**Contractor's General Submission Form (CGS)** 

Contract No.	3/WSD/15	iorar oabimo				
Project Title:	In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Advance Works					
CGS No.:	3WSD15/CGS/SEQ/ALL/JV0360A					
То:	Engineer's Representative		Your Ref:			
Attention:	Mr. Derek K H Ng	Mr. Derek K H Ng				
From:	Ming Hing – Ming Hing Civil – Vasteam Joint Venture					
Title:	EM & A Impact Monitoring Re	eport (July)				
Specification:						
Purpose:	☐ For Information	☐ For Commen	t 🗆 For	Appro	val	
Description of Conf	tents:					
We herewith submit	the EM&A Impact Monitoring	Report (July 2017	) for your peru	sal and	record.	
Attachment:	✓ Yes □ No	Number of Copies:	5+5 CD			
Expected reply date	e: 23 August 2017					
Issued By:	ZA	Pr	inted Name:		Mr. Eros To	
	(ÉT/LP/lp)		•			
Designation:	Site Agent		Date:		9 August 2017	
<u> </u>		<del></del>				
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Received By:	(Signature & Received Chop)					
* Delete if not applica						
CC. JV Partner		(w/ encl.)				
Office Master Co	ору —	(w/ encl.)				



#### 浩科環境工業有限公司

Acumen Environmental Engineering & Technologies Co., Ltd.

#### 香港青衣(北)担杆山路11號地段

Lot 11, Tam Kon Shan Road, Tsing Yi (N). Hong Kong (852) 2333-6823 www.acumen-env.com (852) 2333-1316

Your ref:

Our ref:

CJO-3113

#### By hand

Chief Engineer /Project Management Water Supplies Department 46/F., Immigration Tower 7 Gloucester Road, Wanchai (Attn: Mr. Aletta CHIU)

9 August, 2017

Dear Sir,

In-Situ Reprovisioning of Sha Tin Water Treatment Works – South Works Environmental Permit EP-494/2015
Submission of 17th 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 17<sup>th</sup> 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 Dr Lam, Gabriel, C.K.

Environmental Team Leader

c.c. Independent Environmental Checker

**AECOM** 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

www.aecom.com

+852 3922 9000 tel

Your Ref:

Our Ref:

60479142/C/fyw1708091

#### By Hand & By Email

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

Attn: Mr. Aletta CHIU

9 August 2017

Dear Sir.

#### Contract No.3/WSD/15

In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works Submission of 17th Monthly EM&A Report for July 2017

Reference is made to Environmental Team (ET)'s 17th Monthly EM&A Report for July 2017 (Rev. 0) submitted on 8 August 2017.

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).

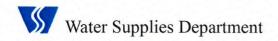
Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully, AECOM Asia Co. Ltd.

Y W Fung

Independent Environmental Checker

**Environmental Team Leader** C.C.





# MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (NO. 17)

#### **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. 17) -

FOR

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

	Name	Signature
Prepared by	Mr. Lok, Kenny, K. M.	A
Checked & Reviewed by	Ir Leung, Jacky, C. H.	1
Approved & Certified by	Ir Dr. Lam, Gabriel, C. K. Environmental Team Leader (ETL)	Con
Verified & Confirmed by	Mr. Fung, Y. W. Independent Environmental Checker (IEC)	y

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#### i

Project no.: CJO-3113

#### 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 17<sup>th</sup> monthly Environmental Monitoring and Audit Report for this Contract covering the period from 1 July 2017 to 31 July 2017 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:
  - Site clearance and site formation works at Logistics Centre area for Wall C.
  - Construction of mini pile for Wall D and bored pile at Wall C.
  - Construction for North Works Temporary Power House
  - Modification of clarifier no.1
  - Modification of valve chamber and construction of flow meter 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	7
Noise	$L_{eq(30  ext{mins})}$ Daytime	7
Water Quality	Water Sampling	13
Inspection /	ET Regular Environmental Site Inspection	5
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 were conducted in the reporting period.
- A.11 As informed by the Contractor, the major works for this Project in August 2017 will be:
  - Site clearance and site formation works at Logistics Centre area for Wall C.
  - Construction of mini pile for Wall D and bored pile at Wall C.
  - Construction for North Works Temporary Power House
  - Modification of clarifier no.1
  - Modification of valve chamber and construction of flow meter house

A.12 EM&A monitoring for the 17<sup>th</sup> reporting period has been completed. The 18<sup>th</sup> monthly EM&A report will cover the period from 1 August 2017 to 31 August 2017.

#### 1

Project no.: CJO-3113

#### 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.

#### 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:

Table 1-1: Key Personnel Contact for Environmental Works

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

#### 1.3. SCOPE OF REPORT

- 1.3.1 This is the 17<sup>th</sup> 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 July 2017 to 31 July 2017 (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:
  - Site clearance and site formation works at Logistics Centre area for Wall C.
  - Construction of mini pile for Wall D and bored pile at Wall C.
  - Construction for North Works Temporary Power House
  - Modification of clarifier no.1
  - Modification of valve chamber and construction of flow meter 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.

Table 2-1: Summary of Impact Monitoring Programme

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 <sub>eq 30 min</sub> 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

#### 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

<b>Environmental Issue</b>	Parameter			
Air Quality	1-hour TSP Monitoring by Real-Time Portable Dust Meter			
Noise	L <sub>eq (30min)</sub> during normal working hours			
	In-situ measurement			
	<ul> <li>Dissolved Oxygen (mg/L);</li> </ul>			
	<ul> <li>Dissolved Oxygen Saturation (%);</li> </ul>			
	• Turbidity (NTU);			
Water Quality	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**.

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

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)

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 seven (7) 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.

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

				1-hour TSP	1-hour TSP (μg/m³)		
Date	Weather	Start Time	End Time	1 <sup>st</sup> Measurement	2 <sup>nd</sup> Measurement	3 <sup>rd</sup> Measurement	
3/7/2017	Cloudy	13:12	16:12	218	234	202	
7/7/2017	Cloudy	13:30	16:30	179	183	211	
12/7/2017	Sunny	8:39	11:39	250	257	241	
17/7/2017	Cloudy	10:20	13:20	231	245	248	
21/7/2017	Sunny	10:17	13:17	197	210	193	
26/7/2017	Sunny	14:44	17:44	235	244	256	
31/7/2017	Sunny	9:11	12:11	261	255	268	
	Average				229.4		
	Range				179-268		

Table 2-6: Summary of 1-hour TSP Monitoring Results - AM2

		1-hour TSP (μg/m³)				
Date	Weather	Start Time	End Time	1 <sup>st</sup> Measurement	2 <sup>nd</sup> Measurement	3 <sup>rd</sup> Measurement
3/7/2017	Cloudy	9:30	12:30	87	111	105
7/7/2017	Cloudy	9:07	12:07	121	126	120
12/7/2017	Sunny	13:45	16:45	102	98	111
17/7/2017	Cloudy	13:38	16:38	93	86	100
21/7/2017	Sunny	14:06	17:06	117	103	109
26/7/2017	Sunny	9:00	12:00	83	89	104
31/7/2017	Sunny	13:58	16:58	110	118	107
	Average				104.8	
	Range				83-126	

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<sub>eq</sub> 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**.

Table 2-7: Details of Noise Monitoring Stations

Noise Monitoring Station	Noise Sensitive Receiver (NSR) ID in the approved EIA Report	Identified Noise Monitoring Station
NM1	HK2	The L Louey (South) (at a platform level of about 5m above road level nearby - free field measurement)
NM2	HK5	Hin Keng Estate – Hin Wan House (at the roof level - facade measurement)
NM3	НК7	C.U.H.K.F.A.A.  Thomas Cheung School  (at the roof level - free field measurement)

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 Sound Level Meter	
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 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<sup>-1</sup> or wind with gusts exceeding 10 ms<sup>-1</sup>. The wind speed was checked with a portable wind speed meter capable of measuring with speeds in ms<sup>-1</sup>.
- 2.3.8 In this Reporting Period, a total seven (7) 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.

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

Date	Weather	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
3/7/2017	Cloudy	13:27-13:57	68.7	69.5	69.2	68.4	70.3	71.2	69.7
7/7/2017	Cloudy	15:47-16:17	71.1	70.9	70.6	69.5	72.1	68.5	70.6
12/7/2017	Sunny	9:18-9:48	70.4	71.3	71.6	72.0	68.4	71.0	70.9
17/7/2017	Cloudy	11:17-11:47	69.3	69.7	71.0	72.0	69.1	69.5	70.2
21/7/2017	Sunny	15:59-16:29	72.0	70.3	71.9	72.4	72.8	71.0	71.8
26/7/2017	Sunny	10:00-10:30	70.0	71.3	72.0	70.6	69.3	71.7	70.9
31/7/2017	Sunny	16:29-16:59	72.4	72.5	71.1	71.8	70.9	68.4	71.4
Limit Level	l >75dB(	<b>A</b> )						Average Range	70.8 69.7-71.8

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

Date	Weather	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
3/7/2017	Cloudy	14:20-14:50	61.2	60.8	60.5	60.3	59.6	59.9	60.4
7/7/2017	Cloudy	14:57-15:27	60.0	59.4	59.7	61.2	60.0	60.2	60.1
12/7/2017	Sunny	10:01-10:31	58.7	59.3	60.4	61.2	60.5	59.9	60.1
17/7/2017	Cloudy	10:24-10:54	62.6	61.5	60.3	61.8	62.0	61.7	61.7
21/7/2017	Sunny	15:15-15:45	60.1	60.0	59.7	59.3	58.9	58.5	59.5
26/7/2017	Sunny	10:47-11:17	61.2	61.4	60.5	60.8	62.0	62.1	61.4
31/7/2017	Sunny	15:46-16:16	59.5	60.1	59.4	59.8	62.7	60.3	60.5
Limit Level	>75dB(	A)						Average	60.6
	- 75 <b>ub</b> (	(1)						Range	59.5-61.7

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

Date	Weather	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
3/7/2017	Cloudy	15:23-15:53	55.7	56.5	56.2	55.8	57.3	54.6	56.1
7/7/2017	Cloudy	14:06-14:36	56.4	55.4	54.3	55.5	56.4	56.1	55.7
12/7/2017	Sunny	10:55-11:25	52.9	55.7	55.0	54.8	53.6	54.7	54.5
17/7/2017	Cloudy	9:30-10:00	55.6	55.2	55.4	56.5	56.2	56.0	55.8
21/7/2017	Sunny	14:26-14:56	53.6	53.7	54.5	54.9	55.0	55.1	54.5
26/7/2017	Sunny	11:29-11:59	54.5	54.8	55.2	53.7	53.9	54.0	54.4
31/7/2017	Sunny	15:01-15:31	56.7	56.2	53.4	53.9	54.2	53.3	54.8
	Limit							Average	55.2
	70dB(A) during normal teaching periods and 65 dB(A) during examination periods							Range	54.4-56.1

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**.

Table 2-12: Details of Water Quality Monitoring Station

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

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:

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

Water quality	
YSI Model ProDSS Multi-pa	rameter 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°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)

#### 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.

Table 2-14: Summary of Water Quality Monitoring Results

Dissolved Oxygen – Mid Depth (mg/L)	<b>C</b> 1	C2	С3	M1	M2	М3
Average	8.21	8.68	N/A	9.16	9.13	9.30
Min.	7.87	8.24	N/A	8.97	8.97	9.22
Max.	8.63	9.23	N/A	9.43	9.32	9.40
Turbidity – Mid Depth (NTU)	C1	C2	C3	M1	M2	M3
Average	2.78	2.47	N/A	3.60	6.16	0.75
Min.	2.00	1.70	N/A	2.30	3.40	0.40
Max.	3.60	2.90	N/A	4.10	8.60	1.00
Suspended Solid – Mid depth (mg/L)	C1	C2	С3	M1	M2	М3
Average	2.18	2.79	N/A	1.89	6.45	<1
Min.	1.60	1.30	N/A	1.20	1.30	<1
Max.	3.30	4.70	N/A	2.60	12.60	<1
pH value (unit)	C1	C2	C3	M1	M2	M3
Average	7.59	8.01	N/A	7.84	8.85	7.96
Min.	7.37	7.13	N/A	7.01	7.99	7.26
Max.	7.78	8.51	N/A	8.05	9.44	8.46

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 in-situ measurements, laboratory analysis data are shown in **Appendix R**.

#### 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 8 July 2017 during the Reporting Period. Detailed monitoring report (No. 35) are shown in **Appendix S**.
- 2.5.4 Ailanthus (Ailanthus fordii) and Incense Tree (Aquilaria sinensis) was transplanted to new location within STWTW. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts were observed on TA327. Contractor has applied the growing hormone helping TA326 and TA327 to regenerate their roots on 26 July 2017. 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 was observed dead

during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out. Lamb of Tartary was under recovery after transplantation. Currently, Lamb of Tartary were temporally stored on 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.

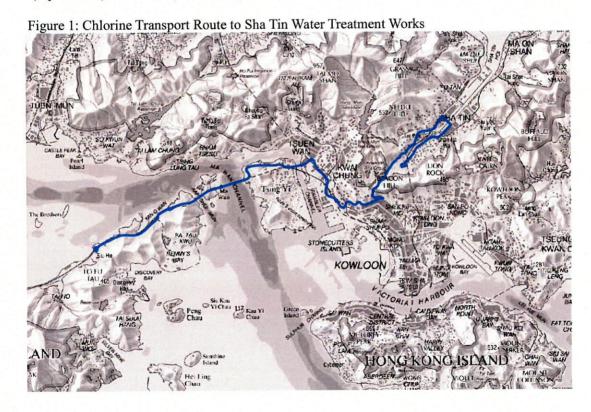
- 2.5.5 In general, all transplanted Lamb of Tartary were in fair condition while Hong Kong Eagle's Claw (Artabotrys hongkongensis) was observed dead during inspection on 20 August 2016 and the survival rate was 96%.
- 2.5.6 In order to compensate for the lost of transplanted Hong Kong Eagle's Claw, 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. 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, TA326 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

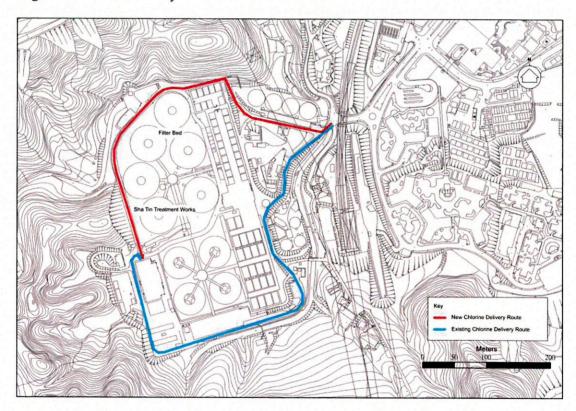
2.7.1 Chlorine is delivered to Sha Tin WTW in batches of up to 6×1-tonne drums. The transport route from Sham Shui Kok dock on North Lantau is shown in **Figure 1**. The route passes along the North Lantau Expressway, around the northern edge of Tsing Yi, through Tsuen Wan and along Tai Po Road (Piper's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



Destination		Route
From Dock	SSK	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway > Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Costal road > Tsing
Sha		Tsuen Road > Tsuen Wan Road > Kwai Chung Road > Ching Cheung Road > Tai Po
WTW		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 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, five (5) site inspections were carried out on 3, 10, 14, 21 & 28 July 2017.
- 2.8.2 One joint site inspection with IEC also undertaken on 14 July 2017. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16.

Table 2-16: Site Observations

Date	Environmental Observations	Follow-up Status
3 July 2017	No environmental issue was observed during the site inspection	N/A
10 July 2017	Over-flood seemed to occur at Wall D.	Contractor would undertake inspection more frequently to monitor the construction areas.
14 July 2017	Observation(s) and Recommendation(s) Leakage of surface runoff to discharge point at Wall D was observed. The Contractor was advised to provide protection to the discharge point to prevent surface runoff entering it.	Sand bags were provided in the concepted works area as protection to the discharge point to prevent surface runoff from entering it.
21 July 2017	No environmental issue was observed during the site inspection	N/A
28 July 2017	No environmental issue was observed during the site inspection	N/A

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	
Construction Noise Permit	GW-RN0027-17 GW-RN0365-17	13/01/2017 08/06/2017	12/07/2017 07/12/2017	MMVJV MMVJV	

#### 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**.

Table 2-18: Environmental Mitigation Measures

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

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

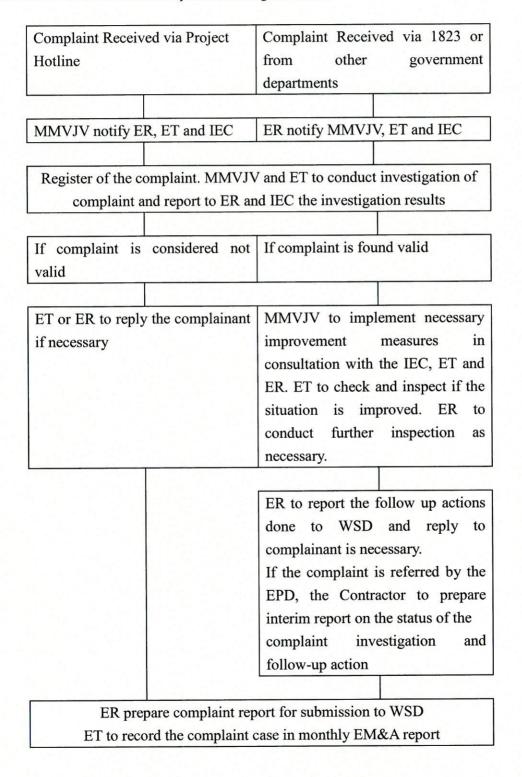
### 2.11. SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

- 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.

#### 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



- 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 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 August 2017 to October 2017 will be:
  - Site clearance and site formation works at Logistics Centre area for Wall C.
  - Construction of mini pile for Wall D and bored pile at Wall C.
  - Construction for North Works Temporary Power House
  - Modification of clarifier no.1
  - Modification of valve chamber and construction of flow meter house

#### 3.2. KEY ISSUES FOR COMING MONTH

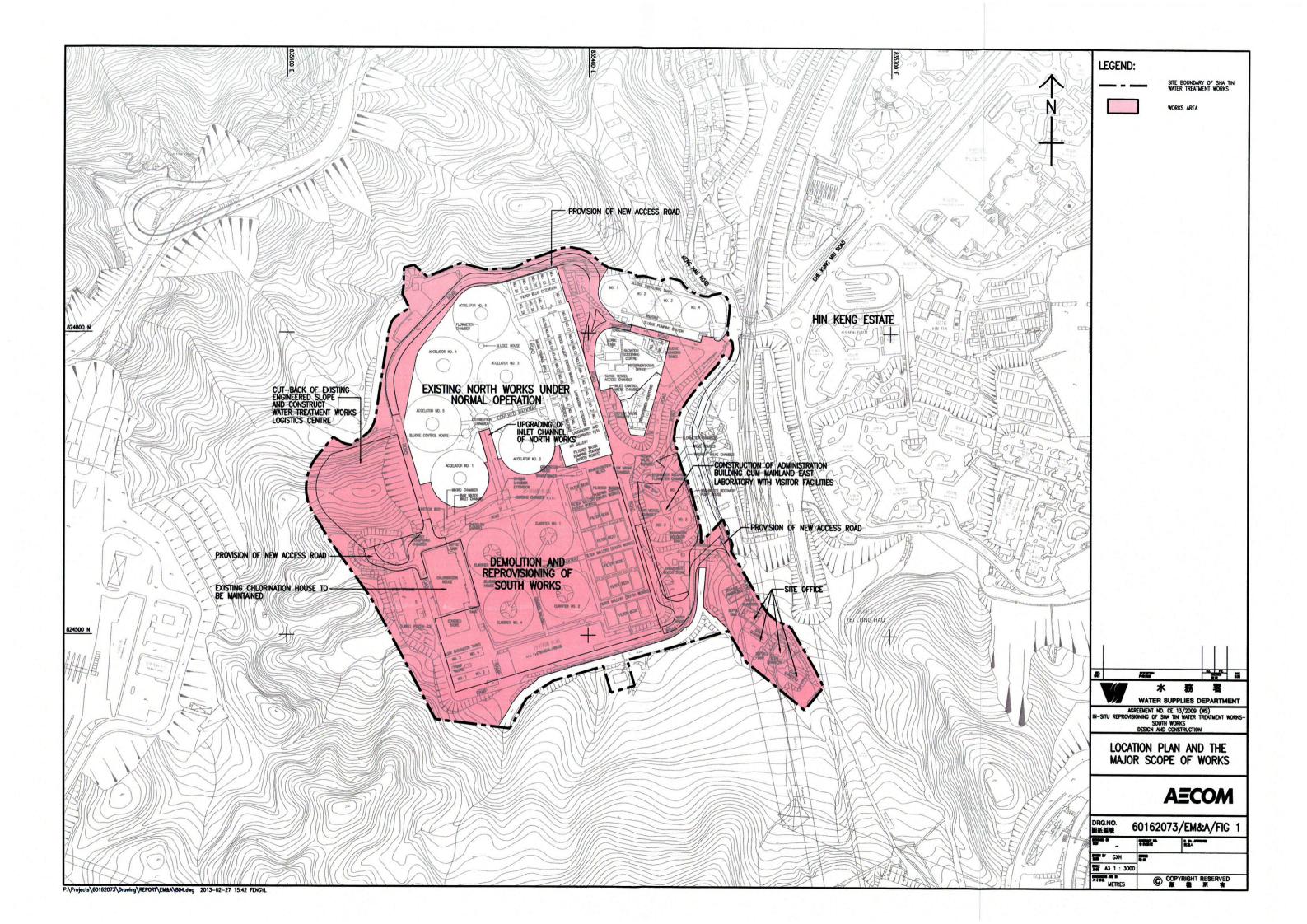
- 3.2.1 Potential environmental impacts arising from the above upcoming construction activities in July 2017 are mainly associated with dust, noise, water quality issues and waste management issues.
- 3.2.2 Particular issues to be considered in the coming month include:
  - Implementation of dust suppression 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.
- 3.2.2 The tentative monitoring schedule for August 2017 to October 2017 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 14 July 2017. 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

