JOB NO.: TCS00881/18 & TCS00944/18

SITE FORMATION AND ASSOCIATED INFRASTRUCTURAL WORKS FOR DEVELOPMENT OF COLUMBARIUM, CREMATORIUM AND RELATED FACILITIES AT SANDY RIDGE CEMETERY

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT (NO.15) – OCTOBER 2019

PREPARED FOR
HSIN CHONG TSUN YIP JOINT VENTURE &
SANG HING CIVIL CONTRACTORS CO., LTD

Date	Reference No.	Prepared By	Certified By
12 November 2019	TCS00881/18/600/R0343v1		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 November 2019	First Submission
2	12 November 2019	Amended according to the IEC's comment on 12 Nov 2019

Our Ref: TCS00881/18/300/L0349

Civil Engineering and Development Department
2/F, Civil Engineering and Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Attn: Mr. SHUM Ngai Hung, Steven

14 November 2019
By e-mail

Dear Sirs,

Re: Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery Monthly Environmental Monitoring & Audit Report (No.15) – October 2019

We confirmed that the captioned report has complied with the requirement set out in the EM&A Manual, we hereby certify the captioned report pursuant to Specific Condition 3.4 of the Environmental Permit No. FEP-01/534/2017/A and EP-534/2017/A.

Should you have any queries, please feel free to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or Email: twtam@fordbusiness.com.

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting (AUES)

T. W. Tam
Environmental Team Leader
TW/nh

cc	ARUP (RE of Contract 1)	Mr. Steven Tang	by e-mail
	ARUP (RE of Contract 2)	Mr. Anthony Lau	by e-mail
.	HCTY-JV (Contractor of Contract 1)	Mr. Ho Man To	by e-mail
	Sang Hing (Contractor of Contract 2)	Mr. Elvin Lam	by e-mail
	Acuity (IEC)	Mr. Jacky Leung	by e-mail

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Our ref: CJO4068

Hsin Chong Tsun Yip Joint Venture (CV/2016/10)
Hsin Chong Centre
107-109 Wai Yip Street
Kwun Tong, Kowloon
Hong Kong

Attention: Mr. HO Man-to

13 November 2019

Dear Sir,

Site formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
Monthly Environmental Monitoring and Audit Report (No.15) October 2019

I refer to the email of ET regarding the captioned Monthly Report. We have no adverse comment on the Monthly Environmental Monitoring and Audit Report (No.15) October 2019 (Version 2) dated 12 November 2019 with reference No. TCS00881/18/600/R0343v1 after verification.

Yours faithfully,

CH Leung

Ir Leung CH Jacky
Independent Environmental Checker

cc. CEDD-DPTL/Land Works – Mr. SHUM Steven
ARUP – Mr. LEE Davis
ET Leader – Mr. TAM

EXECUTIVE SUMMARY

ES.01. This is the **15th** Monthly Environmental Monitoring and Audit (EM&A) Report summarizing the monitoring results and inspection findings under the Project for the period from **1** to **31 October 2019** (the Reporting Month).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. In the Reporting Month, the major construction works under the Project included CV/2016/10 (Contract 1) and CV/2017/02 (Contract 2). Environmental monitoring activities under the EM&A programme in this Reporting Month are summarized in the following table.

Table ES-1 Breach of Action and Limit (A/L) Levels in the Reporting Month

Issues	Environmental Monitoring Parameters / Inspection	Monitoring Locations		Total Occasions
		CV/2016/10	CV/2017/02	
Air Quality	1-hour TSP	ASR-1	ASR-2	54
	24-hour TSP		ASR-3	15
Construction Noise	Leq (30min) Daytime	CN-1 CN-2	CN-3 CN-4	20
Water Quality	In-situ measurement and Water sampling	M3	M1, M2 and M4	13
Ecology	Monthly Monitoring	Transect within site area of CV/2016/10	Transect within site area of CV/2017/02	1
Landscape & Visual	Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	1
Inspection & Audit	ET Regular Environmental Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	5
	IEC Monthly Environmental Site Audit			1

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.03. In the Reporting Month, no exceedance of air quality, noise monitoring and water quality was recorded. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Table ES-2 Breach of Action and Limit (A/L) Levels in the Reporting Month

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation findings	Corrective Actions
Air Quality	1-hour TSP	0	0	0	-	-
	24-hour TSP	0	0	0	-	-
Construction Noise	Leq_{30min} Daytime	0	0	0	-	-
Water Quality	DO	0	0	0	-	-
	Turbidity	0	0	0	-	-
	SS	0	0	0	-	-

Note: NOE – Notification of Exceedance

ENVIRONMENTAL COMPLAINT

ES.04. No environmental complaint was recorded or received in this Reporting Month. The statistics of environmental complaint are summarized in the following table.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

ES.05. In addition, no complaints and emergency events relating to violation of environmental legislation for illegal dumping and landfilling was received.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.06. No environmental summons or successful prosecution was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-4 Environmental Summons Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Summons Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

Table ES-5 Environmental Prosecution Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Prosecution Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

REPORTING CHANGE

ES.07. No reporting change was made in the Reporting Month.

SITE INSPECTION

ES.08. In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on ***2nd, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019***. No non-compliance was noted.

ES.09. Joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on ***2th, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019***. No non-compliance was noted.

FUTURE KEY ISSUES

ES.010. During dry season, air quality is the major environmental issues under the Project Works. Air quality mitigation measures such as wheel wash facilities, watering of haul roads, loose soil construction surface and covering of dusty materials with tarpaulin sheet should be implemented as far as practicable.

ES.011. The Contractors are reminded to pay special attention on water quality mitigation measures and should fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and Conservation Area (CA).

ES.012. Moreover, construction noise mitigation measures such as use of movable noise barriers and Quality Powered Mechanical Equipment (QPME) should be properly provided to reduce construction noise impact, where appropriate.

ES.013. The Contractors should properly maintain the cleanliness and tidiness of the site. In addition, mosquito control should be performed to prevent mosquito breeding on site.

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LIST OF APPENDICES

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Civil Engineering and Development Department is the Project Proponent for the Project "*Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*". The Project is a Designated Project to be implemented under Environmental Permit No. EP-534/2017/A and FEP-01/534/2017/A. The layout plan of the Project is shown in ***Appendix A***. Major works to be executed under the Project shall include to the following:

A Designated Works under EP-534/2017/A

(i) Site formation of about 8 hectares of land and associated drainage, sewerage and landscape works for development of Columbarium and Crematorium facilities at the Sandy Ridge Cemetery;
(ii) Construction of a new road (about 600m) including a section of viaduct connecting the platform for Crematorium and Man Kam To Road and the pick-up/drop-off point at Man Kam To Road.;
(iii) Widening of about 900m of the existing Sha Ling Road;
(iv) Widening of about 1.4km of the existing Lin Ma Hang Road; and
(v) Improvement works to the existing barging point at Siu Lam

Non-Designated Works

(i) Construction of a sewage detention tank complete with odour and septicity control mechanism;
(ii) Construction of noise barriers along Sha Ling Road;
(iii) Construction of a new Refuse Collection Point (RCP) near the junction between Man Kam To Road and Sha Ling Road;
(iv) Landscaping works (including both hard and soft landscape works);
(v) Associated tree felling, transplanting and compensatory planting works;
(vi) Associated street lighting, street furniture and road marking, etc.; and
(vii) Other works which are specified in PS of the Contract.

1.1.2 To facilitate the Project management, the Project works were separated into three different Contracts which are described below sub-sections.

1.1.3 *Contract No. CV/2016/10 – Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery*:-

- Site formation of about 1.77 ha of land for the proposed pick-up and drop-off area for shuttle bus operation;
- Upgrading of a section of 900m existing Sha Ling Road from 3m wide carriageway to 7.3m wide carriageway with footpath at both sides;
- Construction of one EVA with a total length of about 160m;
- Construction of noise barriers along Sha Ling Road;
- Modification of junction between Man Kam To Road and Sha Ling Road;
- Construction of a new pick up / drop off point at Man Kam To Road;
- Relocation and construction of a new refuse collection point near junction between Man Kam To Road and Sha Ling Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures;
- Associated drainage, sewerage and waterworks along Sha Ling Road; and
- Associated landscaping works.

1.1.4 *Contract No. CV/2017/02 – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road for Development of Columbarium at Sandy Ridge Cemetery*:-

- Construction of a new road connecting Columbarium site to Crematorium site;

- Construction of one EVA with a total length of about 300m;
- Widening of a section of 1.4 km long Lin Ma Hang Road (between Man Kam To Road and Ping Yuen River) from 6m wide carriageway to 7.3m with 2m width footpath on both sides;
- Provision of a pair of lay-by at Lin Ma Hang Road;
- Construction of a new vehicular access connecting the Sheung Shui Landmark North PTI and Lung Sum Avenue;
- Construction of covered walkway along Fanling Station Road;
- Removal of planters and central divider along Fanling Station Road and San Wan Road;
- Associated drainage, sewerage, waterworks and utility works along Man Kam To Road and Lin Ma Hang Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works.

1.1.5 *CEDD Contract No. (to be advised)*:-

- Site Formation for the platform of the columbarium site;
- Construction of two 2 at-grade access roads;
- Construction of road junction between Man Kam To Road and the new access road;
- Associated drainage, sewerage and waterworks along the two new access roads;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works

1.1.6 Hsin Chong Tsun Yip Joint Venture (hereafter referred as "HCTYJV") has been awarded Contract 1 on 5 December 2017. According to the Contract requirement, HCTYJV shall take over the responsibility for part of the Environmental Permit No. EP-534/2017 for ease of management, therefore application for Further Environmental Permit was submitted by HCTYJV to EPD on 26 January 2018 and Further Environmental Permit No. FEP-01/534/2017 was granted to HCTYJV by EPD on 23 February 2018. Furthermore, EPD issued Environmental Permit No. FEP-01/534/2017/A on 24 December 2018.

1.1.7 Sang Hing Civil Contractors Company Limited (hereinafter referred as "Sang Hing") was awarded Contract 2 on 23 May 2018. The Contract Works is a Designated Project as under Environmental Permit (EP) No. EP-534/2017. Furthermore, EPD issued Environmental Permit No. EP-534/2017/A on 24 December 2018.

1.1.8 Action-United Environmental Services & Consulting has been commissioned by the Contractors as an Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme in accordance with the approved EM&A Manual as well as the associated duties. As part of the EM&A programme, baseline monitoring to determine the ambient environmental conditions was completed before construction work commencement. The Baseline Monitoring Report (air, noise and water) certified by ET Leader (ETL) and verified by Independent Environmental Checker (IEC) was submitted to Environmental Protection Department (EPD) and it was approved by EPD on 25 October 2018.

1.1.9 This is the **15th** Monthly EM&A Report summarizing the monitoring results and inspection findings for the period from **1** to **31 October 2019**.

1.2 REPORT STRUCTURE

1.2.1 The Monthly EM&A Report is structured into the following sections:-

Section 1 *Introduction*
Section 2 *Project Organization and Construction Progress*
Section 3 *Summary of Monitoring Requirements*

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

2.1.1 To facilitate the project management and implementation, the Project was divided by the following contracts:

- Contract 1 (Contract No. CV/2016/10)
- Contract 2 (Contract No. CV/2017/02)
- Contract 3 (Contract No. TBA)

2.1.2 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in ***Appendix B***.

2.2 CONSTRUCTION PROGRESS

2.2.1 The three-month rolling construction programme for Contract 1 and Contract 2 are enclosed in ***Appendix C***. The construction activities undertaken in this Reporting Month are listed below:-

Contract 1 (CV/2016/10)

2.2.2 Contract 1 was awarded in December 2017 and major construction work was commenced on 16 August 2018. The construction activities undertaken in this Reporting Month is listed below:

- General site clearance
- Bulk Excavation
- Construction of Cut Slope, installation of soil nailing and construction of surface channel
- Construction of retaining wall for Fill Slope.
- Construction of Fill Slope and surface channel

Contract 2 (CV/2017/02)

2.2.3 Contract 2 was awarded in May 2018 and construction work was tentatively commenced on 5 November 2018. The construction activities undertaken in this Reporting Month is listed below:

- Excavation permit (XP) for Fanling Covered Walkway still processing
- The 9th TMLG meeting was held on 24 Sep 2019 and the TMLG meeting minutes to be issued to TMLG members on 16 Oct 2019
- The 10th TMLG meeting is schedule on the 29 Nov 2019
- Preparation of submission documents under EP conditions
- Preparation for submission and resubmission including but not limited to
  - Proposal of Key Staff and Supporting Staff
  - Safety Plan/ Environmental Management Plan/ Sub-Contractor Management Plan/ Weather Protection Scheme
  - Method statement and material submission
- Tree Updating Report for Lin Ma Hang Road, Man Kam To Road & Sha Ling
- Site Patrol and daily cleaning within the site boundary including the anti-mosquito measures
- Liaison with Contract 1 Contractor regarding the access road & CS22
- Construction of Manhole, gullies, drainage pipe at Lin Ma Hang Road between CH330-380 Northbound & CH1015-1115 Northbound
- Soil Nail Works at Lin Ma Hang Road Slope C225
- Filling Works and drainage works for slope FS18 (Part A1)
- Construction of Retaining Wall 13

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 Summary of the relevant permits, licenses, and/or notifications on environmental protection for this Project in this Reporting Month is presented in ***Tables 2-1 and 2-2.***

Table 2-1 Status of Environmental Licenses and Permits for Contract 1

Item	Description	License/ Permit ref no.	License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 428909 Acknowledged by EPD on 20/12/2017	Valid
2	Chemical waste Producer Registration	WPN: 5231-641-H3937-01 Issued by EPD on 27/03/2018	Valid
3	Water Pollution Control Ordinance	License no. WT00030795-2018 Issued date: 9/5/2018 Expire Date: 31/5/2023	Valid
4	Billing Account for Disposal of Construction Waste	Account no.: 7029769	Valid

Table 2-2 Status of Environmental Licenses and Permits for Contract 2

Item	Description	License/ Permit ref no.		License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 440406 Acknowledged by EPD on 14/12/2018	Man Kam To Road (near Sha Ling Road to Kong Nga Po Road	Valid
		Ref. no. 440405 Acknowledged by EPD on 14/12/2018	Fanling Station Road	Valid
		Ref. no. 440404 Acknowledged by EPD on 14/12/2018	Sa Ling Road (Sandy Ridge Cemetery)	Valid
		Ref. no. 440401 Acknowledged by EPD on 14/12/2018	Lin Ma Hang Road (San Uk Ling – Muk Wu Nga Yiu)	Valid
		Ref. no. 440402 Acknowledged by EPD on 14/12/2018	Lung Sum Avenue (near Landmark North)	Valid
2	Chemical waste Producer Registration	WPN: 5213-641-S4151-01 Issued by EPD on 04/02/2019		Valid
3	Water Pollution Control Ordinance	License no: WT00032936-2018 Issued date: 16/01/2019 Expire Date: 31/01/2024	Man Kam To Road & Lin Ma Hang Road, Man Kam To	Valid
		License no: WT00033335-2019 Issued date: 29/03/2019 Expire Date: 31/03/2024	Columbarium at Sandy Ridge Cemetery	Valid
		License no: WT00034717-2019 Issued date: 9/10/2019 Expire Date: 31/10/2024	Fanling Station Road	Valid
4	Billing Account for Disposal of Construction Waste	Account no.: 7031098		Valid

2.4 SUMMARY OF SUBMISSION UNDER THE ENVIRONMENTAL PERMIT REQUIREMENTS

2.4.1 ***Tables 2-3 to 2-4*** summarized the submission status under the EP and/or FEP stipulation in the Reporting Month.

Table 2-3 Status of Submission as under FEP

Item	EP and / or FEP Stipulation	Description	Status
1	Condition 2.10 of FEP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted on 11 April 2018
2	Condition 2.11 of FEP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted on 12 April 2018
3	Condition 2.12 of FEP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
4	Condition 2.13 of FEP	Grassland Reinstatement Plan	Re-submitted on 31 May 2019
5	Condition 2.14 of FEP	Vegetation Survey Report for Contract 1	Approved by EPD on 12 October 2018
6	Condition 2.15 of FEP	Vegetation Transplantation Proposal Contract 1	Approved by EPD on 12 October 2018
7	Condition 2.17 of FEP	Woodland Compensation Plan (Rev.03)	Re-submitted on 23 Aug 2019
8	Condition 2.18 of FEP	Monitoring and Survey Plan for Golden-headed Cisticola for Contract 1 (Rev.02)	Re-submitted on 17 Oct 2019
9	Condition 2.20 of FEP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 1 (Rev.03)	Re-submitted on 20 Sep 2019
10	Condition 2.22 of FEP	Traffic Noise Mitigation Plan Contract 1 (Rev. 4)	Re-submitted on 10 Nov 2019
11	Condition 3.3 of the FEP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018
12	Condition 4.2 of the FEP	The Contract Internet website	Internet website address has notified EPD on 15 Jun 2018

Table 2-3 Status of Submission as under EP

Item	EP and / or FEP Stipulation	Description	Status
1a	Condition 2.10 of EP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted on 24 September 2018
2a	Condition 2.11 of EP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted on 26 September 2018
3	Condition 2.13 of EP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
4	Condition 2.14 of EP	Grassland Reinstatement Plan	Re-submitted on 31 May 2019
5	Condition 2.15 of EP and	Vegetation Survey Report Contract 2	Re-submitted on 30 Oct 2019
6	Condition 2.16 of EP	Vegetation Transplantation Proposal Contract 2	Re-submitted on 30 Oct 2019
7	Condition 2.18 of EP	Woodland Compensation Plan (Rev.03)	Re-submitted on 23 Aug 2019
8	Condition 2.19 of EP	Monitoring and Survey Plan for Golden-headed Cisticola Contract 2	Re-submitted on 30 Oct 2019
9	Condition 2.22 of EP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 2	Re-submitted on 25 Mar 2019
10	Condition 2.24 of EP	Traffic Noise Mitigation Plan Contract 2	Re-submitted on 12 Aug 2019
11	Condition 3.3 of the EP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018
12	Condition 4.2 of the EP	The Contract Internet website	Internet website address has notified EPD on 15 June 2018

3. SUMMARY OF IMPACT MONITORING REQUIREMENT

3.1 GENERAL

3.1.1 The EM&A requirements are set out in the Approved EM&A Manual. Environmental issues such as air quality, construction noise, water quality and ecology were identified as the key issues during the construction phase of the Project.

3.1.2 A summary of construction phase EM&A requirements are presented in the sub-sections below.

3.2 MONITORING PARAMETERS

3.2.1 The EM&A impact monitoring shall cover the following environmental aspect:

- Air quality;
- Construction noise;
- Water quality;
- Ecology; and
- Landscape and visual

3.2.2 A summary of the monitoring parameters is presented in ***Table 3-1*** below

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	• 1-hour TSP; • 24-hour TSP
Noise	• $Leq_{(30min)}$ during normal working hours.; and • $Leq_{(15min)}$ during the construction works undertaken in Restricted Hours
Water Quality	**In-situ Measurements** • Dissolved Oxygen Concentration (mg/L) & Saturation (%); • Temperature (℃); • Turbidity (NTU); • Salinity (ppm) • pH unit; • Water depth (m); and • Stream Flow Velocity (m/sec).
	Laboratory Analysis • Suspended Solids (mg/L)
Ecology	Ecologically sensitive habitats (wetland habitats and non-wetland habitats)

3.3 MONITORING LOCATIONS

3.3.1 According to the Approved EM&A Manual of the Project – *Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*, the designated monitoring locations for air quality, noise, water quality and ecology under the monitoring programme, is shown in ***Appendix D***.

3.3.2 Since the Project was divided into three Works Contracts and all Contracts will be commenced at different time, the construction phase impact monitoring will only be performed at the Contract-related monitoring stations upon commencement of each Contract Works.

Air Quality

3.3.3 There were three (3) designated air quality monitoring stations recommended in the Approved EM&A Manual Section 5.6.1.1. There was proposed relocation of air quality monitoring location ASR-3 in October 2018 since the landlord refused to set up the HVS at his premises and nearby area due to noise nuisance and Muk Wu Nga Yiu House No. 2A was proposed as alternative location ASR-3a. The proposal dated on 9 November 2018 which verified by IEC was submitted to EPD

for approval. Based on rationale in Section 3.3.2, the Contract-related air quality monitoring location for construction phase were summarized in ***Table 3-2*** and illustrated in ***Appendix D***.

Table 3-2 Designated Air Quality Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
ASR-1	Village House along Man Kam To Road	Sha Ling Village House No.6	Contract 1
ASR-2	Village House at San Uk Ling	San Uk Ling Village House No.1	Contract 2
ASR-3	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.28	Contract 2
ASR-3a (#)	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.2A	Contract 2

Remark: (#)
There was proposed relocation of air quality monitoring location ASR-3 in October 2018. The proposal dated on 9 November 2018 after verified by IEC was submitted to EPD for approval.

3.3.4 If the designated monitoring location is required to relocate, alternative monitoring location shall agree with IEC and seek for EPD approval which shall meet the following criteria:

i) Be at the site boundary or such locations close to the major dust emission source;
ii) Close to the sensitive receptors;
iii) Take into account the prevailing meteorological conditions;
iv) For monitoring location located in the vicinity of the ASRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.
v) When positioning the HVS, the following points shall be noted:
   a. a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
   b. no two samplers shall be placed less than 2m apart;
   c. the distance between the HVS and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the HVS;
   d. a minimum of 2 m separation from walls, parapets and penthouses is required for HVS at the rooftop;
   e. a minimum of 2 m separation from any supporting structure, measures horizontally is required;
   f. no furnace or incinerator flue is nearby;
   g. airflow around the sampler is unrestricted;
   h. the HVS is more than 20 m from the dripline;
   i. any wire fence and gate to protect the HVS, shall not cause any obstruction during monitoring;
   j. permission must be obtained to set up the HVS and to obtain access to the monitoring stations; and
   k. a secured supply of electricity is needed to operate the HVS.

Construction Noise

3.3.5 There were four (4) designated noise monitoring locations recommended in the Approved EM&A Manual Section 6.5.1.1. Based on rationale in Section 3.3.2, the Contract-related noise quality monitoring location for construction phase were summarized in ***Table 3-3*** and illustrated in ***Appendix D***.

Table 3-3 Designated Construction Noise Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
CN-1	Village house to the west of Sha Ling Road	Village house to the west of Sha Ling Road (free field condition)	Contract 1

Location ID	Description in EM&A Manual	Location	Related Work Contract
CN-2	Village house to the north of Man Kam To Road	Sha Ling Village House No. 25 (free field condition)	Contract 1 & 3
CN-3	Village house near San Uk Ling	San Uk Ling Village House No. 18 (free field condition)	Contract 2
CN-4	Village house of Muk Wu	Muk Wu Village House No. 267 (1m façade from the building)	Contract 2

Water Quality

3.3.6 There were four (4) water quality monitoring locations recommended in the Approved EM&A Manual Section 7.6.1.2. The locations and coordinates of water quality monitoring were listed in ***Table 3-4***. Based on rationale in Section 3.3.2, the Contract-related water quality monitoring location for construction phase were summarized in ***Table 3-4*** and illustrated in ***Appendix D***.

Table 3-4 Designated Water Quality Monitoring Stations under the Project

Proposed Location ID	Co-ordinates		Description	Related Work Contract
	North	East		
M1	843 431	831 308	Midstream of Nam Hang Stream	Contract 2
M2	843 840	831 101	Downstream of Nam Hang Stream	Contract 2
M3	843 509	830 040	Wetland in the Conservation Area (CA) near Yuen Leng Chai	Contract 1
M4	843 997	831 783	Watercourse across Lin Ma Hang Road, running from east of San Uk Ling to Man Kam To Boundary Control Point	Contract 2

3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of impact monitoring were stipulated in *Sections 5.8.1.1, 6.7.1.1* and *7.8.1.4* of the approved *EM&A Manual* and presented as follows.

Air Quality Monitoring

3.4.2 Monitoring frequency for air quality impact monitoring is as follows:

- 1-Hour TSP — 3 sets of 1-hour TSP monitoring shall be carried out once every six days during construction periods
- 24-Hour TSP — 24-hour TSP monitoring shall be carried out every six days during construction periods

Noise Monitoring

3.4.3 Noise impact monitoring shall be carried out once per week during construction periods. The noise measurement for the time period between 0700 and 1900 hours shall be measured in terms of L_{eq} (30 minutes) or 6 sets of L_{eq} (5mins).

Water Quality Monitoring

3.4.4 The monitoring frequency shall be 3 days per week during construction phase and the interval between two sets of monitoring shall not be less than 36 hours.

3.5 MONITORING EQUIPMENT

3.5.1 The monitoring equipment using for the EM&A program as proposed by the ET shall be verified by the IEC.

Air Quality Monitoring

3.5.2 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50),*

Appendix B. If ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to IEC for approval.

3.5.3 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.4 All equipment used by ET for air quality monitoring is listed in ***Table 3-5***.

Table 3-5 Air Quality Monitoring Equipment

Equipment	Model
24-hour TSP	
High Volume Air Sampler (HVAS)	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A
1-Hour TSP	
Portable Dust Meter	Sibata LD-3 Laser Dust monitor Particle Mass Profiler & Counter

Wind Data Monitoring Equipment

3.5.5 According to the approved EM&A Manual, wind data monitoring equipment shall also be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

1) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.
2) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.
3) The wind data monitoring equipment should be re-calibrated at least once every six months.
4) Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.5.6 ET has liaised with the premises owners/ landlords to grant the permission for the HVS installation. However, they rejected to set up wind data monitoring equipment installation in their premises.

3.5.7 Under this situation, the ET proposed to obtain representative wind data from the Hong Kong Observatory Ta Kwu Ling Weather Station. Ta Kwu Ling Station is located near the Project site which situated at the sea level above 15mPD and the wind data monitoring equipment is installed 10 m above the existing ground.

Noise Monitoring

3.5.8 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} before each noise monitoring event. Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1}.

3.5.9 Noise monitoring equipment used for impact monitoring is listed in ***Table 3-6***.

Table 3-6 Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer

3.5.10 Sound level meters listed above comply with the *International Electrotechnical Commission Publications 651: 1979 (Type 1)* and *804: 1985 (Type 1)* specifications, as recommended in TM issued under the NCO.

Water Quality Monitoring

3.5.11 Water quality parameters include dissolved oxygen, water temperature & depth, turbidity, salinity, pH and stream flow velocity shall be measured *in-situ*, and suspended solids shall be analyzed by a HOKLAS-accredited testing laboratory.

Dissolved Oxygen and Temperature Measurement

3.5.12 The dissolved oxygen (DO) measuring instruments should be portable and weatherproof. The equipment should also complete with cable and sensor, and DC power source. It should be capable of measuring:

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

3.5.13 The equipment should have a membrane electrode with automatic temperature compensation complete with a cable.

3.5.14 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO measuring instruments prior to each measurement.

Turbidity Measurement

3.5.15 The turbidity measuring instruments should be a portable and weatherproof with DC power source. It should have a photoelectric sensor capable of measuring turbidity level between 0–1000 NTU (for example, Hach model 2100Q or an approved similar instrument).

Salinity Measurement

3.5.16 A portable salinometer capable of measuring salinity in the range of 0–40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.

pH Measurement

3.5.17 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions accordingly to the APHA Standard Methods.

Water Depth Measurement

3.5.18 A portable, battery-operated echo sounder or an approved similar instrument should be used for water depths determination at each designated monitoring station.

Stream Flow Velocity Equipment

3.5.19 Since the EM&A Manuals do not specified instrument to use stream flow velocity measurement, the monitoring of stream flow velocity is therefore proposed to be conducted by using a flow probe which is a digital water velocity meter.

Water Sampling Equipment

3.5.20 A water sampler is required for suspended solid (SS) monitoring. A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres, will be used for water sampling if water depth over than 0.5m.

3.5.21 For sampling from very shallow water depths e.g. <0.5 m, water sample will be collected from water surface below 100mm using plastic bottle to avoid inclusion of bottom sediment or humus.

Moreover, Teflon/stainless steel bailer or self-made sampling buckets maybe used for water sampling. The equipment used for sampling will be depended the sampling location and depth situations.

Sample Containers and Storage

3.5.22 Water samples for suspended solid should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory within 24 hours of collection and be analyzed as soon as possible after collection.

3.5.23 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.

3.5.24 Details of the equipment used for water quality monitoring are listed in ***Table 3-7*** below.

Table 3-7 Water Quality Monitoring Equipment

Equipment	Model
Water Depth Detector	Tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or eflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Pro 20
pH meter	AZ8685 pH meter
Turbidimeter	Hach 2100Q
Salinometer	Atago refractometer Atago S Salinity Meter
Stream Flow Velocity	FP211 Global Flow Probe
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-litter plastic cool box with Ice pad

3.5.25 Furthermore**,** Suspended solids (SS) analysis was carried out by *ALS Technichem (HK) Pty Ltd*. Which is one a local HOKLAS-accredited laboratory

3.6 EQUIPMENT CALIBRATION

3.6.1 The HVAS is operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out at fortnightly interval. The calibration data are properly documented and the records are maintained by ET for future reference. Furthermore, Tisch Calibration Kit will be calibrated by the manufacturer in yearly basis.

3.6.2 The 1-hour TSP meter calibrated by a local HOKLAS-accredited laboratory would be undertaken in yearly basis. Zero response of the equipment was checked before and after each monitoring event.

3.6.3 The sound level meter and acoustic calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.

3.6.4 The multi-parameter Water Quality Monitoring System is calibrated by HOKLAS accredited laboratory of three month intervals.

3.6.5 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in this Reporting Month are attached in ***Appendix E***.

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

3.7.1 The impact monitoring data are handled by the ET's systematic data recording and management,

which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.

3.7.2 The monitoring data recorded in the equipment e.g. 1-hour TSP meter, noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

3.8 DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.8.1 The baseline monitoring results form the basis for determining the environmental acceptance criteria for the impact monitoring. The air quality, construction noise and water quality criteria, namely Action and Limit levels were established according to Approved EM&A Manual, and they are listed in ***Tables 3-8, 3-9*** and ***3-10*** below.

Table 3-8 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
ASR-1	331	181	500	260
ASR-2	316	165	500	260
ASR-3	307	160	500	260

Table 3-9 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
CN-1,CN-2, CN-3, CN-4	When one or more documented complaints are received	75 dB(A)

*Note: * Reduces to 70 dB(A) for schools and 65 dB(A) during the school examination periods.*

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location			
		M1	M2	M3	M4
DO (mg/L)	Action Level	3.03	4.99	4.58	3.62
	Limit Level	2.97	4.90	4.49	3.52
Turbidity (NTU)	Action Level	7.1	39.7	5.6	5.4
	Limit Level	7.6	42.2	5.9	5.9
SS (mg/L)	Action Level	8.5	29.0	9.3	4.8
	Limit Level	10.1	31.0	9.5	5.0

Notes:
- *For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits*
- *For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.*

3.8.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in ***Appendix F***.

4. AIR QUALITY

4.1 MONITORING RESULTS

4.1.1 In the Reporting Month, construction works under the project have been commenced in Contract 1 and Contract 2. Air quality monitoring was performed at all designated locations. Air quality impact monitoring schedule was submitted to all relevant parties which shown in ***Appendix G***.

4.1.2 In this Reporting Month, ***15*** occasions of 24-hour TSP and ***54*** occasions of 1-hour TSP were undertaken for air quality monitoring. The air quality monitoring results including 24-hour and 1-hour TSP are summarized in ***Tables 4-1*** to ***4-3***. The database of 24-hour TSP is shown in ***Appendix H*** and the graphical plots of 24-hour and 1-hour TSP result are shown in ***Appendix I***.

Table 4-1 Summary of Air Quality Monitoring Results at ASR-1 under Contract 1

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st hour measured	2nd hour measured	3rd hour measured
3-Oct-19	171	2-Oct-19	9:13	76	81	64
9-Oct-19	108	8-Oct-19	9:23	81	64	55
15-Oct-19	139	14-Oct-19	9:46	73	79	88
21-Oct-19	143	19-Oct-19	9:11	80	79	81
26-Oct-19	146	24-Oct-19	13:46	111	121	116
-	-	31-Oct-19	13:29	108	114	120
Average (Range)	**141 (108 – 171)**	Average (Range)		**88 (55 – 121)**		

Table 4-2 Summary of Air Quality Monitoring Results at ASR-2 under Contract 2

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st hour measured	2nd hour measured	3rd hour measured
3-Oct-19	161	2-Oct-19	9:23	99	87	65
9-Oct-19	81	8-Oct-19	9:31	84	57	65
15-Oct-19	74	14-Oct-19	9:43	70	76	82
21-Oct-19	70	19-Oct-19	9:42	75	77	73
26-Oct-19	105	24-Oct-19	9:18	93	101	108
-	-	31-Oct-19	9:17	83	95	101
Average (Range)	**98 (70 – 161)**	Average (Range)		**83 (57– 108)**		

Table 4-3 Summary of Air Quality Monitoring Results at ASR-3a under Contract 2

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st hour measured	2nd hour measured	3rd hour measured
3-Oct-19	34	2-Oct-19	9:35	89	91	73
9-Oct-19	44	8-Oct-19	9:44	81	72	68
15-Oct-19	45	14-Oct-19	9:40	66	78	86
21-Oct-19	52	19-Oct-19	13:08	81	79	75
26-Oct-19	60	24-Oct-19	9:32	95	99	105
-	-	31-Oct-19	9:30	86	91	99
Average (Range)	**47 (34 – 60)**	Average (Range)		**84 (66 – 105)**		

4.2 AIR MONITORING EXCEEDANCE

4.2.1 As shown in ***Tables 4-1 to 4-3***, the monitoring results of 24-hour and 1-hour TSP monitoring in the Reporting Month were below the Action/ Limit Level. No Notification of Exceedance (NOE) of air quality monitoring criteria was issued and therefore corrective action was not required. The meteorological data during the impact monitoring days are summarized in ***Appendix J***.

5. CONSTRUCTION NOISE

5.1 MONITORING RESULTS

5.1.1 In the Reporting Month, construction works under the project have been commenced in Contract 1 and Contract 2. Noise quality monitoring was performed at all designated locations. Noise impact monitoring schedule was submitted to all relevant parties which shown in ***Appendix G***.

5.1.2 In this Reporting Month, ***20*** occasions of noise monitoring were undertaken at designated noise monitoring location. The sound level were set in a free field situation for CN1, CN2 and CN3 and therefore a façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines. The monitoring result of noise monitoring is show in ***Tables 5-1 and 5-2*** and the graphical plots are shown in ***Appendix I***.

Table 5-1 Summary of Construction Noise Monitoring Results under Contract 1

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	**Start Time**	**CN1(*)**	**Start Time**	**CN2(*)**
2-Oct-19	9:13	71	10:11	68
8-Oct-19	9:03	71	9:53	68
14-Oct-19	9:50	70	10:26	68
24-Oct-19	13:44	68	14:21	66
31-Oct-19	13:27	69	14:03	67
Limit Level	**75 dB(A)**			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Table 5-2 Summary of Construction Noise Monitoring Results under Contract 2

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	**Start Time**	**CN3 (*)**	**Start Time**	**CN4**
2-Oct-19	10:53	61	11:29	58
8-Oct-19	10:39	63	11:27	61
14-Oct-19	11:06	61	11:42	61
24-Oct-19	10:05	64	9:28	55
31-Oct-19	10:00	58	9:24	54
Limit Level	**75 dB(A)**			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

5.1.3 Prior and after noise monitoring, the accuracy of the sound level meter has been checked by an acoustic calibrator to ensure the measurement within acceptance range of ±0.5dB. Moreover, wind speed checked by portable wind speed meter has been performed before noise monitoring. No noise measurement was performed in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1}.

5.2 NOISE MONITORING EXCEEDANCE

5.2.1 As shown in ***Tables 5-1 and 5-2***, no noise monitoring results exceeded the Limit Level in the Reporting Month. No Notification of Exceedance (NOE) of construction noise criterion was issued and no corrective action was therefore required.

6. WATER QUALITY

6.1 MONITORING RESULTS

6.1.1 Water quality impact monitoring schedule was submitted to all relevant parties which shown in ***Appendix G***.

6.1.2 In the Reporting Month, a total of ***13*** monitoring days were carried out for water quality impact monitoring. The monitoring result of key parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in ***Tables 6-1*** and ***6-2***. Detailed monitoring results including in-situ measurements and laboratory analysis data are shown in ***Appendix H*** and graphical plots for monitoring result are shown in ***Appendix I***.

Table 6-1 Summary of Water Quality Monitoring Results – M3 under Contract 1

Date	Parameters		
	DO (Averaged) (mg/L)	Turbidity (Averaged) (NTU)	Suspended Solids (Averaged) (mg/L)
2-Oct-19	7.68	3.6	8.5
4-Oct-19	6.48	3.3	8.5
8-Oct-19	6.79	5.0	7.0
10-Oct-19	6.25	3.9	2.5
12-Oct-19	6.70	4.1	2.0
14-Oct-19	7.47	3.4	2.5
16-Oct-19	7.42	3.1	2.0
18-Oct-19	6.89	3.5	3.5
21-Oct-19	6.57	3.9	4.0
23-Oct-19	7.18	2.8	4.5
25-Oct-19	7.77	4.8	5.0
28-Oct-19	6.62	3.1	3.5
30-Oct-19	7.44	3.5	3.5

Table 6-2 Summary of Water Quality Monitoring Results (M1, M2 and M4) under Contract 2

Date	Parameters								
	DO (Averaged) (mg/L)			Turbidity (Averaged) (NTU)			Suspended Solids (Averaged) (mg/L)		
	M1	M2	M4	M1	M2	M4	M1	M2	M4
2-Oct-19	7.00	#	7.88	2.0	#	1.8	8.0	#	2.5
4-Oct-19	7.28	#	7.34	4.3	#	1.4	5.0	#	2.0
8-Oct-19	7.51	#	7.95	3.4	#	1.2	5.0	#	4.5
10-Oct-19	7.12	#	7.34	1.9	#	1.1	5.0	#	<2
12-Oct-19	7.41	#	7.49	3.0	#	1.4	3.5	#	<2
14-Oct-19	7.62	5.33	7.70	2.6	10.6	2.3	2.0	20.5	9.5
16-Oct-19	6.77	5.27	6.88	5.3	8.8	1.3	2.0	9.0	8.0
18-Oct-19	7.37	#	7.20	2.3	#	1.7	3.0	#	8.0
21-Oct-19	6.07	#	7.51	2.4	#	1.8	3.0	#	4.0
23-Oct-19	8.00	#	7.89	3.3	#	1.1	3.0	#	2.0
25-Oct-19	8.14	#	7.88	4.7	#	1.4	12.0	#	2.0
28-Oct-19	6.92	#	7.25	2.1	#	1.0	3.0	#	<2
30-Oct-19	8.21	#	8.46	2.3	#	1.1	<2	#	<2

Remarks: (#) During the water monitoring, the channel of M2 was observed dried up and water sampling was unable be carried out; Bold and underlined indicated Limit Level exceedance

6.1.3 During the Reporting Month, field measurements including temperature of stream water, salinity concentrations, pH values and the stream flow velocity for all monitoring locations are summarized

in ***Table 6-3.***

Table 6-3 Summary of Field Measurements for Water Quality

Monitoring Location	Parameters of field measurements							
	pH (Averaged) (unit)		Salinity (Averaged) (ppt)		Temp (Averaged) (^{o}C)		Water Flow (Averaged) (m/s)	
	min	max	min	max	min	max	min	max
M1	7.9	10.3	0.03	0.06	15.0	30.8	<0.1	<0.1
M2	8.4	8.9	0.07	0.07	27.0	29.3	<0.1	<0.1
M3	8.3	10.4	0	3.5	26.9	30.4	<0.1	0.1
M4	8.1	9.7	0.02	0.06	25.5	30.8	<0.1	<0.1

6.2 WATER QUALITY MONITORING EXCEEDANCE

6.2.1 In this Reporting Month, no Action Level and Limit Level water quality exceedances was recorded. The non-compliance of water quality performance is summarized in ***Table 6-4***.

Table 6-4 Action and Limit (A/L) Levels Exceedance Record

Station	DO		Turbidity		SS		Total Exceedance		Project Related exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit	Action	Limit
M1	0	0	0	0	0	0	0	0	0	0
M2	0	0	0	0	0	0	0	0	0	0
M3	0	0	0	0	0	0	0	0	0	0
M4	0	0	0	0	0	0	0	0	0	0

6.2.2 Notification of Exceedance (NOE) and the investigation for exceedance in the Reporting Month is summarized in ***Table 6-5***.

Table 6-5 Summary of Investigation of Water Quality Exceedance in the Reporting Month

Date of Exceedance	Exceeded Location	Exceeded Parameter	Cause of Water Quality Exceedance
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7. ECOLOGY MONITORING

7.1 REQUIREMENT

7.1.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.

7.1.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution. In order to monitor the effectiveness of the measures to the minimize impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland habitats (*wet woodland and watercourse*) and non-wetland habitats (*upland grassland and woodland*).

7.2 METHODOLOGY

7.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardized quantitative methodology will conduct at fixed points. For seasonal watercourse, the survey will be conducted whenever the habitat appears. Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and Action/Limit levels to trigger these measures are detailed in ***Table 7-1***.

Table 7-1 Action and Limit Levels for Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

7.2.2 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts. Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and Action/Limit levels to trigger these measures are detailed in ***Table 7-2***.

Table 7-2 Action and Limit Levels for Non-Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

7.2.3 The ecological survey includes all taxa being investigated in accordance with EIA report. Schedule of faunal surveys in each year during construction phase is presented in ***Table 7-3***.

Table 7-3 Schedule of Faunal Surveys in each year During Construction Phase

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Mammal Survey

7.2.4 Mammal surveys will be conducted along the proposed transects (shown in Appendix D of the survey report) during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

Bird Survey

7.2.5 Bird surveys will be conducted along the transects (shown in Appendix D of the survey report) during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilizing.

Herpetofauna Survey

7.2.6 Reptile and amphibian surveys will be conducted along transects (shown in Appendix D of the survey report) during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

Dragonfly and Butterfly Survey

7.2.7 Dragonfly and Butterfly surveys will be conducted along transects (shown in Appendix D of the survey report) during surveys all dragonflies and Butterflies seen will be identified and counted as accurately as possible.

Aquatic Fauna Survey

7.2.8 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

7.2.9 After each ecological monitoring survey, a monthly report of the survey result and data collected will be provided with reference to EM&A Manual. An annual analysis of data will be carried out in order to study if there is any significant reduction in taxa diversity and abundance.

7.3 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 1)

7.3.1 In the Reporting Month, ecological monitoring was undertaken on ***8th October 2019*** at work area of Contract 1. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 1

Mammal

7.3.2 There was an unknown bat recorded in the monitoring area

Birds

7.3.3 There were total of 16 bird individuals from 8 species recorded in the monitoring area. Two species of conservation interests was recorded in the monitoring area: *Centropus sinensis*, Greater Coucal (褐翅鴉鵑) and *Garrulax canorus*, Chinese Hwamei(畫眉).

Herpetofauna

7.3.4 There was no reptile recorded in the monitoring area. There was no amphibian species recorded in the monitoring area.

Dragonfly

7.3.5 There were 4 odonate individuals from 3 species recorded in the monitoring area.

Butterfly

7.3.6 There were 6 butterfly individuals from 2 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

7.3.7 There was no freshwater community recorded in the monitoring area.

7.3.8 The summaries of faunal survey result are shown in ***Tables 7-4, 7-5, 7-6, 7-7, 7-8, 7-9 a***nd ***7-10***.

Table 7-4 Result of Mammal Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Unknown Bat					1

Table 7-5 Result of Avifauna Survey under Contract 1

Scientific Name	English Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Centropus sinensis	Greater Coucal	牛背鷺	**Class 2 Protected Animal of China; China Red Data Book Status: (Vulnerable)**	1	
Lanius schach	Long-tailed Shrike	棕背伯勞		1	1
Parus cinereus	Cinereous Tit	蒼背山雀		2	
Pycnonotus jocosus	Red-whiskered Bulbul	紅耳鵯		2	
Pycnonotus sinensis	Chinese Bulbul	白頭鵯			3
Prinia flaviventris	Yellow-bellied Prinia	黃腹鷦鶯		1	2
Garrulax canorus	Chinese Hwamei	畫眉	**Appendix 2 of CITES**	2	
Gracupica nigricollis	Black-collared Starling	黑領椋鳥		1	

Table 7-6 Result of Reptile Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
--	--	--	--	--

Table 7-7 Result of Amphibian Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
--	--	--	--	--	--

+: Uncountable due to vocal identification.

Table 7-8 Result of Butterfly Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
Parnara guttata	Common Straight Swift	直紋稻弄蝶	1	
Abisara echerius	Plum Judy	蛇目褐蜆蝶	3	2

Table 7-9 Result of Odonate Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Orthetrum glaucum	Common Blue Skimmer	黑尾灰蜻		1	
Pantala flavescens	Wandering Glider	黃蜻			2
Rhyothemis variegata	Variegated Flutterer	斑麗翅蜻			1

Table 7-10 Result of Freshwater Communities Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
--	--	--	--	--	--

+: Species appeared but uncountable.

7.4 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)

7.4.1 In the Reporting Month, ecological monitoring was undertaken on ***8th October 2019*** at work area of Contract 2. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 2

Mammal

7.4.2 There was one unknown bat recorded in the monitoring area

Birds

7.4.3 There were total of 9 bird individuals from 6 species recorded in the monitoring area.

Herpetofauna

7.4.4 There was no reptile recorded in the monitoring area. There was no amphibian was recorded in the

monitoring area.

Dragonfly

7.4.5 There were 4 odonate individuals from 2 species recorded in the monitoring area.

Butterfly

7.4.6 There were 3 butterfly individuals from 2 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

7.4.7 There were two species of freshwater fish were recorded in the monitoring area.

7.4.8 The summaries of faunal survey result are shown in ***Tables 7-11***, ***7-12***, ***7-13***, ***7-14***, ***7-15, 7-16*** and ***7-17***.

Table 7-11 Result of Mammal Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Unknown Bat					1

Table 7-12 Result of Avifauna Survey under Contract 2

Scientific Name	English Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Spilopelia chinensis	Spotted Dove	珠頸斑鳩			3
Corvus macrorhynchos	Large-billed Crow	大嘴烏鴉		1	
Parus cinereus	Cinereous Tit	蒼背山雀		2	
Phylloscopus fuscatus	Dusky Warbler	褐柳鶯			1
Myophonus caeruleus	Blue Whistling Thrush	紫嘯鶇		1	
Motacilla alba	White Wagtail	白鶺鴒			1

Table 7-13 Result of Reptile Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
--	--	--	--	--

Table 7-14 Result of Amphibian Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
--	--	--	--	--	--

Table 7-15 Result of Butterfly Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Jamides alecto	Metallic Cerulean	素雅灰蝶			2
Mycalesis mineus	Dark Brand Bush Brown	小眉眼蝶			1

Table 7-16 Result of Odonate Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Copera marginipes	Yellow Featherlegs	黃狹扇蟌			2
Pseudocopera ciliata	Black-kneed Featherlegs	白狹扇蟌			2

Table 7-17 Result of Freshwater Communities Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-2019
Gambusia affinis	Mosquito fish	食蚊魚		+
Puntius semifasciolatus	Chinese Barb	五線無鬚鮭		+

+: Species appeared but uncountable.

7.4.9 The detailed survey report is attached in ***Appendix K***.

7.4.10 The tentative ecology inspection and monitoring in the next Reporting Month (November 2019) is scheduled on 14th November 2019.

8. LANDSCAPE AND VISUAL

8.1 REQUIREMENT

8.1.1 The EIA has recommended EM&A for landscape and visual resources to be undertaken during the design, construction and operational stages of the project. The design, implementation and maintenance of landscape mitigation measures is a key aspect of this and should be checked to ensure that they are fully realized and that potential conflicts between the proposed landscape measures and any other project works let its are resolved at the earliest possible date and without compromise to the intention of the mitigation measures. In addition, implementation of the mitigation measures recommended by the EIA will be monitored through the site audit programme.

8.1.2 A number of mitigation measures to ameliorate the landscape and visual impacts of the Project implementation is summarized in the EMIS of ***Appendix 13.1*** of the EIA Report.

8.1.3 The landscape and visual mitigation measures proposed should be incorporated in the landscape and engineering design. Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the entire construction period. Mitigation measures to be implemented during operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project. Tree transplantation and compensatory planting should be carried out as early as possible in the Project with transplantation carried out prior to construction starting in any particular area.

8.1.4 During construction phase, Landscape & Visual Monitoring of the contractor's operations should be conducted monthly and reported by ET, and countersigned by IEC.

8.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

8.2.1 In the Reporting Month, landscape & Visual inspection was carried out by the Registered Landscape Architect (RLA) for works area of Contract 1 and Contract 2 on ***31st October 2019***. The findings / reminders recorded during the inspection are presented in ***Tables 8-1 and 8-2.***

Table 8-1 Landscape & Visual Inspection Finding for Contract 1

Date	Findings and Reminder	Follow-Up Status
31st Oct 2019	1. Transplanted trees T2465, T2468 and T2928 were in fair health condition with normal foliage color and density.	• The Contractor keep closely monitor on the health condition of T2928.
	2. Some Tree protection zone (TPZ) was damaged/missing.	• To be followed.
	3. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone (TPZ) and ensure no works is allowed within the TPZ.	• Reminder was noted by the Contractor.
	4. The Contractor was reminded to provide proper maintenance for transplanted tree (T2465, T2468 and T2928) according to the approved method statement.	• Reminder was noted by the Contractor.

Table 8-2 Landscape & Visual Inspection Finding for Contract 2

Date	Findings and Reminder	Follow-Up Status
31st Oct 2019	1. Construction works near retained trees was observed. Tree protection zone was missing around retain trees.	• Tree protection zone was provided for the retained trees before commencement of works.
	2. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone (TPZ) and ensure no work is allowed with in the TPZ.	• Reminder was noted by the Contractor.
	3. Proper TPZ should be set up according to approved method statement.	• Reminder was noted by the Contractor.

8.2.2 Inspection checklist of Landscape & Visual signed by RLA is attached in ***Appendix L***.

9. WASTE MANAGEMENT

9.1 GENERAL WASTE MANAGEMENT

9.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time in accordance with the Waste Management Plan (WMP).

9.2 RECORDS OF WASTE QUANTITIES

9.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

9.2.2 The quantities of waste for disposal in this Reporting Month are summarized in ***Table 9-1*** and ***9-2*** and the Monthly Summary Waste Flow Table is shown in ***Appendix M***. Whenever possible, materials were reused on-site as far as practicable.

Table 9-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
C&D Materials (Inert) ('000m^3)	0	--	1986.310 **(#)**	--
Reused in this Contract (Inert) ('000m^3)	20.506	Within Contract area	0	--
Reused in other Projects (Inert) ('000m^3)	0	--	0	--
Disposal as Public Fill (Inert) ('000m^3)	0.038	Tuen Mun Area 38	1986.310 **(#)**	Tuen Mun Area 38

Remark: the unit is '000kg

Table 9-2 Summary of Quantities of C&D Wastes

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
Recycled Metal ('000kg)	0	--	0	--
Recycled Paper / Cardboard Packing ('000kg)	0	--	0	--
Recycled Plastic ('000kg)	0	--	0	--
Chemical Wastes ('000kg)	0	--	0	--
General Refuses ('000m^3)	0.189	NENT Landfill	4.120**(#)**	NENT Landfill

Remark: the unit is '000kg

9.2.3 Since canteen and/or kitchen are not allowed setting on the Project site, no domestic wastewater was generated from the Project.

10. SITE INSPECTION

10.1 REQUIREMENT

10.1.1 According to the approved EM&A Manual, environmental site inspection should be led by RE and attended by the Contractor and ET at least once per week. Regular environmental site inspections shall be carried out to assess the environmental performance.

10.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

Contract 1

10.2.1 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on ***2nd, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019***. No non-compliance was noted.

10.2.2 The findings / deficiencies that observed during the weekly site inspection are listed in ***Table 10-1***.

Table 10-1 Site Observations for the Works of Contract-1

Date	Findings / Deficiencies	Follow-Up Status
2nd October 2019	• The Contractor was reminded to provide water spray on site more frequently during sunny days.	• Reminder only.
10th October 2019	• No adverse environmental issue was observed.	• NA
17th October 2019	• Drip tray under generator at RTW1 should be plugged. • Chemical waste accumulated in drip tray should be removed (RTW1) • NRMM label for soil nail drilling machine should be properly displayed (CS11). • Chemical waste label should be provided for the chemical waste container. • Chemical waste cabinet should be locked. • The Contractor was reminded to provide water spraying on site more frequently during sunny days. • The Contractor was reminded to improve the housekeeping at CS11.	• Drip tray under generator at RTW1 was plugged. • Chemical waste accumulated in drip tray was removed. • NRMM label for soil nail drilling machine was properly displayed. • Chemical waste label was provided. • Chemical waste carbinet was locked. • Reminder only. • Reminder only.
24th October 2019	• Drip tray should be provided for free-standing chemical container. (RW4) • The Contractor was reminded to dispose the empty bag regularly and properly. • The Contractor was reminded to dispose the general refuse at RW4 regularly.	• Drip tray was provided for free-standing chemical container. • Reminder only. • Reminder only.
31st October 2019	• Cement waste should be properly treated and disposed. • The Contractor was reminded to provide water spray regularly.	• To be followed. • Reminder only.

Contract 2

10.2.3 In the Reporting Month, joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on ***2nd, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019.***

10.2.4 The findings / deficiencies that observed during the weekly site inspection are listed in ***Table 10-2***.

Table 10-2 Site Observations for the Works of Contract-2

Date	Findings / Deficiencies	Follow-Up Status
2nd October 2019	• Debris should be removed at the temporary drainage. (Near Gate 59) • Debris should be removed at the temporary drainage. (Near Gate 59)	• Debris at the temporary drainage was removed. • Reminder only
10th October 2019	• No adverse environmental issue was observed.	• NA.
17th October 2019	• Debris and sediment should be removed from the drainage channel. (TTA2) • Site entrance of TTA2 should be kept clean. • The Contractor was reminded to keep good housekeeping at TTA2	• Sediment was removed from the drainage channel. (TTA2 • Site entrance of TTA2 was kept clean. • Reminder only
24th October 2019	• The Contractor was reminded to keep review the mitigation measure for the slope filling work at Area Part A1. • The Contractor was reminded to maintain the drainage channel at TTA2 in good condition	• Reminder only. • Reminder only.
31st October 2019	• The Contractor was reminded to keep all the site entrance at Lin Ma Hang Road clean	• Reminder only.

11. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

11.1.1 In the Reporting Month, no environmental complaint was received for the Project. No summons and prosecution was lodged for the Contract. The statistical summary table of the environmental complaint, summons and prosecution are presented in ***Tables 11-1, 11-2*** and ***11-3***.

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 October 2019	Contract 1	0	0	NA
1 – 31 October 2019	Contract 2	0	0	NA

11.1.2 In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.

12. IMPLEMENTATION STATUS OF MITIGATION MEASURES

12.1 GENERAL REQUIREMENTS

12.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in ***Appendix N***.

12.1.2 The Works of Contract 1 and Contract 2 under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual subject to the site condition. Environmental mitigation measures implemented in this Reporting Month is summarized in ***Table 12-1***.

Table 12-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	• Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Provided ditches, earth bunds or sand bag barriers to minimize polluted runoff. • Temporary drainage was provided to prevent runoff going through site surface and minimize polluted runoff. • Provided perimeter cut-off drains at site boundaries to intercept storm runoff from crossing the site. • Exposed slopes surface were compacted and covered with tarpaulin or similar means. • Provided portable chemical toilets on site.
Air Quality	• Maintain damp / wet surface on access road. • Maintain low vehicular speed within the works areas. • Provided vehicle wheel washing facilities at each construction site exit; • Provided water spraying for all active works area. • Stockpiles of dusty material were covered with impervious sheeting. • Provided workers to clear dusty materials at the vehicle entrance or exit regularly. • Stockpile more than 20 bags of cement or dry pulverized fuel ash (PFA) has been covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.
Noise	• Restricted operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants • Placed noisy plants away from residence and school • Provided noise barriers or hoarding to enclose the noisy plants or works • Shut down the plants when not in used.
Waste and Chemical Management	• Provided on-site sorting prior to disposal • Followed requirements and procedures of the “Trip-ticket System” • Predicted required quantity of concrete accurately • Collected the unused fresh concrete at designated locations in the sites for subsequent disposal
General	• The site was generally kept tidy and clean.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

12.2.1 According to the information provided by HCTYJV, the forthcoming construction activities for Contract 1 are listed below:

(i) General Site Clearance
(ii) Bulk Excavation
(iii) Construction of Cut Slope, installation of soil nailing and construction of surface channel.

(iv) Construction of retaining wall for Fill Slope
(v) Construction of Fill Slope and surface channel

12.2.2 According to the information provided by Sang Hing, the forthcoming construction activities for Contract 2 are listed below:

- Construction of Manhole, gullies, drainage pipe at Lin Ma Hang Road between CH330-380 Southbound & CH1065-1115 Southbound
- Filling works for slope FS18 (Part A1) & construction of Retaining Wall 13
- Piling Works for Retaining Wall 14

12.3 KEY ISSUES FOR THE COMING MONTH

12.3.1 Key issues to be considered in the coming month for the works of Contract 1 include:

- Implementation of control measures for rainstorm;
- Regular clearance of stagnant water during wet season;
- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Ensure dust suppression measures are implemented properly;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Discharge of site effluent to the nearby wetland is prohibited;
- Nearby wetland prohibited stockpiling and/or disposal of materials;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures.

12.3.2 Although rainy season has passed, the Contractors should pay special attention on water quality mitigation measures and fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and CA. The implementation of water quality mitigation measures conducted by the Contractors is shown in ***Appendix O***.

12.3.3 In coming dry season, special attention should be paid on the potential construction dust impact. The Contractor should fully implement the construction dust mitigation measures as far as practicable.

13. CONCLUSIONS AND RECOMMENTATIONS

13.1 CONCLUSIONS

13.1.1 This is the **15th** Monthly EM&A Report presenting the monitoring results and inspection findings for the period of **1** to **31 October 2019**.

13.1.2 No 24-hour or 1-hour TSP monitoring result that triggered the Action or Limit Levels was recorded. No NOEs or the associated corrective action was therefore required.

13.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement result that exceeded the Limit Level was recorded in this Reporting Month. No NOEs or the associated corrective actions were therefore issued.

13.1.4 In the Reporting Period, no Action Level and Limit Level water quality exceedances was recorded.

13.1.5 Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on ***8th October 2019***. Moreover, Landscape and visual inspection at both Contracts were undertaken by the RLA on ***31th October 2019.***

13.1.6 In the Reporting Month, no environmental complaint, summons and prosecution was received. In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.

13.1.7 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on ***2nd, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019***. No non-compliance was noted.

13.1.8 Joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on ***2nd, 10th, 17th, 24th and 31st October 2019*** and IEC attended joint site inspection on ***17th October 2019.*** No non-compliance was noted.

