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Nishimatsu Construction Co. Ltd.

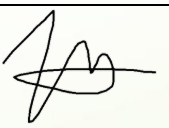
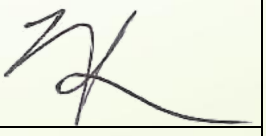
Central Kowloon Route Contract HY/2014/09

Ho Man Tin Access Shaft

Final EM&A Review Report

Rev. 3

(21 April 2020)

	Name	**Signature**
Prepared by	Nicola Y. C. Mau (Environmental Consultant)	
Checked & Reviewed by	Nelson T. H. Tsui (Senior Environmental Consultant)	
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路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

ERM

Environmental Permit No. EP-457/2013/C

Central Kowloon Route

Independent Environmental Checker Verification

Works Contract:	**Ho Man Tin Access Shaft (HY/2014/09)**

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	Final EM&A Review Report
Date of Report:	21 April 2020 (Rev. 3)
Date received by IEC:	21 April 2020

Reference EP Condition / EM&A Manual

EM&A Manual (AEIAR-171/2013)	Section 15.1

15.1 Types of reports that the ET shall prepare and submit include baseline monitoring report, monthly EM&A report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly and final review EM&A reports shall be made available to the Director of Environmental Protection.

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-457/2013/C.

Ms Mandy To Date: 21 April 2020

Independent Environmental Checker

Our ref: 0436942_IEC Verification Cert_HMTS_Final EM&A Review Report.docx

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EXECUTIVE SUMMARY

A.1 NISHIMATSU Construction Company Limited ("Contractor") commenced the construction works of Highway Department (HyD) Central Kowloon Route Contract No. HY/2014/09 - Ho Man Tin Access Shaft ("The Project") on 20 February 2018. This is the Final Environmental Monitoring and Audit (EM&A) Review Report presenting the findings of EM&A Works of the Project.

A.2 The Project was completed on 19 September 2019 and handed over to HY/2018/08 CKR-Central Tunnel on 20 September 2019. The last monitoring for the Project was conducted on 16 September 2019 and last weekly site inspection was carried out on 17 September 2019. EM&A for the Ho Man Tin Access Shaft will be continued by the ET of HY/2018/08 CKR-Central Tunnel.

A.3 A summary of the construction works that undertaken for the Project is listed below.

Construction Activities undertaken

- Decant of Housing Authority Mock Up Centre
- Site Establishment
- Site RE Office Construction
- Diaphragm wall construction
- Noise Enclosure panels installation
- Muck Pit
- Access Shaft Excavation
- Tree Felling

A.4 A summary of the construction noise and 1-hour TSP and 24-hour TSP impact monitoring activities is listed below:

Location	Impact Monitoring	Duration	Sampling Parameter	Frequency
M-A3 SKH Tsoi Kung Po Secondary School	Dust	1-hour continuous measurement	1-hour TSP	3 times per six days
	Dust	24-hour continuous sampling	24-hour TSP	Once per six days
M-N3 SKH Tsoi Kung Po Secondary School	Noise	30-minute continuous measurement	$L_{eq\ 30\ min}$, L_{10} and L_{90} as reference.	Once $L_{eq\ 30\ min}$ from 0700 – 1900 per seven days

Waste Management

A.5 Waste generated from this Project included inert construction and demolition (C&D) materials and non-inert C&D materials. Details of waste management data is presented in

Appendix J.

Landscape and Visual

A.6 Bi-weekly inspection of the implementation of landscape and visual mitigation measures was conducted throughout the construction period. Most of the necessary mitigation measures had been implemented and recommended follow-up actions had been discharged by the Contractor.

Environmental Site Inspection

A.7 Joint weekly site inspections were conducted by representatives of the Contractor, Engineer and Contractor's ET throughout the construction period. The representative of IEC joined the site inspection once per month.

A.8 No change had been made from the described in the approved EM&A Manual.

Environmental Exceedance/Non-conformance/Complaint/Summons and Successful Prosecution

A.9 No exceedance of the Action and Limit Levels of 24-hour TSP, 1-hour TSP was recorded throughout the whole construction period.

A.10 One exceedance of the Action Level of construction noise was recorded on 11 July 2018 and no further exceedance of the Action Level was recorded. No exceedance of Limit Level was recorded throughout the whole construction period.

A.11 One environmental complaint was received in the construction period. Immediate measures implemented by the Contractor for the complaint were observed to be satisfactory. The details of the received complaint are presented in Appendix K**.**

A.12 No non-compliance, summon or prosecution was reported during the construction period.

