wed 3/15/17 Tu 20/5/17 64 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 30/4/17 65 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 20/5/17 66 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 67 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 68 NVTPH-Cable Termination 14 days Sun 9/4/17 Tu 20/5/17 Tu 20/5/17 69 NVTPH-Tacc 30 days Mon 1/5/17 Tu 20/5/17 Tu 20/5/17 Tu 20/5/17 70 NVTPH-Cable Termination 14 days Sun 9/5/17 Tu 20/5/17 Tu 20/5/17 71 Finishig works 120 days Mon 15/2/16 Wed 31/5/17 Tu 20/5/17 72 Completion of architectural finishes and relevant was 140 Yes 20/2 Yes 20/2 Yes 20/2 71 Gristal Split	S1162	NWTPH-300KVA ESS. Genset	42 days	Mon 20/3/17	Sun 30/4/17	20/3≻→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→	
64 NWTPH-Battery Room 14 days Wed 31/5/17 Tue 13/6/17 65 NWTPH-Cable Supports 14 days Mon 17/4/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Tue 13/4/17 Wed 36/4/17 66 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 67 NWTPH-Cable Trays 14 days Wed 36/4/17 Tue 13/6/17 68 NWTPH-Cable Trays 14 days Wed 31/5/17 Tue 20/5/17 69 NWTPH-T&Cable Trays Mon 15/5/17 Tue 20/5/17 Tue 20/5/17 70 NWTPH-T&Cable Trainsing works 120 days Mon 15/5/17 Tue 20/5/17 71 Finishing works 120 days Mon 15/2/16 Wed 31/1/18 157 Completion of architectural finishes and relevant works 1days Mon 25/2/16 Mon 25/2/16 10 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 25/2/16 Mon 25/2/16 102 Data collection for HTH design by Attal 60 days Tue 12/3/16 Fri 29/4/16 15 20/2 20/2 102 Chtical Split Milestone	S1163	NWTPH- PLC & Ctrl. (incl. 6.6kV switchboard to					
65 NWTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 66 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 67 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 68 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 68 NWTPH-Cable Trays 14 days Sun 9/4/17 Tue 18/4/17 68 NWTPH-Cable Trays 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH-Tack ONTPH-Tack 30 days Mon 15/17 Tue 30/5/17 70 NWTPH-Testing 30 days Mon 15/17 Tue 30/5/17 70 NWTPH-Testing 30 days Mon 15/17 Tue 30/5/17 71 Finishing works 12 days Wed 31/1/18 Hou 28/9/17 Thu 28/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 Thu 28/9/17 70 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 15/2 29/2 21/16 21/16 70 Datacollection for HTH design by Atal	01164		14.3	W-101/5/17	Tue 12/6/17		
66 NWTPH- Cable Trays 14 days Thu 13/117 Wed 26/4/17 67 NWTPH- Cable Laying 14 days Sun 9/4/17 Sat 22/4/17 68 NWTPH- Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH- Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 60 NWTPH- T&C CWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 70 NWTPH- Testing 30 days Mon 1/5/17 Wed 31/5/17 71 Finishing works 120 days Wed 31/5/17 Wed 25/4/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 72 Completion of architectural finishes and relevant works 1 days Mon 15/2/16 Wed 31/5/18 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 32/1/18 152 29/2 13 13 28/9 31/1 01 Site survey of existing pipworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 162 Jata collection for HTH design by Atal O days Milestone Summary Critical <	S1164 S1165						
67 NWTPH-Cable Laying 14 days Sun 9/4/17 Sta 22/4/17 68 NWTPH-Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH-T&C NUPH - T&C NUPH	S1165 S1166						
69 NWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 Tue	S1167	NWTPH- Cable Laying	14 days	Sun 9/4/17	Sat 22/4/17		
71 Finishing works 120 days Wed 31/5/17 Wed 27/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri z9/4/16 Fri 29/4/16	S1168						
71 Finishing works 120 days Wed 31/5/17 Wed 27/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri z9/4/16 Fri 29/4/16	1169 1170						
72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 Critical Split Critical Split Critical Split Milestone Milestone Summary Manual Summary Critical	S1170 S1171						
(both internal and external) 00 Hydro Turbine House 717 days Mon 15/2/16 Won 29/2/16 15/2 15/2 15/2 2 Data collection for HTH design by Atal 60 days True 1/3/16 Fri 29/4/16	S1172	Completion of architectural finishes and relevant work					
01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 Critical Split		(both internal and external)					
02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 1/3 29/4 1 Critical Split Critical Split Task Milestone Milestone Manual Summary Critical	S1200						
Critical Split	S1201 S1202						
	51202	Data concentration for fifth uesign by Atal	oo days	100 1/3/10	111 27/4/10		
		Critical Solit T1-		Milastor -	A		
				ivitiestone	•		

ID I	Task Name	Duration	Start	Finish		2016	2017 2018 2019
1203	Construction of cable ducting for signal and power cable	61 davs	Tue 1/3/16	Sat 30/4/16	Oct Nov	Dec Jan	Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov
		•					
1204 1205		76 days	Sun 1/5/16	Fri 15/7/16			
1205		14 days 0 days	Sat 16/7/16 Wed 20/7/16	Fri 29/7/16 Wed 20/7/16			10// ₩ 20// →> 20//
1200		100 days	Sat 30/7/16	Sun 6/11/16			
1207	existing E & M equipment)	100 aujo	541 507 1710	5411 0/11/10			
1208	C 1 1 1	60 days	Mon 7/11/16	Thu 5/1/17			
1209		136 days	Fri 6/1/17	Sun 21/5/17			
1010	backfilling)						
1210 1211		90 days	Fri 6/1/17	Wed 5/4/17			
1211	Completion of concrete structure of Hydro Turbine House	0 days	Sun 21/5/17	Sun 21/5/17			
1212	Finishing works	120 days	Mon 22/5/17	Mon 18/9/17			
51213	Completion of architectural finishes and relevant works		Tue 19/9/17	Tue 19/9/17			
	(both internal and external)	•					
1214		120 days	Mon 22/5/17	Mon 18/9/17			
1215		120 days	Mon 22/5/17	Mon 18/9/17			
S1216 S1217		120 days	Mon 22/5/17	Mon 18/9/17			
1217		120 days 12 days	Mon 22/5/17 Sun 30/7/17	Mon 18/9/17 Thu 10/8/17			
1218	Re-arrangement of Raw Water path B to original Path A		Thu 10/8/17	Thu 10/8/17 Thu 10/8/17			
121)	from High Island Reservoir	o days	1110 10/0/17	110 10/0/17			
51220		0 days	Thu 19/10/17	Thu 19/10/17			19/10
51221	Remove capping of path A and reinstall flow meter at HF1		Thu 19/10/17	Thu 19/10/17			19/10
1222		717 days	Mon 15/2/16	Wed 31/1/18		15/	
51223	Hydro Turbine House - E&M Equipment Procurement		Mon 15/2/16	Sat 5/3/16		15	
\$1224	Hydro Turbine House - E&M Equipment Manufacturing & FAT	300 days	Sun 6/3/16	Fri 30/12/16			
\$1225	e	185 days	Sat 31/12/16	Mon 3/7/17			31/12
S1225		230 days	Sat 31/12/16	Thu 17/8/17			31/12+ 3/7 31/12+ 3/7
/1220	(Needle Valve & Turbine Generator)	200 aujo	540 5 17 12/10	1110 1770/17			
S1227	Hydro Turbine House - H/O by Civil Contractor	0 days	Sun 21/5/17	Sun 21/5/17			
S1228		30 days	Fri 6/10/17	Sat 4/11/17			
\$1229	Hydro Turbine House - Hydropower Generation System	150 days	Mon 22/5/17	Wed 18/10/17			
	Mechanical Installation						
\$1230	T04 - Trench/Cable ducts & Draw Pits H/O by Civil	0 days	Mon 12/6/17	Mon 12/6/17			
51231	Contractor T05 - Trench/Cable ducts & Draw Pits H/O by Civil	0 dave	Mon 12/6/17	Mon 12/6/17			
51251	Contractor	0 days	NIOII 12/0/17	WOII 12/0/17			
S1232	Hydro Turbine House - Electrical & ICA Installation	81 days	Fri 13/10/17	Mon 1/1/18			
S1233	Hydro Turbine House - CLP Inspection & acceptance		Fri 3/11/17	Wed 31/1/18			3/1 3/1 3/1
	(Driven by Logistics house DCS)						
S1234	Hydro Turbine House - T&C	30 days	Tue 2/1/18	Wed 31/1/18			
S1235	•	0 days	Thu 28/9/17	Thu 28/9/17			\$28/9
S1236		14 days	Fri 29/9/17	Thu 12/10/17			21/9 📥 12/10
S1237 S2000		1 day 644 days	Wed 31/1/18 Fri 30/10/15	Wed 31/1/18 Thu 3/8/17	V10 🕶		→ → → → → → → → → → → → → → → → → → →
S2000		1 day		Fri 30/10/15	₩10 ◆ 30/	10	
S2100	Site Formation and Slope Retaining Structures for North			Thu 3/8/17		7/2	3/8
	Circular Road						
S2101		21 days	Sun 7/2/16	Sat 27/2/16		71.	
S2102 S2103		21 days	Sun 7/2/16	Sat 27/2/16		7/.	
S2103 S2104		0 days	Tue 1/3/16	Tue 1/3/16			
S2104 S2105		90 days 110 days	Sun 28/2/16 Wed 13/4/16	Fri 27/5/16 Sun 31/7/16			
S2106		0 days	Mon 22/8/16	Mon 22/8/16			
S2107		100 days	Mon 22/8/16	Tue 29/11/16			
\$2108		90 days	Mon 22/8/16	Sat 19/11/16			
S2109	GI works for bored piles and mini piles	15 days	Wed 30/11/16	Wed 14/12/16			30/11 4/12
S2110		7 days	Thu 15/12/16	Wed 21/12/16			
\$2111		118 days	Thu 22/12/16	Tue 18/4/17			
52112	1.5m) Bored Pile test	28 days	Wed 19/4/17	Tue 16/5/17			
S2112 S2113		28 days 14 days	Wed 19/4/17 Wed 5/4/17	Tue 18/4/17			
	*	28 days	Wed 19/4/17	Tue 16/5/17			
S2114	Construction of mini piles	60 days	Wed 3/5/17	Sat 1/7/17			
S2115	Construction of mini piles cap and L-shape retaining wall		Sun 2/7/17	Thu 3/8/17			
S2115							
S2115 S2116		.	Wed 3/5/17	Sat 1/7/17			
S2115 S2116 S2117	Construction of retaining wall above bored pile	60 days					
S2114 S2115 S2116 S2117 S2118	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with	60 days 79 days	Wed 17/5/17	Thu 3/8/17	1 1 1		
S2115 S2116 S2117	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works	79 days	Wed 17/5/17				
\$2115 \$2116 \$2117 \$2118 \$2002 \$3000	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion	79 days 1 day	Wed 17/5/17 Thu 3/8/17	Thu 3/8/17	v10 🕶		→ → → → → → → → → → → → → → → → → → →
32115 32116 32117 32118 32002 33000 33001	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement	79 days 1 day 1189 days 1 day	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15	V10 ♥ ┌♥ 30/	10	30/1
2115 2116 2117 2118 2002 3000 3001 3003	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road	79 days 1 day 1189 days 1 day 203 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17	V10 ♥ ● 30/	10	
32115 32116 32117 32118 32002 33000 33001 33003 33004	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber	79 days 1 day 1189 days 1 day 203 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16	V10 - 30/	10	1/11 1/11 1/11 1/11 1/11 1/11
32115 32116 32117 32117 32118 32002 33000 33001 33003 33004 33005	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber	79 days 1 day 1189 days 1 day 203 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16)/10 → 30/	10	1/11 1/11 30/12 30/12 30/12
32115 32116 32117 32118 32002 33000 33001 33003 33004 33005 33006	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17	V10 ♥ ←● 30/	10	1/11 30/12 1/11 30/12 30/12 30/12 31/12 28/2
32115 32117 32117 32118 32002 33000 33001 33003 33004 33005 33006 33007	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction for new road and drainage	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17)/10 ♥ ←● 30/	10	1/11 30/12 1/11 30/12 30/12 30/12 31/12 28/2
32115 32116 32117 32118 32002 33000 33001 33003 33004 33005 33006 33007 33008	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction for new road and drainage BS works (lighting)	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Fri 24/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17)/10 - 30/		1/11 30/12 30/12 30/12 31/12 22/5
2115 2116 2117 2118 32002 33000 33001 33003 33004 33005 33006 33007	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17	V10 - 30/	10	1/11 30/12 1/11 30/12 1/11 30/12 31/12 28/2 1/2 29/4 2/3 22/5
2115 2116 2117 2118 2002 3000 3001 3003 3004 3005 3006 3007 3008 3008 3009	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes	79 days 1 day 1189 days 1 day 203 days 60 d	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Fri 24/3/17 Thu 11/2/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17	y10 ♥ 30/		30/1 1/11 30/12 30/12 31/12 31/12 24/3 22/5 22/5 22/5 22/5 21/1 24/3 22/5 21/1 24/3 22/5 27/10
2115 2116 2117 2118 2002 3000 3001 3003 3004 3005 3006 3006 3007 3008 3009 3010	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new valve chamber Construction for new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16 Fri 1/7/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17 Sat 15/10/16	-* 30/	11/2	1/11 30/12 1/11 30/12 31/12 30/12 24/3> 22/5 1/6 26/1 1/7 15/10
2115 2116 2117 2118 2002 3000 3003 3004 3005 3006 3007 3008 3009 3011	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls Critical Split Task	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17	V10 30/	11/2	1/11 30/12 30/12 30/12 30/12 30/12 30/12 30/12 30/12 30/12 1/11 31/12 1/11 31/12 24/3> 29/4 24/3> 22/5 1/6 26/1 1/7/1 15/10 1/7/1 15/10
1115 1116 1117 1118 0002 0000 0003 004 005 006 007 008 009 010 011	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls Critical Split Task	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16 Fri 1/7/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17 Sat 15/10/16	-* 30/	11/2	1/11 30/12 1/11 30/12 31/12 30/12 24/3> 22/5 1/6 26/1 1/7 15/10

ID	'ask Name	Duration	Start	Finish		2016				2017			1			20			
262 \$3012	Construction of Steel Bridge & Decking	61 days	Sat 15/10/16	Wed 14/12/16	Oct Nov 1	Dec Jan	Feb Mar Apr	May Jun Jul A	ug Sep Oct No 15/10	ov Dec Jan Fe	b Mar Aj	pr May	/ Jun .	ul Aug	Sep Oct N	Nov Dec Ja	n Feb Mar	Apr May	Jun Jul Au
263 S3012	Completion of steel platforms and walkway installation	1 day	Thu 15/12/16	Thu 15/12/16	-				15/10	15/12									
53 S3013	Lay 400mm & 100mm pipes	137 days	Thu 1/9/16	Sun 15/1/17	-				1/0	15/1									
65 S3015	External Process Pipe Line installation	120 days	Sat 15/10/16	Sat 11/2/17	-				15/10		11/2								
266 S3016	Electrical installation (Lighting)	30 days	Fri 16/12/16	Sat 14/1/17	-					6/12 14/1	11/2								
267 S3017	Temporary Washwater Recovery Tank - E&M Works		Thu 11/2/16	Fri 27/10/17	-	11/2	~		-	141	_					27/10			
268 S3018	E&M equipment procurement and Completion of	124 days	Wed 29/6/16	Sun 30/10/16	-			29/6		v 10									
0 02010	delivery of E&M equipment on site (Lighting)	16.1	TI 11/0/17	TIL 05/0/16	_														
269 S3019 270 S3020	Temp. WRT - Equipment Procurement	15 days	Thu 11/2/16	Thu 25/2/16	-	11/2	25/2												
	Temp. WRT - Equipment Manufacturing & FAT	141 days	Mon 14/3/16	Mon 1/8/16	-		14/3	18/8	78										
271 S3021 272 S3022	Temp. WRT - Equipment Delivery	136 days	Thu 18/8/16	Sat 31/12/16 Thu 15/12/16	-			18/8		31/12									
272 \$3022 273 \$3023	Temp. WRT - H/O by Civil Contractor Temp. WRT - T01 LV/Fibre Cable draw pit & trench	0 days	Thu 15/12/16	Thu 15/12/16	-					◆15/12									
215 55025	H/O by Civil Contractor	0 days	Thu 15/12/16	1 nu 13/12/10						1.3/12									
274 \$3024	Temp. WRT - E&M Installation	150 days	Sun 1/1/17	Tue 30/5/17	-					1/1			30/5						
275 S 3025	Temp. WRT - Process pipelines installation	90 days	Fri 16/12/16	Wed 15/3/17	-				1	6/12	15/3		5015						
276 S3026	Temp. WRT - ICA	90 days	Wed 31/5/17	Mon 28/8/17	-				1	0/12		31/5		,	18/8				
277 S3027	Temp. WRT - T&C	60 days	Tue 29/8/17	Fri 27/10/17	-							1 343		29/8	H.	7/10			
278 S3300	Administration Building Site Formation + Flow Meter	767 days	Thu 1/9/16	Sun 7/10/18				1	/9										
	House + Valve Chamber	ror duys	1110 1/ // 10	5uii //10/10				1	,, ,										
279 \$3301	Planning & coordination with WSD for re-arrangement or raw watermains from High Island Reservoir and	f 210 days	Thu 1/9/16	Wed 29/3/17					1/9			VB							
280 63202	construction of Flowmeter House and Valve Chamber	(0.1	0.100/00/27	T		1												1	
280 S3302	Removal of existing utilities	60 days	Sat 28/10/17	Tue 26/12/17		1									28/10 🎬	26/	12	din .	
281 S3303	Demolishing existing structure for future adminstration Building	80 days	Wed 27/12/17	Fri 16/3/18		1										27/12 🎽		ur p	
282 S3304	Site formation (Backfilling) for future adminstration building	45 days	Sat 17/3/18	Mon 30/4/18													17/3	30/4	
283 \$3305	Removal of existing Flow meter and Valve Chambers	50 days	Sat 21/10/17	Sat 9/12/17		1									21/10	9/12		1	
284 S3306	Excavation for Flow meter house and Valve chambers	50 days	Sun 10/12/17	Sun 28/1/18	1											10/12	28/1		
285 S 3307	Construction of Flow meter house and Valve chambers	50 days	Mon 29/1/18	Mon 19/3/18	1										1	29/		9/3	
286 \$3308	Finishing Works	60 days	Tue 20/3/18	Fri 18/5/18	1										1		20/3	1	1 8/5
287 \$3309	Relocating existing Flow Meter and Valve	21 days	Tue 20/3/18	Mon 9/4/18	-												20/3	9/4	
288 \$3310	Plumbing and Drainage installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	1	i 8/5
289 \$3311	MVAC installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	-14	i 8/5
290 \$3312	Fire Services installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	1	i 8/5
291 \$3313	Electrical installation	60 days	Tue 20/3/18	Fri 18/5/18	_												20/3 🎽	1	1 8/5
292 S3314	Valve Chamber - E&M Works	462 days	Fri 2/6/17	Thu 6/9/18	_							2/6	ф					11	
293 S 3315	Valve Chamber - Equipment Procurement	60 days	Fri 2/6/17	Mon 31/7/17	_							2/		31/7					
294 S3316	Valve Chamber - Equipment Manufacturing & FAT	180 days	Tue 1/8/17	Sat 27/1/18	_									1/8 📥			27/1		
295 S3317	Valve Chamber - Equipment Delivery	72 days	Sun 28/1/18	Mon 9/4/18	_											28/		9/4	
296 S3318 297 S3319	Valve Chamber - H/O by Civil Contractor	0 days	Mon 9/4/18	Mon 9/4/18	-												10/	● <u></u>	07
297 \$3319 298 \$3320	Valve Chamber - Equipment Site Works Duration*	90 days	Tue 10/4/18	Sun 8/7/18	-												10/		8/7
299 S 3321	Valve Chamber - E&M Installation Valve Chamber - Modifying the actuator to suit new level	60 days 30 days	Tue 10/4/18 Mon 9/7/18	Fri 8/6/18 Tue 7/8/18	-												10/	*	9/7 7/
300 \$3322	Valve Chamber - T&C	30 days	Wed 8/8/18	Thu 6/9/18	1										1			11	8/8
301 S3323	Flowmeter House - E&M Works	733 days	Tue 4/10/16	Sat 6/10/18]				4/10 🛡		╺┥╸╢┼				<u> </u>		_		++
302 \$3324	Flowmeter House - Equipment Procurement	60 days	Tue 4/10/16	Fri 2/12/16					4/10	2/12									
303 \$3325			Sat 3/12/16	Wed 31/5/17					3/	12			31/5		L				
304 S3326	Flowmeter House - Equipment Delivery	131 days	Tue 5/9/17	Sat 13/1/18										5/9	<u> </u>		13/1	ti↓	
305 S3327	Flowmeter House - H/O by Civil Contractor	0 days	Mon 9/4/18	Mon 9/4/18														9/4	
306 S3328	Flowmeter House - E&M Installation of new mono rails & reocate flowmeter	90 days	Tue 10/4/18	Sun 8/7/18													10/	4	8/7
307 S3329	Flowmeter House - Power Supply	30 days	Mon 9/7/18	Tue 7/8/18	-														9/7 7/
308 S3330 309 S3331	Flowmeter House - T&C Completion of architectural finishes and relevant works	60 days	Wed 8/8/18	Sat 6/10/18														1	8/8 🎽
55551	(both internal and external)	1 day	Sun 7/10/18	Sun 7/10/18															
310 S3400	Box Culvert at Tin Sum Nullah	212 days	Thu 1/9/16	Fri 31/3/17				1	/9 🖵			1/3						1	
311 S3401	Excavation for temp water diversion	14 days	Thu 1/9/16	Wed 14/9/16	1 H		+		1/9▶ 14/9		∥[
312 S3402	Excavation for Box culvert (Section 1)	21 days	Thu 15/9/16	Wed 5/10/16		1			15/9 🏊_5/10									1	
313 S3403	Construction for Box Culvert (Section 1)	25 days	Thu 6/10/16	Sun 30/10/16		1			6/10 230									1	
314 S 3404	Excavation for Box culvert (Section 2)	21 days	Fri 4/11/16	Thu 24/11/16		1			4/11	24/11								1	
315 S3405	Construction for Box Culvert (Section 2)	25 days	Fri 25/11/16	Mon 19/12/16		1				19/12								1	
316 S3406	Excavation for Box culvert (Section 3)	21 days	Sun 25/12/16	Sat 14/1/17	- 11	1				25/12 14/1								1	
317 S3407	Construction for Box Culvert (Section 3)	25 days	Sun 15/1/17	Wed 8/2/17		1				15/1 200	\$/2							1	
318 S3408	Excavation for Box culvert (Section 4)	21 days	Tue 14/2/17	Mon 6/3/17		1				14/2	6/3 /3 31							1	
319 \$3409 320 \$3500	Construction for Box Culvert (Section 4)	25 days	Tue 7/3/17	Fri 31/3/17		1	9/3			7	13 3	13							
321 S3500	Storm Drain for Decking at Tin Sum Nullah Temporary water diversion	388 days	Wed 9/3/16 Wed 9/3/16	Fri 31/3/17 Sat 12/3/16			9/3 9/3 12/3					4/2						1	
322 S 3502	Construction for Storm drain (Section 1)	4 days 4 days	Sun 13/3/16	Wed 16/3/16			13/3 16/3											1	
323 S 3503	Installation for Storm Drain	15 days	Thu 17/3/16	Thu 31/3/16	1	1												1	
324 S 3504	Temporary water diversion	14 days	Mon 3/10/16	Sun 16/10/16	1	1			3/10 16/10)								1	
325 \$3505	Excavation for Storm drain (Section 2)	20 days	Mon 17/10/16	Sat 5/11/16	1	1			17/10 🍆 5	/11								1	
326 S3506	Installation for Storm Drain	20 days	Sun 6/11/16	Fri 25/11/16	1	1			6/11 🎽	▶25/11								1	
327 S3507	Temporary water diversion	14 days	Sat 26/11/16	Fri 9/12/16		1			26/11	. ≦ _9 / 12								1	
328 S3508	Excavation for Storm drain (Section 3)	20 days	Sat 10/12/16	Thu 29/12/16		1			10	/12 📥 29/12								1	
329 \$3509	Installation for Storm Drain	20 days	Fri 30/12/16	Wed 18/1/17		1				30/12 🍋 18/1								1	
330 S 3510	Inlet, CP and bendblock construction	14 days	Thu 19/1/17	Wed 1/2/17		1				19/1 🏊 1/								1	
331 S3511	Backfilling	28 days	Thu 2/2/17	Wed 1/3/17		1				2/2 🎽								1	
332 S3512	Modification of STWTW main entrance	30 days	Thu 2/3/17	Fri 31/3/17	- 11					2/.					<u> </u>			1	1
333 S3513	Construction of temp. flow meter house	30 days	Thu 2/3/17	Fri 31/3/17						2/	3 💶 31	13			±				<u> </u>
i																			
	Critical Split		Milestone	•	Summary			Manual Summary	~	Critical									