13.2 RECOMMENDATIONS

13.2.1 The Contractors should pay special attention on water quality mitigation measures and fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and CA.

13.2.2 In coming dry season, special attention should be paid on the potential construction dust impact. The Contractor should fully implement the construction dust mitigation measures as far as practicable.

13.2.3 Construction noise would be a key environmental issue during construction phase of the Project. Noise mitigation measures such as using quiet plants and mobile noise barriers should be implemented in accordance with the EM&A requirement.

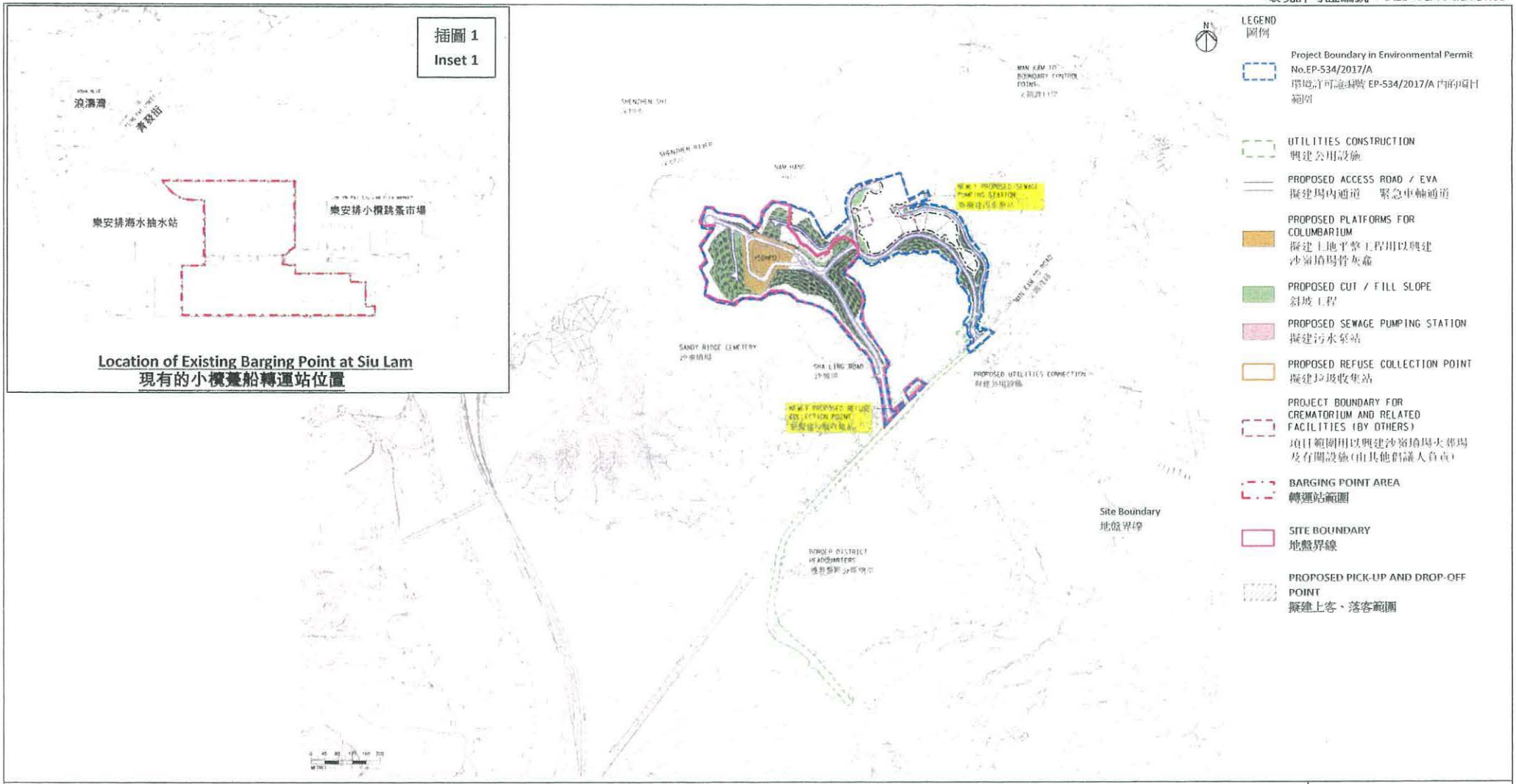
13.2.4 Since some of the construction site under the Project is located near villages, both Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

13.2.5 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be performed to prevent mosquito breeding on site.

Appendix A

Layout Plan of the Project

Layout Plan of Contract CV/2016/10

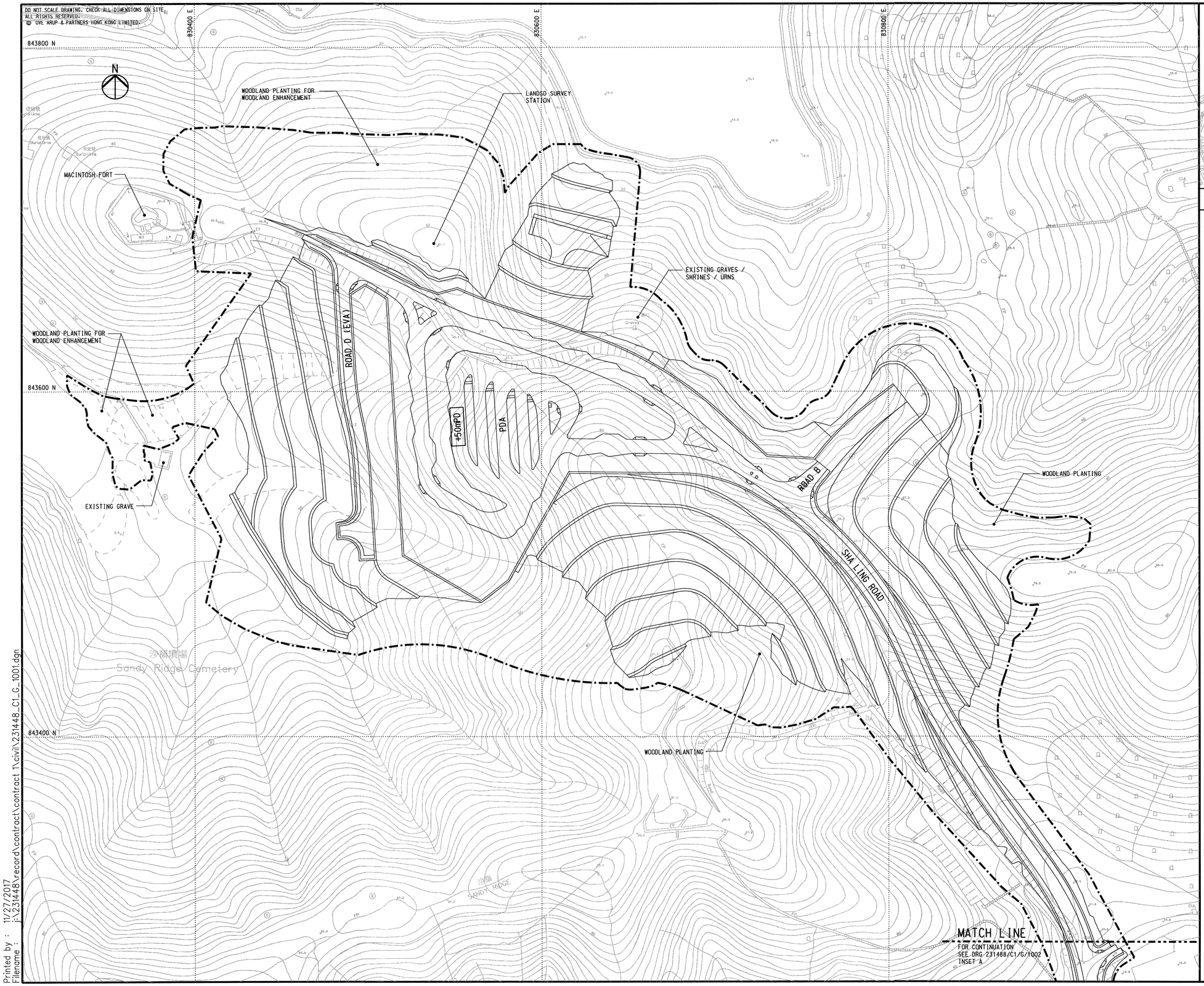


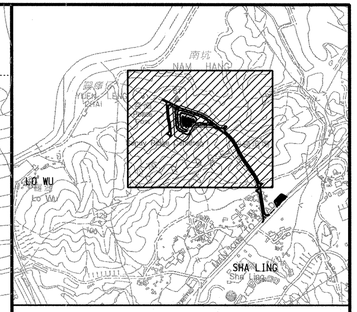
Project Title: Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
工程名稱：沙嶺墳場興建骨灰龕的工地平整及相關基建工程

Figure 1: Project Location Plan
圖 1：項目位置圖
(This figure was prepared based on Figure 1 attached to the VEP Application No. VEP-555/2018 and Figures 1.3 of the Approved EIA Report No. AEIAR-198/2016)
(本圖是根據更改環境許可証申請文件編號：VEP-555/2018 所隨附的圖 1 和環境影響評估報告編號 AEIAR-198/2016 圖 1.3 編制)

Environmental Permit No.: FEP-01/534/2017/A
環境許可證編號：FEP-01/534/2017/A

EIAO EPD





KEY PLAN

LEGEND:

PROPOSED WORKS SITE

+50mPD — SITE FORMATION LEVEL

Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery

Drawing title

GENERAL LAYOUT
(SHEET 1 OF 3)

Drawing no.			Rev.
231448/C1/G/1001			–
Drawn	Date	Checked	Approved
WM	12/16	AW	DL
Scale		Status	
1:1000 @A1		CONTRACT	

土木工程拓展署
Civil Engineering and Development Department

Printed by : 11/27/2017
Filename : j:\231448\record\contract\contract 1\civil\231448_C1_G_1001.dgn

N

830800 E

831000 E

MATCH LINE
FOR CONTINUATION
SEE DRG 231448/C1/G/1001

843200 N

SHA LING ROAD

MAN KAM TO ROAD

SHA LING VILLAGE

PICK UP / DROP OFF POINT

BUS SHELTER (BY KMB)

REPROVISIONED REFUSE COLLECTION POINT

INSET A

830400 E

843200 N

WOODLAND PLANTING

WOODLAND PLANTING

INSET B

829800 E

830000 E

843000 N

WOODLAND PLANTING

Sandy Ridge Uni. Cemetery

LO WU STATION ROAD

Lo Wu Document Storage Building

INSET C

NAM HANG

Sandy Ridge Cemetery

LO WU

SHA LING

INSET A

INSET B

INSET C

KEY PLAN

LEGEND:

PROPOSED WORKS SITE

Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery

Drawing title

GENERAL LAYOUT
(SHEET 2 OF 3)

Drawing no.			Rev.
231448/C1/G/1002			-
Drawn: WM	Date: 12/16	Checked: AW	Approved: DL
Scale: 1:1000 @A1		Status: CONTRACT	

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

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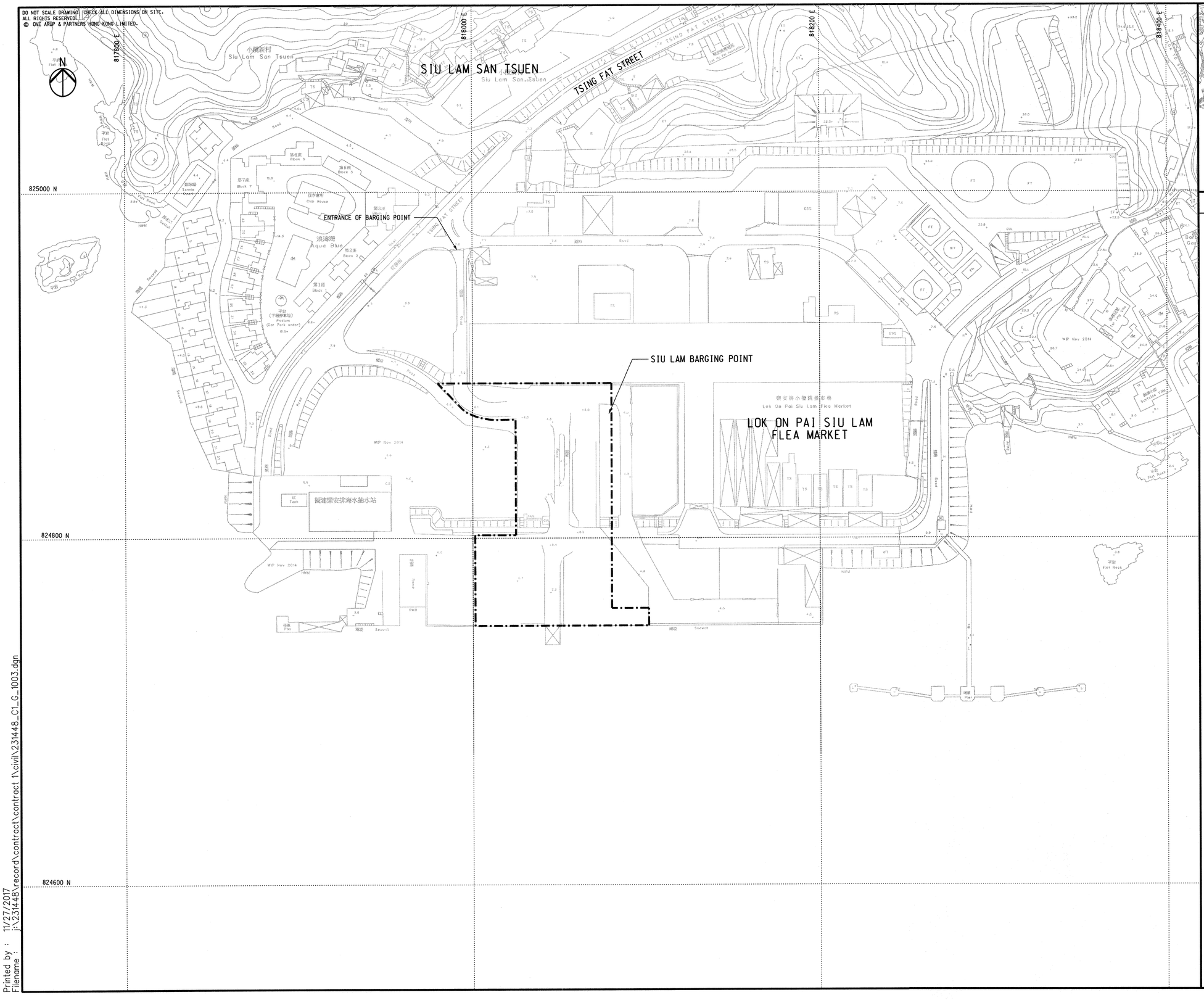

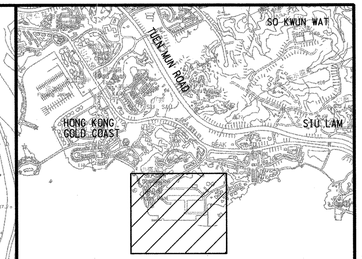

KEY PLAN

LEGEND:

PROPOSED WORKS SITE

Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery

Drawing title

GENERAL LAYOUT
(SHEET 3 OF 3)

Drawing no.	Rev.
231448/C1/G/1003	-

Drawn	Date	Checked	Approved
WM	12/16	AW	DL

Scale: 1:1000 @A1

Status: CONTRACT

土木工程拓展署
Civil Engineering and Development Department

Printed by : 11/27/2017
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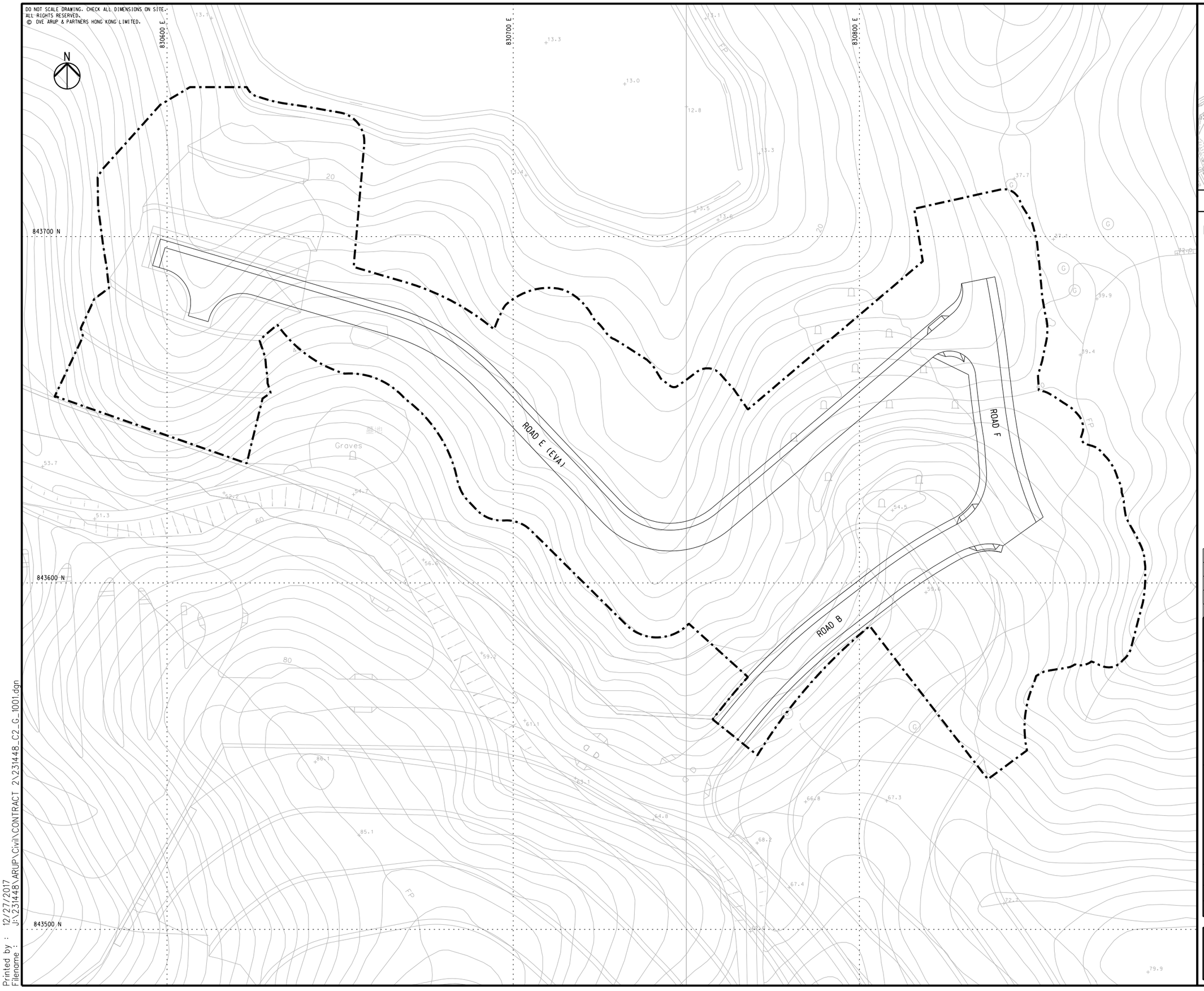
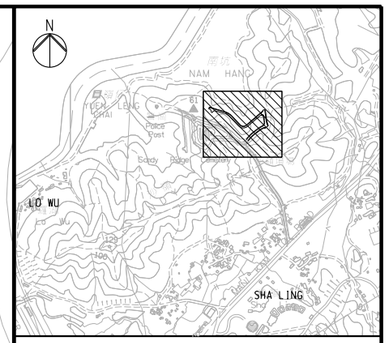
Layout Plan of Contract CV/2017/02





KEY PLAN

LEGEND:

SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title

GENERAL LAYOUT
(SHEET 1 OF 5)

Drawing no.	Rev.
231448/C2/G/1001	-

Drawn	Date	Checked	Approved
WM	07/17	AW	DL

Scale	Status
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土木工程拓展署
Civil Engineering and Development Department

Printed by : 12/27/2017
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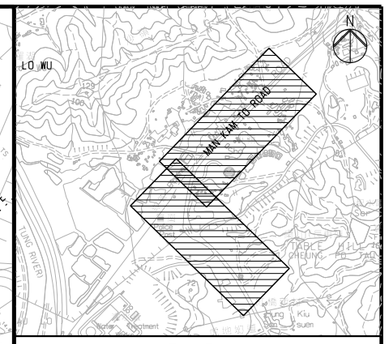

KEY PLAN

LEGEND:

SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title

GENERAL LAYOUT (SHEET 2 OF 5)

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Drawn	Date	Checked	Approved
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CEDD 土木工程拓展署 Civil Engineering and Development Department

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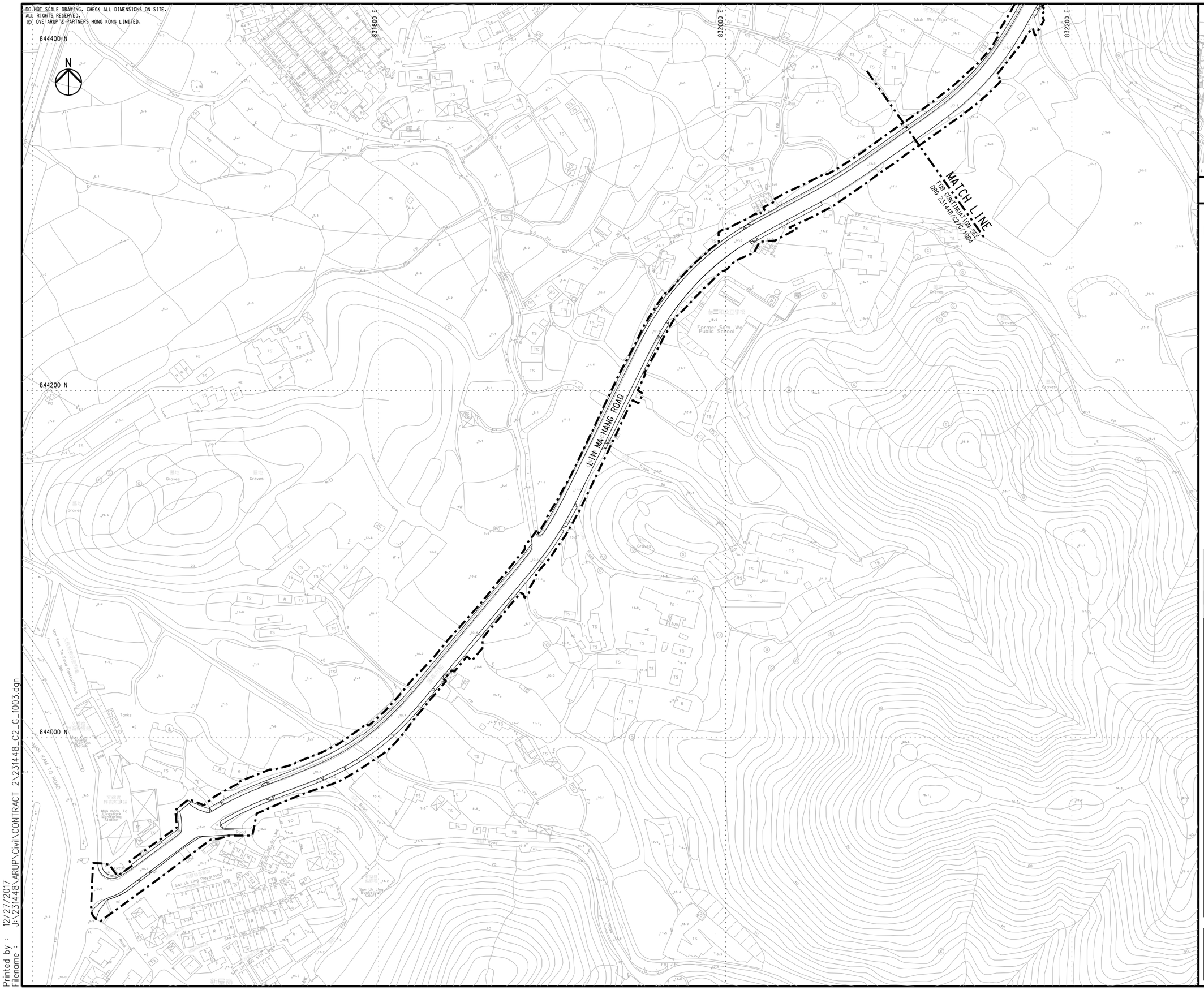

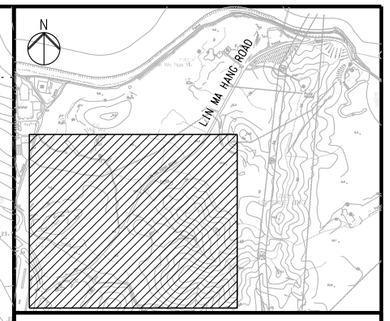

KEY PLAN

LEGEND:

SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title

GENERAL LAYOUT (SHEET 3 OF 5)

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

Printed by : 12/27/2017
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832200 E

832400 E

832600 E

844600 N

844400 N

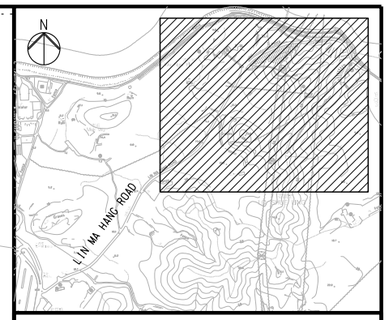
LIN MA HANG ROAD

MATCH LINE
FOR CONTINUATION SEE DRG. 231448/C2/G/1003

Muk Wu Nga Yiu

LO SHUE LING

Printed by : 12/27/2017
Filename : J:\231448\ARUP\Civil\CONTRACT 2\231448_C2_G_1004.dgn



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LEGEND:

SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title

GENERAL LAYOUT
(SHEET 4 OF 5)

Drawing no.			Rev.
231448/C2/G/1004			-
Drawn	Date	Checked	Approved
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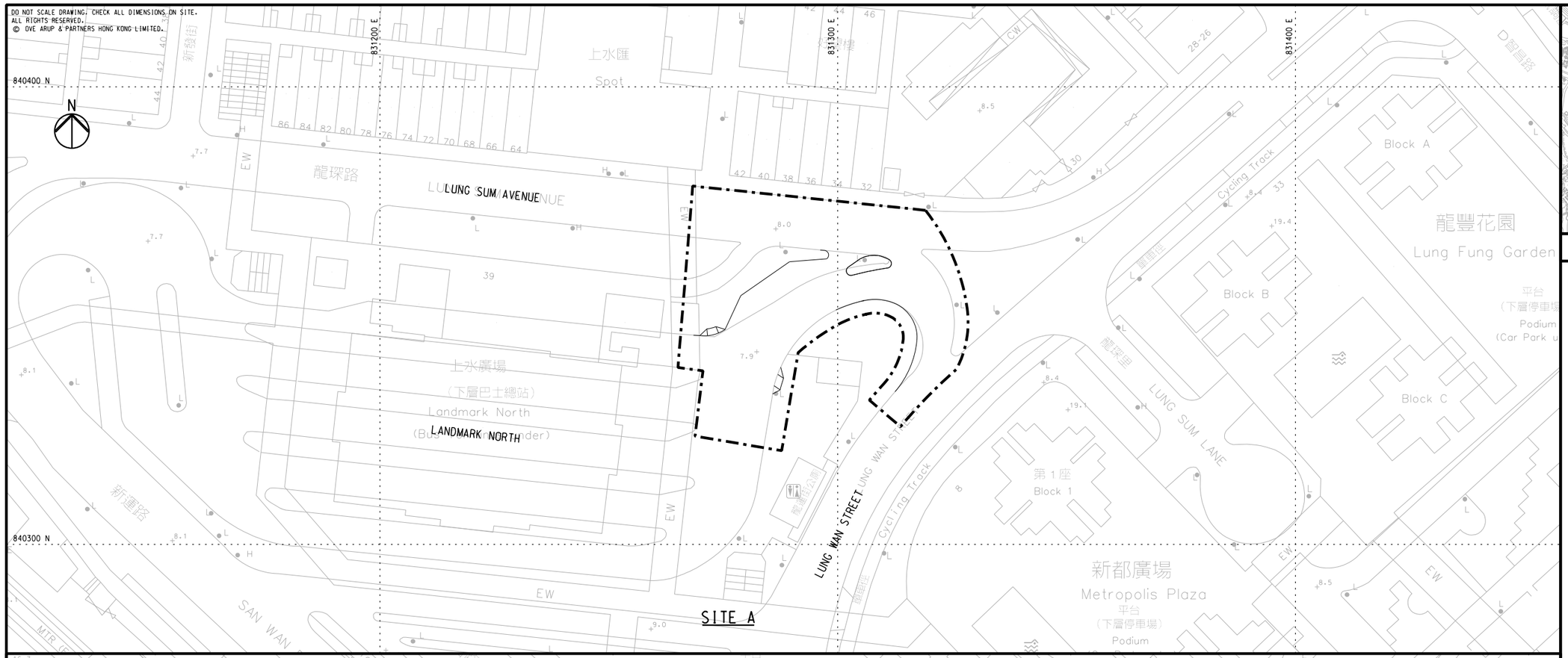
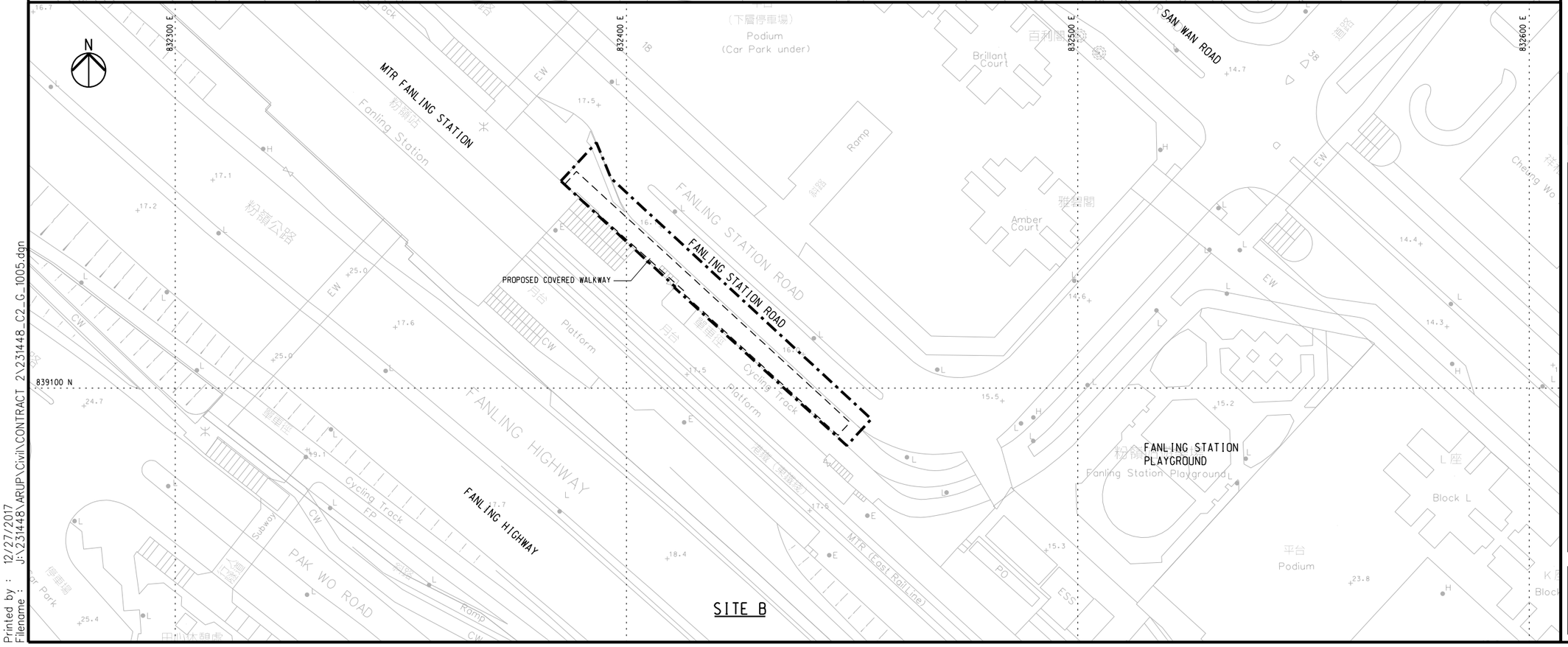
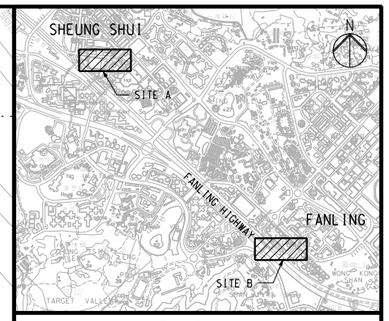
CEDD
土木工程拓展署
Civil Engineering and Development Department







KEY PLAN

LEGEND:

SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title

GENERAL LAYOUT
(SHEET 5 OF 5)

Drawing no.	Rev.
231448/C2/G/1005	-

Drawn	Date	Checked	Approved
WM	07/17	AW	DL

Scale 1:500 @A1

Status TENDER

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

Printed by : 12/27/2017
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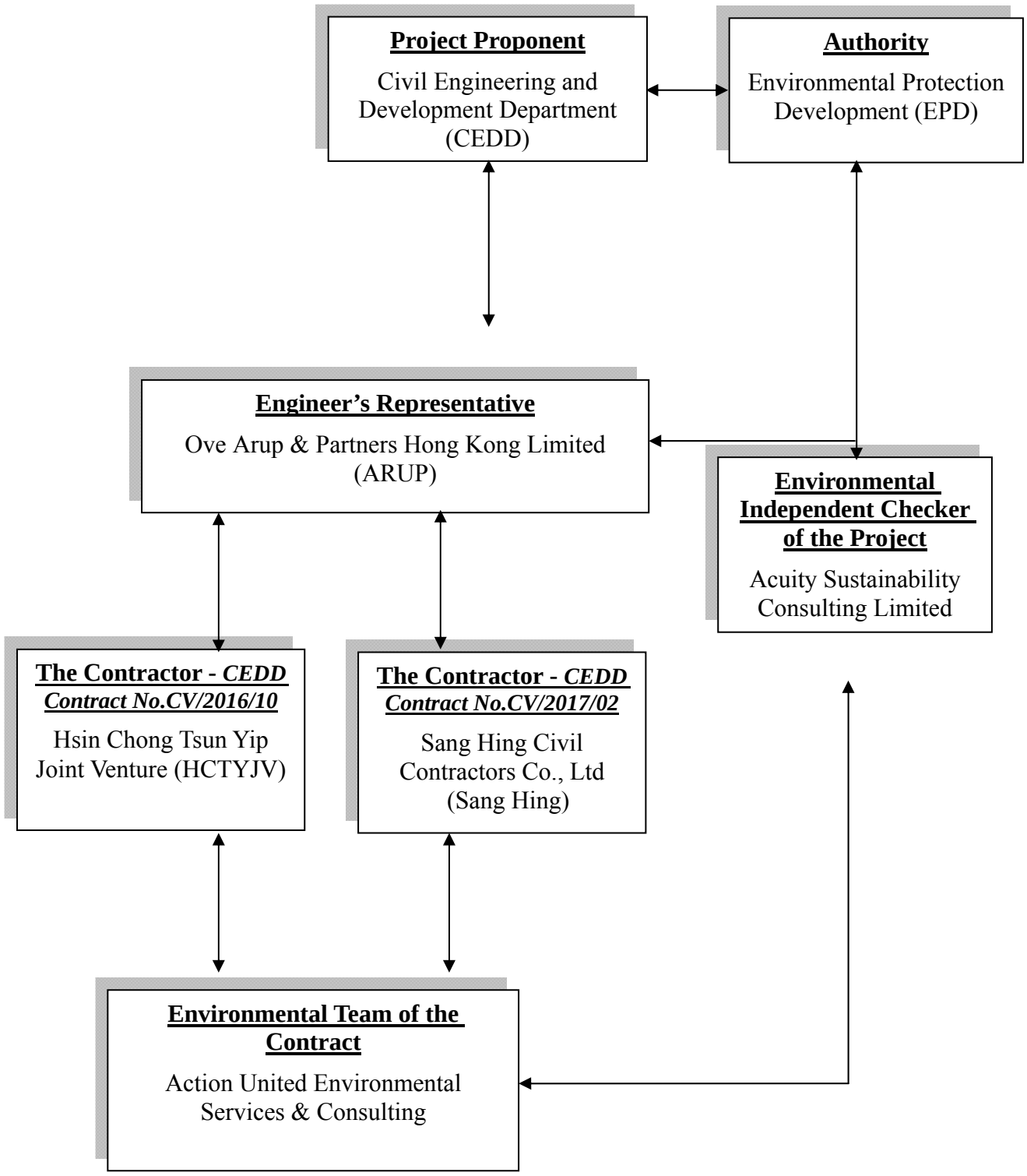
Appendix B

Organization Structure and Contact Details of Relevant Parties

The Contract's Environmental Management Organization



Contact Details of Key Personnel for CV/2016/10 (Contract 1)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	CHOI Wing-hing	2762-5620	2714-0695
ARUP	Engineer's Representative	Steve Tang	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
HCTYJV	Project Director	Mr. Kan Kwok Cheung	9495-2408	2633-4691
HCTYJV	Construction Manager	Mr. Keniel Kwong	9863-0020	2633-4691
HCTYJV	Site Agent	Mr. Ho Man To	9507-9634	2633-4691
HCTYJV	Environmental Officer	Mr. Frankie Lam	6159-1140	2633-4691
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

HCTYJV (Main Contractor) – Hsin Chong Tsun Yip Joint Venture

ACUITY (IEC) – Acuity Sustainability Consulting Limited

AUES (ET) – Action-United Environmental Services & Consulting

Contact Details of Key Personnel for CV/2017/02 (Contract 2)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	CHOI Wing-hing	2762-5620	2714-0695
ARUP	Engineer's Representative	Anthony Lau	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
SANG HING	Project Director	Edwin Au	9208-7329	2403-1162
SANG HING	Construction Manager	Raymond Wong	9272-1831	2403-1162
SANG HING	Site Agent	Elvin Lam	6285-0803	2403-1162
SANG HING	Environmental Officer	Chan Ng jhon-keibi	6090-0183	2403-1162
SANG HING	Environmental Supervisor	Kenny Chan	6115-0120	2403-1162
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

Sang Hing (Main Contractor) –Sang Hing Civil Contractors Co., Ltd

ACUITY (IEC) – Acuity Sustainability Consulting Limited

AUES (ET) – Action-United Environmental Services & Consulting

Appendix C

Three Months rolling Programme

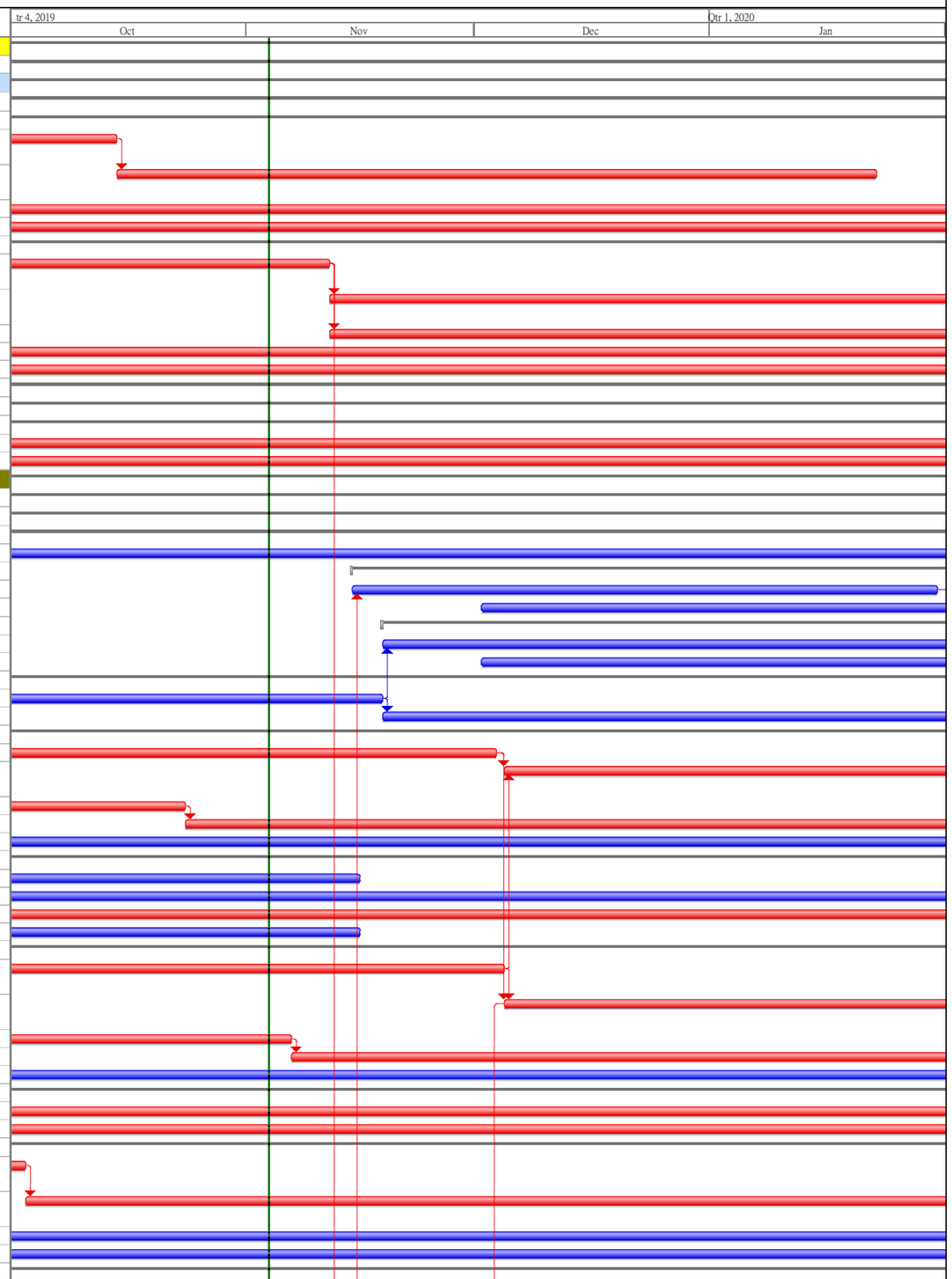
Three Months rolling Programme of Contract CV/2016/10

Contract No. CV/2016/10
Site Formation and Associated Infrastructural Works for
Development of Columbarium at Sandy Ridge Cemetery

3-month Rolling Programme (Oct 2019 to Dec 2019)

Hsin Chong Tsun Yip Joint Venture

ID	Task Name	Duration	Start	Finish
1	**Key Dates**	**2199 days**	**Fri 15/12/17**	**Fri 22/12/23**
21	**Section Completion Date**	**1619 days**	**Wed 17/7/19**	**Fri 22/12/23**
105	**Section 1 of the Works (Parts A1, A2 & A3)**	**940 days**	**Fri 15/12/17**	**Sat 11/7/20**
136	**Fill Slope FS1**	**503 days**	**Thu 11/10/18**	**Fri 3/7/20**
137	**Fill Slope FS1 South (Section 12 at Drawing C1/GE/1030)**	**453 days**	**Wed 14/11/18**	**Wed 3/6/20**
140	FS1 South Backfilling Stage 3 (~7.5m height, Section 12 up to ~+35mPD), (27.5mPD to 30mPD filter blanket x2, on temp cut and 3m below slope surface)	91 days	Mon 24/6/19	Mon 14/10/19
141	FS1 South Backfilling Stage 4 (~7.4m height, Section 12 up to +42.4mPD), (Filter blanket from 35mPD to 37.5mPD)	83 days	Tue 15/10/19	Wed 22/1/20
143	Drainage and Maintenance Access	300 days	Tue 28/5/19	Wed 3/6/20
144	Geotechnical Instrumentation Works	220 days	Wed 14/8/19	Sat 16/5/20
145	**Fill Slope FS1 North (Section 14 at Drawing C1/GE/1030)**	**503 days**	**Thu 11/10/18**	**Fri 3/7/20**
148	FS1 North Backfilling Stage 3 (~7.5m height, Section 14 up to ~+35 mPD), (Filter Blanket 27.5 to 30mPD(rare) + 27.5 to 30mPD(front))	91 days	Tue 23/7/19	Mon 11/11/19
149	FS1 North Backfilling Stage 4 (~7.5m height, Section 14 up to +42.5 mPD), (Filter blanket 35 to 37.5mPD)	83 days	Tue 12/11/19	Sat 22/2/20
151	Existing Slope Feature 3NW-C/F37 Upgrading Re-compaction	175 days	Tue 12/11/19	Wed 17/6/20
152	Drainage and Maintenance Access	300 days	Wed 26/6/19	Fri 3/7/20
153	Geotechnical Instrumentation Works	220 days	Wed 11/9/19	Sat 13/6/20
154	**Road D and Pickup/Drop-Off Area**	**577 days**	**Mon 23/7/18**	**Sat 11/7/20**
162	**Carriageway and Footway**	**577 days**	**Mon 23/7/18**	**Sat 11/7/20**
170	**Landscape Works**	**337 days**	**Tue 21/5/19**	**Sat 11/7/20**
173	Woodland Planting at Fill Slope	300 days	Wed 26/6/19	Fri 3/7/20
174	Hydroseeding at Fill Slope	300 days	Tue 2/7/19	Wed 8/7/20
179	**Section 2 of the Works (Parts B1, B2, C, D, F, G1 & G2)**	**1292 days**	**Fri 15/12/17**	**Mon 28/6/21**
186	**Part B1**	**1034 days**	**Fri 15/12/17**	**Mon 28/6/21**
187	**Utilities Diversion/Protection Works**	**820 days**	**Fri 15/12/17**	**Wed 30/9/20**
188	**HKT**	**820 days**	**Fri 15/12/17**	**Wed 30/9/20**
191	Supporting / Diversion of Existing HKT Cable	700 days	Thu 17/5/18	Wed 30/9/20
199	**Cut Slopes CS1 & CS2**	**81 days**	**Fri 15/11/19**	**Mon 24/2/20**
200	Excavate to Proposed Toe Level	60 days	Fri 15/11/19	Thu 30/1/20
202	Drainage and Maintenance Access	67 days	Mon 2/12/19	Mon 24/2/20
203	**Cut Slope CS3**	**81 days**	**Tue 19/11/19**	**Thu 27/2/20**
204	Excavate to Proposed Toe Level	60 days	Tue 19/11/19	Mon 3/2/20
205	Drainage and Maintenance Access	70 days	Mon 2/12/19	Thu 27/2/20
213	**Temporary Excavation to Proposed Platform at Future PDA**	**434 days**	**Sat 1/9/18**	**Wed 26/2/20**
217	Excavate to +56 mPD	110 days	Mon 8/7/19	Mon 18/11/19
218	Excavate to +50 mPD	80 days	Tue 19/11/19	Wed 26/2/20
219	**Cut Slopes CS11 & CS12**	**759 days**	**Sat 1/9/18**	**Thu 8/4/21**
225	Excavate to +64.5 mPD, Pull Out Test, Soil Nails and Raking Drains (124 Nos. of Soil Nail)	53 days	Sat 28/9/19	Tue 3/12/19
226	Excavate to +57 mPD, Pull Out Test, Soil Nails and Raking Drains (439 nos. of Soil Nail, 62 nos. of Raking Drain)	78 days	Thu 5/12/19	Wed 11/3/20
230	Drainage and Maintenance Access up to +72 mPD	235 days	Wed 2/1/19	Wed 23/10/19
231	Drainage and Maintenance Access from +72 mPD to Toe Level	347 days	Thu 24/10/19	Thu 24/12/20
232	Geotechnical Instrumentation Works	450 days	Wed 27/2/19	Tue 8/9/20
233	**Landscape Works at Cut Slopes CS11 & CS12**	**703 days**	**Tue 22/1/19**	**Fri 18/6/21**
234	Planter W2 Construction Stage 1 up to +72 mPD	238 days	Tue 22/1/19	Fri 15/11/19
235	Shrub Planting at Planter W2 Stage 1 up to +72 mPD	201 days	Tue 11/6/19	Thu 13/2/20
236	Planter W1 & W2 Construction Stage 2 from +72 mPD to Toe Level	352 days	Fri 23/8/19	Wed 4/11/20
240	Hydroseeding Stage 1 up to +72 mPD	212 days	Mon 25/2/19	Fri 15/11/19
249	**Cut Slope CS13**	**791 days**	**Fri 4/5/18**	**Mon 11/1/21**
254	Excavate to +64.5 mPD, Pull Out Test and Soil Nails (68 nos. of Soil Nail)plus 2 nos. of additional soil nail	54 days	Sat 28/9/19	Wed 4/12/19
255	Excavate to +57 mPD, Pull Out Test, Soil Nails and Raking Drains (82 nos. of Soil Nail, 34 nos. of Raking Drain)	78 days	Thu 5/12/19	Wed 11/3/20
259	Drainage and Maintenance Access up to +72 mPD	235 days	Wed 16/1/19	Wed 6/11/19
260	Drainage and Maintenance Access from +72 mPD to Toe Level	347 days	Thu 7/11/19	Mon 11/1/21
261	Geotechnical Instrumentation Works	380 days	Wed 10/7/19	Tue 20/10/20
262	**Landscape Works at Cut Slope CS13**	**549 days**	**Thu 1/8/19**	**Tue 15/6/21**
263	Planter W2 Construction	385 days	Thu 1/8/19	Fri 20/11/20
269	Hydroseeding	412 days	Mon 5/8/19	Mon 28/12/20
270	**Cut Slope CS15**	**524 days**	**Sat 1/9/18**	**Thu 18/6/20**
275	Excavate to +47mPD, Pull Out Test, Soil Nails and Raking Drains (331 nos. of Soil Nail, 45 nos. of Raking Drain)	139 days	Sat 13/4/19	Wed 2/10/19
276	Excavate to +39.5mPD, Pull Out Test, Soil Nails and Raking Drains and Excavate to Proposed Toe Level (415 nos. of Soil Nail, 68 nos. of Raking Drain)	162 days	Thu 3/10/19	Fri 24/4/20
277	Drainage and Maintenance Access	213 days	Wed 25/9/19	Thu 18/6/20
278	Geotechnical Instrumentation Works	460 days	Tue 23/10/18	Wed 20/5/20
279	**Landscape Works at Cut Slope CS15**	**613 days**	**Thu 3/1/19**	**Wed 3/2/21**



3-month Rolling Programme
(Oct 2019 to Dec 2019)

Date: Oct 2019

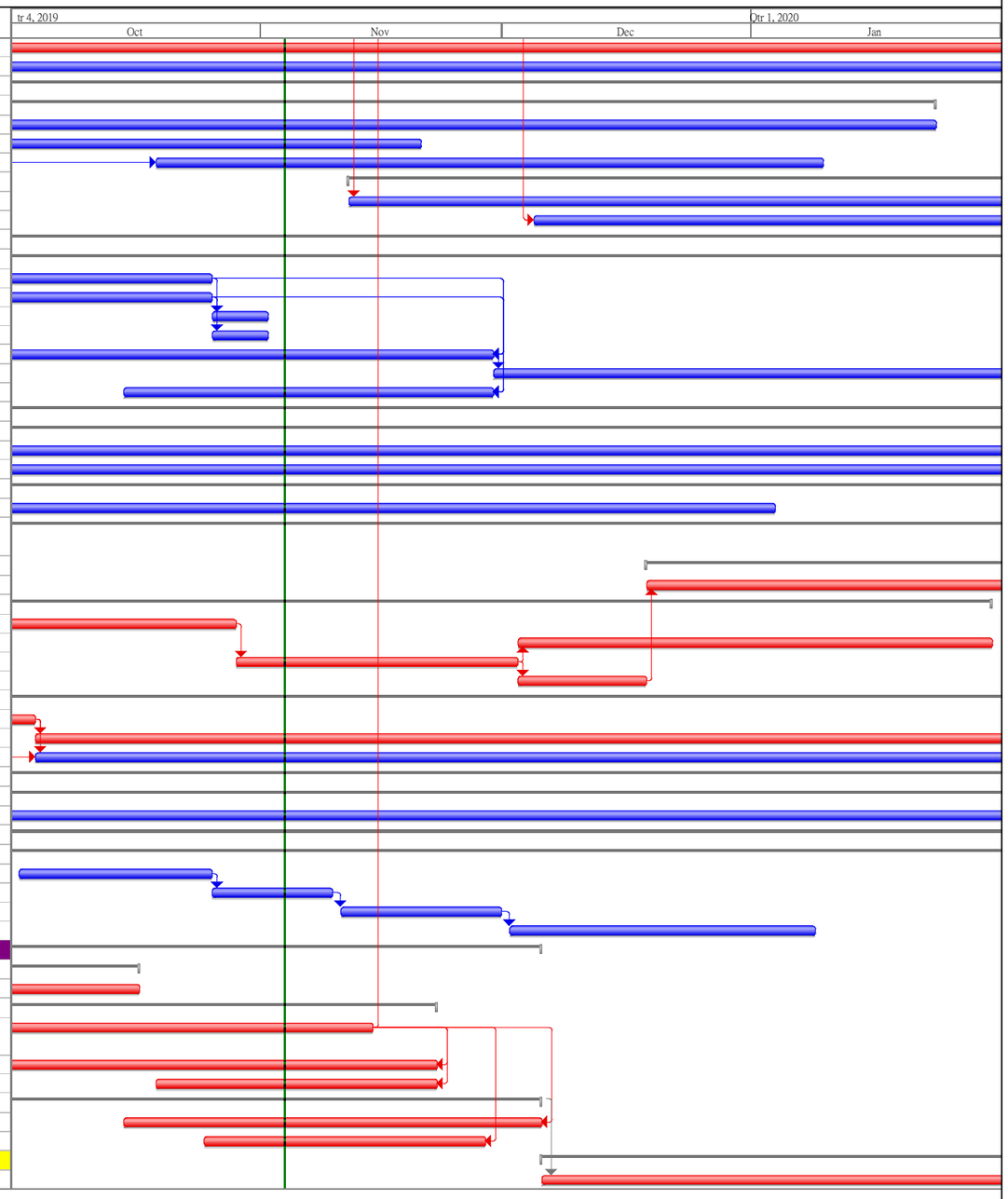
Task · Milestone · Project Summary · External Milestone · Critical · Progress
Split · Summary · External Tasks · Deadline · Critical Split

Contract No. CV/2016/10
Site Formation and Associated Infrastructural Works for
Development of Columbarium at Sandy Ridge Cemetery

3-month Rolling Programme (Oct 2019 to Dec 2019)

Hsin Chong Tsun Yip Joint Venture

ID	Task Name	Duration	Start	Finish
280	Planter W1 & W2 Construction	288 days	Mon 10/6/19	Mon 1/6/20
282	Hydroseeding	450 days	Thu 3/1/19	Sat 18/7/20
291	**Fill Slope FS17**	**717 days**	**Thu 5/7/18**	**Thu 10/12/20**
302	**Landscape Works at Cut Slopes CS16 and CS17**	**460 days**	**Tue 3/7/18**	**Thu 23/1/20**
304	Shrub Planting at Planter W2	196 days	Wed 29/5/19	Thu 23/1/20
305	Planter W1 Construction	68 days	Wed 28/8/19	Wed 20/11/19
306	Shrub Planting at Planter W2	68 days	Sat 19/10/19	Thu 9/1/20
308	**Existing Slope Upgrading Works**	**172 days**	**Tue 12/11/19**	**Sat 13/6/20**
309	Existing Feature 3NW-C/F37 Upgrading Re-compaction	150 days	Tue 12/11/19	Tue 19/5/20
310	Existing Feature 3NW-C/C256 Rock Joint Mapping, drainage and maintenance access	70 days	Thu 5/12/19	Mon 2/3/20
376	**Part B2**	**887 days**	**Fri 15/12/17**	**Wed 23/12/20**
377	**Slope Works (CS14, FS14)**	**170 days**	**Thu 18/7/19**	**Thu 13/2/20**
380	Excavation at CS14	21 days	Fri 27/9/19	Fri 25/10/19
381	Backfilling at FS14 to proposed level	21 days	Fri 27/9/19	Fri 25/10/19
382	Geotechnical Instrumentation Works at CS14	6 days	Sat 26/10/19	Fri 1/11/19
383	Geotechnical Instrumentation Works at FS14	6 days	Sat 26/10/19	Fri 1/11/19
384	Planter E2 Construction	59 days	Wed 18/9/19	Fri 29/11/19
385	Shrubs Planting at E2	59 days	Sat 30/11/19	Thu 13/2/20
386	Drainage and Maintenance Access	40 days	Tue 15/10/19	Fri 29/11/19
387	**Sha Ling Road (M001 CH +40 to +180)**	**602 days**	**Sat 1/12/18**	**Sat 19/12/20**
396	**Utilities and Watermains Works**	**355 days**	**Thu 18/7/19**	**Sat 26/9/20**
397	CLP Structure Relocation (By Others)	180 days	Thu 18/7/19	Tue 25/2/20
398	Existing HKT Pole Relocation (By Others)	180 days	Thu 18/7/19	Tue 25/2/20
413	**Man Kam To Road Bus Shelter**	**836 days**	**Fri 15/12/17**	**Wed 21/10/20**
414	Temporary Storage and Secondary Site Office	600 days	Fri 15/12/17	Fri 3/1/20
421	**Sha Ling Road (M001 CH+0 to +40), Man Kam To Road Drainage, Sewerage, Watermains and Other Utilities**	**749 days**	**Fri 8/6/18**	**Wed 23/12/20**
423	**Works at Existing Sha Ling Road**	**298 days**	**Thu 19/12/19**	**Wed 23/12/20**
424	Sub-structure of Noise Barrier Construction Bay 1 to Bay 2	150 days	Thu 19/12/19	Fri 26/6/20
433	**TTA Stage 1 - Future Sha Ling Road Run-in**	**173 days**	**Sat 29/6/19**	**Thu 30/1/20**
434	Drainage and Sewerage Works	98 days	Sat 29/6/19	Mon 28/10/19
436	Road Lighting E&M works, Testing and Comissioning (by others)	45 days	Tue 3/12/19	Thu 30/1/20
438	Backfill to Formation Level	30 days	Tue 29/10/19	Mon 2/12/19
439	Carraigeway, Pavement, Road Marking and Street Furniture	14 days	Tue 3/12/19	Wed 18/12/19
454	**Part C**	**570 days**	**Tue 15/1/19**	**Wed 23/12/20**
458	R.C. Structure up to Roof	45 days	Sat 10/8/19	Thu 3/10/19
459	ABWF Works	120 days	Fri 4/10/19	Mon 2/3/20
460	Drainage and Sewerage Works and Connections TTA Stage 1	110 days	Fri 4/10/19	Wed 19/2/20
464	**E&M and Waterworks**	**570 days**	**Tue 15/1/19**	**Wed 23/12/20**
472	**Part D**	**586 days**	**Sat 15/12/18**	**Tue 15/12/20**
473	Woodland Planting	586 days	Sat 15/12/18	Tue 15/12/20
474	**Parts G1 and G2**	**300 days**	**Thu 18/7/19**	**Fri 24/7/20**
475	**Land Decontamination Works**	**173 days**	**Thu 18/7/19**	**Mon 17/2/20**
480	EPD Review and Acceptance for CAR	18 days	Wed 2/10/19	Fri 25/10/19
481	Remedial Action Plan (RAP) Submission to EPD	13 days	Sat 26/10/19	Sat 9/11/19
482	EPD Review and Acceptance for RAP	18 days	Mon 11/11/19	Sat 30/11/19
483	Land Decontamination Works	30 days	Mon 2/12/19	Wed 8/1/20
495	**Section 3 of the Works (Part E)**	**721 days**	**Fri 15/12/17**	**Thu 5/12/19**
511	**Retaining Wall RW4**	**192 days**	**Mon 18/2/19**	**Wed 16/10/19**
517	Drainage and Maintenance Access	40 days	Mon 26/8/19	Wed 16/10/19
518	**Fill Slope FS2**	**224 days**	**Mon 18/2/19**	**Fri 22/11/19**
520	Backfilling Stage 2 (~4m, up to Proposed Ground) + 2.5m depth filter blanket 3m below berm surface	50 days	Thu 12/9/19	Thu 14/11/19
521	Drainage, Sewerage and Maintenance Access	82 days	Wed 14/8/19	Fri 22/11/19
522	Geotechnical Instrumentation Works	30 days	Sat 19/10/19	Fri 22/11/19
527	**Landscape Works at Fill Slopes FS2, FS3 and FS4**	**196 days**	**Mon 8/4/19**	**Thu 5/12/19**
529	Whips and shrubs planting FS2	45 days	Tue 15/10/19	Thu 5/12/19
530	Hydroseeding	30 days	Fri 25/10/19	Thu 28/11/19
549	**Section 6 of the Works**	**1096 days**	**Fri 6/12/19**	**Mon 5/12/22**
550	Establishment Works of Part E	1096 days	Fri 6/12/19	Mon 5/12/22