A.13 No reporting changes were revised in the during the construction period.

Conclusion

A.14 The EM&A programme was effective in monitoring environmental impacts arising from the Project. The findings of the environmental monitoring programme suggest that no adverse impacts on sensitive receivers at the designated monitoring locations were brought about by the Project.

A.15 In conclusion, the Project was environmentally acceptable in terms of air quality and noise impact. The EM&A Programme was also covered other environmental aspects such as water quality, waste management and landscape & visual impact.

1. BASIC PROJECT INFORMATION

1.1. Central Kowloon Route (CKR) is a 4.7 km long dual 3-lane trunk road in Central Kowloon linking Yau Ma Tei Interchange in West Kowloon with the road network on Kai Tak Development and Kowloon Bay in East Kowloon.

1.2. The Central Kowloon Route – Design and Construction Environmental Impact Assessment Report (Register No.: AEIAR-171/2013) was approved with conditions by the Environmental Protection Department (EPD) on 11 July 2013. An Environmental Permit (EP 457/2013) was issued on 9 August 2013. Variations of EP (VEP) was subsequently applied for and the latest EP (EP-457/2013/C) was issued by EPD on 16 January 2017.

1.3. The Project was completed on 19 September 2019 and handed over to HY/2018/08 CKR-Central Tunnel on 20 September 2019.

1.4. The construction of the CKR had been divided into different sections. This Contract No. HY/2014/09 - Ho Man Tin Access Shaft (HMTS) ("The Project") covers part of the construction activities located at Ho Man Tin under the EP which includes:

- Central Portion
  i. Decant of Housing Authority Mock Up Centre and Site Establishment
  ii. Diaphragm Walls Construction
  iii. Excavation of Vertical Access Shaft approximately 100m deep and 21m internal diameter

The alignment and works area for the Contract No. HY/2014/09 - are shown in Appendix A.

1.5. A summary of the major construction activities undertaken in the Project is shown in Table 1.1.

Table 1.1 Summary of the construction Activities Undertaken during the Project.

Construction Activities undertaken
• Site Establishment
• Site RE Office Construction
• Diaphragm wall construction
• Decant of Housing Authority Mock Up Centre
• Noise Enclosure panels installation
• Muck Pit
• Access Shaft Excavation
• Tree Felling

1.6. There are no updates on the scope of works and construction methodologies.

1.7. The project organisational chart specifying management structure and contact details are shown in Appendix B.

2. ENVIRONMENTAL MONITORING REQUIREMENTS

2.1. Monitoring Parameters

Air Quality

2.1.1. The impact monitoring had been carried out in accordance with section 5.8 of the approved EM&A Manual to determine the 1-hour and 24-hour total suspended particulates (TSP) levels at the monitoring location in the reporting report.

2.1.2. The sampling frequency of at least once in every 6 days, shall be strictly observed at the monitoring station for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least 3 times in every 6 days should be undertaken when the highest dust impact occurs.

2.1.3. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources had also been recorded throughout the impact monitoring period.

2.1.4. The air quality monitoring station is listed in Table 2.1.

Table 2.1 Air Quality Monitoring Station

Air Quality Monitoring Station	Dust Monitoring Station
M-A3	SKH Tsoi Kung Po Secondary School

Noise

2.1.5. Construction noise level was measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ (30min)}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays.

2.1.6. For all other time periods, $L_{eq\ (5min)}$ was employed for comparison with the Noise Control Ordinance (NCO) criteria.

2.1.7. As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

2.1.8. According to the EM&A Manual, construction noise impact monitoring should be conducted at designated monitoring station. In order to the access to some of the proposed monitoring locations stated in the EM&A Manual was either rejected or unavailable, alternative location was proposed and agreed by the ER. IEC and EPD. The details of construction noise monitoring location are listed in Table 2.2 and shown in Appendix G along with location of noise sensitive receivers (NSRs) related to this Works Contract.

Table 2.2 Noise Monitoring Station

Noise Monitoring Station	Identified Noise Monitoring Station	Type of Measurement
M-N3	SKH Tsoi Kung Po Secondary School	Free-field

2.2. Monitoring frequency and duration

2.2.1. A summary of monitoring duration, sampling parameter and frequency is presented in Table 2.3.

Table 2.3: Summary of Impact Monitoring Programme

Impact Monitoring	Duration	Sampling Parameter	Frequency
Dust	1-hour continuous measurement	1-hour TSP	3 times per six days
Dust	24-hour continuous sampling	24-hour TSP	Once per six days
Noise	30-minute continuous measurement	$L_{eq\ 30\ min}$, L_{10} and L_{90} as reference.	Once $L_{eq\ 30\ min}$ from 0700 – 1900 per seven days

2.2.2. The action and limit levels for air quality and noise monitoring are presented in Appendix G.

2.2.3. When non-compliance of the Action and Limit Levels occurred, action was carried out in accordance with the Event and Action Plan in Appendix C or D.