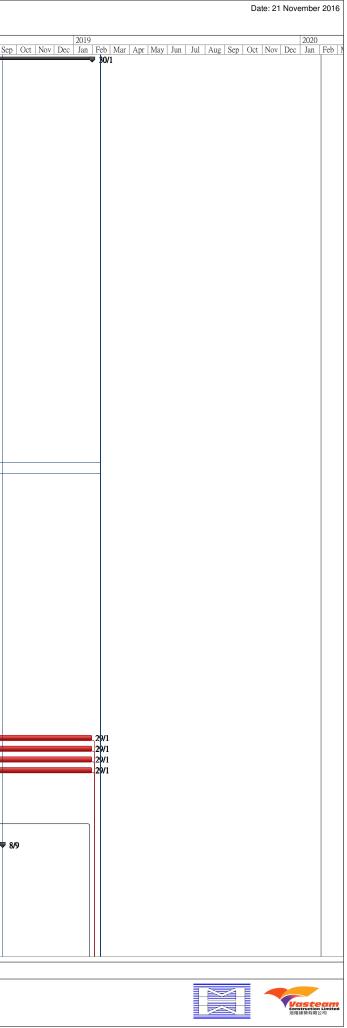
Completion Date: 3 Feb 2020 (EOT for Claim no. 009)



Contract No.: 3/WSD/15 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works

ID	'ask Name	Duration	Start	Finish	Oct Nov Dec Jan Feb May Jun Jul Aug Sep Oct Nov Dec Jan Feb May Jun Jul Aug Sep Oct Nov Dec Jan Feb May Jun Jun
S3600	Site Formation and Bored Pile Wall for Logistics Center cum Alum Saturation Tank	1090 days	Sat 6/2/16	Wed 30/1/19	6/2
S36001	Site Clearance	22 days	Sat 6/2/16	Sat 27/2/16	6/2 - 27/2
36002		30 days	Sun 28/2/16	Mon 28/3/16	28/2 - 28/3
S36003	Excavation for slope slope behind the bored pile wall C and reduce the level to +45.0mPD (Stage 1) (About 100	90 days	Sun 28/2/16	Fri 27/5/16	28/2 - 27/5
26004	vehicles per day)	20.1			
36004	Installation of temp soil nails (60 deg. Temp slope above Haul Road)	30 days	Wed 18/5/16	Thu 16/6/16	18/5
\$36005	Pre-drill for bored piles	50 days	Sat 28/5/16	Sat 16/7/16	28/5
36006 36007	Bored piling machine establishment Construction of bored piles CB (H 10m, L 80m, Dia 2.0m	21 days	Sun 17/7/16 Sun 7/8/16	Sat 6/8/16 Fri 4/11/16	
0007	Construction of boled piles CB (H Tolli, E solii, Dia 2.011) 90 uays	Sull //6/10	FII 4/11/10	
36008	ELS works for CB bored piles	20 days	Sat 5/11/16	Thu 24/11/16	5/11 22/11 25/11
36009 36010	Temp. excavation for CB bored piles construction Construction of bored piles CC (H 10m L 80m Dia 2.0m)	40 days	Fri 25/11/16 Thu 23/2/17	Tue 3/1/17 Sat 8/4/17	25/11 23/2 23/2
50010	Construction of boled pries CC (H Tom E som Dia 2.0m)	45 days	111u 2 <i>5</i> /2/17	Sat 6/4/17	
36011	ELS works for CB bored piles	20 days	Wed 4/1/17	Mon 23/1/17	4/1 23/1
S36012 S36013	Temp. excavation for CB bored piles construction	30 days	Tue 24/1/17	Wed 22/2/17	24/1 22/2 9/4 23/5
36013 36014	Construction of bored piles CA (H 10m L 80m Dia. 2m) Excavation at logistics center and Alum saturation tank	45 days 70 days	Sun 9/4/17 Sat 28/5/16	Tue 23/5/17 Fri 5/8/16	28/5 5/8 723/5
	location to level +33mPD (Stage 2) (About 100 vehicles	10 days	Sut 2013/10	111 5/0/10	
36015	per day) Installation of temp soil nails (60 deg. Temp slope above	70 dava	Sat 28/5/16	Fri 5/8/16	28/5 - 5/8
-30013	Installation of temp soil nails (60 deg. Temp slope above Haul Road)	/0 days	Sat 28/5/16	FTI 5/8/16	
36016	Excavation at the open area between bored pile wall C	65 days	Sat 6/8/16	Sun 9/10/16	6/8 9/10
	and Logistics Center to formation +23.5mPD (Stage 3)				
6017	(About 100 vehicles per day) Installation of sheet piles/pipe pile at level +33mPD	60 days	Sat 6/8/16	Tue 4/10/16	6/8 - 4/10
6018	Installation of sheet piles/pipe pile at level +27.5mPD	60 days	Wed 5/10/16	Sat 3/12/16	5/10 - 3/12
86019	Installation of tie back for level +33mPD sheet piles/ pipe		Wed 5/10/16	Fri 18/11/16	5/10 18/11
6020	piles	164 days	Wad 0/11/17	Emi 01/4/17	9/11
020	location to formation level +20mPD (Stage 4) (About 100		Wed 9/11/16	Fri 21/4/17	9/1
	vehicles per day)				
21	King post installation	20 days	Sun 4/12/16	Fri 23/12/16	4/12 - 23/12
5022	Temp. shoring (waling & strut) installation	100 days	Sat 24/12/16	Sun 2/4/17	24/12
6023	Construction of bored piles lagging walls	180 days	Sun 25/12/16	Thu 22/6/17	25/12
5024	Constrution of bored pile capping beam	160 days	Thu 15/12/16	Tue 23/5/17	15/12
5025 5026	Installation of earth mat Foundation for grid 1-6	30 days 35 days	Sat 22/4/17 Mon 22/5/17	Sun 21/5/17 Sun 25/6/17	22/4 22/5 22/5 25/6
6026	Foundation for grid 1-6 Foundation for reminding portion	66 days	Mon 22/5/17 Mon 22/5/17	Wed 26/7/17	22/5 22/5 25/6
36028	Superstructure for Logistic Center	283 days	Mon 26/6/17	Wed 4/4/18	26/6 4/4
6029	Completion of concrete structure of grid(1-5) Basemen Level +22.5mpd to +28.5mpd of WTW Logistics Centre	t 25 days	Mon 26/6/17	Thu 20/7/17	26/6 💳 20/7
)	Completion of concrete structure of grid(1-5) Ground Level +28.5mpd to +34.5mpd of WTW Logistics	25 days	Fri 21/7/17	Mon 14/8/17	21/7 🖛 14/8
1	Centre Completion of concrete structure of grid(1-5) Frist Level 34.5mpd to 40.5mpd of WTW Logistics Centre	25 days	Tue 15/8/17	Fri 8/9/17	15/8 - 8/9
032	Completion of concrete structure of Basement Level of	60 days	Thu 27/7/17	Sun 24/9/17	21/7 - 24/9
5033	WTW Logistics Centre Completion of concrete structure of Ground Level of	36 days	Mon 25/9/17	Mon 30/10/17	25/9 - 30/10
	WTW Logistics Centre				
36034	Completion of concrete structure of First Level of WTW Logistics Centre	36 days	Tue 31/10/17	Tue 5/12/17	31/10 5/12
5035	Completion of concrete structure of Second Level of	36 days	Wed 6/12/17	Wed 10/1/18	6/12 - 10/1
036	WTW Logistics Centre Completion of concrete structure of Third Level of	36 days	Thu 11/1/18	Thu 15/2/18	
	WTW Logistics Centre				
6037	Completion of concrete structure of Roof Level of WTW Logistics Centre	48 days	Fri 16/2/18	Wed 4/4/18	16/2
6038	Plumbing and Drainage installation	300 days	Thu 5/4/18	Tue 29/1/19	5/4
36039	MVAC installation	300 days	Thu 5/4/18	Tue 29/1/19	5/4
36040	Fire Services installation	300 days	Thu 5/4/18	Tue 29/1/19	
36041	Electrical installation	300 days	Thu 5/4/18	Tue 29/1/19	
36042 36043	Alum Satuation Tanks	231 days	Sat 22/4/17	Fri 8/12/17	22/4
3604 <i>3</i> 36044	Foundation Superstructure for Alum Satuation Tanks	45 days 66 days	Sat 22/4/17 Tue 6/6/17	Mon 5/6/17 Thu 10/8/17	
36045	Canopy above Alum Saturation Tanks	74 days	Mon 25/9/17	Thu 7/12/17	25/9 7/12
36046	Completion of structure including canopy above Alum Saturation Tanks	1 day	Fri 8/12/17	Fri 8/12/17	₹ 8/12
36047 36048	WTW Logistic Centre - Internal E&M Site Works WTW Logistics Centre - Silo Installation B/F	885 days 760 days	Thu 7/4/16 Thu 7/4/16	Sat 8/9/18 Sun 6/5/18	
36048	WTWLC - Lime System - Silo Procurement	65 days	Thu 7/4/16	Fri 10/6/16	
36050	WTWLC - Lime System - Silo Manufacturing & FAT	320 days	Sat 11/6/16	Wed 26/4/17	11/6 26/4
36051	WTWLC - Lime System - Silo Delivery	70 days	Thu 27/4/17	Wed 5/7/17	27//4
\$36052	WTWLC - Second 2/F Slab G.L. CH-1~CH-5 - H/O by Civil Contractor (i.e. Area available from Level +22.5 to +40.5)		Fri 8/9/17	Fri 8/9/17	₹8/9
6053	+22.5 to +40.5) WTWLC - Lime System - Silo Site Works Duration*	240 days	Sat 9/9/17	Sun 6/5/18	9/9
	Critical Split Task		Milactore		Summary Manual Summary Critical
	Critical Split Task	the second se	Milestone	•	

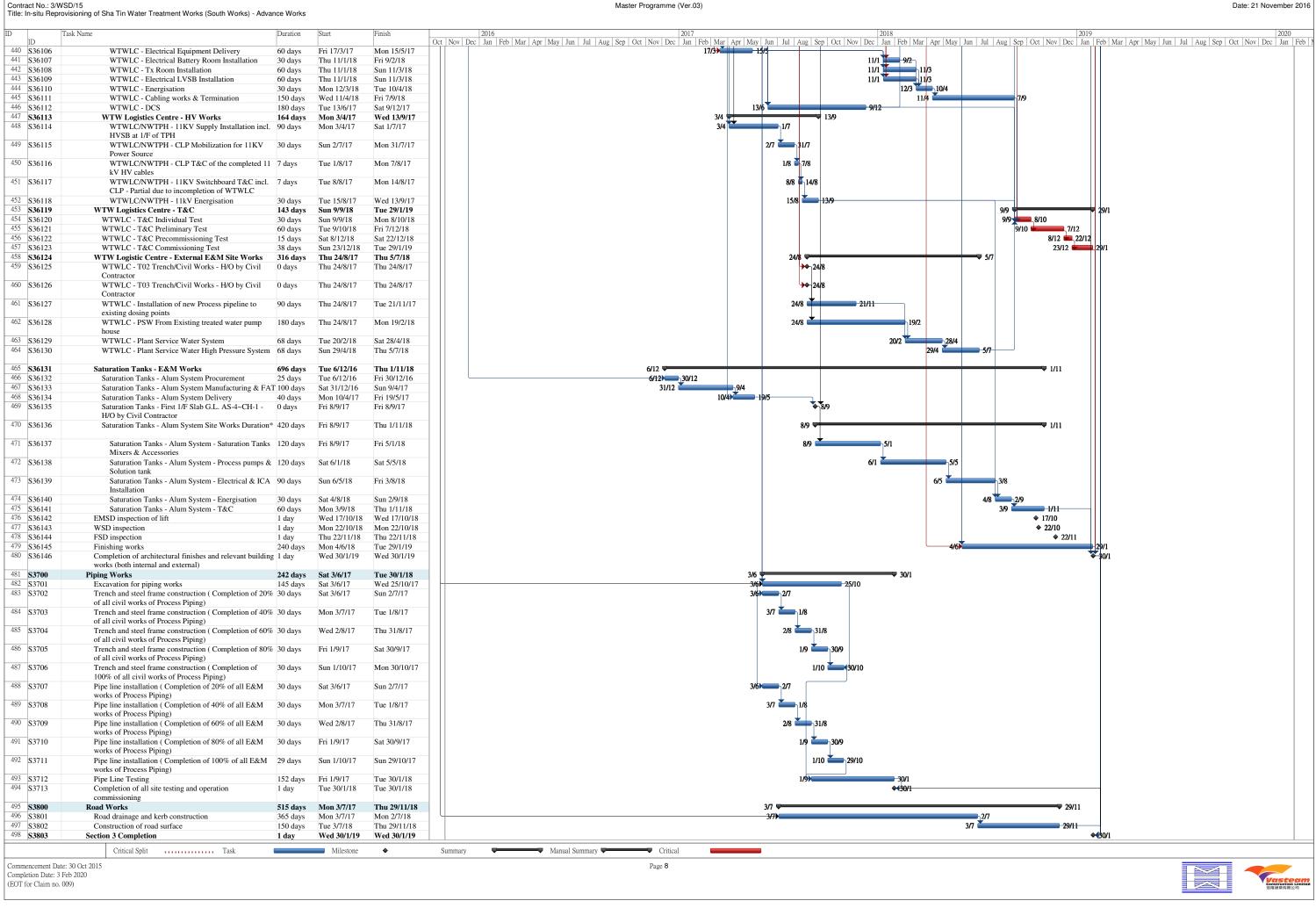
Completion Date: 3 Feb 2020 (EOT for Claim no. 009)



	sioning of Sha Tin Water Treatment Works (South Works) - Advance Works	1			
Tasl	k Name Duration	Start	Finish		2019 Jan Fah Mar Azz May Jun Jul Aug San Oat Nav Dea
6054	WTWLC - Lime System - Silo No.1 60 days	Sat 9/9/17	Tue 7/11/17	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Jan Peo Mai Api May Jun Jun Aug Sep Oct Nov Dec
055	WTWLC - Lime System - Silo No.2 60 days	Wed 8/11/17	Sat 6/1/18	8/11	
056	WTWLC - Lime System - Silo No.3 60 days	Sun 7/1/18	Wed 7/3/18		
057	WTWLC - Lime System - Silo No.4 (Late 60 days commencement so as to allow access for	Thu 8/3/18	Sun 6/5/18	8/3 🛫 🔤 6/5	
	Saturators delivery and installation)				
058	WTW Logistics Centre - Saturators Installation B/F 700 days	Thu 7/4/16	Wed 7/3/18	7/4 💭 7/3	
5059	WTWLC - Lime System - Saturators Procurement 65 days	Thu 7/4/16	Fri 10/6/16		
6060	WTWLC - Lime System - Saturators Manufacturing 300 days & FAT	Sat 11/6/16	Thu 6/4/17		
5061	WTWLC - Lime System - Saturators Delivery 70 days	Fri 7/4/17	Thu 15/6/17	7/4	
5062	WTWLC - Second 2/F Slab G.L. CH-1~CH-5 - H/O 0 days	Fri 8/9/17	Fri 8/9/17	1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/	
	by Civil Contractor (i.e. Area available from Level				
	+22.5 to +40.5)				
6063	WTWLC - Lime System - Saturators Site Works 265 days	Fri 16/6/17	Wed 7/3/18	16/6	
6064	Duration WTWLC - Lime System - Saturators No.1 65 days	Fri 16/6/17	Sat 19/8/17	16/6	
6065	WTWLC - Lime System - Saturators No.1 65 days	Sun 20/8/17	Mon 23/10/17	20/5	
6066	WTWLC - Lime System - Saturators No.3 65 days	Tue 24/10/17	Wed 27/12/17	24/10 -27/12	
5067	WTWLC - Lime System - Saturators No.4 70 days	Thu 28/12/17	Wed 7/3/18	28/12 28/12	
6068	WTW Logistics Centre - Various Dosing System & 885 days	5 Thu 7/4/16	Sat 8/9/18		
6069	Pipeworks G/F WTWLC - Chemcial Dosing System & pipeworks 65 days	Thu 7/4/16	Fri 10/6/16		
	Procurement	110 //4/10	111 10/0/10		
5070	WTWLC - Chemcial Dosing System & pipeworks 330 days	Sat 11/6/16	Sat 6/5/17		
	Manufacturing & FAT				
6071	WTWLC - Chemcial Dosing System & pipeworks 70 days	Sun 7/5/17	Sat 15/7/17	7/5	
6072	Delivery WTWLC - First 1/F Slab G.L. AS-4~CH-1 - H/O by 0 days	Fri 8/9/17	Fri 8/9/17		
	Civil Contractor				
6073	WTWLC - Various Dosing System & Pipeworks 420 days	Sun 16/7/17	Sat 8/9/18	16/7 🗸 👘 👘 👘 👘 👘 👘	
(074	Site Works Duration*	0.0047	N 20/10/17		
6074	WTWLC - Lime System - Pre-Lime Dosing - 52 days South Works	Sat 9/9/17	Mon 30/10/17	9/9	
6075	WTWLC - Lime System Sludge Recycling System 52 days	Tue 31/10/17	Thu 21/12/17	31/10 21/12	
6076	WTWLC - Lime System - Solution Tank 52 days		Sun 11/2/18		
6077	WTWLC - Lime System - Post Lime Dosing - 52 days South Work	Mon 12/2/18	Wed 4/4/18	12/2 - 4/4	
6078	WTWLC - Lime System - Depacking Unit 52 days	Thu 5/4/18	Sat 26/5/18	5/4 26/5	
6079	WTWLC - Waste Chemical Storage Tank 52 days		Tue 17/7/18	27/5 - 17/7	
6080	WTWLC - Floc-Aid Polymer Dosing - South 28 days	Sun 16/7/17	Sat 12/8/17		
(001	Works	0 10/0/17	11/0/17	138 -119	
6081	WTWLC - Floc-Aid Polymer Transfer - North 30 days Works	Sun 13/8/17	Mon 11/9/17	13/8 11/9	
6082	WTWLC - Residuals Polymer Dosing - South 30 days	Tue 12/9/17	Wed 11/10/17	12/9 - 11/10	
	Work				
6083 6084	WTWLC - Polymer Preparation System 30 days	Thu 12/10/17			
6084 6085	WTWLC - Polymer Dilution System 30 days WTWLC - Fluoride Preparation System 30 days		Sun 10/12/17 Tue 9/1/18		
6086	WTWLC - Fluoride Dosing System 30 days	Wed 10/1/18	Thu 8/2/18	10/1 🏣 8/2	
6087	WTWLC - Filter-Aid Polymer Dosing System 30 days	Fri 9/2/18	Sat 10/3/18	9/2 - 10/3	
6088	WTWLC - All interconnecting fittings & 125 days	Mon 7/5/18	Sat 8/9/18		
6089	pipeworks WTW Logistics Centre - Auxiliary System & field 746 days	Thu: 01/4/16	Sum 6/5/19	21/4	
0089	pipeworks	Thu 21/4/16	Sun 6/5/18		
5090	WTWLC - Aux. Sys. & Field pipeworks 60 days Procurement	Thu 21/4/16	Sun 19/6/16	21/4	
6091	WTWLC - Aux. Sys. & Field pipeworks 200 days	Mon 20/6/16	Thu 5/1/17	20/6	
	Manufacturing & FAT				
5092	WTWLC - Aux. Sys. & Field pipeworks Delivery 60 days	Fri 6/1/17	Mon 6/3/17	6/1+ 6/3	
6093	WTWLC - First 1/F Slab G.L. AS-4~CH-1 - H/O by 0 days Civil Contractor	Fri 8/9/17	Fri 8/9/17	₩ ⁵ 8/9	
5094	WTWLC - Aux. Sys. & Field pipeworks Site 256 days	Thu 24/8/17	Sun 6/5/18	24/\$ + 6/5	
	Works Duration*				
6095	WTWLC - Instrument Air Compressor System 60 days (First Lavel slab completed as cailing)	Sat 9/9/17	Tue 7/11/17	9/9 - 7/11	
5096	(First Level slab completed as ceiling) WTWLC - Central Dust Collection System 60 days	Wed 8/11/17	Sat 6/1/18	8/11	
6097	WTWLC - Central Dust Conection System 60 days WTWLC - Powdered Activated Carbon 60 days	Sun 7/1/18	Wed 7/3/18		
	Preparation and Dosing System				
6098	WTWLC - E&M Works new dosing & service 60 days	Thu 8/3/18	Sun 6/5/18	8/3 - 6/5	
6099	water pipework WTWLC - All trenches for new dosing & service 0 days	Thu 24/8/17	Thu 24/8/17		
	water pipework - H/O by Civil Contractor	1110 24/0/17	1110 24/0/17		
5100	WTWLC - Chem Dosing pipeworks to TWPS 100 days		Fri 1/12/17	24/8 1/12	
5101	WTWLC - Chem Dosing pipeworks to Raw Water 100 days	Sat 2/12/17	Sun 11/3/18		
6102	Inlet WTWLC - Plant services water line from TWPS 56 days	Mon 12/3/18	Sun 6/5/18	12/3	
0102	to WTW Logistics Centre 56 days	wion 12/3/18	Suii 0/3/18		
6103	WTW Logistics Centre - Elect. Works 884 days	Thu 7/4/16	Fri 7/9/18	7/4 🖵 🛶 7/9	
(10)	Cabling/MCC/LCP/ALCP/DC				
6104 6105	WTWLC - Electrical Equipment Procurement 29 days WTWLC - Electrical Equipment Manufacturing & 315 days		Thu 5/5/16 Thu 16/3/17	7/4 5/5	
	FAT 515 days		10/0/17		
		Milestone	•	Summary Manual Summary Critical	
	Critical Split Task	WINCStolle			
ent Date: 2	0 Oct 2015	Willestolle	•	Page 7	