3-month Rolling Programme
(Oct 2019 to Dec 2019)

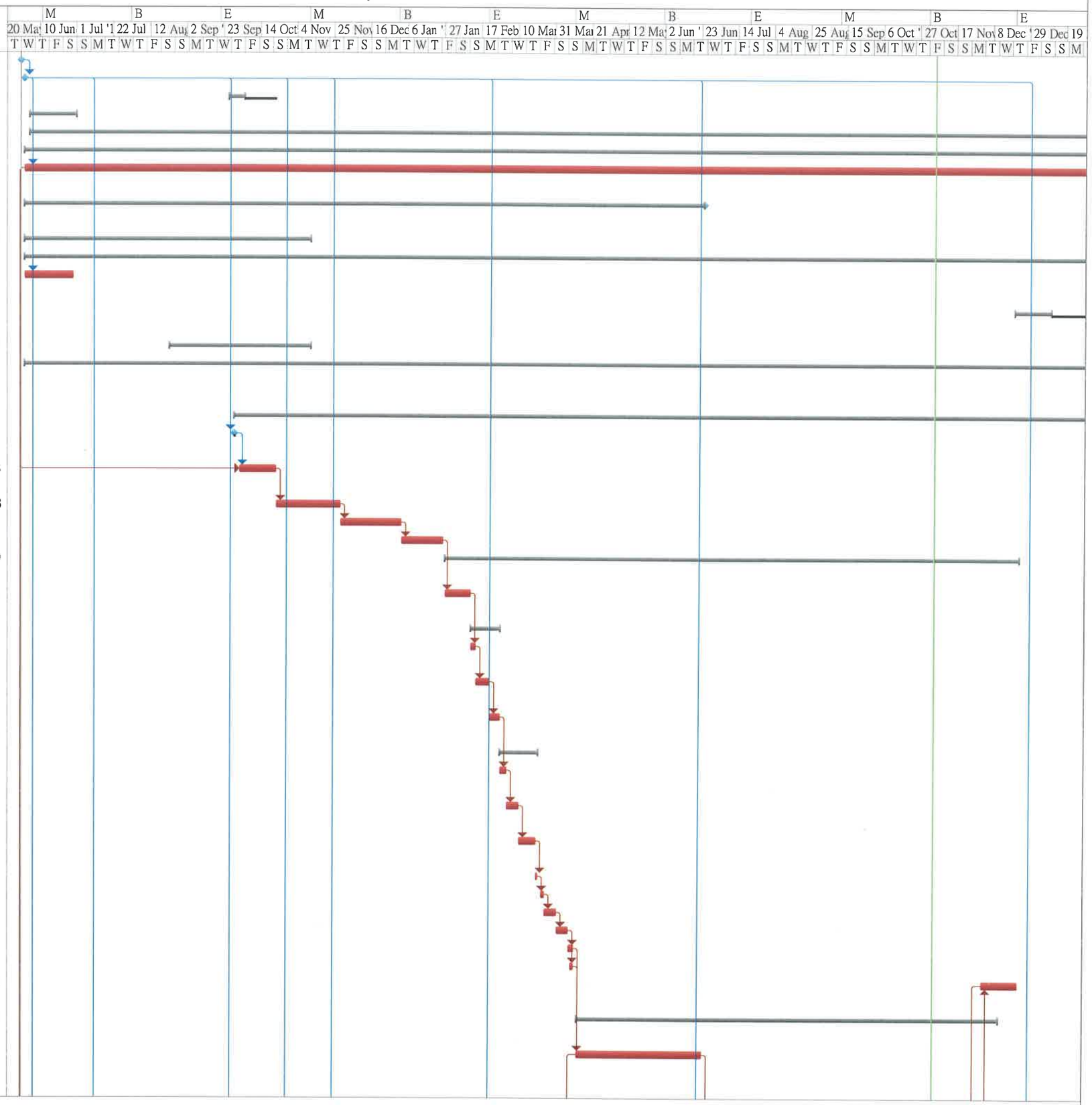
Date: Oct 2019

Task | Milestone | Project Summary | External Milestone | Critical | Progress
Split | Summary | External Tasks | Deadline | Critical Split

Three Months rolling Programme of Contract CV/2017/02

3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1	1	**Letter of Acceptance**	0 days	Wed 30/5/18	Wed 30/5/18
2	2	**Starting Date**	0 days	Thu 31/5/18	Thu 31/5/18
3	3	ET Submissions	9 days	Wed 26/9/18	Fri 5/10/18
12	4	Applications to Government Department	27 days	Mon 4/6/18	Sat 30/6/18
20	5	Submissions & acceptances	835 days	Mon 4/6/18	Tue 15/9/20
44	6	Liaison with Utility Undertakers	979 days	Fri 1/6/18	Wed 3/2/21
47	7	Liaison with Contract CV/2016/01 regarding Parts A1 to A4 (refer PS Appendix A1)	979 days	Fri 1/6/18	Wed 3/2/21
48	8	Liaison Meeting with Interface and associated contractors	389 days	Fri 1/6/18	Mon 24/6/19
53	9	Tree Survey Reporting	164 days	Fri 1/6/18	Sun 11/11/18
58	10	Street Lighting Designs by the Contractor	671 days	Fri 1/6/18	Wed 1/4/20
66	11	Provision of Project Manager's Site Accommodation (PS1.08A(b) & 1.49)	28 days	Fri 1/6/18	Thu 28/6/18
67	12	Design of irrigation system within the Sandy Ridge Cemetery (LS/2021, 2041, 2042, W/1041,1011)	21 days	Fri 20/12/19	Fri 10/1/20
70	13	Condition Survey	81 days	Thu 23/8/18	Sun 11/11/18
77	**14**	**section 1 of the works - Completion of all works within Parts A1, A2 and B of the Site except Establishment works**	979 days	Thu 31/5/18	Wed 3/2/21
78	14.1	**Parts A1**	859 days	Fri 28/9/18	Wed 3/2/21
79	14.1.1	*access date for section 1 (Parts A1) - not more than 120 days after the starting date*	0 days	Fri 28/9/18	Fri 28/9/18
80	14.1.2	form temporary haul road from the south side to Parts A1	14 days	Tue 2/10/18	Mon 22/10/18
81	14.1.3	general site clearance	30 days	Tue 23/10/18	Wed 28/11/18
82	14.1.4	initial survey	27 days	Thu 29/11/18	Wed 2/1/19
83	14.1.5	construction of temporary drainage	21 days	Thu 3/1/19	Sat 26/1/19
84	**14.1.6**	Site Formation works for Cut Slope CS22 (in Parts A1)	258 days	Mon 28/1/19	Mon 23/12/19
85	14.1.6.1	300 stepped channel & catchpits	10 days	Mon 28/1/19	Mon 11/2/19
86	14.1.6.2	Phase I	15 days	Tue 12/2/19	Thu 28/2/19
87	14.1.6.2.1	slope excavation work & fill platform for soil nail works	3 days	Tue 12/2/19	Thu 14/2/19
88	14.1.6.2.2	install test nail PN02 & pull out test	7 days	Fri 15/2/19	Fri 22/2/19
89	14.1.6.2.3	drill, install steel bars and grout soil nails (TB07-TB17)	5 days	Sat 23/2/19	Thu 28/2/19
90	14.1.6.3	Phase II	18 days	Fri 1/3/19	Fri 22/3/19
91	14.1.6.3.1	slope excavation work & fill platform for soil nail	3 days	Fri 1/3/19	Mon 4/3/19
92	14.1.6.3.2	install test nail PN01 & pull out test	6 days	Tue 5/3/19	Mon 11/3/19
93	14.1.6.3.3	drill, install steel bars and grout soil nails (TA08-TA29)	8 days	Tue 12/3/19	Thu 21/3/19
94	14.1.6.3.4	raking drains	1 day	Fri 22/3/19	Fri 22/3/19
95	14.1.6.4	TDR Test (including test & wait issue result)	2 days	Mon 25/3/19	Tue 26/3/19
96	14.1.6.5	soil nail head works	5 days	Wed 27/3/19	Tue 2/4/19
97	14.1.6.6	600mm width concrete maintenance staircase	4 days	Wed 3/4/19	Tue 9/4/19
98	14.1.6.7	install instrument for CS22 (Parts A1)	3 days	Wed 10/4/19	Fri 12/4/19
99	14.1.6.8	placement of erosion control mat/ hydroseeding	2 days	Thu 11/4/19	Fri 12/4/19
100	14.1.6.9	300U channel with planter walls (after backfilling of RW13 bays 1-5)	18 days	Tue 3/12/19	Mon 23/12/19
101	14.1.7	A1) Construction of Retaining Wall RW13 (bays 1 to 5)	192 days	Mon 15/4/19	Thu 12/12/19
102	14.1.7.1	excavation with installation of temporary soil nails work behind RW13 (bays 1 to 5)	56 days	Mon 15/4/19	Tue 25/6/19

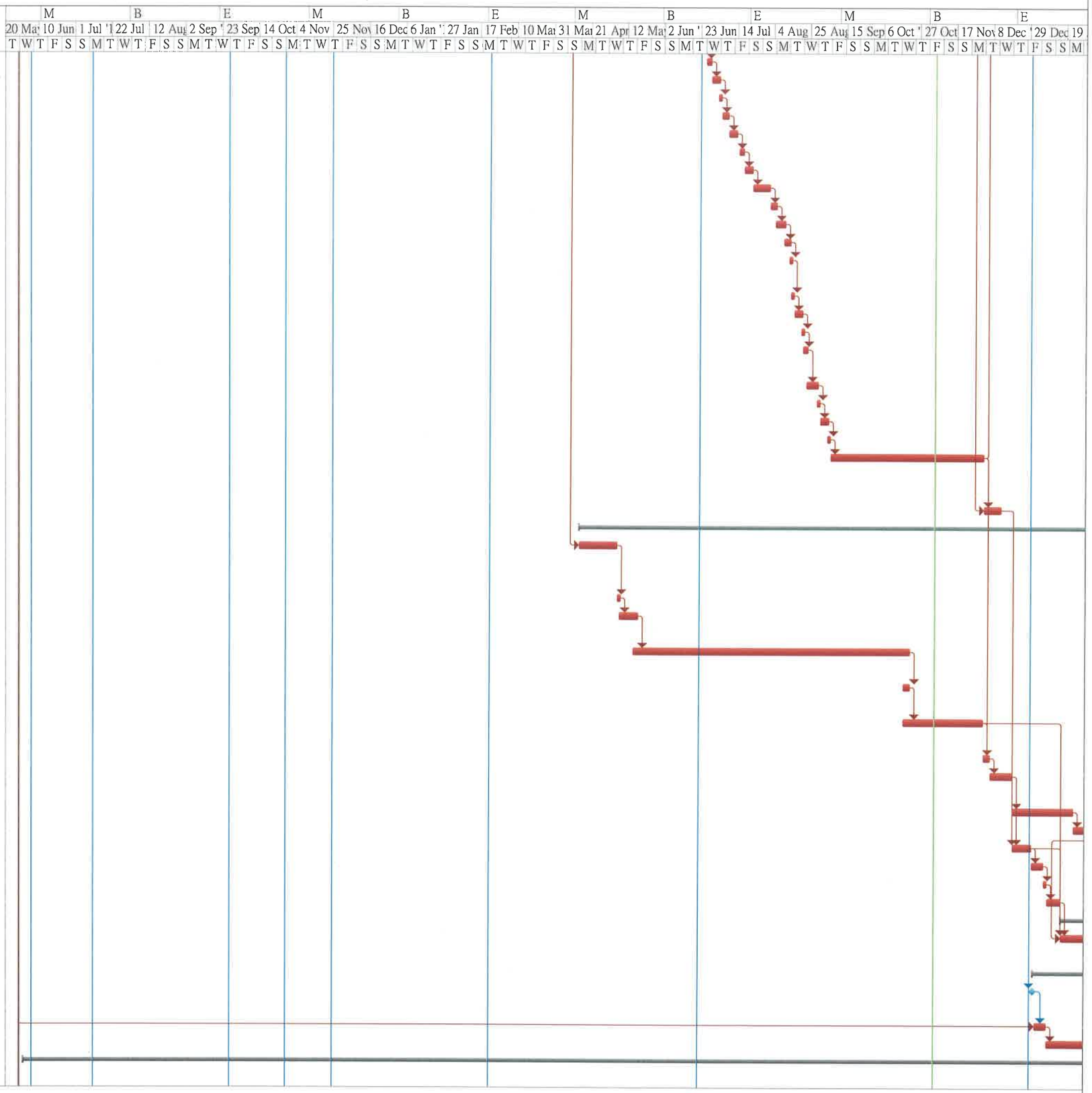


Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery
- Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

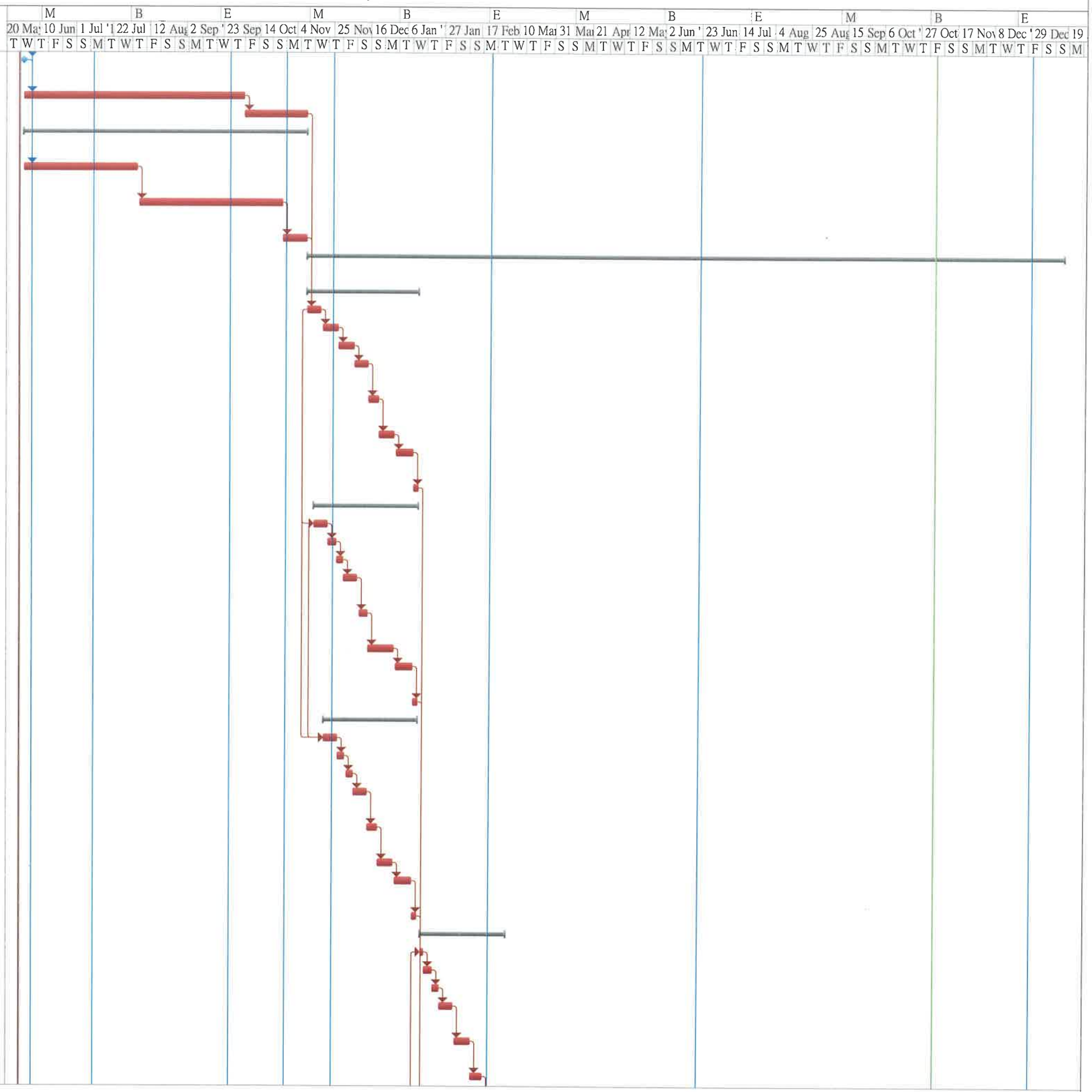
Accepted Initial Works Programme (06)

ID	WBS	Task Name	Duration	Start Date	Completion Date
103	14.1.7.2	plate load tests	3 days	Wed 26/6/19	Fri 28/6/19
104	14.1.7.3	concrete blinding layers for 5 bays	3 days	Sat 29/6/19	Wed 3/7/19
105	14.1.7.4	formwork for bases of alternative first 3 bays	2 days	Wed 3/7/19	Thu 4/7/19
106	14.1.7.5	steel fixing for 3 bases	3 days	Fri 5/7/19	Mon 8/7/19
107	14.1.7.6	concrete and curing for 3 bases	5 days	Tue 9/7/19	Sat 13/7/19
108	14.1.7.7	remove formwork	3 days	Mon 15/7/19	Wed 17/7/19
109	14.1.7.8	falsework and formwork for alternative 3 walls	4 days	Thu 18/7/19	Mon 22/7/19
110	14.1.7.9	steel fixing for 3 walls	9 days	Tue 23/7/19	Thu 1/8/19
111	14.1.7.10	close formwork for 3 walls	3 days	Fri 2/8/19	Mon 5/8/19
112	14.1.7.11	concrete and curing for 3 walls	6 days	Mon 5/8/19	Sat 10/8/19
113	14.1.7.12	remove formwork	3 days	Sat 10/8/19	Tue 13/8/19
114	14.1.7.13	formwork for bases of alternative second two bays	2 days	Tue 13/8/19	Wed 14/8/19
115	14.1.7.14	steel fixing for two bases	2 days	Wed 14/8/19	Thu 15/8/19
116	14.1.7.15	concrete and curing for two bases	4 days	Fri 16/8/19	Tue 20/8/19
117	14.1.7.16	remove formwork	2 days	Tue 20/8/19	Wed 21/8/19
118	14.1.7.17	falsework and formwork of alternative second two walls	3 days	Wed 21/8/19	Fri 23/8/19
119	14.1.7.18	steel fixing for two walls	6 days	Fri 23/8/19	Thu 29/8/19
120	14.1.7.19	close formwork for two walls	2 days	Thu 29/8/19	Fri 30/8/19
121	14.1.7.20	concrete and curing for two walls	4 days	Sat 31/8/19	Wed 4/9/19
122	14.1.7.21	remove falsework & formwork	2 days	Wed 4/9/19	Thu 5/9/19
123	14.1.7.22	after completion of RW13 (bay 1 to 5) , backfilling & compaction behind wall to formation (A1) (Drg GE/1101)	66 days	Fri 6/9/19	Mon 2/12/19
124	14.1.7.23	install instrument for RW13 (bay 1 to bay 5)	9 days	Tue 3/12/19	Thu 12/12/19
125	**14.1.8**	Site Formation works for Fill Slope FS18	231 days	Mon 15/4/19	Mon 3/2/20
126	14.1.8.1	excavate top 3.5m from the existing slope profile (extent to be directed by PM)(Drg.GE/2305)	15 days	Mon 15/4/19	Mon 6/5/19
127	14.1.8.2	prepare formation for filter blanket	2 days	Tue 7/5/19	Wed 8/5/19
128	14.1.8.3	slope backfill FS18 with 2.1m filter blanket (GE/2601)	9 days	Wed 8/5/19	Sat 18/5/19
129	14.1.8.4	backilling from top of filter blanket to formation level (including SRT tests)	126 days	Thu 16/5/19	Mon 21/10/19
130	14.1.8.5	construction of 1.5m width maintenance berm	2 days	Fri 18/10/19	Mon 21/10/19
131	14.1.8.6	construction of U channel/ stepped channel and catchpits	37 days	Fri 18/10/19	Mon 2/12/19
132	14.1.8.7	construction of U channel in front of RW13	4 days	Tue 3/12/19	Fri 6/12/19
133	14.1.8.8	600mm width concrete maintenance staircase with handrailing boxing out	11 days	Sat 7/12/19	Thu 19/12/19
134	14.1.8.9	landscaping (hydroseeding)	27 days	Fri 20/12/19	Thu 23/1/20
135	14.1.8.10	install instrument for FS18	6 days	Fri 24/1/20	Mon 3/2/20
136	14.1.9	CS21 - slope cutting	7 days	Fri 20/12/19	Mon 30/12/19
137	14.1.10	install instrument for CS21	5 days	Tue 31/12/19	Mon 6/1/20
138	14.1.11	placement of erosion control mat/ hydroseeding	2 days	Tue 7/1/20	Wed 8/1/20
139	14.1.12	minor cutting CS26 (Parts A1) (for Road E)	7 days	Thu 9/1/20	Thu 16/1/20
140	14.1.13	Drainage works at Road E	43 days	Fri 17/1/20	Tue 10/3/20
141	14.1.13.1	main pipe laying	31 days	Fri 17/1/20	Tue 25/2/20
159	14.2	**Parts A2**	400 days	Tue 31/12/19	Wed 3/2/21
160	**14.2.1**	*access date for section 1 (Parts A2) - not more than 580 days after the starting date*	0 days	Tue 31/12/19	Tue 31/12/19
161	14.2.2	form temporary haul road to Parts A2	6 days	Thu 2/1/20	Wed 8/1/20
162	14.2.3	general site clearance	18 days	Thu 9/1/20	Sat 1/2/20
228	14.3	**Parts B - refer Appendix MKTR01A & Appendix MKTR01B**	979 days	Thu 31/5/18	Wed 3/2/21



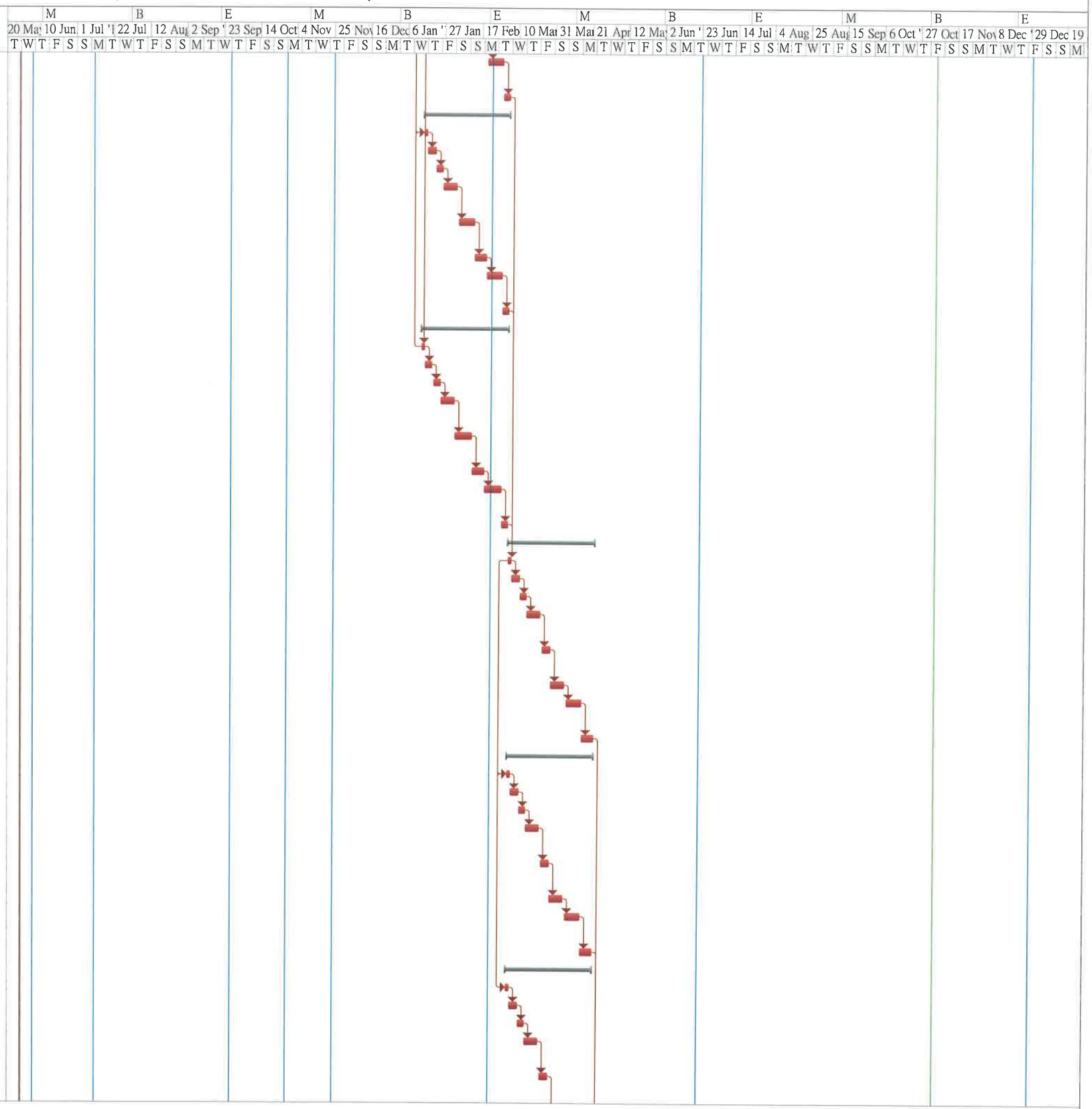
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
229	14.3.1	*access date for section 1 (Parts B) - the starting date*	0 days	Thu 31/5/18	Thu 31/5/18
230	14.3.2	Initial Survey	104 days	Fri 1/6/18	Thu 4/10/18
231	14.3.3	utility detection and submit reports	30 days	Fri 5/10/18	Fri 9/11/18
232	14.3.4	Temporary Traffic Arrangement (TTA) Scheme for Man Kam Road	134 days	Fri 1/6/18	Fri 9/11/18
233	14.3.4.1	Preparation of TTA for TMLG and acceptance from TD and RMO	54 days	Fri 1/6/18	Sat 4/8/18
234	14.3.4.2	Comment & acceptance of TTA scheme by TD & RMO	68 days	Mon 6/8/18	Fri 26/10/18
235	14.3.4.3	Obtain roadwork advice from RMO	12 days	Sat 27/10/18	Fri 9/11/18
236	14.3.5	Construction of Fresh Water Mains (DN400)-refer to Drawings No. MKTR Programme/W/001 & 002	352 days	Sat 10/11/18	Fri 17/1/20
237	14.3.5.1	Phase 1: TTA 1s	52 days	Sat 10/11/18	Sat 12/1/19
238	14.3.5.1.1	trial run for TTA	7 days	Sat 10/11/18	Sat 17/11/18
239	14.3.5.1.2	saw cut existing pavement and removal	8 days	Mon 19/11/18	Tue 27/11/18
240	14.3.5.1.3	trial pits	8 days	Wed 28/11/18	Thu 6/12/18
241	14.3.5.1.4	trench sheetpiling	7 days	Fri 7/12/18	Fri 14/12/18
242	14.3.5.1.5	excavate trench & shoring	5 days	Sat 15/12/18	Thu 20/12/18
243	14.3.5.1.6	pipe laying	6 days	Fri 21/12/18	Sat 29/12/18
244	14.3.5.1.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 31/12/18	Wed 9/1/19
245	14.3.5.1.8	reinstate trench & curing	3 days	Thu 10/1/19	Sat 12/1/19
246	14.3.5.2	Phase 1: TTA 8s	49 days	Wed 14/11/18	Sat 12/1/19
247	14.3.5.2.1	trial run for TTA	7 days	Wed 14/11/18	Wed 21/11/18
248	14.3.5.2.2	saw cut existing pavement and removal	4 days	Thu 22/11/18	Mon 26/11/18
249	14.3.5.2.3	trial pits	4 days	Tue 27/11/18	Fri 30/11/18
250	14.3.5.2.4	trench sheetpiling	7 days	Sat 1/12/18	Sat 8/12/18
251	14.3.5.2.5	excavate trench & shoring	5 days	Mon 10/12/18	Fri 14/12/18
252	14.3.5.2.6	pipe laying & 2 sluice valve in chamber	11 days	Sat 15/12/18	Sat 29/12/18
253	14.3.5.2.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 31/12/18	Wed 9/1/19
254	14.3.5.2.8	reinstate trench & curing	3 days	Thu 10/1/19	Sat 12/1/19
255	14.3.5.3	Phase 1: TTA 15s	44 days	Tue 20/11/18	Sat 12/1/19
256	14.3.5.3.1	trial run for TTA	7 days	Tue 20/11/18	Tue 27/11/18
257	14.3.5.3.2	saw cut existing pavement and removal	4 days	Wed 28/11/18	Sat 1/12/18
258	14.3.5.3.3	trial pits	4 days	Mon 3/12/18	Thu 6/12/18
259	14.3.5.3.4	trench sheetpiling	7 days	Fri 7/12/18	Fri 14/12/18
260	14.3.5.3.5	excavate trench & shoring	5 days	Sat 15/12/18	Thu 20/12/18
261	14.3.5.3.6	pipe laying	6 days	Fri 21/12/18	Sat 29/12/18
262	14.3.5.3.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 31/12/18	Wed 9/1/19
263	14.3.5.3.8	reinstate trench & curing	3 days	Thu 10/1/19	Sat 12/1/19
264	14.3.5.4	Phase 2: TTA 2s	39 days	Tue 15/1/19	Mon 4/3/19
265	14.3.5.4.1	mobilisation & set up TTA	2 days	Tue 15/1/19	Wed 16/1/19
266	14.3.5.4.2	saw cut existing pavement and removal	4 days	Thu 17/1/19	Mon 21/1/19
267	14.3.5.4.3	trial pits	4 days	Tue 22/1/19	Fri 25/1/19
268	14.3.5.4.4	trench sheetpiling	7 days	Sat 26/1/19	Sat 2/2/19
269	14.3.5.4.5	excavate trench & shoring	5 days	Mon 4/2/19	Tue 12/2/19
270	14.3.5.4.6	pipe laying	6 days	Wed 13/2/19	Tue 19/2/19



3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
271	14.3.5.4.7	backfill trench & remove sheetpile, rail & strut	8 days	Wed 20/2/19	Thu 28/2/19
272	14.3.5.4.8	reinstate trench & curing	3 days	Fri 1/3/19	Mon 4/3/19
273	14.3.5.5	Phase 2: TTA 9s	39 days	Tue 15/1/19	Mon 4/3/19
274	14.3.5.5.1	mobilisation & set up TTA	2 days	Tue 15/1/19	Wed 16/1/19
275	14.3.5.5.2	saw cut existing pavement and removal	4 days	Thu 17/1/19	Mon 21/1/19
276	14.3.5.5.3	trial pits	4 days	Tue 22/1/19	Fri 25/1/19
277	14.3.5.5.4	trench sheetpiling	7 days	Sat 26/1/19	Sat 2/2/19
278	14.3.5.5.5	excavate trench & shoring	5 days	Mon 4/2/19	Tue 12/2/19
279	14.3.5.5.6	pipe laying	6 days	Wed 13/2/19	Tue 19/2/19
280	14.3.5.5.7	backfill trench & remove sheetpile, rail & strut	8 days	Wed 20/2/19	Thu 28/2/19
281	14.3.5.5.8	reinstate trench & curing	3 days	Fri 1/3/19	Mon 4/3/19
282	14.3.5.6	Phase 2: TTA 16s	40 days	Mon 14/1/19	Mon 4/3/19
283	14.3.5.6.1	mobilisation & set up TTA	2 days	Mon 14/1/19	Tue 15/1/19
284	14.3.5.6.2	saw cut existing pavement and removal	4 days	Wed 16/1/19	Sat 19/1/19
285	14.3.5.6.3	trial pits	4 days	Mon 21/1/19	Thu 24/1/19
286	14.3.5.6.4	trench sheetpiling	7 days	Fri 25/1/19	Fri 1/2/19
287	14.3.5.6.5	excavate trench & shoring	5 days	Sat 2/2/19	Mon 11/2/19
288	14.3.5.6.6	pipe laying	6 days	Tue 12/2/19	Mon 18/2/19
289	14.3.5.6.7	backfill trench & remove sheetpile, rail & strut	9 days	Tue 19/2/19	Thu 28/2/19
290	14.3.5.6.8	reinstate trench & curing	3 days	Fri 1/3/19	Mon 4/3/19
291	14.3.5.7	Phase 3: TTA3s	39 days	Tue 5/3/19	Tue 23/4/19
292	14.3.5.7.1	mobilisation & set up TTA	2 days	Tue 5/3/19	Wed 6/3/19
293	14.3.5.7.2	saw cut existing pavement and removal	4 days	Thu 7/3/19	Mon 11/3/19
294	14.3.5.7.3	trial pits	4 days	Tue 12/3/19	Fri 15/3/19
295	14.3.5.7.4	trench sheetpiling	7 days	Sat 16/3/19	Sat 23/3/19
296	14.3.5.7.5	excavate trench & shoring	5 days	Mon 25/3/19	Fri 29/3/19
297	14.3.5.7.6	pipe laying	6 days	Sat 30/3/19	Sat 6/4/19
298	14.3.5.7.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 8/4/19	Tue 16/4/19
299	14.3.5.7.8	reinstate trench & curing	3 days	Wed 17/4/19	Tue 23/4/19
300	14.3.5.8	Phase 3: TTA10s	39 days	Tue 5/3/19	Tue 23/4/19
301	14.3.5.8.1	mobilisation & set up TTA	2 days	Tue 5/3/19	Wed 6/3/19
302	14.3.5.8.2	saw cut existing pavement and removal	4 days	Thu 7/3/19	Mon 11/3/19
303	14.3.5.8.3	trial pits	4 days	Tue 12/3/19	Fri 15/3/19
304	14.3.5.8.4	trench sheetpiling	7 days	Sat 16/3/19	Sat 23/3/19
305	14.3.5.8.5	excavate trench & shoring	5 days	Mon 25/3/19	Fri 29/3/19
306	14.3.5.8.6	pipe laying	6 days	Sat 30/3/19	Sat 6/4/19
307	14.3.5.8.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 8/4/19	Tue 16/4/19
308	14.3.5.8.8	reinstate trench & curing	3 days	Wed 17/4/19	Tue 23/4/19
309	14.3.5.9	Phase 3: TTA17s	39 days	Tue 5/3/19	Tue 23/4/19
310	14.3.5.9.1	mobilisation & set up TTA	2 days	Tue 5/3/19	Wed 6/3/19
311	14.3.5.9.2	saw cut existing pavement and removal	4 days	Thu 7/3/19	Mon 11/3/19
312	14.3.5.9.3	trial pits	4 days	Tue 12/3/19	Fri 15/3/19
313	14.3.5.9.4	trench sheetpiling	7 days	Sat 16/3/19	Sat 23/3/19
314	14.3.5.9.5	excavate trench & shoring	5 days	Mon 25/3/19	Fri 29/3/19

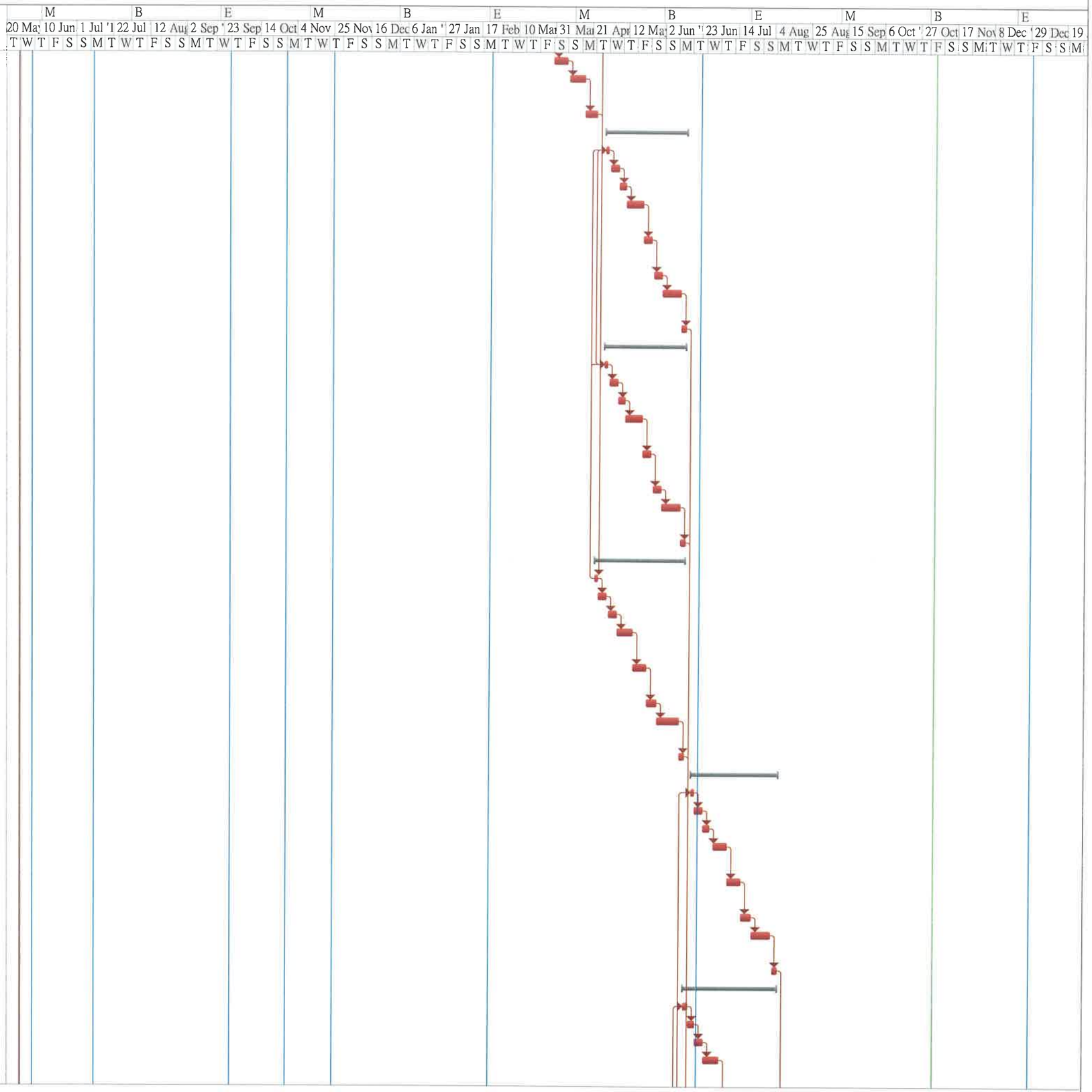


Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery
- Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

Accepted Initial Works Programme (06)

ID	WBS	Task Name	Duration	Start Date	Completion Date
315	14.3.5.9.6	pipe laying	6 days	Sat 30/3/19	Sat 6/4/19
316	14.3.5.9.7	backfill trench & remove sheetpile, rail & strut	8 days	Mon 8/4/19	Tue 16/4/19
317	14.3.5.9.8	reinstate trench & curing	3 days	Wed 17/4/19	Tue 23/4/19
318	14.3.5.10	Phase 4: TTA4s	38 days	Mon 29/4/19	Fri 14/6/19
319	14.3.5.10.1	mobilisation & set up TTA	2 days	Mon 29/4/19	Tue 30/4/19
320	14.3.5.10.2	saw cut existing pavement and removal	4 days	Thu 2/5/19	Mon 6/5/19
321	14.3.5.10.3	trial pits	4 days	Tue 7/5/19	Fri 10/5/19
322	14.3.5.10.4	trench sheetpiling	7 days	Sat 11/5/19	Mon 20/5/19
323	14.3.5.10.5	excavate trench & shoring	5 days	Tue 21/5/19	Sat 25/5/19
324	14.3.5.10.6	pipe laying	5 days	Mon 27/5/19	Fri 31/5/19
325	14.3.5.10.7	backfill trench & remove sheetpile, rail & strut	8 days	Sat 1/6/19	Tue 11/6/19
326	14.3.5.10.8	reinstate trench & curing	3 days	Wed 12/6/19	Fri 14/6/19
327	14.3.5.11	Phase 4: TTA11s	38 days	Mon 29/4/19	Fri 14/6/19
328	14.3.5.11.1	mobilisation & set up TTA	2 days	Mon 29/4/19	Tue 30/4/19
329	14.3.5.11.2	saw cut existing pavement and removal	4 days	Thu 2/5/19	Mon 6/5/19
330	14.3.5.11.3	trial pits	4 days	Tue 7/5/19	Fri 10/5/19
331	14.3.5.11.4	trench sheetpiling	7 days	Sat 11/5/19	Mon 20/5/19
332	14.3.5.11.5	excavate trench & shoring	5 days	Tue 21/5/19	Sat 25/5/19
333	14.3.5.11.6	pipe laying	5 days	Mon 27/5/19	Fri 31/5/19
334	14.3.5.11.7	backfill trench & remove sheetpile, rail & strut	8 days	Sat 1/6/19	Tue 11/6/19
335	14.3.5.11.8	reinstate trench & curing	3 days	Wed 12/6/19	Fri 14/6/19
336	14.3.5.12	Phase 4: TTA18s	42 days	Wed 24/4/19	Fri 14/6/19
337	14.3.5.12.1	mobilisation & set up TTA	2 days	Wed 24/4/19	Thu 25/4/19
338	14.3.5.12.2	saw cut existing pavement and removal	4 days	Fri 26/4/19	Tue 30/4/19
339	14.3.5.12.3	trial pits	4 days	Thu 2/5/19	Mon 6/5/19
340	14.3.5.12.4	trench sheetpiling	7 days	Tue 7/5/19	Wed 15/5/19
341	14.3.5.12.5	excavate trench & shoring	7 days	Thu 16/5/19	Thu 23/5/19
342	14.3.5.12.6	pipe laying	5 days	Fri 24/5/19	Wed 29/5/19
343	14.3.5.12.7	backfill trench & remove sheetpile, rail & strut	10 days	Thu 30/5/19	Tue 11/6/19
344	14.3.5.12.8	reinstate trench & curing	3 days	Wed 12/6/19	Fri 14/6/19
345	14.3.5.13	Phase 5: TTA5s	42 days	Wed 19/6/19	Wed 7/8/19
346	14.3.5.13.1	mobilisation & set up TTA	2 days	Wed 19/6/19	Thu 20/6/19
347	14.3.5.13.2	saw cut existing pavement and removal	4 days	Fri 21/6/19	Tue 25/6/19
348	14.3.5.13.3	trial pits	4 days	Wed 26/6/19	Sat 29/6/19
349	14.3.5.13.4	trench sheetpiling	7 days	Tue 2/7/19	Tue 9/7/19
350	14.3.5.13.5	excavate trench & shoring	7 days	Wed 10/7/19	Wed 17/7/19
351	14.3.5.13.6	pipe laying	5 days	Thu 18/7/19	Tue 23/7/19
352	14.3.5.13.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19
353	14.3.5.13.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19
354	14.3.5.14	Phase 5: TTA12s	45 days	Sat 15/6/19	Wed 7/8/19
355	14.3.5.14.1	mobilisation & set up TTA	2 days	Sat 15/6/19	Mon 17/6/19
356	14.3.5.14.2	saw cut existing pavement and removal	4 days	Tue 18/6/19	Fri 21/6/19
357	14.3.5.14.3	trial pits	4 days	Sat 22/6/19	Wed 26/6/19
358	14.3.5.14.4	trench sheetpiling	7 days	Thu 27/6/19	Fri 5/7/19

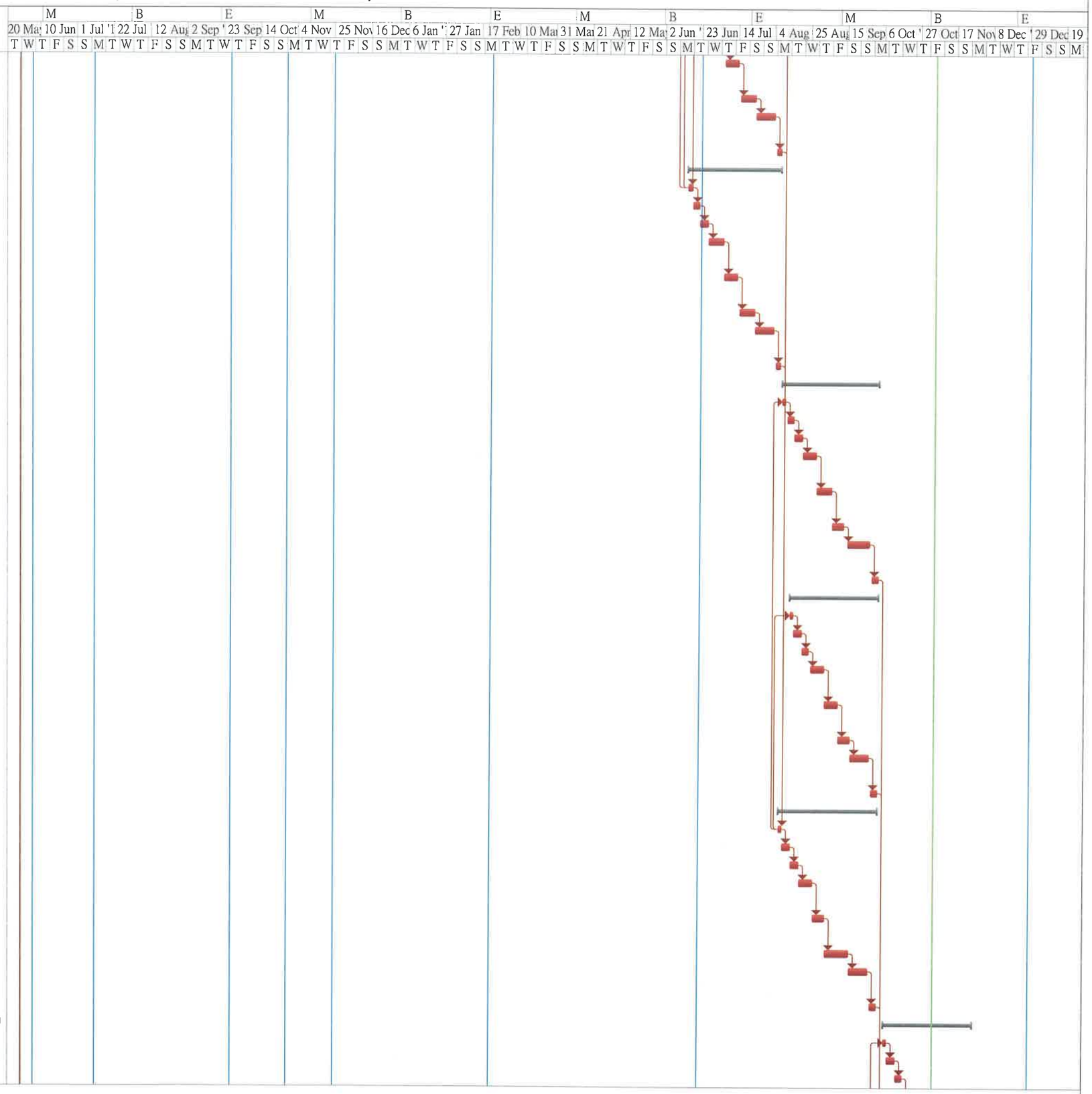


Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery
- Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

Accepted Initial Works Programme (06)

ID	WBS	Task Name	Duration	Start Date	Completion Date
359	14.3.5.14.5	excavate trench & shoring	7 days	Sat 6/7/19	Sat 13/7/19
360	14.3.5.14.6	pipe laying & a washout pump pit	8 days	Mon 15/7/19	Tue 23/7/19
361	14.3.5.14.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19
362	14.3.5.14.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19
363	14.3.5.15	Phase 5: TTA19s	45 days	Sat 15/6/19	Wed 7/8/19
364	14.3.5.15.1	mobilisation & set up TTA	2 days	Sat 15/6/19	Mon 17/6/19
365	14.3.5.15.2	saw cut existing pavement and removal	4 days	Tue 18/6/19	Fri 21/6/19
366	14.3.5.15.3	trial pits	4 days	Sat 22/6/19	Wed 26/6/19
367	14.3.5.15.4	trench sheetpiling	7 days	Thu 27/6/19	Fri 5/7/19
368	14.3.5.15.5	excavate trench & shoring	7 days	Sat 6/7/19	Sat 13/7/19
369	14.3.5.15.6	pipe laying & double air valve in chamber	8 days	Mon 15/7/19	Tue 23/7/19
370	14.3.5.15.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19
371	14.3.5.15.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19
372	14.3.5.16	Phase 6: TTA6s	46 days	Fri 9/8/19	Thu 3/10/19
373	14.3.5.16.1	mobilisation & set up TTA	2 days	Fri 9/8/19	Sat 10/8/19
374	14.3.5.16.2	saw cut existing pavement and removal	4 days	Mon 12/8/19	Thu 15/8/19
375	14.3.5.16.3	trial pits	4 days	Fri 16/8/19	Tue 20/8/19
376	14.3.5.16.4	trench sheetpiling	7 days	Wed 21/8/19	Wed 28/8/19
377	14.3.5.16.5	excavate trench & shoring	8 days	Thu 29/8/19	Fri 6/9/19
378	14.3.5.16.6	pipe laying & a washout pump pit	6 days	Sat 7/9/19	Fri 13/9/19
379	14.3.5.16.7	backfill trench & remove sheetpile, rail & strut	12 days	Mon 16/9/19	Sat 28/9/19
380	14.3.5.16.8	reinstate trench & curing	3 days	Mon 30/9/19	Thu 3/10/19
381	14.3.5.17	Phase 6: TTA13s	42 days	Wed 14/8/19	Thu 3/10/19
382	14.3.5.17.1	mobilisation & set up TTA	2 days	Wed 14/8/19	Thu 15/8/19
383	14.3.5.17.2	saw cut existing pavement and removal	4 days	Fri 16/8/19	Tue 20/8/19
384	14.3.5.17.3	trial pits	4 days	Wed 21/8/19	Sat 24/8/19
385	14.3.5.17.4	trench sheetpiling	7 days	Mon 26/8/19	Mon 2/9/19
386	14.3.5.17.5	excavate trench & shoring	7 days	Tue 3/9/19	Tue 10/9/19
387	14.3.5.17.6	pipe laying	5 days	Wed 11/9/19	Tue 17/9/19
388	14.3.5.17.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 18/9/19	Sat 28/9/19
389	14.3.5.17.8	reinstate trench & curing	3 days	Mon 30/9/19	Thu 3/10/19
390	14.3.5.18	Phase 6: TTA20s	47 days	Thu 8/8/19	Thu 3/10/19
391	14.3.5.18.1	mobilisation & set up TTA	2 days	Thu 8/8/19	Fri 9/8/19
392	14.3.5.18.2	saw cut existing pavement and removal	4 days	Sat 10/8/19	Wed 14/8/19
393	14.3.5.18.3	trial pits	4 days	Thu 15/8/19	Mon 19/8/19
394	14.3.5.18.4	trench sheetpiling	7 days	Tue 20/8/19	Tue 27/8/19
395	14.3.5.18.5	excavate trench & shoring	6 days	Wed 28/8/19	Tue 3/9/19
396	14.3.5.18.6	pipe laying & 2 sluice valve in chamber	11 days	Wed 4/9/19	Tue 17/9/19
397	14.3.5.18.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 18/9/19	Sat 28/9/19
398	14.3.5.18.8	reinstate trench & curing	3 days	Mon 30/9/19	Thu 3/10/19
399	14.3.5.19	Phase 7: TTA7s	44 days	Tue 8/10/19	Wed 27/11/19
400	14.3.5.19.1	mobilisation & set up TTA	2 days	Tue 8/10/19	Wed 9/10/19
401	14.3.5.19.2	saw cut existing pavement and removal	4 days	Thu 10/10/19	Mon 14/10/19
402	14.3.5.19.3	trial pits	4 days	Tue 15/10/19	Fri 18/10/19

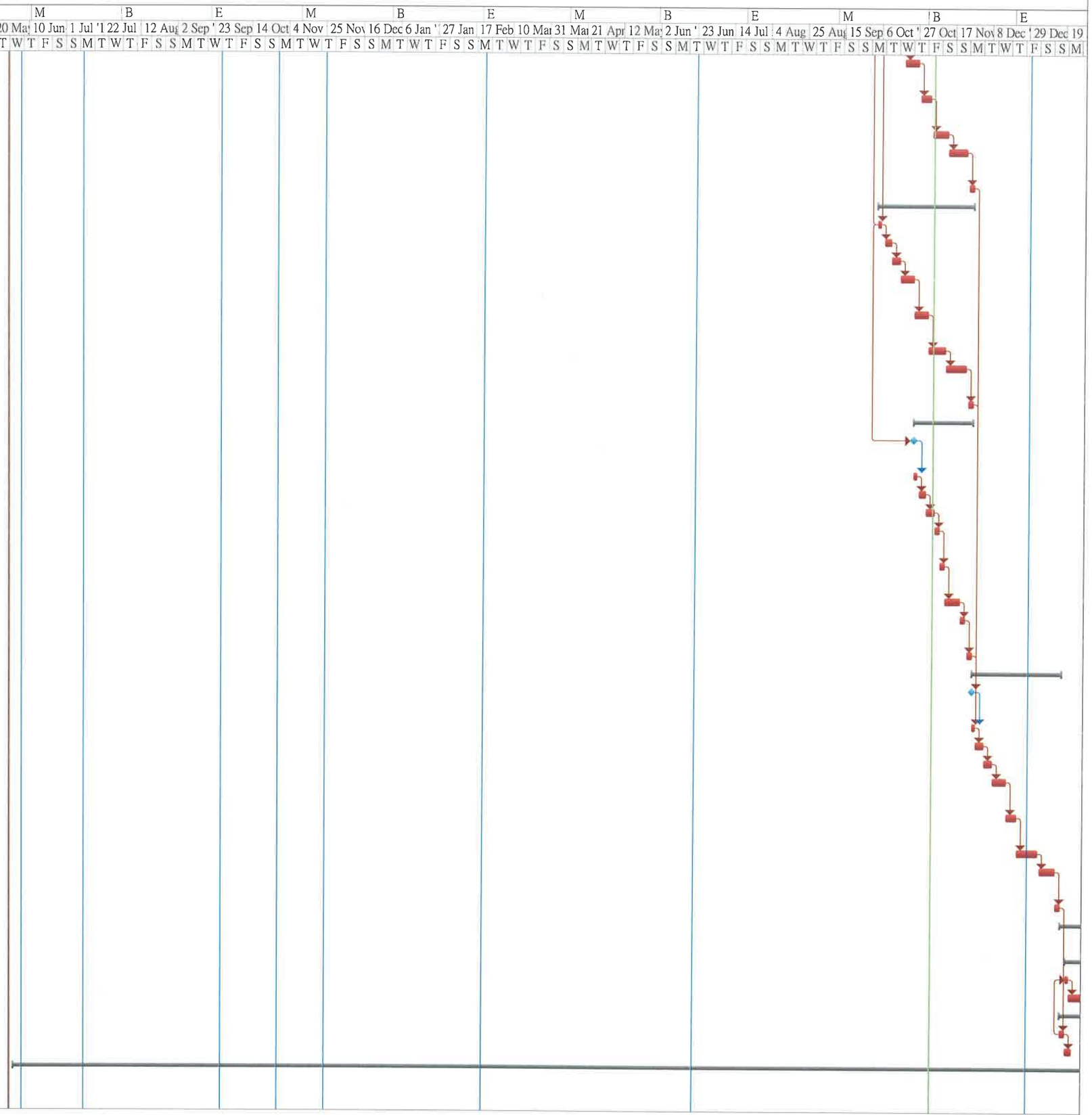


Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery
- Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