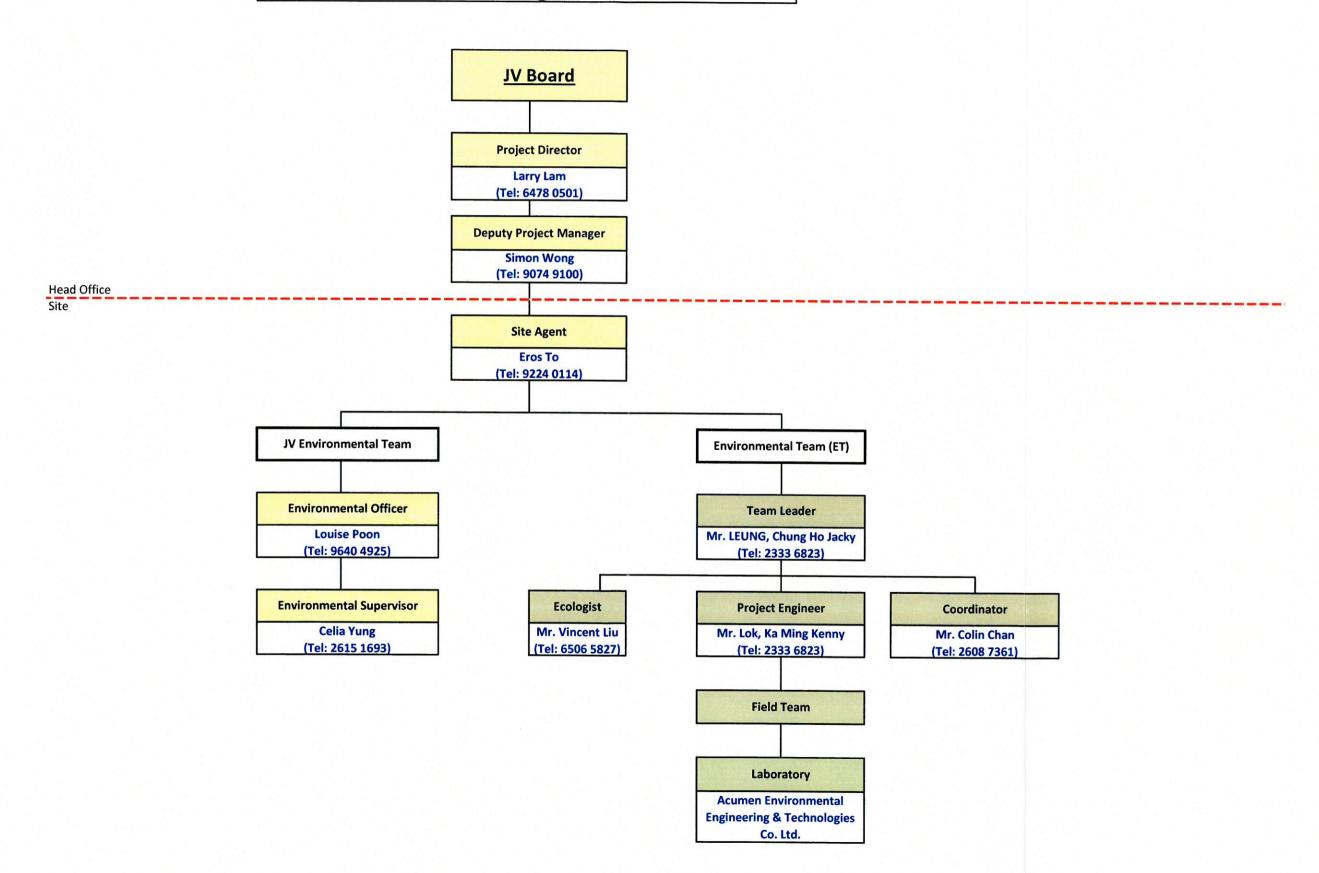


Water Supplies Department
In-situ Reprovisioning of Sha Tin Water Treatment Works – South Works
Monthly EM&A Report (No. 16)

# Appendix B Project Organization

Update Date: 1/2/2017

## **Environmental Organization Chart**



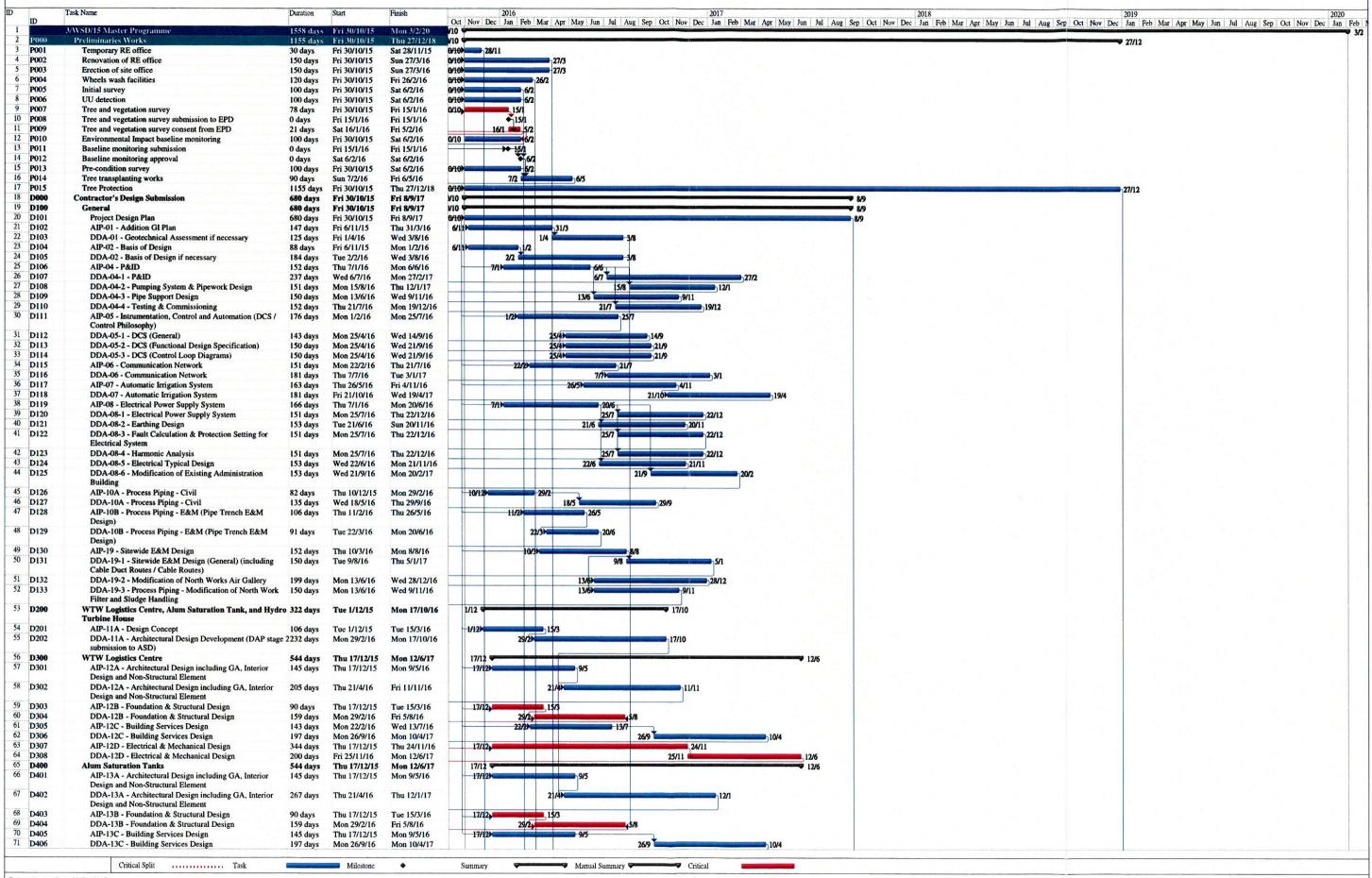
## Appendix C Latest Construction Programme

Project no.: CJO-3113

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

Master Programme (Ver.03)

Date: 21 November 2016



Commencement Date: 30 Oct 2015 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

Duration ID 72 **D407** AIP-13D - Electrical & Mechanical Design 260 days Thu 17/12/15 Thu 1/9/16 73 D408 DDA-13D - Electrical & Mechanical Design Fri 25/11/16 25/11 200 days Mon 12/6/17 74 **D500** 75 **D501 Hydro Turbine House** 443 days Mon 16/11/15 Tue 31/1/17 AIP-14A - Architectural Design including GA, Interior Wed 2/3/16 2/3 Mon 16/11/15 Design and Non-Structural Element (incl. MEICA and BS 76 D502 DDA-14A - Architectural Design including GA, Interior Design and Non-Structural Element (incl. MEICA and BS Thu 3/3/16 Fri 22/7/16 142 days design) 77 D503 AIP-14B - Foundation & Structural Design 130 days Mon 16/11/15 Thu 24/3/16 24/3 D504 DDA-14B - Foundation & Structural Design Fri 22/1/16 22/1 123 days Mon 23/5/16 79 D505 AIP-14C - Building Services Design Mon 22/2/16 Thu 12/5/16 12/5 DDA-14C - Building Services Design
74 days
AIP-14D - Electrical & Mechanical Design (incl. Hydraulic
242 days 80 D506 Tue 17/5/16 Fri 29/7/16 17/5 81 D507 Tue 1/12/15 Fri 29/7/16 82 D508 DDA-14D - Electrical & Mechanical Design (incl. Hydraulic 186 days Sat 30/7/16 Tue 31/1/17 83 **North Works Temporary Power House** D600 Mon 16/11/15 Wed 28/12/16 409 days AIP-15A - Architectural Design including GA, Interior Design and Non-Structural Element D601 93 days Thu 17/12/15 Fri 18/3/16 18/3 85 D602 DDA-15A - Architectural Design including GA, Interior 141 days Fri 22/1/16 Fri 10/6/16 Design and Non-Structural Element 86 D603 87 D604 AIP-15B - Foundation & Structural Design Mon 16/11/15 130 days Thu 24/3/16 D604 DDA-15B - Foundation & Structural Design Fri 22/1/16 Mon 9/5/16 22/1 109 days D605 AIP-15C - Building Services Design 74 days Mon 22/2/16 Thu 5/5/16 DDA-15C - Building Services Design D606 6/5 88 days Fri 6/5/16 Mon 1/8/16 D607 AIP-15D - Electrical & Mechanical Design 221 days Tue 1/12/15 Fri 8/7/16 DDA-15D - Electrical & Mechanical Design 153 days D608 Fri 29/7/16 Wed 28/12/16 29/7 92 D700 Temporary Washwater Recovery Tank 190 days Thu 11/2/16 Thu 18/8/16 11/2 93 D701 AIP-16A - Galvanized Steel Platforms, Walkways and 106 days Thu 11/2/16 Thu 26/5/16 26/5 Footing Design 94 D702 DDA-16A - Galvanized Steel Platforms, Walkways and 102 days Mon 9/5/16 Thu 18/8/16 Footing Design 95 D703 AIP-16B - Lighting Design Mon 22/2/16 Thu 5/5/16 74 days DDA-16B - Lighting Design
AIP-16C - Electrical & Mechanical Design D704 Wed 16/3/16 16/3N 105 days Tue 28/6/16 97 D705 Thu 11/2/16 Thu 26/5/16 26/5 106 days 98 D706 DDA-16C - Electrical & Mechanical Design Wed 17/8/16 140 days Thu 31/3/16 1/12 D800 Flowmeter House 644 days Tue 1/12/15 Mon 4/9/17 100 D801 AIP-17A - Architectural Design including GA, Interior 91 days Tue 1/12/15 Mon 29/2/16 29/2 Design and Non-Structural Element 101 D802 DDA-17A - Architectural Design including GA, Interior Thu 11/2/16 Mon 27/6/16 138 days Design and Non-Structural Element 102 D803 AIP-17B - Foundation & Structural Design Tue 1/12/15 91 days Mon 29/2/16 103 D804 DDA-17B - Foundation & Structural Design 11/2 106 days Thu 11/2/16 Thu 26/5/16 104 D805 105 D806 AIP-17C - Electrical & Mechanical Design 259 days Tue 1/12/15 Mon 15/8/16 DDA-17C - Electrical & Mechanical Design 235 days Fri 13/1/17 Mon 4/9/17 106 D807 107 D808 AIP-17D - Building Services Design 75 days Thu 31/3/16 Mon 13/6/16 DDA-17D - Building Services Designn 13/5 135 days Fri 13/5/16 Sat 24/9/16 108 D900 Valve Chamber 18/12 ▼ Fri 18/12/15 Mon 4/9/17 627 days 109 D901 110 D902 AIP-18A - Foundation, Civil & Structural Design DDA-18A - Foundation, Civil & Structural Design 89 days Fri 18/12/15 Tue 15/3/16 123 days Mon 29/2/16 Thu 30/6/16 111 D903 AIP-18B - Electrical & Mechanical Design 151 days Mon 15/8/16 Thu 12/1/17 12/1 112 D904 DDA-18B - Electrical & Mechanical Design 235 days Fri 13/1/17 Mon 4/9/17 113 D905 AIP-18C - Building Services Design 75 days Thu 31/3/16 Mon 13/6/16 114 D906 115 S0000 13/5 DDA-18C - Building Services Design Fri 13/5/16 135 days Sat 24/9/16 Fri 30/10/15 825 days Fri 30/10/15 Wed 31/1/18 ₹ 31/1 30/10 S1001 Section 1 Commencement Fri 30/10/15 1 day Fri 30/10/15 118 **S1100** North Works Temporary Power House Tue 1/12/15 Wed 31/1/18 1/12 793 days 31/1 119 \$1101 17/2 12/3 Excavation of trial pit for earthing test 25 days Wed 17/2/16 Sat 12/3/16 120 S1102 13/3 22/3 23/3 21/ Ground Investigation Wroks 10 days Sun 13/3/16 Tue 22/3/16 121 S1103 Additational drilling for in planting earthing log 30 days Wed 23/3/16 Thu 21/4/16 3/10 22/11 11/12 122 S1104 Excavation and installation of ELS 50 days Mon 21/11/16 Mon 3/10/16 123 S1105 Installation of earth mat 20 days Tue 22/11/16 Sun 11/12/16 124 S1106 Foundation Mon 12/12/16 Sun 15/1/17 35 days 125 S1107 Structural for North Works Tempoary Power House 76 days Mon 16/1/17 Sat 1/4/17 126 S1108 Laying of cable ducts, construction of draw pits and 76 days Mon 16/1/17 Sat 1/4/17 installation of cable trays 127 S1109 Confirmation of cable routing with CLP and WSD 0 days Mon 3/10/16 Mon 3/10/16 128 S1110 Design 6.6kv / 11kv working platform 120 days Mon 3/10/16 Mon 30/1/17 3/10 129 S1111 Construction of 6.6kv / 11kv working platform 31/1 60 days Tue 31/1/17 Fri 31/3/17 130 \$1112 Cable tray construction 30 days Sat 1/4/17 Sun 30/4/17 131 S1113 Laying 6.6kv / 11 kv cable by CLP Tue 30/5/17 30 days Mon 1/5/17 132 S1114 Completion of concrete structure of North Works 1 day Sun 2/4/17 Sun 2/4/17 Temporary Power House 133 S1115 Plumbing and Drainage installation 100 days Mon 3/4/17 Tue 11/7/17 134 S1116 MVAC installation Mon 3/4/17 Tue 11/7/17 100 days 11/7 135 S1117 Fire Services installation Mon 3/4/17 Tue 11/7/17 100 days 136 \$1118 Flectrical installation 100 days Mon 3/4/17 Tue 11/7/17 137 S1119 Section 1 Site Works For E & M Works 793 days Tue 1/12/15 Wed 31/1/18 1/12 138 S1120 North Works Temporary Power House\_NWTPH 1/12 463 days Tue 1/12/15 Tue 7/3/17 139 \$1121 NWTPH- Electrical Equipment Procurement 21 days Tue 1/12/15 Mon 21/12/15 1/12 21/12 Critical Split ..... Task Milestone Manual Summary Critical

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





Date: 21 November 2016

Contract No.: 3/WSD/15
Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works Master Programme (Ver.03) Date: 21 November 2016 Duration Start Finish | 2018 | 2019 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | ID 140 \$1122 Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Tue 1/12/15 Sun 17/7/16 NWTPH- Electrical Equipment Manufacturing & 230 days 141 \$1123 **NWTPH-** Electrical Equipment Delivery 139 days Thu 20/10/16 Tue 7/3/17 142 S1124 NWTPH Phase 1 - E & M Works 304 days Sun 2/4/17 Wed 31/1/18 143 S1125 NWTPH- Superstructure & ABWF (up to R/F slab) - 0 days H/O by Civil Contractor Sun 2/4/17 Sun 2/4/17 144 S1126 NWTPH- LV Supply Installation Commence at G/F 0 days Sun 2/4/17 Sun 2/4/17 145 S1127 NWTPH- 6.6KV/11kv Switchboard Installation at 28 days Mon 3/4/17 Sun 30/4/17 NWTPH- Installation of 5 nos. of New Cap Bank for 14 days Pumps at 1/F

NWTPH- New ducts, Draw pits & Openings for 6.6kV (Phase 1) Source 2 CLP Diversion - H/O by 146 S1128 Mon 1/5/17 Sun 14/5/17 147 \$1129 Sun 14/5/17 Sun 14/5/17 Civil Contractor 148 S1130 NWTPH- CLP Inspection of the New ducts, Draw 14 days Mon 15/5/17 Sun 28/5/17 15/5 = 28 pits & Openings for 6.6kV

NWTPH- Defect Rectify after CLP Inspection of the 7 days 149 S1131 Mon 29/5/17 29/5 4/6 New ducts, Draw pits & Openings 150 S1132 NWTPH- Second CLP Inspection of the rectified 7 days Mon 5/6/17 Sun 11/6/17 New ducts, Draw pits & Openings 151 S1133 NWTPH-T07 New Ducts/Pits/Openings after defect 0 days rectification to CLP - H/O by Civil Contractor Sun 11/6/17 Sun 11/6/17 152 S1134 NWTPH- CLP Mobilization for Supply 2 diversion 14 days Mon 12/6/17 Sun 25/6/17 153 S1135 NWTPH- CLP T&C of the completed HV cables 7 days Mon 26/6/17 Sun 2/7/17 154 S1136 NWTPH-Liaison with WSD for pump no.12 new 53 days Mon 3/7/17 Thu 24/8/17 155 S1137 NWTPH- Connection of new power supply to Pump 36 days Fri 25/8/17 Fri 29/9/17 156 S1138 NWTPH- 6.6KV Switchboard T&C incl. CLP Sat 30/9/17 Fri 6/10/17 30/9 6/10 7/10 5/11 157 \$1139 NWTPH- 6.6KV Switchboard Energisation Sat 7/10/17 30 days Sun 5/11/17 158 S1140 NWTPH- New ducts, Draw pits & Openings for Mon 1/5/17 0 days Mon 1/5/17 Reroute cable from 6.6 KVSB 3 to 6.6 KVSB - H/O by Civil Contractor 159 \$1141 NWTPH- T06 New ducts & draw pits between Sun 5/11/17 Sun 5/11/17 0 days 5/11 Filters & Sludge treatment plant - H/O by Civil 160 S1142 NWTPH- Diversion of load from Existing LV 60 days Mon 6/11/17 Thu 4/1/18 6/11 161 S1143 NWTPH- Tx 3 relocate to STP & replace Tx 4 30 days Tue 19/12/17 Wed 17/1/18 162 S1144 NWTPH- Reroute Tx cable from 6.6 KVSB 3 to 6.6 14 days Thu 18/1/18 Wed 31/1/18 18/1 31/1 163 **S1145** 164 **S1146** NWTPH Phase 2 - E&M Works 218 days Wed 31/5/17 NWTPH- CLP Mobilization for Supply 3 diversion 15 days Mon 6/11/17 Mon 20/11/17 6/11 20/11 165 S1147 NWTPH-CLP T&C of the completed HV cables Tue 21/11/17 Mon 27/11/17 21/11 27/11 7 days 166 S1148 167 S1149 28/11 4/12 5/12 3/1 NWTPH-6.6KV Switchboard T&C incl. CLP Tue 28/11/17 Mon 4/12/17 7 days 30 days NWTPH-6.6KV Switchboard Energisation Tue 5/12/17 Wed 3/1/18 168 S1150 NWTPH-Liaison with WSD for pump 60 days Wed 31/5/17 Sat 29/7/17 No.9,10,11,13,14 for connection to new supply 169 S1151 NWTPH-T&C incl. the remaining 5 sets of 6.6KV 138 days Sun 30/7/17 Thu 14/12/17 14/12 170 S1152 NWTPH Phase 3 - E&M Works 52 days Tue 11/7/17 Thu 31/8/17 171 S1153 NWTPH-6.6KV Supply Installation Interconnection 52 days Tue 11/7/17 Thu 31/8/17 Cable Diversion 172 S1154 NWTPH Phase 4 - E&M Works 140 days Sun 30/7/17 Sat 16/12/17 16/12 173 S1155 NWTPH-CLP Mobilization for Supply 4 diversion 15 days Fri 1/9/17 Fri 15/9/17 174 S1156 16/9 22/9 23/9 29/9 NWTPH-CLP T&C of the completed HV cables Sat 16/9/17 Fri 22/9/17 7 days 175 S1157 NWTPH-6.6KV Switchboard T&C incl. CLP Sat 23/9/17 7 days Fri 29/9/17 176 S1158 NWTPH-6.6KV Switchboard Energisation 17/11 16/12 30 days Fri 17/11/17 Sat 16/12/17 177 S1159 Relocation of existig 6.6kv capacitor banks 110 days Sun 30/7/17 Thu 16/11/17 30/7 178 **S1160** NWTPH LVSB, Tx, PLC & Genset Installation at 86 days Mon 20/3/17 Tue 13/6/17 179 \$1161 NWTPH-6.6KV/11KV to 380V Transformers Tx 28 days Mon 3/4/17 Sun 30/4/17 180 S1162 NWTPH-300KVA ESS. Genset Mon 20/3/17 42 days Sun 30/4/17 181 S1163 NWTPH- PLC & Ctrl. (incl. 6.6kV switchboard to 30 days Mon 1/5/17 Tue 30/5/17 existing Admin. Building) 182 S1164 **NWTPH-Battery Room** 14 days Wed 31/5/17 Tue 13/6/17 183 S1165 **NWTPH- Cable Supports** 14 days Mon 17/4/17 Sun 30/4/17 184 S1166 NWTPH- Cable Trays Thu 13/4/17 Wed 26/4/17 14 days 185 S1167 NWTPH- Cable Laying 14 days Sun 9/4/17 Sat 22/4/17 186 S1168 14 days **NWTPH- Cable Terminat** Wed 5/4/17 Tue 18/4/17 187 S1169 NWTPH - T&C NWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 188 S1170 **NWTPH- Testing** 30 days Mon 1/5/17 Tue 30/5/17 189 S1171 Finishing works Wed 27/9/17 120 days Wed 31/5/17 190 S1172 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 (both internal and external) 191 **S1200** Hvdro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 192 S1201 193 S1202 Site survey of existing pipeworks and cabling Mon 15/2/16 Mon 29/2/16 29/2 15 days