Contract No.: 3/WSD/15

Master Programme (Ver.03)



	tract No.: 3 : In-situ Re	/WSD/15 provisioning of Sha Tin Water Treatment Works (South Works)	Advance Works				Master Programme (Ver.03)
		· · · · · · · · · · · · · · · · · · ·		10			
D	ID	Task Name	Duration	Start	Finish	Oct	2016 2018 ct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug
499	S4000	Section 4	972 days	Mon 2/1/17	Sat 31/8/19		
500	S4001	Section 4 Commencement	1 day	Mon 2/1/17	Mon 2/1/17		♦ 2/1
501	S4100	Landscaping Softworks & Establishment Works	455 days	Fri 1/6/18	Thu 29/8/19		1/6 👱
	S4101	Landscaping Soft works	90 days	Fri 1/6/18	Wed 29/8/18		1/6
503	S4102	Establishment works	365 days	Thu 30/8/18	Thu 29/8/19		30/8
504	S4002	Section 4 Completion	1 day	Sat 31/8/19	Sat 31/8/19		
505	S5000	Section 5	1558 days	Fri 30/10/15	Mon 3/2/20	3/2	2 //
506	S5001	Section 5 Commencement	1 day	Fri 30/10/15	Fri 30/10/15		♦ 30/10
	S5100	Landscaping Softworks & Establishment Works	1390 days	Fri 8/1/16	Mon 28/10/19		8/1 🗸
508	S5101	Preparation of site area for planting works	20 days	Fri 8/1/16	Wed 27/1/16		8/127/1
509) S5102	Transplanting works	200 days	Thu 28/1/16	Sun 14/8/16		28/1
	S5103	Establishment for transplanting works	365 days	Mon 15/8/16	Mon 14/8/17		15/8
	S5104	Landscaping Soft works	90 days	Tue 31/7/18	Sun 28/10/18		31/7
512	S5105	Establishment works	365 days	Mon 29/10/18	Mon 28/10/19		
513	S5002	Section 5 Completion	1 day	Mon 3/2/20	Mon 3/2/20		

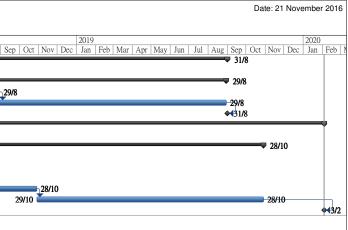
Critical Split	Tas	sk
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Milestone 🔶

Summary

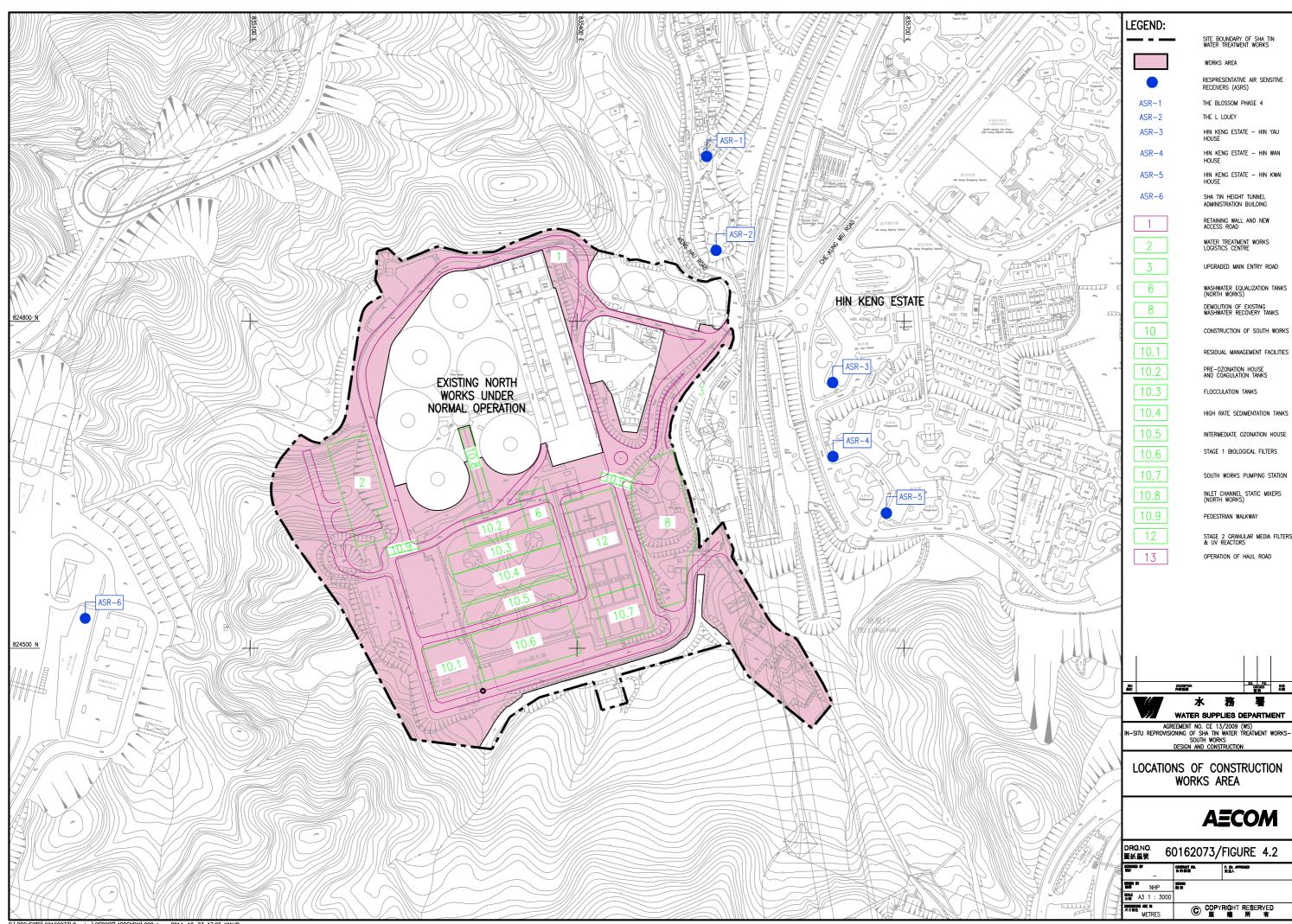
Manual Summary 🛡

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009) Critical





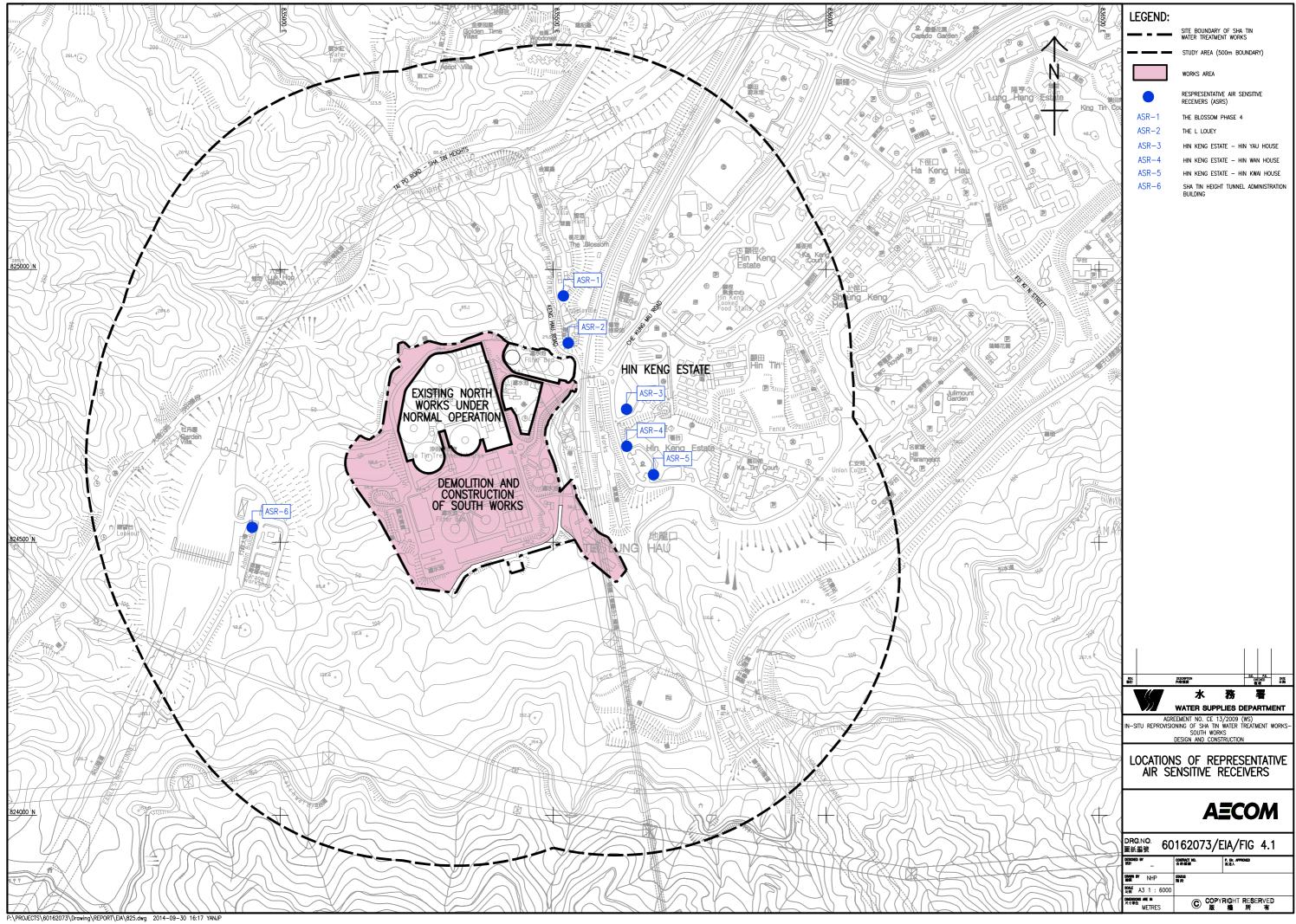
Appendix D Location of Construction Activities

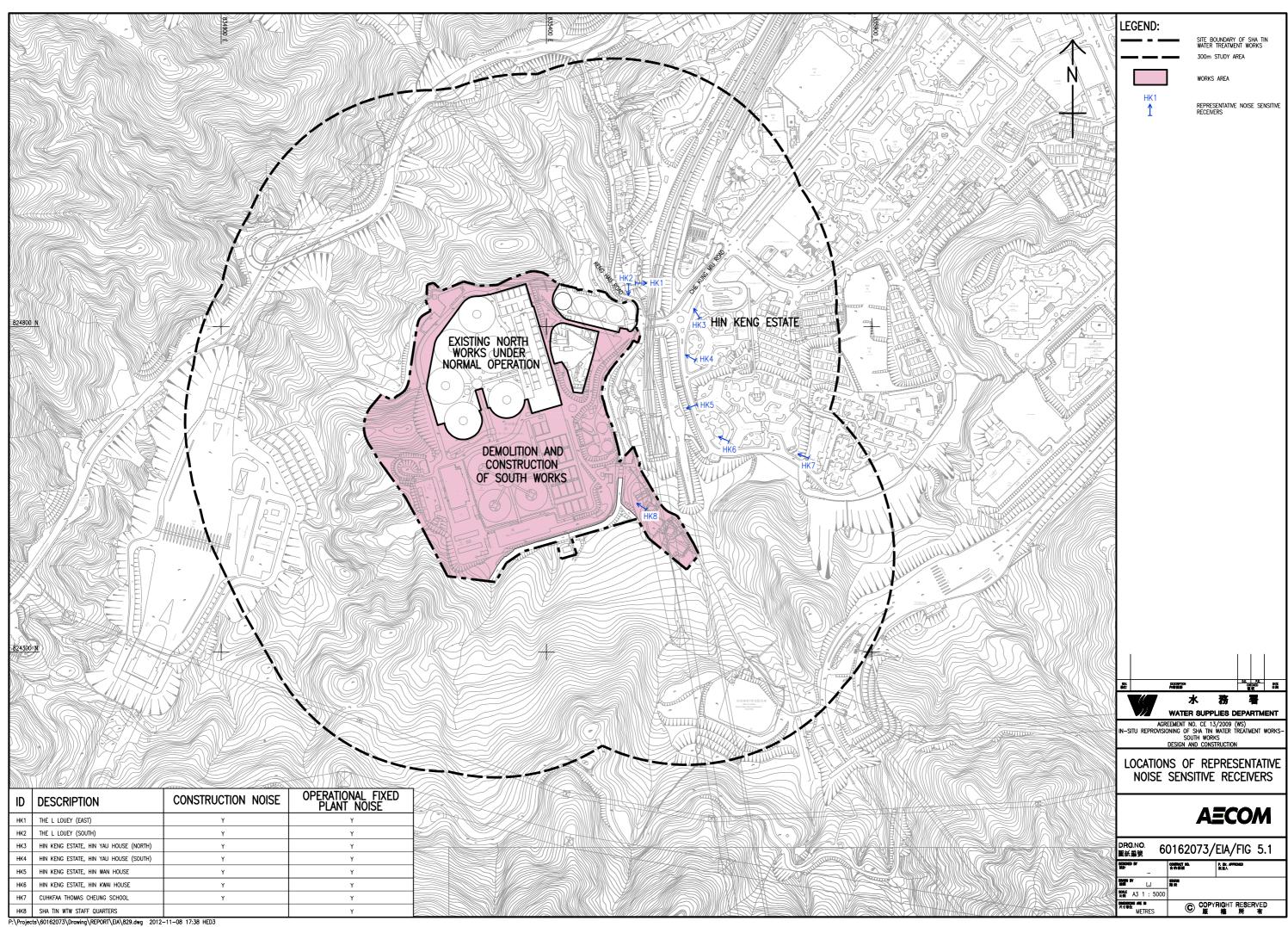


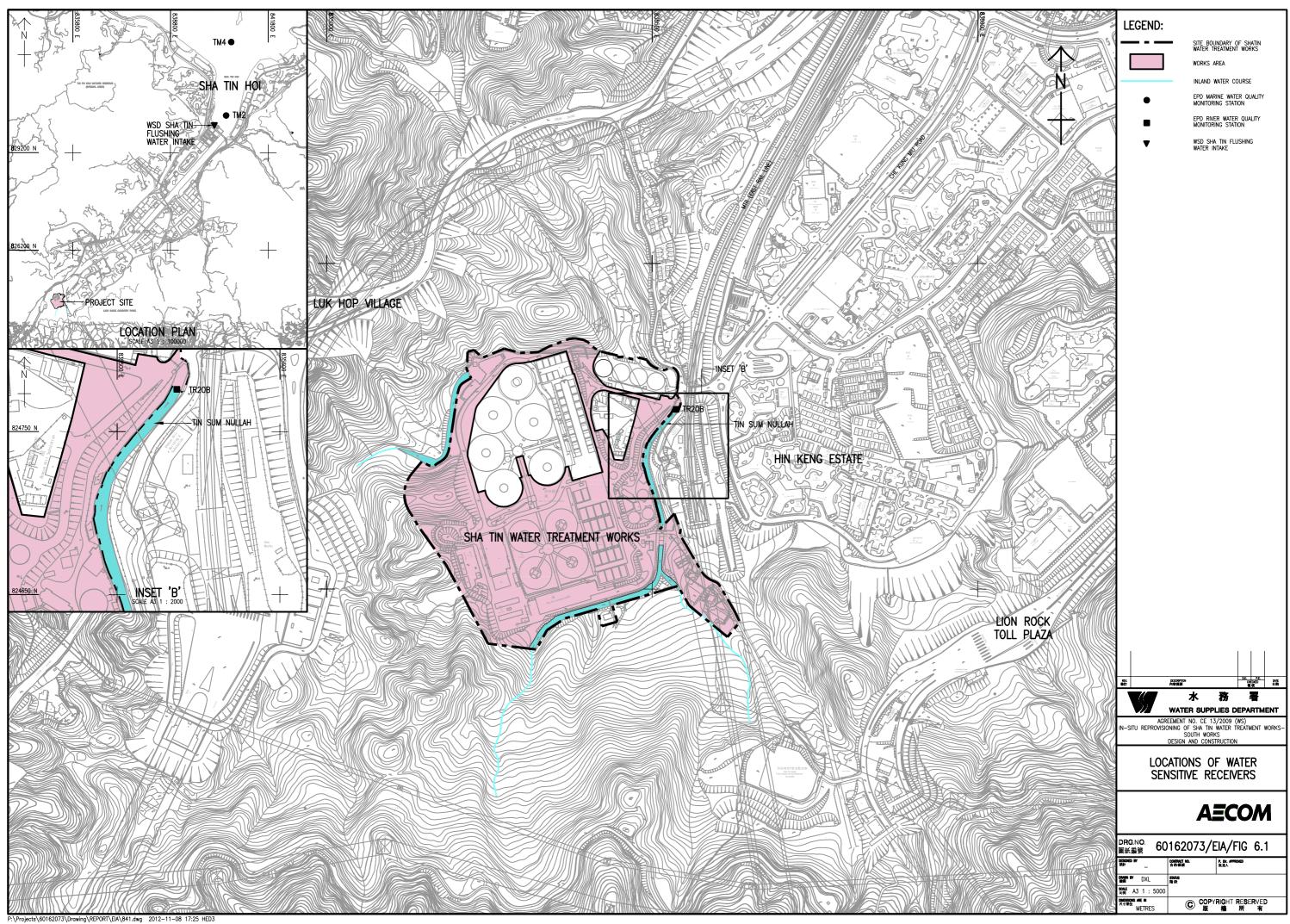
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DRG.NO. 60 圖紙編號 60	0162073/	FIGURE 4.2
DESIGNED BY 1821- —	confinct HD. 合約網號	P. Dr. APPROVED 批准人
NHP	SNUS 階段	
SOLE A3 1 : 3000		
Demensions Are In R寸單位 METRES	C COPY	RIGHT RESERVED 權所有

Appendix E Environmental Sensitive Receivers in the Vicinity of the Project







Appendix F Summary of Action and Limit Levels

Monitoring Locations	Action Level 1-hour TSP, (μg/m³)	Limit Level 1-hour TSP, (µg/m ³)
AM1	357	500
AM2	334	500

Determination of Action and Limit Levels for Air Quality

Determination of Action and Limit Levels for Noise

Monitoring	Action Level	Limit Level in dB(A)			
Location	0700-1900 ho	ours on normal weekdays			
NM1		For domestic premises: 75 dB(A) for			
NM2	When one documented	NM1 & NM2			
NM3	complaint is received	For schools: 70dB(A) during normal teaching periods and 65 dB(A) during examination periods for NM3			

Determination of Action and Limit Levels for Water Quality

Water		d Oxygen g/L)	Suspendee (mg/		Turbidity	v (NTU)	рН		
monitoring stations	Action	Limit	Action	Limit	Action	Limit	Action	Limit	
stations	Level	Level	Level	Level	Level	Level	Level	Level	
C1	7.51	7.44	4.19	6.73	3.99	4.00	Beyond the range 6.6 to 7.9	Beyond the range 6.5 to 8.0	
C2	C2 8.10 7.98 4.33		8.16	3.13	3.28	Beyond the range 6.6 to 8.8	Beyond the range 6.5 to 8.9		
C3*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
M1	8.90	8.89	3.30	3.56	4.36	4.48	Beyond the range 6.6 to 8.2	Beyond the range 6.6 to 8.3	
M2	8.92	8.91	18.84	26.80	12.64	13.72	Beyond the range 6.6 to 11.0	Beyond the range 6.6 to 11.0	
M3	9.16	9.15	1.00	1.00	1.10	1.18	Beyond the range 6.6 to 8.6	Beyond the range 6.6 to 8.7	

Remark: For DO, action should be taken when monitoring result of either one of the surface, middle or bottom DO is lower than the proposed Action/Limit Levels.

Appendix G Event/Action Plan

Air Quality

		ACT	ΓΙΟΝ	
EVENT	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one	1. Inform the Contractor, IEC	1. Check monitoring data	1. Confirm receipt of	1. Identify source(s),
sample	and ER;	submitted by the ET;	notification of exceedance	investigate the causes of
	2. Discuss with the	2. Check Contractor's	in writing.	exceedance and propose
	Contractor on the remedial	working method; and		remedial measures;
	measures required;	3. Review and advise the ET		2. Implement remedial
	3. Repeat measurement to	and ER on the effectiveness		measures; and
	confirm findings; and	of the proposed remedial		3. Amend working methods
	4. Increase monitoring	measures.		agreed with the ER as
	frequency.			appropriate.
2. Exceedance for two or	1. Inform the Contractor, IEC	1. Check monitoring data	1. Confirm receipt of	1. Identify source and
more consecutive samples	and ER;	submitted by the ET;	notification of exceedance	investigate the causes
	2. Discuss with the ER and	2. Check Contractor's	in writing;	of exceedance;
	Contractor on the remedial	working method; and	2. Review and agree on the	2. Submit proposals for
	measures required;	3. Review and advise the ET	remedial measures proposed	remedial measures to
	3. Repeat measurements to	and ER on the effectiveness	by the Contractor; and	the ER with a copy to
	confirm findings;	of the proposed remedial	3. Supervise implementation	ET and IEC within three
	4. Increase monitoring	measures.	of remedial measures.	working days of notification;
	frequency to daily;			3. Implement the agreed
	5. If exceedance continues,			proposals; and

	arrange meeting with the			4. Amend proposal as
	IEC, ER and Contractor; and			appropriate.
	6. If exceedance stops,			
	cease additional monitoring.			
LIMIT LEVEL				
Event	ET	IEC	ER	CONTRACTOR
1. Exceedance for one	1. Inform the Contractor,	1. Check monitoring data	1. Confirm receipt of	1. Identify source(s) and
sample	IEC, EPD and ER;	submitted by the ET;	notification of exceedance	investigate the causes
	2. Repeat measurement to	2. Check the Contractor's	in writing;	of exceedance;
	confirm findings;	working method;	2. Review and agree on the	2. Take immediate action to
	3. Increase monitoring	3. Discuss with the ET, ER	remedial measures proposed	avoid further exceedance;
	frequency to daily; and	and Contractor on possible	by the Contractor; and	3. Submit proposals for
	4. Discuss with the ER, IEC	remedial measures; and	3. Supervise implementation	remedial measures to ER
	and contractor on the	4. Review and advise the ER	of remedial measures.	with a copy to ET and IEC
	remedial measures and	and ET on the effectiveness		within three working days of
	assess the effectiveness.	of Contractor's remedial		notification;
		measures.		4. Implement the agreed
				proposals; and
				5. Amend proposal if
				appropriate.