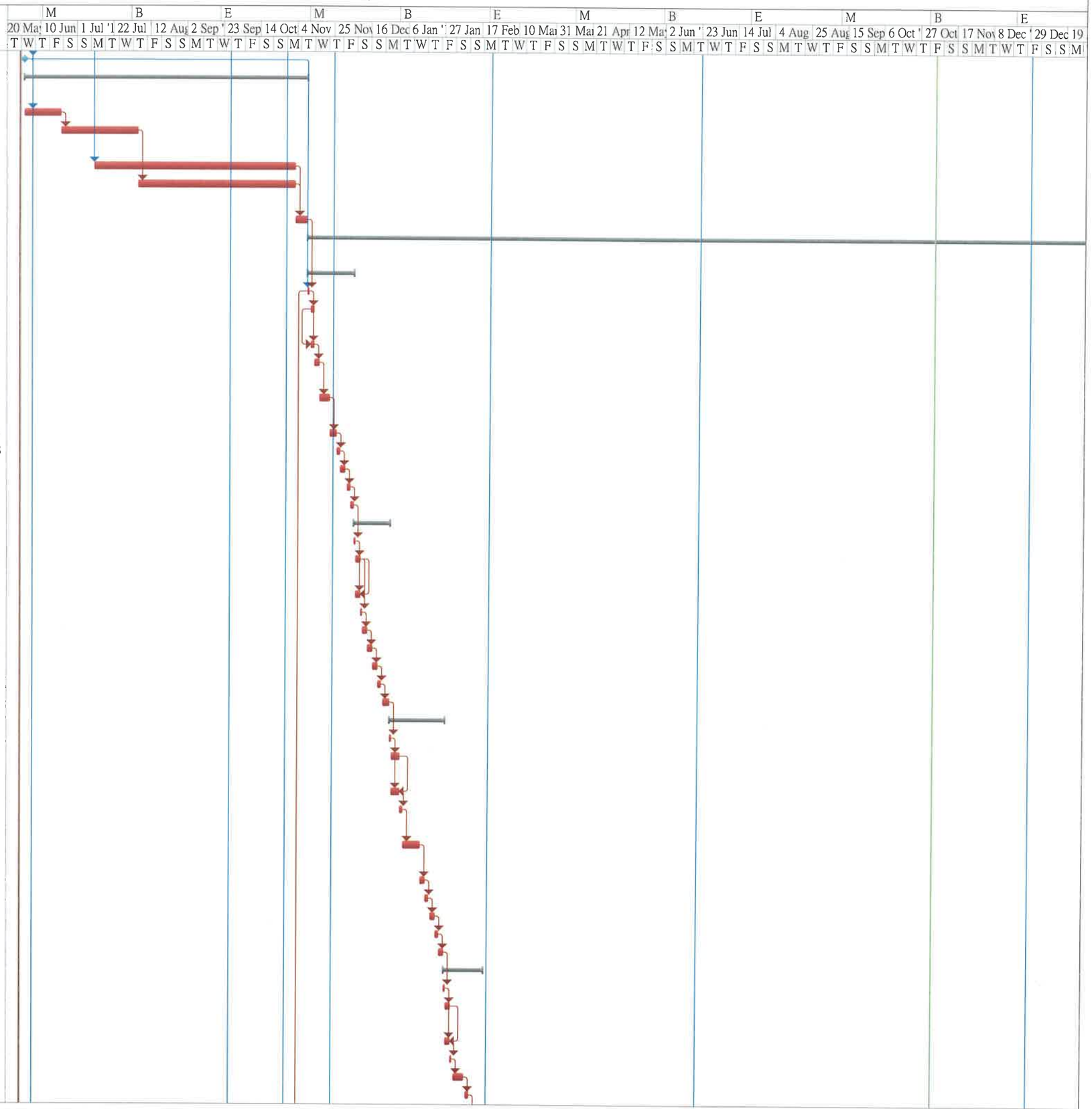
Accepted Initial Works Programme (06)

ID	WBS	Task Name	Duration	Start Date	Completion Date
403	14.3.5.19.4	trench sheetpiling	7 days	Sat 19/10/19	Sat 26/10/19
404	14.3.5.19.5	excavate trench & shoring	6 days	Mon 28/10/19	Sat 2/11/19
405	14.3.5.19.6	pipe laying & double air valve in chamber	8 days	Mon 4/11/19	Tue 12/11/19
406	14.3.5.19.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 13/11/19	Sat 23/11/19
407	14.3.5.19.8	reinstate trench & curing	3 days	Mon 25/11/19	Wed 27/11/19
408	14.3.5.20	Phase 7: TTA14s	46 days	Fri 4/10/19	Wed 27/11/19
409	14.3.5.20.1	mobilisation & set up TTA	2 days	Fri 4/10/19	Sat 5/10/19
410	14.3.5.20.2	saw cut existing pavement and removal	4 days	Tue 8/10/19	Fri 11/10/19
411	14.3.5.20.3	trial pits	4 days	Sat 12/10/19	Wed 16/10/19
412	14.3.5.20.4	trench sheetpiling	7 days	Thu 17/10/19	Thu 24/10/19
413	14.3.5.20.5	excavate trench & shoring	7 days	Fri 25/10/19	Fri 1/11/19
414	14.3.5.20.6	pipe laying & double air valve in chamber	8 days	Sat 2/11/19	Mon 11/11/19
415	14.3.5.20.7	backfill trench & remove sheetpile, rail & strut	11 days	Tue 12/11/19	Sat 23/11/19
416	14.3.5.20.8	reinstate trench & curing	3 days	Mon 25/11/19	Wed 27/11/19
417	14.3.5.21	Phase 7: additional TTA21s	29 days	Thu 24/10/19	Wed 27/11/19
418	14.3.5.21.1	latest access date for additional works area TTA 21s	0 days	Thu 24/10/19	Thu 24/10/19
419	14.3.5.21.2	mobilisation & set up TTA	2 days	Fri 25/10/19	Sat 26/10/19
420	14.3.5.21.3	saw cut existing pavement and removal	4 days	Mon 28/10/19	Thu 31/10/19
421	14.3.5.21.4	trial pits	4 days	Fri 1/11/19	Tue 5/11/19
422	14.3.5.21.5	trench sheetpiling	3 days	Wed 6/11/19	Fri 8/11/19
423	14.3.5.21.6	excavate trench & shoring	2 days	Sat 9/11/19	Mon 11/11/19
424	14.3.5.21.7	pipe laying & 2 sluice valve in chamber	8 days	Tue 12/11/19	Wed 20/11/19
425	14.3.5.21.8	backfill trench & remove sheetpile, rail & strut	3 days	Thu 21/11/19	Sat 23/11/19
426	14.3.5.21.9	reinstate trench & curing	3 days	Mon 25/11/19	Wed 27/11/19
427	14.3.5.22	additional Phase 8: additional TTA 0s	41 days	Wed 27/11/19	Fri 17/1/20
428	14.3.5.22.1	latest access date for additional works area TTA0s (same as TTA 0n)	0 days	Wed 27/11/19	Wed 27/11/19
429	14.3.5.22.2	mobilisation & set up TTA	2 days	Thu 28/11/19	Fri 29/11/19
430	14.3.5.22.3	saw cut existing pavement and removal	4 days	Sat 30/11/19	Wed 4/12/19
431	14.3.5.22.4	trial pits	4 days	Thu 5/12/19	Mon 9/12/19
432	14.3.5.22.5	trench sheetpiling	7 days	Tue 10/12/19	Tue 17/12/19
433	14.3.5.22.6	excavate trench & shoring	5 days	Wed 18/12/19	Mon 23/12/19
434	14.3.5.22.7	pipe laying & sluice valve in chamber	8 days	Tue 24/12/19	Sat 4/1/20
435	14.3.5.22.8	backfill trench & remove sheetpile, rail & strut	8 days	Mon 6/1/20	Tue 14/1/20
436	14.3.5.22.9	reinstate trench & curing	3 days	Wed 15/1/20	Fri 17/1/20
437	14.3.6	Construction of Sewerage (DN630) - refer to Drawing No. MKTR Programme/DR/001	311 days	Sat 18/1/20	Wed 3/2/21
438	14.3.6.1	Phase A: TTA 1n	50 days	Tue 21/1/20	Sat 21/3/20
439	14.3.6.1.1	mobilisation & set up TTA	2 days	Tue 21/1/20	Wed 22/1/20
440	14.3.6.1.2	saw cut existing pavement and removal	4 days	Thu 23/1/20	Thu 30/1/20
447	14.3.6.2	Phase A: TTA 7n	52 days	Sat 18/1/20	Sat 21/3/20
448	14.3.6.2.1	mobilisation & set up TTA	2 days	Sat 18/1/20	Mon 20/1/20
449	14.3.6.2.2	saw cut existing pavement and removal	4 days	Tue 21/1/20	Fri 24/1/20
557	17	**section 2 of the works - Completion of all works within Parts C1 and C2 of the Site except Establishment works**	979 days	Thu 31/5/18	Wed 3/2/21



3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
558	17.1	*access date for section 2 (Part C1)*	0 days	Thu 31/5/18	Thu 31/5/18
559	17.2	Temporary Traffic Arrangement (TTA) Scheme for Lin Ma Hang Road	162 days	Fri 1/6/18	Fri 9/11/18
560	17.2.1	Submission / acceptance of traffic consultant	21 days	Fri 1/6/18	Thu 21/6/18
561	17.2.2	Preparation of TTA for TMLG and acceptance from TD and RMO	44 days	Fri 22/6/18	Sat 4/8/18
562	17.2.3	Application for XP	115 days	Wed 11/7/18	Fri 2/11/18
563	17.2.4	Comment & acceptance of TTA scheme by TD & RMO	90 days	Sun 5/8/18	Fri 2/11/18
564	17.2.5	Obtain roadwork advice from RMO	7 days	Sat 3/11/18	Fri 9/11/18
565	17.3	works at Lin Ma Hang Road (section 2 Part C1) refer Appendice LMHR01a to d	817 days	Sat 10/11/18	Wed 3/2/21
566	17.3.1	Phase I (stage 1)-south lane (chainage 240-283)	23 days	Sat 10/11/18	Thu 6/12/18
567	17.3.1.1	TTA & UU detection	1 day	Sat 10/11/18	Sat 10/11/18
568	17.3.1.2	tree felling	2 days	Mon 12/11/18	Tue 13/11/18
569	17.3.1.3	saw cut & remove existing pavement	2 days	Mon 12/11/18	Tue 13/11/18
570	17.3.1.4	excavate pipe trench and manhole(s)	3 days	Wed 14/11/18	Fri 16/11/18
571	17.3.1.5	lay pipes & construct manhole(s)	5 days	Sat 17/11/18	Thu 22/11/18
572	17.3.1.6	backfill formation & SRT test	3 days	Fri 23/11/18	Mon 26/11/18
573	17.3.1.7	lay kerb, sub-base	2 days	Tue 27/11/18	Wed 28/11/18
574	17.3.1.8	sub-base SRT test	3 days	Thu 29/11/18	Sat 1/12/18
575	17.3.1.9	DBM (Roadbase)	2 days	Mon 3/12/18	Tue 4/12/18
576	17.3.1.10	base course and wearing course	2 days	Wed 5/12/18	Thu 6/12/18
577	17.3.2	Phase I (stage 2)-north lane (chainage 240-283)	16 days	Fri 7/12/18	Thu 27/12/18
578	17.3.2.1	TTA & UU detection	1 day	Fri 7/12/18	Fri 7/12/18
579	17.3.2.2	tree felling	2 days	Sat 8/12/18	Mon 10/12/18
580	17.3.2.3	saw cut & remove existing pavement	2 days	Sat 8/12/18	Mon 10/12/18
581	17.3.2.4	excavate gully trench and gully pot(s)	1 day	Tue 11/12/18	Tue 11/12/18
582	17.3.2.5	lay& connect gully pipes& construct gully pot(s)	3 days	Wed 12/12/18	Fri 14/12/18
583	17.3.2.6	lay kerb, sub-base	2 days	Sat 15/12/18	Mon 17/12/18
584	17.3.2.7	sub-base SRT test	3 days	Tue 18/12/18	Thu 20/12/18
585	17.3.2.8	DBM (Roadbase)	2 days	Fri 21/12/18	Sat 22/12/18
586	17.3.2.9	base course and wearing course	2 days	Mon 24/12/18	Thu 27/12/18
587	17.3.3	Phase I (stage 3)-south lane (chainage 283-335)	26 days	Fri 28/12/18	Mon 28/1/19
588	17.3.3.1	TTA & UU detection	1 day	Fri 28/12/18	Fri 28/12/18
589	17.3.3.2	tree felling	3 days	Sat 29/12/18	Wed 2/1/19
590	17.3.3.3	saw cut & remove existing pavement	3 days	Sat 29/12/18	Wed 2/1/19
591	17.3.3.4	excavate pipe trench and manhole(s)	2 days	Thu 3/1/19	Fri 4/1/19
592	17.3.3.5	lay pipes & construct manhole(s)	8 days	Sat 5/1/19	Mon 14/1/19
593	17.3.3.6	backfill formation & SRT test	3 days	Tue 15/1/19	Thu 17/1/19
594	17.3.3.7	lay kerb, sub-base	2 days	Fri 18/1/19	Sat 19/1/19
595	17.3.3.8	sub-base SRT test	3 days	Mon 21/1/19	Wed 23/1/19
596	17.3.3.9	DBM (Roadbase)	2 days	Thu 24/1/19	Fri 25/1/19
597	17.3.3.10	base course and wearing course	2 days	Sat 26/1/19	Mon 28/1/19
598	17.3.4	Phase I (stage 4)-north lane (chainage 283-335)	17 days	Tue 29/1/19	Wed 20/2/19
599	17.3.4.1	TTA & UU detection	1 day	Tue 29/1/19	Tue 29/1/19
600	17.3.4.2	tree felling	3 days	Wed 30/1/19	Fri 1/2/19
601	17.3.4.3	saw cut & remove existing pavement	3 days	Wed 30/1/19	Fri 1/2/19
602	17.3.4.4	excavate gully trench and gully pot(s)	1 day	Sat 2/2/19	Sat 2/2/19
603	17.3.4.5	lay& connect gully pipes& construct gully pot(s)	3 days	Mon 4/2/19	Sat 9/2/19
604	17.3.4.6	lay kerb, sub-base	2 days	Mon 11/2/19	Tue 12/2/19



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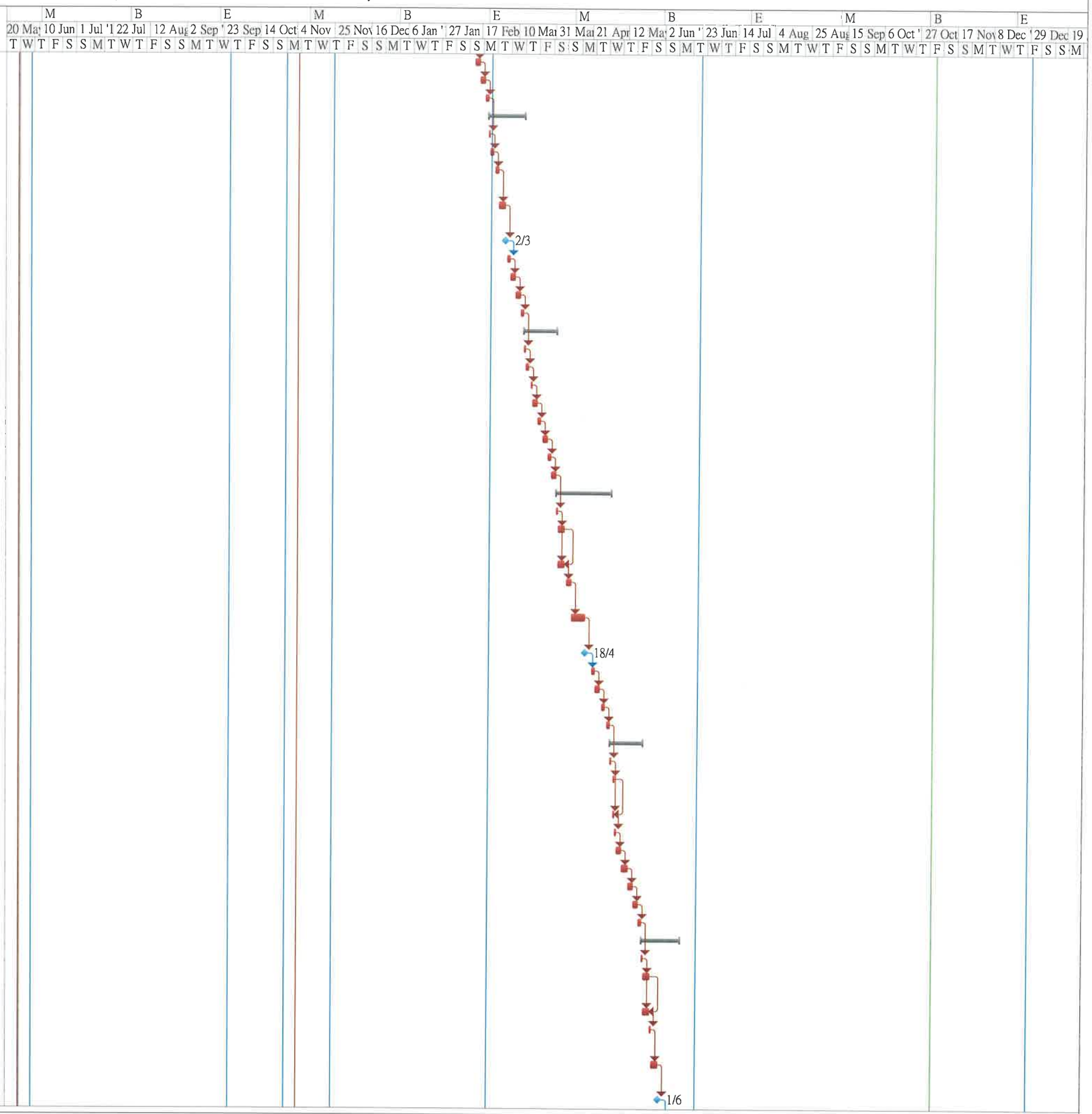
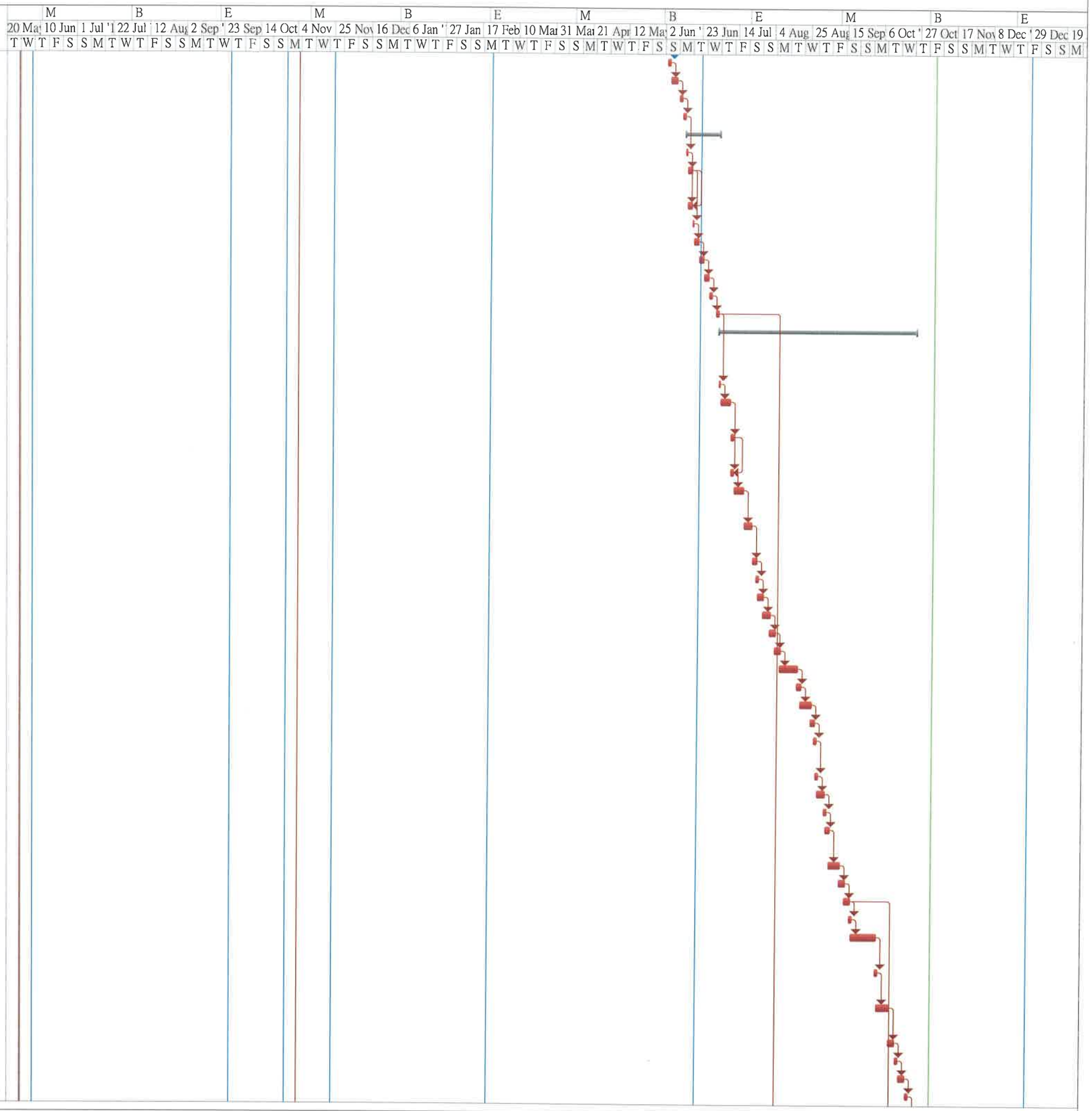
ID	WBS	Task Name	Duration	Start Date	Completion Date
605	17.3.4.7	sub-base SRT test	3 days	Wed 13/2/19	Fri 15/2/19
606	17.3.4.8	DBM (Roadbase)	2 days	Sat 16/2/19	Mon 18/2/19
607	17.3.4.9	base course and wearing course	2 days	Tue 19/2/19	Wed 20/2/19
608	17.3.5	Phase I (stage 5)-south lane (chainage 335-380)	18 days	Thu 21/2/19	Wed 13/3/19
609	17.3.5.1	TTA & UU detection	1 day	Thu 21/2/19	Thu 21/2/19
610	17.3.5.2	saw cut & remove existing pavement	2 days	Fri 22/2/19	Sat 23/2/19
611	17.3.5.3	excavate pipe trench and manhole(s)	2 days	Mon 25/2/19	Tue 26/2/19
612	17.3.5.4	lay pipes & construct manhole(s)	4 days	Wed 27/2/19	Sat 2/3/19
613	17.3.5.5	backfill formation & SRT test	0 days	Sat 2/3/19	Sat 2/3/19
614	17.3.5.6	lay kerb, sub-base	2 days	Mon 4/3/19	Tue 5/3/19
615	17.3.5.7	sub-base SRT test	3 days	Wed 6/3/19	Fri 8/3/19
616	17.3.5.8	DBM (Roadbase)	2 days	Sat 9/3/19	Mon 11/3/19
617	17.3.5.9	base course and wearing course	2 days	Tue 12/3/19	Wed 13/3/19
618	17.3.6	Phase I (stage 6)-north lane (chainage 335-380)	16 days	Thu 14/3/19	Mon 1/4/19
619	17.3.6.1	TTA & UU detection	1 day	Thu 14/3/19	Thu 14/3/19
620	17.3.6.2	saw cut & remove existing pavement	2 days	Fri 15/3/19	Sat 16/3/19
621	17.3.6.3	excavate gully trench and gully pot(s)	1 day	Mon 18/3/19	Mon 18/3/19
622	17.3.6.4	lay& connect gully pipes& construct gully pot(s)	3 days	Tue 19/3/19	Thu 21/3/19
623	17.3.6.5	lay kerb, sub-base	2 days	Fri 22/3/19	Sat 23/3/19
624	17.3.6.6	sub-base SRT test	3 days	Mon 25/3/19	Wed 27/3/19
625	17.3.6.7	DBM (Roadbase)	2 days	Thu 28/3/19	Fri 29/3/19
626	17.3.6.8	base course and wearing course	2 days	Sat 30/3/19	Mon 1/4/19
627	17.3.7	Phase I (stage 7)-south lane (chainage 380-435)	23 days	Tue 2/4/19	Fri 3/5/19
628	17.3.7.1	TTA & UU detection	1 day	Tue 2/4/19	Tue 2/4/19
629	17.3.7.2	tree felling	3 days	Wed 3/4/19	Sat 6/4/19
630	17.3.7.3	saw cut & remove existing pavement	3 days	Wed 3/4/19	Sat 6/4/19
631	17.3.7.4	excavate pipe trench and manhole(s)	3 days	Mon 8/4/19	Wed 10/4/19
632	17.3.7.5	lay pipes & construct manhole(s)	7 days	Thu 11/4/19	Thu 18/4/19
633	17.3.7.6	backfill formation & SRT test	0 days	Thu 18/4/19	Thu 18/4/19
634	17.3.7.7	lay kerb, sub-base	2 days	Tue 23/4/19	Wed 24/4/19
635	17.3.7.8	sub-base SRT test	3 days	Thu 25/4/19	Sat 27/4/19
636	17.3.7.9	DBM (Roadbase)	2 days	Mon 29/4/19	Tue 30/4/19
637	17.3.7.10	base course and wearing course	2 days	Thu 2/5/19	Fri 3/5/19
638	17.3.8	Phase I (stage 8)-north lane (chainage 380-435)	15 days	Sat 4/5/19	Wed 22/5/19
639	17.3.8.1	TTA & UU detection	1 day	Sat 4/5/19	Sat 4/5/19
640	17.3.8.2	tree felling	1 day	Mon 6/5/19	Mon 6/5/19
641	17.3.8.3	saw cut & remove existing pavement	1 day	Mon 6/5/19	Mon 6/5/19
642	17.3.8.4	excavate gully trench and gully pot(s)	1 day	Tue 7/5/19	Tue 7/5/19
643	17.3.8.5	lay& connect gully pipes& construct gully pot(s)	3 days	Wed 8/5/19	Fri 10/5/19
644	17.3.8.6	lay kerb, sub-base	2 days	Sat 11/5/19	Tue 14/5/19
645	17.3.8.7	sub-base SRT test	3 days	Wed 15/5/19	Fri 17/5/19
646	17.3.8.8	DBM (Roadbase)	2 days	Sat 18/5/19	Mon 20/5/19
647	17.3.8.9	base course and wearing course	2 days	Tue 21/5/19	Wed 22/5/19
648	17.3.9	Phase I (stage 9)-south lane (chainage 190-240)	18 days	Thu 23/5/19	Thu 13/6/19
649	17.3.9.1	TTA & UU detection	1 day	Thu 23/5/19	Thu 23/5/19
650	17.3.9.2	tree felling	3 days	Fri 24/5/19	Mon 27/5/19
651	17.3.9.3	saw cut & remove existing pavement	3 days	Fri 24/5/19	Mon 27/5/19
652	17.3.9.4	excavate pipe trench and manhole(s)	1 day	Tue 28/5/19	Tue 28/5/19
653	17.3.9.5	lay pipes & construct manhole(s)	4 days	Wed 29/5/19	Sat 1/6/19
654	17.3.9.6	backfill formation & SRT test	0 days	Sat 1/6/19	Sat 1/6/19



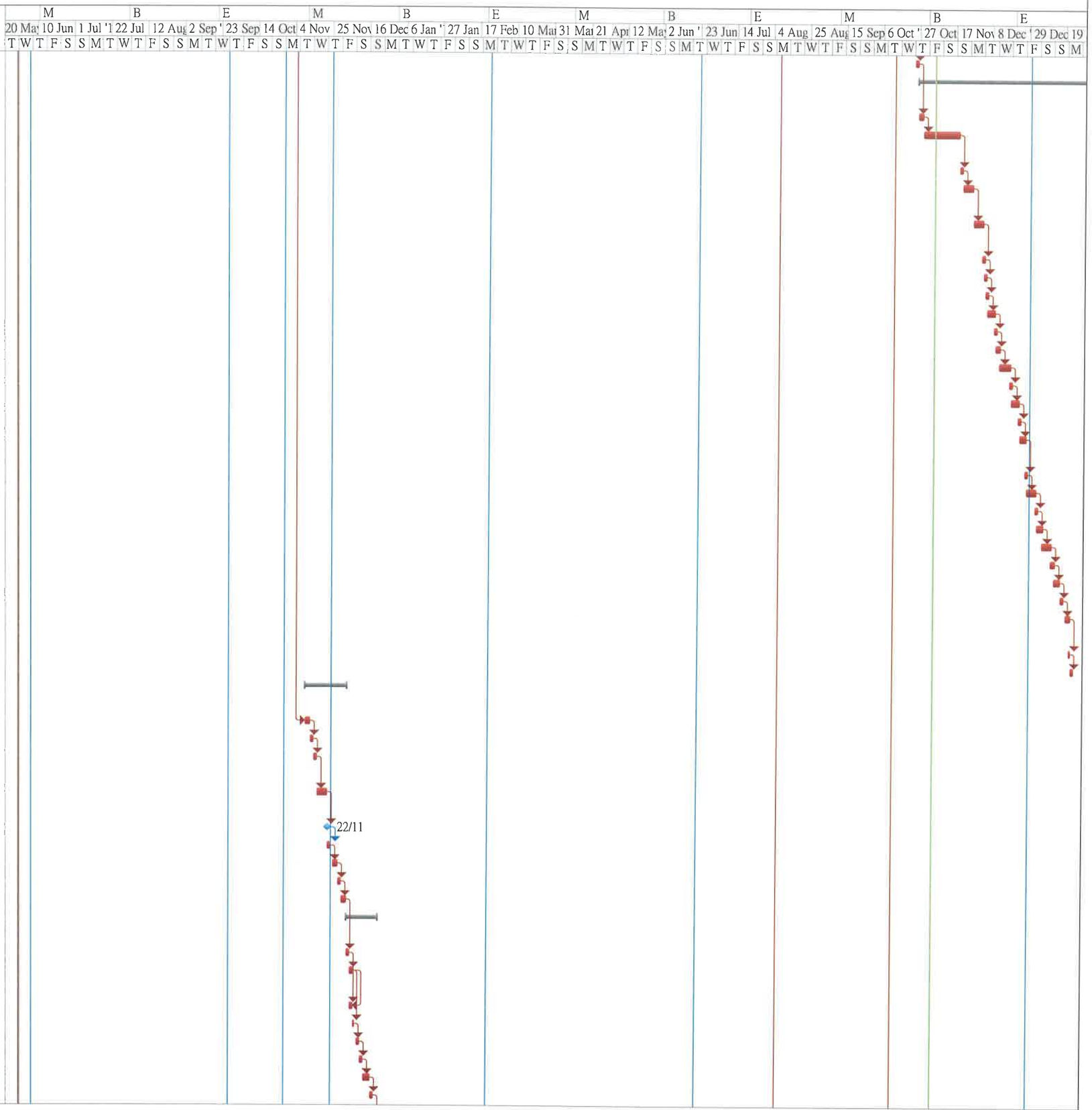
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
655	17.3.9.7	lay kerb, sub-base	2 days	Mon 3/6/19	Tue 4/6/19
656	17.3.9.8	sub-base SRT test	3 days	Wed 5/6/19	Sat 8/6/19
657	17.3.9.9	DBM (Roadbase)	2 days	Mon 10/6/19	Tue 11/6/19
658	17.3.9.10	base course and wearing course	2 days	Wed 12/6/19	Thu 13/6/19
659	17.3.10	Phase I (stage 10)-north lane (chainage 190-240)	16 days	Fri 14/6/19	Wed 3/7/19
660	17.3.10.1	TTA & UU detection	1 day	Fri 14/6/19	Fri 14/6/19
661	17.3.10.2	tree felling	2 days	Sat 15/6/19	Mon 17/6/19
662	17.3.10.3	saw cut & remove existing pavement	2 days	Sat 15/6/19	Mon 17/6/19
663	17.3.10.4	excavate gully trench and gully pot(s)	1 day	Tue 18/6/19	Tue 18/6/19
664	17.3.10.5	lay& connect gully pipes& construct gully pot(s)	3 days	Wed 19/6/19	Fri 21/6/19
665	17.3.10.6	lay kerb, sub-base	2 days	Sat 22/6/19	Mon 24/6/19
666	17.3.10.7	sub-base SRT test	3 days	Tue 25/6/19	Thu 27/6/19
667	17.3.10.8	DBM (Roadbase)	2 days	Fri 28/6/19	Sat 29/6/19
668	17.3.10.9	base course and wearing course	2 days	Tue 2/7/19	Wed 3/7/19
669	17.3.11	Phase II (stage 1)-south lane (chainage 32-85)-Noise Barrier MM6 (bays 1-3) & MM7 (bays 1-2)	95 days	Thu 4/7/19	Fri 25/10/19
670	17.3.11.1	TTA, UU detection	1 day	Thu 4/7/19	Thu 4/7/19
671	17.3.11.2	relocate existing CLP(LV) cable and HKT cable (not agreed yet)	5 days	Fri 5/7/19	Wed 10/7/19
672	17.3.11.3	tree felling	2 days	Thu 11/7/19	Fri 12/7/19
673	17.3.11.4	saw cut & remove existing pavement	2 days	Thu 11/7/19	Fri 12/7/19
674	17.3.11.5	install sheetpiles	5 days	Sat 13/7/19	Thu 18/7/19
675	17.3.11.6	excavate and install rails and struts	4 days	Fri 19/7/19	Tue 23/7/19
676	17.3.11.7	concrete blinding layers for 5 bays	3 days	Wed 24/7/19	Fri 26/7/19
677	17.3.11.8	formwork for bases of alternative first 3 bays	2 days	Fri 26/7/19	Sat 27/7/19
678	17.3.11.9	steel fixing for 3 bases	3 days	Sat 27/7/19	Tue 30/7/19
679	17.3.11.10	concrete and curing for 3 bases	5 days	Tue 30/7/19	Sat 3/8/19
680	17.3.11.11	remove formwork	3 days	Sat 3/8/19	Tue 6/8/19
681	17.3.11.12	falsework and formwork for alternative 3 walls	4 days	Tue 6/8/19	Fri 9/8/19
682	17.3.11.13	steel fixing for 3 walls	9 days	Fri 9/8/19	Mon 19/8/19
683	17.3.11.14	close formwork for 3 walls	3 days	Mon 19/8/19	Wed 21/8/19
684	17.3.11.15	concrete and curing for 3 walls	6 days	Wed 21/8/19	Tue 27/8/19
685	17.3.11.16	remove formwork	3 days	Tue 27/8/19	Thu 29/8/19
686	17.3.11.17	formwork for bases of alternative second two bays	2 days	Thu 29/8/19	Fri 30/8/19
687	17.3.11.18	steel fixing for two bases	2 days	Fri 30/8/19	Sat 31/8/19
688	17.3.11.19	concrete and curing for two bases	4 days	Sat 31/8/19	Wed 4/9/19
689	17.3.11.20	remove formwork	2 days	Wed 4/9/19	Thu 5/9/19
690	17.3.11.21	falsework and formwork of alternative second two walls	3 days	Thu 5/9/19	Sat 7/9/19
691	17.3.11.22	steel fixing for two walls	6 days	Sat 7/9/19	Fri 13/9/19
692	17.3.11.23	close formwork for two walls	2 days	Fri 13/9/19	Mon 16/9/19
693	17.3.11.24	concrete and curing for two walls	4 days	Mon 16/9/19	Thu 19/9/19
694	17.3.11.25	remove formwork	2 days	Thu 19/9/19	Fri 20/9/19
695	17.3.11.26	backfill formation & SRT test	12 days	Fri 20/9/19	Fri 4/10/19
696	17.3.11.27	excavate pipe trench and manhole(s)	2 days	Fri 4/10/19	Sat 5/10/19
697	17.3.11.28	lay pipes & construct manhole(s)	6 days	Sat 5/10/19	Sat 12/10/19
698	17.3.11.29	backfill pipe trench & SRT test	3 days	Sat 12/10/19	Tue 15/10/19
699	17.3.11.30	lay kerb, sub-base	2 days	Wed 16/10/19	Thu 17/10/19
700	17.3.11.31	sub-base SRT test	3 days	Fri 18/10/19	Mon 21/10/19
701	17.3.11.32	DBM (Roadbase)	2 days	Tue 22/10/19	Wed 23/10/19



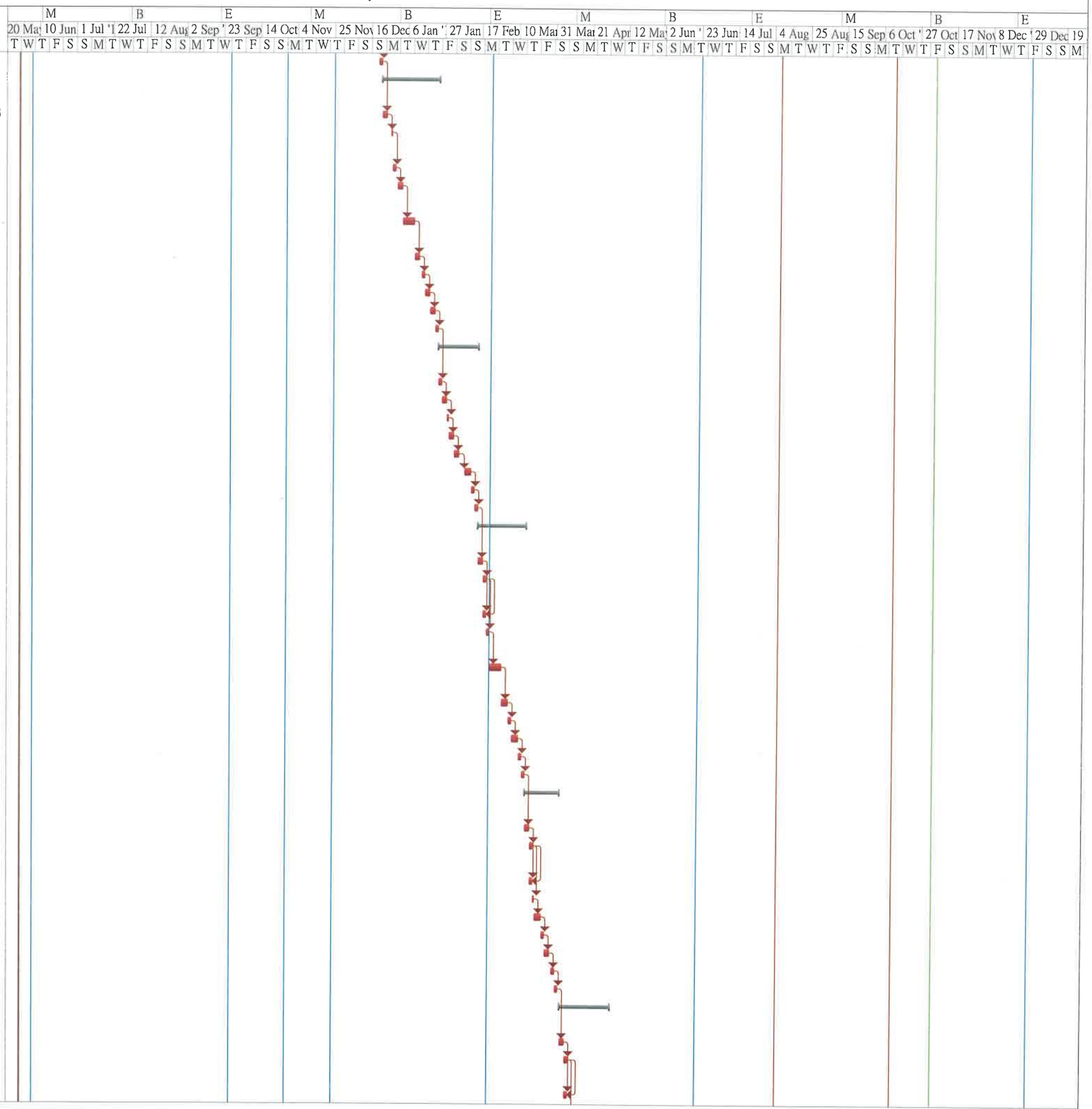
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
702	17.3.11.33	base course and wearing course	2 days	Thu 24/10/19	Fri 25/10/19
703	17.3.12	Phase II (stage 2)-north lane (chainage 32-85)-Noise Barrier MM9 (bays 1-4)	84 days	Sat 26/10/19	Fri 7/2/20
704	17.3.12.1	TTA, UU detection	2 days	Sat 26/10/19	Mon 28/10/19
705	17.3.12.2	relocate existing HKT, HGC & WTT cables (from ch50-185) - Not Yet Agreed	18 days	Tue 29/10/19	Mon 18/11/19
706	17.3.12.3	saw cut & remove existing pavement	2 days	Tue 19/11/19	Wed 20/11/19
707	17.3.12.4	install sheetpiles	5 days	Thu 21/11/19	Tue 26/11/19
708	17.3.12.5	excavate and install rails and struts	5 days	Wed 27/11/19	Mon 2/12/19
709	17.3.12.6	concrete blinding layers for 4 bays	2 days	Mon 2/12/19	Tue 3/12/19
710	17.3.12.7	formwork for bases of alternative first two bays	2 days	Tue 3/12/19	Wed 4/12/19
711	17.3.12.8	steel fixing for two bases	2 days	Wed 4/12/19	Thu 5/12/19
712	17.3.12.9	concrete and curing for two bases	4 days	Thu 5/12/19	Mon 9/12/19
713	17.3.12.10	remove formwork	2 days	Mon 9/12/19	Tue 10/12/19
714	17.3.12.11	falsework and formwork for two walls	3 days	Tue 10/12/19	Thu 12/12/19
715	17.3.12.12	steel fixing for two walls	6 days	Thu 12/12/19	Wed 18/12/19
716	17.3.12.13	close formwork for two walls	2 days	Wed 18/12/19	Thu 19/12/19
717	17.3.12.14	concrete and curing for two walls	4 days	Thu 19/12/19	Mon 23/12/19
718	17.3.12.15	remove formwork	2 days	Mon 23/12/19	Tue 24/12/19
719	17.3.12.16	formwork for bases of alternative second two bays	2 days	Tue 24/12/19	Fri 27/12/19
720	17.3.12.17	steel fixing for two bases	2 days	Fri 27/12/19	Sat 28/12/19
721	17.3.12.18	concrete and curing for two bases	4 days	Sat 28/12/19	Thu 2/1/20
722	17.3.12.19	remove formwork	2 days	Thu 2/1/20	Fri 3/1/20
723	17.3.12.20	falsework and formwork for two walls	3 days	Fri 3/1/20	Mon 6/1/20
724	17.3.12.21	steel fixing for two walls	6 days	Mon 6/1/20	Sat 11/1/20
725	17.3.12.22	close formwork for two walls	2 days	Sat 11/1/20	Mon 13/1/20
726	17.3.12.23	concrete and curing for two walls	4 days	Mon 13/1/20	Thu 16/1/20
727	17.3.12.24	remove formwork	2 days	Fri 17/1/20	Sat 18/1/20
728	17.3.12.25	backfill formation & SRT test	3 days	Mon 20/1/20	Wed 22/1/20
729	17.3.12.26	excavate gully trench and gully pot(s)	1 day	Wed 22/1/20	Wed 22/1/20
730	17.3.12.27	lay& connect gully pipes& construct gully pot(s)	2 days	Thu 23/1/20	Fri 24/1/20
894	17.3.23	Phase Ia (stage 101)-south lane (chainage 633-685)	20 days	Sat 10/11/18	Mon 3/12/18
895	17.3.23.1	TTA & UU detection	2 days	Sat 10/11/18	Mon 12/11/18
896	17.3.23.2	saw cut & remove existing pavement	2 days	Tue 13/11/18	Wed 14/11/18
897	17.3.23.3	excavate pipe trench and manhole(s)	2 days	Thu 15/11/18	Fri 16/11/18
898	17.3.23.4	lay pipes & construct manhole(s)	5 days	Sat 17/11/18	Thu 22/11/18
899	17.3.23.5	backfill formation & SRT test	0 days	Thu 22/11/18	Thu 22/11/18
900	17.3.23.6	lay kerb, sub-base	2 days	Fri 23/11/18	Sat 24/11/18
901	17.3.23.7	sub-base SRT test	3 days	Mon 26/11/18	Wed 28/11/18
902	17.3.23.8	DBM (Roadbase)	2 days	Thu 29/11/18	Fri 30/11/18
903	17.3.23.9	base course and wearing course	2 days	Sat 1/12/18	Mon 3/12/18
904	17.3.24	Phase Ia (stage 102)-north lane (chainage 633-685)	16 days	Tue 4/12/18	Fri 21/12/18
905	17.3.24.1	TTA & UU detection	2 days	Tue 4/12/18	Wed 5/12/18
906	17.3.24.2	tree felling	2 days	Thu 6/12/18	Fri 7/12/18
907	17.3.24.3	saw cut & remove existing pavement	2 days	Thu 6/12/18	Fri 7/12/18
908	17.3.24.4	excavate gully trench and gully pot(s)	1 day	Sat 8/12/18	Sat 8/12/18
909	17.3.24.5	lay& connect gully pipes& construct gully pot(s)	2 days	Mon 10/12/18	Tue 11/12/18
910	17.3.24.6	lay kerb, sub-base	2 days	Wed 12/12/18	Thu 13/12/18
911	17.3.24.7	sub-base SRT test	3 days	Fri 14/12/18	Mon 17/12/18
912	17.3.24.8	DBM (Roadbase)	2 days	Tue 18/12/18	Wed 19/12/18



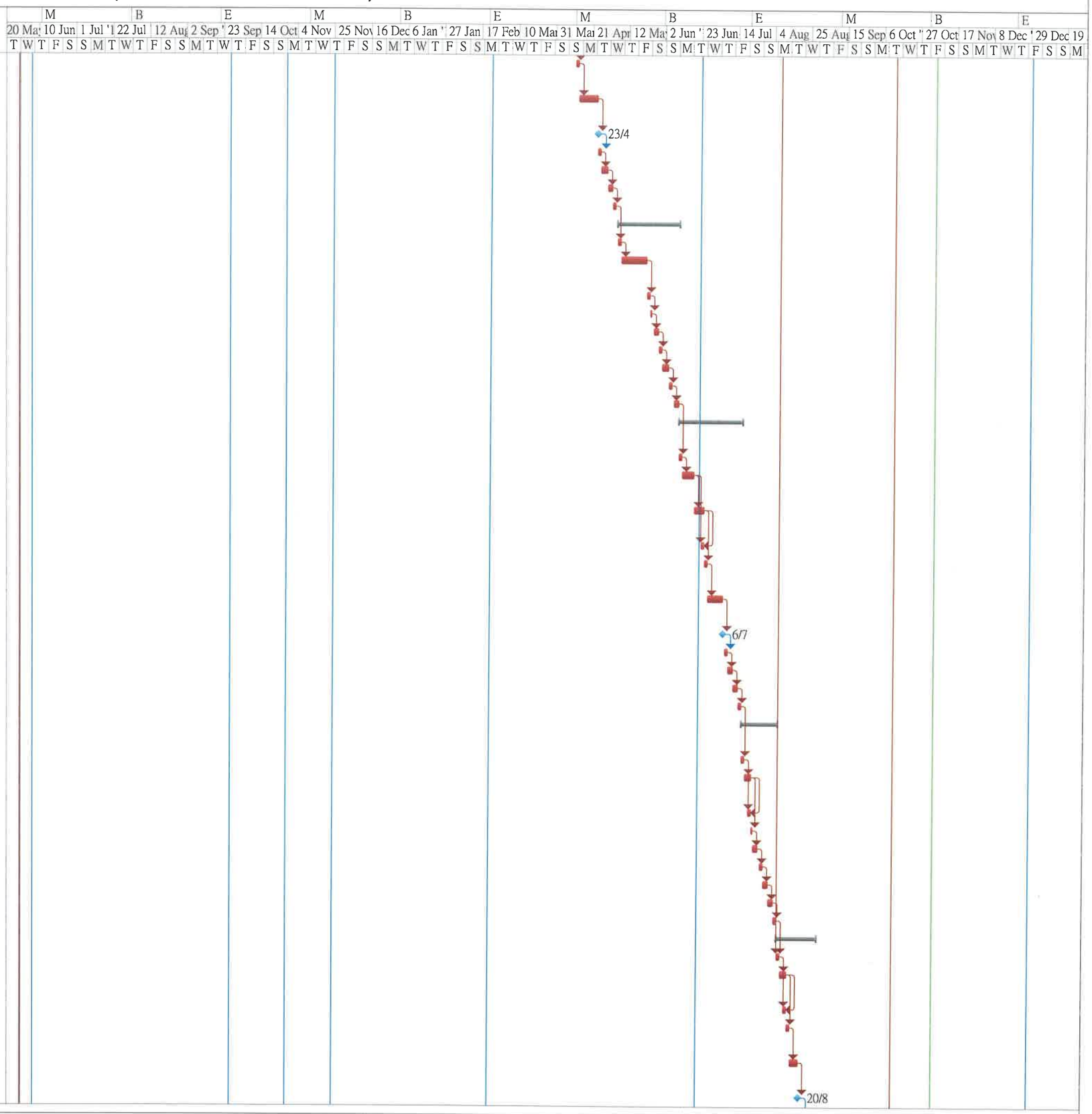
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
913	17.3.24.9	base course and wearing course	2 days	Thu 20/12/18	Fri 21/12/18
914	17.3.25	Phase Ia (stage 103)-south lane (chainage 685-740)	25 days	Sat 22/12/18	Wed 23/1/19
915	17.3.25.1	TTA & UU detection	2 days	Sat 22/12/18	Mon 24/12/18
916	17.3.25.2	tree transplant	1 day	Thu 27/12/18	Thu 27/12/18
917	17.3.25.3	saw cut & remove existing pavement	2 days	Fri 28/12/18	Sat 29/12/18
918	17.3.25.4	excavate pipe trench and manhole(s)	2 days	Mon 31/12/18	Wed 2/1/19
919	17.3.25.5	lay pipes & construct manhole(s)	6 days	Thu 3/1/19	Wed 9/1/19
920	17.3.25.6	backfill formation & SRT test	3 days	Thu 10/1/19	Sat 12/1/19
921	17.3.25.7	lay kerb, sub-base	2 days	Mon 14/1/19	Tue 15/1/19
922	17.3.25.8	sub-base SRT test	3 days	Wed 16/1/19	Fri 18/1/19
923	17.3.25.9	DBM (Roadbase)	2 days	Sat 19/1/19	Mon 21/1/19
924	17.3.25.10	base course and wearing course	2 days	Tue 22/1/19	Wed 23/1/19
925	17.3.26	Phase Ia (stage 104)-north lane (chainage 685-740)	17 days	Thu 24/1/19	Fri 15/2/19
926	17.3.26.1	TTA & UU detection	2 days	Thu 24/1/19	Fri 25/1/19
927	17.3.26.2	saw cut & remove existing pavement	2 days	Sat 26/1/19	Mon 28/1/19
928	17.3.26.3	excavate gully trench and gully pot(s)	1 day	Tue 29/1/19	Tue 29/1/19
929	17.3.26.4	lay & connect gully pipes & construct gully pot(s)	3 days	Wed 30/1/19	Fri 1/2/19
930	17.3.26.5	lay kerb, sub-base	2 days	Sat 2/2/19	Mon 4/2/19
931	17.3.26.6	sub-base SRT test	3 days	Fri 8/2/19	Mon 11/2/19
932	17.3.26.7	DBM (Roadbase)	2 days	Tue 12/2/19	Wed 13/2/19
933	17.3.26.8	base course and wearing course	2 days	Thu 14/2/19	Fri 15/2/19
934	17.3.27	Phase Ia (stage 105)-south lane (chainage 740-790)	24 days	Sat 16/2/19	Fri 15/3/19
935	17.3.27.1	TTA & UU detection	2 days	Sat 16/2/19	Mon 18/2/19
936	17.3.27.2	tree felling	2 days	Tue 19/2/19	Wed 20/2/19
937	17.3.27.3	saw cut & remove existing pavement	2 days	Tue 19/2/19	Wed 20/2/19
938	17.3.27.4	excavate pipe trench and manhole(s)	2 days	Thu 21/2/19	Fri 22/2/19
939	17.3.27.5	lay pipes & construct manhole(s)	6 days	Sat 23/2/19	Fri 1/3/19
940	17.3.27.6	backfill formation & SRT test	3 days	Sat 2/3/19	Tue 5/3/19
941	17.3.27.7	lay kerb, sub-base	2 days	Wed 6/3/19	Thu 7/3/19
942	17.3.27.8	sub-base SRT test	3 days	Fri 8/3/19	Mon 11/3/19
943	17.3.27.9	DBM (Roadbase)	2 days	Tue 12/3/19	Wed 13/3/19
944	17.3.27.10	base course and wearing course	2 days	Thu 14/3/19	Fri 15/3/19
945	17.3.28	Phase Ia (stage 106) north lane (chainage 740-790)	17 days	Sat 16/3/19	Thu 4/4/19
946	17.3.28.1	TTA & UU detection	2 days	Sat 16/3/19	Mon 18/3/19
947	17.3.28.2	tree felling	2 days	Tue 19/3/19	Wed 20/3/19
948	17.3.28.3	saw cut & remove existing pavement	2 days	Tue 19/3/19	Wed 20/3/19
949	17.3.28.4	excavate gully trench and gully pot(s)	1 day	Thu 21/3/19	Thu 21/3/19
950	17.3.28.5	lay& connect gully pipes& construct gully pot(s)	3 days	Fri 22/3/19	Mon 25/3/19
951	17.3.28.6	lay kerb, sub-base	2 days	Tue 26/3/19	Wed 27/3/19
952	17.3.28.7	sub-base SRT test	3 days	Thu 28/3/19	Sat 30/3/19
953	17.3.28.8	DBM (Roadbase)	2 days	Mon 1/4/19	Tue 2/4/19
954	17.3.28.9	base course and wearing course	2 days	Wed 3/4/19	Thu 4/4/19
955	17.3.29	Phase Ia stage 107)-south lane (chainage 790-840)	21 days	Sat 6/4/19	Sat 4/5/19
956	17.3.29.1	TTA & UU detection	2 days	Sat 6/4/19	Mon 8/4/19
957	17.3.29.2	tree felling	2 days	Tue 9/4/19	Wed 10/4/19
958	17.3.29.3	saw cut & remove existing pavement	2 days	Tue 9/4/19	Wed 10/4/19



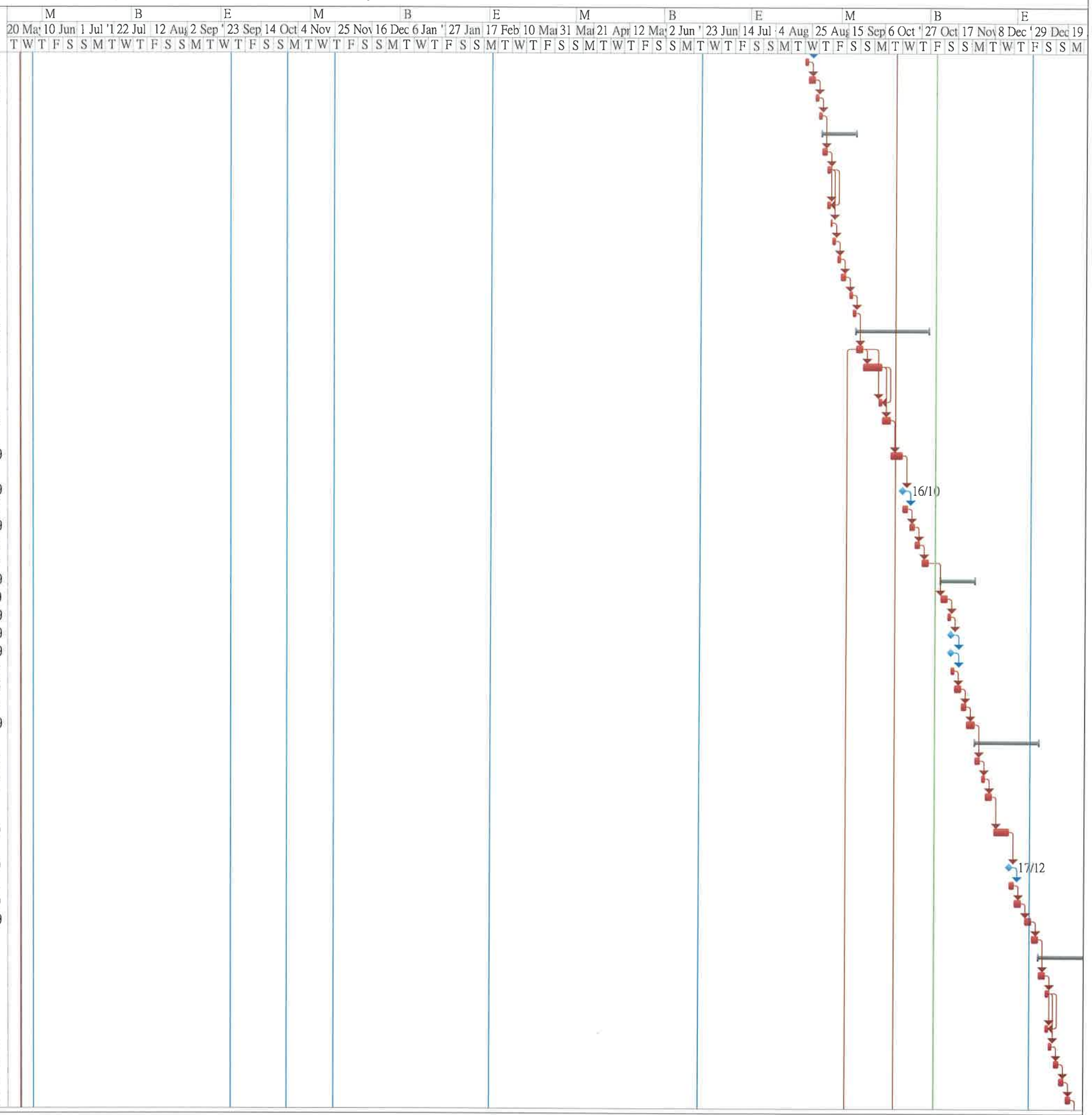
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
959	17.3.29.4	excavate pipe trench and manhole(s)	2 days	Thu 11/4/19	Fri 12/4/19
960	17.3.29.5	lay pipes & construct manhole(s)	6 days	Sat 13/4/19	Tue 23/4/19
961	17.3.29.6	backfill formation & SRT test	0 days	Tue 23/4/19	Tue 23/4/19
962	17.3.29.7	lay kerb, sub-base	2 days	Wed 24/4/19	Thu 25/4/19
963	17.3.29.8	sub-base SRT test	3 days	Fri 26/4/19	Mon 29/4/19
964	17.3.29.9	DBM (Roadbase)	2 days	Tue 30/4/19	Thu 2/5/19
965	17.3.29.10	base course and wearing course	2 days	Fri 3/5/19	Sat 4/5/19
966	17.3.30	Phase Ia (stage 108)-north lane (chainage 790-840)	29 days	Mon 6/5/19	Mon 10/6/19
967	17.3.30.1	TTA & UU detection	2 days	Mon 6/5/19	Tue 7/5/19
968	17.3.30.2	relocate existing HGC & WTT cables- not yet agreed	12 days	Wed 8/5/19	Wed 22/5/19
969	17.3.30.3	saw cut & remove existing pavement	2 days	Thu 23/5/19	Fri 24/5/19
970	17.3.30.4	excavate gully trench and gully pot(s)	1 day	Sat 25/5/19	Sat 25/5/19
971	17.3.30.5	lay& connect gully pipes& construct gully pot(s)	3 days	Mon 27/5/19	Wed 29/5/19
972	17.3.30.6	lay kerb, sub-base	2 days	Thu 30/5/19	Fri 31/5/19
973	17.3.30.7	sub-base SRT test	3 days	Sat 1/6/19	Tue 4/6/19
974	17.3.30.8	DBM (Roadbase)	2 days	Wed 5/6/19	Thu 6/6/19
975	17.3.30.9	base course and wearing course	2 days	Sat 8/6/19	Mon 10/6/19
976	17.3.31	Phase Ia (stage 109)-south lane (chainage 840-890)	31 days	Tue 11/6/19	Wed 17/7/19
977	17.3.31.1	TTA & UU detection	2 days	Tue 11/6/19	Wed 12/6/19
978	17.3.31.2	relocate HKT cables south lane from chainage 840-890 - NOT YET AGREED	6 days	Thu 13/6/19	Wed 19/6/19
979	17.3.31.3	tree felling	5 days	Thu 20/6/19	Tue 25/6/19
980	17.3.31.4	saw cut & remove existing pavement	2 days	Mon 24/6/19	Tue 25/6/19
981	17.3.31.5	excavate pipe trench and manhole(s)	2 days	Wed 26/6/19	Thu 27/6/19
982	17.3.31.6	lay pipes & construct manhole(s)	7 days	Fri 28/6/19	Sat 6/7/19
983	17.3.31.7	backfill formation & SRT test	0 days	Sat 6/7/19	Sat 6/7/19
984	17.3.31.8	lay kerb, sub-base	2 days	Mon 8/7/19	Tue 9/7/19
985	17.3.31.9	sub-base SRT test	3 days	Wed 10/7/19	Fri 12/7/19
986	17.3.31.10	DBM (Roadbase)	2 days	Sat 13/7/19	Mon 15/7/19
987	17.3.31.11	base course and wearing course	2 days	Tue 16/7/19	Wed 17/7/19
988	17.3.32	Phase Ia (stage 110)-north lane (chainage 840-890)	18 days	Thu 18/7/19	Wed 7/8/19
989	17.3.32.1	TTA & UU detection	2 days	Thu 18/7/19	Fri 19/7/19
990	17.3.32.2	tree felling	3 days	Sat 20/7/19	Tue 23/7/19
991	17.3.32.3	saw cut & remove existing pavement	2 days	Mon 22/7/19	Tue 23/7/19
992	17.3.32.4	excavate gully trench and gully pot(s)	1 day	Wed 24/7/19	Wed 24/7/19
993	17.3.32.5	lay& connect gully pipes& construct gully pot(s)	3 days	Thu 25/7/19	Sat 27/7/19
994	17.3.32.6	lay kerb, sub-base	2 days	Mon 29/7/19	Tue 30/7/19
995	17.3.32.7	sub-base SRT test	3 days	Wed 31/7/19	Fri 2/8/19
996	17.3.32.8	DBM (Roadbase)	2 days	Sat 3/8/19	Mon 5/8/19
997	17.3.32.9	base course and wearing course	2 days	Tue 6/8/19	Wed 7/8/19
998	17.3.33	Phase III (stage 1)-south lane (chainage 435-490)	20 days	Thu 8/8/19	Fri 30/8/19
999	17.3.33.1	TTA & UU detection	2 days	Thu 8/8/19	Fri 9/8/19
1000	17.3.33.2	tree felling	3 days	Sat 10/8/19	Tue 13/8/19
1001	17.3.33.3	saw cut & remove existing pavement	2 days	Mon 12/8/19	Tue 13/8/19
1002	17.3.33.4	excavate pipe trench and manhole(s)	2 days	Wed 14/8/19	Thu 15/8/19
1003	17.3.33.5	lay pipes & construct manhole(s)	4 days	Fri 16/8/19	Tue 20/8/19
1004	17.3.33.6	backfill formation & SRT test	0 days	Tue 20/8/19	Tue 20/8/19