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

Data collection for HTH design by Atal

Critical Split ..... Task

60 days

Tue 1/3/16

Milestone

Fri 29/4/16

Summary





Manual Summary

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

Task Name Duration Start Finish ID 194 \$1203 Mar Apr May Jun Jul Construction of cable ducting for signal and power cable 61 days Tue 1/3/16 Sat 30/4/16 195 S1204 196 S1205 Relocation of sampling panel and cable diversion Sun 1/5/16 Fri 15/7/16 76 days Water suspension of High Island Water main pipes Sat 16/7/16 Fri 29/7/16 14 days 197 S1206 Capping of path A Wed 20/7/16 Wed 20/7/16 198 \$1207 ELS works and demolition of EDH (incl. relocation of 100 days Sat 30/7/16 Sun 6/11/16 existing E & M equipment) 199 S1208 Mon 7/11/16 Thu 5/1/17 60 days 200 \$1209 Superstructure for Hydro Turbine House (incl. 136 days Fri 6/1/17 Sun 21/5/17 backfilling) 201 S1210 Installation of I/O pipes outside HTH Fri 6/1/17 Wed 5/4/17 90 days 202 S1211 Completion of concrete structure of Hydro Turbine House 0 days Sun 21/5/17 Sun 21/5/17 203 \$1212 Finishing works 120 days Mon 22/5/17 Mon 18/9/17 22/5 204 S1213 Completion of architectural finishes and relevant works 1 day Tue 19/9/17 Tue 19/9/17 (both internal and external) 205 \$1214 Plumbing and Drainage installation 120 days Mon 22/5/17 Mon 18/9/17 206 S1215 MVAC installation 120 days Mon 22/5/17 Mon 18/9/17 22/5 S1216 Fire Services installation Mon 22/5/17 Mon 18/9/17 22/5 120 days 208 \$1217 Electrical installation 120 days Mon 22/5/17 Mon 18/9/17 209 S1218 Water suspension of High Island Water main pipes 12 days Sun 30/7/17 Thu 10/8/17 210 \$1219 Re-arrangement of Raw Water path B to original Path A Thu 10/8/17 Thu 10/8/17 from High Island Reservoir 211 S1220 19/10 19/10 Connecting HTH outlet pipe to original path B 0 days Thu 19/10/17 Thu 19/10/17 212 S1221 Remove capping of path A and reinstall flow meter at HF10 days 213 S1222 Hydro Turbine House - E&M Works (Section 1) 717 days Mon 15/2/16 Wed 31/1/18 15/2 5/3 214 \$1223 Hydro Turbine House - E&M Equipment Procurement 20 days Mon 15/2/16 Sat 5/3/16 215 \$1224 Hydro Turbine House - E&M Equipment 300 days Sun 6/3/16 Fri 30/12/16 30/12 Manufacturing & FAT 216 S1225 Hydro Turbine House - E&M Equipment Delivery 185 days Sat 31/12/16 Mon 3/7/17 31/12 217 S1226 Hydro Turbine House - E&M Equipment Delivery 31/12 Sat 31/12/16 230 days Thu 17/8/17 (Needle Valve & Turbine Generator) 218 S1227 Hydro Turbine House - H/O by Civil Contractor 0 days Sun 21/5/17 Sun 21/5/17 219 \$1228 Installation of needle valve and turbine genertor 30 days Fri 6/10/17 Sat 4/11/17 220 S1229 Hydro Turbine House - Hydropower Generation System 150 days Wed 18/10/17 Mon 22/5/17 22/5 221 \$1230 T04 - Trench/Cable ducts & Draw Pits H/O by Civil 0 days Mon 12/6/17 Mon 12/6/17 Contractor 222 S1231 T05 - Trench/Cable ducts & Draw Pits H/O by Civil 0 days Mon 12/6/17 Mon 12/6/17 223 S1232 Hydro Turbine House - Electrical & ICA Installation Fri 13/10/17 Mon 1/1/18 224 S1233 Hydro Turbine House - CLP Inspection & acceptance 90 days (Driven by Logistics house DCS) Fri 3/11/17 Wed 31/1/18 225 S1234 Hydro Turbine House - T&C 30 days Tue 2/1/18 Wed 31/1/18 226 S1235 FSD inspection Thu 28/9/17 Thu 28/9/17 0 days 227 S1236 Rectification of defects and issue of certificate 14 days Fri 29/9/17 Thu 12/10/17 9 - 12/10 228 S1237 Section 1 Completion 1 day Wed 31/1/18 Wed 31/1/18 229 S2000 ection 2 644 days Fri 30/10/15 Thu 3/8/17 230 S2001 Section 2 Commencement Fri 30/10/15 1 day Fri 30/10/15 Site Formation and Slope Retaining Structures for North 544 days Circular Road 231 **S2100** Thu 3/8/17 232 S2101 7/2 27/2 7/2 27/2 1/3 Sun 7/2/16 Site Clearance Sat 27/2/16 21 days 233 S2102 Temporary works removal Utilities relocation Sun 7/2/16 Sat 27/2/16 21 days 234 S2103 Submission of DI 1038 Tue 1/3/16 Tue 1/3/16 0 days 235 S2104 Excavation for L-shape Retaining wall 90 days Sun 28/2/16 Fri 27/5/16 27/5 236 S2105 Construction of L-shape Retaining wall 110 days Wed 13/4/16 Sun 31/7/16 237 S2106 Permission of DI 1038 Mon 22/8/16 22/8 Mon 22/8/16 0 days 238 S2107 Excavation and backfilling for bore piling works area 100 days Mon 22/8/16 Tue 29/11/16 239 S2108 Installation of temp. soil nail Mon 22/8/16 Sat 19/11/16 22/8 90 days 240 S2109 30/11 14/12 GI works for bored piles and mini piles 15 days Wed 30/11/16 Wed 14/12/16 241 S2110 Wed 21/12/16 15/12 21/12 Bored piling machine establishmen 7 days Thu 15/12/16 242 S2111 Construction of bored piles (D) (H 5-10m, L 70m, Dia 118 days Thu 22/12/16 Tue 18/4/17 22/12 243 S2112 Bored Pile test 28 days Wed 19/4/17 Tue 16/5/17 244 S2113 19/4 Excavation for mini pile area 14 days Wed 5/4/17 Tue 18/4/17 245 S2114 Mini pile load test 28 days Wed 19/4/17 Tue 16/5/17 246 S2115 Construction of mini piles 60 days Wed 3/5/17 Sat 1/7/17 247 S2116 Construction of mini piles cap and L-shape retaining wall 33 days Sun 2/7/17 Thu 3/8/17 248 S2117 Construction of retaining wall above bored pile Wed 3/5/17 Sat 1/7/17 60 days 249 \$2118 Construction of R-wall above ground concurrent with Thu 3/8/17 Wed 17/5/17 79 days backfilling works 250 **S2002** Section 2 Completion Thu 3/8/17 Thu 3/8/17 S3000 Section 3 1189 days Fri 30/10/15 Wed 30/1/19 252 S3001 30/10 Section 3 Commencement Fri 30/10/15 1 day Fri 30/10/15 253 **S3003** North Circular New Road 203 days Tue 1/11/16 Mon 22/5/17 254 S3004 Raising the existing Flowmeter chamber 60 days Tue 1/11/16 Fri 30/12/16 30/12 255 S3005 Excavation for construction of new valve chamber 60 days Tue 1/11/16 Fri 30/12/16 30/12 256 S3006 Construction of new valve chamber 60 days Sat 31/12/16 Tue 28/2/17 31/12 257 S3007 Construction for new road and drainage 60 days Wed 1/3/17 Sat 29/4/17 BS works (lighting)
Temporary Washwater Recovery Tank 258 S3008 Fri 24/3/17 Mon 22/5/17 259 **S3009** 625 days Thu 11/2/16 Fri 27/10/17 260 S3010 Construction of DN900 Washwater pipes 240 days Wed 1/6/16 Thu 26/1/17 1/7) 261 \$3011 15/10 Construction of Wier Walls 107 days Fri 1/7/16 Sat 15/10/16 Critical Split ..... Task Milestone Manual Summary Critical

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



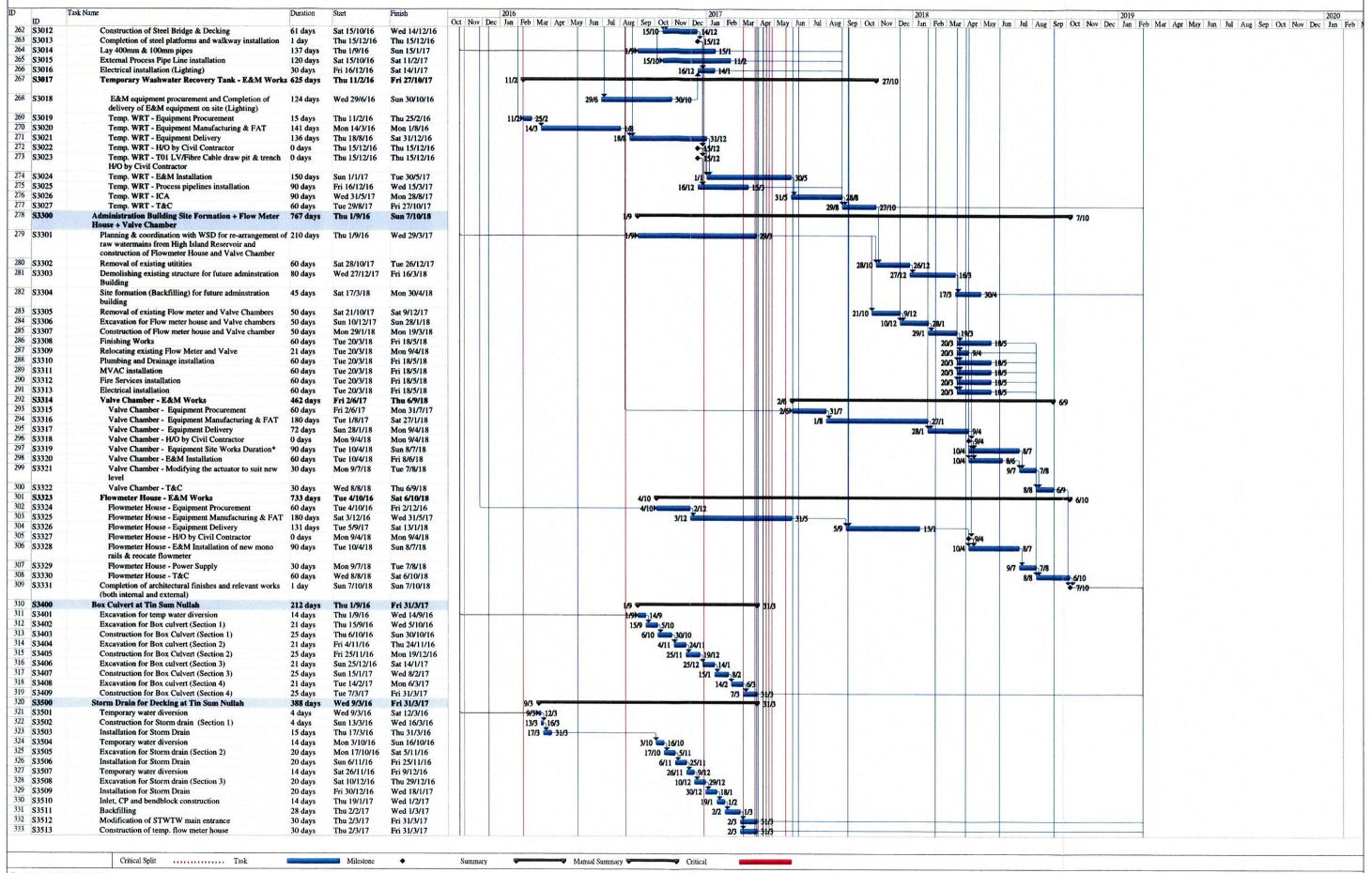


Date: 21 November 2016

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

Master Programme (Ver.03)

Date: 21 November 2016



Commencement Date: 30 Oct 20 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

Date: 21 November 2016

| 2017 | 2018 | 2018 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | Duration Start 334 **S3600** Site Formation and Bored Pile Wall for Logistics Center 1090 days Sat 6/2/16 cum Alum Saturation Tank Wed 30/1/19 335 S36001 Sat 27/2/16 6/2 27/2 22 days 336 \$36002 Learing curve and resolution of early teething problems Sun 28/2/16 Mon 28/3/16 28/2 28/3 337 S36003 Excavation for slope slope behind the bored pile wall C and reduce the level to +45.0mPD (Stage 1) (About 100 Sun 28/2/16 Fri 27/5/16 28/2 338 **S36004** Installation of temp soil nails (60 deg. Temp slope above 30 days Wed 18/5/16 Thu 16/6/16 Haul Road) 339 S36005 Pre-drill for bored piles Sat 28/5/16 Sat 16/7/16 50 days 17/7 - 6/8 340 S36006 Bored piling machine establishment 21 days Sun 17/7/16 Sat 6/8/16 341 \$36007 Construction of bored piles CB (H 10m, L 80m, Dia 2.0m) 90 days Sun 7/8/16 Fri 4/11/16 342 S36008 5/11 24/11 25/11 Thu 24/11/16 ELS works for CB bored piles 20 days Sat 5/11/16 Temp. excavation for CB bored piles construction S36009 40 days Fri 25/11/16 Tue 3/1/17 23/2 344 S36010 Construction of bored piles CC (H 10m L 80m Dia 2.0m) 45 days Thu 23/2/17 Sat 8/4/17 345 S36011 ELS works for CB bored piles 20 days Wed 4/1/17 Mon 23/1/17 4/1 23/1 S36012 Temp. excavation for CB bored piles construction 30 days Tue 24/1/17 Wed 22/2/17 24/1 22/2 347 S36013 Construction of bored piles CA (H 10m L 80m Dia. 2m) 45 days Sun 9/4/17 Tue 23/5/17 348 S36014 Excavation at logistics center and Alum saturation tank location to level +33mPD (Stage 2) (About 100 vehicles Sat 28/5/16 Fri 5/8/16 349 S36015 Installation of temp soil nails (60 deg. Temp slope above 70 days Sat 28/5/16 Fri 5/8/16 Haul Road) 350 S36016 Excavation at the open area between bored pile wall C and Logistics Center to formation +23.5mPD (Stage 3) (About 100 vehicles per day) Sat 6/8/16 Sun 9/10/16 6/8 351 S36017 Installation of sheet piles/pipe pile at level +33mPD 60 days Installation of sheet piles/pipe pile at level +27.5mPD 60 days Installation of tie back for level +33mPD sheet piles/ pipe 45 days Tue 4/10/16 Sat 6/8/16 4/10 352 S36018 Wed 5/10/16 5/10 Sat 3/12/16 5/10 Wed 5/10/16 Fri 18/11/16 354 S36020 Excavation at logistics center and Alum saturation tank location to formation level +20mPD (Stage 4) (About 100 Wed 9/11/16 Fri 21/4/17 vehicles per day) 355 S36021 King post installation Temp. shoring (waling & strut) installation Sun 4/12/16 Fri 23/12/16 4/12 20 days 23/12 356 S36022 Sat 24/12/16 Sun 2/4/17 24/12 100 days 357 S36023 Construction of bored piles lagging walls Sun 25/12/16 180 days 358 S36024 Constrution of bored pile capping beam 160 days Thu 15/12/16 Tue 23/5/17 15/12 359 S36025 Installation of earth mat 30 days Sat 22/4/17 Sun 21/5/17 360 S36026 Foundation for grid 1-6 35 days Mon 22/5/17 Sun 25/6/17 22/5 25/6 S36027 Foundation for reminding portion 66 days Mon 22/5/17 Wed 26/7/17 283 days 362 S36028 Superstructure for Logistic Center Wed 4/4/18 Mon 26/6/17 Completion of concrete structure of grid(1-5) Basement 25 days Level +22.5mpd to +28.5mpd of WTW Logistics 26/6 20/7 363 S36029 Mon 26/6/17 Thu 20/7/17 364 S36030 Completion of concrete structure of grid(1-5) Ground 25 days Fri 21/7/17 Mon 14/8/17 21/7 Level +28.5mpd to +34.5mpd of WTW Logistics Centre 365 S36031 Completion of concrete structure of grid(1-5) Frist 25 days Tue 15/8/17 Fri 8/9/17 15/8 8/9 Level 34.5mpd to 40.5mpd of WTW Logistics Centre 366 S36032 Completion of concrete structure of Basement Level of 60 days Thu 27/7/17 Sun 24/9/17 27/1 24/9 WTW Logistics Centre 367 \$36033 Completion of concrete structure of Ground Level of 36 days Mon 25/9/17 Mon 30/10/17 25/9 WTW Logistics Centre 368 S36034 Completion of concrete structure of First Level of 36 days Tue 31/10/17 Tue 5/12/17 31/10 5/12 WTW Logistics Centre 369 S36035 Wed 6/12/17 Completion of concrete structure of Second Level of 36 days Wed 10/1/18 6/12 10/1 WTW Logistics Centre 370 S36036 Completion of concrete structure of Third Level of 36 days Thu 11/1/18 Thu 15/2/18 11/1 15/2 WTW Logistics Centre Completion of concrete structure of Roof Level of WTW Logistics Centre 371 S36037 Fri 16/2/18 Wed 4/4/18 48 days 372 S36038 Plumbing and Drainage installation 300 days Thu 5/4/18 Tue 29/1/19 373 S36039 MVAC installation 300 days Thu 5/4/18 Tue 29/1/19 374 S36040 Fire Services installation 300 days Thu 5/4/18 Tue 29/1/19 375 S36041 Electrical installation Thu 5/4/18 Tue 29/1/19 376 \$36042 **Alum Satuation Tanks** 231 days Sat 22/4/17 Fri 8/12/17 377 S36043 Foundation 45 days Sat 22/4/17 Mon 5/6/17 378 S36044 Superstructure for Alum Satuation Tanks Tue 6/6/17 Thu 10/8/17 66 days 379 S36045 Canopy above Alum Saturation Tanks 74 days Mon 25/9/17 Thu 7/12/17 380 S36046 Completion of structure including canopy above Alum 1 day Fri 8/12/17 Fri 8/12/17 Saturation Tanks 381 S36047 WTW Logistic Centre - Internal E&M Site Works Thu 7/4/16 Sat 8/9/18 885 days 382 S36048 WTW Logistics Centre - Silo Installation B/F 760 days Thu 7/4/16 Sun 6/5/18 ₩ 6/5 383 S36049 WTWLC - Lime System - Silo Procurement Thu 7/4/16 Fri 10/6/16 65 days 384 \$36050 WTWLC - Lime System - Silo Manufacturing & 320 days Sat 11/6/16 Wed 26/4/17 385 S36051 WTWLC - Lime System - Silo Delivery Thu 27/4/17 Wed 5/7/17 70 days 386 S36052 WTWLC - Second 2/F Slab G.L. CH-1~CH-5 - H/O 0 days Fri 8/9/17 by Civil Contractor (i.e. Area available from Level +22.5 to +40.5) 387 S36053 WTWLC - Lime System - Silo Site Works 240 days Sat 9/9/17 Sun 6/5/18 Critical Split ..... Task Milestone Manual Summary

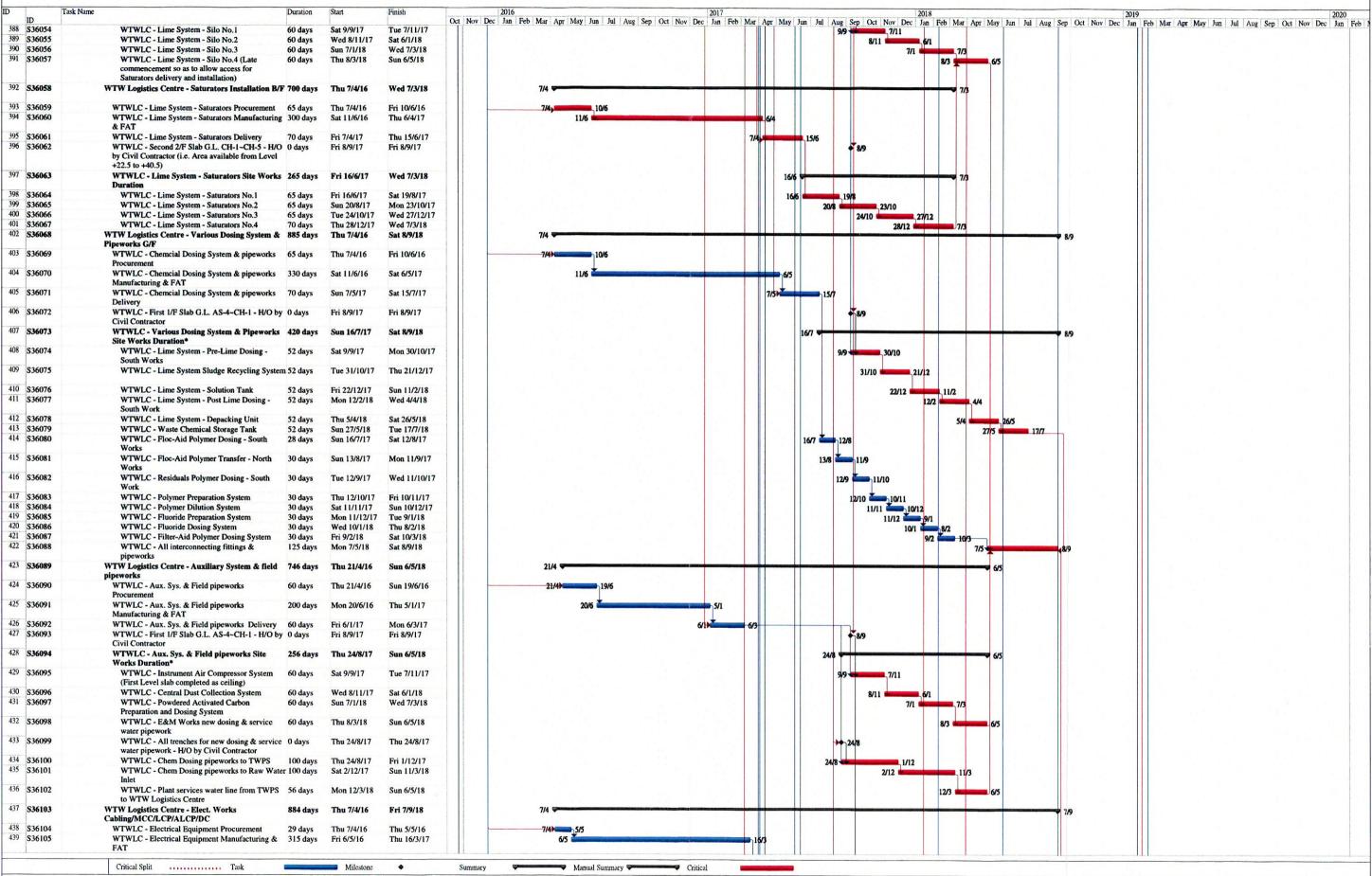
Master Programme (Ver.03)



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

Master Programme (Ver.03)