	ET	IEC	ER	CONTRACTOR
2. Exceedance for two or	1. Notify Contractor, IEC, EPD	1. Check monitoring data	1. Confirm receipt of	1. Identify source(s) and
more consecutive samples	and ER;	submitted by the ET;	notification of exceedance	investigate the causes of
	2. Repeat measurement to	2. Check the Contractor's	in writing;	exceedance;
	confirm findings;	working method;	2. In consultation with the ET	2. Take immediate action
	3. Increase monitoring	3. Discuss with ET, ER, and	and IEC, agree with the	to avoid further exceedance;
	frequency to daily;	Contractor on the potential	Contractor on the remedial	3. Submit proposals for
	4. Carry out analysis of the	remedial measures; and	measures to be	remedial measures to the ER
	Contractor's working procedures	4. Review and advise the ER	implemented;	with a copy to the IEC and
	with the ER to determine	and ET on the effectiveness	3. Supervise the	ET within three working days
	possible mitigation to be	of Contractor's remedial	implementation of remedial	of notification;
	implemented;	measures.	measures; and	4. Implement the agreed
	5. Arrange meeting with the IEC		4. If exceedance continues,	proposals;
	and ER to discuss the remedial		consider what portion of the	5. Revise and resubmit
	measures to be taken;		work is responsible and	proposals if problem still not
	6. Review the effectiveness of		instruct the Contractor to	under control; and
	the Contractor's remedial		stop that portion of work	6. Stop the relevant portion
	measures and keep IEC, EPD		until the exceedance is	of works as determined by
	and ER informed of the results;		abated.	the ER until the exceedance
	and			is abated.
	7. If exceedance stops, cease			
	additional monitoring.			

Noise

		AC	ΓΙΟΝ	
EVENT	ET	IEC	ER	CONTRACTOR
ACTION LEVEL	1. Notify the Contractor, IEC	1. Review the investigation	1. Confirm receipt of	1. Investigate the complaint
	and ER;	results submitted by the	notification of complaint in	and propose remedial
	2. Discuss with the ER and	Contractor; and	writing;	measures;
	Contractor on the remedial	2. Review and advise the ET	2. Review and agree on the	2. Report the results of
	measures required; and	and ER on the effectiveness	remedial measures proposed	investigation to the IEC, ET
	3. Increase monitoring	of the remedial measures	by the Contractor; and	and ER;
	frequency to check mitigation	proposed by the Contractor.	3. Supervise implementation	3. Submit noise mitigation
	effectiveness.		of remedial measures.	proposals to the ER with
				copy to the IEC and ET
				within three working days of
				notification; and
				4. Implement noise mitigation
				proposals.
LIMIT LEVEL	1. Notify the Contractor, IEC,	1. Check monitoring data	1. Confirm receipt of	1. Identify source and
	EPD and ER;	submitted by the ET;	notification of failure in	investigate the causes of
	2. Repeat measurement to	2. Check the Contractor's	writing;	exceedance;
	confirm findings;	working method;	2. In consultation with the ET	2. Take immediate action to
	3. Increase monitoring	3. Discuss with the ER, ET	and IEC, agree with the	avoid further exceedance;
	frequency;	and Contractor on the	Contractor on the remedial	3. Submit proposals for
	4. Carry out analysis of	potential remedial measures;	measures to be	remedial measures to the ER

Contractor's working	and	implemented;	with copy to the IEC and ET
procedures to determine	4. Review and advise the ET	3. Supervise the	within three working days of
possible mitigation to be	and ER on the effectiveness	implementation of remedial	notification;
implemented;	of the remedial measures	measures; and	4. Implement the agreed
5. Arrange meeting with the	proposed by the Contractor.	4. If exceedance continues,	proposals;
IEC and ER to discuss the		consider what portion of the	5. Revise and resubmit
remedial measures to be		work is responsible and	proposals if problem still not
taken;		instruct the Contractor to	under control; and
6. Review the effectiveness		stop that portion of work until	6. Stop the relevant portion
of Contractor's remedial		the exceedance is abated.	of works as determined by
measures and keep IEC,			the ER until the exceedance
EPD and ER informed of the			is abated.
results; and			
7. If exceedance stops,			
cease			

Water Quality

		ACTION									
EVENT	ET Leader			IEC		ER		CONTRACTOR			
Action level being exceeded	•	Repeat in situ	•	Discuss with ET and	•	Discuss with IEC on the	•	Inform the ER and			
by one sampling day		measurement to		Contractor on the		proposed mitigation		confirm notification of			
		confirm findings;		mitigation measures;		measures;		the non-compliance in			
	•	Identify reasons for	•	Review proposals on	•	Make agreement on the		writing;			
		non-compliance and		mitigation measures		mitigation measures to	•	Rectify unacceptable			
		source(s) of impact;		submitted by		be implemented.		practice;			
	•	Inform IEC and		Contractor and advise	•	Assess the	•	Check all plant and			
		Contractor;		the ER accordingly;		effectiveness of the		equipment;			
	•	Check monitoring data,	•	Assess the		implemented mitigation	•	Consider changes of			
		all plant, equipment		effectiveness of the		measures.		working methods;			
		and Contractor's		Implemented mitigation			•	Discuss with ET and			
		working methods;		measures.				IEC and propose			
	•	Discuss mitigation						mitigation measures to			
		measures with IEC and						IEC and ER;			
		Contractor;					•	Implement the agreed			
	•	Repeat measurement						mitigation measures.			
		on next day of									
		exceedance.									

		ET Leader		IEC		ER		CONTRACTOR
Action level being exceeded	•	Repeat in situ	•	Discuss with ET and	•	Discuss with IEC on the	•	Inform the ER and
by more than one		measurement to		Contractor on the		proposed mitigation		confirm notification of
consecutive sampling day		confirm findings;		mitigation measures;		measures;		the non-compliance in
	•	Identify reasons for	•	Review proposals on	•	Make agreement on the		writing;
		non-compliance and		mitigation measures		mitigation measures to	•	Rectify unacceptable
		source(s) of impact;		submitted by		be implemented;		practice;
	•	Inform IEC and		Contractor and advise	•	Assess the	•	Check all plant and
		Contractor;		the ER accordingly;		effectiveness of the		equipment;
	•	Check monitoring data,	•	Assess the		implemented mitigation	•	Consider changes of
		all plant, equipment		effectiveness of the		measures.		working methods;
		and Contractor's		implemented mitigation			•	Discuss with ET and
		working methods;		measures.				IEC and propose
	•	Discuss mitigation						mitigation measures to
		measures with IEC and						IEC and ER within
		Contractor;						three working days;
	•	Ensure mitigation					•	Implement the agreed
		measures are						mitigation measures.
		implemented;						
	•	Prepare to increase the						
		monitoring frequency to						
		daily;						

	•	Repeat measurement on next day of exceedance.						
		ET Leader		IEC		ER		CONTRACTOR
Limit level being	•	Repeat in situ	•	Discuss with ET and	•	Discuss with IEC, ET	•	Inform the ER and
exceeded by one		measurement to		Contractor on the		and Contractor on the		confirm notification of
sampling day		confirm findings;		mitigation measures;		proposed mitigation		the non-compliance in
	•	Identify reasons for	•	Review proposals on		measures;		writing;
		non-compliance and		mitigation measures	•	Request Contractor to	•	Rectify unacceptable
		source(s) of impact;		submitted by		critically review the		practice;
	•	Inform IEC Contractor		Contractor and advise		working methods;	•	Check all plant and
		and EPD;		the ER accordingly;	•	Make agreement on the		equipment;
	•	Check monitoring data,	•	Assess the		mitigation measures to	•	Consider changes of
		all plant, equipment		effectiveness of the		be implemented;		working methods;
		and Contractor's		implemented mitigation	•	Assess the	•	Discuss with ET, IEC
		working methods;		measures.		effectiveness of the		and ER and propose
	•	Discuss mitigation				implemented mitigation		mitigation measures to
		measures with IEC, ER				measures.		IEC and ER within
		and Contractor;						three working days;
	•	Ensure mitigation					•	Implement the agreed
		measures are						mitigation measures.
		implemented;						

	•	Increase the monitoring						
		frequency to daily until						
		no exceedance of Limit						
		level.						
		ET Leader		IEC		ER		CONTRACTOR
Limit level being	•	Repeat in situ	•	Discuss with ET and	•	Discuss with IEC, ET	•	Inform the ER and
exceeded by more		measurement to		Contractor on the		and Contractor on the		confirm notification of
than one		confirm findings;		mitigation measures;		proposed mitigation		the non-compliance in
consecutive	•	Identify reasons for	•	Review proposals on		measures;		writing;
sampling day		non-compliance and		mitigation measures	•	Request Contractor to	•	Rectify unacceptable
		source(s) of impact;		submitted by		critically review the		practice;
	•	Inform IEC Contractor		Contractor and advise		working methods;	•	Check all plant and
		and EPD;		the ER accordingly;	•	Make agreement on the		equipment;
	•	Check monitoring data,	•	Assess the		mitigation measures to	•	Consider changes of
		all plant, equipment		effectiveness of the		be implemented;		working methods;
		and Contractor's		implemented mitigation	•	Assess the	•	Discuss with ET, IEC
		working methods;		measures.		effectiveness of the		and ER and propose
	•	Discuss mitigation				implemented mitigation		mitigation measures to
		measures with IEC, ER				measures;		IEC and ER within
		and Contractor;			•	Consider and instruct, if		three working days;
	•	Ensure mitigation				necessary, the	•	Implement the agreed
		measures are				Contractor to slow		mitigation measures;

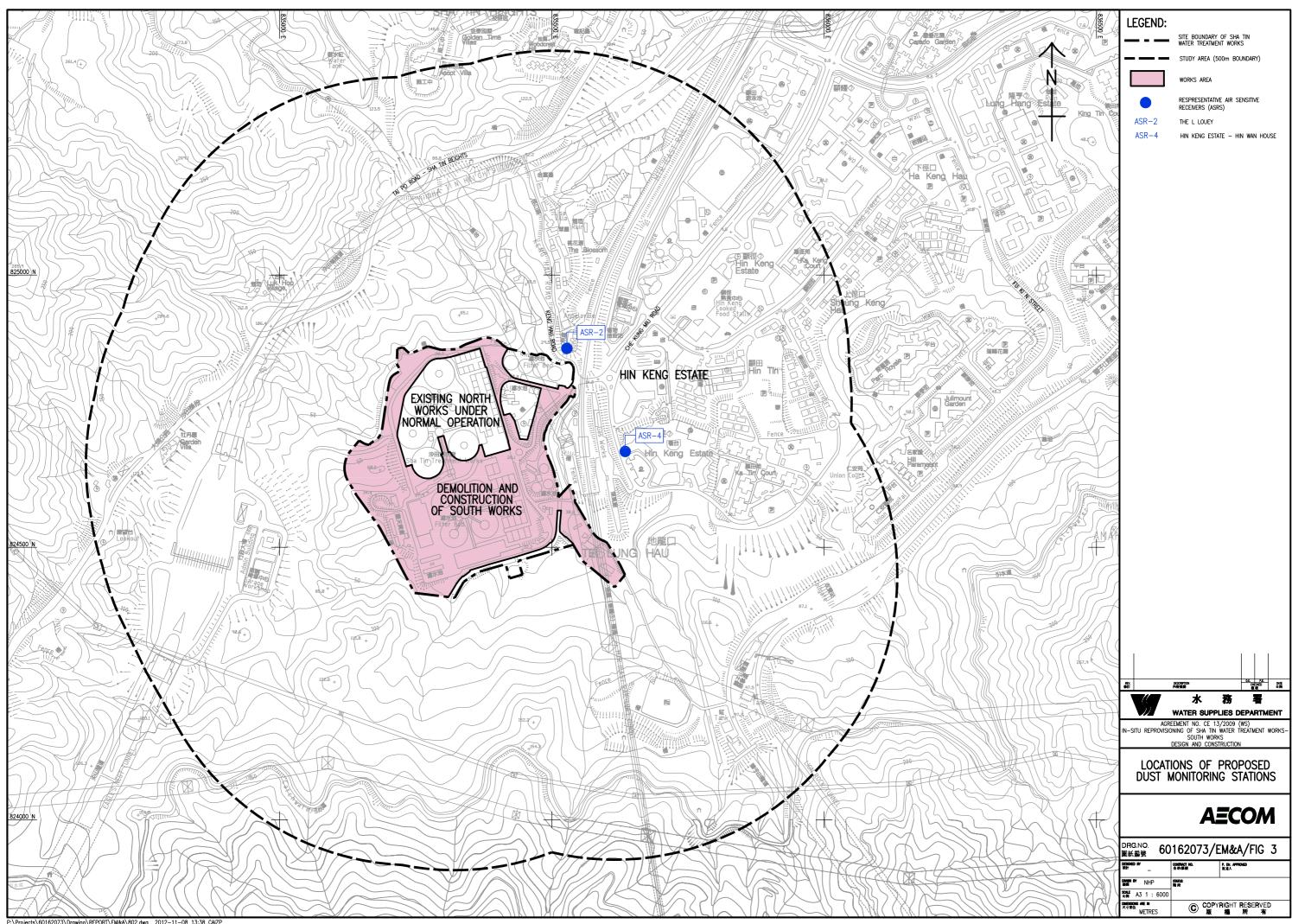
implemented; Increase	down or to stop all or	• As directed by the ER,
the monitoring	part of the construction	to slow down or to stop
frequency to daily until	activities until no	all or part of the
no exceedance of Limit	exceedance of Limit	construction activities.
level for two	level.	
consecutive days.		

Appendix H Impact Monitoring Schedules

Impact Monitoring Schedule for STWTW

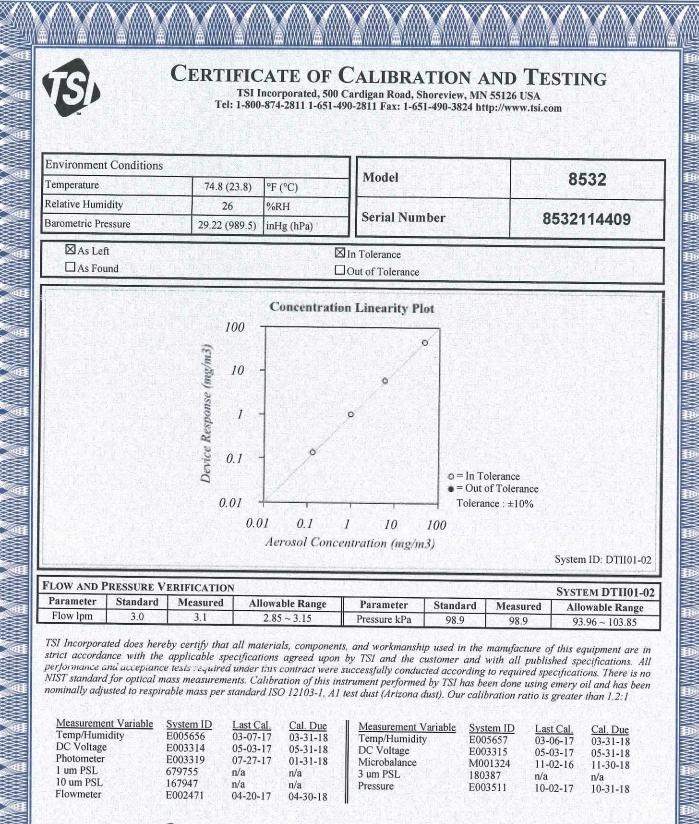
	Impact Monitoring Schedule for STWTW										
			Sep-18								
Sun	Mon	Tue	Wed	Thur	Fri	Sat					
						1					
						-					
		-	-	-	_						
2	3	4	5	6	/	8					
	Impact		Impact		Impact						
			P. C. C.		P. C.						
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,						
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3						
	Air monitoring for AM1 & AM2										
	Noise monitoring for NM1, NM2 &				Air monitoring for AM1 & AM2						
	Noise monitoring for NM1, NM2 &				Noise monitoring for NM1, NM2 &						
	NM3				NM3						
9	10	11	12	13	14	15					
	Impost		Impact		line of the						
	Impact		inputt		Impact						
			Water Quality monitoring for C1, C2,								
	Water Quality monitoring for C1, C2,				Water Quality monitoring for C1, C2,						
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3						
			Air monitoring for AM1 & AM2								
			Noise monitoring for NM1, NM2 &								
			NM3								
			NM3								
16	17	19		20	21	22					
16	17	18	NM3	20	21	22					
16		18	19	20		22					
16	17 Impact	18		20	21 Impact	22					
16		18	19	20	Impact	22					
16	Impact	18	19 Impact	20	Impact Water Quality monitoring for C1,	22					
16	Impact Water Quality monitoring for C1, C2,	18	19 Impact Water Quality monitoring for C1, C2,	20	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22					
16	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	18	19 Impact	20	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22					
16	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2	18	19 Impact Water Quality monitoring for C1, C2,	20	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2	22					
16	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	18	19 Impact Water Quality monitoring for C1, C2,	20	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	22					
16	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2	18	19 Impact Water Quality monitoring for C1, C2,	20	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2	22					
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Appendix I Location Plan of Air Quality Monitoring Station



P:\Projects\60162073\Drawing\REPORT\EM&A\802.dwg 2012-11-08 13:38 CAIZP

Appendix J Calibration Certificates (Air Monitoring)

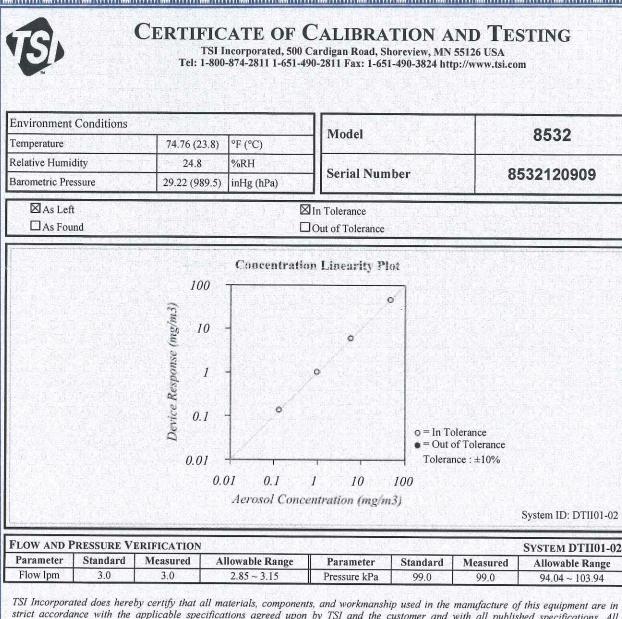


P/N 2300157

Calibrated

December 20, 2017

Date



strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

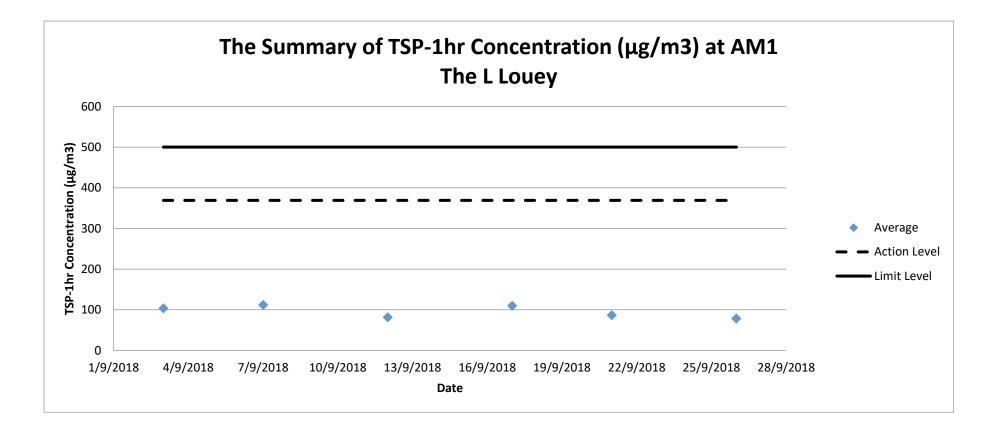
Measurement Variable Temp/Humidity	System ID E005656	Last Cal. 03-07-17	<u>Cal. Due</u> 03-31-18	Measurement Variable Temp/Humidity	System ID E005657	Last Cal.	Cal. Due
DC Voltage	E003314	05-03-17	05-31-18	DC Voltage	E003037 E003315	03-06-17 05-03-17	03-31-18 05-31-18
Photometer 1 um PSL	E003319 679755	07-27-17 n/a	01-31-18 n/a	Microbalance 3 um PSL	M001324 180387	11-02-16 n/a	11-30-18 n/a
10 um PSL Flowmeter	167947	n/a	n/a	Pressure	E003511	10-02-17	10-31-18
riowineter	E002471	04-20-17	04-30-18				