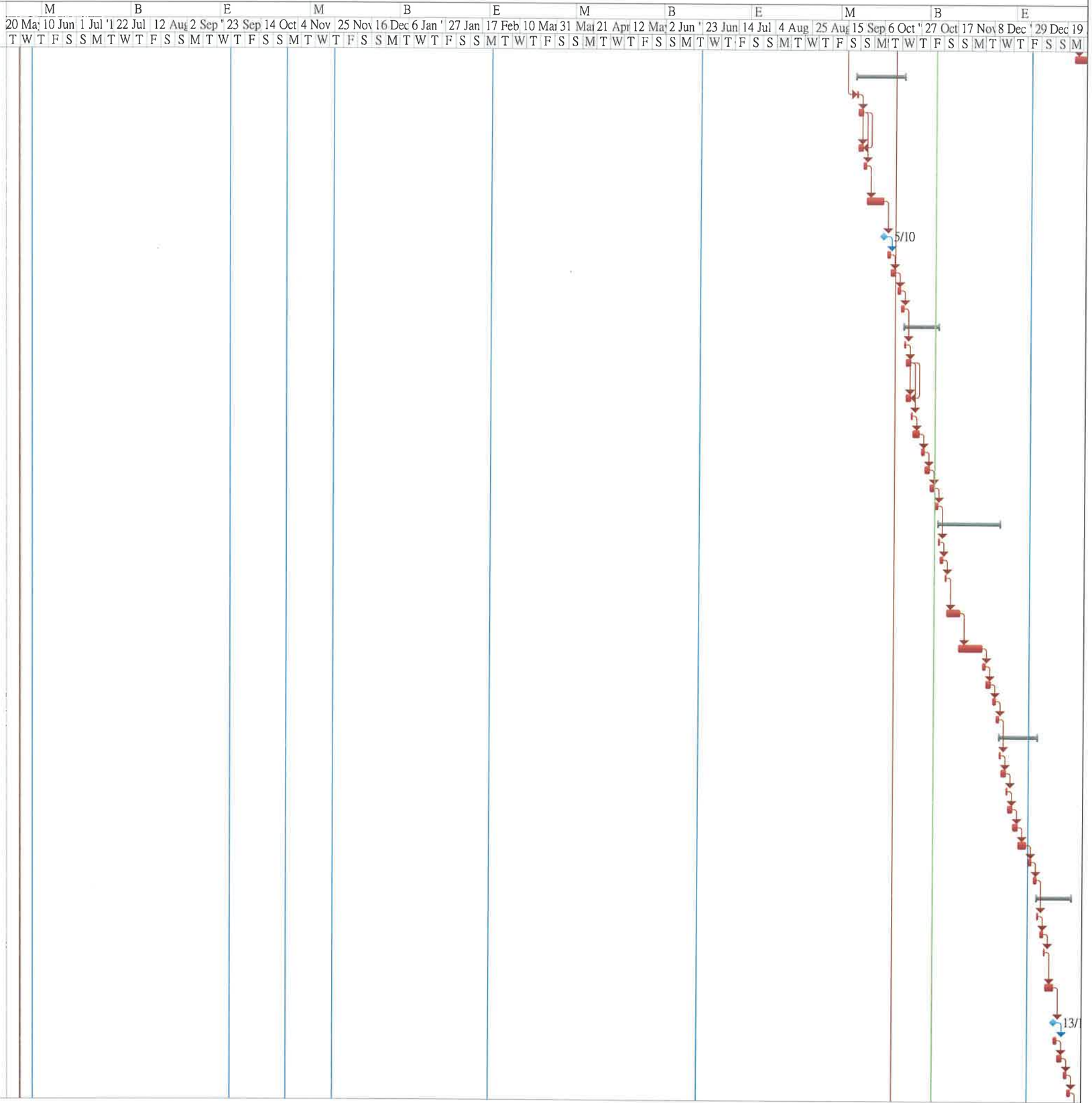
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1005	17.3.33.7	lay kerb, sub-base	2 days	Wed 21/8/19	Thu 22/8/19
1006	17.3.33.8	sub-base SRT test	3 days	Fri 23/8/19	Mon 26/8/19
1007	17.3.33.9	DBM (Roadbase)	2 days	Tue 27/8/19	Wed 28/8/19
1008	17.3.33.10	base course and wearing course	2 days	Thu 29/8/19	Fri 30/8/19
1009	17.3.34	Phase III (stage 2)-north lane (chainage 435-490)	16 days	Sat 31/8/19	Thu 19/9/19
1010	17.3.34.1	TTA & UU detection	2 days	Sat 31/8/19	Mon 2/9/19
1011	17.3.34.2	tree felling	2 days	Tue 3/9/19	Wed 4/9/19
1012	17.3.34.3	saw cut & remove existing pavement	2 days	Tue 3/9/19	Wed 4/9/19
1013	17.3.34.4	excavate gully trench and gully pot(s)	1 day	Thu 5/9/19	Thu 5/9/19
1014	17.3.34.5	lay& connect gully pipes& construct gully pot(s)	2 days	Fri 6/9/19	Sat 7/9/19
1015	17.3.34.6	lay kerb, sub-base	2 days	Mon 9/9/19	Tue 10/9/19
1016	17.3.34.7	sub-base SRT test	3 days	Wed 11/9/19	Fri 13/9/19
1017	17.3.34.8	DBM (Roadbase)	2 days	Mon 16/9/19	Tue 17/9/19
1018	17.3.34.9	base course and wearing course	2 days	Wed 18/9/19	Thu 19/9/19
1019	17.3.35	Phase III (stage 3)-south lane (chainage 490-540)	34 days	Fri 20/9/19	Thu 31/10/19
1020	17.3.35.1	TTA & UU detection	3 days	Fri 20/9/19	Mon 23/9/19
1021	17.3.35.2	tree felling	9 days	Tue 24/9/19	Fri 4/10/19
1022	17.3.35.3	saw cut & remove existing pavement	2 days	Thu 3/10/19	Fri 4/10/19
1023	17.3.35.4	excavate pipe trench and manhole(s)	3 days	Sat 5/10/19	Wed 9/10/19
1024	17.3.35.5	lay pipes & construct manhole(s)	6 days	Thu 10/10/19	Wed 16/10/19
1025	17.3.35.6	backfill formation & SRT test	0 days	Wed 16/10/19	Wed 16/10/19
1026	17.3.35.7	lay kerb, sub-base	3 days	Thu 17/10/19	Sat 19/10/19
1027	17.3.35.8	sub-base SRT test	3 days	Mon 21/10/19	Wed 23/10/19
1028	17.3.35.9	DBM (Roadbase)	3 days	Thu 24/10/19	Sat 26/10/19
1029	17.3.35.10	base course and wearing course	4 days	Mon 28/10/19	Thu 31/10/19
1030	17.3.36	Phase III (stage 4)-north lane (chainage 490-540)	17 days	Fri 8/11/19	Wed 27/11/19
1031	17.3.36.1	TTA & UU detection	3 days	Fri 8/11/19	Mon 11/11/19
1032	17.3.36.2	saw cut & remove existing pavement	2 days	Tue 12/11/19	Wed 13/11/19
1033	17.3.36.3	excavate gully trench and gully pot(s)	0 days	Wed 13/11/19	Wed 13/11/19
1034	17.3.36.4	lay& connect gully pipes& construct gully pot(s)	0 days	Wed 13/11/19	Wed 13/11/19
1035	17.3.36.5	lay kerb, sub-base	2 days	Thu 14/11/19	Fri 15/11/19
1036	17.3.36.6	sub-base SRT test	3 days	Sat 16/11/19	Tue 19/11/19
1037	17.3.36.7	DBM (Roadbase)	3 days	Wed 20/11/19	Fri 22/11/19
1038	17.3.36.8	base course and wearing course	4 days	Sat 23/11/19	Wed 27/11/19
1039	17.3.37	Phase III (stage 5)-south lane (chainage 540-590)	29 days	Thu 28/11/19	Fri 3/1/20
1040	17.3.37.1	TTA & UU detection	3 days	Thu 28/11/19	Sat 30/11/19
1041	17.3.37.2	saw cut & remove existing pavement	2 days	Mon 2/12/19	Tue 3/12/19
1042	17.3.37.3	excavate pipe trench and manhole(s)	4 days	Wed 4/12/19	Sat 7/12/19
1043	17.3.37.4	lay pipes & construct manhole(s)	8 days	Mon 9/12/19	Tue 17/12/19
1044	17.3.37.5	backfill formation & SRT test	0 days	Tue 17/12/19	Tue 17/12/19
1045	17.3.37.6	lay kerb, sub-base	3 days	Wed 18/12/19	Fri 20/12/19
1046	17.3.37.7	sub-base SRT test	3 days	Sat 21/12/19	Tue 24/12/19
1047	17.3.37.8	DBM (Roadbase)	3 days	Fri 27/12/19	Mon 30/12/19
1048	17.3.37.9	base course and wearing course	3 days	Tue 31/12/19	Fri 3/1/20
1049	17.3.38	Phase III (stage 6)-north lane (chainage 540-590)	22 days	Sat 4/1/20	Sat 1/2/20
1050	17.3.38.1	TTA & UU detection	3 days	Sat 4/1/20	Tue 7/1/20
1051	17.3.38.2	tree felling	2 days	Wed 8/1/20	Thu 9/1/20
1052	17.3.38.3	saw cut & remove existing pavement	2 days	Wed 8/1/20	Thu 9/1/20
1053	17.3.38.4	excavate gully trench and gully pot(s)	2 days	Fri 10/1/20	Sat 11/1/20
1054	17.3.38.5	lay& connect gully pipes& construct gully pot(s)	3 days	Mon 13/1/20	Wed 15/1/20
1055	17.3.38.6	lay kerb, sub-base	3 days	Thu 16/1/20	Sat 18/1/20
1056	17.3.38.7	sub-base SRT test	3 days	Mon 20/1/20	Wed 22/1/20



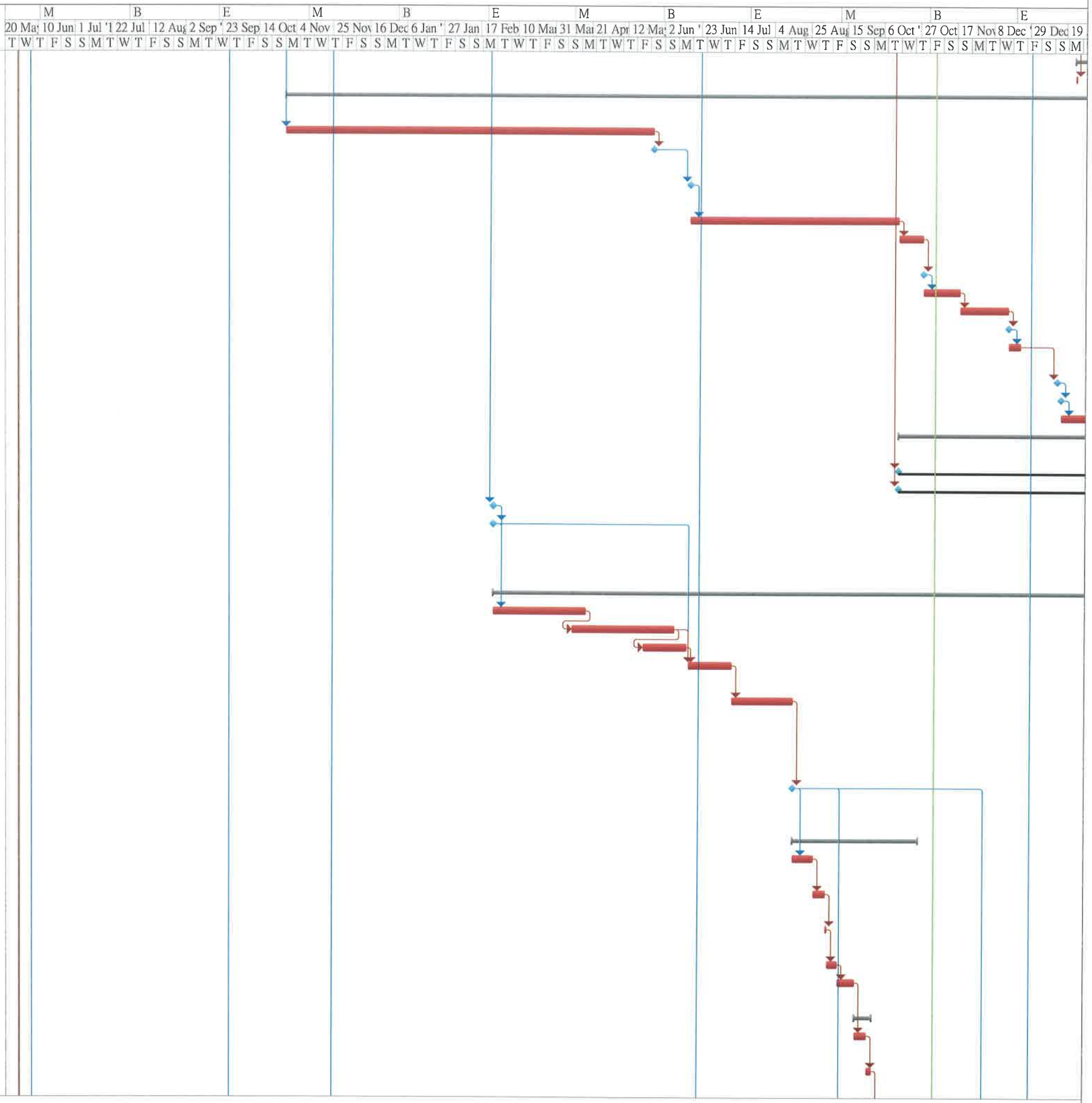
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1057	17.3.38.8	DBM (Roadbase)	3 days	Thu 23/1/20	Wed 29/1/20
1082	17.3.44	Phase IV (stage 1)-south lane (chainage 890-940)	22 days	Fri 20/9/19	Thu 17/10/19
1083	17.3.44.1	TTA & UU detection	1 day	Fri 20/9/19	Fri 20/9/19
1084	17.3.44.2	tree felling	2 days	Sat 21/9/19	Mon 23/9/19
1085	17.3.44.3	saw cut & remove existing pavement	2 days	Sat 21/9/19	Mon 23/9/19
1086	17.3.44.4	excavate pipe trench and manhole(s)	2 days	Tue 24/9/19	Wed 25/9/19
1087	17.3.44.5	lay pipes & construct manhole(s)	8 days	Thu 26/9/19	Sat 5/10/19
1088	17.3.44.6	backfill formation & SRT test	0 days	Sat 5/10/19	Sat 5/10/19
1089	17.3.44.7	lay kerb, sub-base	2 days	Tue 8/10/19	Wed 9/10/19
1090	17.3.44.8	sub-base SRT test	3 days	Thu 10/10/19	Sat 12/10/19
1091	17.3.44.9	DBM (Roadbase)	2 days	Mon 14/10/19	Tue 15/10/19
1092	17.3.44.10	base course and wearing course	2 days	Wed 16/10/19	Thu 17/10/19
1093	17.3.45	Phase IV (stage 2)-north lane (chainage 890-940)	17 days	Fri 18/10/19	Wed 6/11/19
1094	17.3.45.1	TTA & UU detection	1 day	Fri 18/10/19	Fri 18/10/19
1095	17.3.45.2	tree felling	2 days	Sat 19/10/19	Mon 21/10/19
1096	17.3.45.3	saw cut & remove existing pavement	2 days	Sat 19/10/19	Mon 21/10/19
1097	17.3.45.4	excavate gully trench and gully pot(s)	1 day	Tue 22/10/19	Tue 22/10/19
1098	17.3.45.5	lay& connect gully pipes& construct gully pot(s)	4 days	Wed 23/10/19	Sat 26/10/19
1099	17.3.45.6	lay kerb, sub-base	2 days	Mon 28/10/19	Tue 29/10/19
1100	17.3.45.7	sub-base SRT test	3 days	Wed 30/10/19	Fri 1/11/19
1101	17.3.45.8	DBM (Roadbase)	2 days	Sat 2/11/19	Mon 4/11/19
1102	17.3.45.9	base course and wearing course	2 days	Tue 5/11/19	Wed 6/11/19
1103	17.3.46	Phase IV (stage 3)-south lane (chainage 940-983)	31 days	Thu 7/11/19	Thu 12/12/19
1104	17.3.46.1	TTA & UU detection	1 day	Thu 7/11/19	Thu 7/11/19
1105	17.3.46.2	saw cut & remove existing pavement	2 days	Fri 8/11/19	Sat 9/11/19
1106	17.3.46.3	excavate pipe trench and manhole(s)	1 day	Mon 11/11/19	Mon 11/11/19
1107	17.3.46.4	lay pipes & construct manhole(s)	7 days	Tue 12/11/19	Tue 19/11/19
1108	17.3.46.5	backfill formation & SRT test	12 days	Tue 19/11/19	Mon 2/12/19
1109	17.3.46.6	lay kerb, sub-base	2 days	Tue 3/12/19	Wed 4/12/19
1110	17.3.46.7	sub-base SRT test	3 days	Thu 5/12/19	Sat 7/12/19
1111	17.3.46.8	DBM (Roadbase)	2 days	Mon 9/12/19	Tue 10/12/19
1112	17.3.46.9	base course and wearing course	2 days	Wed 11/12/19	Thu 12/12/19
1113	17.3.47	Phase IV (stage 4)-north lane (chainage 940-983)	16 days	Fri 13/12/19	Fri 3/1/20
1114	17.3.47.1	TTA & UU detection	1 day	Fri 13/12/19	Fri 13/12/19
1115	17.3.47.2	saw cut & remove existing pavement	2 days	Sat 14/12/19	Mon 16/12/19
1116	17.3.47.3	excavate gully trench and gully pot(s)	1 day	Tue 17/12/19	Tue 17/12/19
1117	17.3.47.4	lay& connect gully pipes& construct gully pot(s)	3 days	Wed 18/12/19	Fri 20/12/19
1118	17.3.47.5	lay kerb, sub-base	2 days	Sat 21/12/19	Mon 23/12/19
1119	17.3.47.6	sub-base SRT test	3 days	Tue 24/12/19	Sat 28/12/19
1120	17.3.47.7	DBM (Roadbase)	2 days	Mon 30/12/19	Tue 31/12/19
1121	17.3.47.8	base course and wearing course	2 days	Thu 2/1/20	Fri 3/1/20
1122	17.3.48	Phase V (stage 1)-south lane (chainage 983-1035)	17 days	Sat 4/1/20	Thu 23/1/20
1123	17.3.48.1	TTA & UU detection	1 day	Sat 4/1/20	Sat 4/1/20
1124	17.3.48.2	saw cut & remove existing pavement	2 days	Mon 6/1/20	Tue 7/1/20
1125	17.3.48.3	excavate pipe trench and manhole(s)	1 day	Wed 8/1/20	Wed 8/1/20
1126	17.3.48.4	lay pipes & construct manhole(s)	4 days	Thu 9/1/20	Mon 13/1/20
1127	17.3.48.5	backfill formation & SRT test	0 days	Mon 13/1/20	Mon 13/1/20
1128	17.3.48.6	lay kerb, sub-base	2 days	Tue 14/1/20	Wed 15/1/20
1129	17.3.48.7	sub-base SRT test	3 days	Thu 16/1/20	Sat 18/1/20
1130	17.3.48.8	DBM (Roadbase)	2 days	Mon 20/1/20	Tue 21/1/20
1131	17.3.48.9	base course and wearing course	2 days	Wed 22/1/20	Thu 23/1/20



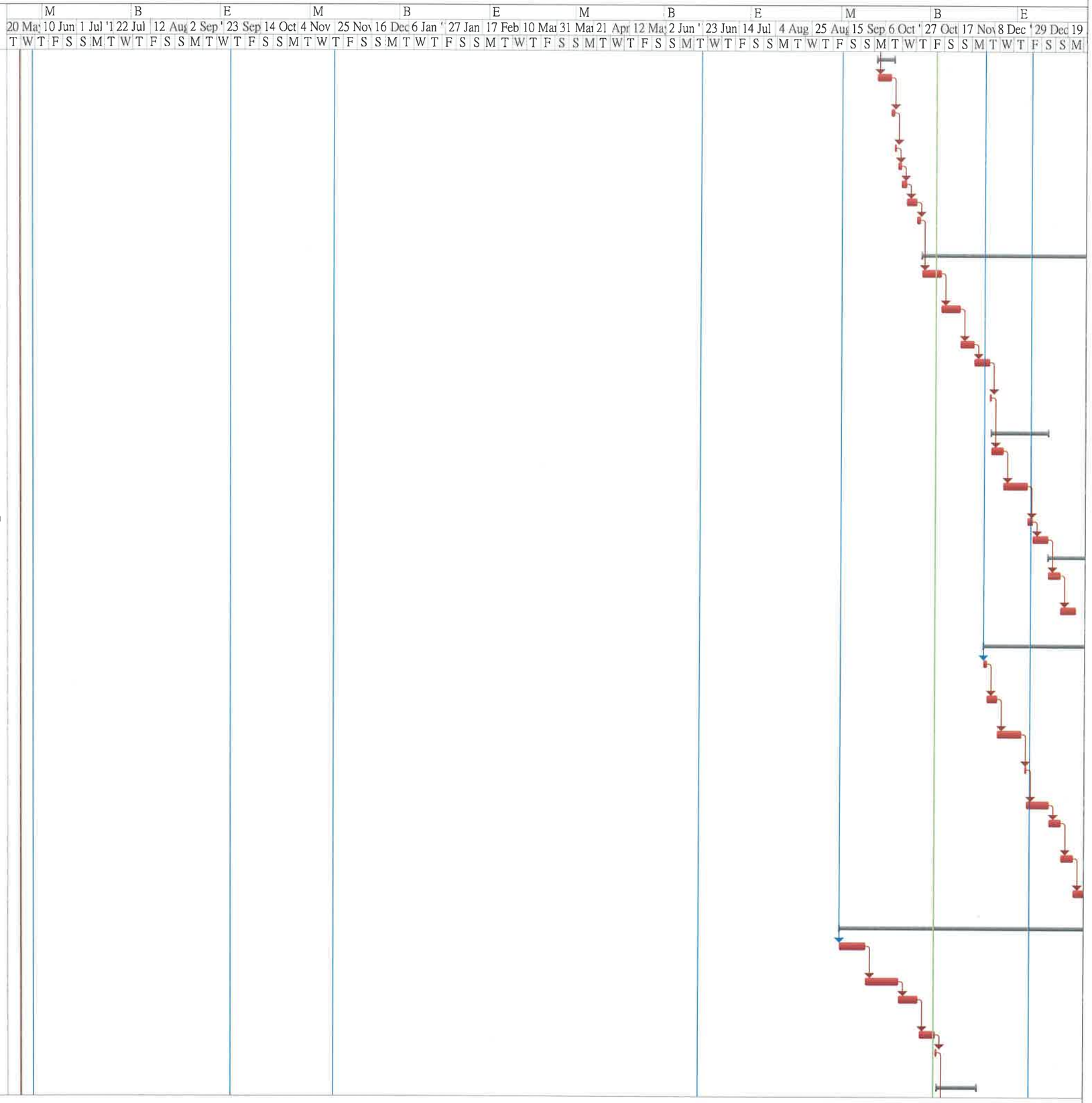
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1132	17.3.49	Phase V (stage 2)-north lane (chainage 983-1035)	16 days	Fri 24/1/20	Fri 14/2/20
1133	17.3.49.1	TTA & UU detection	1 day	Fri 24/1/20	Fri 24/1/20
1278	17.4	Noise Barrier works above the concrete substructure of the noise barrier (section 2 Part C1)	674 days	Mon 29/10/18	Wed 3/2/21
1279	17.4.1	seek specialist subcontractor to design and build	210 days	Mon 29/10/18	Sun 26/5/19
1280	17.4.2	propose specialist subcontractor to PM for acceptance	0 days	Sun 26/5/19	Sun 26/5/19
1281	17.4.3	acceptance of propose specialist subcontractor by Project Manager	0 days	Sun 16/6/19	Sun 16/6/19
1282	17.4.4	prepare design & liaise with designer & PM	120 days	Mon 17/6/19	Mon 14/10/19
1283	17.4.5	submit a proposal detailing the changes to PM's design, if any	14 days	Tue 15/10/19	Mon 28/10/19
1284	17.4.6	submit 1st design for PM's comment	0 days	Mon 28/10/19	Mon 28/10/19
1285	17.4.7	PM's comments	21 days	Tue 29/10/19	Mon 18/11/19
1286	17.4.8	revise design	28 days	Tue 19/11/19	Mon 16/12/19
1287	17.4.9	re-submit design for PM's acceptance	0 days	Mon 16/12/19	Mon 16/12/19
1288	17.4.10	submit 3 sample panels for each type & colour for acceptance	7 days	Tue 17/12/19	Mon 23/12/19
1289	17.4.11	PM's & relevant authorities' acceptance	0 days	Mon 13/1/20	Mon 13/1/20
1290	17.4.12	ordering of noise barrier panel	0 days	Wed 15/1/20	Wed 15/1/20
1291	17.4.13	fabricating of panel and steelworks	180 days	Thu 16/1/20	Mon 13/7/20
1293	17.4.15	completion of concrete curing of substructure of Nosie Barriers	463 days	Mon 14/10/19	Tue 19/1/21
1295	17.4.15.2	MM6	0 days	Mon 14/10/19	Mon 14/10/19
1296	17.4.15.3	MM7	0 days	Mon 14/10/19	Mon 14/10/19
1323	17.5	*access date for section 2 (Part C2)*	0 days	Sun 24/2/19	Sun 24/2/19
1324	17.6	**additional site possession for areas outside site boundary {for 3NW-C/C470 (existing D-DH7), C224 (existing D-DH11) & C225 new drillholes DHA1,A2 & A3 }**	0 days	Sun 24/2/19	Sun 24/2/19
1325	17.7	**Slope Upgrading works (section 2 Part C2)**	578 days	Mon 25/2/19	Wed 3/2/21
1326	17.7.1	general site clearance	45 days	Mon 25/2/19	Thu 18/4/19
1327	17.7.2	Initial topographic survey	45 days	Thu 11/4/19	Sat 8/6/19
1328	17.7.3	utility detection and submit reports	21 days	Wed 22/5/19	Sat 15/6/19
1329	17.7.4	drilling of verification boreholes DHA1,A2 & A3	21 days	Mon 17/6/19	Thu 11/7/19
1330	17.7.5	baseline monitoring for 3NW-C/C230 (DH15 & 16) & C225 (DH3 & 17) on existing drillholes & 3NW-C/C470 (existing D-DH7), C224 (existing D-DH11) & C225 proposed verification drillholes DHA1,A2 & A3	30 days	Fri 12/7/19	Thu 15/8/19
1331	17.7.6	submit 4 sets of initial readings of baseline monitoring and preliminary logs to the Project Manager to the Project Manager	0 days	Thu 15/8/19	Thu 15/8/19
1332	17.7.7	**Slopeworks: 3NW-C/C470 (ch490-540S/B)**	59 days	Fri 16/8/19	Sat 26/10/19
1333	17.7.7.1	removal of existing trees	10 days	Fri 16/8/19	Tue 27/8/19
1334	17.7.7.2	hoarding & fencing	6 days	Wed 28/8/19	Tue 3/9/19
1335	17.7.7.3	slope excavation works	1 day	Wed 4/9/19	Wed 4/9/19
1336	17.7.7.4	temporary scaffolding	5 days	Thu 5/9/19	Tue 10/9/19
1337	17.7.7.5	proposed slope stripping for mapping or rock and relict discontinuities (AS5-A,B, AS6-A,B)	8 days	Wed 11/9/19	Fri 20/9/19
1338	17.7.7.6	Phase I	8 days	Sat 21/9/19	Mon 30/9/19
1339	17.7.7.6.1	install test nail PN02 & pull out test	6 days	Sat 21/9/19	Fri 27/9/19
1340	17.7.7.6.2	drill, install steel bars and grout soil nails (B01-12)	2 days	Sat 28/9/19	Mon 30/9/19



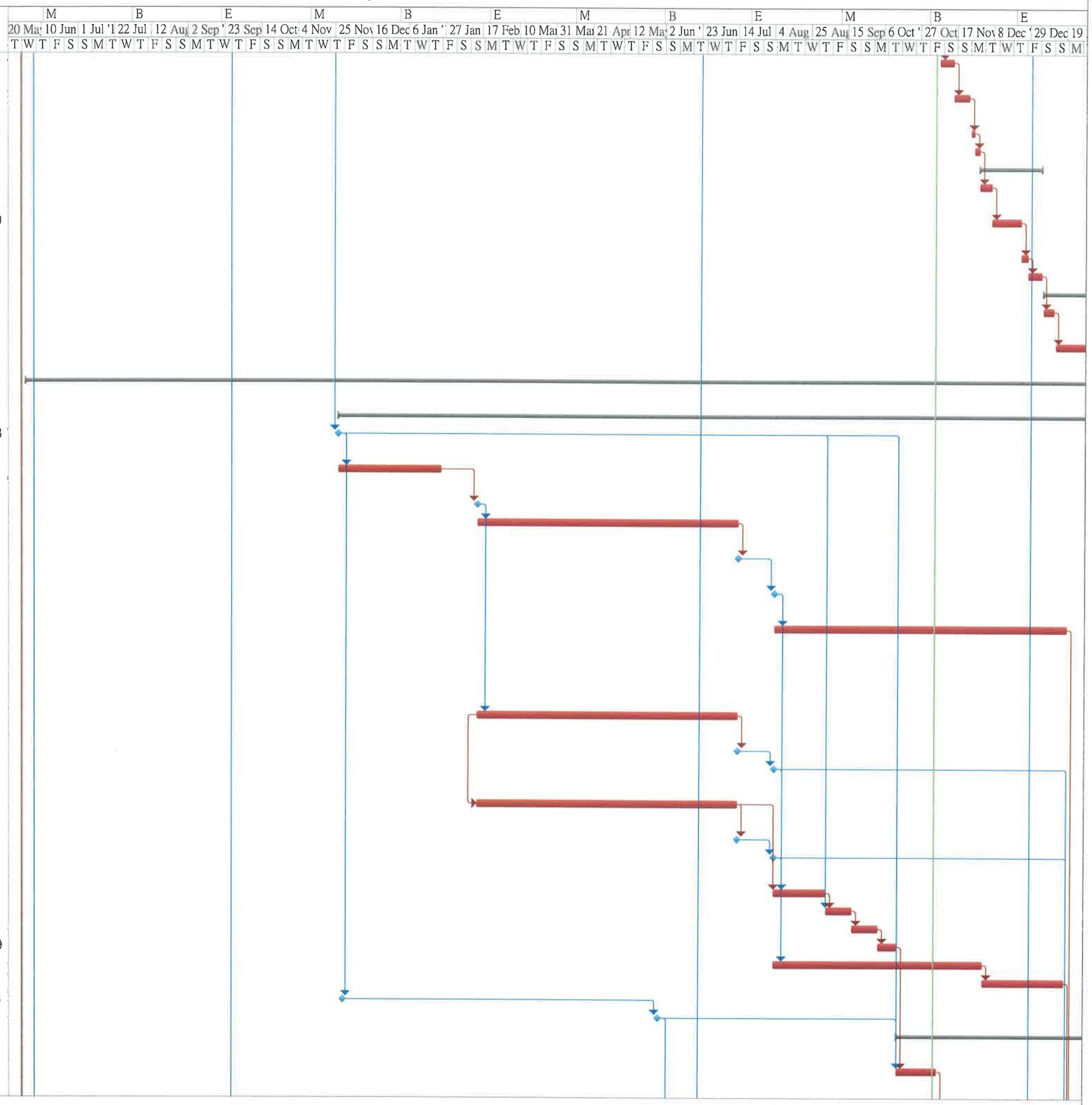
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1341	17.7.7.7	Phase II	8 days	Wed 2/10/19	Fri 11/10/19
1342	17.7.7.7.1	install test nail PN01 & pull out test	6 days	Wed 2/10/19	Wed 9/10/19
1343	17.7.7.7.2	drill, install steel bars and grout soil nails (A01-17)	2 days	Thu 10/10/19	Fri 11/10/19
1344	17.7.7.8	raking drains	1 day	Sat 12/10/19	Sat 12/10/19
1345	17.7.7.9	TDR Test (including test & wait issue result)	2 days	Mon 14/10/19	Tue 15/10/19
1346	17.7.7.10	soil nail head works	3 days	Wed 16/10/19	Fri 18/10/19
1347	17.7.7.11	UC & catchpit (38m & 1 nr)	5 days	Sat 19/10/19	Thu 24/10/19
1348	17.7.7.12	biodegradable erosion control mat with hydroseeding	2 days	Fri 25/10/19	Sat 26/10/19
1349	17.7.8	**Slopeworks: - 3NW-C/C230 (ch1240-1330S/B)**	130 days	Mon 28/10/19	Thu 2/4/20
1350	17.7.8.1	removal of existing trees	10 days	Mon 28/10/19	Thu 7/11/19
1351	17.7.8.2	hoarding & fencing	9 days	Fri 8/11/19	Mon 18/11/19
1352	17.7.8.3	temporary scaffolding	7 days	Tue 19/11/19	Tue 26/11/19
1353	17.7.8.4	proposed slope stripping for mapping or rock and relict discontinuities (AS3-A,B, AS4-A,B)	8 days	Wed 27/11/19	Thu 5/12/19
1354	17.7.8.5	slope excavation works	1 day	Fri 6/12/19	Fri 6/12/19
1355	17.7.8.6	Phase I	25 days	Sat 7/12/19	Wed 8/1/20
1356	17.7.8.6.1	install test nail PN22 & pull out test	6 days	Sat 7/12/19	Fri 13/12/19
1357	17.7.8.6.2	drill, install steel bars and grout soil nails (K01-22, N01-05, M01-11, J01-25)	10 days	Sat 14/12/19	Fri 27/12/19
1358	17.7.8.6.3	TDR Test (including test & wait issue result)	2 days	Sat 28/12/19	Mon 30/12/19
1359	17.7.8.6.4	soil nail head works	7 days	Tue 31/12/19	Wed 8/1/20
1360	17.7.8.7	Phase II	22 days	Thu 9/1/20	Thu 6/2/20
1361	17.7.8.7.1	install test nail PN21 & pull out test	6 days	Thu 9/1/20	Wed 15/1/20
1362	17.7.8.7.2	drill, install steel bars and grout soil nails (H01-25, L01-16)	8 days	Thu 16/1/20	Fri 24/1/20
1404	17.7.10	**Slopeworks: - 3NW-C/C225 (ch1300-1376N/B)**	348 days	Tue 3/12/19	Wed 3/2/21
1405	17.7.10.1	tree transplant	2 days	Tue 3/12/19	Wed 4/12/19
1406	17.7.10.2	removal of existing trees	5 days	Thu 5/12/19	Tue 10/12/19
1407	17.7.10.3	hoarding & fencing	12 days	Wed 11/12/19	Tue 24/12/19
1408	17.7.10.4	slope excavation works	1 day	Fri 27/12/19	Fri 27/12/19
1409	17.7.10.5	temporary scaffolding	10 days	Sat 28/12/19	Thu 9/1/20
1410	17.7.10.6	install test nail PN31-PN33, grout & pull out tests	6 days	Fri 10/1/20	Thu 16/1/20
1411	17.7.10.7	install test nail PN34-PN36, grout & pull out tests	6 days	Fri 17/1/20	Thu 23/1/20
1412	17.7.10.8	install test nail PN37-PN39, grout & pull out tests	6 days	Fri 24/1/20	Mon 3/2/20
1438	17.7.11	**Slopeworks: - 3NW-C/C231 (ch1220-1240N/B)**	415 days	Thu 12/9/19	Wed 3/2/21
1439	17.7.11.1	hoarding & fencing	12 days	Thu 12/9/19	Thu 26/9/19
1440	17.7.11.2	temporary scaffolding	14 days	Fri 27/9/19	Tue 15/10/19
1441	17.7.11.3	proposed slope stripping for mapping or rock and relict discontinuities (AS1-A,B, AS2-A,B)	10 days	Wed 16/10/19	Sat 26/10/19
1442	17.7.11.4	trial pits (A1, A2, A3)	8 days	Mon 28/10/19	Tue 5/11/19
1443	17.7.11.5	slope excavation works	1 day	Wed 6/11/19	Wed 6/11/19
1444	17.7.11.6	Phase I	20 days	Thu 7/11/19	Fri 29/11/19



3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1445	17.7.11.6.1	install test nails PN41-42 & pull out tests	7 days	Thu 7/11/19	Thu 14/11/19
1446	17.7.11.6.2	drill, install steel bars and grout soil nails (BP01-08, BT01-05, BN01-08, BS01-08))	8 days	Fri 15/11/19	Sat 23/11/19
1447	17.7.11.6.3	TDR Test (including test & wait issue result)	2 days	Mon 25/11/19	Tue 26/11/19
1448	17.7.11.6.4	soil nail head works	3 days	Wed 27/11/19	Fri 29/11/19
1449	17.7.11.7	Phase II	28 days	Sat 30/11/19	Sat 4/1/20
1450	17.7.11.7.1	install test nails PN43-44 & pull out tests	6 days	Sat 30/11/19	Fri 6/12/19
1451	17.7.11.7.2	drill, install steel bars and grout soil nails (BM01-09, BR01-13, BL01-09, BQ01-22)	14 days	Sat 7/12/19	Mon 23/12/19
1452	17.7.11.7.3	TDR Test (including test & wait issue result)	2 days	Tue 24/12/19	Fri 27/12/19
1453	17.7.11.7.4	soil nail head works	6 days	Sat 28/12/19	Sat 4/1/20
1454	17.7.11.8	Phase III	29 days	Mon 6/1/20	Tue 11/2/20
1455	17.7.11.8.1	install test nails PN45-46 & pull out tests	6 days	Mon 6/1/20	Sat 11/1/20
1456	17.7.11.8.2	drill, install steel bars and grout soil nails (BJ01-09, BK01-27, BG01-12, BH01-20)	14 days	Mon 13/1/20	Fri 31/1/20
1507	20	**section 3 of the works - Completion of all works within Parts D and E of the Site**	797 days	Thu 31/5/18	Wed 3/2/21
1508	20.1	**Parts D**	800 days	Mon 26/11/18	Wed 3/2/21
1509	20.1.1	*access date for section 3 (Parts D) - not more than 180 days after the starting date*	0 days	Mon 26/11/18	Mon 26/11/18
1510	20.1.2	seek specialist for design, supply and installation of the covered walkway	59 days	Tue 27/11/18	Thu 24/1/19
1511	20.1.3	acceptance of specialist	0 days	Thu 14/2/19	Thu 14/2/19
1512	20.1.4	design for approval for lighting system for the covered walkway	150 days	Fri 15/2/19	Sun 14/7/19
1513	20.1.5	submit for approval for lighting system for the covered walkway	0 days	Sun 14/7/19	Sun 14/7/19
1514	20.1.6	acceptance of lighting system for the covered walkway	0 days	Sun 4/8/19	Sun 4/8/19
1515	20.1.7	Coordination with CLP to obtain the electricity supply for the street lighting system (Design for Road B, Road E, Road F(part), Lin Ma Hang Road and Sheung Shui Landmark PTI & Lighting system for the covered walkway)	168 days	Mon 5/8/19	Sun 19/1/20
1516	20.1.8	design for glazing system of the proposed covered walkway at Fanling Station Road	150 days	Fri 15/2/19	Sun 14/7/19
1517	20.1.9	submission of glazing system	0 days	Sun 14/7/19	Sun 14/7/19
1518	20.1.10	acceptance of glazing system and fall arrest system by Project Manager	0 days	Sun 4/8/19	Sun 4/8/19
1519	20.1.11	design for fall arrest system of the proposed covered walkway at Fanling Station Road	150 days	Fri 15/2/19	Sun 14/7/19
1520	20.1.12	submission of fall arrest system	0 days	Sun 14/7/19	Sun 14/7/19
1521	20.1.13	acceptance of fall arrest system by Project Manager	0 days	Sun 4/8/19	Sun 4/8/19
1522	20.1.14	Liaison with MTRC for the works arrangement	30 days	Mon 5/8/19	Tue 3/9/19
1523	20.1.15	general site clearance	12 days	Wed 4/9/19	Wed 18/9/19
1524	20.1.16	initial survey	12 days	Thu 19/9/19	Thu 3/10/19
1525	20.1.17	utility detection and submit reports	8 days	Fri 4/10/19	Mon 14/10/19
1526	20.1.18	Fabrication of Steelworks & glass panel	100 days	Mon 5/8/19	Mon 2/12/19
1527	20.1.19	delivery steelworks & glass panel to site	38 days	Tue 3/12/19	Sat 18/1/20
1528	20.1.20	application of XP (for Parts D)	0 days	Thu 29/11/18	Thu 29/11/18
1529	20.1.21	acceptance of XP (for Parts D)	0 days	Thu 30/5/19	Thu 30/5/19
1530	20.1.22	Construction of Covered Walkway at Fanling Station	390 days	Tue 15/10/19	Wed 3/2/21
1531	20.1.22.1	construct the concrete foundation of covered walkway (first 20m)	20 days	Tue 15/10/19	Wed 6/11/19

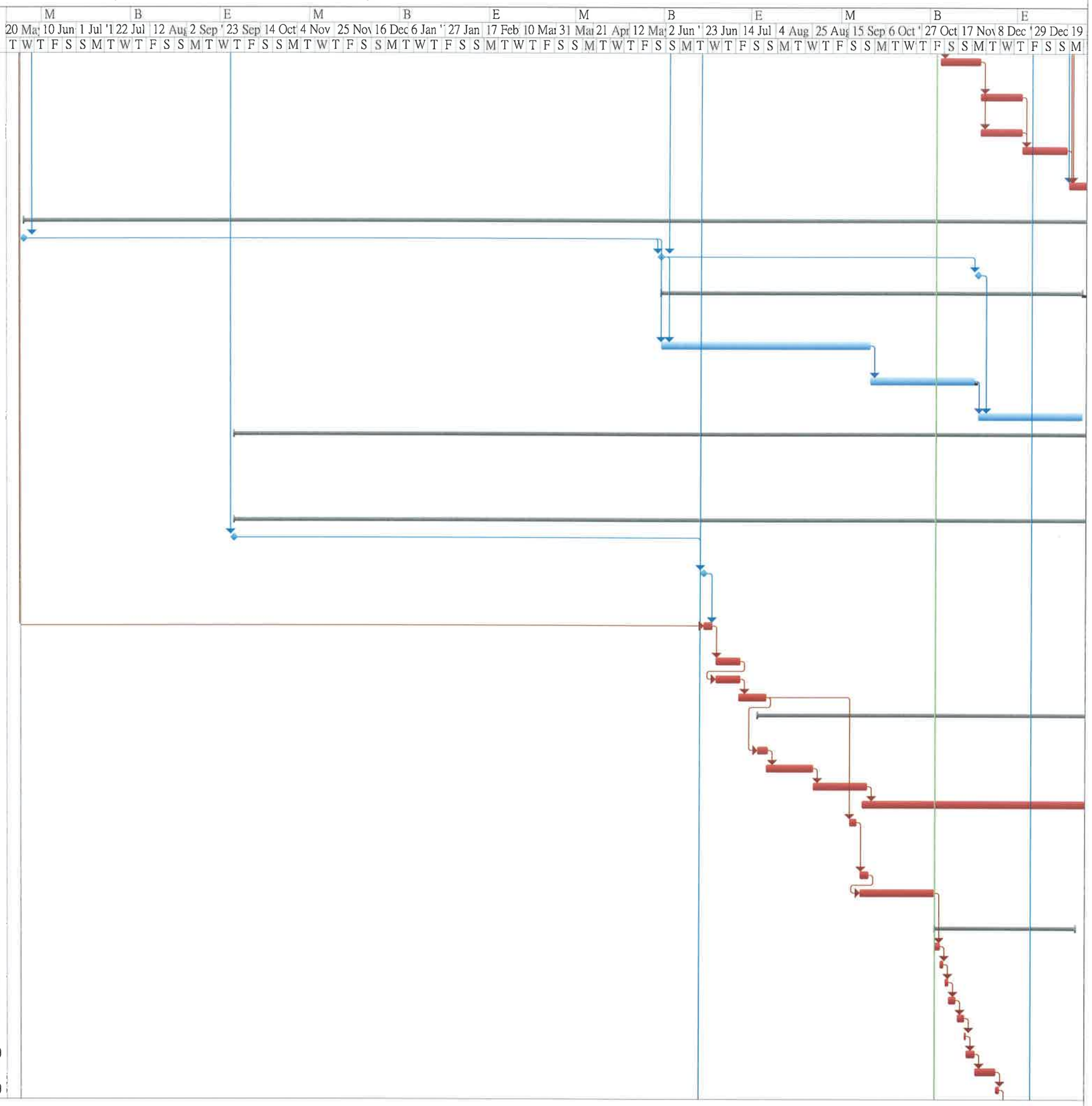


Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery
- Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

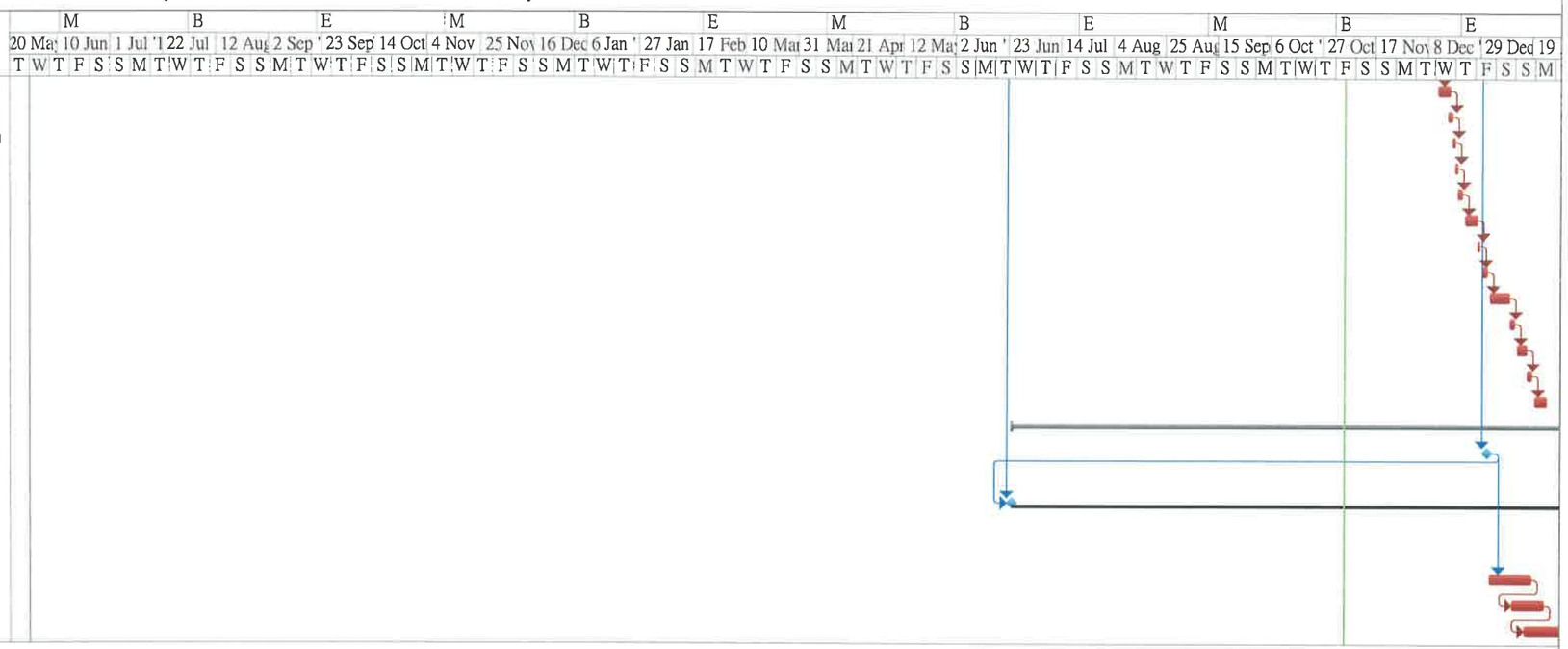
3 Month Rolling Programme
(from 26/10/2019 to 25/1/2020)

Accepted Initial Works Programme (06)

ID	WBS	Task Name	Duration	Start Date	Completion Date
1532	20.1.22.2	construct the concrete foundation of covered walkway (2nd 20m)	20 days	Thu 7/11/19	Fri 29/11/19
1533	20.1.22.3	construct the concrete foundation of covered walkway (3rd 20m)	20 days	Sat 30/11/19	Mon 23/12/19
1534	20.1.22.4	demolished existing planter (drg.WY/1051)	20 days	Sat 30/11/19	Mon 23/12/19
1535	20.1.22.5	construct the concrete foundation of covered walkway (4th 20m)	20 days	Tue 24/12/19	Sat 18/1/20
1536	20.1.22.6	construction of covered walkway including steelworks, glass panel and electrical works	265 days	Mon 20/1/20	Wed 9/12/20
1538	20.2	**Parts E**	782 days	Thu 31/5/18	Sat 16/1/21
1539	20.2.1	*access date for section 3 (Parts E)*	0 days	Thu 31/5/18	Thu 31/5/18
1540	20.2.2	application of XP (for Parts E)	0 days	Thu 30/5/19	Thu 30/5/19
1541	20.2.3	acceptance of XP (for Parts E)	0 days	Thu 28/11/19	Thu 28/11/19
1542	20.2.4	Temporary Traffic Arrangement (TTA) Scheme for Sheung Shui Landmark North PTI and Fanling Station Road	242 days	Fri 31/5/19	Mon 27/1/20
1543	20.2.4.1	Preparation of TTA for TMLG and acceptance from TD and RMO	120 days	Fri 31/5/19	Fri 27/9/19
1544	20.2.4.2	Comment & acceptance of TTA scheme by TD & RMO	60 days	Sat 28/9/19	Tue 26/11/19
1545	20.2.4.3	Obtain roadwork advice from RMO	60 days	Fri 29/11/19	Mon 27/1/20
1569	**29**	**section 6 of the works (section Subject to Excision) - Completion of all works within Parts A3 and A4 of the Site except Establishment works. Extent of works under section 6 of the works is defined in Drawing No.: 231448/C2/G/1031**	859 days	Fri 28/9/18	Wed 3/2/21
1570	29.1	**Parts A3**	859 days	Fri 28/9/18	Wed 3/2/21
1571	29.1.1	*access date for section 6 (Part A3) - not more than 120 days after the starting date*	0 days	Fri 28/9/18	Fri 28/9/18
1572	29.1.2	The time for ordering the "section Subject to Excision" for section 6 and 7 is within 390 days commencing from and including the starting date	0 days	Mon 24/6/19	Mon 24/6/19
1573	29.1.3	form temporary haul road from the south side to Parts A3	5 days	Tue 25/6/19	Sat 29/6/19
1574	29.1.4	general site clearance & tree felling	12 days	Tue 2/7/19	Mon 15/7/19
1575	29.1.5	initial survey	12 days	Tue 2/7/19	Mon 15/7/19
1576	29.1.6	construction of temporary drainage	14 days	Mon 15/7/19	Tue 30/7/19
1577	29.1.7	**Construction of Retaining Wall RW14 (Bay 1-Bay 6)**	312 days	Fri 26/7/19	Sat 22/8/20
1578	29.1.7.1	excavation (open cut) to formation (bays 1 to 4)	5 days	Fri 26/7/19	Wed 31/7/19
1579	29.1.7.2	temporary soil nails (bays 5 to 7)	23 days	Wed 31/7/19	Mon 26/8/19
1580	29.1.7.3	predrilling for socketed H-Piling	25 days	Tue 27/8/19	Thu 26/9/19
1581	29.1.7.4	construction of socketed H-Pile	185 days	Tue 24/9/19	Thu 21/5/20
1631	29.1.23	Site Formation works for Cut Slope CS24 (include temporary cutting from top of RW12 to toe of CS24) (for RW12 bays 1-3)	4 days	Tue 17/9/19	Fri 20/9/19
1632	29.1.24	install instrument for CS24	5 days	Mon 23/9/19	Fri 27/9/19
1633	29.1.25	temporary soil nails between CS20 & RW12 (for RW12 bays 1-3)	30 days	Mon 23/9/19	Mon 4/11/19
1634	29.1.26	**Construction of Retaining Wall RW12 CH 0-20**	67 days	Tue 5/11/19	Fri 24/1/20
1635	29.1.26.1	plate load tests	3 days	Tue 5/11/19	Thu 7/11/19
1636	29.1.26.2	blinding concrete for bay 1 to 3	2 days	Fri 8/11/19	Sat 9/11/19
1637	29.1.26.3	base formwork for bay 1 & 3	2 days	Mon 11/11/19	Tue 12/11/19
1638	29.1.26.4	base steel fixing for bay 1 & 3	4 days	Wed 13/11/19	Sat 16/11/19
1639	29.1.26.5	base concreting & curing for bay 1 & 3	4 days	Mon 18/11/19	Thu 21/11/19
1640	29.1.26.6	remove base formwork	1 day	Fri 22/11/19	Fri 22/11/19
1641	29.1.26.7	falsework and formwork for walls of bay 1 & 3	4 days	Sat 23/11/19	Wed 27/11/19
1642	29.1.26.8	steel fixing for walls of bay 1 & 3	10 days	Thu 28/11/19	Mon 9/12/19
1643	29.1.26.9	close formwork for walls of bay 1 & 3	2 days	Tue 10/12/19	Wed 11/12/19



ID	WBS	Task Name	Duration	Start Date	Completion Date
1644	29.1.26.10	concreting & curing for walls of bay 1 & 3	4 days	Thu 12/12/19	Mon 16/12/19
1645	29.1.26.11	remove falsework and formwork for walls	2 days	Mon 16/12/19	Tue 17/12/19
1646	29.1.26.12	blinding concrete for bay 2	1 day	Wed 18/12/19	Wed 18/12/19
1647	29.1.26.13	base formwork for bay 2	1 day	Thu 19/12/19	Thu 19/12/19
1648	29.1.26.14	base steel fixing for bay 2	2 days	Fri 20/12/19	Sat 21/12/19
1649	29.1.26.15	base concreting & curing for bay 2	3 days	Mon 23/12/19	Fri 27/12/19
1650	29.1.26.16	remove base formwork	1 day	Sat 28/12/19	Sat 28/12/19
1651	29.1.26.17	falsework & formwork for walls of bay 2	2 days	Mon 30/12/19	Tue 31/12/19
1652	29.1.26.18	steel fixing for walls of bay 2	7 days	Thu 2/1/20	Thu 9/1/20
1653	29.1.26.19	close formwork for walls of bay 2	2 days	Fri 10/1/20	Sat 11/1/20
1654	29.1.26.20	concreting & curing for walls of bay 2	4 days	Mon 13/1/20	Thu 16/1/20
1655	29.1.26.21	remove falsework and formwork for walls	2 days	Fri 17/1/20	Sat 18/1/20
1656	29.1.26.22	install instrument for RW12	5 days	Mon 20/1/20	Fri 24/1/20
1671	29.2	**Parts A4**	590 days	Mon 24/6/19	Wed 3/2/21
1672	29.2.1	*access date for section 6 (Parts A4) - not more than 580 days after the starting date*	0 days	Tue 31/12/19	Tue 31/12/19
1673	29.2.2	The time for ordering the "section Subject to Excision" for section 6 and 7 is within 390 days commencing from and including the starting date	0 days	Mon 24/6/19	Mon 24/6/19
1674	29.2.3	general site clearance	15 days	Thu 2/1/20	Sat 18/1/20
1675	29.2.4	initial survey	11 days	Sat 11/1/20	Thu 23/1/20
1676	29.2.5	construction of temporary drainage	15 days	Thu 16/1/20	Wed 5/2/20