Date: 21 November 2016



Commencement Date: 30 Oct 2015 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 Master Programme (Ver.03) Date: 21 November 2016 2016 - 2017 - 2018 - 2018 - 2018 - 2019 - 20 Duration 440 S36106 441 S36107 WTWLC - Electrical Equipment Delivery WTWLC - Electrical Battery Room Installation Fri 17/3/17 Mon 15/5/17 60 days 30 days Thu 11/1/18 Fri 9/2/18 442 S36108 WTWLC - Tx Room Installat 60 days Thu 11/1/18 Sun 11/3/18 443 \$36109 WTWLC - Electrical LVSB Installation 60 days Thu 11/1/18 Sun 11/3/18 11/3 444 S36110 WTWLC - Energisation 30 days Mon 12/3/18 Tue 10/4/18 445 S36111 WTWLC - Cabling works & Termination Wed 11/4/18 150 days Fri 7/9/18 446 S36112 WTWLC - DCS 180 days Tue 13/6/17 Sat 9/12/17 447 S36113 WTW Logistics Centre - HV Works
WTWLC/NWTPH - 11KV Supply Installation incl. Mon 3/4/17 Wed 13/9/17 164 days 13/9 448 S36114 90 days Mon 3/4/17 Sat 1/7/17 HVSB at 1/F of TPH 449 S36115 WTWLC/NWTPH - CLP Mobilization for 11KV 30 days Sun 2/7/17 Mon 31/7/17 20 - 110 450 S36116 WTWLC/NWTPH - CLP T&C of the completed 11 7 days Tue 1/8/17 Mon 7/8/17 kV HV cables 451 S36117 WTWLC/NWTPH - 11KV Switchboard T&C incl. 7 days Tue 8/8/17 Mon 14/8/17 8/8 14/8 CLP - Partial due to incompletion of WTWLC 452 S36118 WTWLC/NWTPH - 11kV Energisation Tue 15/8/17 Wed 13/9/17 453 **S36119** WTW Logistics Centre - T&C 9/9 8/10 143 days Sun 9/9/18 Tue 29/1/19 454 S36120 WTWLC - T&C Individual Test Sun 9/9/18 30 days Mon 8/10/18 455 S36121 WTWLC - T&C Preliminary Test Tue 9/10/18 60 days 456 S36122 WTWLC - T&C Precommissioning Test
WTWLC - T&C Commissioning Test 8/12 22/12 15 days Sat 8/12/18 Sat 22/12/18 457 S36123 38 days Sun 23/12/18 Tue 29/1/19 23/12 458 S36124 WTW Logistic Centre - External E&M Site Works 316 days Thu 24/8/17 Thu 5/7/18 459 S36125 WTWLC - T02 Trench/Civil Works - H/O by Civil Thu 24/8/17 Thu 24/8/17 0 days 460 S36126 WTWLC - T03 Trench/Civil Works - H/O by Civil 0 days Thu 24/8/17 Thu 24/8/17 461 S36127 WTWLC - Installation of new Process pipeline to 90 days Thu 24/8/17 Tue 21/11/17 existing dosing points 462 S36128 WTWLC - PSW From Existing treated water pump 180 days Thu 24/8/17 Mon 19/2/18 463 S36129 WTWLC - Plant Service Water System 68 days Tue 20/2/18 Sat 28/4/18 464 S36130 WTWLC - Plant Service Water High Pressure System 68 days Sun 29/4/18 465 **S36131** Saturation Tanks - E&M Works Tue 6/12/16 Thu 1/11/18 696 days 6/12 466 S36132 Saturation Tanks - Alum System Procurement 25 days Tue 6/12/16 Fri 30/12/16 6/12 30/12 467 S36133 Saturation Tanks - Alum System Manufacturing & FAT 100 days Sat 31/12/16 Sun 9/4/17 468 S36134 Saturation Tanks - Alum System Delivery 40 days Mon 10/4/17 Fri 19/5/17 469 S36135 Saturation Tanks - First 1/F Slab G.L. AS-4~CH-1 - 0 days Fri 8/9/17 Fri 8/9/17 470 S36136 Saturation Tanks - Alum System Site Works Duration\* 420 days Fri 8/9/17 Thu 1/11/18 1/11 471 S36137 Saturation Tanks - Alum System - Saturation Tanks 120 days Fri 5/1/18 Fri 8/9/17 472 S36138 Saturation Tanks - Alum System - Process pumps & 120 days Sat 6/1/18 Sat 5/5/18 Solution tank 473 S36139 Saturation Tanks - Alum System - Electrical & ICA 90 days Sun 6/5/18 Fri 3/8/18 474 S36140 Saturation Tanks - Alum System - Energisation Sat 4/8/18 Sun 2/9/18 475 S36141 Saturation Tanks - Alum System - T&C 60 days Mon 3/9/18 Thu 1/11/18 476 S36142 EMSD inspection of lift 1 day Wed 17/10/18 Wed 17/10/18 **4** 17/10 477 S36143 WSD inspection Mon 22/10/18 Mon 22/10/18 1 day **22/10** 478 S36144 FSD inspection Thu 22/11/18 Thu 22/11/18 1 day **4** 22/11 479 S36145 Finishing works 240 day: Mon 4/6/18 Tue 29/1/19 480 S36146 Completion of architectural finishes and relevant building 1 day Wed 30/1/19 Wed 30/1/19 works (both internal and external) 481 **S3700** Sat 3/6/17 **Piping Works** 242 days Tue 30/1/18 482 S3701 Excavation for piping works Sat 3/6/17 Wed 25/10/17 25/10 483 S3702 Trench and steel frame construction (Completion of 20% 30 days of all civil works of Process Piping) Sat 3/6/17 Sun 2/7/17 484 S3703 Trench and steel frame construction ( Completion of 40% 30 days of all civil works of Process Piping) Mon 3/7/17 Tue 1/8/17 3/7 485 S3704 Trench and steel frame construction ( Completion of 60% 30 days Wed 2/8/17 Thu 31/8/17 of all civil works of Process Piping) 486 S3705 Trench and steel frame construction (Completion of 80% 30 days Fri 1/9/17 Sat 30/9/17 1/9 30/9 of all civil works of Process Piping) 487 S3706 Trench and steel frame construction ( Completion of 30 days Sun 1/10/17 Mon 30/10/17 1/10 100% of all civil works of Process Piping) 488 S3707 Pipe line installation (Completion of 20% of all E&M 30 days Sat 3/6/17 Sun 2/7/17 works of Process Piping) 489 S3708 Pipe line installation (Completion of 40% of all E&M 30 days Mon 3/7/17 Tue 1/8/17 works of Process Piping) 490 S3709 Pipe line installation (Completion of 60% of all E&M 30 days Wed 2/8/17 Thu 31/8/17 works of Process Piping) 491 S3710 Pipe line installation (Completion of 80% of all E&M 30 days Fri 1/9/17 Sat 30/9/17 works of Process Piping) 492 S3711 Pipe line installation (Completion of 100% of all E&M 29 days Sun 1/10/17 Sun 29/10/17 1/10 29/10 works of Process Piping) 493 S3712 Pine Line Testing 152 days Fri 1/9/17 Tue 30/1/18 494 \$3713 Completion of all site testing and operation Tue 30/1/18 1 day Tue 30/1/18

Commencement Date: 30 Oct 201 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)

Road Works

**Section 3 Completion** 

Road drainage and kerb construction

Critical Split ..... Task

Construction of road surface

515 days

365 days

150 days

1 day

Mon 3/7/17

Mon 3/7/17

Tue 3/7/18

Wed 30/1/19

Milestone

Thu 29/11/18

Mon 2/7/18

Thu 29/11/18

Wed 30/1/19

495 **S3800** 

496 S3801

497 S3802

498 S3803



Contract No.: 3/WSD/15
Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works Master Programme (Ver.03) Date: 21 November 2016

Task Name | 2016 | 2018 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | Duration Start | ID | 499 | \$4000 | 500 | \$4001 | 501 | \$4100 | 502 | \$4101 | 503 | \$4102 | 504 | \$4002 | 505 | \$85001 | 507 | \$8500 | 508 | \$5101 | 509 | \$5102 | 510 | \$5103 | \$5104 | 511 | \$5104 | 512 | \$5105 | 513 | \$85002 | \$5002 | 510 | 5113 | \$5002 Mon 2/1/17 Mon 2/1/17 Section 4
Section 4 Commencement Sat 31/8/19 972 days Mon 2/1/17 **♦ 2/1** 1 day 455 days Landscaping Softworks & Establishment Works Landscaping Soft works Establishment works Fri 1/6/18 Thu 29/8/19 90 days Fri 1/6/18 Wed 29/8/18 365 days Thu 30/8/18 Thu 29/8/19 29/8 Section 4 Completion 1 day Sat 31/8/19 1558 days Fri 30/10/15 1 day Fri 30/10/15 Sat 31/8/19 Mon 3/2/20 <del>443</del>1/8 Section 5 Section 5 Commencement

Landscaping Softworks & Establishment Works

Preparation of site area for planting works

Transplanting works 1 day Fri 30/10/1 1390 days Fri 8/1/16 Fri 30/10/15 ♦ 30/10 Mon 28/10/19 28/10 Wed 27/1/16 8/1 \_\_\_\_27/1 20 days Fri 8/1/16 200 days 365 days 90 days Thu 28/1/16 Sun 14/8/16 15/8 Establishment for transplanting works Mon 14/8/17 Mon 15/8/16 Landscaping Soft works
Establishment works Tue 31/7/18 Sun 28/10/18 29/10 365 days Mon 29/10/18 Mon 28/10/19 **Section 5 Completion** Mon 3/2/20 1 day Mon 3/2/20 443/2

Critical Split ..... Task Commencement Date: 30 Oct 2015

Milestone

(EOT for Claim no. 009)

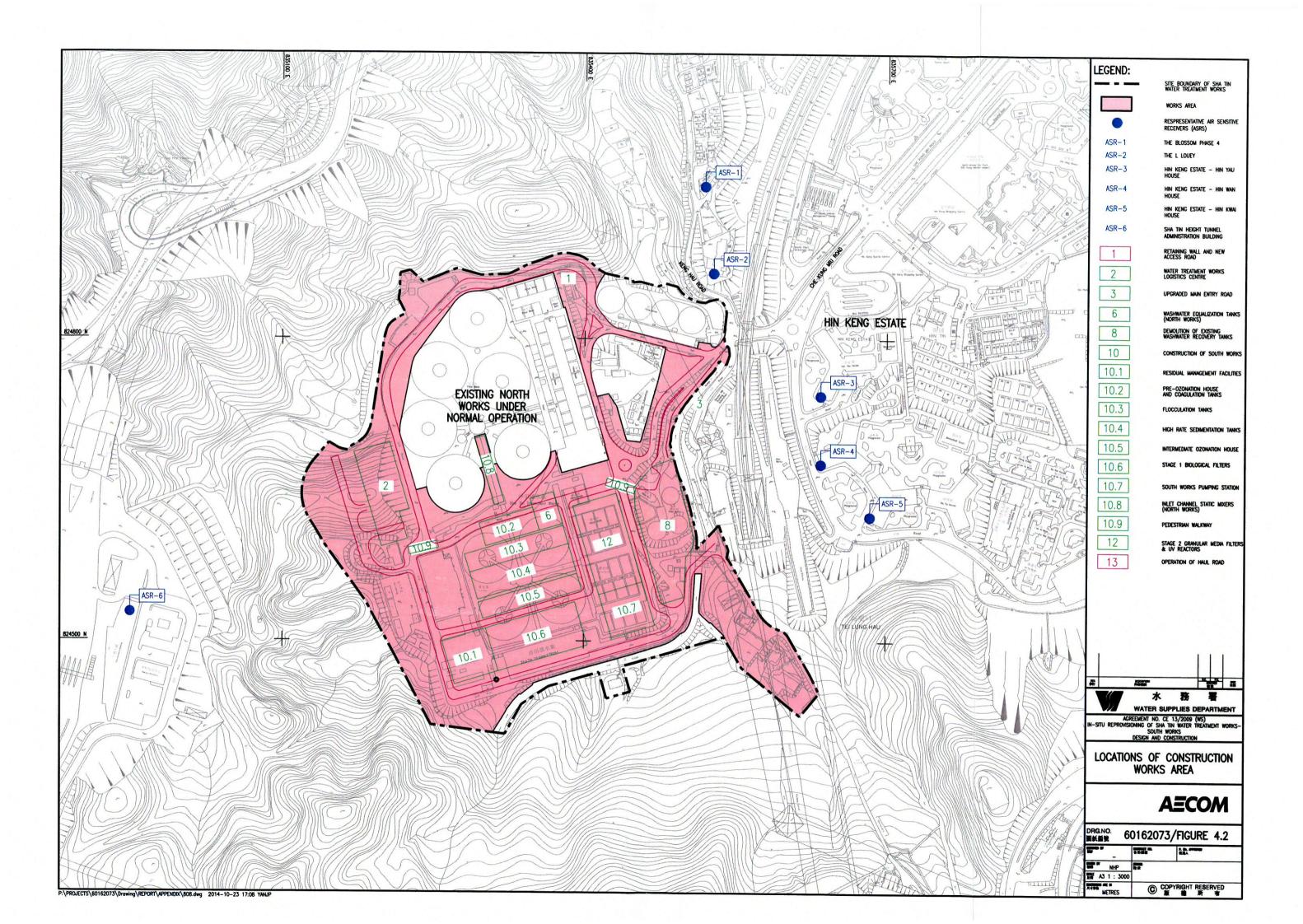
Completion Date: 3 Feb 2020



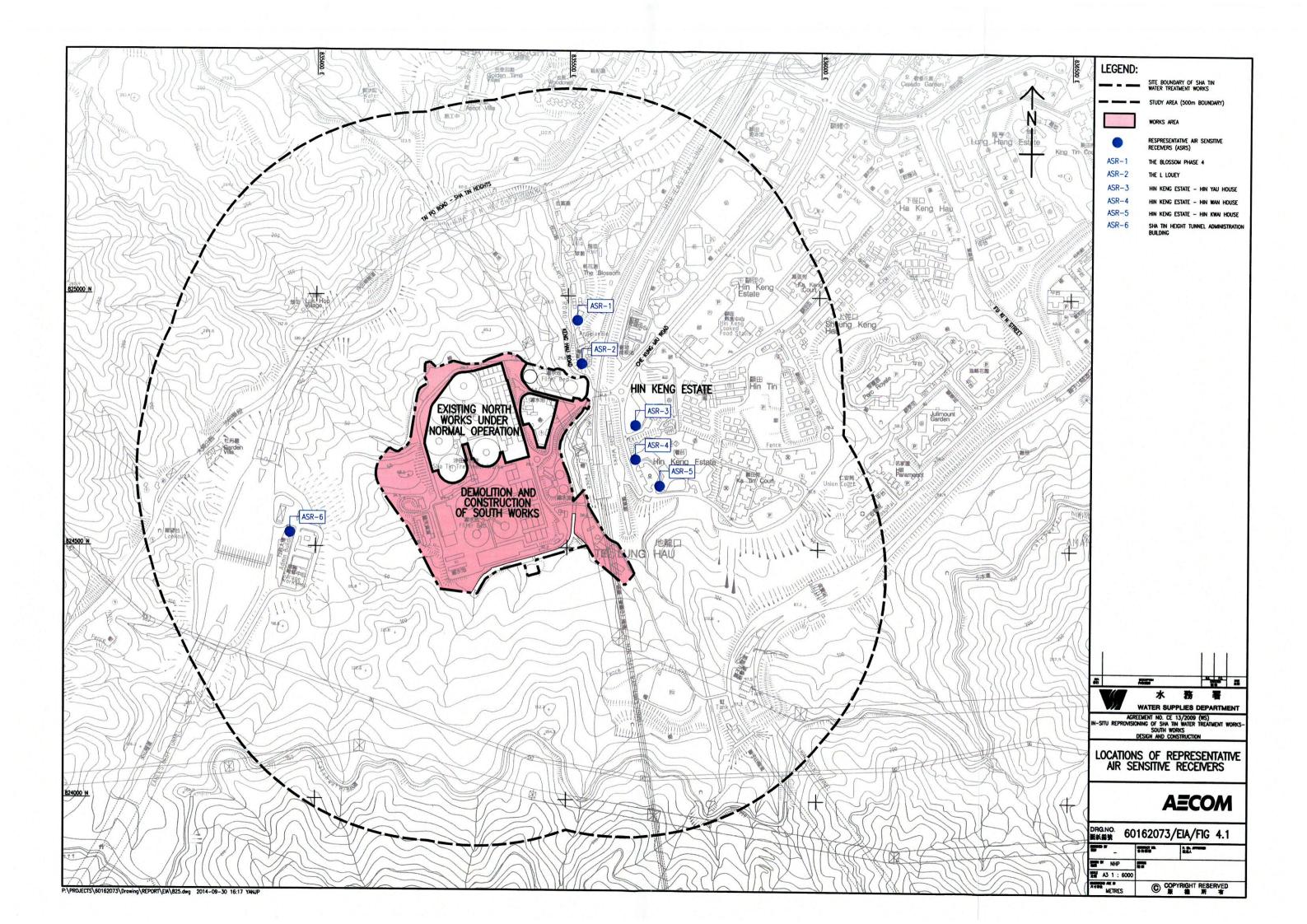


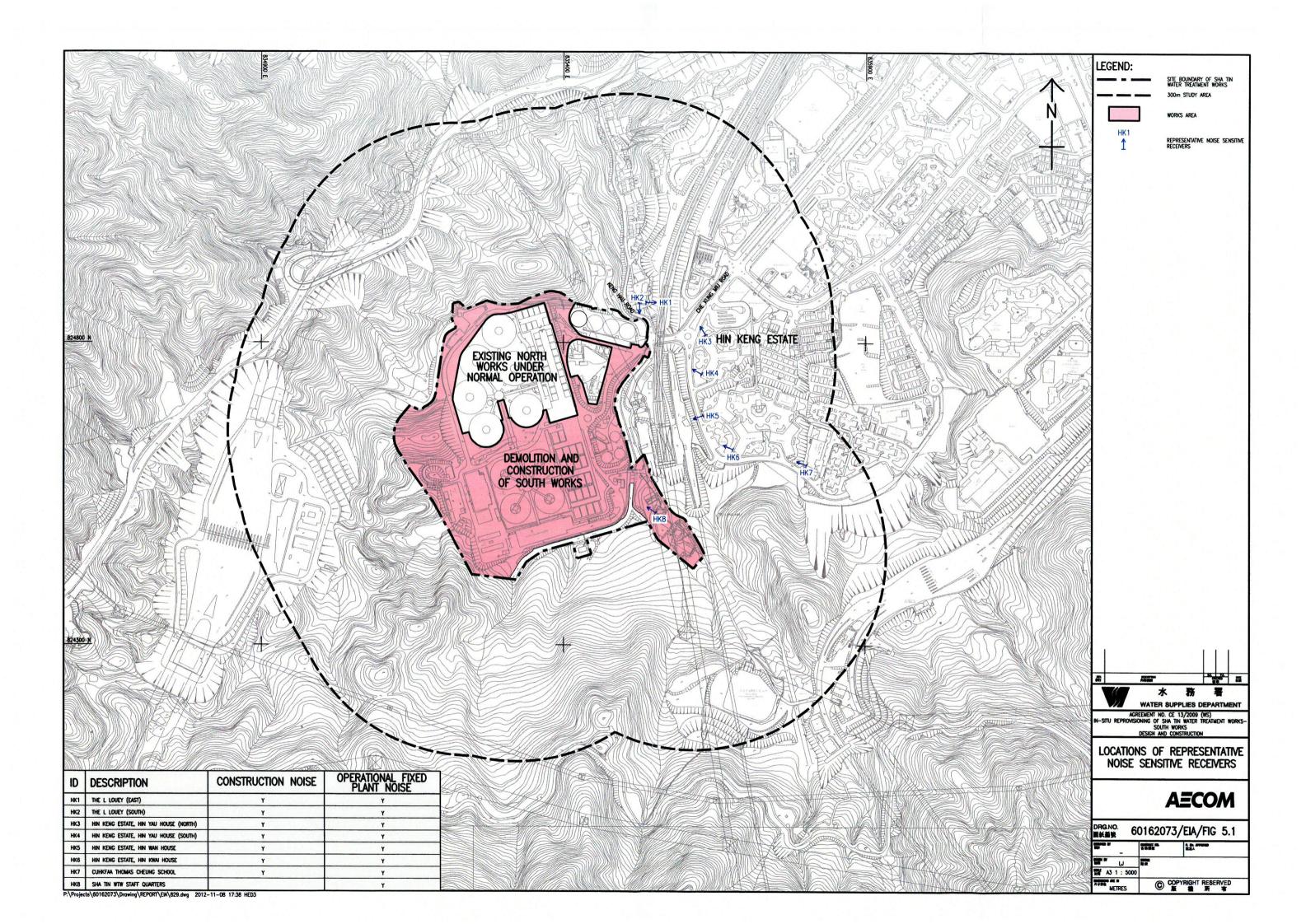
Manual Summary

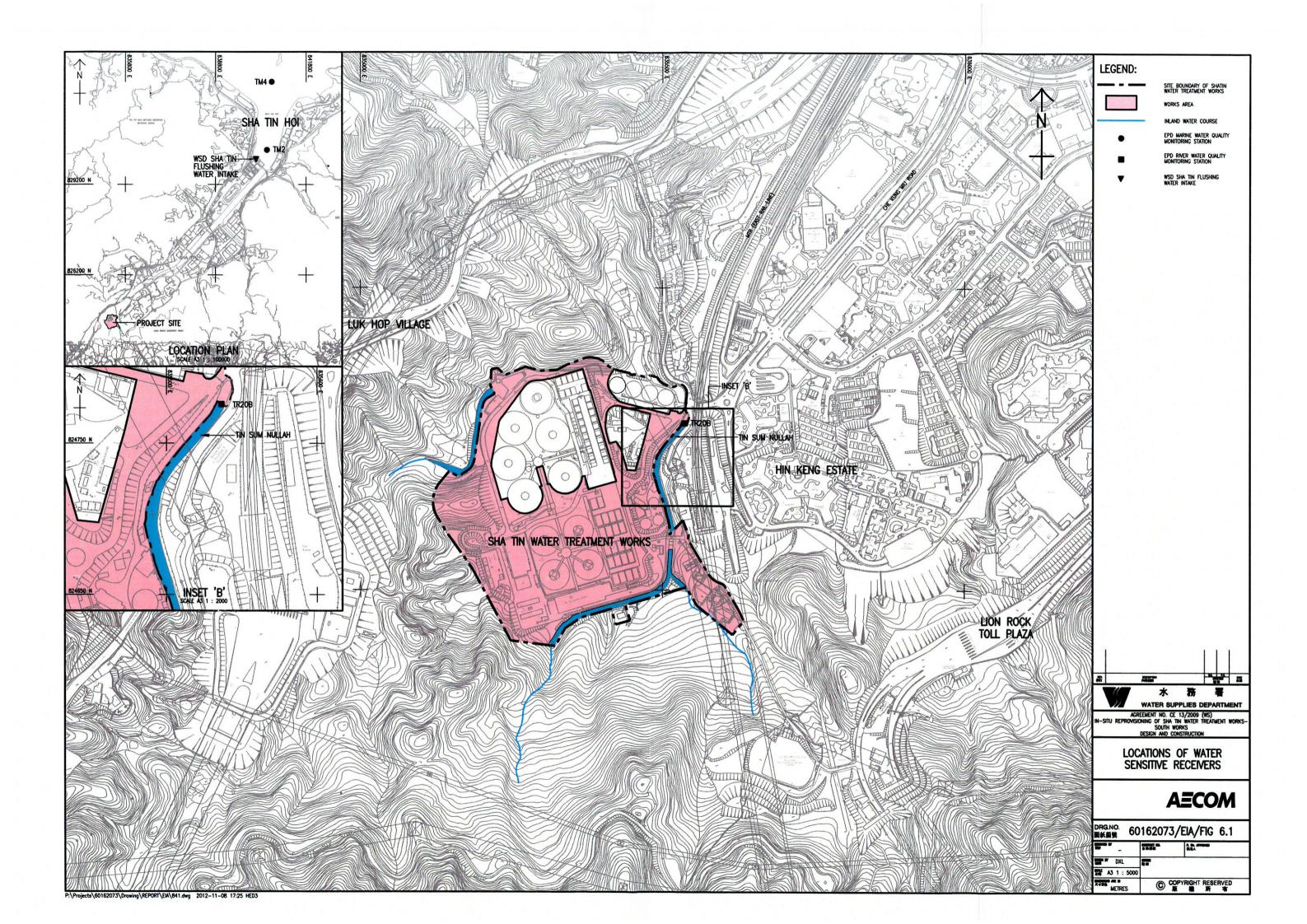
## Appendix D Location of Construction Activities



# Appendix E Environmental Sensitive Receivers in the Vicinity of the Project







# Appendix F Summary of Action and Limit Levels

#### Determination of Action and Limit Levels for Air Quality

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

#### Determination of Action and Limit Levels for Noise

Monitoring	Action Level	Limit Level in dB(A)				
Location	0700-1900 hours on normal weekdays					
NM1		For domestic premises: 75 dB(A) for				
NM2	When one documented	NM1 & NM2				
ND 60	complaint is received	For schools: 70dB(A) during normal				
NM3		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)	Suspende (mg/		Turbidity	y (NTU)	pl	Н
monitoring stations	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit 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	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

FVENT		ACT	TION	
EVENT	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one	1. Inform the Contractor, IEC	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	The part of the last to the la	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	Check monitoring data	1. Confirm receipt of	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 IEC, ER and Contractor; and 6. If exceedance stops,			Amend proposal as appropriate.
	cease additional monitoring.			
LIMIT LEVEL		<b>T</b>		
Event	ET	IEC	ER	CONTRACTOR
1. Exceedance for one	1. Inform the Contractor,	Check monitoring data	1. Confirm receipt of	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	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
× 1 × 1 × 1	the Contractor's remedial		stop that portion of work	6. Stop the relevant portion
x 1	measures and keep IEC, EPD		until the exceedance is	of works as determined by
* 7 * 1	and ER informed of the results;		abated.	the ER until the exceedance
	and			is abated.
×*	7. If exceedance stops, cease			
	additional monitoring.			