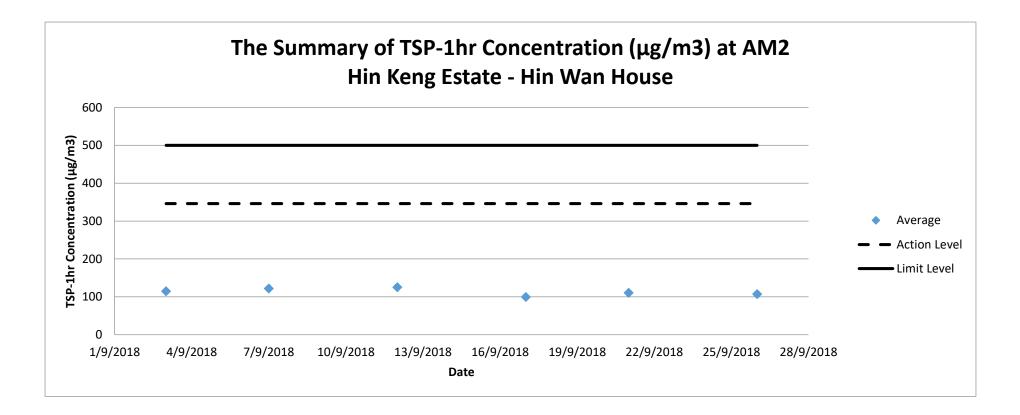
Calibrated

December 20, 2017

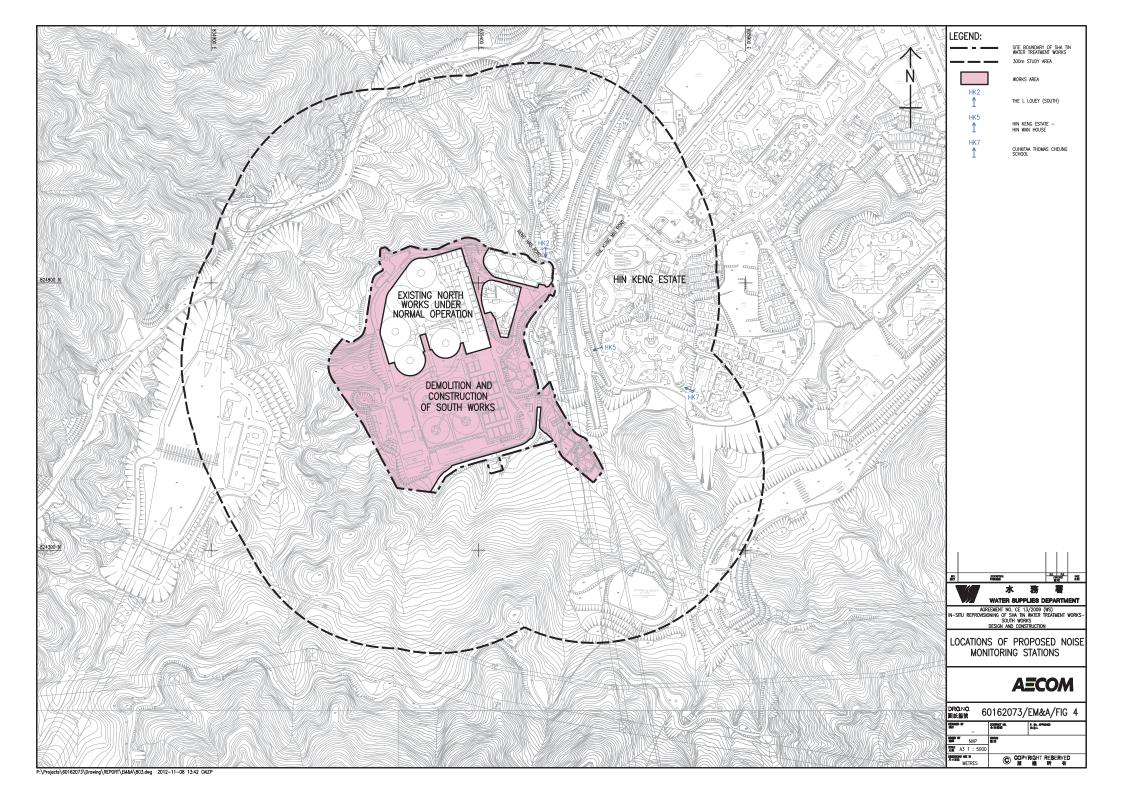
Date

Appendix K Impact Air Quality Monitoring Results and Graphical Presentation





Appendix L Location Plan of Noise Monitoring Station



Appendix M Calibration Certificates (Noise)



Certificate of Calibration 校正證書

Certificate No. : C180282 證書編號

ITEM TESTED / 送檢項	目 (Job No. / 序引編號: IC17-3011)	Date of Receipt / 收件日期: 29 December 2017
Description / 儀器名稱 :	Sound Level Meter	
Manufacturer / 製造商 :	Pulsar	
Model No. / 型號 :	43	
Serial No. / 編號 :	PN1374	
Supplied By / 委託者 :	Acumen Environmental Engineering a	nd Technologies Co., Ltd.
	Lot 11, Tam Kon Shan Road, North T	sing Yi, N.T.
	試條件 23 ± 2)°C 	Relative Humidity / 相對濕度 : (55 ± 20)%

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 13 January 2018

TEST RESULTS / 測試結果

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

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

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

Tested By 測試	: K C Lee Engineer			
Certified By 核證	: <u>Chan than Chan</u> H C Chan Engineer	Date of Issue 簽發日期	:	16 January 2018

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 輝創工程有限公司 – 校正及檢測實驗所 c/o 香港新界屯門與安里一號青山灣機樓四樓 Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No.: C180282 證書編號

- 1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- 2. Self-calibration using laboratory acoustic calibrator was performed before test from 6.1.1.2 to 6.3.2.
- 3. The results presented are the mean of 3 measurements at each calibration point.
- 4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

- 5. Test procedure : MA101N.
- 6. Results :
- 6.1 Sound Pressure Level
- 6.1.1 Reference Sound Pressure Level
- 6.1.1.1 Before Self-calibration

UUT Setting		Applied	UUT	
Frequency	Time	Level	Freq.	Reading
Weighting	Weighting	(dB)	(kHz)	(dB)
LA	F	94.00	1	93.6

6.1.1.2 After Self-calibration

UUT S	Setting	Applie	d Value	UUT	IEC 61672 Class 1
Frequency	Time	Level	Freq.	Reading	Spec.
Weighting	Weighting	(dB)	(kHz)	(dB)	(dB)
LA	F	94.00	1	93.7	± 1.1

6.1.2 Linearity

UUT	Setting	Applied	1 Value	UUT
Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
LA	F	94.00	1	93.7 (Ref.)
		104.00		103.7
		114.00		113.7

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

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

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



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No.: C180282 證書編號

6.2 Time Weighting

UUT	Setting	Applie	d Value	UUT	IEC 61672 Class 1
Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Spec. (dB)
LA	F	94.00	1	93.7	Ref.
	S			93.7	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT	Setting	Applied Value		UUT	IEC 61672 Class 1
Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Spec. (dB)
LA	F	94.00	63 Hz	67.5	-26.2 ± 1.5
			125 Hz	77.5	-16.1 ± 1.5
			250 Hz	85.0	-8.6 ± 1.4
			500 Hz	90.4	-3.2 ± 1.4
			1 kHz	93.7	Ref.
			2 kHz	94.9	$+1.2 \pm 1.6$
			4 kHz	94.8	$+1.0 \pm 1.6$
			8 kHz	93.0	-1.1 (+2.1 ; -3.1)
			12.5 kHz	89.4	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT	UUT Setting Applied Value		UUT	IEC 61672 Class 1	
Frequency	Time	Level	Freq.	Reading	Spec.
Weighting	Weighting	(dB)		(dB)	(dB) '
LC	F	94.00	63 Hz	92.9	-0.8 ± 1.5
			125 Hz	93.5	-0.2 ± 1.5
			250 Hz	93.7	0.0 ± 1.4
			500 Hz	93.7	0.0 ± 1.4
			1 kHz	93.7	Ref.
			2 kHz	93.6	-0.2 ± 1.6
			4 kHz	93.0	-0.8 ± 1.6
			8 kHz	91.1	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.5	-6.2 (+3.0 ; -6.0)

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

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



Certificate of Calibration 校正證書

Certificate No.: C180282 證書編號

Remarks : - UUT Microphone Model No. : PM1 & S/N : 010760C

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :	94 dB		63 Hz - 125 Hz 250 Hz - 500 Hz 1 kHz 2 kHz - 4 kHz	: $\pm 0.35 \text{ dB}$: $\pm 0.30 \text{ dB}$: $\pm 0.20 \text{ dB}$: $\pm 0.35 \text{ dB}$
			8 kHz 12.5 kHz	: ± 0.45 dB : ± 0.70 dB
1	04 dB	:	1 kHz	$\pm 0.10 \text{ dB}$ (Ref. 94 dB)
1	14 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)
	100000000 000000	•	5778875757	

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

Note :

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

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

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

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



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CALIBRATION CERTIFICATE

Certificate Information	11-Sep-2018	7	Certificate Numbe	er MLCN182166S
Customer Informatio				
Company Name		bility Consulting Limite		
Address		301-305 Castle Peak R	.oad,	
	Kwai Chung, N.	I.		
Equipment-under-Te	st (EUT)			
Description	Acoustic Calibra	itor		
Manufacturer	Pulsar			
Model Number	105			
Serial Number	63705			
Equipment Number				
Calibration Particula	ur.			
Date of Calibration	11-Sep-2018			
Calibration Equipment) / AV180068 / 13-Ma	v-20	
Cumpration Equipment) / MLEC18/05/02 / 25		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Calibration Procedure	MLCG00, MLC	G15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C	
	,	Relative Humidity	$55\% \pm 25\%$	
	EUT	Stabilizing Time	Over 3 hours	
		Warm-up Time	Not applicable	
		Power Supply	Internal battery	
Calibration Results	Calibration data	were detailed in the co	ntinuation pages.	
		It was out of EUT spec		
Approved By & Date				
Approved by & Dute			1	
		-	K.O. Lo	11-Sep-2018
Statements				11.000 2010
 Calibration equipment used 	for this calibration are	traceable to national / inte	rnational standards.	
			at the time of the calibration and the unce	rtainties quoted will not
	1. TR		hanges, vibration and shock during trans	portation, overloading,
 mishandling, misuse, and th MaxLab Calibration Centre 			easurement. resulting from the use of the EUT.	
			No part of this Certificate may be repro-	duced without the prior
written approval of MaxLab	Calibration Centre Li	mited.		



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Certificate No.

MLCN182166S

EUT	Standard	EUT Error from	Calibration	EUT
Setting	Reading	Setting	Uncertainty	Specification
94 dB	93.6 dB	-0.4 dB *	0.20 dB	± 0.2 dB

- END -

Calibrated By :	Dan	Checked By :	K.O. Lo
Date :	11-Sep-18	Date :	11-Sep-18
			Page 2 of 2





This instrument was produced under rigorous factory production control and documented standard procedures. It was individually visually inspected, leak tested and function tested for display, backlight, button and software performance. The accuracy of each of its primary measurements was individually calibrated and/or tested against standards traceable to the National Institute of Standards and Technology ("NIST") or calibrated intermediary standards. This instrument is certified to have performed at the time of manufacture in compliance with the following specifications as they apply to this meter's specific model, measurements and features.

Methods Used in Calibration and Testing

Wind Speed:

The Kestrel Pocket Weather Meter impeller installed in this unit was individually tested in a subsonic wind tunnel operating at approximately 300 fpm (1.5 m/s) and 1200 fpm (6.1 m/s) monitored by a Gill Instruments Model 1350 ultrasonic time-of-flight anemometer. The Standard's maximum combined uncertainty is +/-1.04%within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and +/-1.66% within the airspeed range 166.6 to 706.6 fpm (0.85 to 3.59 m/s).

Temperature:

Temperature response is verified in comparison with a Eutechnics 4600 Precision Thermometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Eutechnics 4600. The Eutechnics 4600 is calibrated annually and is traceable to NIST with a system accuracy of +/-0.05 °C.

Direction / Heading

The sensitivity of the magnetic directional sensor is verfied at the component level by applying a magnetic field to the sensor and measuring the signal output at 4 points, as well as after assembly by orienting the unit to the cardinal directions and measuring the magnetic field output. In both cases the compass output must be accurate to within ± -5 degrees.

Relative Humidity:

Relative humidity receives a two-point calibration in humidity and temperature controlled chambers at 75.3% RH and 32.8% RH at 25° C. The calibration tanks are monitored with an Edgetech Model 2002 DewPrime II Standard Chilled Mirror Hygrometer. Following calibration, performance is further verified at an RH of approximately 43.2% against the Edgetech Hygrometer. The Edgetech Hygrometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/- 0.2% RH.

Barometric Pressure:

Pressure response is verified against a Mensor Series 6000 Digital Barometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Mensor Barometer. The Mensor Barometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/- 0.02% F.S.

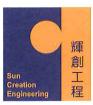
Approved By:

Michael Naughton, Engineering Manager

The enclosed Kestrel Weather and Environmental Meter was manufactured by Nielsen-Kellerman Co. at its facilities located at 21 Creek Circle, Boothwyn, PA 19061 USA.

															SENSO	RS		
SENSOR	1000	2000	2500	3000	3500	3500	4000	4200	4250	4300	4400	4500	4500	ACCURACY (+/-)*	RESOLUTION	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed Air Flow	•	•	•	•	•	•	•	•	•	•	•	•	•	Larger of 3% of reading, least significant digit or 20 ft/min	0.1 m/s 1 ft/min 0.1 km/h 0.1 kmots 1 B	0.6 to 40.0 m/s 118 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 77.8 knots 0 to 12 B	0.6 to 60.0 m/s 118 to 11,811 ft/min 2.2 to 216.0 km/h 1.3 to 134.2 mph 1.2 to 116.6 kmots 0 to 12 B	1 inch/25 mm diameter impeler with precision axie and low-friction Zytel8 bearings. Startup s statud as sover imit, readings may be taken down to 04 mm (7 Britmin 11 Shrmh 1 Bryth). Effort impeler statud as 04 mm (2 Britmin 11 Shrmh 1 Bryth). Effort and the regiment statud (2 Britmin 12 Bryth 12
Ambient Temperature	V	•	•	•	•	•	•	•	•	•	•	•	•	0.9 *F 0.5 *C	0.1 *F 0.1 *C	-20.0 to 158.0 *F -29.0 to 70.0 *C	14.0.0 to 131.0 "F -10.0 to 55.0 "C	Hermelically-seaked, precision thermitor mounted externally and thermally licelated (US Paik 5.936.645) for rapidr response. Altificior 0.2 mpc/1 mm or greater provide fattest response exaction of molecular offset. C alternal on thregidging. Thermater may also be used to may be used to make the second seco
Globe Temperature - Tg								-			•			*F 1.4 *C	0.1 *F 0.1 *C	-20.0 to 140.0 °F -29.0 to 60.0 °C	14.0 to 131.0 *F -10.0 to 55.0 *C	Temperature inside 1in 25 mm black powder coated copper globe converted to Tg equivalent standard 6 in 150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph m/s.
Relative Humidity				•	•	•	•	•	•	•	•	•	•	3.0 %RH	0.1 %RH	5 to 95% non-condensing	0 to 100%	Polymer capacitive humidity sensor mounted in thin-walled chamber external to case for rapic accurate response (US Plante 6.257 2074). To achieve stated accuracy, unit mat be permit equilibrate to activate la Imprature wall en exposed to large, rapid temperature damps and b out of direct sunight. California of the -2% over 24 months. Humidity sensor may be recall at factory or in fault using Kastel Humiding California for (MR PH-0602).
Pressure	1	-01	•	14	•	•	•		•	•		•	•	0.03 inHg 1.0 hPaImbar 0.01 PSI	0.01 inHg 0.1 hPajmbar 0.01 PSI	8.86 to 32.49 inHg 300.0 to 1100.0 hPajmbar 4.35 to 15.95 PSI and 32.0 to 185.0 *F 0.0 to 85.0 *C	0.30 to 48.87 in Hg 10.0 to 1654.7 h Palmbar 0.14 to 24.00 PSI and 14.0 to 131.0 °F -10.0 to 55.0 °C	Monothics sillion piecewsitely pressure sensor with second order temperature controllon- Pressure sensor may be nearbitrated at tochyo in field. Adjustable reference attubus also display of tation pressure on anometric pressure connected to MSL. Kestini 4.200 display attation pressure on addicated screen. Restriet 2000 and 3000 display continuously update three-hour barometric pressure trend indicator: main graphy, ning, steady, falling, falling na kestitel 4000 estes displays on sexite tend frough graphing function. PSI display on Kestite
Compass		153						1919 1-1-1-1				•	•	5*	1* 1/16th Cardinal Scale	0 to 360*	0 to 360°	400 series only. 2-axis sole-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical populion. Self-aultication routine eliminates imagnetic en from bittines or unit anomato te un after every full power-down (bittiney removal or change increation). Declarationariation advatable for Time North read-unit.
						18								CALCUL		SUREMENTS		
MEASUREMENT	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (+/-)*	RESOLUTION	SPECIFICATION RANGE	SENSORS EMPLOYED	NOTES
Air Density	1	-	1		123	Y	1	•	•		13	31	3.23	0.0002 lb/tt ³ 0.0033 kg/m ³	0.001 lbs/ft ³ 0.001 kg/m ³	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•	-					6.71%	1 cfm 1 m ³ /hr 1 m ³ /m 0.1m ³ /s 1 L/s	Refer to Ranges for Sensors Employed	Air Flow User Input (Duct Shape & Size)	Volume of air flowing through an opening. Automatically calculated from Air Velocity measure and user-specified duct shape (circle or rectangle) and dimensions (units, in ft, cm or m). Maximum duct dimension input: 258.0 in 21.5 ft 655.3 cm 6.35 m.
Altitude			•		•	•	•	•	•	•	•	•	•	typical: 23.6 ft 7.2 m max: 48.2 ft 14.7 m	1 ft 1 m	typical: 750 to 1100 mBar max: 300 to 750 mBar	Pressure User Input (Reference Pressure)	Height above Mean Sea Level ("MSL"). Temperature compensated pressure (barometric) altimeter requires accurate reference barometric pressure to produce maximum absolute accuracy. Both accuracy specs corresponds to a reference pressure anywhere from 850 to mBar.
Barometric Pressure			•		•	•	•	•	•	•	•	•	•	0.07 inHg 2.4 hPa mbar 0.03 PSI	0.01 inHg 0.1 hPa mbar 0.01 PSI	Refer to Ranges for Sensors Employed	Pressure User Input (Reference Altitude)	Air pressure that would be present in identical conditions at MSL. Station pressure compensation local elevation provided by reference abitude. Requires accurate reference abitude to pro maximum absolute accuracy.
Crosswind & Headwind/Tailwind											rin		•	7.1%	1 mph 1 ft/min 0.1 km/h 0.1 m/s 0.1 knots	Refer to Ranges for Sensors Employed	Wind Speed Compass	Effective wind relative to a target or travel direction. Auto-switching headwindtailwind indicate
Delta T	18		an		an	•							ins	3.2 *F 1.8 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Difference between dry bulb temperature and wet bulb temperature. When spraying, indicate evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 $^{\circ}$ / 2 to 9 $^{\circ}$
Density Altitude							•	•	•	•	•	•	•	226 ft 69 m	1 ft 1 m	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Local air density converted to equivalent elevation above sea level in a uniform layer consisti the International Standard Atmosphere.
Dewpoint				•	•	•	•	•	•		•	•	•	3.4 *F 1.9 *C	0.1 *F 0.1 *C	15 to 95 % RH Refer to Range for Temperature Sensor	Temperature Relative Humidity	Temperature that a volume of air must be cooled to at constant pressure for the water vapor present to condense into dew and form on a solid surface. Can also be considered to be the water-to-air saturation temperature.
Evaporation Rate										•				0.01 lb/ft ² /hr 0.06 kg/m2/hr	0.01 b/ft²/hr 0.01 kg/m²/hr	Refer to Ranges for Sensors Employed	Wind Speed Temperature Relative Humidity Pressure User Input (Concrete Temperature)	The rate at which moleture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or probe thermometer ("F or "C, not included). Readings should be taken 20 inches above pour surfac with the thermiser braked, and averaged for 5-10 seconds using built-in waveraging function.
Heat Index		121	•	1.	•	1231	•	•	•	•	•	•	•	7.1 *F 4.0 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity	Perceived temperature resulting from the combined effect of temperature and relative humidit Calculated based on NVNS Heat Index (HI) tables. Measurement range limited by extent of published tables.
Moisture Content Humidity Ratio ("Grains")								•	•					.3 gpp .04 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density									•					0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
Thermal Work Limit (TWL)														10.9 W/m ²	0.1 W/m ²	Refer to Ranges for Sensors Employed	Wind Speed Temperature Giobe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (Wim2) for the conditions and clothing factors. Based off of estimated metabolic output of typical human. On screen zone warnings.
Outdoor Wet Bulb Globe Temperature (WBGT)											•			1.3 °F 0.7 °C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Measure of human heat stress defined as the combination of effects due to radiation, convec and conduction. Outdoor WBGT is calculated from a weighted sum of natural wet bub (Triwb) globe temperature (Tg), and dry bub temperature (Td). User settable on-screen warning zone
Wet Bulb Temperature - aturally Aspirated (Tnwb)					23	112	18	3. "F) 11		•	101		1.4 *F 0.8 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Similar to psychrometric web-bub temperature (see below). However, Trub only undergoes for convection from the ambient air velocity. Trub is a measure of the evaporative cooling that th will allow. This is accounted for by combining the effects of, mainly, relative humidity and windspeed.
Wet Bulb Temperature - Psychrometric					•	•	•		•	•	•	•	•	3.2 °F 1.8 °C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Temperature indicated by a sling psychrometer. Due to nature of the psychrometric ratio for water-air system, this approximates the thermodynamic wei-bub temperature. The thermodyn wei-bub temperature is the temperature a parcel of air would have if cooled adiabatically to saturation temperature via water evaporating into it.
Wind Chill		•			•		•	•		•	•	•	•	1.6 *F 0.9 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Wind Speed Temperature	Perceived temperature resulting from combined effect of wind speed and temperature. Calcul based on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adju by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. Measurement range limited by extern of published tables.
																CIFICATIONS		
Display & Backlight		•	•								AND CONTRACTOR	CONT.		Reflective 5 digit LCD. D	Digit height 0.36 in / 9 r	nm. Choice of aviation green of	iuminescent backlight. Manual activation or visible red (NV models only) electrol	uminescent backlight. Manual activation with auto-off.
Response Time & Display Update	•	•	•	•	•	•	•	•	•	•	•	•		All measurements except equilibrate to a large cha	ot those based on relations in the measurements of		ly within 1 second. Relative humidity a tes every 1 second.	viectroluminescent backlight. Automatic or manual activation. nd all measurements which include RH in their calculation may require as long as 1 minute to ful
Max/Avg Wind			-				•	•	•	•	•	•	•					with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBGT
Data Storage & Graphical Display, Min/Max/Avg History										• 3600 points			• 2500	Minimum, maximum, ave				ta logger with graphical display. Mariual and auto data storage. Min/Max/Avg history may be res y off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity shown.
ata Upload & Bluetooth® Data Connect Option								•	•	•	•	•		Bluetooth Data Trans pairing and transmitting.	fer Option: Adjustabl Employs Bluetooth Se	32) or Bluetooth data transfer e power consumption and radi rial Port Protocol for data tran 32) or Bluetooth data transfer	io range from up to 30 ft 9 meters. In smission.	sividual unit ID and 4-digit PIN code preprogrammed for easy identification and data security whe
Clock / Calendar					•		•	•			•	•		Requires optional PC int	erface (USB or RS-23	 or Bluetooth data transfer or Bluetooth data transfer or Bluetooth data transfer 	option and provided software.	Western refer to the transfer of
Auto Shutdown Languages							•	•	*	*	•	•		Requires optional PC int English, French, German	erface (USB or RS-23 n, Italian, Spanish.	32) or Bluetooth data transfer	option and provided software.	
Certifications Origin	•	*	*	*	*	•	*	•	•		•	•		CE certified, RoHS and Designed and manufact	WEEE compliant. Inde ured in the USA from U	JS and imported components.		ts available at additional charge). t and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Battery Life	•	•	•	•	•	•	•				•	•		Standard Models: AA	A Alkaline, two, include	d. Average life, 400 hours of u	klight use in 2000 to 3500 models. use, reduced by backlight or Bluetooth	radio transmission use.
Shock Resistance Sealing	•	•	•	•	•	•	•	•	•	•	•	•		Waterproof (IP67 and N	EMA-6).		t may damage replaceable impeller.	nge of the display and batteries by maintaining the unit within the operational range and exposin
Operational Temperature Limits Storage Temperature	*	•	•	•	*	*	*	*	*	•	•	*		14" F to 131" F -10 "C to the more extreme env -22.0 "F to 140.0 "F -3	ironment for the minim	nts may be taken beyond the li num time necessary to take rea	ading.	nge or one weavery and batteries by maintaining, the unit within the operational range and exposin
atorage remperature		•	•				-		-		-	-		4.8 x 1.9 x 1.1 in / 12.2 >	4.8 x 2.8 cm, 3.6 oz /	102 g (including slip-on cover)).	
Size & Weight														5.0 x 1.8 x 1.1 in / 12.7 x	45x28 m 20	102 g		

Please note, these specifications are valid for all Kestrel 4400 products and all other Kestrel 4000 series with a serial number higher than 659340. If your product has a lower serial number, please reference the previous version of the specifications.