Appendix D

Monitoring Locations

Air Quality Monitoring Location

Legend

- Project Boundary
- Utilities Construction
- Proposed Air Monitoring Stations

Sha Ling Road

ASR-1

Proposed Pick-up and Drop-off Point

Man Kam To Road

Location ID	Description
ASR-1	Village House along Man Kam To Road

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

0 25 50 METRES

Printed by : 2/26/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final\Figure 5.1.2 - Locations of Construction Dust Monitoring (Sheet 2 of 4).dgn

Man Kam To Boundary Control Point

HVS shifted to outside premises of San Uk Ling Village House No.1 for impact air quality monitoring

Lin Ma Hang Road

ASR-2

San Uk Ling

HVS placed inside premises of San Uk Ling Village House No.1 during baseline air quality monitoring

Location ID	Description
ASR-2	Village House at San Uk Ling

Legend

- Project Boundary
- Existing Air Monitoring Stations

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Figure 1
Air Quality Monitoring Location (ASR-2)

0 25 50 METRE

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Location ASR-3 at Muk Wu Nga Yiu House No. 28 during baseline monitoring

Proposed Location ASR-3a at Muk Wu Nga Yiu House No. 2A for impact monitoring

ASR-3a

ASR-3

100m

Muk Wu Nga Yiu

Lin Ma Hang Road

SHAM CHUN RIVER (SHENZHEN HE)

SHENZHEN SHI

LO SHUE LING

N

0 25 50 METRES

Location ID	Description
ASR-3	Village House at Muk Wu Nga Yiu

Legend

- Project Boundary
- Existing Air Monitoring Station
- Proposed Air Monitoring Station

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Figure 2
Air Quality Monitoring Location (ASR-3)

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Noise Monitoring Location

Sha Ling Road

Proposed Pick-up and Drop-off Point

CN-1

Man Kam To Road

N

Legend

- Project Boundary
- Utilities Construction
- 300m Assessment Area
- Proposed Construction Noise Monitoring Locations

Location ID	Description
CN-1	Village house to the west of Sha Ling Road

0 25 50
METRES

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

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Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final_v1\Figure 6.2.2 - Locations of Proposed Construction Noise Monitoring (Sheet 2 of 4).dgn

Planned

Sandy Ridge Cemetery

Man Kam To Road

CN-2

0 25 50
METRES

Legend

- Project Boundary
- Utilities Construction
- 300m Assessment Area
- Proposed Construction Noise Monitoring Locations

Location ID	Description
CN-2	Village house to the north of Man Kam To Road

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Printed by : 2/29/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final_v1\Figure 6.2.3 - Locations of Proposed Construction Noise Monitoring (Sheet 3 of 4).dgn

Man Kam To Boundary Control Point

Lin Ma Hang Road

San Uk Ling

CN-4

CN-3

N

Legend

- Project Boundary
- 300m Assessment Area
- Proposed Construction Noise Monitoring Locations

Location ID	Description
CN-3	Village house near San Uk Ling
CN-4	Village house of Muk Wu

0 25 50
METRES

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

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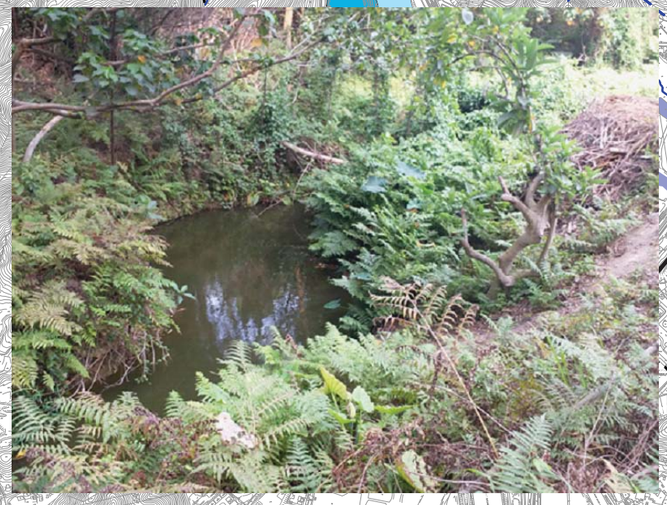
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final_v1\Figure 6.2.4 - Locations of Proposed Construction Noise Monitoring (Sheet 4 of 4).dgn

Water Quality Monitoring Station



Legend

- Project Boundary
- Utilities Construction
- 500m Assessment Area
- Channelized River
- Pond
- Watercourse
- Conservation Area (CA)
- Wet Woodland
- Seasonal Watercourse
- Water Quality Monitoring Stations in EM&A Manual

Rev	Description	By	Date
E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Printed by : 2/29/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final_v1\Figure 7.1.1 - Water Quality Monitoring Locations.dgn

Appendix E

Calibration Certificate of Monitoring Equipment and Laboratory Certificate

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT USED IN THE REPORTING MONTH

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	21 Sep 19	5 Oct 19
1a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	8 Oct 19	22 Oct 19
1b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	24 Oct 19	7 Nov 19
2		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	21 Sep 19	5 Oct 19
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	8 Oct 19	22 Oct 19
2b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	24 Oct 19	7 Nov 19
3		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	21 Sep 19	5 Oct 19
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	8 Oct 19	22 Oct 19
3b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	24 Oct 19	7 Nov 19
4		Calibration Kit TISCH Model TE-5025A Orifice ID 1941 and Rootsmeter S/N 438320	5 Feb 19	5 Feb 20
5		Laser Dust Monitor, Model LD-3B (Serial No. 366409) – EQ109	14 Jan 19	13 Jan 20
6		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	14 Jan 19	13 Jan 20
7		Laser Dust Monitor, Model LD-3B (Serial No. 3Y6502) – EQ113	15 Mar 19	14 Mar 20
8	Noise	Brüel & Kjær 2238 Sound Level Meter (Serial No. 3012330) – EQ017	12 Jun 19	12 Jun 20
9		Brüel & Kjær 2238 Sound Level Meter (Serial No. 2285690) – EQ008	22 Jul 19	22 Jul 20
10		Brüel & Kjær 4231 Acoustical Calibrator (Serial No. 2713428) – EQ082	12 Jun 19	12 Jun 20
11	Water	YSI Pro 20 (Serial No. 12C100570)	25 Jul 19	25 Oct 19
11a		YSI 550A (Serial No. 16A104433)	3 Oct 19	3 Jan 20
12		HACH 2100Q Turbidimeter (Serial No. 11030C008499)	24 Sep 19	24 Dec 19
13		AZ 8685 pH Meter (Serial No. 1118396)	16 Sep 19	16 Dec 19
14a		AZ8371 Salinity Meter (Serial No. 1219392)	16 Sep 19	16 Dec 19
15		Global Water FP211 Flow Meter (Serial No. 1449006330)	18 Oct 18	18 Oct 19
15a		Global Water FP211 Flow Meter (Serial No. 1449006330)	9 Oct 19	9 Oct 20

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6 — Date of Calibration: 21-Sep-19
Location ID : ASR-1 — Next Calibration Date: 5-Oct-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1008	Corrected Pressure (mm Hg)	756
Temperature (°C)	29.2	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.50	5.50	11.0	1.567	49	48.19	Slope = 31.5235
13	4.55	4.55	9.1	1.425	42	41.31	Intercept = -2.4832
10	3.40	3.40	6.8	1.232	36	35.41	Corr. coeff. = 0.9951
7	2.20	2.20	4.4	0.991	30	29.51	
5	1.20	1.20	2.4	0.732	21	20.65	

Calculations :

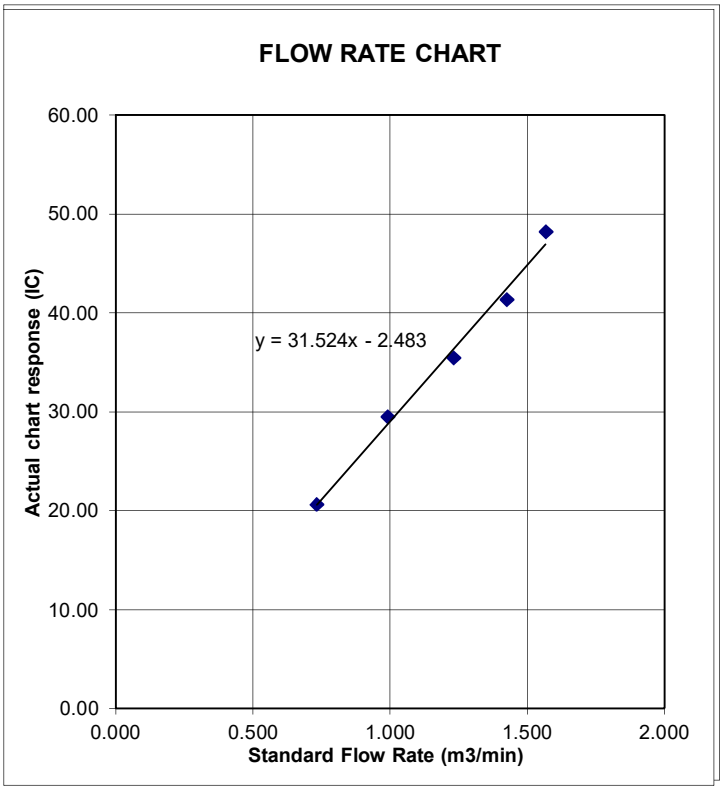
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6 — Date of Calibration: 8-Oct-19
Location ID : ASR-1 — Next Calibration Date: 22-Oct-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1015.6	Corrected Pressure (mm Hg)	761.7
Temperature (°C)	27.7	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.15	6.15	12.3	1.667	52	51.59	Slope = 34.3299
13	4.90	4.90	9.8	1.488	46	45.64	Intercept = -5.3749
10	3.85	3.85	7.7	1.319	40	39.69	Corr. coeff. = 0.9936
7	2.30	2.30	4.6	1.020	32	31.75	
5	1.55	1.55	3.1	0.837	22	21.83	

Calculations :

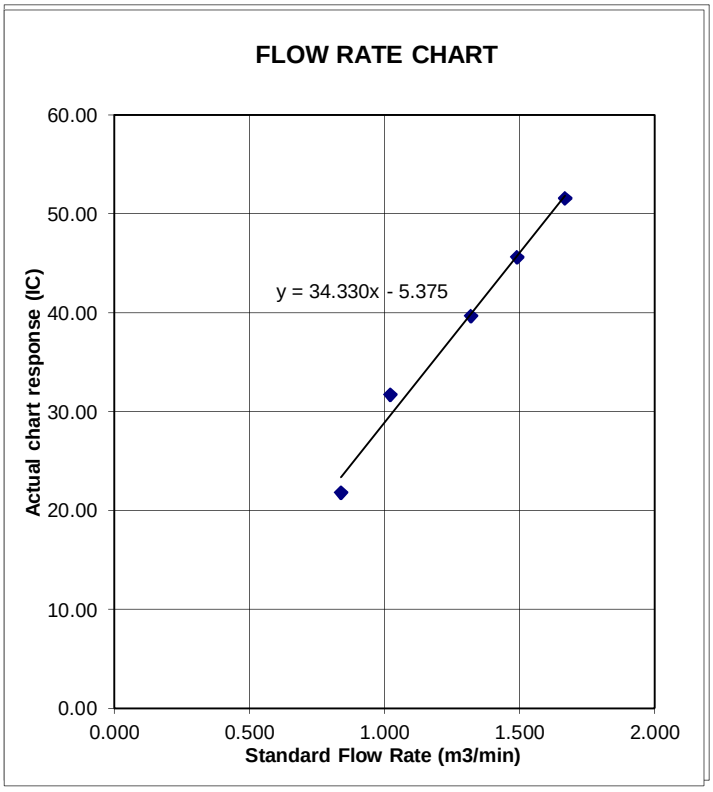
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6 — Date of Calibration: 24-Oct-19
Location ID : ASR-1 — Next Calibration Date: 7-Nov-19
Name and Model: TISCH HVS Model TE-5170 — Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1014.9	Corrected Pressure (mm Hg)	761.175
Temperature (°C)	26.2	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.20	6.20	12.4	1.678	52	51.83	Slope = 35.7479
13	4.80	4.80	9.6	1.476	45	44.85	Intercept = -7.5830
10	3.75	3.75	7.5	1.305	40	39.87	Corr. coeff. = 0.9951
7	2.35	2.35	4.7	1.033	31	30.90	
5	1.55	1.55	3.1	0.839	21	20.93	

Calculations :

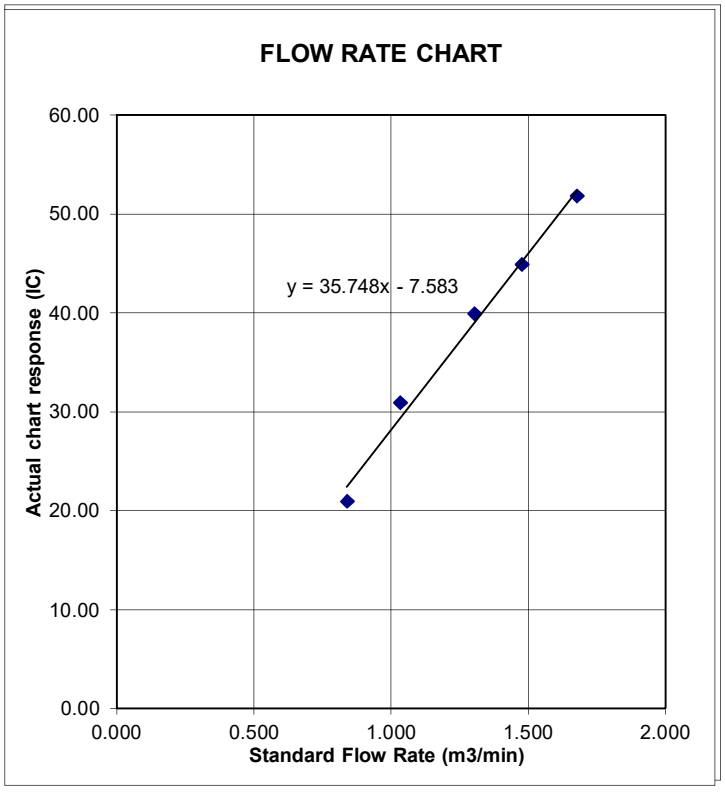
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1 Date of Calibration: 21-Sep-19
Location ID : ASR-2 Next Calibration Date: 5-Oct-19
Name and Model: TISCH HVS Model TE-5170 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1008	Corrected Pressure (mm Hg)	756
Temperature (°C)	29.2	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.60	5.60	11.2	1.581	48	47.21	Slope = 31.5422
13	4.80	4.80	9.6	1.464	42	41.31	Intercept = -3.6902
10	3.50	3.50	7.0	1.250	36	35.41	Corr. coeff. = 0.9968
7	2.10	2.10	4.2	0.968	28	27.54	
5	1.25	1.25	2.5	0.747	20	19.67	

Calculations :

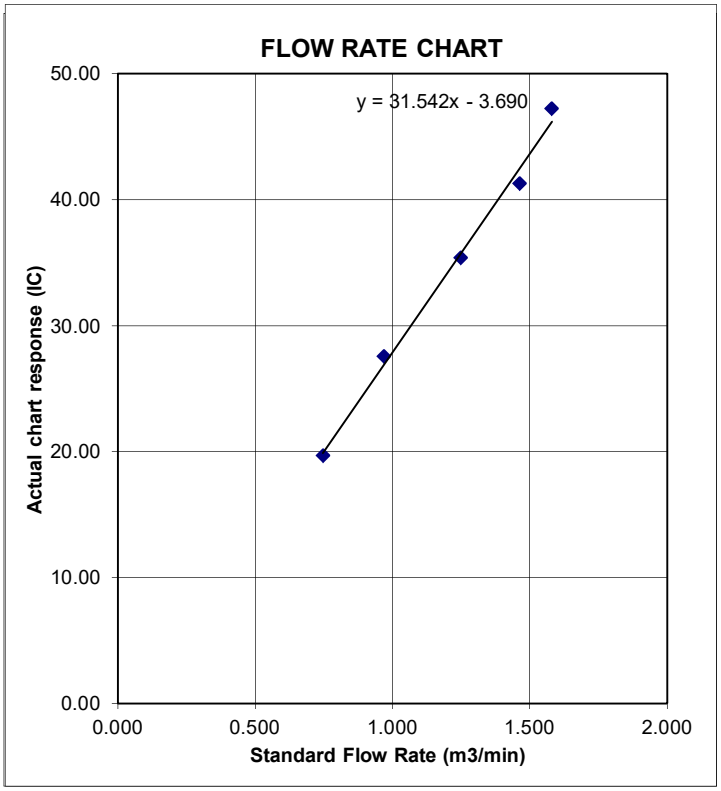
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1 Date of Calibration: 8-Oct-19
Location ID : ASR-2 Next Calibration Date: 22-Oct-19
Name and Model: TISCH HVS Model TE-5170 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1015.6	Corrected Pressure (mm Hg)	761.7
Temperature (ºC)	27.7	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.660	50	49.61	Slope = 34.2439
13	4.85	4.85	9.7	1.481	44	43.65	Intercept = -6.7604
10	3.65	3.65	7.3	1.285	38	37.70	Corr. coeff. = 0.9904
7	2.20	2.20	4.4	0.997	30	29.76	
5	1.55	1.55	3.1	0.837	20	19.84	

Calculations :

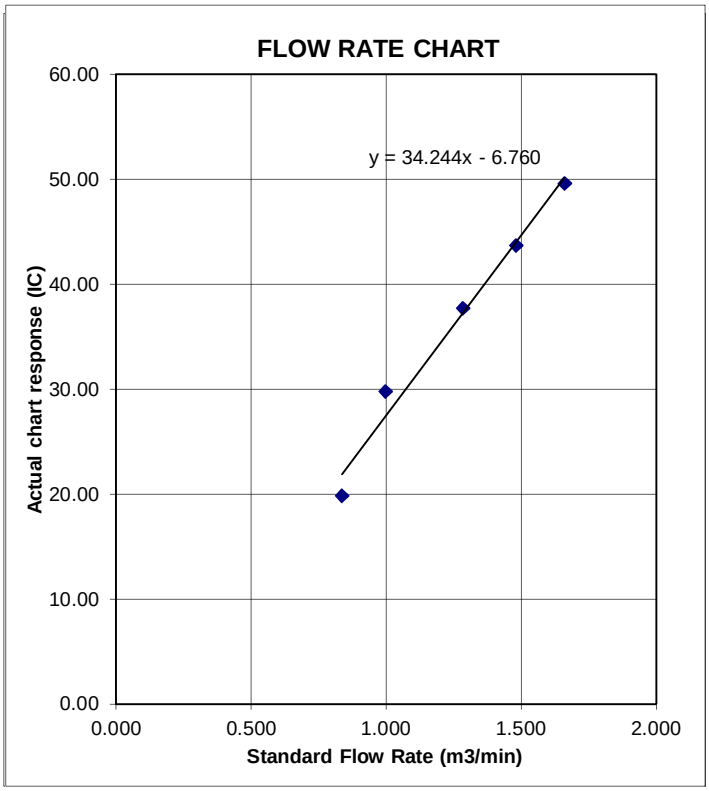
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1 Date of Calibration: 24-Oct-19
Location ID : ASR-2 Next Calibration Date: 7-Nov-19
Name and Model: TISCH HVS Model TE-5170 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1014.9	Corrected Pressure (mm Hg)	761.175
Temperature (°C)	26.2	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.664	51	50.83	Slope = 32.8557
13	4.80	4.80	9.6	1.476	43	42.86	Intercept = -4.4651
10	3.65	3.65	7.3	1.287	38	37.88	Corr. coeff. = 0.9942
7	2.05	2.05	4.1	0.965	29	28.91	
5	1.55	1.55	3.1	0.839	22	21.93	

Calculations :

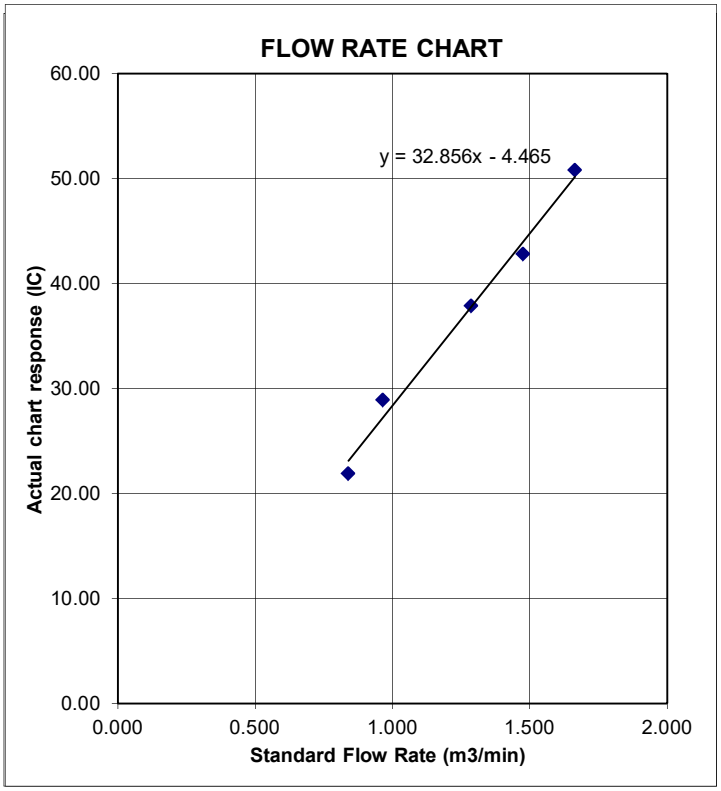
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A
Location ID : ASR-3a
Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 21-Sep-19
Next Calibration Date: 5-Oct-19
Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1008	Corrected Pressure (mm Hg)	756
Temperature (°C)	29.2	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.60	5.60	11.2	1.581	49	48.19	Slope = 34.5729
13	4.80	4.80	9.6	1.464	44	43.27	Intercept = -6.8702
10	3.65	3.65	7.3	1.277	38	37.37	Corr. coeff. = 0.9995
7	2.25	2.25	4.5	1.002	28	27.54	
5	1.30	1.30	2.6	0.762	20	19.67	

Calculations :

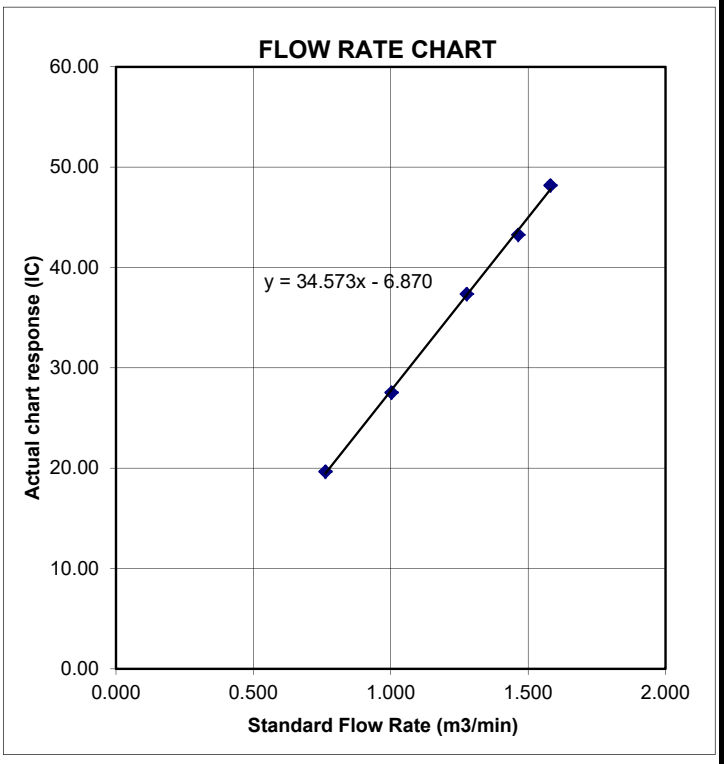
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A
Location ID : ASR-3a
Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 8-Oct-19
Next Calibration Date: 22-Oct-19
Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1015.6	Corrected Pressure (mm Hg)	761.7
Temperature (°C)	27.7	Temperature (K)	301

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.40	6.40	12.8	1.701	54	53.57	Slope = 32.7297
13	5.10	5.10	10.2	1.518	49	48.61	Intercept = -1.4442
10	3.75	3.75	7.5	1.302	42	41.67	Corr. coeff. = 0.9987
7	2.50	2.50	5.0	1.063	34	33.73	
5	1.60	1.60	3.2	0.851	26	25.80	

Calculations :

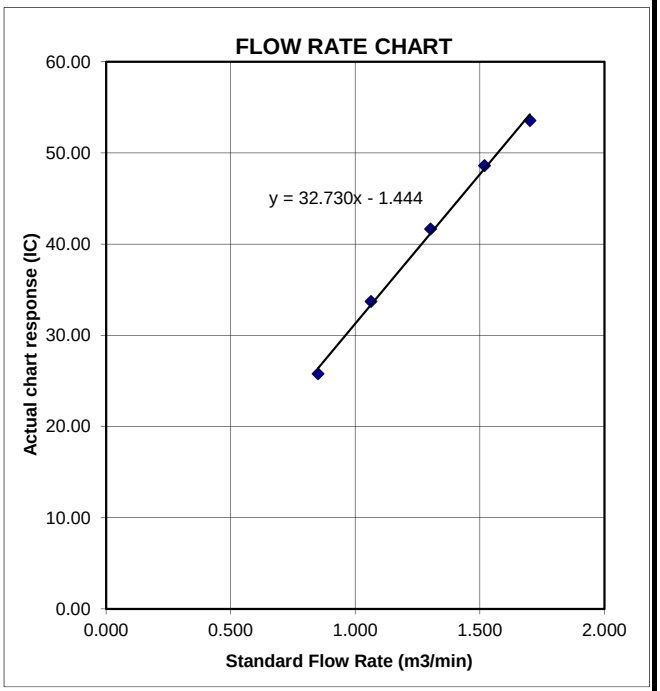
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A
Location ID : ASR-3a
Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 24-Oct-19
Next Calibration Date: 7-Nov-19
Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1014.9	Corrected Pressure (mm Hg)	761.175
Temperature (°C)	26.2	Temperature (K)	299

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.40	6.40	12.8	1.704	56	55.82	Slope = 36.8474
13	5.10	5.10	10.2	1.522	49	48.84	Intercept = -6.8115
10	3.70	3.80	7.5	1.305	42	41.86	Corr. coeff. = 0.9988
7	2.60	2.60	5.2	1.087	34	33.89	
5	1.60	1.60	3.2	0.852	24	23.92	

Calculations :

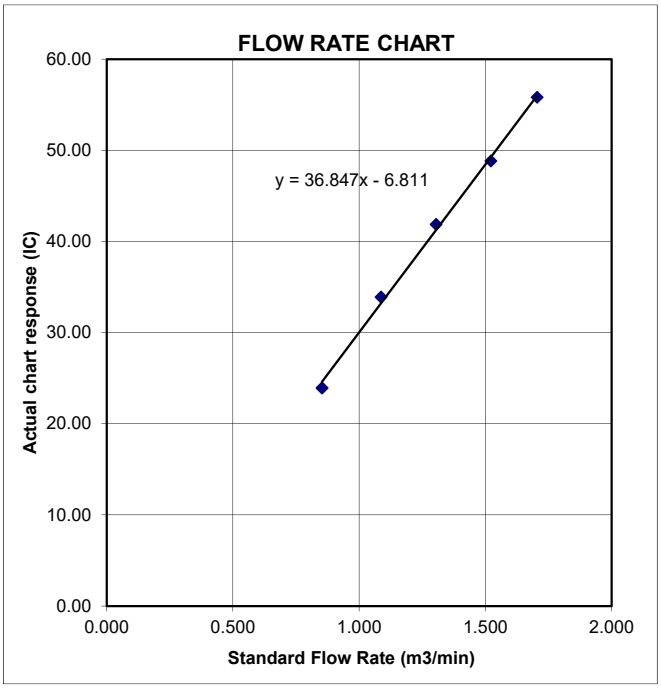
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 5, 2020

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 5, 2019	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 753.1	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1941**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4830	3.2	2.00
2	3	4	1	1.0430	6.4	4.00
3	5	6	1	0.9300	7.9	5.00
4	7	8	1	0.8870	8.7	5.50
5	9	10	1	0.7320	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0036	0.6767	1.4197	0.9958	0.6714	0.8821
0.9993	0.9581	2.0078	0.9915	0.9506	1.2475
0.9973	1.0723	2.2448	0.9895	1.0640	1.3947
0.9962	1.1231	2.3544	0.9884	1.1144	1.4628
0.9908	1.3536	2.8395	0.9831	1.3431	1.7642
QSTD	**m=**	**2.09680**	**QA**	**m=**	**1.31298**
	b=	**-0.00065**		**b=**	**-0.00040**
	r=	**0.99999**		**r=**	**0.99999**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1908928**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	25-FEB-2019
			DATE OF ISSUE	:	4-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

- **Sample(s) were received in ambient condition.**
- **Sample(s) analysed and reported on an as received basis.**
- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK1908928
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1908928-001	S/N: 366409	AIR	25-Feb-2019	S/N: 366409

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366409
Equipment Ref:	EQ109
Job Order	HK1908928

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	21 December 2018

Equipment Verification Results:

Testing Date: 7 January 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	09:01 ~ 11:08	18.5	1021.4	0.045	2419	19.1
2hr11min	11:13 ~ 13:24	18.5	1021.4	0.032	1698	13.0
2hr07min	13:30 ~ 15:37	18.5	1021.4	0.089	5066	40.0

Sensitivity Adjustment Scale Setting (Before Calibration) 517 (CPM)

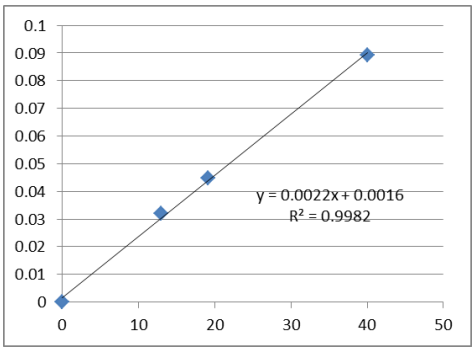
Sensitivity Adjustment Scale Setting (After Calibration) 517 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9991

Date of Issue 14 January 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0022 should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Martin Li Signature : Date : 14 January 2019

QC Reviewer : Ben Tam Signature : Date : 14 January 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	21-Dec-18
Location ID :	Calibration Room	Next Calibration Date:	21-Mar-19

CONDITIONS

Sea Level Pressure (hPa)	1016.1	Corrected Pressure (mm Hg)	762.075
Temperature (°C)	22.4	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.699	56	56.32	Slope = 34.0074
13	4.4	4.4	8.8	1.495	51	51.29	Intercept = -0.4093
10	3.4	3.4	6.8	1.317	45	45.26	Corr. coeff. = 0.9972
8	2.3	2.3	4.6	1.086	36	36.21	
5	1.4	1.4	2.8	0.851	28	28.16	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

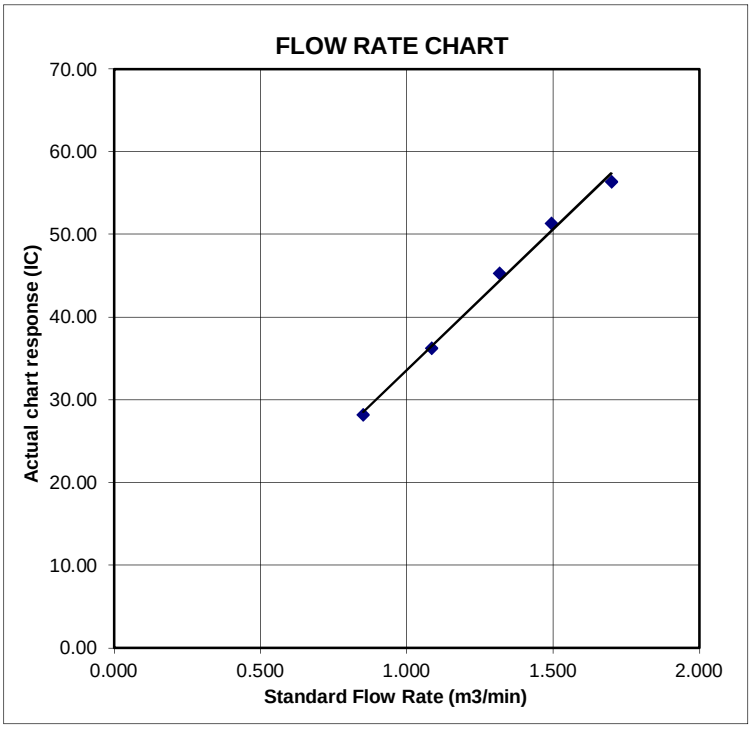
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

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FAX: (513)467-900

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1908929**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	25-FEB-2019
			DATE OF ISSUE	:	4-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

- **Sample(s) were received in ambient condition.**
- **Sample(s) analysed and reported on an as received basis.**
- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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

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

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Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 **www.alsglobal.com**

WORK ORDER : HK1908929
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1908929-001	S/N: 366410	AIR	25-Feb-2019	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366410
Equipment Ref:	EQ110
Job Order	HK1908929

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	21 December 2018

Equipment Verification Results:

Testing Date: 7 January 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	09:01 ~ 11:08	18.5	1021.4	0.045	2377	18.8
2hr11min	11:13 ~ 13:24	18.5	1021.4	0.032	1522	11.6
2hr07min	13:30 ~ 15:37	18.5	1021.4	0.089	5117	40.4

Sensitivity Adjustment Scale Setting (Before Calibration) 674 (CPM)

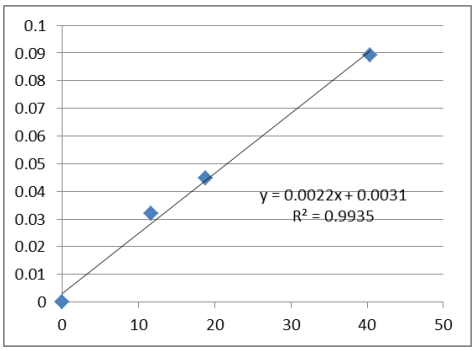
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9967

Date of Issue 14 January 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0022 should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Martin Li Signature : Date : 14 January 2019

QC Reviewer : Ben Tam Signature : Date : 14 January 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	21-Dec-18
Location ID :	Calibration Room	Next Calibration Date:	21-Mar-19

CONDITIONS

Sea Level Pressure (hPa)	1016.1	Corrected Pressure (mm Hg)	762.075
Temperature (°C)	22.4	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.699	56	56.32	Slope = 34.0074
13	4.4	4.4	8.8	1.495	51	51.29	Intercept = -0.4093
10	3.4	3.4	6.8	1.317	45	45.26	Corr. coeff. = 0.9972
8	2.3	2.3	4.6	1.086	36	36.21	
5	1.4	1.4	2.8	0.851	28	28.16	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

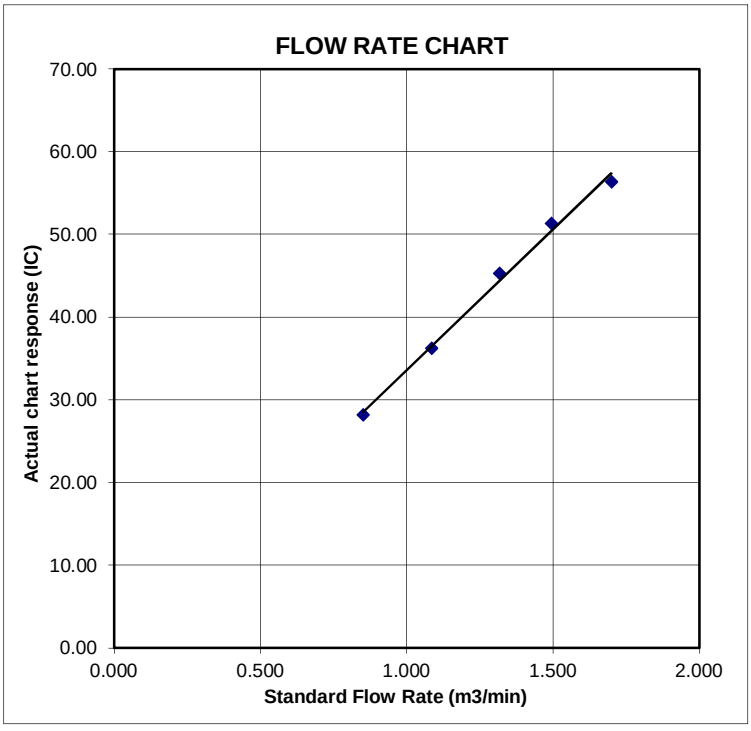
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
QSTD	**m=**	**2.02017**	**QA**	**m=**	**1.26500**
	b=	**-0.03691**		**b=**	**-0.02263**
	r=	**0.99988**		**r=**	**0.99988**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

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ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR BEN TAM	WORK ORDER	:	**HK1912134**
CLIENT	:	**ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**			
ADDRESS	:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	:	1
			DATE RECEIVED	:	20-MAR-2019
			DATE OF ISSUE	:	22-MAR-2019
PROJECT	:	----	NO. OF SAMPLES	:	1
			CLIENT ORDER	:	----

General Comments

- **Sample(s) were received in ambient condition.**
- **Sample(s) analysed and reported on an as received basis.**
- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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

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

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WORK ORDER : HK1912134
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1912134-001	S/N: 3Y6502	AIR	20-Mar-2019	3Y6502

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	3Y6502
Equipment Ref:	EQ113
Job Order	HK1912134

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	12 February 2019

Equipment Verification Results:

Calibration Date: 11 March 2019

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	2670	22.3
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	2917	24.3
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	3301	27.5

Sensitivity Adjustment Scale Setting (Before Calibration) 573 (CPM)

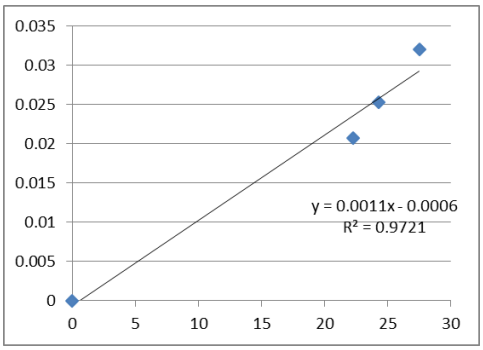
Sensitivity Adjustment Scale Setting (After Calibration) 573 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0011

Correlation Coefficient (R) 0.9860

Date of Issue 15 March 2019



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0011 should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Fai So Signature : Date : 15 March 2019

QC Reviewer : Ben Tam Signature : Date : 15 March 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	12-Feb-19
Location ID :	Calibration Room	Next Calibration Date:	12-May-19

CONDITIONS

Sea Level Pressure (hPa)	1024.2	Corrected Pressure (mm Hg)	768.15
Temperature (°C)	19.0	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	7.7	11.7	1.738	60	60.94	Slope = 35.5369
13	2.8	6.9	9.7	1.584	52	52.81	Intercept = -1.8924
10	1.9	5.4	7.3	1.377	46	46.72	Corr. coeff. = 0.9951
8	0.6	4	4.6	1.097	38	38.59	
5	-0.4	3.1	2.7	0.844	27	27.42	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

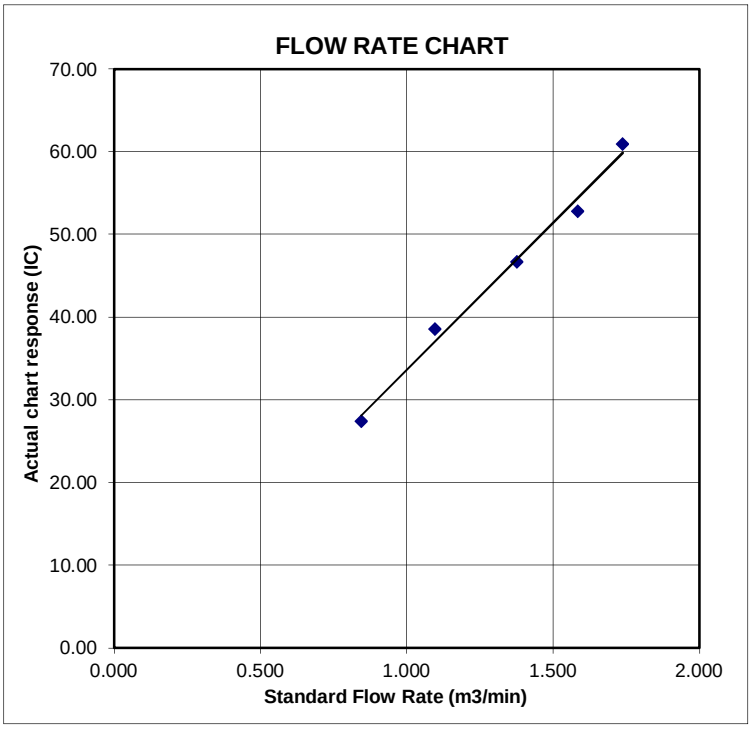
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



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

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Level Meter (EQ017)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2250
Serial No. / 編號 : 3012330
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Engineer

Date of Issue 簽發日期 : 12 June 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C192957
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 the test 6.1.1.2 to 6.3.2.

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.1

6.1.1.2 After Self-calibration

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)	Spec. (dB)
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

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

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	95.0	+1.0 ± 1.6
			8 kHz	92.9	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.3	-4.3(+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			250 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	91.0	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.4	-6.2 (+3.0 ; -6.0)

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C192957
證書編號

Remarks : - UUT Microphone Model No. : 4189 & S/N : 3130396

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	:	63 Hz - 125 Hz	: ± 0.35 dB
		250 Hz - 500 Hz	: ± 0.30 dB
		1 kHz	: ± 0.20 dB
		2 kHz - 4 kHz	: ± 0.35 dB
		8 kHz	: ± 0.45 dB
		12.5 kHz	: ± 0.70 dB
104 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C193784
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 5 July 2019

Description / 儀器名稱 : Integrating Sound Level Meter (EQ008)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285690
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 17 July 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : Cheuk
K P Cheuk
Assistant Engineer

Certified By 核證 :
K C Lee
Engineer

Date of Issue 簽發日期 : 22 July 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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Certificate of Calibration
校正證書

Certificate No. : C193784
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 the test from 6.1.1.2 to 6.4.

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L_{AFP}	A	F	94.00	1	94.2

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L_{AFP}	A	F	94.00	1	94.0	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

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Certificate of Calibration
校正證書

Certificate No. : C193784
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L_{AFP}	A	F	94.00	1	94.0	Ref.
	L_{ASP}		S			94.0	± 0.1
	L_{AIP}		I			94.0	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L_{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L_{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L_{ASP}		S		Continuous	106.0	Ref.
	L_{ASMax}				500 ms	102.0	-4.1 ± 1.0

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L_{AFP}	A	F	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

Certificate of Calibration
校正證書

Certificate No. : C193784
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L_{CFP}	C	F	94.00	31.5 Hz	91.1	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L_{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						$1/10^2$		90	90.1	± 0.5
			60 sec.			$1/10^3$		80	79.8	± 1.0
			5 min.			$1/10^4$		70	69.7	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812705

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB	: 31.5 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level		: ± 0.2 dB (Ref. 110 dB continuous sound level)

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

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

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

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

Certificate of Calibration
校正證書

Certificate No. : C192956
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098) Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

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
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 12 June 2019

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C192956
證書編號

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

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

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C183775
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C181288

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

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

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

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

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1931216
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 19-Jul-2019 25-Jul-2019

COMMENTS

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

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

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

Scope of Test:	Dissolved Oxygen and Temperature
Equipment Type:	Dissolved Oxygen Meter
Brand Name:	YSI
Model No.:	Pro 20
Serial No.:	12C100570
Equipment No.:	--
Date of Calibration:	25-Jul-2019

NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1931216

SUB-BATCH: 0
DATE OF ISSUE: 25-Jul-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 25-Jul-2019 Date of Next Calibration: 25-Oct-2019

PARAMETERS:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
7.23	7.22	-0.01
5.75	5.70	-0.05
3.70	3.62	-0.08
	Tolerance Limit (mg/L)	±0.20

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

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
10.5	10.8	+0.3
20.0	19.0	-1.0
41.0	39.1	-1.9
	Tolerance Limit (^{o}C)	±2.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1941384
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	25-Sep-2019
		DATE OF ISSUE:	03-Oct-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen and Temperature
Equipment Type:	Dissolved Oxygen Meter
Brand Name/ Model No.:	YSI/ 550A
Serial No./ Equipment No.:	16A104433
Date of Calibration:	03-Oct-2019

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1941384

SUB-BATCH: 0
DATE OF ISSUE: 03-Oct-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name/ Model No.: YSI/ 550A
Serial No./ Equipment No.: 16A104433
Date of Calibration: 03-Oct-2019 Date of Next Calibration: 03-Jan-2020

PARAMETERS:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
7.30	7.19	-0.11
4.83	4.80	-0.03
3.15	3.00	-0.15
	Tolerance Limit (mg/L)	±0.20

Temperature

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

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
11.0	11.8	+0.8
22.0	21.6	-0.4
37.0	36.2	-0.8
	Tolerance Limit (^{o}C)	±2.0

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1940395
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 18-Sep-2019 25-Sep-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name/ Model No.:	Hach 2100Q
Serial No./ Equipment No.:	11030C008499
Date of Calibration:	24-Sep-2019

NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1940395

SUB-BATCH: 0
DATE OF ISSUE: 25-Sep-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name/ Model No.: Hach 2100Q
Serial No./ Equipment No.: 11030C008499
Date of Calibration: 24-Sep-2019 Date of Next Calibration: 24-Dec-2019

PARAMETERS:
Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.51	--
4	3.98	-0.5
40	42.2	+5.5
80	79.3	-0.9
400	434	+8.5
800	854	+6.8
	Tolerance Limit (%)	±10.0

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1938899
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	09-Sep-2019
		DATE OF ISSUE:	16-Sep-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH Value and Temperature
Equipment Type:	pH meter
Brand Name/ Model No.:	AZ 8685
Serial No./ Equipment No.:	1118396
Date of Calibration:	16-Sep-2019

NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1938899

SUB-BATCH: 0
DATE OF ISSUE: 16-Sep-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter
Brand Name/ Model No.: AZ 8685
Serial No./ Equipment No.: 1118396
Date of Calibration: 16-Sep-2019 Date of Next Calibration: 16-Dec-2019

PARAMETERS:

pH Value

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.8	-0.20
7.0	7.0	+0.00
10.0	9.8	-0.20
	Tolerance Limit (pH unit)	±0.20

Temperature

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

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
13.0	13.5	+0.5
25.5	24.0	-1.5
39.0	38.0	-1.0
	Tolerance Limit (^{o}C)	±2.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1938902
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH: LABORATORY: DATE RECEIVED: DATE OF ISSUE:	0 HONG KONG 09-Sep-2019 16-Sep-2019

COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.
The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Salinity
Equipment Type:	Salinity Meter
Brand Name/ Model No.:	AZ8371
Serial No./ Equipment No.:	1219392
Date of Calibration:	16-Sep-2019

NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1938902

SUB-BATCH: 0
DATE OF ISSUE: 16-Sep-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Salinity Meter
Brand Name/ Model No.: AZ8371
Serial No./ Equipment No.: 1219392
Date of Calibration: 16-Sep-2019 Date of Next Calibration: 16-Dec-2019

PARAMETERS:
Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.7	-3.0
20	19.5	-2.5
30	28.3	-5.7
	Tolerance Limit (%)	±10.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

ALS Technichem (HK) Pty Ltd
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR IVAN LEUNG	**WORK ORDER:**	HK1858535
CLIENT:	ALS TECHNICHEM (HK) PTY LTD	**SUB-BATCH:**	0
ADDRESS:	11/F, CHUNG SHUN KNITTING CENTRE, 1-3 WING YIP STREET, KWAI CHUNG, N.T., HONG KONG	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	08-Nov-2018
		DATE OF ISSUE:	09-Nov-2018

COMMENTS

The calibration of flow rate performed by AUES staff on 18 October 2018.

Scope of Test:	Flow rate
Equipment Type:	Flow Meter
Brand Name:	Global Water
Model No.:	FP211
Serial No.:	1449006330
Equipment No.:	--
Calibration Factor:	314
Date of Calibration:	18 October, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

IP

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1858535
Sub-batch: 0
Date of Issue: 09-Nov-2018
Client: ALS TECHNICHEM (HK) PTY LTD

Reference Equipment:
Model: SonTek IQ Standard
Serial Number : IQ1217004

Equipment to be calibrated:
Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 1449006330
Equipment No.: --
Calibration Factor: 314

Date of Calibration: 18 October, 2018

Parameters: The calibration of flow meter is verified with standard flow meter on site by AUES Staff.

Flow rate

Trial	Reading of Reference Equipment (m/s) SonTek IQ Standard Serial No: IQ1217004	Reading of Equipment to be calibrated (m/s) Global Water FP211 Serial No. 1449006330
1	0.09	0.1
2	0.17	0.2
3	0.19	0.2
4	0.38	0.4
5	0.46	0.5
6	0.72	0.7

PP Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1946056
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTI	**SUB-BATCH:**	0
ADDRESS:	RM A 20/F., GOLD KING IND BLDG,	**LABORATORY:**	HONG KONG
	NO. 35-41 TAI LIN PAI ROAD,	**DATE RECEIVED:**	11-Oct-2019
	KWAI CHUNG, N.T. HONG KONG	**DATE OF ISSUE:**	28-Oct-2019

COMMENTS

The calibration of flow rate performed by AUES staff on 09 October 2019.

Scope of Test:	Flow rate
Equipment Type:	Flow Meter
Brand Name:	Global Water
Model No.:	FP211
Serial No.:	1449006330
Equipment No.:	--
Calibration Factor:	314
Date of Calibration:	09 October, 2019

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1946056
Sub-batch: 0
Date of Issue: 28-Oct-2019
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Reference Equipment:
Model: SonTek IQ Standard
Serial Number : IQ1217004

Equipment to be calibrated:
Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 1449006330
Equipment No.: --
Calibration Factor: 314

Date of Calibration: 09 October, 2019

Parameters: The calibration of flow meter is verified with standard flow meter on site by AUES Staff.

Flow rate

Trial	Reading of Reference Equipment (m/s) SonTek IQ Standard Serial No: IQ1217004	Reading of Equipment to be calibrated (m/s) Global Water FP211 Serial No. 1449006330
1	0.11	0.1
2	0.19	0.2
3	0.46	0.4
4	0.77	0.8
5	1.02	1.0
6	1.17	1.1

Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong

Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a
為香港認可處執行機關根據認可諮詢委員會建議而接受的

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 – General requirements for the competence of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as listed in the HOKLAS Directory of Accredited Laboratories within the test category of
此實驗所符合ISO / IEC 17025 : 2005 –《測試及校正實驗所能力的通用規定》所訂的要求，獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定測試或校正工作

Environmental Testing
環境測試

This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作（見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報）。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator
執行幹事 陳成城
Issue Date : 5 May 2009
簽發日期：二零零九年五月五日

Registration Number : HOKLAS 066
註冊號碼：

Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日

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

L 000552

Appendix F

Event and Action Plan of Air Quality, Noise and Water Quality

Event and Action Plan for air quality

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action level exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit level exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit level exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative

Event and Action Plan for Construction Noise

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level Exceedance	1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness	1. Review the analyzed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals
Limit Level Exceedance	1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

Event and Action Plan for Water Quality

Event	Action			
	ET	IEC	ER	Contractor
Action level exceedance for one sampling day	1. Inform IEC, Contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; and 3. Discuss remedial measures with IEC and Contractor and ER.	1. Discuss with ET, ER and Contractor on the implemented mitigation measures; 2. Review proposals on remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the implemented mitigation measures; 2. Make agreement on the remedial measures to be implemented; 3. Supervise the implementation of agreed remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment; 5. Consider changes of working methods; 6. Discuss with ER, ET and IEC and purpose remedial measures to IEC and ER; and 7. Implement the agreed mitigation measures.
Action level exceedance for more than one consecutive sampling days	1. Repeat in-situ measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Check monitoring data, all plant, equipment and Contractor's working methods; 4. Discuss remedial measures with IEC, contractor and ER 5. Ensure remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the proposed mitigation measures; 2. Make agreement on the remedial measures to be implemented ; and 3. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of remedial measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed mitigation measures.
Limit level exceedance for one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Rectify unacceptable practice; 4. Check monitoring data, all plant, 5. equipment and Contractor's working methods; 6. Consider changes of working methods; 7. Discuss mitigation measures with IEC, ER and Contractor; and 8. Ensure the agreed remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; and 4. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures.
Limit level exceedance for more than one consecutive sampling days	1. Inform IEC, contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; 3. Discuss mitigation measures with IEC, ER and Contractor; 4. Ensure mitigation measures are implemented; and 5. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; 4. Discuss with ET and IEC on the effectiveness of the implemented mitigation measures; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures; and 7. As directed by the ER, to slow down or stop all or part of the construction activities until no exceedance of Limit level.

Note: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative
Each step of actions required shall be implemented within 1 working day unless otherwise specified or agreed with EPD.