### Noise

CVENT	ACTION							
EVENT	ET	IEC	ER	CONTRACTOR				
ACTION LEVEL	1. Notify the Contractor, IEC	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,	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 E				

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

### Water Quality

FVFNIT				ACT	TION			
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
я		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
	8	Contractor;						three working days;
	•	Ensure mitigation					•	Implement the agreed
		measures are						mitigation measures.
		implemented;						
	•	Prepare to increase the						
		monitoring frequency to						
		daily;						

	•	Repeat measurement			8		2.7	
		on next day of						
		exceedance.						
		ET Leader		IEC	15000	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
	Î	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	5.	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;

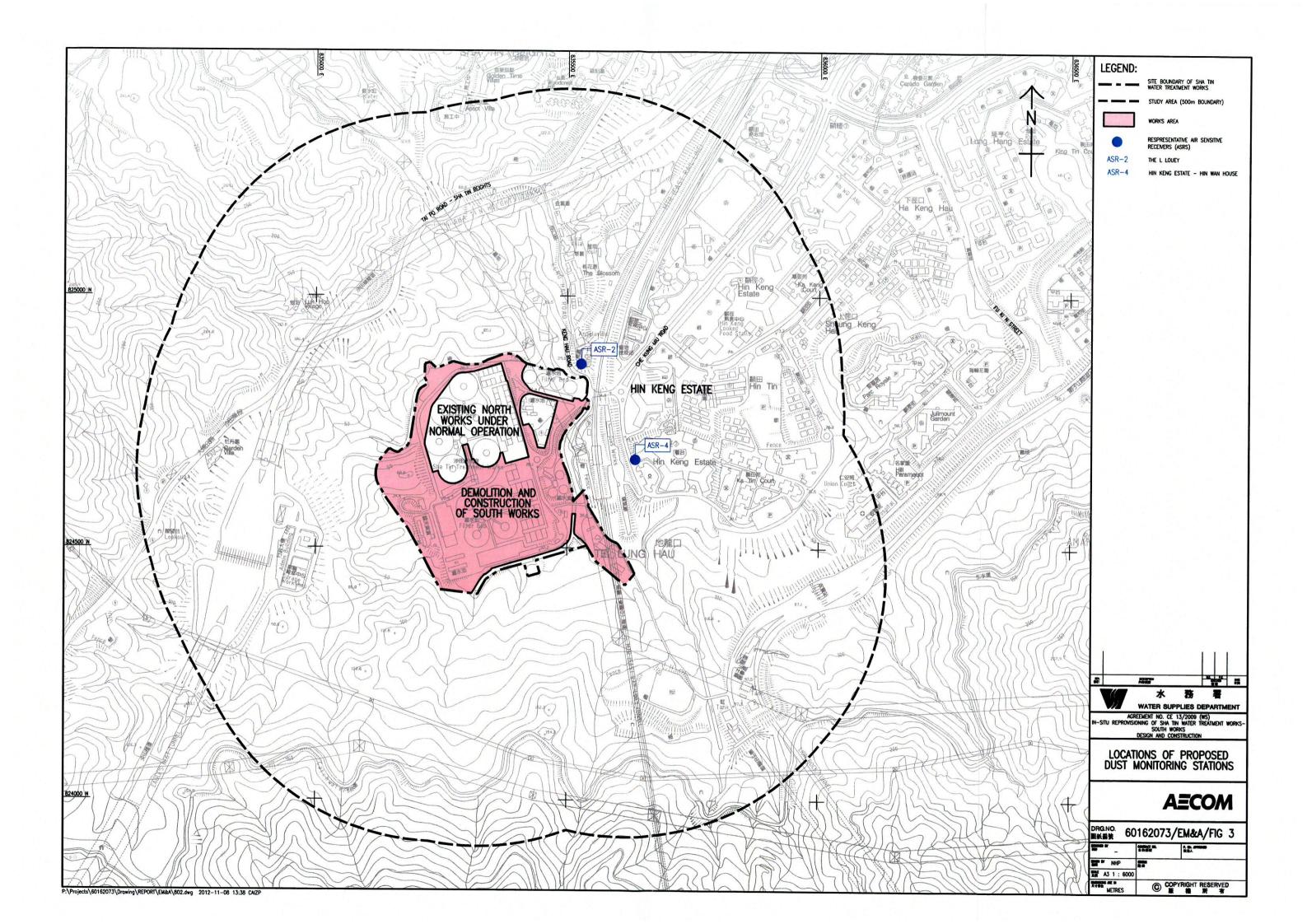
implemented; Increase	down or to stop all or	•	As directed by the ER,
the monitoring	part of the construction		to slow down or to stop
frequency to daily until	activities until no		all or part of the
no exceedance of Limit	exceedance of Limit		construction activities.
level for two	level.		
consecutive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

# Appendix H Impact Monitoring Schedules

Impact Monitoring Schedule for STWTW

Jul-17								
Sun	Mon	Tue	Wed	Thur	Fri	Sat		
						1		
						1		
2	3	4	5	6	7	8		
	Impact		Impact		Impact			
	i i							
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	Air monitoring for AM1 & AM2		C2, C3, W12, W12 & W13		Air monitoring for AM1 & AM2			
	Noise monitoring for NM1, NM2				Noise monitoring for NM1, NM2			
	& NM3				& NM3			
9	10	11	12	13	14	15		
	Impact		Impact		Impact			
	mpace				mpace			
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	C2, C3, M1, M2 & M3		Air monitoring for AM1 & AM2		C2, C3, IVI1, IVI2 & IVI3			
			Noise monitoring for NM1, NM2					
			& NM3					
16	17	18	19	20	21	22		
16		18		20	21	22		
16	17 Impact	18	19 Impact	20	21 Impact	22		
16	Impact	18	Impact	20	Impact	22		
16	Impact Water Quality monitoring for C1,	18	Impact Water Quality monitoring for C1,	20	Impact Water Quality monitoring for C1,	22		
16	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	18	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	Impact Water Quality monitoring for C1,	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	Impact Water Quality monitoring for C1,	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	Impact Water Quality monitoring for C1,	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	Impact Water Quality monitoring for C1,	20	Impact  Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2	22		
	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			
23	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	20	Impact  Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	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			
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# Appendix I Location Plan of Air Quality Monitoring Station



# Appendix J Calibration Certificates (Air Monitoring)



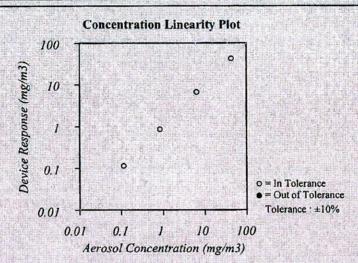
### CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions					
Temperature 73.92 (23.3) °F (°C)					
Relative Humidity	59.8	%RH			
Barometric Pressure	28.73 (972.9)	inHg (hPa)			

Model	8532
Serial Number	8532114409

☐ As Left ☐ In Tolerance ☐ Out of Tolerance



System ID: DTI101-02

FLOW AND P	RESSURE VI	ERIFICATION					SYSTEM DTII01-02
Parameter	Standard	Measured	Allowable Range	Parameter	Standard	Measured	Allowable Range
Flow Ipm	ORDER OF THE OWN	2.0	2.97~3.29	Pressure kPa	97.3	073	92.44 ~ 102.17

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in 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 MIST 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, Al test dust (Arizona dust) Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System 1D	Last Cal.	Cal. Due
Temp/Humidity	E005656	03-08-16	03-08-17	Temp/Humidity	E005657	03-16-16	03-16-17
DC Voltage	E003314	05-19-16	05-19-17	DC Voltage	E003315	05-19-16	05-19-17
Photometer	E003319	01-22-16	07-22-16	Microbalance	M001324	01-05-15	01-05-17
1 um PSL	655458	n/a	n/a	3 um PSL	43042	n/a	n/a
10 um PSL	42808	n/a	n/a	Pressure	E003511	10-22-15	10-22-16
Flowmeter	E002471	04-26-16	04-26-17				

Sour Chang

June 15, 2016

Date



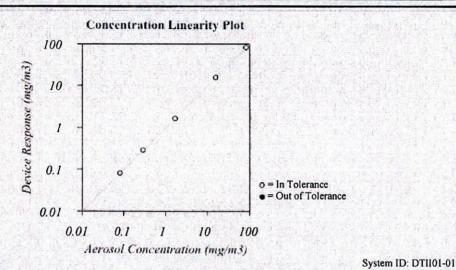
### CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions				
Temperature	74.1 (23.4)	°F (°C)		
Relative Humidity	31	%RH		
Barometric Pressure	28.81 (975.6)	inHg (hPa)		

Model	AM520
Serial Number	5201704001

A 100	⊠ As Left	☑ In Tolerance
	☐ As Found	Out of Tolerance



CONCENTRATION Unit: mg/m3 STANDARD MEASURED ALLOWABLE RANGE STANDARD MEASURED ALLOWABLE RANGE 0.082 0.081 0.057~0.107 4 15.792 15.700 14,213~17,371 0.290 0.290 0.247~0.333 5 82.275 81.990 74.047~90.503 1.486~1.816 1.651 1.611

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in 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	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-06-16	03-06-17	Flowmeter	E004570	06-29-16	06-29-17
DC Voltage(Keithley)	E002859	11-04-16	11-30-17	Microbalance	M001324	11-02-16	11-30-18
Temp/Humidity	E005656	03-08-16	03-08-17	Temp/Humidity	E005657	03-16-16	03-16-17
Pressure	E003440	08-02-16	08-02-17				

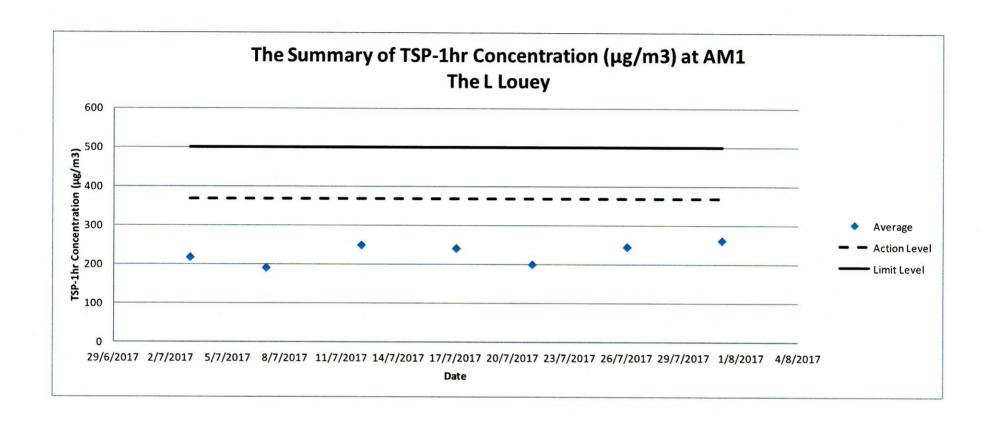
Linda Willheimer

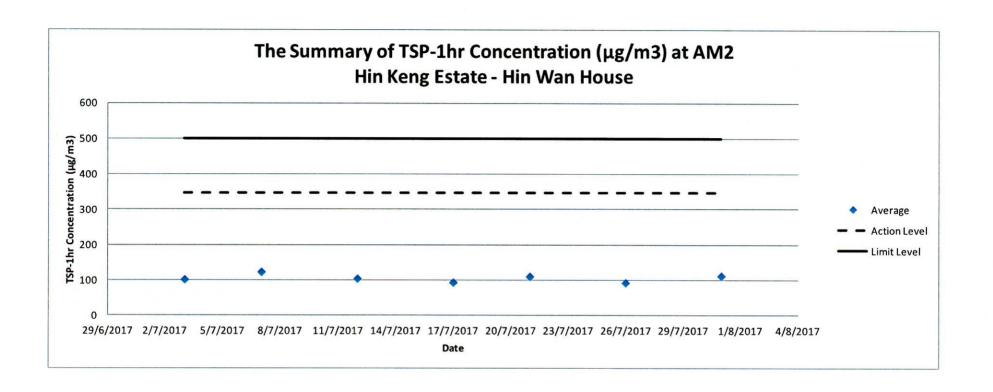
January 23, 2017

Date

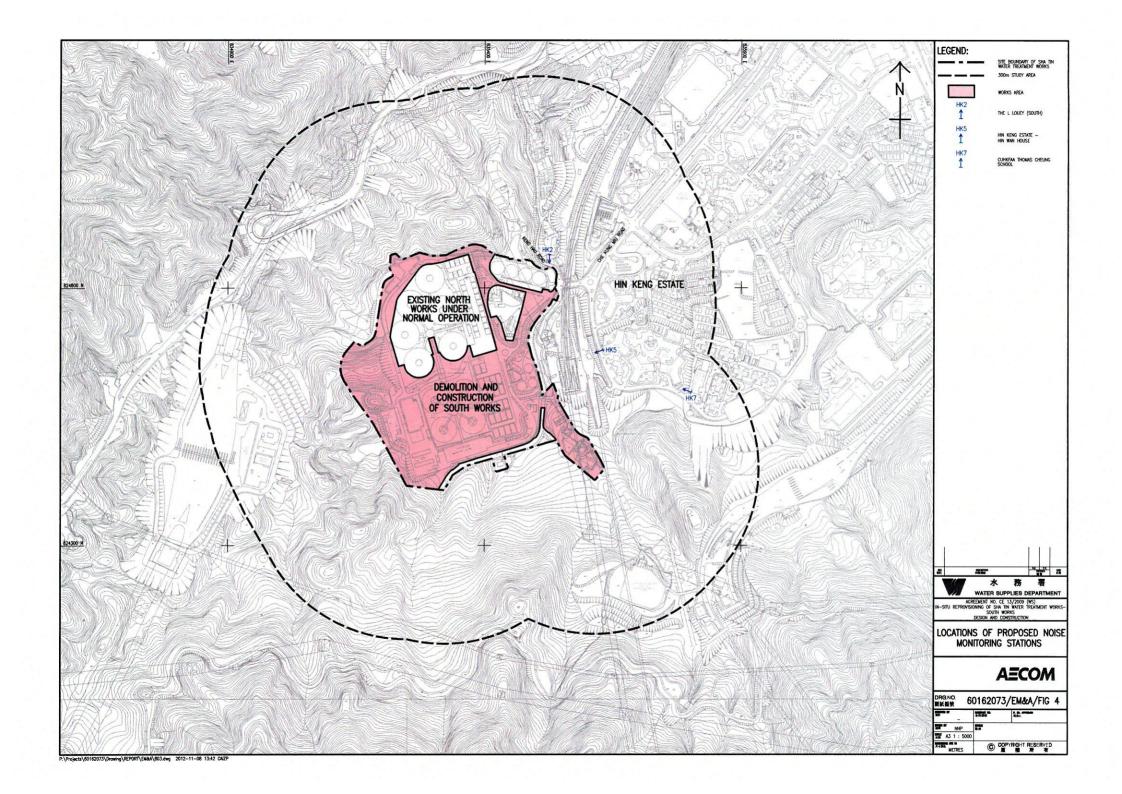
SI P/N 2300157

# Appendix K Impact Air Quality Monitoring Results and Graphical Presentation





# Appendix L Location Plan of Noise Monitoring Station



# Appendix M Calibration Certificates (Noise)





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.

SENSOR	1000	2000	2800	3000	3500	3500	4890	4200	4250	4300	4400	#500	4500	ACCURACY (+/-)*	SENSO	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed   Air Flow										•	ŀ		HOR	Larger of 3% of reading least significant digit or 20 filmin	0.1 m/s 1 filmin 0.1 km/h 0.1 km/h 0.1 km/h 1.5	0.6 to 40.0 mys 118 to 7,674 ft mm 2.2 to 144.0 km/h 1.3 to 86.5 mph 1.2 to 77.8 kmots 0 to 12.8	0.6 to 60.0 m/s 118 to 11,811 filmin 2.2 to 216.0 km/s 1.3 to 134.2 mpn 1.2 to 116.6 km/s 0 to 128.	I notici2 mm dameter impoler with precision ask and love-fiction Zyfalli branting. Starking is stated as lever first, readings may be later down to 64 min / 19 filtren ; 15 min ). If year, 15 min is empty to the impole stated on Chrass accuracy 14, 92 of editors, 29 (4) of 3-98; 92 filtren of the control of the impole stated on Chrass accuracy 14, 92 of editors, 29 (4) of 3-98; 93 filtren of the impole stated on the import of soor disk stated on the impole stated on the import of soor disk stated on the impo
Ambient Temperature			•		•			•			•	•	•	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	Hermitically vasible, precision in territoris mounted estimates are berriarly, inclined (LIS False- 5.958-65) for rapid response. Afforced 2.2 mg/s) mor greate provides feelest response exaction of mischine reflect. Calazironi der register. Emmatter arey as the less than seed to make interpretate of valetie or service, submirringly berriarity priction into material in-service register. Seeder priction of the control of the
Globe Temperature - Tg			and the		3225		100					O.E.		14°C	01 °F 01 °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 convented to Tg equivalent fi standard 6 in/150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph/1 ms.
Relative Humidity														3.0 %RH	0.1 NRH	5 to 95% non-condensing	0 to 100%	Polymer capacitive humidity sensor mounted in this waited champer external to case for rapid accurate response (US Palerie 6.25 7.074). To exhibite stated accuracy, will make be primitively explicate to external temperature where explosed to large rapid temperature changes and be out of direct sunlight. Californion et it in 25 years 24 months. Humidity sensor may be incubitively all factory or in Endet camps Kassler Humidity Californion (NR IR-M-0802).
Pressure						•	•			1000			•	inHg 10 hPs Imber 0.01 PSi	0.01 inHg 0.1 hPainbar 0.01 PSi	8 86 to 32 49 inHg 300 0 to 1100 0 hPaintear 4.35 to 15.95 PSI and 32.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48 87 inHg 10 0 to 1604.7 RPaymeter 0.14 to 24 D0 PSH annul 14 0 to 151.0 °F -10 0 to 55 0 °C	Monothic sixon pazoresistive pressure sensor with second-order temperature correction. Pressure sensor may be readinated at factory or in fell. Adjustable reference alklus alknow alsoays of station pressure or tearments pressure centered to SIK. Kastelal (200 display station pressure on advicated screen. Restrict 2500 and 3500 display continuously adorsing when the tearment pressure are not disclanation maying region fing steady, falling falling as Kastel 4000 sensor sold pressure are not disnaying graphing function. PSI display on Mostric 4000 sensor, only
Compass					×	SIF!		100	0	21	135			Me to	1" 1/16th Cardinal Scale	0 to 360°	0 to 360*	2-axis sold-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon units vertical position. Self-satisfaction recursive remarks magnetic en from bildness or unit and man the unit after week in plane-device (batter) remarks of the magnetic entrangent in the case of the unit is pointed when held in a varical contraders of the sensor device the production of the sensor device the
											200			CALCUL	ATED ME	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								•						0.0002 lb/ft <sup>3</sup> 0.0033 kg/m <sup>3</sup>	0.001 bs/ft <sup>3</sup> 0.001 kg/m <sup>3</sup>	Refer to Ranges for Sensors Employed	Temperature Relative Hurridity Pressure	Misss of air per unit volume
Air Flow														6.71%	1 ofm 1 m/m 1 m/m 0 tm/m	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 measurem and user-specified duct shape (circle or rectangle) and dimensions (units: in ft, cm or m). Meximum duct dimension input: 258.0 in   21.5 ft   655.3 cm   6.55 m.
Altitude														1ypical: 23.6 ft 7.2 m max: 48.2 ft	1 to	typical. 750 to 1100 mBar max 300 to 750 mBar	Pressure User input (Reference Pressure)	Height above Mean Sep Level ("MSL") Temperature compensated pressure (berometric) altimater requires accurate reference barometric pressure to produce maximum absolute accuracy. Beth accuracy speec corresponds to a reference pressure ampliere from #50 to 1
Barometric Pressure			•										•	14.7 m 0.07 inHg 2.4 hPsimber	0.01 inHg 0.1 hPalmbar	Refer to Ranges for Sensors Employed	Pressure User Input (Reference Attitude)	milia.  Air pressure that would be present in identical conditions at MSI. Station pressure comparisation for local elevation provided by reterance attitude. Requires accurate reference attitude to prod
Crosswind & Headwind/Teilwind								1000	300	200				0.03 PSi 7.1%	0 01 PSI 1 mpl: 1 ff/min 0 1 km/h 0.1 m/s	Refer to Ranges for Sensors Employed	Wind Speed Compass	maintain a bookle accuracy  Effective varid relative to a target or bravel direction. Auto-switching headerindtailuind indicator.
Delta 7								Н	+	-	-	STR	278	32°F 18°C	0.1 knots 0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humiday	Difference between dry bulb temperature and wet bulb temperature. When spraying, indicates
Density Altitude						NESS.								226 ft	18	Refer to Ranges for	Pressure Temperature Relative Hurrich	evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 °F / 2 to 5 °L Local air density converted to equivalent elevation above sea level in a uniform layer consists.
Dewpoint														58 m	1 m	Sensors Employed 15 to 95 % RH Refer to Range for	Pressure Temperature	the international Standard Atmosphere.  Temperature that a volume of air must be cooled to at constant pressure for the water vapor
Evaporation Rate	100		101					14	133					0.01 to/ft <sup>2</sup> /hr 0.06 to/ft <sup>2</sup> /hr	0.01 biff/hi 0.01 biff/hi	Temperature Sensor  Refer to Ranges for Sensors Employed	Relative Hurridity  Wind Speed  Temperature Relative Hurridity  Pressure	present fit conditions into draw and form on a cold surface. Can also be considered to be the selective-draw statistics therepression.  The rise of which meabase is bat from the surface of caring concess. Requires user measurement and entry of docrease the temperature obtained when a sourcess fit or probe thermoment of the probe that the surface of the selective of the surface post surface that the surface of the surface of the selective salengiate in surface with the thermost harded, and waveget for 6-10 seconds using busin as using graduation.
Heat Index							789							7.1 °F 40°C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	User input (Concrete Temperature)  Temperature Relative Humidity	Perceived temperature resulting from the combined effect of temperature and relative humbling Calculated based on NVVS Heat takes (HR) tables. Measurement range broken by output of
Moisture Content   lumidity Ratio ("Grains")							0.000				ZNO			3 gos 64	0.1 gap 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Hurridty	published tables  Mass of water vapor in a mass of air.
Relative Air Density								EEN						0.3%	0.1%	Refer to Ranges for Sensors Employed	Pressure Temperature Relative Humidity	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
hermal Work Limit (TWL)											•			10.9 W/m²	0 1 Wim²	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature Globe Temperature Relative Hurridity	Estimated self-emailmum centinuously sustainable human metabolic rate (Wind) for the conditions and culting fracters. Based off of estimated metabolic output of typical human. On screen zone warmings.
Outdoor Wet Built Globe Temperature (WBGT)	1								N.	18				13 F 07 °C	01°F	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature Globe Temperature Relative Hurridty	Measure of human heat stress defined as the combination of effects due to radiation, connect and conduction. Outdoor WRST is calculated from a weighted sum of netural vet bulk (Tinub), gibble temperature (Tig), and of yo
Wet Bulb Temperature - iturally Aspirated (Triwb)											•			1.4 °F 0.6 °C	01°F 01°C	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature Gibt Temperature Relative Hurriday Pressure	Similar to psychrometric web-built temperature (see below). However, Tinde only undergoes for convection from the ambient air velocity. Tinde is a measure of the evaporative cooling that the will also. This is accounted for by combring the effects of, mainly, relative humstly and windspeed.
Wet Bulb Temperature - Psychrometric					•									32 °F 18 °C	01°F 01°C	Refer to Ranges for Sensors Employed	Temperature Relative Humsdity Pressure	Temperature indicated by a sting psychrometer. Due to nature of the psychrometer ratio for a water-air system, this approximates the thermodynamic web-bulb temperature. The thormodyn self-bulb temperature is the temperature a parcet of air would have if cooled aduationly to
Wind Chill	Q.			•		100		•			•			16°F 08°C	01°F 01°C	Refer to Ranges for Sensors Employed	Wind Speed Temporature	saturation temperature visualizer aspects light into it.  Perceived temperature resulting from combined effect of wind speed and temperature. Cabilities also also the MVM White Child Temperature (WCT) Index, revised 2001, with wind speed again by a factor of 1.5 to yeld equivalent results to wind speed measured at 10 m above ground. Measurement range Firstle by extend of glabilities better
CONTRACTOR OF		31			强制	16					調整	1				CIFICATIONS	Anna Maria	SECTION OF THE PROPERTY OF THE PERSON OF THE
Display & Backlight	12.1	e di con		•			200							Reflective 5 digit LCD. E	Digit height 0.36 in / 9 m	en. Choice of aviation green o	umnescent becktignt. Menual activate or visible red (NV models only) electro	unanescent backlight. Manual activation with auto-off.
Response Time & Display Update			•											Al measurements excep	p those based on relat	display. Choice of aviation give humidity respond accurate int environment. Display update	ly within I second Relative hurridity o	rectroluminescent backlight. Automatic of manual activation. nd all measuroments which include RH in their calculation may require as long as 1 minute to full
Max/Avg Wind	•	•	•		•	•								One-button clear and re- Max and everage wind o	start of Max Wind Gus	and Average Wind measurer	ment.	with all other wind-related functions air velocity, crosswind, headwindtailwind, wind chill WBGT
ata Storage & Graphical Display, Min/Max/Avg							4000	3200			2300			TWL, evaporation rate.			THE PERSON NAMED IN COLUMN TWO IS NOT THE	ate logger with graphical display Manual and auto data atorage. MiniMax/Avg history may be ret- y off except for 2 and 5 second intervals (code version 4.16 and later). Data capacity shown.
History	-		-				points	points	points	points	points	points		Requires optional PC in	serface (USB or RS-23	(2) or Rawlooth data transfer	nation and provided uniforms	
Data Connect Option		•	•		•	5.0	•		1	•	•	•	•	Bluetooth Data Trans pairing and transmitting Requires optional PC int	fer Option: Adjustable Employs Bluetooth Se terface (USB or RS-22	power consumption and radi rial Port Protocol for data tram (2) or Bustooth data transfer	o range from up to 30 ft   9 meters in smission. option and provided software	dividual unit ID and 4-digit PNN code preprogrammed for easy identification and data socurity whe
Clash (Calcad		•					•	•	•		•	•	•	Requires optional PC in Requires optional PC in	lerface (USB or RS-2) terface (USB or RS-2)	or Bluetooth data transfer     or Bluetooth data transfer	option and provided software. option and provided software.	
Clock / Calendar	•											:		Requires optional PC in	terface (USB or RS-23 n. talian, Spanish	(2) or Bluetooth data transfer	option and provided software.	
Auto Shutdown	•				-	The same of	and the same of	1		100	Library .	and the same of					to the section of the	
Auto Shutdown	:	•	•	:	:	•	:		:			:	:	CE certified, RoHS and Designed and manufact	used in the USA from L	S and imported components	Comples with Regional Value Conten	is available at additional charge) t and Taviff Code Transformation requirements for NAFTA Preference Criterion B.
Auto Shutdown Languages Certifications Origin Battery Life	:	:	:				•			•	•	:	:	CE certified, RoHS and Designed and manufact CR2032, one included Standard Models: AA	ured in the USA from U Average life, 300 hour A Alkaline, two include	S and imported components is. Battery life reduced by back if Average life, 400 hours of u	Complies with Regional Value Contentight use in 2000 to 3500 models. se, reduced by backlight or Bluetooth	t and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Auto Shutdown Languages Certifications Origin Battery Life Shoca Resistance Sealing	:	:	:			•		:		:	•	•	:	CE certified, RoHS and Designed and manufact CR2032, one, included Standard Models: AA- Mit-STD-610g, Transit Waterproof (IP67 and N	ured in the USA from U Average life, 300 hour A Alkaline, two include Shock, Method 516.5 ( EMA-8)	IS and imported components is Battery life reduced by back if Average life, 400 hours of uncodure IV, unit only, impact	Complies with Regional Value Conten- light use in 2000 to 3500 models, se, reduced by backlight or Bluetooth many damage replaceable impeller.	a and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Auto Shutdown Languages Certifications Origin Battery Life Shock Resistance		:	:				•	•				•	:	CE certified, RoHS and Designed and manufacit CR2032, one, included. Standard Models: AA- MitSTO-610g, Transit Waterproof (IPB7 and N 14" F to 131" F   -10 "C	ared in the USA from the Average life, 300 hour A Alkaline, two includes Shock Method 516.5 (EMA-8) to 55 °C. Measurement for the minimum of	IS and imported components is Battery life reduced by back if Average life, 400 hours of uncodure IV, unit only, impact	Complies with Regional Value Contentight use in 2000 to 3500 models, se, reduced by backlight or Bluetooth may damage replaceable impeller mits of the operational temperature ra	t and Tariff Code Transformation requirements for NAFTA Preference Criterion B.