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No.: C175265 證書編號

	ITEM TESTED / 送檢項目 Description / 儀器名稱 : Manufacturer / 製造商 : Model No. / 型號 : Serial No. / 編號 : Supplied By / 委託者 :	(Job No. / 序引編號: IC17-2132) Acoustic Calibrator Pulsar 105 63705 Acumen Environmental Engineering an Lot 11, Tam Kon Shan Road, North Tsi	
	TEST CONDITIONS / 測社	-Mz //-	
	TEST CONDITIONS / 測記 Temperature / 溫度 : (23 Line Voltage / 電壓 :	$(1 \pm 2)^{\circ}C$	Relative Humidity / 相對濕度 : (55 ± 20)%
-	TEST SPECIFICATIONS /	測試規範	
	Calibration check		о
	DATE OF TEST / 測試日期	: 17 September 2017	
-	TEST RESULTS / 測試結界	1	2
	The results apply to the partic		
	The results do not exceed ma The results are detailed in the	nufacturer's specification.	
	11 101 102 102 102 102 102 102 102 102 1		

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany

•

- Fluke Everett Service Center, USA

Tested By 測試

H T Wong

Technical Officer

Certified By t 核證 K C Lee Engineer

Date of Issue 簽發日期 •

21 September 2017

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 輝創工程行限公司 – 按正及檢測實驗所 c/o 香港新界屯門興安里一號青山灣機樓四樓 Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C175265 證書編號

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

Equipment ID	Description	Certificate No.
TST150A	Measuring Amplifier	C161175
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023

- 4. Test procedure : MA100N.
- 5. Results :
- 5.1 Sound Level Accuracy

UUT	Measured Value	IEC60942:2003	Uncertainty of Measured Value
Nominal Value	(dB)	Class 1 Spec.	(dB)
94 dB, 1 kHz	93.7	± 0.4 dB	± 0.2

Mfr's Spec. : IEC60942:2003 Class 1

5.2 Frequency Accuracy

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

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

Note :

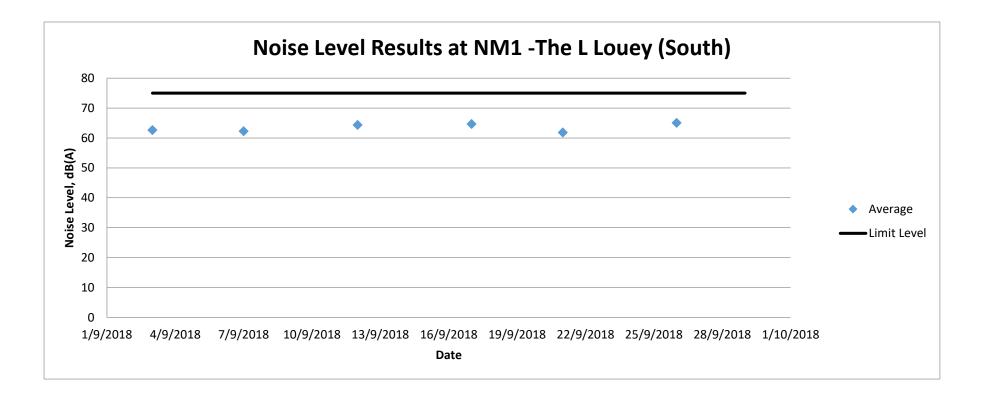
Only the original copy or the laboratory's certified true copy is valid.

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

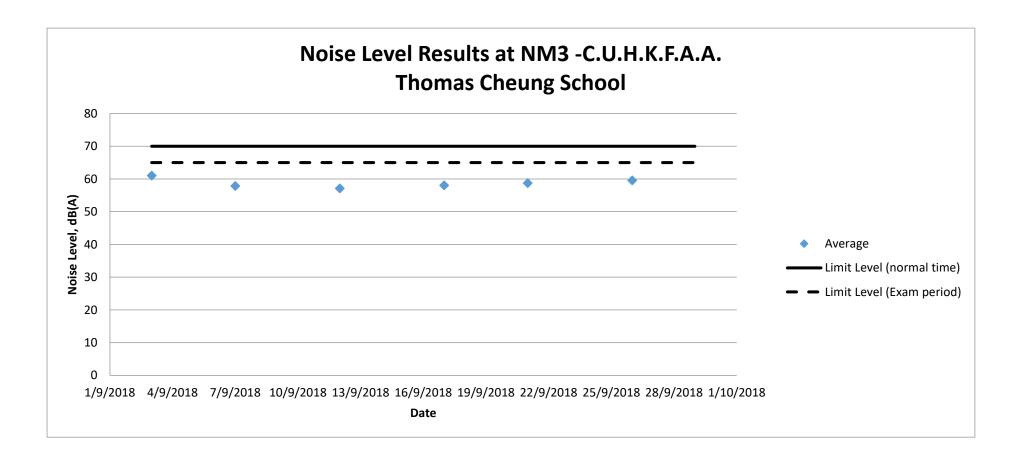
本證書所載按正用之測試器材均可溯源至國際標準。局部被印本證書需先獲本實驗所書面批准。

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

Appendix N Impact Noise Monitoring Results and Graphical Presentation

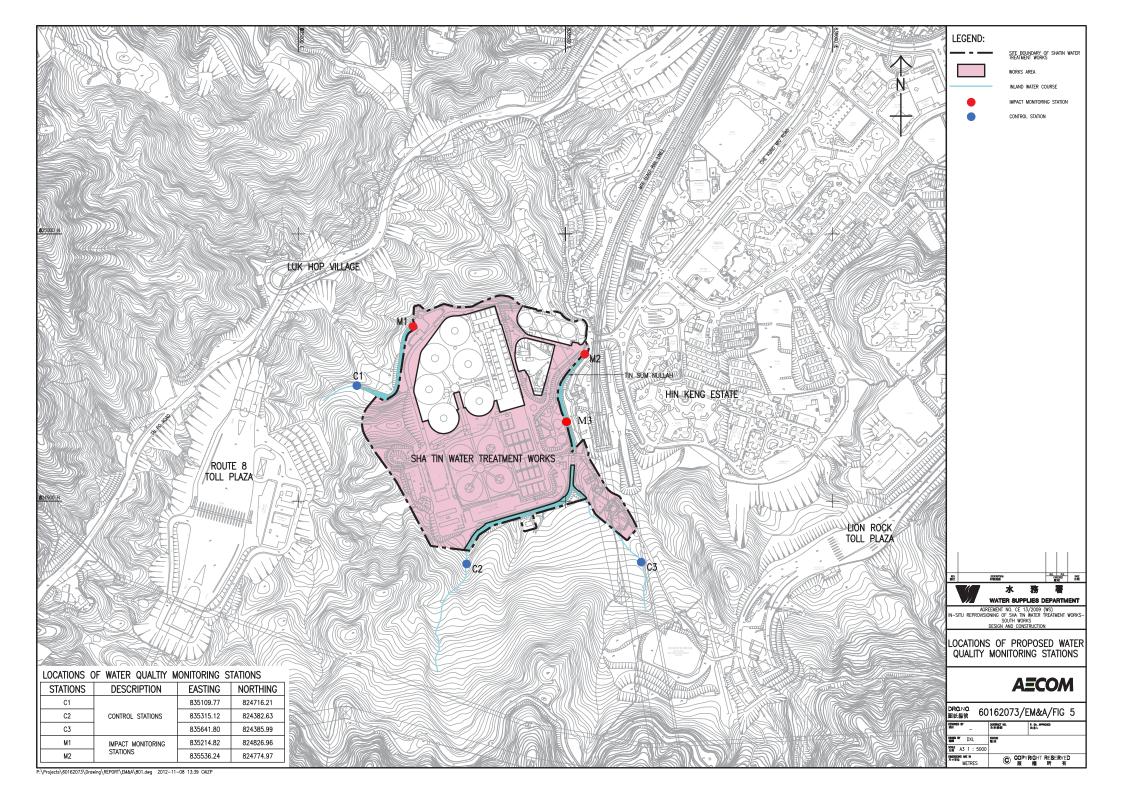






Appendix O Location Plan of Water Quality Monitoring Station

Project no.: CJO-3113



Appendix P Calibration Certificate (Water Quality)

Project no.: CJO-3113



ALS Technichem (HK) Pty Ltd 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street, Kwai Chung N.T., Hong Kong T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR NELSON TSUI	WORK ORDER:	HK1835956
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD		
ADDRESS:	LOT 11, TAM KON SHAN ROAD, TSING YI (NORTH), N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 26-Jun-2018 13-Aug-2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen, pH Value, Turbitidy, Salinity, Redox Potential and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	HORIBA Water Quality Monitor
Model No.:	U-5000
Serial No.:	BGYP9CKD
Equipment No.:	
Date of Calibration:	04 July, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu Assistant Manager - Inorganic

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a:	
	(ALS)

WORK ORDER: HK1835956

SUB-BATCH:	0
DATE OF ISSUE:	13-Aug-2018
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type:	Multifunctional Meter		
Brand Name:	HORIBA Water Quality Monitor		
Model No.:	U-5000		
Serial No.:	BGYP9CKD		
Equipment No.:	2 		
Date of Calibration:	25 July, 2018	Date of Next Calibration:	04 October, 2018

PARAMETERS: Dissolved Oxvge

Dissolved Oxygen Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.90	3.09	+0.19
5.35	5.51	+0.16
7.56	7.62	+0.06
	Tolerance Limit (mg/L)	±0.20

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Ms. Lin Wai Yu Assistant Manager - Inorganic

ALS

WORK ORDER: HK1835956

SUB-BATCH:	0
DATE OF ISSUE:	13-Aug-2018
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type:	Multifunctional Meter	
Brand Name:	HORIBA Water Quality Monitor	
Model No.:	U-5000	
Serial No.:	BGYP9CKD	
Equipment No.:		
Date of Calibration:	04 July, 2018	Date of Next Calibration:

04 October, 2018

PARAMETERS:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.95	-0.05
7.0	6.84	-0.16
10.0	10.08	+0.08
	Tolerance Limit (pH unit)	±0.20

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Expected Reading (NTU) Displayed Reading (NTU) Tolerance (%)	
0	0.78	
4	4.06	+1.5
40	36.1	-9.8
80	78.9	-1.4
400	409	+2.3
800	809	+1.1
	Tolerance Limit (%)	±10.0

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Ms. Lin Wai Yu Assistant Manager - Inorganic

WORK ORDER: HK1835956

SUB-BATCH:	0
DATE OF ISSUE:	13-Aug-2018
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Brand Name:	Multifunctional Meter HORIBA Water Quality Monitor		
Model No.:	U-5000		
Serial No.:	BGYP9CKD		
Equipment No.:	7.7		
Date of Calibration:	04 July, 2018	Date of Next Calibration:	04 October, 2018

PARAMETERS: Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Expected Reading (ppt) Displayed Reading (ppt) Tolerance (%)	
0	0.00	
10	9.90	-1.0
20	19.50	-2.5
30	28.30	-5.7
	Tolerance Limit (%)	±10.0

Redox Potential

Method Ref: APHA (21st edition), 2580B

Method Ref: Orion Research Instruction Manual and the Laboratory Manual

the Environmental of Water, Wastewater and Soil (2nd edition), Rump & Krist (1992)

Expected Reading (mV)	Displayed Reading (mV)	Difference of A and B (mV)
Solution A (~234mV)	188	
Solution B (~300mV)	272	+84
	Tolerance Limit (mV)	>66

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	11.27	+0.8
21.0	21.64	+0.6
40.0	39.43	-0.6
	Tolerance Limit (°C)	±2.0

Ms. Lin Wai Yu Assistant Manager - Inorganic

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	(ALS)

WORK ORDER: HK1835956

SUB-BATCH:	0
DATE OF ISSUE:	13-Aug-2018
CLIENT:	ACUMEN ENVIRONMENTAL ENG & TECH CO LTD
Equipment Type:	Multifunctional Meter

Equipment Type:Multifunctional MeterBrand Name:HORIBA Water Quality MonitorModel No.:U-5000Serial No.:BGYP9CKDEquipment No.:--Date of Calibration:04 July, 2018

PARAMETERS: Dissolved Oxygen

gen Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (%)
3.30	no readable reading	N/A
5.49	no readable reading	N/A
7.80	no readable reading	N/A
	Tolerance Limit (mg/L)	±0.20

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Ms. Lin Wai Yu Assistant Manager - Inorganic

Appendix Q The Certification of Laboratory with HOKLAS accredited Analytical Tests



Hong Kong Accreditation Service 香港認可處

Certificate of Accreditation 認可證書

This is to certify that 特此證明

ACUMEN LABORATORY AND TESTING LIMITED 浩科檢測中心有限公司

Lot 12, Tam Kon Shan Road, North Tsing Yi, New Territories, Hong Kong 香港新界青衣北担杆山路12路段

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a 在認可諮詢委員會的建議下獲香港認可處執行機關接受為

HOKLAS Accredited Laboratory 「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO/IEC 17025:2005 and it has been accredited for performing specific tests or calibrations as listed in the scope of accreditation within the test category of

Environmental Testing

此實驗所符合ISO/IEC 17025:2005所訂的要求 並獲認可進行載於認可範圍內下述測試類別中的指定測試或校正工作

環境測試

This accreditation to ISO/IEC 17025:2005 demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué). 此页 ISO/IEC 17025:2005 的認可資格證明此實驗所認可合作組織及國際標準化組織的聯合公報)。 實施一套實驗所質量管理體系(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive 現經香港認可處執行機關授權在此蓋上香港認可處的印章

CAON

WONG Wang-wan, Executive Administrator 執行幹事 黄宏華 Issue Date:16 July 2014 簽發日期:二零一四年七月十六日

Registration Number : HOKLAS 241 註冊號碼:

This certificate is issued subject to the terms and conditions laid down by HKAS 本證書按照香港認可處訂立的條款及條件發出



Date of First Registration : 16 July 2014 首次註冊日期:二零一四年七月十六日

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Appendix R Impact Water Quality Monitoring Results

Date	Time	Weather	Location	Co-or	dinates	Water Depth	Sample Depth	Те	mp.	DO	con.	DO Sa	turation	Tu	rbidity		p	θΗ	SS
				East	North	m	m	c	C	m	g/L		%	N	JTU		u	nit	mg/L
	11:06	Fine	C1	835110	824716	0.04	0.02	29.6	29.6	8.25	8.24	87.1	87.1	2.4	4	2.5	7.35	7.34	2.0
	11:27	Fine	C2	835403	824470	0.02	0.01	29.5	29.5	8.61	8.6	90.9	90.8	2.	5	2.6	7.62	7.63	2.2
2/0/2010	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A
3/9/2018	10:31	Cloudy	M1	835215	824827	0.8	0.4	29.8	29.8	9.18	9.18	96.7	96.7	1	2	1.9	7.81	7.83	1.8
	9:43	Fine	M2	835536	824775	0.05	0.025	29.7	29.6	9.17	9.18	96.7	96.7	1.8	8	1.8	7.69	7.71	2.5
	9:58	Cloudy	M3	835501	824648	0.02	0.01	29.8	29.7	9.26	9.25	97.5	97.5	0.5	5	0.5	7.55	7.56	<1
	10:34	Fine	C1	835110	824716	0.04	0.02	29.7	29.7	8.66	8.67	91.4	91.5	2.0	5	2.6	7.57	7.57	2.7
		Fine	C2	835403	824470	0.02	0.01	29.9		8.83	8.83	93.2	93.1	2.0		2.6	7.88	7.9	2.8
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A
5/9/2018	9:54	Cloudy	M1	835215	824827	0.8	0.4	29.3	29.3	9.08	9.08	95.7	95.7	2.3	3	2.2	7.85	7.84	2.0
	9:11	Fine	M2	835536	824775	0.05	0.025	29.6			9.31	98.1	98	1.9		1.8	7.66		3.2
	9:23	Cloudy	M3	835501	824648	0.02	0.01	29.2			9.17	96.7	96.7	0.1		0.8	7.64	7.63	<1
	11:52	Fine	C1	835110	824716	0.04	0.02	29.9	29.9	8.5	8.51	89.7	89.8	2.4	1	2.4	7.72	7.74	2.3
	12:15	Fine	C2	835403	824470	0.02	0.02	30.1	30.1	8.43	8.43	88.9	88.9	2.4	-	2.3	7.59		2.7
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.0	N/A	N/A	N/A
7/9/2018	11:20	Cloudy	M1	835215	824827	0.8	0.4	29.7	29.7		9.15	96.5	96.4		2	2.1	7.82		1.5
	10:33	Fine	M2	835536	824775	0.05	0.025	30.2		9.12	9.13	96.1	96.2	1.0		1.6	7.85	7.87	2.5
	10:50	Cloudy	M3	835501	824648	0.02	0.01	29.8			9.18	96.7	96.7	0.0	-	0.6	7.78		<1
	10.50	010000			02.0.0	0.01	0.02	2,10		,	,	,	,		~	0.0			
	12:10	Fine	C1	835110	824716	0.04	0.02	29.6	29.6	8.73	8.74	92.2	92.2	2.	5	2.4	7.36	7.38	2.8
	12:27		C2	835403	824470	0.02	0.01	29.8			8.68	91.6	91.6	2.0		2.5	7.89	7.91	2.5
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A
10/9/2018	11:36	Cloudy	M1	835215	824827	0.8	0.4	29.6	29.5	8.98	8.97	94.7	94.6	2.2	2	2.3	7.8	7.82	1.9
	10:50	Fine	M2	835536	824775	0.05	0.025	30	30	8.97	8.98	94.6	94.6	1.	-	1.7	7.7	7.7	2.4
	11:02	Cloudy	M3	835501	824648	0.02	0.01	29.8	29.8	9.29	9.28	97.9	97.8	0.2	7	0.8	7.52	7.51	<1
	11:21	Fine	C1	835110	824716	0.04	0.02	26.8	26.8	8.81	8.82	93.4	93.5	2.4	4	2.3	7.42	7.42	2.1
	11:45	Fine	C2	835403	824470	0.02	0.02	20.0			8.67	92	91.9	2.	-	2.7	7.38	7.37	2.7
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	, N/A		N/A	N/A	N/A
12/9/2018	10:46	Cloudy	M1	835215	824827	0.8	0.4	26.4			9.12	96.7	96.7	2.	-	2.1	7.66		1.7
	9:56	Fine	M2	835536	824775	0.05	0.025	26.9			8.99	95.2	95.3	1.	-	1.5	7.68	7.68	2.9
	10:13	Cloudy	M3	835501	824648	0.02	0.01	27			9.43	99.8	99.8	0.3		0.4	7.68	7.67	<1
	10.59	Fine	C1	835110	824716	0.04	0.02	28.3	28.3	8.65	8.66	91.5	91.6	2.4	4	2.3	7.56	7.56	2.5
	11:16	Fine	C2	835403	824470	0.02	0.02	28.7			8.47	89.6	89.5	2.		2.8	7.24		2.2
	N/A	N/A	C3	835642	824386	0.02 N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	, N/A	2.0	N/A	N/A	N/A
14/9/2018	10:28	Cloudy	M1	835215	824827	0.8	0.4	28.8	28.8	9.27	9.26	97.8	97.7	2.2	-	2.3	7.82	7.84	1.6
	9.34	Fine	M2	835536	824775	0.05	0.025	28.4	28.4	9.07	9.08	95.8	95.9	1.	-	1.7	7.8		2.4
	9.34	Cloudy	M3	835501	824648	0.02	0.025	28.7			9.39	99	99.1	0.3		0.3	7.6		<1
	7.47	cioudy	111.5	555501	521010	0.02	0.01	20.7	20.0	1.57	7.37	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	/).1	0	-	0.5	7.0	7.01	\$1