Appendix G

Monitoring Schedules of the Reporting Month and Coming Month

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – October 2019

Date		NOISE MONITORING	AIR QUALITY MONITORING		WATER QUALITY
			1-HOUR TSP	24-HOUR TSP	
Tue	1-Oct-19				
Wed	2-Oct-19	✓	✓		✓
Thu	3-Oct-19			✓	
Fri	4-Oct-19				✓
Sat	5-Oct-19				
Sun	6-Oct-19				
Mon	7-Oct-19				
Tue	8-Oct-19	✓	✓		✓
Wed	9-Oct-19			✓	
Thu	10-Oct-19				✓
Fri	11-Oct-19				
Sat	12-Oct-19				✓
Sun	13-Oct-19				
Mon	14-Oct-19	✓	✓		✓
Tue	15-Oct-19			✓	
Wed	16-Oct-19				✓
Thu	17-Oct-19				
Fri	18-Oct-19				✓
Sat	19-Oct-19		✓		
Sun	20-Oct-19				
Mon	21-Oct-19			✓	✓
Tue	22-Oct-19				
Wed	23-Oct-19				✓
Thu	24-Oct-19				
Fri	25-Oct-19	✓	✓		✓
Sat	26-Oct-19			✓	
Sun	27-Oct-19				
Mon	28-Oct-19				✓
Tue	29-Oct-19				
Wed	30-Oct-19				✓
Thu	31-Oct-19	✓	✓		

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – November 2019

Date		NOISE MONITORING	AIR QUALITY MONITORING		WATER QUALITY
			1-HOUR TSP	24-HOUR TSP	
Fri	1-Nov-19			✓	✓
Sat	2-Nov-19				
Sun	3-Nov-19				
Mon	4-Nov-19				✓
Tue	5-Nov-19				
Wed	6-Nov-19	✓	✓		✓
Thu	7-Nov-19			✓	
Fri	8-Nov-19				✓
Sat	9-Nov-19				
Sun	10-Nov-19				
Mon	11-Nov-19				✓
Tue	12-Nov-19	✓	✓		
Wed	13-Nov-19			✓	✓
Thu	14-Nov-19				
Fri	15-Nov-19				✓
Sat	16-Nov-19				
Sun	17-Nov-19				
Mon	18-Nov-19	✓	✓		✓
Tue	19-Nov-19			✓	
Wed	20-Nov-19				✓
Thu	21-Nov-19				
Fri	22-Nov-19				✓
Sat	23-Nov-19		✓		
Sun	24-Nov-19				
Mon	25-Nov-19			✓	✓
Tue	26-Nov-19				
Wed	27-Nov-19				✓
Thu	28-Nov-19				
Fri	29-Nov-19	✓	✓		✓
Sat	30-Nov-19			✓	

✓	Monitoring Day
	Sunday or Public Holiday

Appendix H

Monitoring Data

- **24-hour TSP Air Quality**
- **Noise**
- **Water Quality**

Air Quality (24-hour TSP)

24-Hour TSP Monitoring Data for ASR-1

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
3-Oct-19	24781	21536.07	21560.07	1440.00	24	24	24.0	26.7	1012.5	0.84	1206	2.7200	2.9264	0.2064	171
9-Oct-19	24764	21560.07	21584.11	1442.40	24	24	24.0	27.9	1013.5	0.85	1229	2.7114	2.8444	0.1330	108
15-Oct-19	24802	21584.11	21608.11	1440.00	24	24	24.0	25	1019	0.86	1235	2.6817	2.8537	0.1720	139
21-Oct-19	24878	21608.11	21632.11	1440.00	23	24	23.5	24.9	1014.8	0.84	1212	2.7096	2.8831	0.1735	143
26-Oct-19	24925	21632.11	21656.12	1440.60	23	24	23.5	25.9	1017	0.87	1253	2.8569	3.0393	0.1824	146

24-Hour TSP Monitoring Data for ASR-2

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
3-Oct-19	24779	18916.40	18940.40	1440.00	36	38	37.0	28.6	1012.2	1.28	1847	2.7070	3.0047	0.2977	161
9-Oct-19	24890	18940.40	18964.84	1466.40	36	36	36.0	27.9	1013.5	1.24	1824	2.7073	2.8552	0.1479	81
15-Oct-19	24803	18964.84	18988.84	1440.00	34	36	35.0	25	1019	1.22	1760	2.6994	2.8288	0.1294	74
21-Oct-19	24877	18988.84	19012.84	1440.00	34	36	35.0	24.9	1014.8	1.22	1757	2.7046	2.8282	0.1236	70
26-Oct-19	24926	19012.84	19036.68	1430.40	34	36	35.0	25.9	1017	1.20	1719	2.8202	3.0011	0.1809	105

24-Hour TSP Monitoring Data for ASR-3a

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
3-Oct-19	24780	12748.15	12771.84	1421.40	31	31	31.0	28.6	1012.2	1.09	1549	2.6835	2.7357	0.0522	34
9-Oct-19	24891	12771.84	12795.51	1420.20	30	31	30.5	27.9	1013.5	0.97	1380	2.6992	2.7599	0.0607	44
15-Oct-19	24801	12795.51	12819.27	1425.60	30	32	31.0	25	1019	0.99	1417	2.6994	2.7631	0.0637	45
21-Oct-19	24916	12819.27	12843.05	1426.80	31	32	31.5	24.9	1014.8	1.01	1437	2.8120	2.8861	0.0741	52
26-Oct-19	24924	12843.05	12866.78	1423.80	32	32	32.0	25.9	1017	1.05	1500	2.8262	2.9155	0.0893	60

Noise

Noise Measurement Results (dB(A)) of CN-1																				
Date	**Start Time**	**1st Leq_{5min}**	**L10**	**L90**	**2nd Leq_{5min}**	**L10**	**L90**	**3rd Leq_{5min}**	**L10**	**L90**	**4th Leq_{5min}**	**L10**	**L90**	**5th Leq_{5min}**	**L10**	**L90**	**6th Leq_{5min}**	**L10**	**L90**	**Leq_{30min}**	**Façade Collection (*)**
2-Oct-19	9:13	65.0	67.5	57.8	63.4	65.2	57.8	64.5	64.4	59.0	65.7	66.9	58.1	63.7	64.7	59.1	62.9	63.3	57.6	68	71
8-Oct-19	9:03	61.3	63.0	58.7	67.5	61.6	58.3	62.9	65.0	60.5	65.0	65.5	62.3	63.8	65.2	62.1	65.1	65.5	63.2	68	71
14-Oct-19	9:50	62.6	63.8	61.5	62.6	63.4	61.4	60.8	62.7	59.2	65.7	65.8	61.2	66.1	66.9	61.3	63.4	64.9	62.2	67	70
24-Oct-19	13:44	58.8	59.7	56.8	59.3	59.7	56.9	65.9	69.1	58.0	60.6	62.1	57.6	59.7	60.8	56.1	61.2	61.8	57.5	65	68
31-Oct-19	13:27	62.7	61.3	57.7	60.2	60.0	57.4	65.1	61.4	57.1	61.1	63.3	58.4	63.4	62.0	59.7	60.7	61.7	58.5	66	69

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-2																				
Date	**Start Time**	**1st Leq_{5min}**	**L10**	**L90**	**2nd Leq_{5min}**	**L10**	**L90**	**3rd Leq_{5min}**	**L10**	**L90**	**4th Leq_{5min}**	**L10**	**L90**	**5th Leq_{5min}**	**L10**	**L90**	**6th Leq_{5min}**	**L10**	**L90**	**Leq_{30min}**	**Façade Collection (*)**
2-Oct-19	10:11	67.6	70.3	62.2	65.2	68.3	57.6	62.8	68.3	55.2	64.4	69.5	58.2	64.9	69.2	59.1	63.9	68.0	55.8	65	68
8-Oct-19	9:53	65.5	69.5	54.8	64.3	68.1	54.8	64.5	67.8	54.7	65.6	68.9	55.9	64.2	67.8	55.7	62.9	67.2	55.1	65	68
14-Oct-19	10:26	65.8	68.2	57.0	64.4	67.7	56.4	63.7	66.0	57.8	64.5	67.5	57.0	63.2	66.3	56.5	65.1	68.3	58.1	65	68
24-Oct-19	14:21	62.6	66.5	53.6	63.6	67.9	49.1	62.3	66.6	51.1	64.8	68.0	52.5	63.5	67.5	51.3	63.0	67.0	50.0	63	66
31-Oct-19	14:03	63.8	67.0	54.3	63.4	68.4	56.0	64.8	67.2	54.3	64.9	68.5	52.5	63.5	67.1	51.5	64.0	68.5	53.0	64	67

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-3																				
Date	**Start Time**	**1st Leq_{5min}**	**L10**	**L90**	**2nd Leq_{5min}**	**L10**	**L90**	**3rd Leq_{5min}**	**L10**	**L90**	**4th Leq_{5min}**	**L10**	**L90**	**5th Leq_{5min}**	**L10**	**L90**	**6th Leq_{5min}**	**L10**	**L90**	**Leq_{30min}**	**Façade Collection (*)**
2-Oct-19	10:53	57.8	58.2	52.1	58.3	59.4	51.4	58.7	61.2	51.4	56.4	59.5	52.5	58.5	61.2	51.5	56.3	60.4	52.7	58	61
8-Oct-19	10:39	61.6	64.7	53.3	57.5	60.9	48.3	59.9	61.8	47.9	58.6	61.1	47.4	57.0	59.6	48.4	62.7	64.0	48.3	60	63
14-Oct-19	11:06	57.6	60.4	52.0	58.2	60.8	52.0	56.2	58.8	51.4	57.4	59.9	50.6	58.3	60.5	51.9	58.6	60.4	51.0	58	61
24-Oct-19	10:05	54.2	57.6	47.9	68.1	58.6	47.8	52.2	55.4	48	53.6	56	47.3	54.7	57.7	48.6	53.2	56	48.1	61	64
31-Oct-19	10:00	54.5	56	51.5	55.7	58.4	51.9	55.5	57.7	51.2	55.6	57	51.6	55.3	57.2	50.7	56.1	59.3	51.1	55	58

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-4																			
Date	**Start Time**	**1st Leq_{5min}**	**L10**	**L90**	**2nd Leq_{5min}**	**L10**	**L90**	**3rd Leq_{5min}**	**L10**	**L90**	**4th Leq_{5min}**	**L10**	**L90**	**5th Leq_{5min}**	**L10**	**L90**	**6th Leq_{5min}**	**L10**	**L90**	**Leq_{30min}**
2-Oct-19	11:29	58.6	61.5	43.7	58.2	60.8	43.5	58.9	63.0	43.6	56.2	57.9	42.8	58.0	58.5	44.1	58.3	59.3	43.6	58
8-Oct-19	11:27	60.1	63.9	44.5	61.2	64.1	44.3	62.9	65.9	44.5	61.6	64.6	44.8	58.3	62.6	43.6	59.6	62.6	43.3	61
14-Oct-19	11:42	62.8	67.0	43.2	61.3	66.0	43.7	60.5	64.3	45.0	60.2	63.1	46.4	61.2	64.5	44.8	59.0	63.6	43.2	61
24-Oct-19	9:28	56.7	57.8	39.4	53.9	57.0	40.2	54.6	58.9	40.0	55.5	58.3	40.9	54.6	58.6	40.8	55.8	58.9	40.8	55
31-Oct-19	9:24	53.6	52.2	41.3	53.6	53.1	41.8	54.2	57.0	41.9	53.1	55.4	40.0	54.4	56.7	41.4	55.8	57.1	41.3	54

Water Quality

Water Quality Impact Monitoring Result for M1

Date	2-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:40	0.13	29.1	29.1	<0.1	<0.1	6.99	7.00	92.4	92.5	1.96	2.0	8.90	8.9	0.04	0.04	8	8.0
			29.1		<0.1		7		92.5		2.02		8.90		0.04		8	

Date	4-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:20	0.13	29.8	29.8	<0.1	<0.1	7.28	7.28	95.9	95.9	4.87	4.3	7.90	7.9	0.03	0.03	5	5.0
			29.8		<0.1		7.27		95.8		3.67		7.90		0.03		5	

Date	8-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	14:20	0.14	29.5	29.5	<0.1	<0.1	7.46	7.51	97.6	98.0	3.19	3.4	8.10	8.1	0.06	0.06	5	5.0
			29.5		<0.1		7.55		98.3		3.66		8.10		0.06		5	

Date	10-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:20	0.14	0	15.0	<0.1	<0.1	7.11	7.12	94.0	94.1	1.86	1.9	9.50	9.5	0.03	0.03	5	5.0
			30		<0.1		7.12		94.1		1.96		9.50		0.03		5	

Date	12-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:00	0.14	30.8	30.8	<0.1	<0.1	7.42	7.41	98.0	97.8	2.88	3.0	9.40	9.4	0.04	0.04	3	3.5
			30.8		<0.1		7.4		97.6		3.1		9.40		0.04		4	

Date	14-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:15	0.15	26.9	26.9	<0.1	<0.1	7.6	7.62	96.1	96.2	2.37	2.6	8.80	8.8	0.03	0.03	2	2.0
			26.9		<0.1		7.63		96.3		2.86		8.80		0.03		2	

Date	16-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:45	0.13	29.1	29.1	<0.1	<0.1	6.76	6.77	88.1	88.2	5.25	5.3	9.90	9.9	0.03	0.03	2	2.0
			29.1		<0.1		6.78		88.3		5.32		9.90		0.03		2	

Date	18-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:30	0.13	27.5	27.5	<0.1	<0.1	7.37	7.37	93.4	93.4	2.2	2.3	9.50	9.5	0.03	0.03	3	3.0
			27.5		<0.1		7.36		93.3		2.3		9.50		0.03		3	

Date	21-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:05	0.13	28.5	28.5	<0.1	<0.1	6.04	6.07	77.1	77.4	2.33	2.4	9.40	9.4	0.04	0.04	3	3.0
			28.5		<0.1		6.09		77.6		2.41		9.40		0.04		3	

Date	23-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:00	0.13	25.4	25.4	<0.1	<0.1	7.99	8.00	98.6	98.7	3.36	3.3	10.00	10.0	0.03	0.03	3	3.0
			25.4		<0.1		8		98.7		3.29		10.00		0.03		3	

Date	25-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:40	0.13	27.4	27.4	<0.1	<0.1	8.13	8.14	102.0	102.1	4.75	4.7	10.30	10.3	0.04	0.04	5	5.0
			27.4		<0.1		8.14		102.2		4.6		10.30		0.04		5	

Date	28-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:00	0.13	28.8	28.8	<0.1	<0.1	6.92	6.92	89.5	89.5	1.92	2.1	9.80	9.8	0.04	0.04	3	3.0
			28.8		<0.1		6.92		89.4		2.23		9.80		0.04		3	

Date	30-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:10	0.12	25	25.0	<0.1	<0.1	8.2	8.21	100.7	100.7	2.23	2.3	8.90	8.9	0.03	0.03	<2	<2
			25		<0.1		8.21		100.7		2.43		8.90		0.03		<2	

Water Quality Impact Monitoring Result for M2

Date	4-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	9:55	0.00 *(#)*																

Date	8-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	9:30	0.02 *(#)*																

Date	10-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.01 *(#)*																

Date	12-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.00 *(#)*																

Date	14-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:35	0.12	27	27.0	<0.1	<0.1	5.31	5.33	66.6	66.8	10.7	10.6	8.40	8.4	0.07	0.07	20	20.5
			27		<0.1		5.34		66.9		10.4		8.40		0.07		21	

Date	16-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:20	0.09	29.3	29.3	<0.1	<0.1	5.26	5.27	68.3	68.4	7.58	8.8	8.90	8.9	0.07	0.07	9	9.0
			29.3		<0.1		5.27		68.4		10.1		8.90		0.07		9	

Date	18-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:05	0.02 *(#)*																

Date	21-Oct-19																			
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:35	0.01 *(#)*																

Date	23-Oct-19										
Location	**Time**	**Depth (m)**	**Temp (oC)**	**Flow Velocity (m/s)**	**DO (mg/L)**	**DO (%)**	**Turbidity (NTU)**	**pH**	**Salinity**	**SS(mg/L)**
M2	10:45	0.00 *(#)*								

Date	25-Oct-19										
Location	**Time**	**Depth (m)**	**Temp (oC)**	**Flow Velocity (m/s)**	**DO (mg/L)**	**DO (%)**	**Turbidity (NTU)**	**pH**	**Salinity**	**SS(mg/L)**
M2	10:45	0.00 *(#)*								

Date	28-Oct-19										
Location	**Time**	**Depth (m)**	**Temp (oC)**	**Flow Velocity (m/s)**	**DO (mg/L)**	**DO (%)**	**Turbidity (NTU)**	**pH**	**Salinity**	**SS(mg/L)**
M2	10:35	0.00 *(#)*								

Date	30-Oct-19										
Location	**Time**	**Depth (m)**	**Temp (oC)**	**Flow Velocity (m/s)**	**DO (mg/L)**	**DO (%)**	**Turbidity (NTU)**	**pH**	**Salinity**	**SS(mg/L)**
M2	10:40	0.00 *(#)*								

Remarks: (#) During the water monitoring, the channel of M2 was observed dried up and water sampling was unable be carried out;

Water Quality Impact Monitoring Result for M3

Date	2-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.42	30.4	30.4	<0.1	<0.1	7.68	7.68	100.2	100.2	3.82	3.6	8.80	8.8	0.0	0.00	8	8.5
			30.4		<0.1		7.67		100.1		3.42		8.80		0.0		9	

Date	4-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:05	2.45	30	30.0	<0.1	<0.1	6.47	6.48	85.6	85.7	3.42	3.3	9.60	9.6	0.0	0.00	9	8.5
			30		<0.1		6.49		85.8		3.11		9.60		0.0		8	

Date	8-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	9:40	2.50	29.3	29.3	0.1	0.1	6.34	6.79	81.9	88.1	5.22	5.0	10.40	10.4	0.0	0.01	7	7.0
			29.3		0.1		7.24		94.2		4.78		10.40		0.0		7	

Date	10-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.45	30.1	30.1	<0.1	<0.1	6.24	6.25	82.7	82.8	3.97	3.9	8.70	8.7	0.0	0.00	3	2.5
			30.1		<0.1		6.26		82.8		3.89		8.70		0.0		2	

Date	12-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.45	30.1	30.1	<0.1	<0.1	6.65	6.70	88.5	88.9	4.32	4.1	8.80	8.8	0.0	0.00	2	2.0
			30.1		<0.1		6.74		89.3		3.93		8.80		0.0		2	

Date	14-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:40	2.50	27.1	27.1	0.1	0.1	7.45	7.47	93.8	94.0	3.43	3.4	8.30	8.3	0.0	0.00	3	2.5
			27.1		0.0		7.48		94.1		3.32		8.30		0.0		2	

Date	16-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	11:30	2.45	29.1	29.1	<0.1	<0.1	7.41	7.42	95.8	95.9	3.05	3.1	8.60	8.6	0.0	0.00	2	2.0
			29.1		<0.1		7.42		95.9		3.23		8.60		0.0		2	

Date	18-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	11:15	2.45	27.5	27.5	<0.1	<0.1	6.88	6.89	87.2	87.2	3.5	3.5	9.30	9.3	0.0	0.00	3	3.5
			27.5		<0.1		6.89		87.2		3.41		9.30		0.0		4	

Date	21-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:40	2.45	27.8	27.8	<0.1	<0.1	6.55	6.57	83.1	83.3	4.06	3.9	8.90	8.9	0.0	0.00	4	4.0
			27.8		<0.1		6.58		83.4		3.7		8.90		0.0		4	

Date	23-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:55	2.45	26.9	26.9	<0.1	<0.1	7.17	7.18	89.5	89.6	2.49	2.8	9.80	9.8	0.0	0.00	5	4.5
			26.9		<0.1		7.19		89.6		3.01		9.80		0.0		4	

Date	25-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:55	2.45	27.4	27.4	<0.1	<0.1	7.73	7.77	96.6	97.0	4.77	4.8	9.80	9.8	0.0	0.00	4	5.0
			27.4		<0.1		7.81		97.4		4.86		9.80		0.0		6	

Date	28-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:45	2.45	28.6	28.6	<0.1	<0.1	6.6	6.62	84.9	85.1	3.11	3.1	9.30	9.3	0.0	0.00	4	3.5
			28.6		<0.1		6.63		85.2		3.16		9.30		0.0		3	

Date	30-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:50	2.45	24.9	24.9	<0.1	<0.1	7.44	7.44	92.2	92.3	3.31	3.5	8.60	8.6	3.3	3.47	4	3.5
			24.9		<0.1		7.44		92.3		3.62		8.60		3.6		3	

Water Quality Impact Monitoring Result for M4

Date	2-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	10:50	0.40	28.9	28.9	<0.1	<0.1	7.94	7.88	102.8	102.1	1.9	1.8	8.60	8.6	0.02	0.02	3	2.5
			28.9		<0.1		7.82		101.3		1.8		8.60		0.02		2	

Date	4-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	10:20	0.40	30.4	30.4	<0.1	<0.1	7.33	7.34	97.5	97.6	1.4	1.4	9.40	9.4	0.05	0.05	2	2.0
			30.4		<0.1		7.35		97.7		1.3		9.40		0.05		2	

Date	8-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	14:35	0.41	29.7	29.7	<0.1	<0.1	7.85	7.95	101.7	102.9	1.3	1.2	9.70	9.7	0.03	0.03	4	4.5
			29.7		<0.1		8.05		104.1		1.1		9.70		0.03		5	

Date	10-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	9:35	0.41	29.9	29.9	<0.1	<0.1	7.33	7.34	96.9	97.0	1.1	1.1	8.10	8.1	0.05	0.05	<2	<2
			29.9		<0.1		7.35		97.1		1.1		8.10		0.05		<2	

Date	12-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	10:45	0.40	30.8	30.8	<0.1	<0.1	7.47	7.49	99.3	99.5	1.5	1.4	8.60	8.6	0.05	0.05	<2	<2
			30.8		<0.1		7.51		99.7		1.3		8.60		0.05		<2	

Date	14-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	10:55	0.42	27.2	27.2	<0.1	<0.1	7.68	7.70	97.0	97.3	2.5	2.3	8.10	8.1	0.03	0.03	4	4.0
			27.2		<0.1		7.72		97.5		2.1		8.10		0.03		4	

Date	16-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	11:50	0.40	29.2	29.2	<0.1	<0.1	6.87	6.88	89.4	89.5	1.3	1.3	8.80	8.8	0.05	0.05	2	2.5
			29.2		<0.1		6.89		89.5		1.2		8.80		0.05		3	

Date	18-Oct-19																	
Location	**Time**	**Depth (m)**	**Temp (oC)**		**Flow Velocity (m/s)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**Salinity**		**SS(mg/L)**	
M4	11:35	0.40	27.7	27.7	<0.1	<0.1	7.19	7.20	91.6	91.7	1.6	1.7	9.20	9.2	0.03	0.03	3	3.0
			27.7		<0.1		7.2		91.7		1.9		9.20		0.03		3	

Date	21-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:55	0.40	27.5	27.5	<0.1	<0.1	7.5	7.51	94.7	94.8	1.8	1.8	8.50	8.5	0.06	0.06	4	4.0
			27.5		<0.1		7.52		94.9		1.8		8.50		0.06		4	

Date	23-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:20	0.40	27	27.0	<0.1	<0.1	7.89	7.89	98.8	98.8	1.1	1.1	9.50	9.5	0.05	0.05	2	2.0
			27		<0.1		7.88		98.7		1.1		9.50		0.05		2	

Date	25-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:10	0.40	26.8	26.8	<0.1	<0.1	7.87	7.88	98.3	98.4	1.3	1.4	9.50	9.5	0.05	0.05	2	2.0
			26.8		<0.1		7.88		98.4		1.5		9.50		0.05		2	

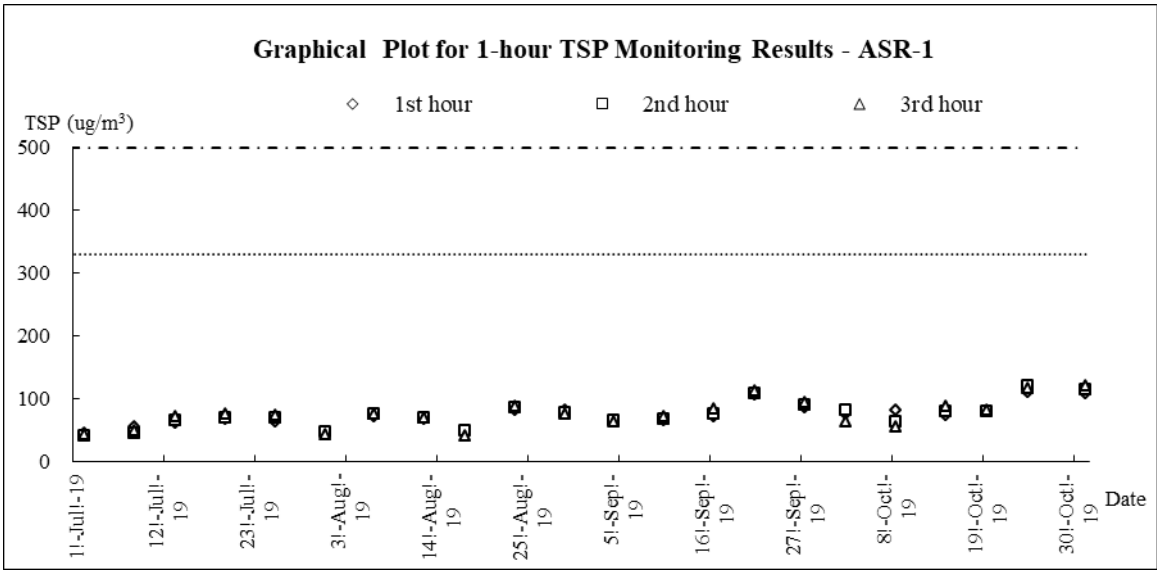
Date	28-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:00	0.40	28.2	28.2	<0.1	<0.1	7.23	7.25	92.7	92.8	1.0	1.0	8.80	8.8	0.05	0.05	<2	<2
			28.2		<0.1		7.26		92.9		1.0		8.80		0.05		<2	

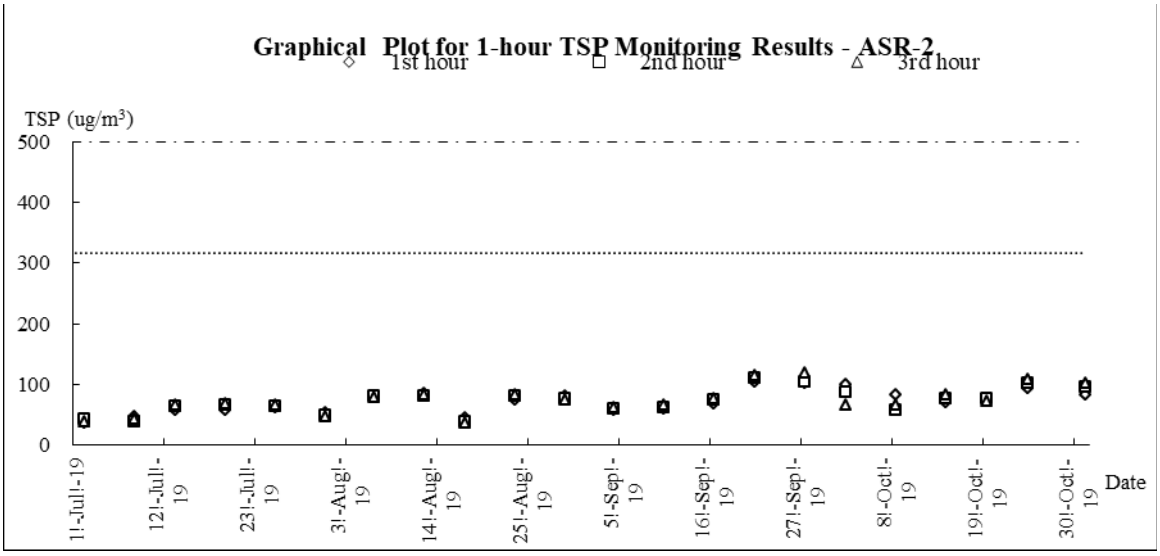
Date	30-Oct-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:10	0.40	25.5	25.5	<0.1	<0.1	8.45	8.46	104.2	104.3	1.2	1.1	8.30	8.3	0.06	0.06	<2	<2
			25.5		<0.1		8.46		104.3		1.1		8.30		0.06		<2	

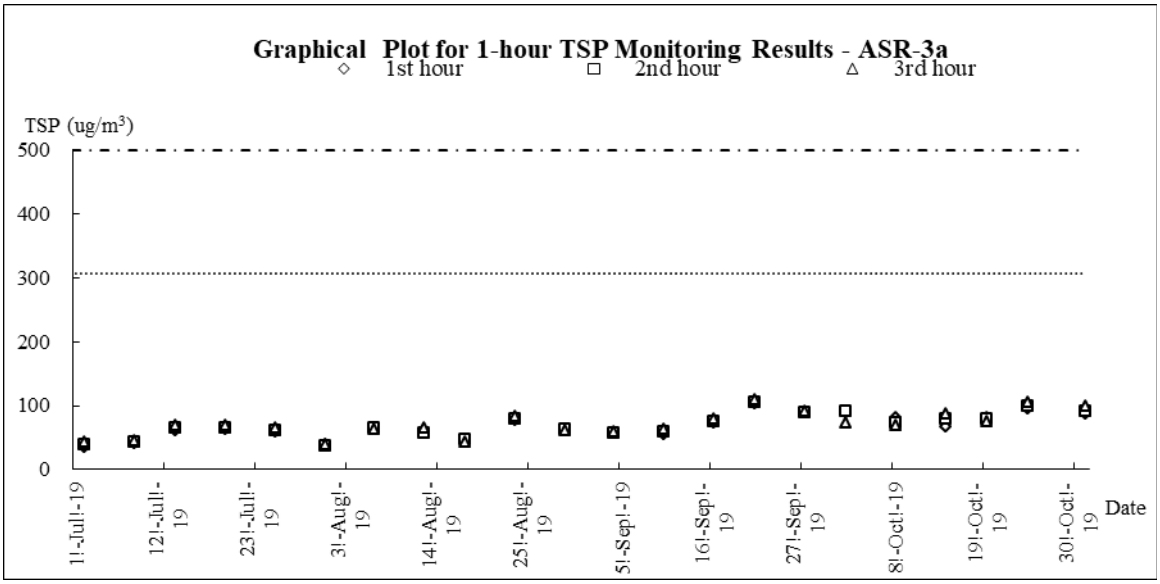
Appendix I

Graphical Plots of Air Quality, Noise and Water Quality

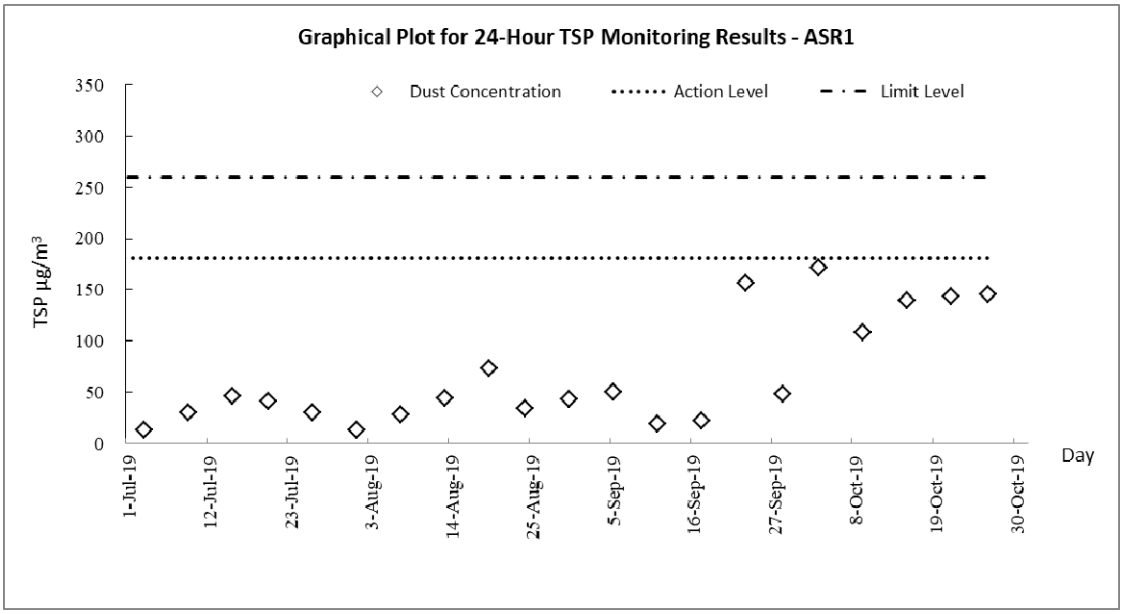
Air Quality Impact Monitoring – 1-hour TSP

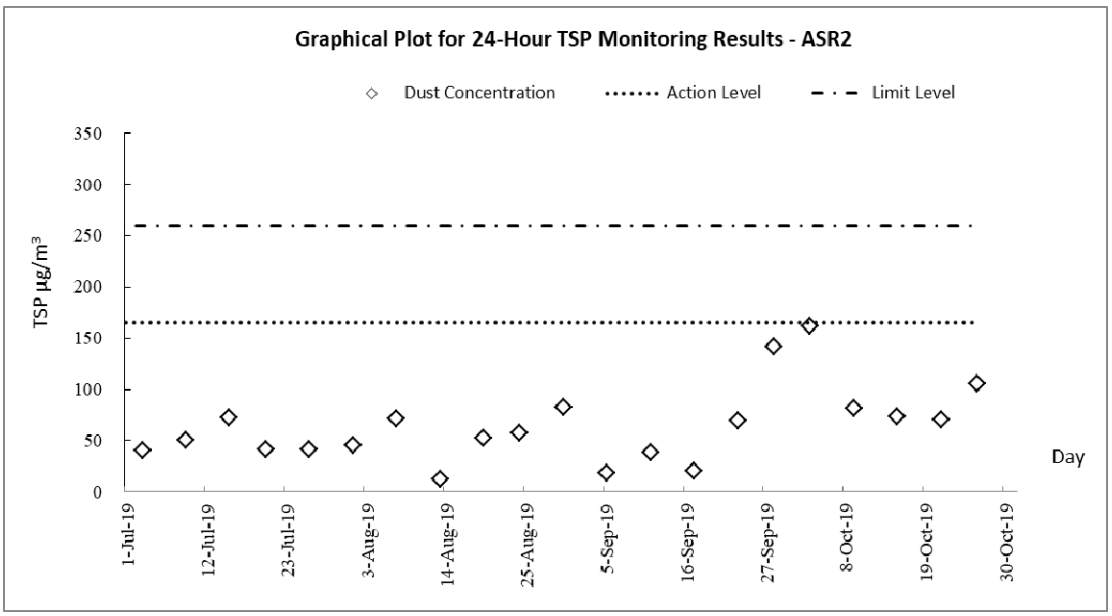


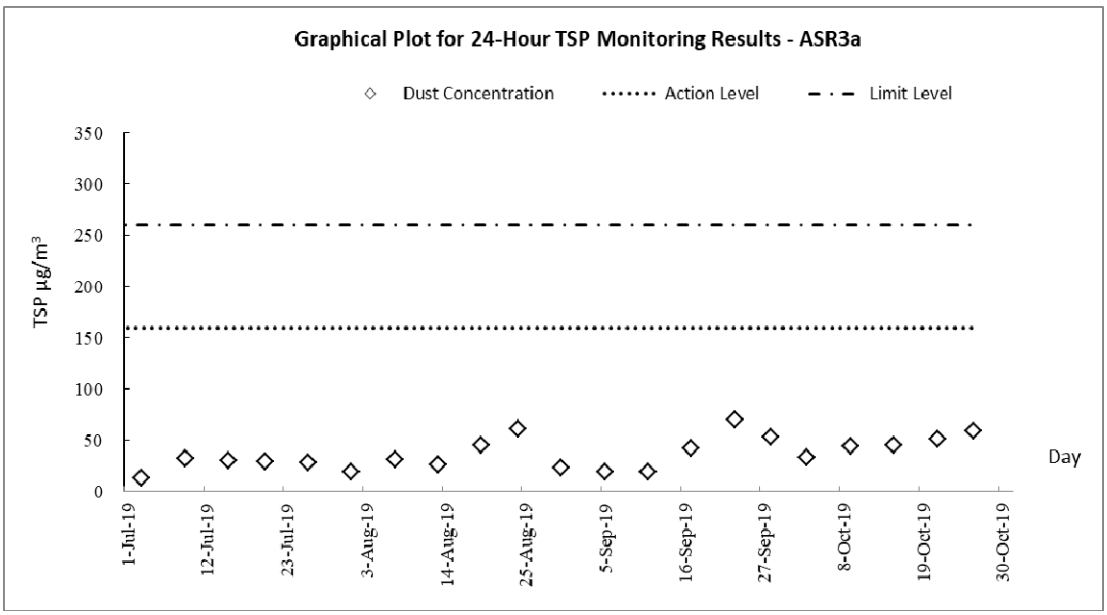




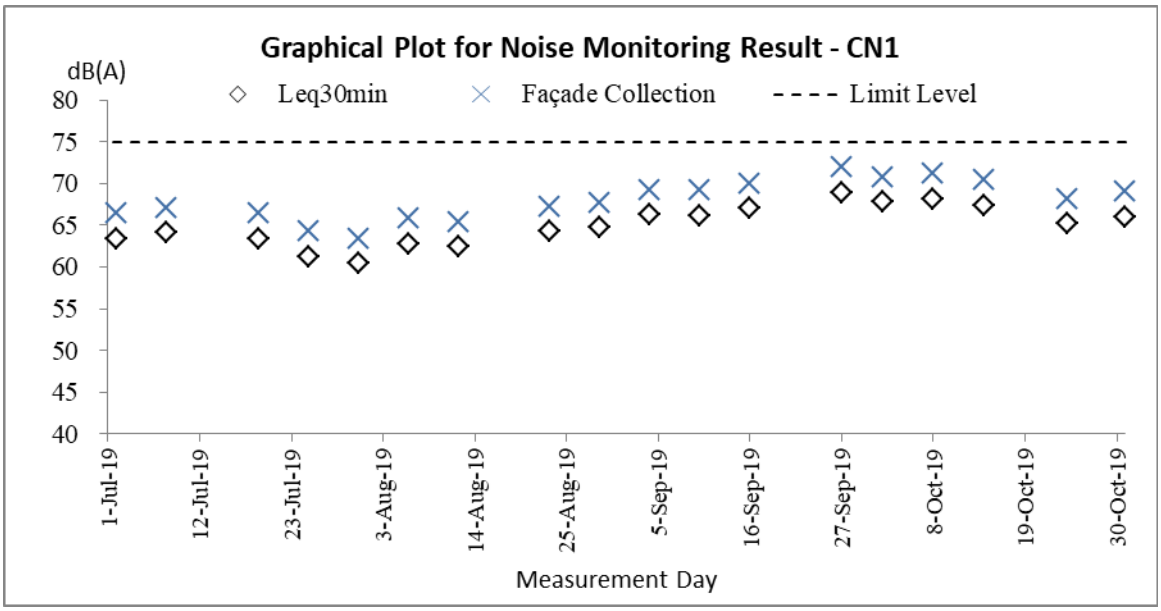
Air Quality Impact Monitoring – 24-hour TSP

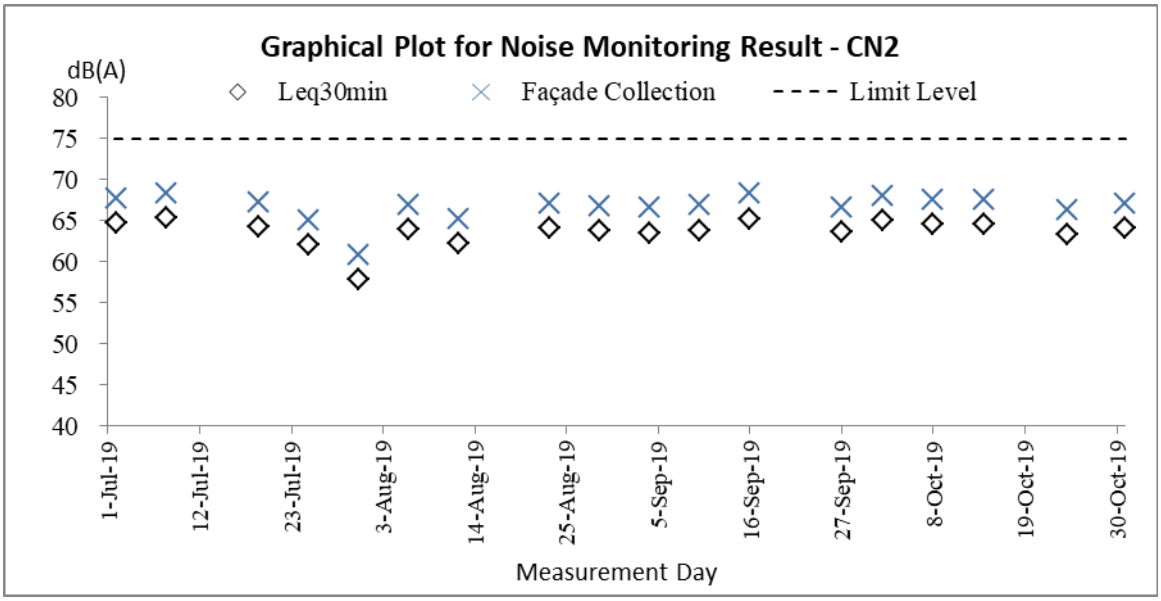


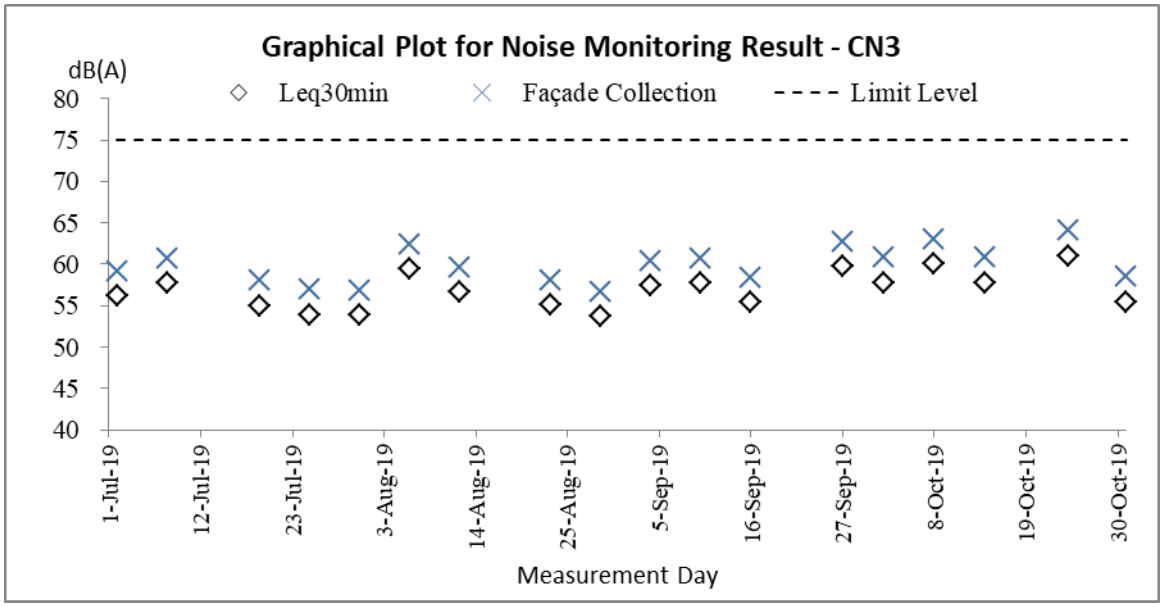


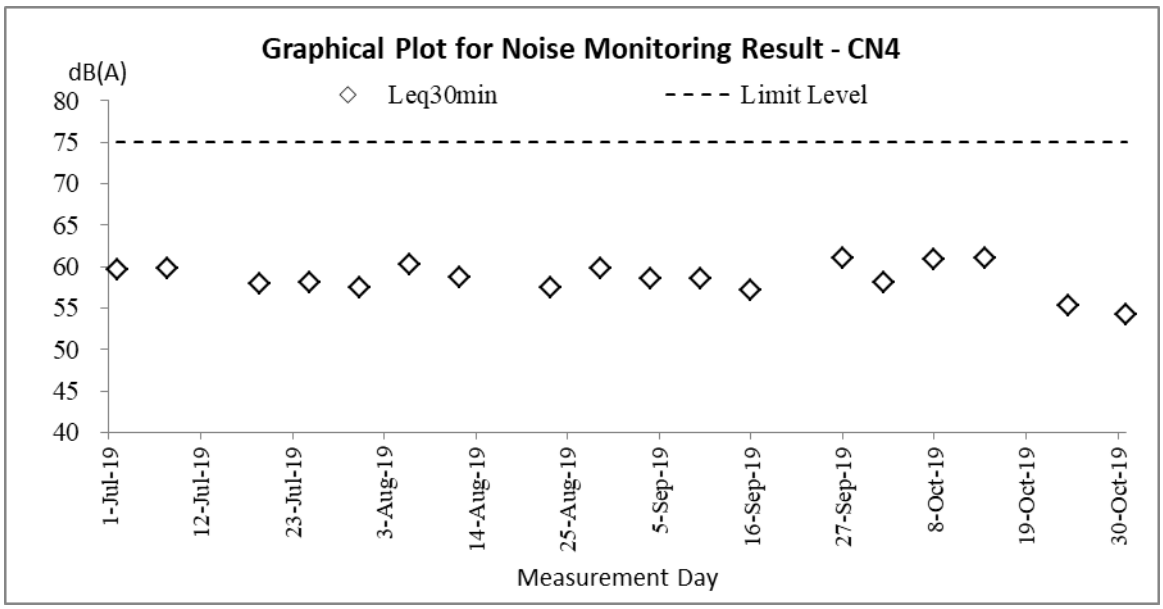


Construction Noise Impact Monitoring

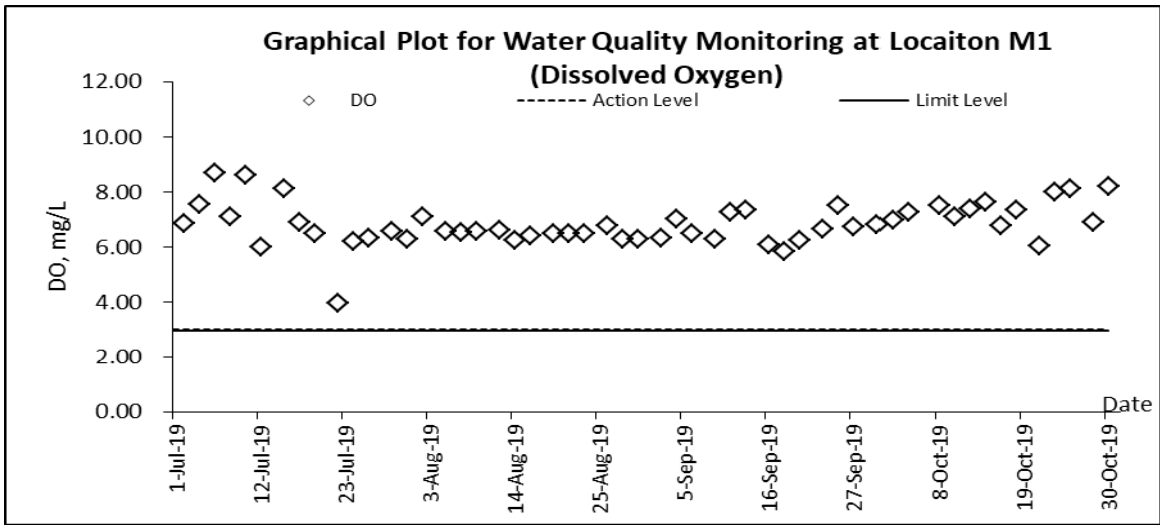


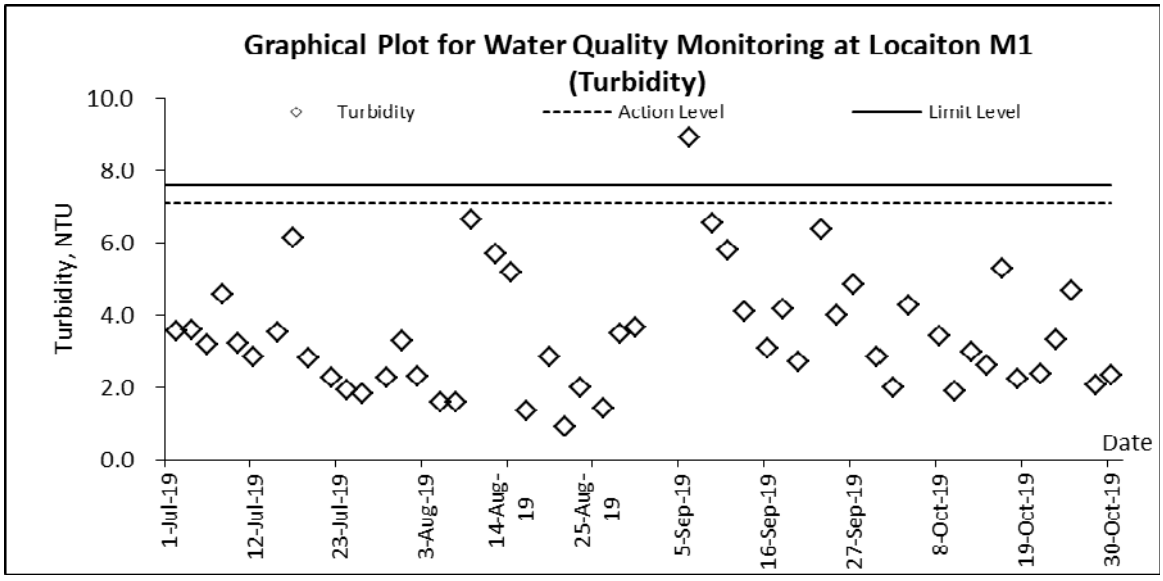


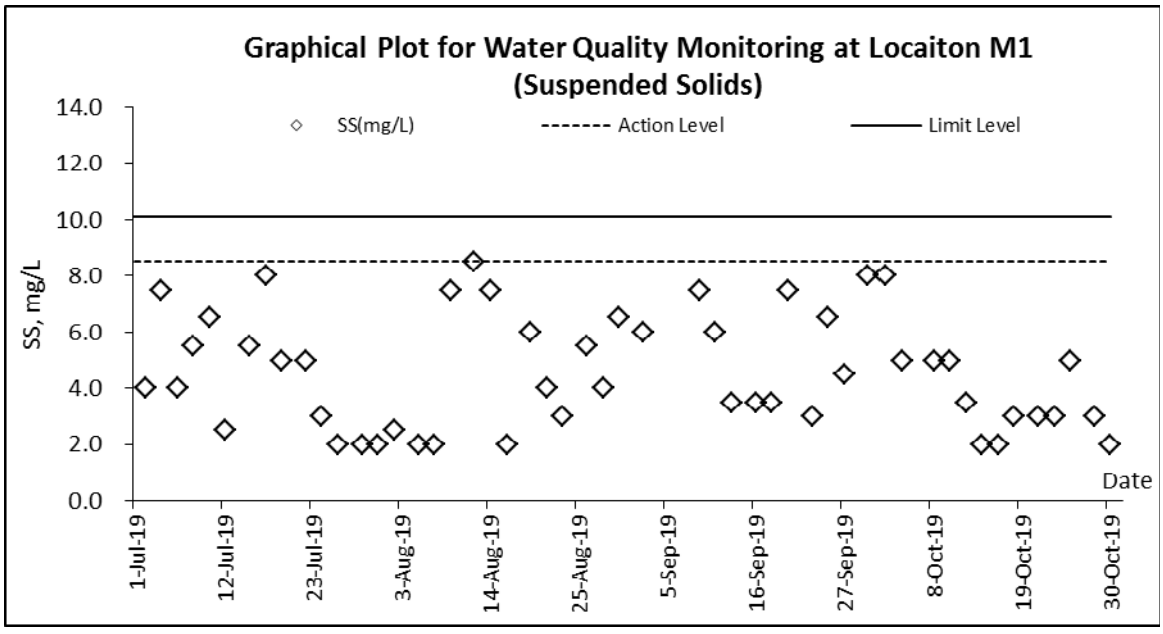

Graphical Plot for Noise Monitoring Result - CN3
dB(A)
Leq30min
Façade Collection
Limit Level
80
75
70
65
60
55
50
45
40
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19
Measurement Day

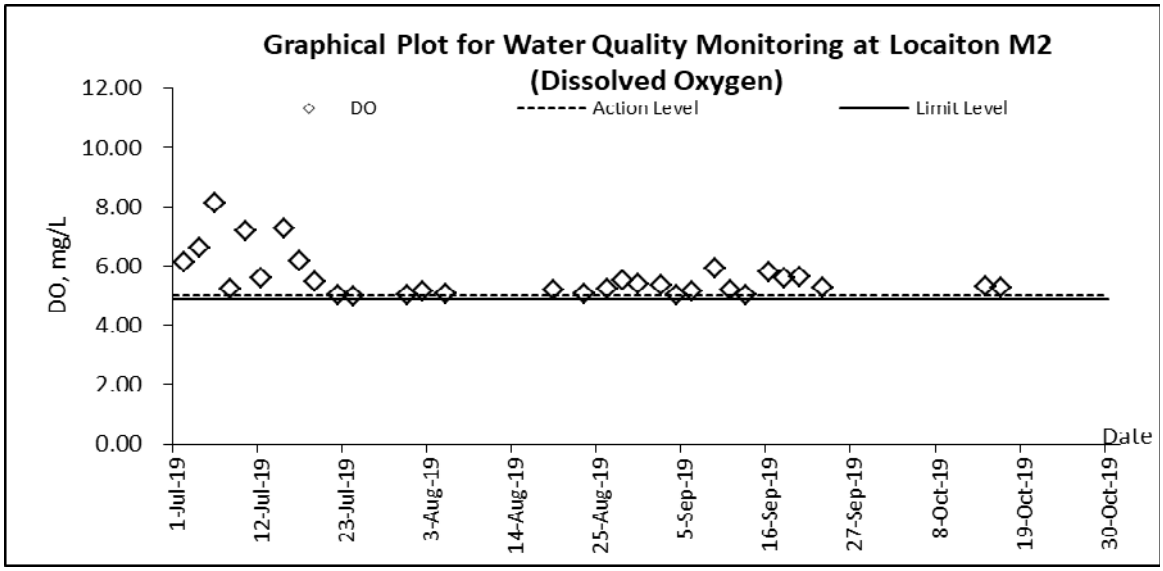

Graphical Plot for Noise Monitoring Result - CN4
dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
40
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19
Measurement Day

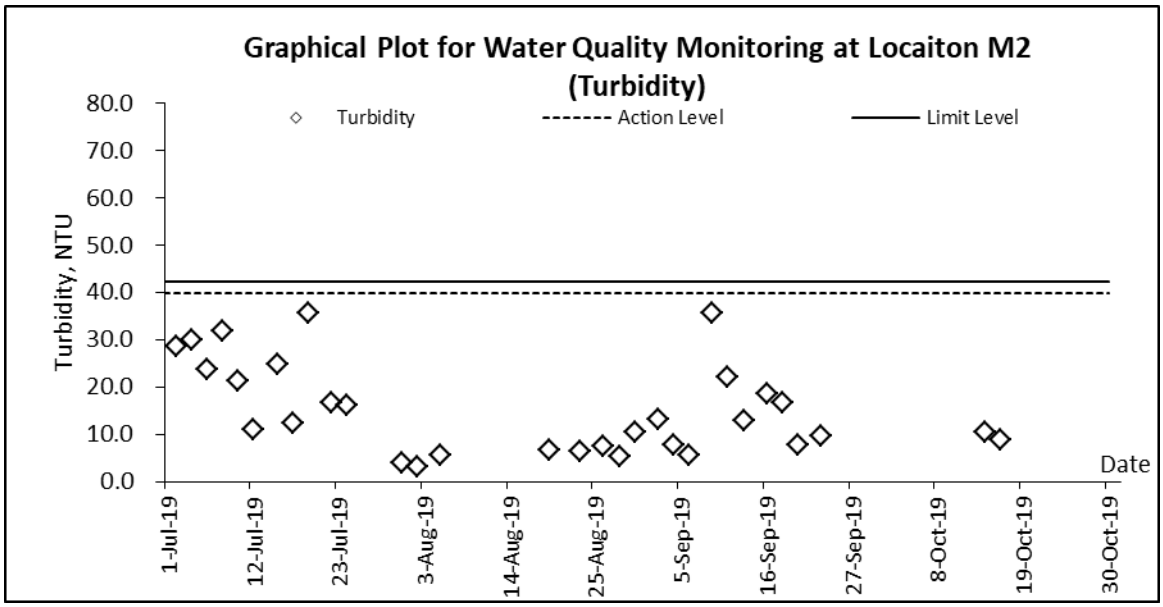
Water Quality Impact Monitoring

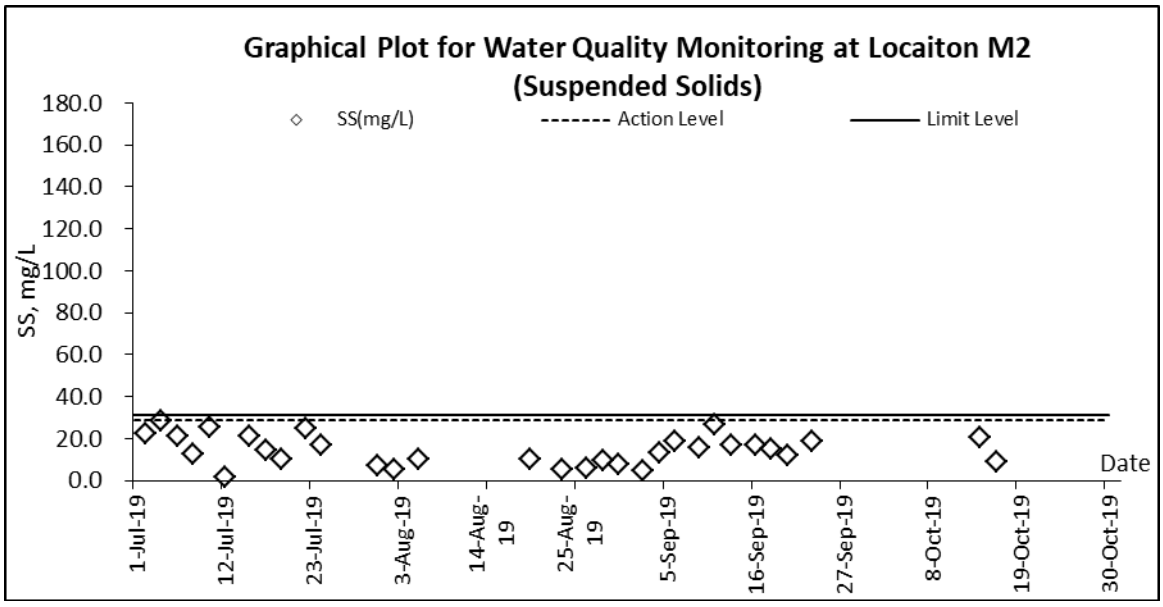


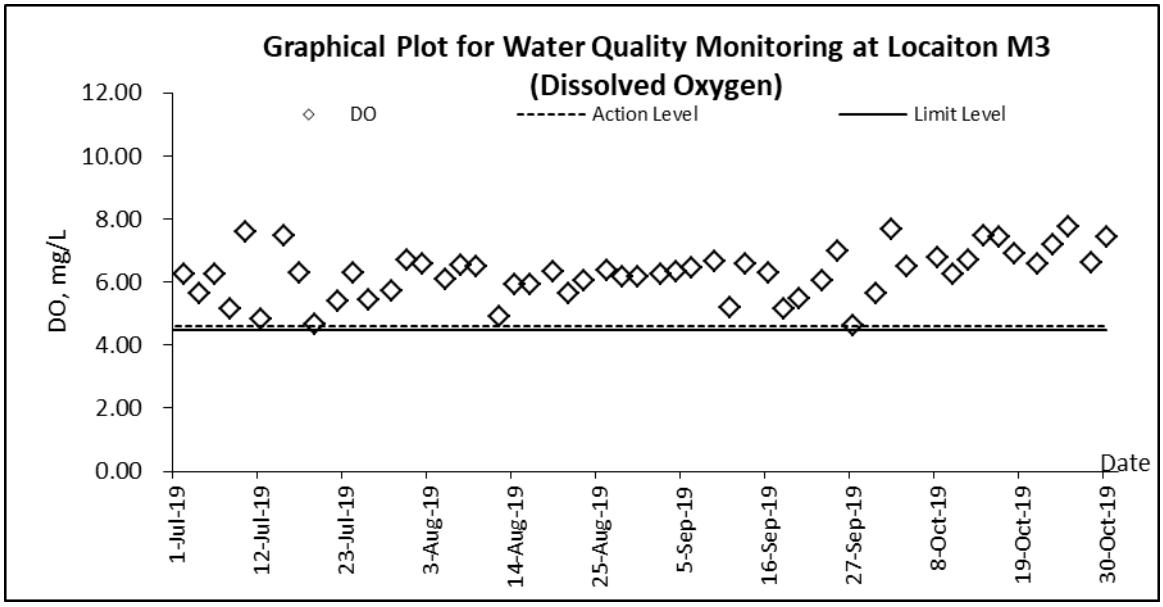


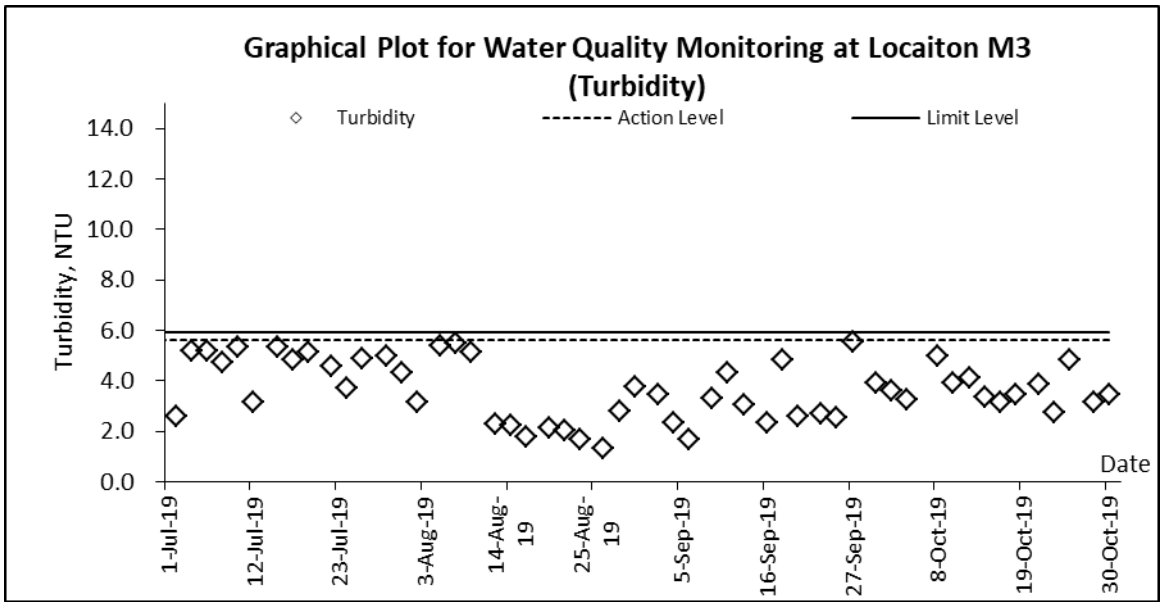


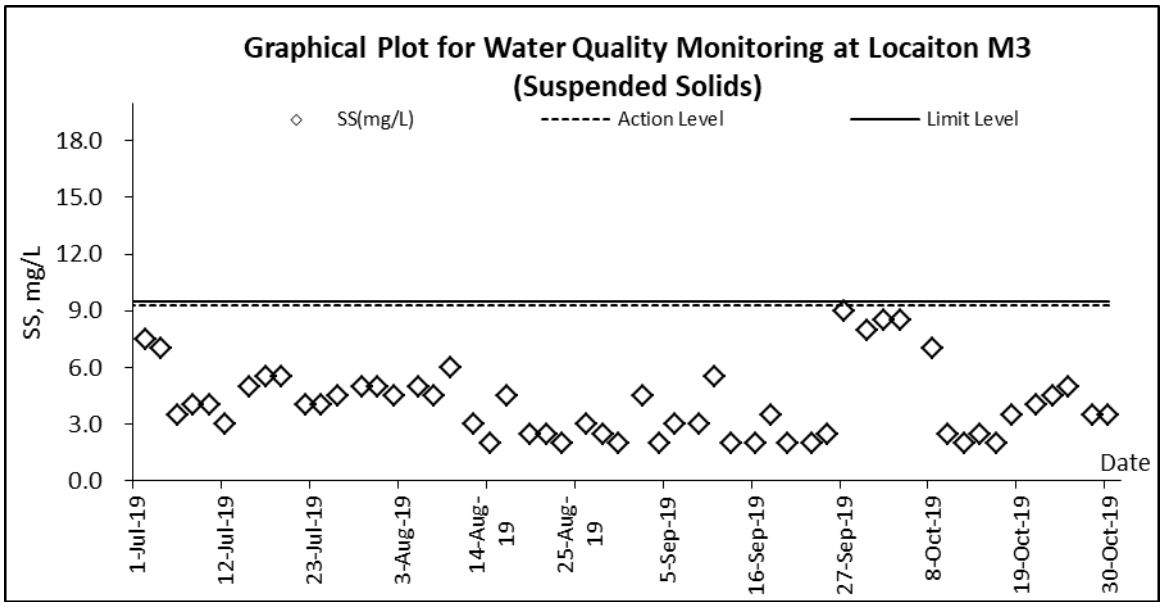

Graphical Plot for Water Quality Monitoring at Locaiton M2
(Dissolved Oxygen)
DO
Action Level
Limit Level
DO, mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19