<sup>\*</sup>NOTE Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the comined effects from primary sensor specifications, circuit conversions, and all other sources of error using a coverage factor of k=2, or two standard deviations (25)

NK#0011 1 12 2 11



#### Sun Creation Engineering Limited

**Calibration and Testing Laboratory** 

# Certificate of Calibration 校正證書

Certificate No.:

C166584

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號: IC16-2614) Date of Receipt / 收件日期: 15 November 2016

Description / 儀器名稱

Sound Level Meter

Manufacturer / 製造商 :

Pulsar

Model No. / 型號

43

Serial No. / 編號 Supplied By / 委託者 PN1374

Acumen Environmental Engineering and Technologies Co., Ltd.

Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 :

 $(23 \pm 2)^{\circ}$ 

C

Relative Humidity / 相對濕度 :

 $(55 \pm 20)\%$ 

Line Voltage / 電壓 : --

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期

25 November 2016

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 : \_

H T Wong Technical Officer

Certified By 核證

K C Lee Project Engineer Date of Issue 簽發日期 25 November 2016

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 and Testing Laboratory** 

# Certificate of Calibration 校正證書

Certificate No.: C166584

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** CL281

40 MHz Arbitrary Waveform Generator

C160077

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 S	Setting	Applied	UUT	
Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
LA	F	94.00	1	93.9

#### 6.1.1.2 After Self-calibration

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

6.1.2 Linearity

UUT Setting		Applied	d 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. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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

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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

Fax/傳真: 2744 8986 Tel/電話: 2927 2606

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



Sun Creation Engineering Limited

**Calibration and Testing Laboratory** 

# Certificate of Calibration 校正證書

Certificate No.:

C166584

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.
LA	F	94.00	1	93.7	Ref.
	S			93.7	± 0.3

#### 6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting		Appli	ed 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	$-26.2 \pm 1.5$
			125 Hz	77.5	-16.1 ± 1.5
. 11. juli 11. juli			250 Hz	85.0	$-8.6 \pm 1.4$
			500 Hz	90.4	$-3.2 \pm 1.4$
			1 kHz	93.7	Ref.
			2 kHz	94.9	+1.2 ± 1.6
			4 kHz	94.7	$+1.0 \pm 1.6$
			8 kHz	92.9	-1.1 (+2.1; -3.1)
			12.5 kHz	89.4	-4.3 (+3.0; -6.0)

6.3.2 C-Weighting

UUT Setting		Appli	ed Value	UUT	IEC 61672 Class 1
Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Spec. (dB)
LC	F	94.00	63 Hz	92.9	$-0.8 \pm 1.5$
			125 Hz	93.5	$-0.2 \pm 1.5$
			250 Hz	93.7	$0.0 \pm 1.4$
			500 Hz	93.7	$0.0 \pm 1.4$
		Carlotte Park	1 kHz	93.7	Ref.
		T.	2 kHz	93.5	$-0.2 \pm 1.6$
			4 kHz	93.0	$-0.8 \pm 1.6$
			8 kHz	91.0	-3.0 (+2.1; -3.1)
			12.5 kHz	87.5	-6.2 (+3.0; -6.0)

Sun Creation Engineering Limited - Calibration & Testing Laboratory c/o 4/E. Tsing Shan Wan Exchange Building. 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 郝朝工程有限公司 – 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/

Website/相址: www.suncreation.com

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 and Testing Laboratory** 

# Certificate of Calibration

Certificate No.: C166584

證書編號

Remarks: - UUT Microphone Model No.: PM1 & S/N: 011060C

- Mfr's Spec, : IEC 61672 Class 1

- Uncertainties of Applied Value: 94 dB: 63 Hz - 125 Hz  $: \pm 0.35 \, dB$ 

> 250 Hz - 500 Hz  $: \pm 0.30 \text{ dB}$ 1 kHz  $: \pm 0.20 \text{ dB}$ 2 kHz - 4 kHz  $: \pm 0.35 \, dB$ 8 kHz : ± 0.45 dB

12.5 kHz  $: \pm 0.70 \text{ dB}$  $: \pm 0.10 \text{ dB (Ref. 94 dB)}$ 

104 dB : 1 kHz 114 dB : 1 kHz  $: \pm 0.10 \text{ dB (Ref. 94 dB)}$ 

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

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

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

The test equipment used for calibration 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測源至國際標準。局部複印本證書需先獲本實驗所書面批准。



香港特別行政區政府標準及校正實驗所

### Certificate of Calibration

校正證書

Certificate No. PA160094

證書編號

Page 1 of 7 pages

(共

Customer / 客戶 Acumen Environmental Engineering & Technologies Co. Ltd.

Lot 11, Tam Kon Shan Road,

Tsing Yi (N), Hong Kong

Equipment / 儀器

Description / 名稱

Sound Calibrator

Make/製造商

RION

Model / 型號

NC-74

Serial No. / 序號

34615222

Date of Receipt / 收件日期

21 July 2016

Test Environment / 測試環境

Temperature / 溫度

 $(23 \pm 1)$  °C

Relative Humidity / 相對濕度

 $(45 \pm 8) \%$ 

Air Pressure / 氣壓

(99.5 to 99.6) kPa

Date of Test / 測試日期

22 July 2016

Test Specifications / 測試規格

To calibrate the sound pressure level, frequency and total distortion of the sound calibrator at 94 dB in accordance with the International Standard IEC 60942: 2003 Annex B.

Test Results / 測試結果

The results are detailed in the continuation pages.

**Approved Signatory** 

Lam Hoi Shan

Date: 27 July 2016

日期

批簽

Swende Lan

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (Reg. No. HOKLAS 051) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are metrologically traceable to the International System of Units (S.I.) or recognised measurement standards.

香港認可處已根據香港實驗所認可計劃,認可本實驗所 (Reg. No. HOKLAS 051) 進行《認可實驗所所名冊》內載列的指定活動。本證書所載結果可溯源至國際單位制或公認的計量標準。

The copyright of this certificate is owned by the Government of the Hong Kong Special Administrative Region. This certificate shall only be reproduced in full unless prior written approval is obtained from the Head of the Standards and Calibration Laboratory, the Government of the Hong Kong Special Administrative Region.

省港特別行政區政府擁有本證書的版權,除非事前獲得香港特別行政區政府標準及校正實驗所主管的書而批准,否則在複印本證書時必須<u>整份</u>進行。

Main Laboratory : 36/F, Immigration Tower, 7 Gloucester Road, Wan Chai, Hong Kong.

Branch Laboratory: G04, Public Works Central Laboratory Building, 2B Cheung Yip Street, Kowloon Bay, Kowloon. 總所: 香港灣仔告士打道 7 號入境事務大樓 36 樓 電話: 2829 4830

分所:九龍九龍灣祥業街 2 號 B 工務中央試驗所大樓地下 04 室

電話: 2829 4830 電話: 2798 7347

M010638

Tel: 2829 4830



# Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號 Page 2 of 7 pages 第 頁 (共 頁)

- 1. The test equipment was allowed to stabilise in the laboratory environment at 23 °C and 45 % RH for over 24 hours before the test.
- 2. The power supply to the instrument under test was two 1.5 V batteries.
- 3. Procedures from IEC 60942: 2003 Annex B were used to perform the calibration, which included the following tests:
  - (1) Sound pressure level

Performance tests were carried out in accordance with Section B.3.4 of IEC 60942: 2003. The sound pressure level generated by the RION NC-74 was measured by a laboratory B&K 4180 standard microphone. Measurement results are presented in Table 1.

(2) Frequency\*

Relevant tests were carried out in accordance with Section B.3.5 of IEC 60942: 2003. The frequency of the acoustic signal was measured by a frequency counter. Measurement results are presented in Table 2.

(3) Total distortion\*

Relevant tests were carried out in accordance with Section B.3.6 of IEC 60942:2003. The distortion of the acoustic signal was measured by a distortion meter. Measurement results are presented in Table 3.

Note\*: Item is not included in the CIPM Classification of Services in Acoustics Ultrasound and Vibration, Version 2.0, and is not supported by CIPM MRA.

Calibrated by:

VC Kwan

Checked by:

H.S. Lam

Date: 26 July 2016



# Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page 3 of 7 pages 第 頁 (共 頁)

- 4. No adjustment was made to the instrument under test.
- 5. The Sound Calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942: 2003 for the sound pressure level, frequency and total distortion stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organization responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942: 2003, no general statement or conclusion can be made about conformance of the sound calibrator to the requirements of IEC 60942: 2003.
- 6. The measurement uncertainty evaluation has been carried out in accordance with principles in the Evaluation of Measurement Data Guide to the Expression of Uncertainty in Measurement, JCGM 100:2008. The expanded measurement uncertainty U, with its coverage factor k, corresponds to a 95 % probability that the value of the measurand Y lies within the interval y-U to y+U. The combined standard measurement uncertainty  $u_c$  can be calculated as  $u_c = U/k$  and its degrees of freedom  $v_{eff}$  is given by the t-distribution with the respective k value.

Calibrated by:

C Kwan

Checked by:

HS Lam

Date: 26 July 2016



香港特別行政區政府標準及校正實驗所

# Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page 4 of 7 pages 第 頁 (共 頁)

- 7. The values given in this Certificate of Calibration only relate to the values measured at the time of the test and any measurement uncertainties quoted will not include allowances for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, or the capability of any other laboratory to repeat the measurement.
- 8. This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (for details see <a href="http://www.bipm.org">http://www.bipm.org</a>).

CIPM:

:

International Committee for Weights and Measures

MRA

Mutual Recognition Arrangement

Calibrated by:

Y.C. Kwan

Checked by:

H.S. Lam

Date: 26 July 2016



香港特別行政區政府標準及校正實驗所

# Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page 5 of 7 pages 第 頁 (共 頁)

# <u>Table 1</u> Sound Pressure Level Test Results

	Measured Sound Pressure Level <sup>(1)</sup>					
RION NC-74		Measurement Uncertainty				
Sound Pressure Level Setting	Value y	Expanded Measurement Uncertainty U	Coverage Factor k			
94 dB	94.08 dB	0.06 dB	2.0			

Note (1): Measurement results at measurement conditions were corrected to the following reference conditions:

Temperature: 23 °C Humidity: 50 % RH

Pressure: 101.325 kPa

Calibrated by:

Y.C. Kwan

Checked by:

H S. Lam

Date: 26 July 2016



香港特別行政區政府標準及校正實驗所

# Certificate of Calibration (Continuation Page)

校正證書(續頁)

Certificate No. PA160094 證書編號

Page 6 of 7 pages 第 頁 (共 頁)

### <u>Table 2</u> <u>Frequency Test Results<sup>(1)</sup></u>

	Measured Frequency					
RION NC-74		Measurement Uncerta				
RION NC-74 Sound Pressure Level Setting	Value y	Expanded Measurement Uncertainty U	Coverage Factor			
94 dB	1 001.662 Hz	0.010 Hz	2.0			

Note (1): Items not supported by CIPM MRA.

Calibrated by:

Y.C. Kwan

Checked by:

H.S. Lam

Date: 26 July 2016



香港特別行政區政府標準及校正實驗所

# Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page 7 of 7 pages 第 頁 供 頁

# <u>Table 3</u> <u>Total Distortion Test Results<sup>(1)</sup></u>

	Measured Total Distortion					
RION NC-74		Measurement	Uncertainty			
RION NC-74 Sound Pressure Level Setting	Value y	Expanded Measurement Uncertainty U	Coverage Factor			
94 dB	1.3 %	0.5 %	2.0			

Note (1): Items not supported by CIPM MRA.

- END -

Calibrated by:

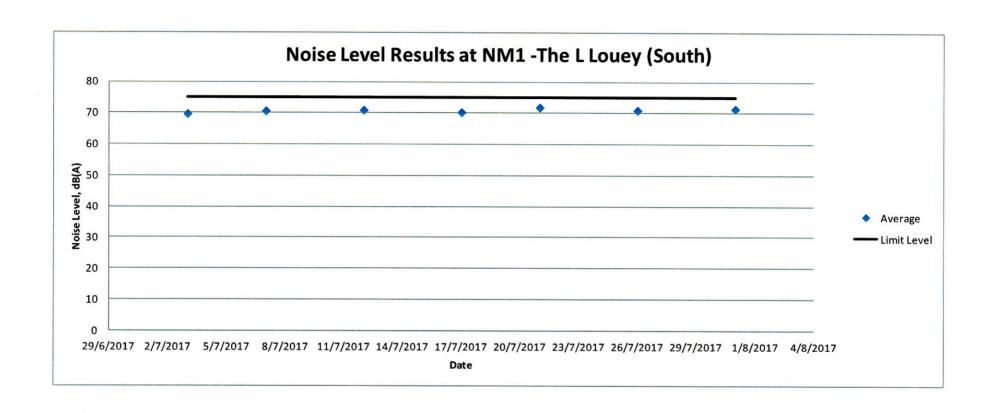
Y.C. Kwan

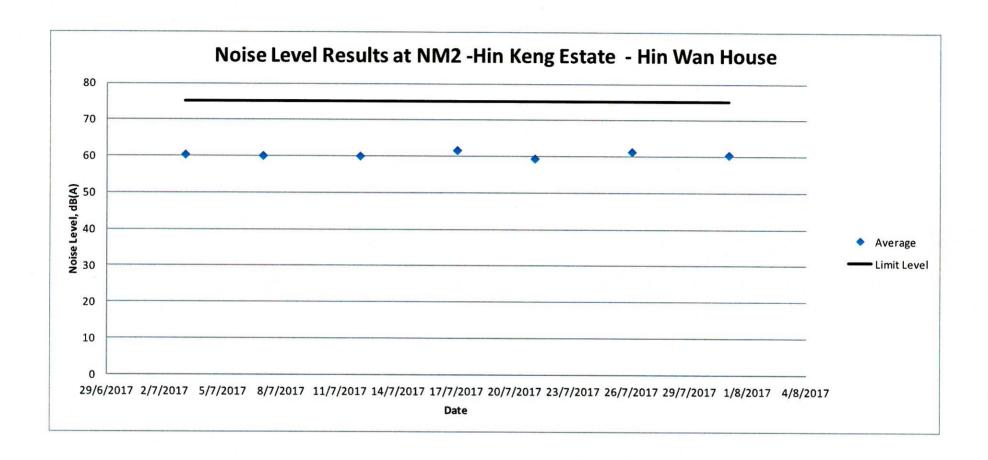
Checked by:

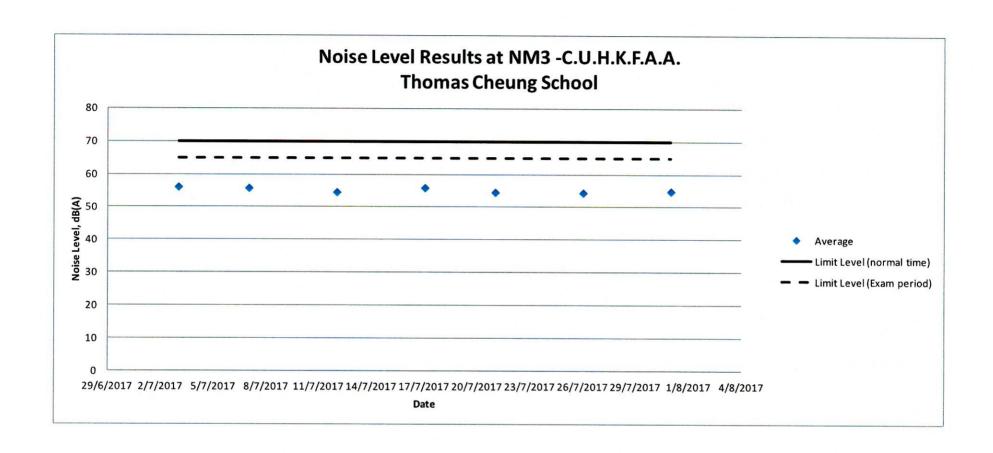
H.S. Lam

Date: 26 July 2016

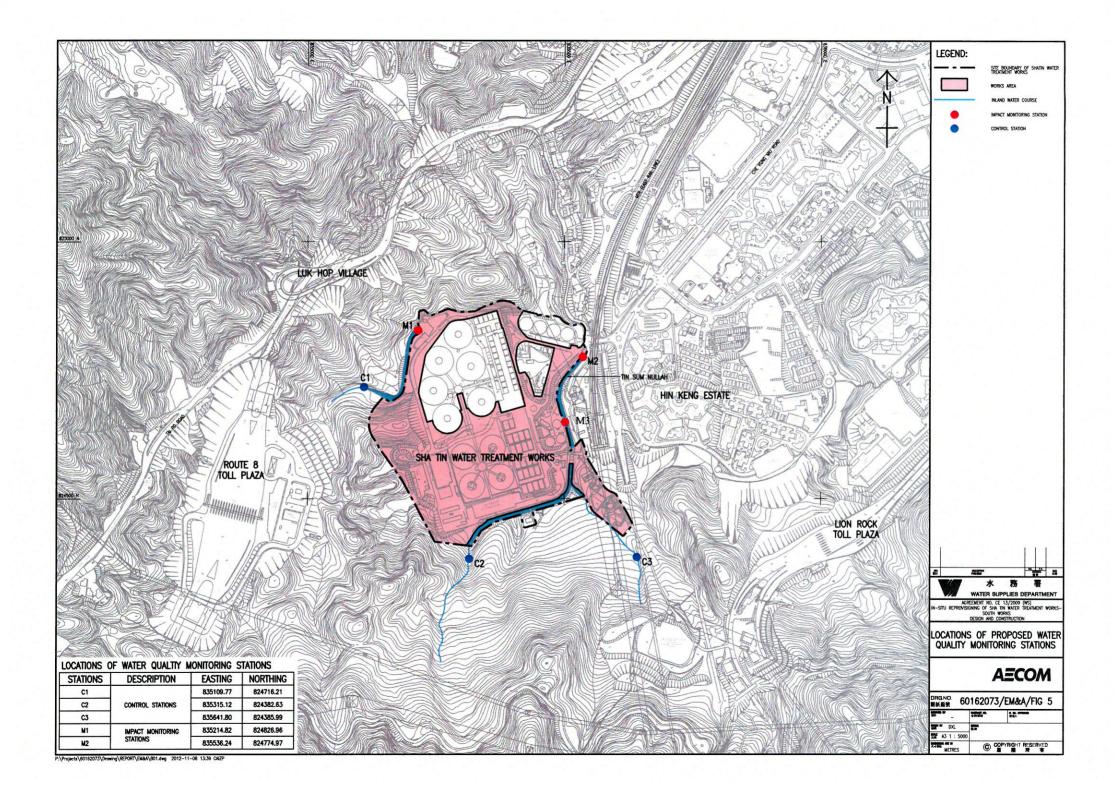
# Appendix N Impact Noise Monitoring Results and Graphical Presentation







# Appendix O Location Plan of Water Quality Monitoring Station



# Appendix P Calibration Certificate (Water Quality)

Project no.: CJO-3113

# Acumen Laboratory and Testing Ltd.

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

Page 1 of 2

#### **Test Report**

Job Number : CJO-3113

Completion Date : 20/5/2017

#### Client Information

Company/ Organization : Acumen Environmental Engineering and Technologies

Co. Ltd.