F	10:47	Fine	C1	835110	824716	0.04	0.02	28.1	28.1	8.27	8.28	87.6	87.7	2.4	1 2	.3 7.5	8 7.58	2.8
		Fine	C2	835403	824470	0.02	0.02	20.1	27.7	8.34	8.35	88.4	88.5	2.8	_			2.4
15000000	N/A	N/A	C3	835642	824386	N/A	N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
17/9/2018	10:14	Cloudy	M1	835215	824827	0.8	0.4	27.6	27.6	9.21	9.21	97.4	97.4	2.2	2 2	.3 7.8	2 7.81	2.3
Г	9:20	Fine	M2	835536	824775	0.05	0.025	28	27.9	9.24	9.24	97.6	97.6	1.1	7 1	.7 7.7	1 7.7	2.7
	9:37	Cloudy	M3	835501	824648	0.02	0.01	27.8	27.8	9.26	9.26	97.8	97.9	0.4	4 0	.4 7.6	1 7.62	<1
																_	_	_
L	12:42	Fine	C1	835110	824716	0.04	0.02	27			8.52	90.5	90.5	2.4				2.2
Ļ	13:07	Fine	C2	835403	824470	0.02	0.01	27.2		8.36		88.7	88.6	2.	_			3.0
19/9/2018	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12:01	Cloudy	M1	835215	824827	0.8	0.4	27		9.01	9.01	95.5	95.4	2.3	-			2.1
Ļ	11:16	Fine	M2	835536	824775	0.05	0.025	26.9		9.26	9.26	98	98	1.4		.4 7.		2.6
	11:28	Cloudy	M3	835501	824648	0.02	0.01	26.8	26.8	9.22	9.23	97.6	97.7	0.7	7 0	.7 7.6	5 7.64	<1
	11.44	Fine	C1	835110	824716	0.04	0.02	27.1	27.1	8.44	8.43	00 F	00 5	2.0	5 2	.7 7.6	7 7.67	2.4
ŀ		Fine	C1 C2	835403	824716	0.04	0.02	27.1				89.5 87.8	89.5 87.8	2.0				2.4
Ţ	12.00	N/A	C2 C3	835642	824386	0.02 N/A	0.01 N/A	27.5 N/A	27.3 N/A	0.20 N/A	0.20 N/A	07.0 N/A	07.0 N/A	N/A	N/A	.3 7.8 N/A	N/A	2.0 N/A
21/9/2018	N/A 11:07	Cloudy	M1	835215	824380	0.8	0.4	27.3		9.15	9.15	96.8	96.9	1.9	-	2 7.7		2.1
ŀ	10:12	Fine	M1 M2	835536	824775	0.05	0.025	27.5		9.13	9.13	90.8	90.9	1.0	-	.7 7.7		3.3
F	10:12	Cloudy	M3	835501	824648	0.02	0.025	27.6		9.2		100.3	100.4	0.4				<1
أسعدهم	10.29	Cloudy	1015	055501	021010	0.02	0.01	21.0	21.1	7.5	7.5	100.5	100.1	0.	0	/.	1.17	
·	11:49	Fine	C1	835110	824716	0.04	0.02	28.3	28.2	8.54	8.54	90.3	90.4	2.	5 2	.4 7.5	3 7.53	2.4
- F		Fine	C2	835403	824470	0.02	0.01	27.9				90		2.0				1.9
]	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24/9/2018	11:18	Cloudy	M1	835215	824827	0.8	0.4	28.3	28.2	9.27	9.27	97.9	97.9	2.3	3 2	.3 7.	6 7.6	1.6
[10:36	Fine	M2	835536	824775	0.05	0.025	28	27.9	9.05	9.06	95.7	95.8	1.4	1 1	.5 7.8	2 7.82	2.6
	10:49	Cloudy	M3	835501	824648	0.02	0.01	28.3	28.4	9.57	9.58	101	101	0.	5 0	.4 7.6	1 7.62	<1
ļ																_	-	
Ļ	12:12		C1	835110	824716	0.04	0.02	28.9			8.65	91.4	91.4	2.2				2.3
	12:36	Fine	C2	835403	824470	0.02	0.01	28.7	28.6			91.2	91.2	2.	_			2.6
26/9/2018	N/A	N/A	C3	835642	824386	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
-	11:41	Cloudy	M1	835215	824827	0.8	0.4	28.8	28.8	9.02	9.01	95.2	95.1	2.				2.1
ŀ	2010 -	Fine	M2	835536	824775	0.05	0.025	28.9	28.9	9.32	9.32	98.3	98.3	1.7				3.4
ليسي	11:05	Cloudy	M3	835501	824648	0.02	0.01	28.8	28.8	9.28	9.28	97.9	97.9	0.	5 0	.6 7.5	2 7.54	<1
ر المحمد العربي الع العربي العربي	11:09	Fine	C1	835110	824716	0.04	0.02	26.5	26.6	8.66	8.67	91.9	92	2.0	5 2	.7 7.3	1 7.3	2.3
		Fine	C1 C2	835403	824710	0.04	0.02	26.6			8.81	91.9	93.5	2.0				2.5
ŀ				835642	824386	0.02 N/A	0.01 N/A	20.0 N/A		0.01 N/A	0.01 N/A	95.4 N/A	95.5 N/A	N/A	N/A	.0 7.0 N/A	/ 7.07 N/A	2.4 N/A
-	N/Δ	N/A						1 1/1 1		1 1/1 1	1 1/1 1	1 1/ / 1	1 1/1 1	1 1/1 1	1 1/ 1 1	1 1/ / 1	1 1/1 1	1 1/1 1
28/92018	N/A	N/A Cloudy	C3 M1					26.7		918	917	973	97.2	21	2 2	2 78	7 7 88	1.6
28/92018	N/A 10:30 9:36	N/A Cloudy Fine	M1 M2	835215 835536	824827 824775	0.8	0.4	26.7 26.5	26.6 26.6	9.18 9.29	9.17 9.29	97.3 98.4	97.2 98.4	2.2		.2 7.8 .9 7.7		1.6 2.3

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Test Report

Page 1 of 2

Report Number	: Q180003aR180687
Job Number	: R180687
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-411
Sample Description	: SS test
Laboratory ID	: R180687/1-5
Date of Sampling	: 03/09/2018
Date Received	: 03/09/2018
Test Period	: 03/09/2018– 04/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager Chemical Division

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Test Report

Page 2 of 2

Report Number	: Q180003aR180687

Job Number : R180687

: 05/10/2018 **Issue Date**

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180687/1	03/09/2018	C1	2.0
R180687/2	03/09/2018	C2	2.2
R180687/3	03/09/2018	M1	1.8
R180687/4	03/09/2018	M2	2.5
R180687/5	03/09/2018	МЗ	<1

1. mg/L indicates milligram per liter Note:

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180688
Job Number	: R180688
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-412
Sample Description	: SS test
Laboratory ID	: R180688/1-5
Date of Sampling	: 05/09/2018
Date Received	: 05/09/2018
Test Period	: 05/09/2018– 06/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Acumen Laboratory and Testing Limited

Test Report

Page 2 of 2

Report Number	: Q180003aR180688	
Job Number	: R180688	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180688/1	05/09/2018	C1	2.7
R180688/2	05/09/2018	C2	2.8
R180688/3	05/09/2018	M1	2.0
R180688/4	05/09/2018	M2	3.2
R180688/5	05/09/2018	МЗ	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

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Test Report

Page 1 of 2

Report Number	: Q180003aR180689
Job Number	: R180689
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-413
Sample Description	: SS test
Laboratory ID	: R180689/1-5
Date of Sampling	: 07/09/2018
Date Received	: 07/09/2018
Test Period	: 07/09/2018– 08/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	: Q180003aR180689	
Job Number	: R180689	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180689/1	07/09/2018	C1	2.3
R180689/2	07/09/2018	C2	2.7
R180689/3	07/09/2018	M1	1.5
R180689/4	07/09/2018	M2	2.5
R180689/5	07/09/2018	МЗ	<1

Note: 1. mg/L indicates milligram per liter

2. mg O2/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

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Test Report

Page 1 of 2

Report Number	: Q180003aR180690
Job Number	: R180690
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-414
Sample Description	: SS test
Laboratory ID	: R180690/1-5
Date of Sampling	: 10/09/2018
Date Received	: 10/09/2018
Test Period	: 10/09/2018– 11/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	: Q180003aR180690	
Job Number	: R180690	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180690/1	10/09/2018	C1	2.8
R180690/2	10/09/2018	C2	2.5
R180690/3	10/09/2018	M1	1.9
R180690/4	10/09/2018	M2	2.4
R180690/5	10/09/2018	М3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

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Test Report

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Report Number	: Q180003aR180691
Job Number	: R180691
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-415
Sample Description	: SS test
Laboratory ID	: R180691/1-5
Date of Sampling	: 12/09/2018
Date Received	: 12/09/2018
Test Period	: 12/09/2018– 13/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	: Q180003aR180691	
Job Number	: R180691	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180691/1	12/09/2018	C1	2.1
R180691/2	12/09/2018	C2	2.7
R180691/3	12/09/2018	M1	1.7
R180691/4	12/09/2018	M2	2.9
R180691/5	12/09/2018	M3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180692
Job Number	: R180692
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-416
Sample Description	: SS test
Laboratory ID	: R180692/1-5
Date of Sampling	: 14/09/2018
Date Received	: 14/09/2018
Test Period	: 14/09/2018– 15/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

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Report Number	: Q180003aR180692

Job Number : R180692

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180692/1	14/09/2018	C1	2.5
R180692/2	14/09/2018	C2	2.2
R180692/3	14/09/2018	M1	1.6
R180692/4	14/09/2018	M2	2.4
R180692/5	14/09/2018	М3	<1

Note:

1. mg/L indicates milligram per liter 2. mg O_2/L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180693
Job Number	: R180693
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-417
Sample Description	: SS test
Laboratory ID	: R180693/1-5
Date of Sampling	: 17/09/2018
Date Received	: 17/09/2018
Test Period	: 17/09/2018– 18/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

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Report Number	: Q180003aR180693	

Job Number : R180693

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180693/1	17/09/2018	C1	2.8
R180693/2	17/09/2018	C2	2.4
R180693/3	17/09/2018	M1	2.3
R180693/4	17/09/2018	M2	2.7
R180693/5	17/09/2018	М3	<1

1. mg/L indicates milligram per liter Note:

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180694
Job Number	: R180694
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-418
Sample Description	: SS test
Laboratory ID	: R180694/1-5
Date of Sampling	: 19/09/2018
Date Received	: 19/09/2018
Test Period	: 19/09/2018– 20/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

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Report Number	: Q180003aR180694

Job Number : R180694

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180694/1	19/09/2018	C1	2.2
R180694/2	19/09/2018	C2	3.0
R180694/3	19/09/2018	M1	2.1
R180694/4	19/09/2018	M2	2.6
R180694/5	19/09/2018	М3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180695
Job Number	: R180695
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-419
Sample Description	: SS test
Laboratory ID	: R180695/1-5
Date of Sampling	: 21/09/2018
Date Received	: 21/09/2018
Test Period	: 21/09/2018– 22/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

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Report Number	: Q180003aR180695	
Job Number	: R180695	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180695/1	21/09/2018	C1	2.4
R180695/2	21/09/2018	C2	2.6
R180695/3	21/09/2018	M1	2.1
R180695/4	21/09/2018	M2	3.3
R180695/5	21/09/2018	M3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

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Test Report

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Report Number	: Q180003aR180696
Job Number	: R180696 : 05/10/2018
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-420
Sample Description	: SS test
Laboratory ID	: R180696/1-5
Date of Sampling	: 24/09/2018
Date Received	: 24/09/2018
Test Period	: 24/09/2018– 25/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	:Q180003aR180696
Job Number	: R180696

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180696/1	24/09/2018	C1	2.4
R180696/2	24/09/2018	C2	1.9
R180696/3	24/09/2018	M1	1.6
R180696/4	24/09/2018	M2	2.6
R180696/5	24/09/2018	М3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

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Page 1 of 2

Report Number	: Q180003aR180697
Job Number	: R180697
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-421
Sample Description	: SS test
Laboratory ID	: R180697/1-5
Date of Sampling	: 26/09/2018
Date Received	: 26/09/2018
Test Period	: 26/09/2018– 27/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	: Q180003aR180697		
Job Number	: R180697		

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180697/1	26/09/2018	C1	2.3
R180697/2	26/09/2018	C2	2.6
R180697/3	26/09/2018	M1	2.1
R180697/4	26/09/2018	M2	3.4
R180697/5	26/09/2018	М3	<1

Note: 1. mg/L indicates milligram per liter

2. mg O2/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number	: Q180003aR180698
Job Number	: R180698
Issue Date	: 05/10/2018
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-422
Sample Description	: SS test
Laboratory ID	: R180698/1-5
Date of Sampling	: 28/09/2018
Date Received	: 28/09/2018
Test Period	: 28/09/2018– 29/09/2018
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager **Chemical Division**

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Test Report

Page 2 of 2

Report Number	: Q180003aR180698	
Job Number	: R180698	

Issue Date : 05/10/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180698/1	28/09/2018	C1	2.3
R180698/2	28/09/2018	C2	2.4
R180698/3	28/09/2018	M1	1.6
R180698/4	28/09/2018	M2	2.3
R180698/5	28/09/2018	МЗ	<1

Note: 1. mg/L indicates milligram per liter

2. mg O₂/ L indicates milligram oxygen per liter

3. < indicates less than.

4. > indicates more than.

5. NA indicates Not Applicable.

End of Report

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Appendix S

Impact Monitoring report for Ecology

Post-Transplantation Monitoring Report

for Agreement No. CE 13/2009 (WS) IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

Report No.49

September 2018

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1. INTRODUCTION

- 1.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works - South Works" ("The Project").
- 1.2 Upon the requirement of the Environmental Permit, a detailed vegetation report presenting the baseline vegetation condition for flora species with conservation interest, transplanting and monitoring programme for the Project has been prepared and approved by DEP in February 2016.
- 1.3 There were 4 flora species of conservation importance were recorded in the woodland habitat within project site including Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*). In total, 2 nos. of Incense Tree (*Aquilaria sinensis*), 1 no. of Ailanthus (*Ailanthus fordii*) trees, 5 colonies of Lamb of Tartary (*Cibotium barometz*) and 1 no. Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was recommended to be transplanted in the approved detailed vegetation survey report.
- 1.4 Detailed vegetation report was planned that Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees will be transplanted within existing Sha Tin Water Treatment Works (STWTW). All other shrubs including Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the hillside slope at Sha Tin South Fresh Water Service Reservoir (STSFWSR).
- 1.2 Upon the requirement of the Environmental Permit, a qualified Ecologist was commissioned to prepare a post-transplantation monitoring report to present the status (health condition and survival rate) of transplanted vegetation and submitted to the DEP.
- 1.3 Monitoring of transplanted flora was conducted after the transplantation. The monitoring will be conducted at twice per month during the first year and once per month during the course of planting works. The parameters to be monitoring will include the health condition and survival rate of the transplanted flora. Any observations and recommendations will be reported in monthly EM&A reports.
- 1.3 This is Tree Report presents data collected on 28 September 2018. It contains the following information:
 - Introduction (Section 1)
 - Description Of Tree Monitoring Area (Section 2)
 - Monitoring Methodology (Section 3)
 - Result (Section 4)
 - Summary

- Photos (Appendix I)
- Summary table (Appendix II)
- Typhoon information (Appendix III)

2. DESCRIPTION OF TREE MONITORING SITE

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees was transplanted within existing Sha Tin Water Treatment Works (STWTW) where is the extended compensatory plantation area. The area was flat and without covering with concrete.
- 2.2 Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the Sha Tin South Fresh Water Service Reservoir (STSFWSR) where is currently covered with concrete. Plough is required before planting on to this area.
- 2.3 The planting site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation. Transplanted Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was temporally stored at a nursery garden at Wang Toi Shan, Kam Tin. Once the planting site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) was prepared and temporally stored transplanted vegetation were in fair condition, all transplanted Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be planted at the planting site.

3. MONITORING METHODOLOGY

- 3.1 Site inspection will be carried out by walking through the transplanting area. Health condition and survival rate will be observed during inspection.
- 3.4 Health condition of all transplanted vegetation including trees/Shrubs surveyed was evaluated according to the following criteria:
 - Transplanted vegetation with good health are classified as **good**;
 - Transplanted vegetation with few or no visible defects or health problems are classified as being **fair**;
 - Transplanted vegetation was badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth are classified as **poor**.
- 3.5 Survival rate for each of transplanted vegetation species will be calculated based on site observation.

4. **RESULT**

- 4.1 Monitoring inspections were conducted on 28 September 2018. Three trees TA572, TA326 and TA327 were transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016.
- 4.2 The condition of TA572 was observed in poor condition due to the damage of two main trunks. TA327 was also in poor condition. The already dead tree TA326 collapsed due to big hit by the Signal No.10 typhoon Mangkhut on 16 September 2018. Tree guying cables have been installed to provide external support to the remaining two transplanted trees.
- 4.3 Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. On the other hand, young foliage was growing out to replace the old one.
- 4.4 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary was still temporally stored in a nursery garden at Wang Toi Shan, Kam Tin.
- 4.5 In general, all transplanted Lamb of Tartary (*Cibotium barometz*) were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. The survival rate for Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was 96%. The Summary table for health condition and survival rate was shown in Appendix II.
- 4.5.1 All transplanted Lamb of Tartary (*Cibotium barometz*) were under recovery stage. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage. Once their condition has recovered to acceptable level, they can be moved to the transplantation site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) when the site is ready.
- 4.6 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during non-raining day.

5. MITIGATION MEASURE

5.1 Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the loss of transplanted Hong Kong Eagle's Claw which is in climber growing form, it is recommended to plant an individual of native climber species at compensatory planting site (Sha Tin South Fresh Water Service Reservoir (STSFWSR)) together with compensatory tree planting. Recommended list of species are given in the Table 1 below. It is suggested that about 1 species of climber to be selected from the following list according to availability of the nursery source. The recommended plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

Native Tree Species			
Common Name	Latin Name	Chinese Name	Growing Form
Climbing Bauhinia	Bauhinia glauca	粉葉羊蹄甲	Climber
Spiny-fruited Vine	Byttneria aspera	刺果藤	Climber
Bentham,s Rose-wood	Dalbergia benthamii	兩廣黃檀	Climber
Desmos	Desmos chinensis	假鷹爪	Climber
Glaucescent Diploclisia	Diploclisia glaucescens	蒼白秤鈎風	Climber
Luofushan Joint-fir	Gnetum luofuense	羅浮買麻藤	Climber
Australian Cow-plant	Gymnema sylvestre	匙羹藤	Climber
Shining Hypserpa	Hypserpa nitida	夜花藤	Climber
Large-floweredHoneysuckle	Lonicera macrantha	大花忍冬	Climber
Splash-of-white	Mussaenda pubescen	玉葉金花	Climber
Rusty-haired Raspberry	Rubus reflexus	鏽毛莓	Climber
Sandpaper Vine	Tetracera asiatica	錫葉藤	Climber
Hong Kong Eagle's Claw	Artabotrys hongkongensis	鷹爪花	Climber

Table 1. Table for Recommended climber species list to be planted

- 5.2 For yellowish color for the leave of transplanted Lamb of Tartary (*Cibotium barometz*), it is recommended to provide shelter (such as 遮光網) for them to reduce the intensity of sunlight.
- 5.3 Incense Tree (*Aquilaria sinensis*) tagged as TA326 was observed dead during inspection on 10 August 2017. Its DBH was measured as 346cm. In according to the Tree Preservation, Development Bureau Technical Circular (Works) No. 7/2015, the compensatory planting will try to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH.
- 5.4 In total, 3 individual of native tree species with heavy standard size will be planted with 2.5-3 meters (center to center) spacing at compensatory planting site. Recommended list of species are given in the Table 2 below. It is suggested that at least 1 tree species to be selected from the following list according to availability of the nursery source. The recommended plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds. Dead Incense Tree (TA326) is recommended to be removed in order to prevent tree failure.

Native Tree Species			
Common Name	Latin Name	Chinese Name	Growing Form
Ivy Tree	Schefflera heptaphylla	鴨腳木	Tree
Levine's Syzygium	Syzygium levinei	山蒲桃	Tree
Chekiang Machilus	Machilus chekiangensis	浙江潤楠	Tree
Aporusa	Aporusa dioica	銀柴	Tree
Mountain Tallow Tree	Sapium discolor	山烏桕	Tree
Fragrant Litsea	Litsea cubeba	山蒼樹	Tree
Chinese Apea Ear-ring	Archidendron lucidum	亮葉猴耳環	Tree
Chinese Hackberry	Celtis sinensis	朴樹	Tree
Turn-in-the-wind	Mallotus paniculatus	白楸	Tree
Acronychia	Acronychia pedunculata	降真香	Tree

Table 2. Table for Recommended tree species list to be planted

6. SUMMARY

- 6.1 The condition of TA572 was observed in poor condition due to broken of main trunk. TA327 was also in poor condition; while already dead TA326 collapsed under Signal No. 10 typhoon Mangkhut. Tree guying cables have been installed to provide external support to the two remaining transplanted trees. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. Shelter (遮光網) was recommended to reduce the intensity of sunlight. Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out and were recovering from transplantation. Currently, Lamb of Tartary was temporally stored in a nursery garden at Wang Toi Shan, Kam Tin. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage.
- 6.2 In general, all transplanted Lamb of Tartary (*Cibotium barometz*) were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) and one Incense Tree (*Aquilaria sinensis*) TA326 were observed dead during inspection on 20 August 2016 and on 10 August 2017 respectively.
- 6.3 In order to compensate for the loss of transplanted Hong Kong Eagle's Claw and Incense Tree, it is recommended to plant an individual of native climber species and 3 heavy standard native tree species at compensatory planting site. The suggested species in planting list would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

6.4 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

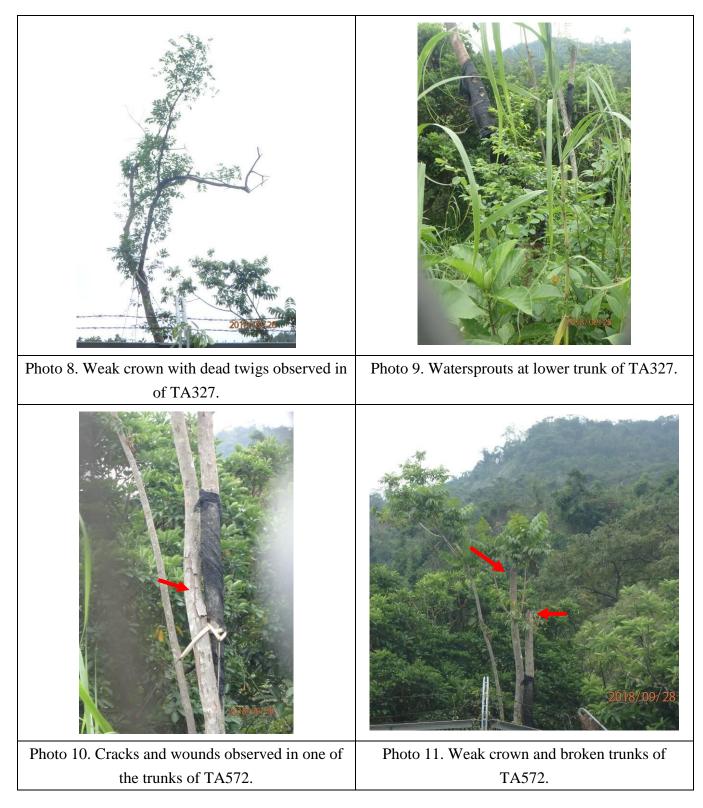
APPENDIX I Photo



IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS - SOUTH WORKS-Post-Transplantation Monitoring Report



Photo 7. Transplanted Incense Tree (*Aquilaria sinensis*) – the already dead TA326 collapsed (indicated by white arrow at top photo taken in last monitoring for comparison), TA327 (left); and Ailanthus (*Ailanthus fordii*) – TA572 (right)



APPENDIX II Table for condition of transplanted plant

No.	Species	Condition	Alive/Dead	Remark
1	Cibotium barometz	Fair	Alive	Under recovering
2	Cibotium barometz	Fair	Alive	Under recovering
3	Cibotium barometz	Fair	Alive	Under recovering
4	Cibotium barometz	Fair	Alive	Under recovering
5	Cibotium barometz	Fair	Alive	Under recovering
6	Cibotium barometz	Fair	Alive	Under recovering
7	Cibotium barometz	Fair	Alive	Under recovering
8	Cibotium barometz	Fair	Alive	Under recovering
9	Cibotium barometz	Fair	Alive	Under recovering
10	Cibotium barometz	Fair	Alive	Under recovering
11	Cibotium barometz	Fair	Alive	Under recovering
12	Cibotium barometz	Fair	Alive	Under recovering
13	Cibotium barometz	Fair	Alive	Under recovering
14	Cibotium barometz	Fair	Alive	Under recovering
15	Cibotium barometz	Fair	Alive	Under recovering
16	Cibotium barometz	Fair	Alive	Under recovering
17	Cibotium barometz	Fair	Alive	Under recovering
18	Cibotium barometz	Fair	Alive	Under recovering
19	Cibotium barometz	Fair	Alive	Under recovering
20	Cibotium barometz	Fair	Alive	Under recovering
21	Cibotium barometz	Fair	Alive	Under recovering
22	Cibotium barometz	Fair	Alive	Under recovering
23	Cibotium barometz	Fair	Alive	Under recovering
24	Cibotium barometz	Fair	Alive	Under recovering
25	Cibotium barometz	Fair	Alive	Under recovering
26	Cibotium barometz	Fair	Alive	Under recovering
27	Cibotium barometz	Fair	Alive	Under recovering
28	Artabotrys hongkongensis		Dead	
		Survival rate (%)	96%	