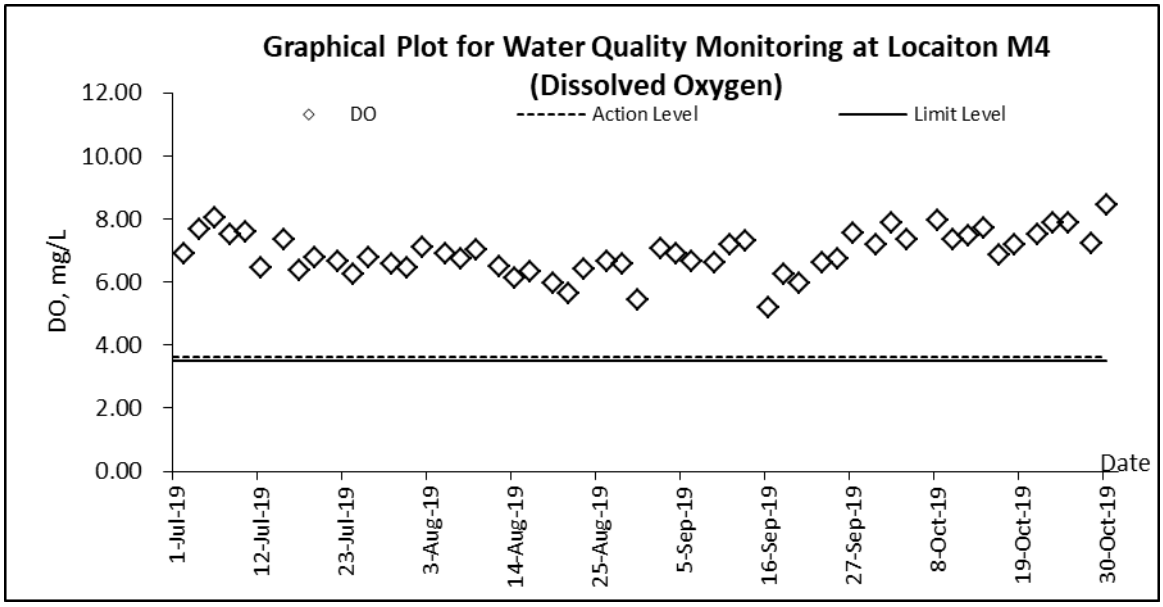

Graphical Plot for Water Quality Monitoring at Locaiton M2
(Turbidity)
Turbidity
Action Level
Limit Level
Turbidity, NTU
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19

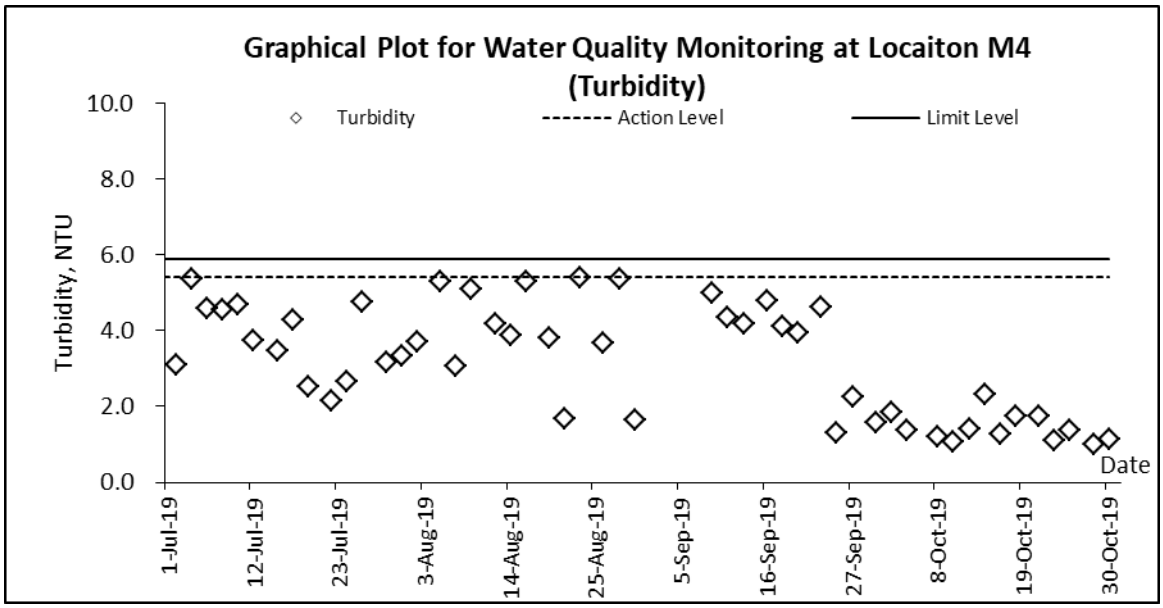

Graphical Plot for Water Quality Monitoring at Locaiton M2
(Suspended Solids)
SS(mg/L)
Action Level
Limit Level
SS, mg/L
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19

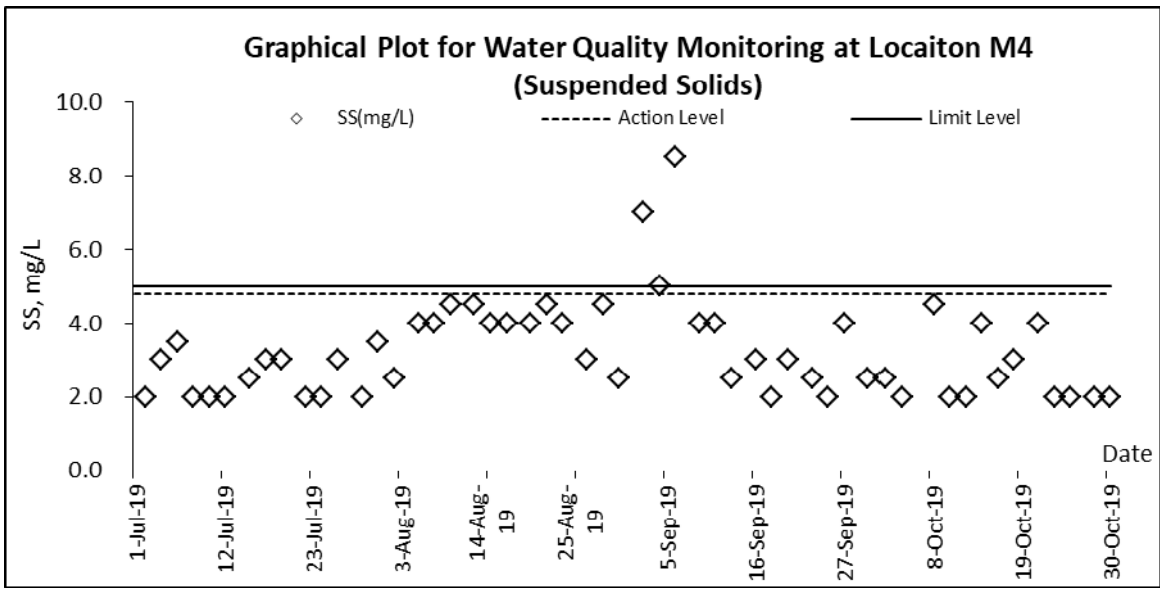

Graphical Plot for Water Quality Monitoring at Locaiton M3
(Dissolved Oxygen)
DO
Action Level
Limit Level
DO, mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19


Graphical Plot for Water Quality Monitoring at Locaiton M3
(Turbidity)
Turbidity
Action Level
Limit Level
Turbidity, NTU
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19


Graphical Plot for Water Quality Monitoring at Locaiton M3
(Suspended Solids)
SS(mg/L)
Action Level
Limit Level
SS, mg/L
18.0
15.0
12.0
9.0
6.0
3.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19


Graphical Plot for Water Quality Monitoring at Locaiton M4
(Dissolved Oxygen)
DO
Action Level
Limit Level
DO, mg/L
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19


Graphical Plot for Water Quality Monitoring at Locaiton M4
(Turbidity)
Turbidity
Action Level
Limit Level
Turbidity, NTU
10.0
8.0
6.0
4.0
2.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19


Graphical Plot for Water Quality Monitoring at Locaiton M4
(Suspended Solids)
SS(mg/L)
Action Level
Limit Level
SS, mg/L
10.0
8.0
6.0
4.0
2.0
0.0
Date
1-Jul-19
12-Jul-19
23-Jul-19
3-Aug-19
14-Aug-19
25-Aug-19
5-Sep-19
16-Sep-19
27-Sep-19
8-Oct-19
19-Oct-19
30-Oct-19

Appendix J

Meteorological Data of the Reporting Month

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Oct-19	Tue	Sunny periods. Isolated showers in the morning.	0	28.9	6.4	61.2	SW
2-Oct-19	Wed	Moderate easterly winds, fresh offshore later.	0	28.2	5	67	W/SW
3-Oct-19	Thu	Sunny periods. Isolated showers in the morning.	0	28	4.5	70.5	S/SW
4-Oct-19	Fri	Sunny periods. Isolated showers in the morning.	0	27.2	5.5	72.5	E
5-Oct-19	Sat	Mainly fine. Hot in the afternoon.	0	27.9	7.2	69.5	E
6-Oct-19	Sun	Mainly fine. Hot in the afternoon.	46.8	26.9	6.9	71.5	E/NE
7-Oct-19	Mon	Isolated showers later. Light winds.	17.9	26.5	9	78	E
8-Oct-19	Tue	Moderate easterly winds, fresh offshore later.	4.9	28.2	6.5	75.5	E
9-Oct-19	Wed	Isolated showers later. Light winds.	Trace	28.1	8.3	71.7	E
10-Oct-19	Thu	Isolated showers later. Light winds.	0	28.3	6.4	74.2	E
11-Oct-19	Fri	Mainly fine. Hot in the afternoon.	0	27.8	7.2	69.5	S/SW
12-Oct-19	Sat	Fine. Dry in the afternoon.	0.3	28.1	4.2	79.2	N
13-Oct-19	Sun	Mainly fine and dry. Moderate easterly winds.	13.6	26.9	4.6	81	E
14-Oct-19	Mon	Isolated showers later. Light winds.	52.1	26.7	5.5	80	N
15-Oct-19	Tue	Fresh east to northeasterly winds, strong offshore.	10.4	26.5	6.8	69	E
16-Oct-19	Wed	Mainly fine. Hot in the afternoon.	0	25.6	6.9	71	E/NE
17-Oct-19	Thu	Isolated showers later. Light winds.	0	24.6	8.5	71.5	N
18-Oct-19	Fri	Moderate easterly winds, fresh offshore later.	Trace	25.2	7.5	69	N
19-Oct-19	Sat	Isolated showers later. Light winds.	0	24.6	7.2	71.7	E/SE
20-Oct-19	Sun	Fresh east to northeasterly winds, strong offshore.	3.5	25.5	6.9	70	E/SE
21-Oct-19	Mon	Mainly fine and dry. Moderate easterly winds.	0	24.5	6.5	68.5	E
22-Oct-19	Tue	Mainly fine and dry. Moderate easterly winds.	0	22.9	7.5	74	E/NE
23-Oct-19	Wed	Moderate northeasterly winds, occasionally fresh offshore.	0	24.5	6.9	71	E/NE
24-Oct-19	Thu	Mainly fine. Cloudy periods tonight.	0	26.3	6.1	Maintenance	E
25-Oct-19	Fri	Mainly fine and dry. Moderate easterly winds.	0	25.1	7.7	74.7	E/NE
26-Oct-19	Sat	Mainly fine and dry. Moderate easterly winds.	Trace	25.6	7.4	69.5	E/NE
27-Oct-19	Sun	Moderate northeasterly winds, occasionally fresh offshore.	Trace	25.2	5.4	70.5	E
28-Oct-19	Mon	Mainly fine. Cloudy periods tonight.	Trace	24.5	10.6	70.2	N/NW
29-Oct-19	Tue	Sunny periods. Moderate to fresh easterly winds	0	21.5	11.2	61	N
30-Oct-19	Wed	Dry with bright periods. Moderate to fresh east to northeasterly winds	0	21.5	7.4	69.5	N

Appendix K

Ecology Survey Report

Ecology Survey Report for Contract CV/2016/10

Muni Arborist

Contract No. CV/2016/10
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Monthly Report of Ecologically Sensitive Habitats Monitoring – October 2019

Revision	0	
Date of issue	28 October 2019	
Prepared by	Alan Lam	
Reviewed by	Edwina Yeung	
Verified by	Mike Leung	

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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.

1.1.2 The project includes site formation and associated works for development of C&C facilities at the Sandy Ridge Cemetery, road works within Sandy Ridge Cemetery, widening a section of Lin Ma Hang Road (from 6.5m to 7.3m), provision of off-site pick-up/drop-off points for shuttle buses as well as barging point at Siu Lam, Lok On Pai.

1.1.3 The Environmental Impact Assessment (EIA) report, including Environmental Monitoring and Audit Manual (EM&A Manual), was approved with conditions on 8 August 2016 (Register No.: AEIAR-198/2016). EPD issued an Environmental Permit (EP) for the Project (EP-534/2017) on 7 April 2017. A Further Environment Permit (FEP) for the Project (FEP-01/534/2017) was issued on 23 February 2018, variation of EP (EP-534/2017/A) and variation of FEP (FEP-01/534/2017/A) were issued on 24 December 2018.

1.1.4 According to Clause 3.1 of the FEP (FEP-01/534/2017/A), "The Permit Holder shall implement the EM&A programme in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the programme shall be justified by the ET Leader and verified by the IEC as conforming to the information and requirements contained in the EM&A Manual before submission to the Director for approval".

1.1.5 This Ecologically Sensitive Habitats Monitoring Methodology articulates the protocol of monitoring the ecology of concerned habitats as specified in EM&A Manual.

1.2 OBJECTIVE

1.2.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.

1.2.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution.

2 ECOLOGICALLY SENSITIVE HABITATS

2.1 DESCRIPTION OF HABITATS

2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conversation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.

2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.

2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.

2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.

2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 8th October 2019. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible.

- Mammal

  There was an unknown bat recorded in the monitoring area.

- Bird

  There were a total of 16 bird individuals from 8 species recorded in the monitoring area. Two species of conservation interests were recorded in the monitoring area: *Centropus sinensis*, Greater Coucal (褐翅鴉鵑) and *Garrulax canorus*, Chinese Hwamei(畫眉) .

- Herpetofauna

  There was no reptile recorded in the monitoring area.

  There was no amphibian species recorded in the monitoring area.

- Butterfly

  There were 6 butterfly individuals from 2 species recorded in the monitoring area.

- Dragonfly

  There were 4 odonate individuals from 3 species recorded in the monitoring area.

- Freshwater communities

  There was no freshwater community recorded in the monitoring area.

Figure 1
Upland in monitoring area.

Figure 2
Wetland in monitoring area.

Table 4 Result of mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
Unknown Bat					1

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
Centropus sinensis	Greater Coucal	褐翅鴉鵑	**Class 2 Protected Animal of China;China Red Data Book Status: (Vulnerable)**	1	
Lanius schach	Long-tailed Shrike	棕背伯勞		1	1
Parus cinereus	Cinereous Tit	蒼背山雀		2	
Pycnonotus jocosus	Red-whiskered Bulbul	紅耳鵯		2	
Pycnonotus sinensis	Chinese Bulbul	白頭鵯			3
Prinia flaviventris	Yellow-bellied Prinia	黃腹鷦鶯		1	2
Garrulax canorus	Chinese Hwamei	畫眉	**Appendix 2 of CITES**	2	
Gracupica nigricollis	Black-collared Starling	黑領椋鳥		1	

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	8-Oct-19	
			Non-wetland	Wetland
N/A				

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
N/A					

+: Uncountable due to vocal identification

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	8-Oct-19	
			Non-wetland	Wetland
Parnara guttata	Common Straight Swift	直紋稻弄蝶	1	
Abisara echerius	Plum Judy	蛇目褐蜆蝶	3	2

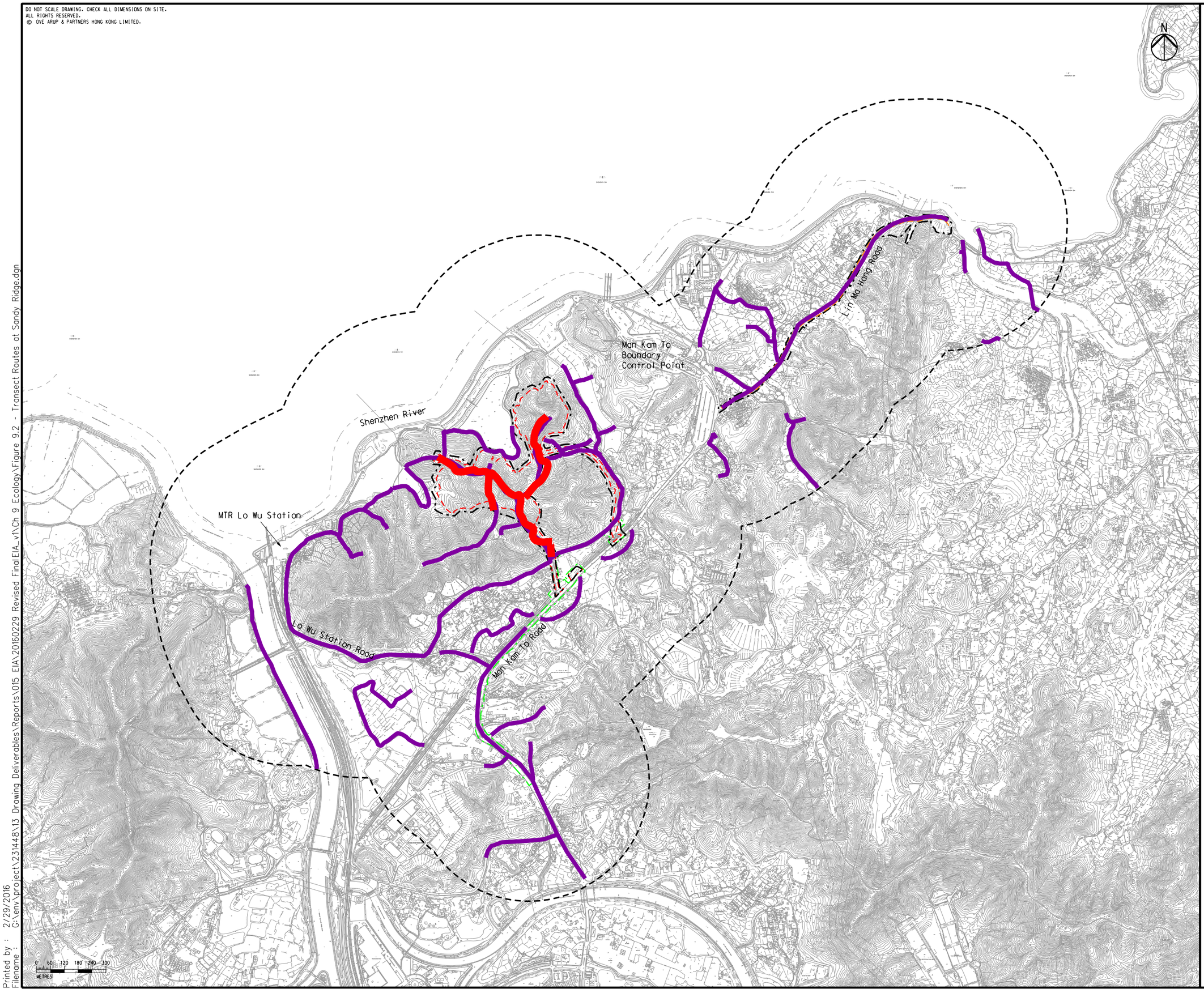
Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
Orthetrum glaucum	Common Blue Skimmer	黑尾灰蜻		1	
Pantala flavescens	Wandering Glider	黃蜻			2
Rhyothemis variegata	Variegated Flutterer	斑麗翅蜻			1

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-19	
				Non-wetland	Wetland
N/A					

Appendix I – Transect Routes for Contract CV/2016/10



Legend

- Project Boundary
- Utilities Construction
- Sandy Ridge Works Area
- Lin Ma Hang Road Works Area
- 500m Assessment Area
- Survey Transect

Rev	Description	By	Date
G	SEVENTH ISSUE	GL	02/16
F	SIXTH ISSUE	GL	01/16
E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15

Consultant

ARUP

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Transect Routes at Sandy Ridge

Drawing no.		Rev.
Figure 9.2		G
Drawn: GL	Date: 02/16	Checked: EL	Approved: ST
Scale: AS SHOWN		Status: PRELIMINARY	

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

Printed by : 2/29/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\015 EIA\20160229 Revised Final\EIA_v1\Ch 9 Ecology\Figure 9.2 - Transect Routes at Sandy Ridge.dgn

Ecology Survey Report for Contract CV/2017/02

Muni Arborist

Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Monthly Report of Ecologically Sensitive Habitats Monitoring – October 2019

Revision	0	
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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.

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2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conversation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.

2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.

2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.

2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.

2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 8th Oct 2019. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible.

- Mammal
  There was one unknown bat recorded in the monitoring area.

- Bird
  There were a total of 9 bird individuals from 6 species recorded in the monitoring area.

- Herpetofauna
  There was no reptile recorded in the monitoring area.
  There was no amphibian recorded in the monitoring area.

- Butterfly
  There were 3 butterfly individuals from 2 species recorded in the monitoring area.

- Dragonfly
  There were 4 odonate individuals from 2 species recorded in the monitoring area.

- Freshwater communities
  There were two species of freshwater fish recorded in the monitoring area.

Figure 1
The construction site in monitoring area.

Figure 2
The construction site in monitoring area.

Table 4 Result of mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Oct-2019	
				Non-wetland	Wetland
Unknown bat					1

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Oct-2019	
				Non-wetland	Wetland
Spilopelia chinensis	Spotted Dove	珠頸斑鳩			3
Corvus macrorhynchos	Large-billed Crow	大嘴烏鴉		1	
Parus cinereus	Cinereous Tit	蒼背山雀		2	
Phylloscopus fuscatus	Dusky Warbler	褐柳鶯			1
Myophonus caeruleus	Blue Whistling Thrush	紫嘯鶇		1	
Motacilla alba	White Wagtail	白鶺鴒			1

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	8-Oct-2019	
			Non-wetland	Wetland
N/A				

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-2019	
				Non-wetland	Wetland
N/A					

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	8-Oct-2019	
			Non-wetland	Wetland
Jamides alecto	Metallic Cerulean	素雅灰蝶		2
Mycalesis mineus	Dark Brand Bush Brown	小眉眼蝶		1

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-2019	
				Non-wetland	Wetland
Copera marginipes	Yellow Featherlegs	黃狹扇螅			2
Pseudocopera ciliata	Black-kneed Featherlegs	白狹扇螅			2

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Oct-2019
Gambusia affinis	Mosquito fish	食蚊魚		+
Puntius semifasciolatus	Chinese Barb	五線無鬚鮅		+

+: Species appeared but uncountable

Appendix I – Transect Routes for Contract CV/2017/02

VSRs TYPE ID	KEY VSRs
R1	RESIDENTS OF VILLAGES ALONG MAN KAM TO ROAD
R2	RESIDENTS OF SAN UK LING
R3	RESIDENTS OF LO WU VILLAGE
R4	RESIDENTS OF MUK WU
R5	RESIDENTS OF VILLAGES ALONG FOOTHILL OF TAI SHEK MO
R6	RESIDENTS OF MUK WU NGA YIU
GIC1	WORKERS AT BORDER DISTRICT POLICE HEADQUARTER
GIC2	WORKERS AT WATER TREATMENT WORKS
GIC3	WORKERS AT MAN KAM TO PUMPING STATION
GIC4	WORKERS AT LO WU CORRECTIONAL INSTITUTION
T1	TRAVELLERS ALONG EAST RAIL LINE
T2	TRAVELLERS ALONG MAN KAM TO ROAD
I1	WORKERS AT STORAGE AREA ALONG MAN KAM TO ROAD

LEGEND:

- PROJECT BOUNDARY
- ZONE OF VISUAL ENVELOPE
- VANTAGE POINTS
- Transect of C2

830000 E 831000 E 832000 E 829000 E 844000 N 843000 N 842000 N

SHENZHEN SHI
MAN KAM TO
TAI SHEK MO
SANDY RIDGE
LO WU
CHAM SHAN
NG TUNG RIVER
PROPOSED DEVELOPMENT
MACLNTOSH FORT
Indicative site boundary for contract package 2

R1 R2 R3 R4 R5 R6
GIC 1 GIC 2 GIC 3 GIC 4
I1 T1 T2
VP1 VP2 VP3 VP4 VP5 VP6 VP7

Rev	Description	By	Date
A	REVISED SUBMISSION	WM	01/15

Consultant: ARUP

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title:
VISUAL ENVELOPE LOCATIONS OF VISUAL SENSITIVE RECEIVERS (VSRs) AND VANTAGE POINT (VPs)

Drawing no.	Rev.
FIGURE 11.4.1	A

Drawn	Date	Checked	Approved
WM	08/13	PC	DL

Scale: N.T.S. Status: PRELIMINARY

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

Printed by : 3/3/2016
Filename : J:\231448\ARUP\Civil\Figure\EIA\Figure_11_4_1.dgn

Appendix L

Landscape & Visual Inspection Checklist

Contract No. CV/2016/10
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 31/10/2019 10:30 Weather: Fine/ ~~Overcast~~/ ~~Rain~~/ ~~Windy~~

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	**Landscape and Visual**				
1.1	Is the construction period become shortened?			✓	Under review.
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or "camouflaged" and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)	✓			
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?	✓			
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?	✓			
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	Tree planting works have not yet been commenced.
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)	✓			
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)	✓			

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New observation:

1. Transplanted trees T2465, T2468 and T2928 were in fair health condition with normal foliage color and density.
2. Some Tree protection zone (TPZ) was damaged/missing.

Reminders:

1. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
2. Contractor is reminded to provide proper maintenance for transplanted tree (T2465, T2468 and T2928) according to approved method statement.

Photo Record:

Fig A.

General view (1)

Fig B.

General view (2)

Fig C.

Tree protection zone

Fig D.

Tree protection zone is missing

Fig E.

Transplanted tree (T-2928)

Fig F.

Transplanted tree (T-2465)

Fig G.

Transplanted tree (T-2468)

Contract No. CV/2017/02
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Development of Columbarium at Sandy Ridge Cemetery –
Infrastructural Works at Man Kam To Road and Lin Ma Hang Road
Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 31/10/2019 11:30 Weather: Fine/ ~~Overcast~~/ ~~Rain~~/ ~~Windy~~

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	**Landscape and Visual**				
1.1	Is the construction period become shortened?			✓	Under review
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or "camouflaged" and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)			✓	
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?		✓		
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?			✓	Tree transplanting works have not yet been commenced
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)			✓	
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)			✓	

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New Observation:

1. Construction works near retained trees was observed. Tree protection zone was missing around retain trees.

Reminders:

1. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
2. Proper TPZ should be set up according to approved method statement.

Photo Record:

Fig A.

General view (1)

Fig B.

General view (2)

Fig C.

Tree Protection Zone

Fig D.

Tree protection zone is missing

Signature:

		Signature	Date
Recorded by	Registered Landscape Architect		1 Nov 2019
Checked by	Environmental Team Leader		4 Nov 2019
	Independent Environmental Checker		13 Nov 2019

Appendix M

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for October 2019

Department: Civil Engineering and Development Department Contract No.: CV/2016/10

Contract Title: Site Formation and Assoicated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery

Commencement Date: 15-Dec-2017 Estimated completion Date 22-Dec-2023 Estimated Contract Sum: 780M

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan	44.444	0.000	10.431	0.000	34.013	0.000	0.000	0.000	0.000	0.332	0.089
Feb	37.322	0.000	13.008	0.000	24.314	0.000	0.000	0.000	0.000	0.000	0.011
Mar	31.192	0.000	0.696	0.000	30.496	0.000	0.000	0.000	0.000	0.000	0.492
Apr	28.659	0.000	9.739	0.000	18.920	0.000	0.000	0.000	0.000	0.000	0.590
May	12.591	0.000	3.856	0.000	8.735	0.000	0.000	0.000	0.000	0.000	0.060
June	13.357	0.000	5.186	0.000	8.171	0.000	0.000	0.000	0.000	0.498	0.042
Sub-total	**167.565**	**0.000**	**42.916**	**0.000**	**124.649**	**0.000**	**0.000**	**0.000**	**0.000**	**0.830**	**1.284**
July	23.057	0.000	12.253	0.000	10.804	0.000	0.000	0.000	0.000	0.000	0.072
Aug	14.565	0.000	11.046	0.000	3.519	0.000	0.000	0.000	0.000	0.000	0.118
Sept	16.377	0.000	15.650	0.000	0.727	0.000	0.000	0.000	0.000	0.000	0.044
Oct	20.544	0.000	20.506	0.000	0.038	0.000	0.000	0.000	0.000	0.000	0.189
Nov											
Dec											
Total	**242.108**	**0.000**	**102.371**	**0.000**	**139.737**	**0.000**	**0.000**	**0.000**	**0.000**	**0.830**	**1.707**

Notes:
(1) The waste flow table should cover the whole construction period of the Contract.
(2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
(3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
(4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
(5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(6) Broken concrete for recycling into aggregates.

Name of Department: CEDD

Monthly Summary Waste Flow Table for 2019

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)
JAN	13.050	0.000	13.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FEB	355.770	0.000	0.000	0.000	355.77	0.000	0.000	0.000	0.000	0.000	0.000
MAR	**184.340**	0.000	**0.000**	**0.000**	**184.34**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
APRIL	**467.030**	0.000	**0.000**	**0.000**	**467.03**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**1.460**
MAY	**496.260**	0.000	**0.000**	**0.000**	**496.26**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
JUN	**695.540**	0.000	**0.000**	**0.000**	**695.54**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**3.430**
Sub Total	2211.990	0.000	13.050	0.000	2198.940	0.000	0.000	0.000	0.000	0.000	4.890
JUL	**649.090**	0.000	**0.000**	**0.000**	**649.09**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**8.210**
AUG	**544.790**	0.000	**0.000**	**0.000**	**544.79**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**4.180**
SEP	**0.000**	0.000	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**5.570**
OCT	**1986.310**	0.000	**0.000**	**0.000**	**1986.310**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**4.120**
NOV	--	--	--	--	--	--	--	--	--	--	--
DEC	--	--	--	--	--	--	--	--	--	--	--
Total	5392.180	0.000	13.050	0.000	5379.130	0.000	0.000	0.000	0.000	0.000	26.970

Notes:

Name of Department: CEDD

Forecast of Total Quantities of C&D Materials to be Generated from the Contract (see Note 4)										
Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported Fill	Metal	Paper / cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
0	0	0	0	0	350	30	4	2	1	4

Notes:

(1) The performance targets are given in PS clause 6(14) above.

(2) The waste flow table shall also include C&D materials that are specified in the Contractor to be imported for use at the Site.

(3) Plastic refer to plastic bottles/containers, plastic sheets/foam from packaging material.

(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature

- Hard Rocks and Large Broken Concrete = Cannot be defined at this stage
- Imported Fill = Estimated by the Contractor
- Metal = Estimated by the Contractor
- Paper/cardboard packaging = Estimated by the Contractor
- Plastics = Estimated by the Contractor
- Chemical Waste = Estimated by the Contractor (Spent lubricating oil, assume density 0.9kg/L)
- Other, e.g. general refuse = Estimated by the Contractor

Appendix N

Implementation Schedule for Environmental Mitigation Measures (ISEMM)

Environmental Mitigation Implementation Schedule – Sandy Ridge

Note: Chapters 1 to 3 of the EIA report present the background information of the Project, identified concurrent projects, objectives and scope for various environmental aspects, and description on alternative options and construction description. Chapters 4 to 12 of the EIA report present the EIA findings and mitigation measures are described below with cross-reference to the EIA report. Chapters 13 to 15 describe the environmental monitoring requirements and conclusion.

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Common Mitigation Measures (Applicable to ALL Project Components, including DPs and Non-DPS)						
Construction Dust Impact						
S4.4.5.2	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	• APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria
S4.4.5.3	Water spraying every hour for all active works area.	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	• APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria
S4.4.5.2	• Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Vehicle wheel washing facilities should be provided at each construction	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	• APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels; • When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S4.4.5.1	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitoring of dust impact	Contractor	Selected representative dust monitoring station	Construction phase	• TM-EIAO
S4.4.5.3	• All road surface within the barging facilities will be paved. • Dust enclosures will be provided for the loading ramp, installation of 3-sided screen with top cover and the provision of water sprays at the discharge point would be provided. • Vehicles will be required to pass through designated wheel wash facilities. • Continuous water spray at the loading point.	Minimise dust impact at the nearby sensitive receivers	Contractor	Barging point at Siu Lam	Construction phase	• TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Construction Noise						
S5.5.5.3	Implement the following good site management practices: • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	Control construction noise	Contractor	All construction sites	Construction phase	• Annex 5, TM-EIAO
S5.5.5.5	Adopt quiet plants during the construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road. The quiet plants should be made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in EPD web pages or taken from BS5228: Part 1: 2009 Noise Control on Construction and Open Sites as far as possible.	Reduce the noise levels of plant items	Contractor	Works area for construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road	Construction phase	• Annex 5, TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S5.5.5.6	Install temporary noise barriers (in the form of site hoardings, approx. 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.7 – S5.5.5.12	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered upper portion of superficial density no less than 7kg/m^2 on a skid footing with 25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators etc.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.13	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction noise	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S13.2.1.1 – S13.4.1.2	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction phase	• TM-EIAO
Operational Noise (Road Traffic Noise)						
S5.6.6.4	Provide a series of noise mitigation measures including absorptive noise barriers and low noise road surfacing materials along Lin Ma Hang Road and Sha Ling Road before operation of the proposed project for existing and planned representative NSRs. Locations of noise mitigation measures are stated as following: *For existing representative NSRs* • Approx. 12m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM1); • Approx. 92m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM2);	Reduce operation noise from road traffic	Contractor	Refer to **Figures 5.6.9 – 5.6.13** of the EIA Report	Prior to operation of the Project for existing representative NSRs. While for barriers to protect planned representative NSRs, it should constructed before intake of planned representative NSRs.	• TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• Approx. 28m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM3); • Approx. 51m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM4); • Approx. 25m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM5); • Approx. 21m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM6); • Approx. 14m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM7); • Approx. 18m of absorptive noise barrier 3m above road level along Lin Ma Hang Road near San Uk Ling (MM8); • Approx. 42m of absorptive noise barrier 3m above road level along temporary pullover space opposite San Uk Ling (MM9); • Approx. 93m of absorptive noise barrier 3m above road level along Lin Ma Hang Road opposite San Uk Ling (MM10); • Approx. 185m of low noise surfacing materials along Lin Ma Hang Road near San Uk Ling (MM11); *For planned representative NSRs* • Approx. 36m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM12); • Approx. 47m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM13); • Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM14); • Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM15); • Approx. 41m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM16);					

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• Approx. 340m of low noise surfacing materials along Lin Ma Hang Road near Muk Wu Nga Yiu (MM17).					

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Water Quality (Construction Phase)						
S6.4.4.1 – S6.4.4.3	In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN1/94), construction phase mitigation measures shall include the following: <u>*General Site Operation*</u> • At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction; • Diversion of natural stormwater should be avoided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipment in order to avoid or minimise polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m^3 capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped; • The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a site/sediment trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates; • The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of	To minimise water quality impact from construction site runoff and general construction activities	Contractor	All construction sites where applicable	Construction phase	• Water Pollution Control Ordinance • ProPECC PN1/94 • TM-EIAO • TM-DSS

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction; • Construction works should be programmed to minimise surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means; • If the excavation of trenches in wet periods is necessary, it should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas; • All open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than $50m^3$ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system; • Manholes (including newly constructed ones) should always be covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers; • Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes;					

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains; • Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain; • Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts; • All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby; • Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the water bodies, marsh and ponds; • Adopt best management practices.					
S6.4.4.4 – S6.4.4.5	*Sewage from workforce* • Portable chemical toilets and sewage holding tanks are recommended for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance;	To minimise water quality from sewage effluent	Contractor	All construction sites where practicable	Construction phase	• Water Pollution Control Ordinance • TM-DSS

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project; • Regular environmental audit on the construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site.					
S6.4.4.6	*Operation of Barging Point at Siu Lam* • All barges should be fitted with tight bottom seals to prevent leakage of materials during transport; • Barges or hoppers should not be filled to a level that will cause overflow of materials or polluted water during loading or transportation; • All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and • Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. • Mitigation measures for land-based activities as outlined in Section 6.4.4 should be applied to minimise water quality impacts from site runoff and open stockpile spoils at the proposed barging facilities where appropriate.	To minimise water quality from operation of barging point at Siu Lam	Contractor	All construction sites where practicable	Construction phase	• Water Pollution Control Ordinance • TM-DSS
Water Quality (Operational Phase)						
S6.5.4.1 – S6.5.4.6	The following mitigation measures during operational phase are recommended: • Sewage and wastewater discharge should be connected to foul sewerage system; • Proper drainage systems with silt traps and oil interceptors should be installed;	To minimise the road runoff, wastewater discharge and erosion of seasonal watercourse during the operational phase	Highways Department / Contractors	Whole alignment	Construction / Operational Phase	• Water Pollution Control Ordinance • TM-DSS

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• The design of road gullies with silt traps should be incorporated especially for the catchment leading to the existing wet woodland area located at the north of the site; • The silt traps and oil interceptors should be cleaned and maintained regularly, especially before peak seasons of the visitors in Ching Ming Festival and Chung Yeung Festival; • Energy dissipaters should be installed at the seasonally wet watercourses to reduce the magnitude of the first flush in order to minimise the erosion impact to the wet woodland.					

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Waste Management (Construction Waste)						
S7.3.3.8	Construction & Demolition Material Management Plan (C&DMMP) • A C&DMMP shall be submitted to the Public Fill Committee for approval in the case of C&D materials disposal exceeding 50,000m^3.	To enhance the management of construction and demolition (C&D) material including rock in public works projects	Contractor	All construction sites	Construction phase	• Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.2	Good Site Practice The following good site practices are recommended throughout the construction activities: • nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; • provision of sufficient waste disposal points and regular collection for disposal; • appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • a Waste Management Plan (WMP) should be prepared by the contractor and submitted to the Engineer for approval.	Minimise waste generation during construction	Contractor	All construction sites	Construction phase	• Waste Disposal Ordinance
S7.3.4.3	Waste Reduction Measures Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction: • segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal;	Reduce waste generation	Contractor	All construction sites	Construction phase	• Waste Disposal Ordinance

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	• proper storage and site practices to minimise the potential for damage and contamination of construction materials; • plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; • sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); • provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.					
S7.3.4.5	Storage of Waste The following recommendation should be implemented to minimise the impacts: • non-inert C&D materials such as soil should be handled and stored well to ensure secure containment; • stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; • different locations should be designated to stockpile each material to enhance reuse;	Good site practice to minimise the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction phase	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TCW No. 19/2005
S7.3.4.6	Collection and Transportation of Waste The following recommendation should be implemented to minimise the impacts: • remove waste in timely manner; • employ the trucks with cover or enclosed containers for waste transportation; • obtain relevant waste disposal permits from the appropriate authorities; and • disposal of waste should be done at licensed waste disposal facilities.	Minimise waste impacts from storage	Contractor	All construction sites	Construction phase	• Waste Disposal Ordinance
S7.3.4.8 – S7.3.4.15	Excavated and C&D Materials Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at public filling areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials: • maintain temporary stockpiles and reuse excavated fill material for	Minimise waste impacts from excavated and C&D materials	Contractor	All construction sites	Construction phase	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	backfilling; • carry out on-site sorting; • make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; and • implement a recording system for the amount of waste generated, recycled and disposed of for checking. The recommended C&D materials handling should include: • On-site sorting of C&D materials; • Reuse of C&D materials; and • Use of Standard Formwork and Planning of Construction Materials purchasing.					• ETWB TCW No. 19/2005 • Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.17 – S7.3.4.18	Chemical Waste If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producer. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste Contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction phase	• Waste Disposal (Chemical Waste) General) Regulation • Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S7.3.4.19	General Refuse • General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. • Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. • A reputable waste collector should be employed to remove general refuse on a daily basis.	Minimise production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	• Waste Disposal Ordinance
S7.3.4.20	Sewage • The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability,	Minimise production of sewage impacts	Contractor	All construction sites	Construction phase	• Waste Disposal Ordinance

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	site condition and activities. • Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts.					
Waste Management (Operational Waste)						
S7.4.4.1	<u>General Refuse</u> A reputable waste collector should be employed to remove general refuse on a daily basis.	Remove general refuse during routine road cleaning activities on the roads network and avoid odour, pest and litter impacts	Highways Department / Contractor	Roads network for the C&C facilities and Lin Ma Hang Road	Operational phase	• Waste Disposal Ordinance

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Land Contamination						
S8.9.1.1	Re-appraisal of the potentially contaminated site (SRC-1)	Identify any hot spots for SI within the southeast and western portions of SRC-1	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Once the works area for the Project is confirmed and site access is available (e.g. after land resumption)	• Annex 19 of the TM-EIAO, Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3 : Potential Contaminated Land Issues); • Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management; • Guidance Notes for Contaminated Land Assessment and Remediation; and • Practice Guide for Investigation and Remediation of Contaminated Land • Recommendations in Health Risk Assessment
S8.11.1.1	Preparation and submission of Contamination Assessment Plan (CAP) to EPD for review and approval, if required	Present the findings of the re-appraisal and strategy of the recommended SI, if required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	After land resumption and prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Contamination Assessment Report (CAR) to EPD for review and approval, if required	Present the findings of SI, if any, and evaluate the level and extent of potential contamination	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S8.11.1.2	Preparation and submission of Remediation Action Plan (RAP) to EPD for review and approval if contamination is identified	Recommend appropriate mitigation measures for the contaminated soil and groundwater identified in the assessment if remediation is required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Remediation Report (RR) to EPD for review and approval following the completion of any necessary remediation works	Demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Ecology (Construction Phase)						
S9.7.2.3	Preparation and submission of Upland Grassland Reinstatement Plan to EPD for agreement.	An Upland Grassland Reinstatement Plan will be prepared by a qualified ecologist/botanist with full details of the findings of a baseline grassland survey, the practical details and methodology of the physical excavation, transport and storage or turves/topsoil and their subsequent reinstatement once the receptor sites have been established, along with an implementation programme of reinstatement, post- reinstatement monitoring and maintenance programme. A contingency plan should be proposed in the Grassland Reinstatement Plan so as to describe the action and limit levels and the action plan if certain performance criteria (such as area of preferred habitat) are not met during the monitoring and maintenance period.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Upland Grassland Reinstatement Plan	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to **Figure 9.11** of the EIA Report	Prior to construction phase	• Reinstatement and establishment requirements to be detailed in Upland Grassland Reinstatement Plan • TM-EIAO
S9.7.2.5 – S9.7.2.6	Preparation and submission of a Vegetation Survey Report and Transplantation Proposal (if needed as concluded in the Vegetation Survey Report) to EPD for agreement.	The Vegetation Survey will report the presence, as well as update the conditions, number, locations and habitat types of any identified floral species of conservation importance to be impacted by the development,	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for	Within the Project Area where applicable	Prior to construction phase	• Survey findings and transplantation methodology to be detailed in Vegetation Survey Report and Transplantation Plan

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
		and evaluate suitability and/or practicality of transplantation. The Transplantation Proposal will recommend locations of the receptor site(s), transplantation methodology, implementation programme of transplantation and post-transplantation monitoring and maintenance programme.	Vegetation Survey Report and Transplantation Proposal.			respectively. • TM-EIAO.
S9.7.5.3 – S9.7.5.5, S9.8.1.6	Preparation and submission of Enhancement Woodland Proposal to EPD for agreement.	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to **Figure 9.11** of the EIA Report	Prior to construction phase	• Enhancement planting and establishment requirements to be detailed in Wooded Enhancement Proposal. • TM-EIAO
S9.7.3.1 – S9.7.3.3	Indirect impacts due to potential changes in water quality, hydrology and sedimentation could occur to a series of downstream watercourses and wetland systems (including the wet woodland, marsh and mitigation ponds) during both the construction (for the Platform and LMHR widening works) and operational stages. Generally, indirect water impact to any aquatic fauna during the construction phase should easily be avoided by implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and good site practices (further details are discussed in Section 6 of the EIA Report).	Minimise the indirect impacts to Water Quality and Hydrology	Contractor /detailed design consultant.	On the edge of any active works area, 30m from the watercourse	Prior to commencement and during construction phase	• ETWB TCW No. 5/2005 • TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	In addition, construction phase impacts on the watercourses, riparian corridor and fauna using these areas will be minimised by erection of a 2m high, solid, dull green site boundary fence on the edge of any active works area, 30m from the watercourse. Where this is not practicable due to site constraints, demarcation fencing will need to be erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. Detailed mitigation measures will be designed at the detailed design stage.					
S9.7.3.4 – S9.7.3.6	Mitigation for noise disturbance (details refer to S5.5.5 to S5.6.6 of this table). Site formation and construction are tentatively proposed to cover a 65-month period from mid 2017 to late 2022. As a precautionary approach, consideration should be given at the detailed design stage to avoid the use of highly reflective materials in the design and implementing the use of opaque materials, fritting, breaking up external reflections with stickers or plastic wrap and/or any other bird-friendly design for noise barriers. Works will be restricted to daytime and any construction lighting should be designed and positioned as to not impact on adjacent ecologically sensitive areas.	The construction work and site formation will be phased in order to reduce overall noise disturbance impacts in particular areas. Collisions usually occurs as a result of birds perceiving a clear path through an object that is transparent or appears to be transparent at some distance, or if the noise barrier is highly reflective which would appear to be composed of the adjacent natural vegetation. Furthermore, mitigation measures to control noise disturbance during this phase will involve the selection of quieter plant, use of movable noise barriers and erection of hoarding and fencing to demarcate the site boundary	Contractor Project Proponent	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S.9.7.3.7	In order to demonstrate ecological awareness and to minimise the risk of indirect impacts from water pollution and hill fires, a series of good site practices should be adopted by site staff throughout the construction phase at each works site. These are as follows: • Put up signs to alert site staff about any locations which are ecologically sensitive and measures to prevent accidental impacts; • Erection of temporary geotextile silt or sediment fences/oil traps around any earth-moving works to trap any sediments and prevent them from entering watercourses; • Prohibition of soil storage against trees or close to waterbodies; • Delineation of works site to prevent encroachment onto adjacent habitats and fence off areas which have some ecological value; • No smoking, hot works or sources of fire close to upland grassland; • No on-site burning of waste; and • Waste and refuse in appropriate receptacles.	Minimise impacts on hydrological condition and water quality of hillside watercourses and reduce chances of hillfires.	Contractor	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.
S.9.7.3.9	Precautionary checks by a suitably experienced ecologist of the vegetation for the presence of nesting birds should be carried out in the breeding season (February to July) before vegetation clearance. These impacts can be avoided by conducting vegetation clearance during the non-breeding season (tentatively August-January) and phased through the project period to minimise impacts.	Minimise the impacts to breeding birds within the works areas.	Contractor	All construction sites	Prior to site clearance	• TM-EIAO • WAPO
Ecology (Operational Phase)						

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S9.7.2	Establishment, maintenance and monitoring of a Upland Grassland Reinstatement Area	Reinstatement of upland grassland and to maintain connectivity in Sandy Ridge.	Project Proponent / Contractor / Maintenance Authority	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to **Figure 9.11** of the EIA Report	Operational phase	• Monitoring methodology and successfulness of survival of upland grassland should follow Upland Grassland Reinstatement Plan. • TM-EIAO.
S9.7.5.3 – S9.7.5.6	Establishment, maintenance and monitoring of an enhancement woodland	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to **Figure 9.11** of the EIA Report	Operational phase	• Enhancement planting and establishment requirements to be detailed in Wooded Area Proposal. • TM-EIAO.
S9.7.4.1 – S9.7.4.5	<u>Mitigation for Impacts to Water Quality and Hydrology (Operational Phase)</u> • Stormwater drainage system will be further developed in detailed design stage to collect dusty materials from water collected from the platform and associated road system. Silt traps will be installed to ensure removal of dusty materials. Regular cleaning will be conducted to avoid debris entering downstream rivers during first flush; and • The proposed small diameter bore pile system at the foundation of the proposed platform structure.	Specific mitigation measures will be implemented to prevent indirect impacts wetland habitats and fauna. Mitigation measures are to be further developed in the detailed design stage to address any water quality impacts due to the drainage from the proposed platform, and any erosion issues due to the drainage from the	Detailed Design Consultant	Wet woodland (and further down the marsh and mitigation ponds) and the seasonal watercourse to the east of the Project boundary	Detailed Design phase/Operational phase	• TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
		proposed platform. The surface runoff collected on the platform will be captured by a stormwater drainage system, which will be further developed at the detailed design stage The proposed small diameter bore pile system at the foundation of the proposed platform structure would allow a notional free area of about 87 – 91% for groundwater to pass through				
S9.7.4.6 – S9.7.4.7	<u>Minimise the potential indirect light disturbance on the Street Lighting on fireflies surrounding the Project Site during operational phase</u> • It is considered that at the detailed design stage, street lighting of similar lux/light intensity as to what is currently present is utilised. Furthermore, as a precautionary measure, it is suggested that deflectors are fixed to the back of the street lights to prevent additional light reaching the marsh and causing adverse impacts to fireflies.	Reduce light pollution and impact on the nearby habitats and their associated wildlife groups, particularly nocturnal fireflies.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO
S9.7.4.9 – S9.7.4.9	The increase in visitors to the columbarium allows greater public access to the upland grassland of Sandy Ridge and in turn, the potential for hill fires is also increased. Fires may emanate from discarded cigarettes and from specific practices during festivals or grave-sweeping. In order to reduce the risk of hill fires, sufficient educational signage should be displayed throughout the columbarium warning people of the risks of fire and strictly prohibits practices that could cause hill fires. This will require input in the detailed design phase.	Minimise the risk of hill fires.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Fisheries						
S10.5.1.1	No loss of fish ponds is anticipated and no *in situ* mitigation is required. However, mitigation measures for water quality (S6.4.4 – S6.5.4 in this table) proposed are also pertinent in ensuring that fisheries impacts of the Project do not occur downstream of the Project area either locally or in Inner Deep Bay.	-	-	-	-	-

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Landscape & Visual						
S11.8.1.3, Table 11.9	CM1 – The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape, and the reliance on off-site construction.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM3 – Screening of construction works by hoardings/noise barriers around works area in visually unobtrusive colours and to screen construction works. It is proposed that screening be compatible with the surrounding environment and non-reflective, recessive colours be used. Hoarding should be taken down at the end of the construction period.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM4 – Dust and Erosion Control for Exposed Soil - Excavation works and demolition of existing building blocks shall be well planned with precautions to suppress dust. Exposed soil shall be covered or watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Suitable drainage shall be provided around construction sites to avoid discharge of contaminants and sediments into sensitive water-based habitat.	Minimise indirect landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM5 – Control night-time lighting and glare by hooding all lights.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	CM6 – Tree Protection and Preservation – Woodland, plantation and other vegetation within the Study Area will be protected and preserved as far as possible in accordance with ETWB TCW No. 29/2004 - Registration of Old and Valuable Trees, and Guidelines for their Preservation and DEVB TCW No.07/2015 – Tree Preservation. Detailed Design Considerations are made to avoid impacts to trees, e.g. proper viaduct/ bridge design routing to avoid majority of the woodland, locating the columbarium buildings in areas with less trees and ensuring design of the buildings has as small a footprint as practical.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	• DEVB TC(W) 07/2015 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB
S11.8.1.3, Table 11.9	CM7 – Tree Transplantation – Tree(s) will be affected according to the Tree Preservation and Removal Proposal to be carried out in a later stage. Established trees of value are to be re-located where practically feasible.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	• 'Guidelines for Tree Risk Management and Assessment Arrangement on an Area Basis and on a Tree Basis', issued January 2011, Greening, Landscape and Tree Management (GLTM) Section, DevB • Latest recommended horticultural practices from GLTM Section, DevB

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	CM8 - Implementing precautionary control measures during construction stage accordingly to ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works to avoid direct or indirect impacts any watercourses and good site practices.	Minimize landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	• ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works
S11.8.1.3, Table 11.9	OM1 – Compensatory Woodland Planting - The arrangement of compensatory planting (e.g. areas of woodland to be compensated and space to be allowed within the Project Site) will be subject to detailed engineering design, landscape design and planting plan, and is recommended to be implemented prior to the construction activities as far as practical.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Prior to Construction phase	• DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	OM2 – Compensatory Tree Planting for Plantation and Other Vegetated Areas - Compensatory planting should be provided in accordance with DEVB TCW No. 07/2015 to compensate for those trees felled. According to the preliminary design, compensatory trees will be planted on the cut/fill slopes, along new roads and in car parks. The selection of planting species shall be made with reference to the species identified in the future Detailed Tree Survey and be native to Hong Kong or the South China region.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	• DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM3 – Amenity Planting and aesthetic streetscape design of hard landscaping for Pedestrian Walkway, Roadside - Roadside amenity planting should be provided along Sha Ling Road, Lin Ma Hang Road, as well as the internal road within Sandy Ridge columbarium and crematorium site; to enhance the landscape quality of the existing and proposed transport routes. Climbers are proposed to cover vertical, hard surfaces of the piers of the proposed viaducts, and also the newly formed retaining wall within the site. Shade tolerant plants will be planted, where light is sufficient, to improve aesthetic value of areas under viaducts.	Minimise visual impact and also enhance landscape.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	• Guidelines on Greening of Noise Barriers, issued April 2012, GLTMS, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM4 – Greening Works and Contour Grading Works on Cut/ Fill Slopes - Greening works such as hydroseeding/ terraces of shrub or tree planting will be provided where slope gradient allows, according to Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	OM5 – Landscape design treatment to be provided by relevant government department.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM6 – Architectural and chromatic treatment of the hard architectural and engineering structures and facilities.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM7 – Aesthetic design of the proposed noise barriers.	Mitigate the visual impact	Funded by CEDD and implemented by Contractor	Along Sha Ling Road and Lin Ma Hang Road	Construction phase	• WBTC No. 36/2004 - ACABAS - submission is required to ACABAS for approval of any bridges and associated structures within the public highway system.
S11.8.1.3, Table 11.9	OM8 - Silt traps should also be incorporated into design of road gullies for the natural water stream(s).	Minimise the landscape impact on natural stream	Funded by CEDD and implemented by Contractor	Within Project Site	Construction Phase	

Notes:

(a) A detailed Tree Survey Report showing all identified valuable trees and OVT will be undertaken in a separate Tree Preservation and Removal Proposal.

(b) Wood resulting from tree removal should be recycled as mulch or soil conditioner for re-use within the Project or in other projects as far as possible e.g. for the construction of soft landscape work, were practical.

(c) Contractor is responsible for landscaping during the agreed establishment and maintenance period. Other designated management and maintenance agents to take up maintenance and management of landscaping after end of agreed period.

(d) Highways Department (HyD) is responsible for maintenance and management of landscaping of public road side slope, Leisure and Cultural Services Department (LCSD) is responsible for the management and maintenance of soft landscapes along non-expressway public roads outside Country Park and Food and Environmental Hygiene Department (FEHD) is responsible for maintenance and management of landscaping of other areas allocated to FEHD.

(e) The landscape mitigation treatment of the future development site shall follow the below frameworks:
- Buffer planting shall be provided to soften the edge of the site.
- Aesthetic landscape treatment including both soft and hard landscape features shall be provided.
- Vertical greening shall be provided as far as practicable.
- At-grade tree planting shall be provided as far as possible while planting space is allowed, to enhance the overall environment.
- Architectural design shall blend in with the surrounding environment.
- Overall greening ratio shall comply with TC(W) No.3/2012 Site coverage of Greenery for Government Building Projects.

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The compensatory woodland planting shall be included woodland mixed whips, seeding, and shrubs. The principle of the location shall be the extension of the existing woodland, as well as the original lost woodland location. The proposal will be agreed with AFCD, the woodland enhancement planting shall refer to Chapter 9.						

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
EM&A Project						
S13.1.1.1, S13.2.1.2	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Highways Department	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO
S13.2.1.1 – S13.4.1.2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Highways Department / Contractor	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO

Appendix O

Implementation of Water Quality Mitigation Measures

Water Quality Mitigation Measures under CV/2016/10 (Contract 1)	
 Provided efficient silt removal facilities to prevent leakage of muddy runoff from site area. Removal was silt was conducted by the Contractor regularly.	 Temporary drainage was provided to prevent runoff going through site surface.
 Provided earth bunds and barriers to minimize muddy runoff.	 Hydro-seeding was applied on the slope to minimize muddy runoff.
 Hydro-seeding was applied on the slope to minimize muddy runoff.	 Exposed slopes surface were compacted and covered.

Water Quality Mitigation Measures under CV/2017/02 (Contract 2)	
 Sedimentation tank was provided to treat any wastewater at TTA1.	 Sedimentation tank was provided to treat any wastewater at TTA2.
 Sump pit and geo-textile were installed to prevent leakage of muddy runoff at Area Part A1.	 Exposed slopes surface was paved by cement mortar to minimize muddy runoff.