Address : No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name : CJO-3113-214-01

Sample Description : Certificate of Reference Check

#### **Test Information**

Laboratory ID : R170261/6

Item : YSI ProDSS Multi-parameter Water Quality Monitoring

System

Serial No. : 16A101332

Receive Date : 19/5/2017

Test Period : 20/5/2017-20/5/2017

Test Result : The results are presented on page 2

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

## Acumen Laboratory and Testing Ltd.

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

Page 2 of 2

#### **Test Report**

Job Number

: CJO-3113

Completion Date

: 20/5/2017

#### **Test Result:**

pН

Reference Reading	Recorded Reading
4.00	4.04
7.00	6.95
10.00	10.04
Allowing Deviation	±0.2 unit

Testing Method: APHA 4500-H\*B

Temperature

, [	Reference Reading	Recorded Reading	
	8.0°C	8.4°C	
	<b>25.0</b> ℃	25.8℃	
	42.0°C	41.5℃	
	Allowing Deviation	±2.0℃	

Testing Method: In-house method

**Turbidity** 

Reference Reading	Recorded Reading					
0.0NTU	0.0NTU					
4.0NTU	4.1NTU					
40.0NTU	40.3NTU					
80.0NTU	79.5NTU					
400.0NTU	398.2NTU					
800.0NTU	801.8NTU					
Allowing Deviation	±10%					

Testing Method: APHA 2130B

Dissolved Oxygen

Reference Reading	Recorded Reading					
3.30mg/L	3.25mg/L					
5.90mg/L	5.81mg/L					
8.20mg/L	8.13mg/L					
Allowing Deviation	±0.2mg/L					

Testing Method: APHA 4500-OC & G

-----End of Report-----

# Appendix Q The Certification of Laboratory with HOKLAS accredited Analytical Tests

Project no.: CJO-3113



Hong Kong Accreditation Service 香港認可慮

#### **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 並擴認可進行觀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). 此項 ISO/IEC 17025:2005 的認可資格證明此實驗所具價指定範疇內所須的技術能力並實施一套實驗所委量管理體系(是國際認可論理、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慮的印意

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

Gion

Registration Number: HOKLAS 241 註冊號碼:

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

L 001195

This cartificate is issued subject to the terms and conditions leid down by HKAS 本證書按照香港總可處訂立的複数及核件創出

# Appendix R Impact Water Quality Monitoring Results

Date	Time	Weather	Location	Co-ordinates		Water Depth	Sample Depth	Temp.		DO	con.	DO Sa	turation	Tur	bidity		ЭН	SS
				East	North	m	m	C	'C	m	g/L		%	N	ITU	ı	ınit	mg/L
3/7/2017	8:59	Cloudy	C1	835110	824716	0.04	0.02	24.8	24.9	8.01	8.01	100.4	100.7	3.6	3.	6 7.59	7.59	1.6
	9:16	Cloudy	C2	835403	824470	0.02	0.01	23.6	23.7	8.47	8.47	101.5	101.4	2.8	2.	8 7.13	7.13	2.3
	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
	_	Cloudy	M1	835215	824827	0.8	0.4	24.2	24.1	9.05	9.05	99.4	99.3	3.9	4.	0 7.92	7.92	1.7
		Cloudy	M2	835536	824775	0.05	0.025	24.6	24.5	9.12	9.12	95.6	95.7	8.1	8.	0 8.65	8.65	12.6
	10:15	Cloudy	M3	835501	824648	0.02	0.01	23.7	23.9	9.33	9.33	97.6	97.8	1.0	1.0	0 8.39	8.40	<1
		Cloudy	C1	835110	824716	0.04	0.02	24.6	24.7	8.22	8.23	98.3	98.4	3.5	3.	7.61	7.61	2.2
		Cloudy	C2	835403	824470	0.02	0.01	24.0	24.1	8.52	8.51	96.2	96.2	2.3	2.:	3 7.44	7.46	3.1
5/7/2017	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
57772017		Cloudy	M1	835215	824827	0.8	0.4	25.5	25.6	9.23	9.21	99.9	100.1	3.5	3.	5 8.03	8.03	1.8
		Cloudy	M2	835536	824775	0.05	0.025	24.3	24.2	9.17	9.15	100.5	100.4	5.7	5.	9.15	9.15	3.0
	10:10	Cloudy	M3	835501	824648	0.02	0.01	23.9	24.0	9.40	9.40	96.8	97.0	0.9	0.9	7.29	7.27	<1
	8.48	Cloudy	Cl	835110	824716	0.04	0.02	23.7	23.8	7.98	7.97	98.0	98.2	2.2	2.3	7.63	7.63	3,0
		Cloudy	C2	835403	824470	0.02	0.01	24.1	24.2	8.67	8.67	98.7	98.7	2.4	2		7.58	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
7/7/2017			M1	835215	824827	0.8	0.4	25.0	25.1	8.99	9.00	97.6	97.4	3.9	4.0		7.94	1.2
		Cloudy	M2	835536	824775	0.05	0.025	24.6	24.7	8,97	8.97	98.0	98.0	7.6			9.22	4.8
		Cloudy	M3	835501	824648	0.02	0.01	23.9	24.0	9.26	9.26	100.5	100.3	0.8			8.32	<1
						0.00	0.01	20.7	2110	7.20	7.20	100.5	100.5	0.0	0.	0.52	0.52	
	9:52	Sunny	C1	835110	824716	0.04	0.02	23.6	23.7	8.52	8.52	101.5	101.6	2.4	2.3	7.66	7.65	2.2
		Sunny	C2	835403	824470	0.02	0.01	24.0	24.1	9.23	9.21	97.7	97.8	2.9			7.49	3.6
0/7/2017	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
.0///2017	10:16	Sunny	M1	835215	824827	0.8	0.4	24.8	24.9	9.20	9.21	96.5	96.6	4.1	4.		7.90	2.2
	10:29	Sunny	M2	835536	824775	0.05	0.025	25.2	25.2	9.14	9.13	95.9	96.1	5.0			9.37	7.8
	10:40	Sunny	M3	835501	824648	0.02	0.01	24.6	24.7	9.37	9.35	99.0	98.9	0.8			7.56	<1
		Sunny	C1	835110	824716	0.04	0.02	25.0	25.1	8.43	8.41	100.1	100.1	3.5	3.5	7.77	7.78	2.3
	15:24	Sunny	C2	835403	824470	0.02	0.01	23.7	23.8	8.56	8.56	99.6	99.6	2.6	2.7	8.21	8.22	3.2
2/7/2017	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
		Sunny	M1	835215	824827	0.8	0.4	24.5	24.7	9.35	9.34	96.7	96.5	4.0	4.0	7.91	7.91	1.5
		Sunny	M2	835536	824775	0.05	0.025	24.9	25.0	9.21	9.20	96.0	96.1	4.3	4.2	8.65	8.65	5.1
	16:04	Sunny	M3	835501	824648	0.02	0.01	25.4	25.3	9.26	9.27	96.5	96.5	0.8	0.8	8.30	8.28	<l< td=""></l<>
	0.46	0		005110	004516	0.04	0.00		***									
		Sunny Sunny	C1	835110	824716	0.04	0.02	23.5	23.4	7.99	8.01	99.9	99.9	2.0	2.0		7.37	1.8
	N/A	N/A	C2 C3	835403	824470	0.02	0.01	22.7	22.8	8.35	8.35	100.6	100.5	2.4	2.5		8.06	3.9
4/7/2017		Sunny	MI	835642 835215	824386 824827	N/A		N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
		Sunny	M1 M2	835215	824827	0.8	0.4	24.6	24.7	9.08	9.10	98.0	98.0	3.1	3.1		7.69	1.9
		Sunny	M3	835501	824773 824648	0.03	0.025	23.9 24.5	24.1 24.5	9.15 9.23	9.15	99.0 99.3	98.8	8.0	8.0		9.25	10.1
	9.57	Buility	CIVI	100000	024040	0.02	0.01	24.5	24.5	9.23	9.22	99.3	99.1	0.4	0.5	8.26	8.27	<1
	9.21	Cloudy	C1	835110	824716	0.04	0.02	26.0	26.0	8.63	8.62	07.4	07.6	25	2.0	7 51	7.51	2.0
		Cloudy	C2	835403	824470	0.04	0.02	24.8	24.8	8.97	8.62	97.6 97.7	97.6 97.7	2.5	2.5		7.51	2.0
\s	N/A	N/A	C3	835642	824386			N/A	N/A	N/A	8.97 N/A		97.7 N/A	1.8 N/A	1.7 N/A	N/A	8.04 N/A	1.3
7/7/2017		Cloudy	M1	835215	824827	0.8	0.4	24.7	24.8	9.30	9.28	99.2	99.2					N/A
		Cloudy	M2	835536	824775	0.05	0.025	23.6	23.6	9.04	9.26	100.8	101.0	3.0	3.1		8.05	2.6
		Cloudy	M3	835501	824648	0.03	0.023	24.0	24.0	9.04	9.00	99.5	99.6	0.6	0.6		8.78	6.0
	10.12	Cloudy	UIVI	033301	UZTUTO	0.02	0.01	24.0	24.0	9.20	7.21	77.3	99.0	0.0	0.0	1.20	7.27	<1

	10:0	1 Cloudy	I Cl	835110	824716	0.04	0.02	23.6	23.7	8,05	8.06	100.3	100.5	1 21	2.2	7.77	7.76	
		5 Cloudy	C2	835403	824470	0.04		22.8	22.9	8.87	8.89	98.2	98.2	2.1	2.2	7.77 8.16		2.2
	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	3.0 N/A
19/7/2017	10:4		MI	835215	824827	0.8			23.2	8.97	8.97	95.5	95.4	3.3		7.99		2.6
	10:5	Cloudy	M2	835536	824775	0.05				9.11	9.12	99.3	99.3	5.2		8.22		6.0
		Cloudy	M3	835501	824648	0.02		24.6		9.34	9.36	98.5	98.4	0.8	0.9			<1
							0.01	2.110	2110	7.01	7.50	70.5	70.4	0.0	0.7	7.07	1.00	\1
	15:0	1 Sunny	C1	835110	824716	0.04	0.02	24.7	24.6	8.60	8.61	97.6	97.6	3.6	3.5	7.59	7.59	2.4
	15:3	2 Sunny	C2	835403	824470	0.02	0.01	24.8	24.8	8.26	8.24	97.4	97.3	2.1	2.1	8.24		2.6
21/7/2017	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
21///2017	15:4	8 Sunny	M1	835215	824827	0.8	0.4	23.5	23.4	9.04	9.06	99.8	99.8	2.4	2.3	8.01	8.02	1.4
	16:0	3 Sunny	M2	835536	824775	0.05	0.025	26.0	25.8	9.32	9.31	98.4	98.5	6.5	6.5	8.89	8.89	2.0
	16:1	Sunny	M3	835501	824648	0.02	0.01	25.2	25.3	9.25	9.26	98.0	97.9	1.0	0.9	8.37	8.37	<1
		Sunny	C1	835110	824716	0.04	0.02		23.9	8.29	8.28	96.0	95.7	3.1	3.1	7.55	7.55	2.4
	15:4	Sunny	C2	835403	824470	0.02		24.2	24.2	8.44	8.45	98.7	98.8	2.9	2.9	8.51	8.51	2.4
24/7/2017	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
211712017		Sunny	M1	835215	824827	0.8	0.4		25.0	9.18	9.18	98.4	98.5	4.0	4.0	7.48	7.48	2.3
		5 Sunny	M2	835536	824775	0.05	0.025	24.9	24.8	9.05	9.05	101.7	101.7	5.7	5.7	7.99	8.01	2.7
	16:4	3 Sunny	M3	835501	824648	0.02	0.01	23,7	23.7	9.30	9.28	99.3	99.5	0.8	0.8	7.73	7.73	<1
	160	40	G1	005110	004516	0.04	0.00	22.2										
		1 Sunny	C1	835110	824716	0.04			22.4	8.17	8.17	100.5	100.4	3.3	3.2		7.60	1.6
		Sunny	C2	835403	824470	0.02		24.0	24.1	8.57	8.57	99.0	99.2	2.5	2.5	8.43	8.43	4.7
26/7/2017	N/A	N/A Sunny	C3 M1	835642	824386			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Sunny	M2	835215 835536	824827 824775	0.8	0.4	24.7	24.8 25.0	9.16	9.16	95.3	95.4	4.1	4.0	7.01	7.01	1.8
		Sunny	M3	835501	824648	0.03	0.025	25.0 25.1	25.0	9.00	8.98 9.24	98.2 97.4	98.2 97.4	4.4	4.3	8.61	8.61	7.2
	10.5.	Journey	IVID	033301	024040	0.02	0.01	23.1	23.1	9.22	9.24	97.4	97.4	0.4	0.4	8.20	8.20	<1
	15.4	Sunny	C1	835110	824716	0.04	0.02	24,9	24.8	7.89	7.87	100.5	100.5	2.3	2,4	7.65	7.65	2.0
		Sunny	C2	835403	824470	0.02		23.8	23.7	9.09	9.10	97.3	97.3	2.7	2.8	8.49	8.50	1.3
20/5/2015	N/A	N/A	C3	835642		N/A		N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A
28/7/2017	16:14	Sunny	M1	835215	824827	0.8	0.4	24.6	24.7	9.41	9.43	98.0	98.2	3.5	3.5	7.98	7.98	1.8
	16:29	Sunny	M2	835536	824775	0.05	0.025	23.9	23.9	9.27	9.27	100.4	100.4	7.7		9.44	9.43	5.7
11	16:35	Sunny	M3	835501	824648	0.02	0.01	24.0	24.0	9.30	9.30	99.5	99.5	0.8	0.9	8.45	8.46	<1
u na digita degra de la Agrica.		Sunny	Cl	835110	824716	0.04	0.02	25.5	25.5	8.02	8.01	95.1	95.1	2.1	2.0	7.40	7.38	3.3
	10:08	Sunny	C2	835403	824470	0.02	0.01	24.8	24.7	8.81	8.79	97.1	97.2	2.6	2.6	8.27	8.28	3.0
31/7/2017	N/A	N/A	C3	835642			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21112011	10:2		M1	835215	824827	0.8	0.4	24.6	24.7	9.08	9.08	98.6	98.6	4.0	4.0	7.97	7.97	1.9
	10:48		M2	835536	824775	0.05	0.025	23.7	23.6	9.21	9.19	97.7	97.7	8.6	8.6	8.88	8.89	1.3
	10:56	Sunny	M3	835501	824648	0.02	0.01	25.0	25.0	9.31	9.31	101.0	100.9	0.5	0.6	7.67	7.67	<1

### **Acumen Laboratory and Testing Limited**

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#### **Test Report**

Page 1 of 2

Report Number

: Q170003aR170382

Job Number

: R170382

Issue Date

: 04/08/2017

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-3113-233

Sample Description

: SS test

Laboratory ID

: R170382/1-5

Date of Sampling

: 03/07/2017

**Date Received** 

: 03/07/2017

**Test Period** 

: 03/07/2017-04/07/2017

**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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E-mail: htthui@acumenhk.com / jleung@acumenhk.com

# Acumen Laboratory and Testing Limited

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#### **Test Report**

Page 2 of 2

Report Number

: Q170003aR170382

Job Number

: R170382

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Suspended Solids (SS), mg/L	
R170382/1	03/07/2017	C1	1.6
R170382/2	03/07/2017	C2	2.3
R170382/3	03/07/2017	M1	1.7
R170382/4	03/07/2017	M2	12.6
R170382/5	03/07/2017	M3	<sub>.</sub> <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

: Q170003aR170383

Job Number

: R170383

Issue Date

: 04/08/2017

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-3113-234

Sample Description

: SS test

Laboratory ID

: R170383/1-5

Date of Sampling

: 05/07/2017

**Date Received** 

: 05/07/2017

**Test Period** 

: 05/07/2017-06/07/2017

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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E-mail:

htthui@acumenhk.com / jleung@acumenhk.com

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# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170383

Job Number

: R170383

Issue Date

: 04/08/2017

#### Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170383/1	05/07/2017	C1	2.2
R170383/2	05/07/2017	C2	3.1
R170383/3	05/07/2017	M1	1.8
R170383/4	05/07/2017	M2	3.0
R170383/5	05/07/2017	М3	<1

Note:

- 1. mg/L Indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170384

Job Number

: R170384

Issue Date

: 04/08/2017

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-3113-235

Sample Description

: SS test

Laboratory ID

: R170384/1-5

Date of Sampling

: 07/07/2017

**Date Received** 

: 07/07/2017

Test Period

: 07/07/2017--08/07/2017

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** 

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170384

Job Number

: R170384

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170384/1	07/07/2017	C1	3,0
R170384/2	07/07/2017	C2	2.7
R170384/3	07/07/2017	M1	1.2
R170384/4	07/07/2017	M2	4.8
R170384/5	07/07/2017	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

: Q170003aR170385

Job Number

: R170385

Issue Date

: 04/08/2017

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-3113-236

Sample Description

: SS test

Laboratory ID

: R170385/1-5

Date of Sampling

: 10/07/2017

Date Received

: 10/07/2017

**Test Period** 

: 10/07/2017-11/07/2017

**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** 

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170385

Job Number

: R170385

**Issue** Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170385/1	10/07/2017	C1	2.2
R170385/2	10/07/2017	C2	3.6
R170385/3	10/07/2017	М1	2.2
R170385/4	10/07/2017	M2	7.8
R170385/5	10/07/2017	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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# **Test Report**

Page 1 of 2

Report Number

: Q170003aR170386

Job Number

: R170386

Issue Date

: 04/08/2017

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-3113-237

Sample Description

: SS test

Laboratory ID

: R170386/1-5

**Date of Sampling** 

: 12/07/2017

**Date Received** 

: 12/07/2017

**Test Period** 

: 12/07/2017-13/07/2017

**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** 

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170386

Job Number

: R170386

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170386/1	12/07/2017	C1	2.3
R170386/2	12/07/2017	C2	3.2
R170386/3	12/07/2017	M1	1.5
R170386/4	12/07/2017	M2	5.1
R170386/5	12/07/2017	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than
- 5. NA indicates Not Applicable.

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Acumen Laboratory & Testing Limited | Lot 12 Tam Kon Shan Road, Tsing Yi (N), Hong Kong

E-mail:

(852) 2333 6823 Fax: (852) 2333 1316

htthui@acumenhk.com / jleung@acumenhk.com

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 1 of 2

Report Number

: Q170003aR170387

Job Number

: R170387

Issue Date

: 04/08/2017

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-3113-238

Sample Description

: SS test

Laboratory ID

: R170387/1-5

Date of Sampling

: 14/07/2017

**Date Received** 

: 14/07/2017

Test Period

: 14/07/2017-15/07/2017

**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

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170387

Job Number

: R170387

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170387/1	14/07/2017	C1	1.8
R170387/2	14/07/2017	C2	3.9
R170387/3	14/07/2017	M1	1.9
R170387/4	14/07/2017	M2	10.1
R170387/5	14/07/2017	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170389

Job Number

: R170389

Issue Date

: 04/08/2017

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-3113-239

Sample Description

: SS test

Laboratory ID

: R170389/1-5

Date of Sampling

: 17/07/2017

Date Received

: 17/07/2017

**Test Period** 

: 17/07/2017-18/07/2017

**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

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170389

Job Number

: R170389

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170389/1	17/07/2017	C1	2.0
R170389/2	17/07/2017	C2	1.3
R170389/3	17/07/2017	M1	2.6
R170389/4	17/07/2017	M2	6.0
R170389/5	17/07/2017	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170390

Job Number

: R170390

Issue Date

: 04/08/2017

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-3113-240

Sample Description

: SS test

Laboratory ID

: R170390/1-5

Date of Sampling

: 19/07/2017

Date Received

: 19/07/2017

**Test Period** 

: 19/07/2017-20/07/2017

**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** 

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170390

Job Number

: R170390

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	, Client Sample ID	Suspended Solids (SS), mg/L
R170390/1	19/07/2017	C1	2.2
R170390/2	19/07/2017	C2	3.0
R170390/3	19/07/2017	M1	2.6
R170390/4	19/07/2017	M2	6.0
R170390/5	19/07/2017	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170391

Job Number

: R170391

Issue Date

: 04/08/2017

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-3113-241

Sample Description

: SS test

Laboratory ID

: R170391/1-5

Date of Sampling

: 21/07/2017

**Date Received** 

: 21/07/2017

Test Period

: 21/07/2017-22/07/2017

**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

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170391

Job Number

: R170391

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170391/1	21/07/2017	C1	2.4
R170391/2	21/07/2017	C2	2.6
R170391/3	21/07/2017	M1	1.4
R170391/4	21/07/2017	M2	2.0
R170391/5	21/07/2017	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170392

Job Number

: R170392

Issue Date

: 04/08/2017

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-3113-242

Sample Description

: SS test

Laboratory ID

: R170392/1-5

Date of Sampling

: 24/07/2017

Date Received

: 24/07/2017

**Test Period** 

: 24/07/2017-25/07/2017

**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

: Q170003aR170392

Job Number

: R170392

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170392/1	24/07/2017	C1	2.4
R170392/2	24/07/2017	C2	2.4
R170392/3	24/07/2017	M1	2.3
R170392/4	24/07/2017	M2	2.7
R170392/5	24/07/2017	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

: Q170003aR170393

Job Number

: R170393

Issue Date

: 04/08/2017

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-3113-243

Sample Description

: SS test

Laboratory ID

: R170393/1-5

Date of Sampling

: 26/07/2017

**Date Received** 

: 26/07/2017

**Test Period** 

: 26/07/2017-27/07/2017

**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

: Q170003aR170393

Job Number

: R170393

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170393/1	26/07/2017	C1	1.6
R170393/2	26/07/2017	C2	4.7
R170393/3	26/07/2017	M1	1.8
R170393/4	26/07/2017	М2	7.2
R170393/5	26/07/2017	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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

: Q170003aR170394

Job Number

: R170394

Issue Date

: 04/08/2017

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-3113-244

Sample Description

: SS test

Laboratory ID

: R170394/1-5

Date of Sampling

: 28/07/2017

**Date Received** 

: 28/07/2017

Test Period

: 28/07/2017-29/07/2017

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

: Q170003aR170394

Job Number

: R170394

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170394/1	28/07/2017	C1	2.0
R170394/2	28/07/2017	C2	1.3
R170394/3	28/07/2017	М1	1.8
R170394/4	28/07/2017	M2	5.7
R170394/5	28/07/2017	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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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E-mail:

htthui@acumenhk.com / jleung@acumenhk.com

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 1 of 2

Report Number

: Q170003aR170395

Job Number

: R170395

Issue Date

: 04/08/2017

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-3113-245

Sample Description

: SS test

Laboratory ID

: R170395/1-5

Date of Sampling

: 31/07/2017

**Date Received** 

: 31/07/2017

**Test Period** 

: 31/07/2017-01/08/2017

**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** 

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

# **Test Report**

Page 2 of 2

Report Number

: Q170003aR170395

Job Number

: R170395

Issue Date

: 04/08/2017

#### **Test Result:**

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170395/1	31/07/2017	C1	3.3
R170395/2	31/07/2017	C2	3.0
R170395/3	31/07/2017	M1	1.9
R170395/4	31/07/2017	М2	1.3
R170395/5	31/07/2017	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O<sub>2</sub>/ 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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(852) 2333 6823 Fax: (852) 2333 1316

htthui@acumenhk.com / jleung@acumenhk.com

# 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.35

08 July 2017

#### TABLE OF CONTENTS

1.	INTRODUCTION	. 2
2.	DESCRIPTION OF TREE MONITORING SITE	. 3
3.	MONITORING METHODOLOGY	. 3
4.	RESULT	. 3
5	SUMMARY	1

#### **APPENDICES**

**APPENDIX I- Photos** 

APPENDIX II- Table for condition of transplanted plant

#### 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 no. 35 Tree Report presents data collected in 08 July 2017. 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)

#### 2. DESCRIPTION OF TREE MONITORING SITE

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees will be 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*) will be temporally stored at 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 were 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 inspection was conducted on 08 July 2017. TA572, TA326 and TA327 tree was transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts were observed on TA327. Growing hormone has been applied for TA326 and TA327 on 26 July 2017. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour.
- 4.2 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary and Hong Kong Eagle's Claw was still temporally stored on Nursery garden at Wang Toi Shan, Kam Tin.
- 4.3 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.
- 4.4 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) in order to increase their transplantation survival rate.
- 4.5 After transplantation, root ball of TA572, TA326 and TA327 tree should be kept moisture especially during non-raining day.