Shrubs of Lamb of Tartary and Hong Kong Eagle's Claw

No.	Species	Condition	Alive/Dead	Remark
TA572	Ailanthus fordii	Poor	Alive	Two main trunks were
				broken during typhoon
				on 23 August 2017.
				Cracks and wounds
				observed in one of the
				trunks. Weak canopy
				formed only by sprouts.
TA327	Aquilaria sinensis	Poor	Alive	Tree crown of TA327
				was thinner after
				transplantation. Water
				sprouts and cracks on
				tree bark observed.
TA326	Aquilaria sinensis	Dead	Dead	Collapsed due to the
				Signal No.10 typhoon
				Mangkhut
		Survival rate (%)	67%	

Trees of Ailanthus and Incense Tree

Appendix T Monthly Summary of Waste Flow Table

Water Supplies Department Monthly Summary Waste Flow Table for Contract with Environmental Management Plan under ETWB TCW No. 19/2005 and its Interim Guidance Note Reporting Year: <u>2018</u>

Contract No. 3/WSD/15

(To be submitted to C&D MM Coordinator of Respective Division/Region via Engineer's Representative before 15th of the following month)

	Act	tual Quantities of Inc	ert C&D Materials	Generated / Import	ed (in '000 m ³)		Actual Quantities of Other C&D Materials / Wastes Generated				
Month	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (bottles/containers, plastic sheets/ foams from package material)	Chemical Waste	Others (e.g. General Refuse etc.)
	[a+b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
January	0.403	0.000	0.000	0.000	0.403	0.000	0.000	0.000	0.000	0.000	0.019
February	0.517	0.000	0.000	0.000	0.517	0.000	7.040	0.000	0.000	0.000	0.008
March	0.174	0.000	0.000	0.000	0.174	0.000	7.460	0.000	0.000	0.000	0.016
April	0.210	0.032	0.000	0.000	0.178	0.000	7.010	0.000	0.000	0.000	0.032
May	0.272	0.000	0.000	0.000	0.272	0.000	17.750	0.000	0.000	0.000	0.020
June	0.674	0.092	0.000	0.000	0.582	0.000	9.060	0.000	0.000	0.000	0.032
Half-year total	2.250	0.124	0.000	0.000	2.126	0.000	48.320	0.000	0.000	0.000	0.127
July	0.417	0.017	0.000	0.000	0.400	0.000	10.340	0.000	0.000	0.000	0.036
August	0.125	0.019	0.000	0.000	0.105	0.000	3.683	0.033	0.002	0.000	0.050
September	0.220	0.000	0.000	0.000	0.220	0.000	0.000	0.000	0.000	0.000	0.062
October											
November											
December											
Yearly Total	3.012	0.160	0.000	0.000	2.851	0.000	62.343	0.033	0.002	0.000	0.275

Appendix U Implementation Schedule of Environmental Mitigation Measures (EMIS)

Environmental Mitigation and Enhancement Measure Implementation Schedule at Construction Stage

EIA Ref.	Recommended Mitigation Measures	Location of the Measures	Implementation Agent	n Relevant Legislation and Guidelines	Implementation Phase			Status
					D	с	0	
Air Quality								
4.7.1	Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.	All works areas	Contractor	Air Pollution Control		\checkmark		Y
4.7.1	Side enclosure and covering of any aggregate or stockpiling of dusty material to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines.	All works areas	Contractor	Ordinance and Air Pollution Control (Construction		\checkmark		Y
4.7.1	Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.	All works areas	Contractor	Dust) Regulation EM&A Manual		\checkmark		Y
4.7.1	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	All works areas	Contractor			\checkmark		Y
4.7.1	Imposition of speed controls for vehicles on site haul roads.	All works areas	Contractor			\checkmark		Y
4.7.1	Implement EM&A program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.	All works areas / Monitoring points	Contractor					Y
Noise					1		I	
5.6.4	Implement good site practices to reduce noise level	All works areas	Contractor	Noise Control Ordinance		\checkmark		Y
5.6.5	Adoption of Quiet PME	All works areas	Contractor			\checkmark		N/A
5.6.6	Use of Movable Noise Barrier	All works areas	Contractor	-		\checkmark		N/A
5.8	Noise monitoring	Monitoring points	Contractor			\checkmark		Y
Water Quality								
6.8.1	Surface run-off from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand	All works areas	Contractor	ProPECC PN 1/94 Construction		\checkmark		Y

	traps, silt traps and sedimentation basins. Channels or earth bunds or			Site Drainage		
	sand bag barriers should be provided on site to properly direct					
	stormwater to such silt removal facilities. Perimeter channels at site			TM-DSS		
	boundaries should be provided where necessary to intercept storm					
	run-off from outside the site so that it will not wash across the site.			Water Pollution		
	Catchpits and perimeter channels should be constructed in advance of			Control		
	site formation works and earthworks.			Ordinance		
6.8.2	Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding.	All works areas	Contractor		\checkmark	Y
6.8.3	Temporary exposed slope surfaces should be covered and temporary	All works area	Contractor	_		
0.8.5	access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to prevent storm run-off from washing across exposed soil surfaces.	All WORKS area	Contractor		\checkmark	Y
6.8.4	Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.	All works areas	Contractor		\checkmark	N/A
6.8.5	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All works areas	Contractor	-	\checkmark	Y
6.8.6	Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms.	All works areas	Contractor		\checkmark	Y
6.8.7	Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system.	All works areas	Contractor	-	\checkmark	Y
6.8.8	Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area.	All works areas	Contractor		\checkmark	Y
6.8.9	All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains.	All works areas	Contractor			Y
6.8.10	Before commencing any demolition works, all drainage connections should be sealed to prevent building debris, soil, sand etc. from entering	All works areas	Contractor		\checkmark	N/A

	drains.		
6.8.11	Wastewater generated from building construction activities including concreting, plastering, internal decoration, cleaning of works and similar activities should not be discharged into the stormwater drainage system. If the wastewater is to be tankered off site for disposal into foul sewers, it should undergo the removal of settleable solids in a silt removal facility, and pH adjustment as necessary.	All works areas	Contractor
6.8.12	Acidic wastewater generated from acid cleaning, etching, pickling and similar activities should be neutralized to within the pH range of 6 to 10. The neutralized wastewater should be tankered off site for disposal into foul sewers or treated to a standard acceptable to storm drains and the receiving waters.	All works areas	Contractor
6.8.13	All surface run-off must proper collected and discharge at designated location. The discharge quality must meet the requirements specified in the discharge license.	All works areas	Contractor
6.8.15	Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	All works areas	Contractor
6.8.16	Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges	All works areas	Contractor
6.8.17	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	All works areas	Contractor
6.8.18	Sewage generated from the workforce should be properly treated by interim treatment facilities, such as chemical toilets which are properly maintained with the employment of licensed collectors for the collection and disposal on a regular basis.	All works areas	Contractor
6.8.19	Adopt relevant measures stated in ETWB TC (Works) No. 5/2005 "Protection of Natural Streams/rivers from Adverse Impacts arising from Construction Works" to minimize the potential water quality impacts from the construction works near any water courses.	All works areas	Contractor
6.10	Water quality monitoring	Monitoring points	Contractor

7.6.1	Appropriate waste handling, transportation and disposal methods for all	All works areas	Contractor	Waste Disposal		
	waste arisings generated during the construction works for the Project			Ordinance	\checkmark	Y
	should be implemented to ensure that construction wastes do not enter					
	the nearby streams or drainage channel.			DEVB TCW No.		
7.6.2	Implementation of good site practices for waste management	All works areas	Contractor	6/2010,	\checkmark	Y
7.6.3	Implementation of trip ticket system to control waste disposal	All works areas	Contractor	ETWB TCW No. 19/2005	\checkmark	Y
7.6.4	Implementation of good site practices to reduce waste generations	All works areas	Contractor	Land	\checkmark	Y
7.6.5	Re-use of excavated C&D materials on site as far as practical. A suitable area should be designated within the site for temporary stockpiling of	All works areas	Contractor	(Miscellaneous Provisions)	\checkmark	Y
7.0	C&D material and to facilitate the sorting process.			Ordinance		
7.6.8	General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material.	All works areas	Contractor	Code of Practice on the Packaging, Labelling and	\checkmark	Y
7.6.9	All storage of asbestos waste should be carried out properly in a secure place isolated from other substances so as to prevent any possible release of asbestos fibres into the atmosphere and contamination of other substances. The storage area should bear warning panels to alert people of the presence of asbestos waste.	All works areas	Contractor	Storage of Chemical Wastes		N/A
7.6.10	A licensed asbestos waste collector will be appointed to collect the asbestos waste and deliver to the designated landfill for disposal. Application should be submitted to EPD.	All works areas	Contractor		\checkmark	N/A
7.6.11	If chemical wastes were to be produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer, and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport the chemical wastes. The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with	All works areas	Contractor		\checkmark	Y

	the Waste Disposal (Chemical Waste) (General) Regulation.					
Ecology		•	•		· · ·	
8.8.1	Ecological impacts on important habitats and the associated wildfile caused by the proposed development should be mitigated and compensation approaches to the maximum practical extent	All works areas in particular important	The Engineer/ Contractor	EIAO-TM EM&A Manual	\checkmark	Y
8.8.2	Reduce the amount of vegetation removal required and thereby minimize the footprint of the slope at the woodland habitat	habitats All works areas	The Engineer/ Contractor		\checkmark	Y
8.8.3	Conduct detailed vegetation survey and implement suggested measures for species of conservation importance.		The Engineer/ Contractor	-	\checkmark	Y
8.8.4	The affected Incense Tree and Ailanthus as mentioned in the detailed vegetation survey report within the works area will be transplanted		The Engineer/ Contractor	-	\checkmark	Y
8.8.5	To avoid impacts on Short-nosed Fruit Bat, the tree with records of an active roost and trees showing evidence of roosting activity should be retained where possible. Where Chinese Fan-palm (Livistona chinensis) removal is required, these should be checked by suitably qualified ecologist with over 7 years relevant experience for roosting bats prior to their removal. If roosting bats are observed, a strategy for passive removal will be agreed with the AFCD and implemented. This could include undertaking the works just after the bats have left the roost (i.e. dusk).		The Engineer/ Contractor		~	N/A
8.8.6	The inclusion of Chinese Fan-palm of similar size as the affected plant within the areas of compensatory planting or other suitable areas is recommended to replace affected specimens, and compensate for the impact to roosting opportunities for this bat species		The Engineer/ Contractor		\checkmark	N/A
8.8.7	Implement good site measures to minimize the disturbance impacts to terrestrial habitat and associated wildlife arising from the land-based construction activities.		The Engineer/ Contractor		√	Y
8.8.8	To minimize the contamination of wastewater discharge, accidental chemical spillage and construction site run-off to the receiving water bodies, mitigation measures such as diverting the site runoff to silt trap facilities before discharging into storm drain, proper waste and dumping management and standard good site practice for land-based construction.		The Engineer/ Contractor		~	Y
8.8.9-8.8.11	Implement woodland compensation		The Engineer/ Contractor		\checkmark	N/A

Landscape and	d Visual					
9.8.1	Existing tress to be retained on site shall be carefully protected during construction. Trees unavoidably affected by the works shall be transplanted as far as possible.	All works areas	Contractor	DEVB TCW No. 10/2013	\checkmark	Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor	EIAO TM	\checkmark	Y
	Control of night-time lighting glare.	All works areas	Contractor		\checkmark	Y
	Erection of decorative screen hoarding compatible with the surrounding setting.	All works areas	Contractor		\checkmark	Y
	Management of facilities on work sites which give control on the height and disposition/arrangement of all facilities on the works site to minimize visual impact to adjacent VSRs.	All works areas	Contractor		\checkmark	Y
Cultural Herita	age					
10.6.2	Vibration monitoring at Ex KCR Beacon Hill Tunnel during piling works of Administration Building	Work site	The Engineer /Contractor		\checkmark	N/A
Land Contami	nation	•			I	
11.7	Identify contamination and implement appropriate remedial measures on site. Provide relevant submission and obtain approval from EPD if necessary.	All works areas	Contractor	Guidance Note for Contaminated Land Assessment and Remediation Guidance Manual for Use of Risk based Remediation Goals for Contaminated Land Management (Guidance Manual)	\checkmark	N/A
Hazard to Life						
Table 12.22	Ensure speed limit enforcement is specified in the contractor's Method Statement to limit the speed of construction vehicles on site	All works areas	The Engineer	EIAO-TM	\checkmark	Y
	Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control	All works areas	The Engineer		\checkmark	Y
	Ensure construction method statement is endorsed by the Engineer (AECOM)	All works areas	The Engineer	1	\checkmark	Y

		1	 	
Ensure designated manoeuvring area for the new access road construction is away from the Chlorination House	New access road area	Contractor/ The Engineer	\checkmark	Y
Ensure that the emergency response plan and procedures (including drills) cover the reprovisioning activities	All works areas	Contractor/ The Engineer	\checkmark	Y
Safety training to be provided to construction workers and WSD/Engineer staff regarding evacuation procedures	All works area	Contractor/ The Engineer	\checkmark	Y
Ensure communication protocol is in place between construction and operation staff with regard to the change of chlorine delivery route and the switchover from the existing to new chlorinated water piping;	All works areas	Contractor/ The Engineer	\checkmark	N/A
Ensure temporary suspension of crane operation and construction truck movements during chlorine delivery	All works areas	Contractor/ The Engineer	\checkmark	Y
Provide a crash barrier between the construction site and the north side of the Chlorination House.	Chlorination House area	Contractor	\checkmark	Y
Conduct vibration monitoring at the Chlorination House during piling activities to ensure vibration levels are acceptable and will not lead to any damage of the Chlorination House	Chlorination House area	Contractor	√	Y
Civil engineering calculation to be performed to confirm differential settlement from excavation work is within acceptable limits for the Chlorination House	Chlorination House area	Contractor	\checkmark	Y
Provide settlement monitoring for the Chlorination House to ensure no subsidence occurs from nearby excavation works.	Chlorination House area	Contractor	\checkmark	Y
Confirm the chlorine concentration for the chlorinated water before the switchover from the existing to new piping. This is to avoid the potential for chlorine gas vapours being released if the concentration is too high and there is spillage during switchover	Chlorinated water piping	WSD	\checkmark	N/A
Develop an operating procedure for performing the chlorinated water switchover from the existing piping to new piping.	All works areas	Contractor/ The Engineer / WSD	\checkmark	N/A
Ensure the location/height of the lifting equipment is such there is no impact on Chlorination House/chlorine delivery route in case of falling, swinging or dropped load.	Chlorination House area	Contractor/ The Engineer	\checkmark	Y
Implement the controlled demolition of the existing E&M workshop to ensure that any steel structural elements can only fall away from the Chlorination House	Existing E&M Workshop and Chlorination House	Contractor/ The Engineer	\checkmark	N/A

	areas				
	areas				
Stop any construction activities which may lead to vibrations and potential slope/boulder disturbance during the chlorine deliveries	All works areas	Contractor			Y
Installation of Chlorine gas monitors with audible alarms in the relevant	Reprovisioning	Contractor/			k.
reprovisioning works area	works areas	The Engineer		•	
Provision of an accompanying vehicle for the chlorine truck on the WTW site and ensuring that during the chlorine drums delivery construction works are stopped and the construction workers moved away from Chlorination House	All works areas	Contractor		\checkmark	Y
Establish a liaison between the contractor and HKCG and develop a	Beacon Hill	The Engineer /			
chlorine/town gas emergency plan to ensure gas safety during the	North Gas	Contractor /			
Construction Phase	Offtake Station	HKCG		,	
	and Gas			\checkmark	k
	Pipelines in Old Beacon Hill				
	Tunnel				
Temporary suspend chlorine delivery during the short period of		The Engineer /			
construction of the concerned section of elevated walkway to avoid		Contractor		\checkmark	N
mobile crane impact on the chlorine truck					
Provide clear road signs for site vehicles	Chlorine	The Engineer /			
	delivery route	Contractor			
	and			\checkmark	Y
	reprovisioning works access				
	roads				
Large equipment/plant movement should be controlled by	All works areas	The Engineer /			
'Permit-to-move' system		Contractor /		\checkmark	Y
		WSD			
Define restricted zone for the equipment (i.e. keep the equipment from	Chlorination	The Engineer /		,	
the Chlorination House at a safe distance). The extent of the restricted zone would be determined by the size of the equipment	House area	Contractor		\checkmark	Y
Locate the construction site office at or near property boundary away	Construction	The Engineer /			Y
from the Chlorination House as far as possible	Office area	Contractor		N	Y
Entry of non-authorized personnel to the construction site to be prohibited	All works areas	Contractor		\checkmark	Y

12.15.4, 12.18.1, 12.22.9	GPS fleet management system with driver training to help enforce truck speeds	Chlorine delivery trucks, fleet management centre	WSD / Chlorine Supply Contractor	EIAO-TM	\checkmark	k.i.v.				
	Improved clamps with independent checks to prevent load shedding	stallation of fire screen and larger fire extinguishers to prevent engine ad wheel fires from spreading to the cargo area doption of the chlorine delivery route from Sham Shui Kok Dock to Sha n WTW				\checkmark	F			
	Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area				\checkmark	F				
	Adoption of the chlorine delivery route from Sham Shui Kok Dock to Sha Tin WTW					F				
	Provision of emergency repair kit					F				
12.34.3 Table 12.37	Ban the use of retreaded tyres and perform regular visual checks on the tyres.	a r, d t n e				\checkmark	F			
& 12.38	A vehicle accompanying chlorine truck along critical road sections in Sha Tin. The truck should be equipped with emergency kit, fire extinguisher, radio set for communication. The accompanying vehicle will be ahead of the chlorine truck after the vehicles entering the water treatment works site – An accompanying vehicle may provide rapid response to an incident but any action would be limited to containing a small leak.								\checkmark	F
	Limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table 12.37 – advance measure).									
	Review the practicality of reducing combustible materials or use of fire retardant materials in the cab. (Item 2.3 of Table 12.37 – further measure)		_		~	k.i.v.				
	Annual periodic radiography or ultrasonic test inspections of the chlorine Chlorine drums should be considered for implementation as soon as feasible (Item 3.8 of Table 12.37).	Chlorine drums			\checkmark	k.i.v.				
	Implement side, front and rear crash guards with high energy absorption in coordination and accordance with the relevant authorities.	Chlorine delivery trucks			\checkmark	k.i.v.				
	Implement a sturdy steel frame to minimize the potential for chlorine release due to truck rollover				\checkmark	k.i.v.				
12.34.4	WSD will continue to keep under review the latest development of use of alternative disinfectants in water supply industry to aim at minimising on-site chlorine storage.4	Chlorine delivery Route	WSD		\checkmark	k.i.v.				

	Training should be provided for the use of the GPS fleet management and improved safe driving.	\checkmark	k.i.v.
	Ensured that independent checks are performed to ensure proper chlorine drum latching and clamping.	\checkmark	F
	Chlorine truck drivers or driver attendants should be further trained to check and detect potential chlorine leaks during transport. This should include the timely application of the emergency kit.	\checkmark	k.i.v.
	Training should be provided to driver and driver attendant for the emergency use of the new 2 × 9L AFFF extinguishers.	\checkmark	F
	Induction training for new drivers and driver attendant should include familiarisation with the route, familiarisation with chlorine risks, defensive driving, application of emergency kits, use of fire extinguishers and emergency response	\checkmark	k.i.v.
	Provision of a fire screen between the cab and cargo as well as fire retardant materials for the wheel arches on the chlorine truck should be planned and provided	\checkmark	F
	To keep under review alternate chlorine receiving dock in Sha Tin/Tai Po area for chlorine delivery to STWTW.	\sim	k.i.v.
<u>Legend</u>			
D – Design I			
C – Constru	ction Phase		
0 – Operati	on Phase		
Y - Complia	nce of Mitigation Measures		
N/A – Not A	Applicable in Reporting Period		
k.i.v – Keep	In View		
nine neep			

Appendix V Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

				Ai	r Quality	7			
Location	Action Level			Limit Level					Total
AM1		0				0			0
AM2	0			0					0
					Noise				
Location	n Action Level Limit Level						Total		
NM1	0					0			0
NM2	0 0					0			
NM3	0 0					0			
				Wa	ter Qualit	У			
Location	Action Level				Limit Level				Total
Location	DO	Turbidity	SS	рН	DO	Turbidity	SS	рН	Total
C1	0	0	0	0	0	0	0	0	0
C2	0	0	0	0 0 0 0 0					0
C3	N/A N/A N/A N/A N/A N/A N/A N/A						0		
M1	0	0	0	0	0	0	0	0	0
M2	0	0	0	0	0	0	0	0	0
M3	0	0	0	0	0	0	0	0	0

Statistical Summary of Exceedances

Statistical Summary of Environmental Complaints

Reporting	Environmental Complaint Statistics				
Period	Frequency	Cumulative	Complaint Nature		
1 September- 30 September	0	0	N/A		

Statistical Summary of Environmental Summons

Reporting	E	Environmental Summons Statistics				
Period	Frequency	Cumulative	Details			
1 September-	0	0	N/A			
30 September	Ū.	, i i i i i i i i i i i i i i i i i i i				

Statistical Summary of Environmental Prosecution

Reporting	Environmental Prosecution Statistics				
Period	Frequency	Cumulative	Details		
1 September- 30 September	0	0	N/A		

Appendix W

Tentative schedule for environmental monitoring

Impact Monitoring Schedule for STWTW

7 8		Tue 2 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	Oct-18 Wed 3 10	Thur 4 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 11	Fri 5 12	Sat 6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3
1 7 8	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	2 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	3 10	4 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	5	6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3
- 7 8 V	Water Quality monitoring for C1, C2, C3, M1, M2 & M3	Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &		Water Quality monitoring for C1, C2, C3, M1, M2 & M3	12	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3
7 8 V	Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9		11	12	13
v	Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Import			
	Noise monitoring for NM1, NM2 & NM3		Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	
14 15	5	16	17	18	19	20
W	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3
21 22	2	23	24	25	26	27
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	
28 29	9	30	31			
w	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	*Remark: No construction works will b	e performed on public holidays 01/10 &	17/10

Impact Monitoring Schedule for STWTW

	Impact Monitoring Schedule for STWTW							
	I		Nov-18	1.	Γ.	Ι.		
Sun	Mon	Tue	Wed		Fri 2	Sat 3		
				1	2 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	3		
4	5	6	7	8	9	10		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			
11	12	13	14	15	16	17		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3			
18	19	20	21	22	23	24		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			
25	26	27	28	29	30			
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3			

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW								
	Dec-18							
Sun	Mon	Тие	Wed	Thur	Fri	Sat		
						1		
2	3	4	5	6	7	8		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			
9	10	11	12	13	14	15		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3			
16	17	18	19	20	21	22		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			
23	24	25	26	27	28	29		
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3			Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		
30	31							