#### 5. MITIGATION MEASURE

Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the lost 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 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.

Table for Recommended species list to be planted

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
Cassytha	Cassytha filiformis	無根藤	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

5.2 For yellowish color for the leave of transplanted Lamb of Tartary (Cibotium barometz), it is recommended to provide shelter (such as 遊光網) for them to reduce the intensity of sunlight.

#### 6. SUMMARY

Ailanthus (Ailanthus fordii) and Incense Tree (Aquilaria sinensis) was transplanted to new location within STWTW. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts were observed on TA327. Contractor has applied the growing hormone helping TA326 and TA327 to regenerate their roots on 26 July 2017. Transplanted Lamb of Tartary (Cibotium barometz) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. Shelter (遊光網) was recommended to reduce the intensity of sunlight. Hong Kong Eagle's Claw was observed dead during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out. Lamb of Tartary was under recovery after transplantation. Currently, Lamb of Tartary were temporally stored on 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 were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016 and the survival rate was 96%.
- 6.3 In order to compensate for the lost of transplanted Hong Kong Eagle's Claw, 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. 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, TA326 and TA327 tree should be kept moisture especially during dry and non-raining day.

# APPENDIX I Photo

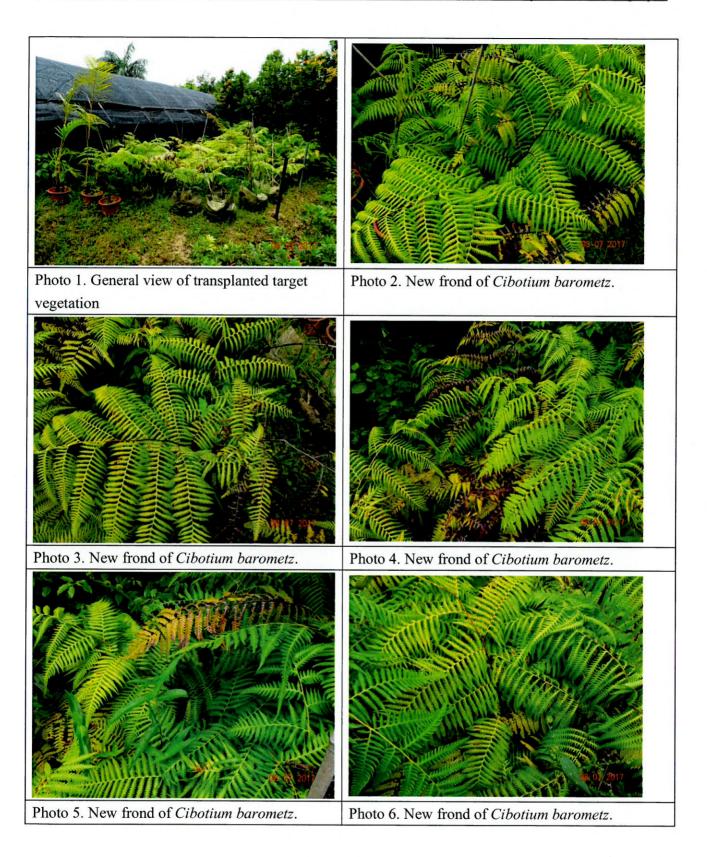






Photo 7. New frond of Cibotium barometz.

Photo 8. New frond of Cibotium barometz.



Photo 9. Incense Tree after transplantation (*Aquilaria sinensis*) – TA326 (left) and TA327 (middle), (*Ailanthus fordii*) – TA572 (right)

APPENDIX II

Table for condition of transplanted plant

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

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%					

## Trees of Ailanthus and Incense Tree

No.	Species	Condition	Alive/Dead	Remark
TA572	Ailanthus fordii	Poor to Fair	Alive	
TA327	Aquilaria sinensis	Poor	Alive	Tree crown of TA327
				was thinner after
				transplantation. Water
				sprouts and Flowering
				were observed.
TA326	Aquilaria sinensis	Very Poor	Alive	Tree crown of TA326
				was thinner after
				transplantation. No new
				leave was observed
				generated during this
				growing season and tree
				bark was seen peel off
		-		from tree trunk at TA326.
		Survival rate (%)	100%	

## 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: 2017

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)

	Ac	ctual Quantities of Ine	ert C&D Materials	Generated / Importe	ed (in '000 m <sup>3</sup> )		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 <sup>3</sup> )	
January	3.377	0.000	0.050	2.990	0.336	0.000	4.086	0.001	0.003	0.000	0.018	
February	5.074	0.000	0.080	4.190	0.803	0.000	0.000	0.000	0.000	0.000	0.007	
March	7.363	0.000	0.006	6.562	0.796	0.000	4.545	0.075	0.002	0.000	0.014	
April	0.496	0.000	0.026	0.240	0.231	0.000	4.145	0.065	0.015	0.000	0.005	
May	5.480	0.000	0.062	0.026	5.392	0.000	0.000	0.000	0.000	0.433	0.015	
June	2.272	0.000	0.053	0.463	1.756	0.000	0.008	0.050	0.007	0.000	0.002	
Half-year total	24.063	0.000	0.278	14.471	9.314	0.000	12.784	0.191	0.027	0.433	0.061	
July	0.891	0.000	0.055	0.000	0.837	0.000	2.505	0.050	0.013	0.000	0.015	
August	0.000									0.000	0.015	
September	0.000		F1									
October	0.000											
November	0.000											
December	0.000						<u></u>					
Yearly Total	24.954	0.000	0.332	14.471	10.151	0.000	15.289	0.241	0.040	0.433	0.076	

## Appendix U Implementation Schedule of Environmental Mitigation Measures (EMIS)

Project no.: CJO-3113

## Environmental Mitigation and Enhancement Measure Implementation Schedule at Construction Stage

EIA Ref.	Recommended Mitigation Measures		Implementation	Relevant Legislation	Implementation Phase			Status
		Measures	Agent	and Guidelines	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		1		Υ
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		1		Υ
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		1		Υ
4.7.1	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	All works areas	Contractor	EIVIQA Manuai		1		Υ
4.7.1	Imposition of speed controls for vehicles on site haul roads.	All works areas	Contractor			1		Υ
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			1		Υ
Noise								
5.6.4	Implement good site practices to reduce noise level	All works areas	Contractor	Noise Control Ordinance		1		Υ
5.6.5	Adoption of Quiet PME	All works areas	Contractor			1		N/A
5.6.6	Use of Movable Noise Barrier	All works areas	Contractor			1		N/A
5.8	Noise monitoring	Monitoring points	Contractor			1		Υ
Water Qualit	<u>:</u>							
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		1		Υ

	traps, silt traps and sedimentation basins. Channels or earth bunds or sand bag barriers should be provided on site to properly direct			Site Drainage			
	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			ļ
6.8.2	site formation works and earthworks.  Silt removal facilities, channels and manholes should be maintained and	All works areas	Contractor	Ordinance		-	
0.6.2	the deposited silt and grit should be removed regularly, at the onset of	All works areas	Contractor				Y
	and after each rainstorm to prevent local flooding.				'		1
6.8.3	Temporary exposed slope surfaces should be covered and temporary	All works area	Contractor	-			
0.0.5	access roads should be protected by crushed stone or gravel, as	7 III WOTKS UTCU	Contractor		ΙΙ.		
	excavation proceeds. Intercepting channels should be provided to				1		Y
	prevent storm run-off from washing across exposed soil surfaces.						
6.8.4	Earthworks final surfaces should be well compacted and the subsequent	All works areas	Contractor				
	permanent work or surface protection should be carried out immediately						
	after the final surfaces are formed to prevent erosion caused by				√		N/A
	rainstorms. Appropriate drainage like intercepting channels should be	74					
	provided where necessary.						
6.8.5	Rainwater pumped out from trenches or foundation excavations should	All works areas	Contractor				Y
	be discharged into storm drains via silt removal facilities.		N		v		•
6.8.6	Open stockpiles of construction materials (e.g. aggregates, sand and fill	All works areas	Contractor				
	material) on sites should be covered with tarpaulin or similar fabric				√		Y
	during rainstorms.			_			
6.8.7	Manholes (including newly constructed ones) should always be	All works areas	Contractor				
	adequately covered and temporarily sealed so as to prevent silt,				1		Υ
6.8.8	construction materials or debris from getting into the drainage system.	Allowania	Cambanatan			-	
6.8.8	Good site practices should be adopted to remove rubbish and litter from	All works areas	Contractor				\ \ \
	construction sites so as to prevent the rubbish and litter from spreading from the site area.				1		Y
6.8.9	All vehicles and plant should be cleaned before they leave a construction	All works areas	Contractor	+			-
0.0.5	site to minimize the deposition of earth, mud, debris on roads. A wheel	All Works areas	Contractor	1			
	washing bay should be provided at every site exit if practicable and				\		Υ
	wash-water should have sand and silt settled out or removed before	g.					
	discharging into storm drains.						
6.8.10	Before commencing any demolition works, all drainage connections	All works areas	Contractor	1	-1		
	should be sealed to prevent building debris, soil, sand etc. from entering				1		N/A
	<u> </u>			1			1

	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,	All works areas	Contractor	<b>√</b>	\
6.8.12	and pH adjustment as necessary.  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	<b>V</b>	N
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	V	Y
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	٧	Y
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	<b>V</b>	Y
6.8.17	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	All works areas	Contractor	1	Y
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	٧	Υ
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	٧	Y
6.10	Water quality monitoring	Monitoring points	Contractor	√	Υ

7.6.1	Appropriate waste handling, transportation and disposal methods for all waste arisings generated during the construction works for the Project	All works areas	Contractor	Waste Disposal Ordinance		908
	should be implemented to ensure that construction wastes do not enter				\  \	Y
	the nearby streams or drainage channel.	A1999 CAN (24.9	D	DEVB TCW No.		
7.6.2	Implementation of good site practices for waste management	All works areas	Contractor	6/2010,	\ \	Υ
7.6.3	Implementation of trip ticket system to control waste disposal	All works areas	Contractor	ETWB TCW No.	1	Υ
7.6.4	Implementation of good site practices to reduce waste generations	All works areas	Contractor	19/2005 Land	V	Υ
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 C&D material and to facilitate the sorting process.	All works areas	Contractor	(Miscellaneous Provisions) Ordinance	√	Y
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	V	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	٧	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		1	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.	All works areas	Contractor		<b>√</b>	Y
	The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with					

	the Waste Disposal (Chemical Waste) (General) Regulation.					
Ecology		- 100	the state of the s			
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	1	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		\ \ \	Υ
8.8.3	Conduct detailed vegetation survey and implement suggested measures for species of conservation importance.		The Engineer/ Contractor		<b>√</b>	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	1	1	Υ
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		<b>√</b>	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		\ \ \	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		\ \lambda	Υ
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		<b>V</b>	Y
8.8.9-8.8.11	Implement woodland compensation		The Engineer/ Contractor		1	N/A

Landscape and 9.8.1	Existing tress to be retained on site shall be carefully protected during	All works areas	Contractor	DEVB TCW No.		
	construction. Trees unavoidably affected by the works shall be transplanted as far as possible.	All Works areas	Contractor	10/2013	1	Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor	EIAO TM	V	Y
	Control of night-time lighting glare.	All works areas	Contractor		1	Υ
	Erection of decorative screen hoarding compatible with the surrounding setting.	All works areas	Contractor		<b>V</b>	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		<b>V</b>	Y
Cultural Herita	age	A 1777-1-1-1-1-1-1				
10.6.2	Vibration monitoring at Ex KCR Beacon Hill Tunnel during piling works of	Work site	The Engineer		1	N/A
	Administration Building		/Contractor			
and Contami	ination					75
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)	<b>√</b>	N/A
Hazard to Life		• 11 1	T=1	T 5140 TM		
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	<b>√</b>	Y
	Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control	All works areas	The Engineer		1	Υ
	Ensure construction method statement is endorsed by the Engineer (AECOM)	All works areas	The Engineer		1	Υ

Ensure designated manoeuvring area for the new access road construction is away from the Chlorination House	New access road area	Contractor/ The Engineer		7	Y
Ensure that the emergency response plan and procedures (including drills) cover the reprovisioning activities	All works areas	Contractor/ The Engineer		7	Y
Safety training to be provided to construction workers and WSD/Engineer staff regarding evacuation procedures	All works area	Contractor/ The Engineer		7	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		<b>V</b>	N/A
Ensure temporary suspension of crane operation and construction truck movements during chlorine delivery	All works areas	Contractor/ The Engineer		1	Y
Provide a crash barrier between the construction site and the north side of the Chlorination House.	Chlorination House area	Contractor	-	7	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		٧	Υ
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		1	Υ
Provide settlement monitoring for the Chlorination House to ensure no subsidence occurs from nearby excavation works.	Chlorination House area	Contractor		1	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		٨	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		٧	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		1	Υ
 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		~	N/A

	areas			
Stop any construction activities which may lead to vibrations and potential slope/boulder disturbance during the chlorine deliveries	All works areas	Contractor	<b>√</b>	210201
The state of the s	Reprovisioning works areas	Contractor/ The Engineer	<b>V</b>	
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	<b>V</b>	
chlorine/town gas emergency plan to ensure gas safety during the Construction Phase	Beacon Hill North Gas Offtake Station and Gas Pipelines in Old Beacon Hill Tunnel	The Engineer / Contractor / HKCG	V	
Temporary suspend chlorine delivery during the short period of construction of the concerned section of elevated walkway to avoid mobile crane impact on the chlorine truck		The Engineer / Contractor	\ \ \	
	Chlorine delivery route and reprovisioning works access roads	The Engineer / Contractor	<b>V</b>	
Large equipment/plant movement should be controlled by 'Permit-to-move' system	All works areas	The Engineer / Contractor / WSD	<b>V</b>	1
And the state of t	Chlorination House area	The Engineer / Contractor	<b>V</b>	
The state of the s	Construction Office area	The Engineer / Contractor	4	
Entry of non-authorized personnel to the construction site to be prohibited	All works areas	Contractor	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	

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	٧	k.i.v.	
	Improved clamps with independent checks to prevent load shedding	Chlorine	1		1	F	
	Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area	delivery trucks			\ \lambda	F	
	Adoption of the chlorine delivery route from Sham Shui Kok Dock to Sha Tin WTW				<b>V</b>	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.				√	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.  Limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table				٧	F	
	12.37 – advance measure).					F	
	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)					<b>V</b>	k.i.v.
	Annual periodic radiography or ultrasonic test inspections of the chlorine drums should be considered for implementation as soon as feasible (Item 3.8 of Table 12.37).	Chlorine drums			\ \	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			√	k.i.v.	
	Implement a sturdy steel frame to minimize the potential for chlorine release due to truck rollover				<b>√</b>	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		٧	k.i.v.	

Training should be provided for the use of the GPS fleet management and improved safe driving.		<b>V</b>	k.i.v.
Ensured that independent checks are performed to ensure proper chlorine drum latching and clamping.		<b>V</b>	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.		<b>V</b>	k.i.v.
Training should be provided to driver and driver attendant for the emergency use of the new 2 × 9L AFFF extinguishers.		<b>V</b>	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		<b>V</b>	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		V	F
To keep under review alternate chlorine receiving dock in Sha Tin/Tai Po area for chlorine delivery to STWTW.		<b>V</b>	k.i.v.

## Legend

- D Design Phase
- C Construction Phase
- O Operation Phase
- Y Compliance of Mitigation Measures
- N/A Not Applicable in Reporting Period
- k.i.v Keep In View
- F Completed

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

## Statistical Summary of Exceedances (Air Quality)

				Ai	r Quality	1			
Location	A	ction Lev	el		Limit Level				
AM1		0				0			0
AM2		0				0			0
					Noise				
Location	A	ction Lev	el		I	Limit Leve	el		Total
NM1		0		Y		0			0
NM2		0				0			0
NM3	0 0				0				
				Wa	ter Qualit	y			
Location	Action Level				Limit Level				
Location	DO	Turbidity	SS	pН	DO	Turbidity	SS	pH	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 Environmental Complaints

Reporting	Environmental Complaint Statistics				
Period	Frequency	Cumulative	Complaint Nature		
1 Jun - 30 Jun	0	3	Water Quality		

## Statistical Summary of Environmental Summons

Reporting	<b>Environmental Summons Statistics</b>				
Period	Frequency	Cumulative	Details		
1 Jun - 30 Jun	0	0	N/A		

## Statistical Summary of Environmental Prosecution

Reporting	<b>Environmental Prosecution Statistics</b>				
Period	Frequency	Cumulative	Details		
1 Jun - 30 Jun	0	0	N/A		

Project no.: CJO-3113

## Appendix W

Tentative schedule for environmental monitoring

Project no.: CJO-3113

Impact Monitoring Schedule for STWTW

Aug-17								
Sun	Mon	Tue	Wed Wed	Thur				
		1	2	3	Fri	Sat		
		1	-	3	4	5		
			Impact		Impact			
			Water Quality monitoring for C1,		Water Quality monitoring for C1,			
			C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
			, , ,		Air monitoring for AM1 & AM2			
					Noise monitoring for NM1, NM2			
					& NM3			
					Q IVIVIS			
6	7	R	9	10				
			,	10	11	12		
	Impact		Impact		Impact			
	Water Quality monitoring for C1,		Water Ovelity manifesting for Ca		Motor Ovelity manifestants - 6 64			
	C2, C3, M1, M2 & M3		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, W11, W2 & W3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
			Air monitoring for AM1 & AM2					
			Noise monitoring for NM1, NM2					
			& NM3					
13	14	15	16	17	18	19		
	Impact		Impact		Impact			
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	Air monitoring for AM1 & AM2				Air monitoring for AM1 & AM2			
	Noise monitoring for NM1, NM2				Noise monitoring for NM1, NM2			
	& NM3				& NM3			
20	21	22	23	24	25	26		
	Impact		Impact		Impact			
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
			Air monitoring for AM1 & AM2					
			Noise monitoring for NM1, NM2					
			& NM3					
27	20							
27	28	29	30	31				
	Impact		Impact		Impact			
	Motor Quality manifestor for Co		W					
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	Air monitoring for AM1 & AM2				Air monitoring for AM1 & AM2			
	Noise monitoring for NM1, NM2				Noise monitoring for NM1, NM2			
	& NM3				& NM3			

Impact Monitoring Schedule for STWTW

CONTRACTOR OF THE STATE OF THE	Impact Monitoring Schedule for STWTW								
Sun         Mon         Tue         Wed         Thur         Fri         Cot									
Juli	Moli	Tue	Wed	Thur	Fri	Sat			
					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	0				
					8	9			
	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				
10	11	12	13	14	15	16			
	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	10			
17	18	19	20	21	22	23			
	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				
24	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  Oct-17								
Sun	Mon	Tue	Wed	Thur				
1	2	2	Wed	Inur	Fri	Sat		
	-	3	4	5	6	7		
			Impact		Impact			
			Water Quality monitoring for C1,		Water Quality monitoring for C1,			
			C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
					Air monitoring for AM1 & AM2			
					Noise monitoring for NM1, NM2			
					& NM3			
8	9	10	11	12	13	14		
	Impact		Impact			14		
	impact		impact		Impact			
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	52, 55, 1112, 1112 & 1115				C2, C3, M1, M2 & M3			
			Air monitoring for AM1 & AM2					
			Noise monitoring for NM1, NM2					
			& NM3					
		Control of the Contro	Control of the Contro					
15	16	17	18	19	20	21		
	Impact		Impact		Impact			
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
	Air monitoring for AM1 & AM2				Air monitoring for AM1 & AM2			
	Noise monitoring for NM1, NM2				Noise monitoring for NM1, NM2			
	& NM3				& NM3			
					Q.1111.13			
22	23	24	25	26	27	28		
	Impact		Impact	20	ALEXANDER CONTRACTOR OF THE PARTY OF THE PAR	28		
	psat		impact		Impact			
	Water Quality monitoring for C1,		Water Ovelite manifests of a Co					
	C2, C3, M1, M2 & M3		Water Quality monitoring for C1,		Water Quality monitoring for C1,			
	C2, C3, W11, W12 & W13		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3			
			Air monitoring for AM1 & AM2					
			Noise monitoring for NM1, NM2					
			& NM3					
29	30	31						
	Impact							
	Water Quality monitoring for C1,							
	C2, C3, M1, M2 & M3							
	Air monitoring for AM1 & AM2							
	Noise monitoring for NM1, NM2							
	& NM3							