Landscape and Visual

2.2.4. In accordance with the EM&A Manual, the landscape and visual mitigation measures was implemented and a site inspection was conducted once every two weeks throughout the construction period.

3. SUMMARY OF EM&A WORKS

Air Quality

3.1.1. 1-hour TSP and 24-hour TSP monitoring were carried out at the designated monitoring station during normal weekdays of the construction period by ET of HY/2014/09. The graphical presentation of dust monitoring data throughout the construction period of the Project is presented in Appendix H and a summary of the dust monitoring results in the construction period is given in Table 3.1.

Table 3.1 Summary Table of Dust Impact Monitoring Results

Monitoring Location	Parameter	Minimum ($\mu g/m^3$)	Maximum ($\mu g/m^3$)	Average ($\mu g/m^3$)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)	Major Dust Source
M-A3	1-hour TSP	11	136	69	333	500	Traffic
M-A3	24- hour TSP	7	141	35	153	260	

3.1.2. No exceedance of the Action and Limit Levels of the resulted air quality were reported during the construction period. Hence, it is considered that no adverse impact for air quality was brought to the nearby air quality monitoring station by this Project.

3.1.3. Mitigation measures recommended in Section 4.3.10 of the EIA Report were implemented by the Contractor as far as practicable and were considered effective.

Noise

3.1.4. Impact construction noise measurements were carried out at the monitoring stations during normal weekdays of the reporting period by ET of HY/2014/09.

3.1.5. The graphical presentation of construction noise monitoring data throughout the construction period of the Project is presented in Appendix I and a summary of the noise monitoring results in the construction period is given in Table 3.2.

Table 3.2 Summary Table of Noise Impact Monitoring Results

Monitoring Location	Range dB(A), $L_{eq\ (30\ mins)}$	Limit Level dB(A), $L_{eq\ (30\ mins)}$	Major Noise Source
M-N3	58.5-69.1	70 dB(A) during normal teaching period and 65 dB(A) during examination period.	Traffic

3.1.6. One exceedance of the Action Level of construction noise was recorded on 11 July 2018 and no further exceedance of the Action Level was recorded. No exceedance of the Limit Levels of the resulted construction noise was reported during the construction period. Hence, it is considered that no adverse noise impact was brought to the nearby noise monitoring station by this Project.

3.1.7. Mitigation measures recommended in Section 5.4.1 of the EIA Report were implemented by the Contractor as far as practicable and were considered effective.

Waste management

3.1.8. The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse, vegetative wastes and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials. With reference to relevant handling records and trip tickets of this Project, comparison of the estimated and actual amounts of quantities of waste generated in the construction period is summarised in Table 3.3. Details of cumulative waste management data are presented as a waste flow table in Appendix J.

Table 3.3 Comparison of Estimated and Actual Amounts of Waste Generated from the Project

	Quantity						
	Inert C&D Materials (in '000m3)	Chemical Waste (in '000kg)	Non-inert C&D Materials				
			Others, e.g. General Refuse disposed at Landfill (in '000m3)	Recycled materials			
				Paper/card board (in '000kg)	Plastics (in '000kg)	Metals (in '000kg)	Yard waste (in '000kg)
Estimated	19.750	0.02	0.050	0.02	0.00	0.00	0.00
Actual	53.744	0.00	0.194	0.00	0.00	0.00	0.049

Remark: Estimated quantities of waste generated from the Project was estimated before the Project was started. Actual quantities of waste generated from the Project was the actual amount of waste generated and summarize after the Project was completed.

3.1.9. Mitigation measures recommended in Section 7.5.1 of the EIA Report were implemented by the Contractor as far as practicable and were considered effective.

Landscape and Visual

3.1.10. Bi-weekly inspection of the implementation of landscape and visual mitigation measures was conducted throughout the construction period. The observations and recommendations made during the audit sessions are summarized in each of the Monthly EM&A Report.

3.1.11. Mitigation measures recommended in Section 10.10.2 of the EIA Report were implemented by the Contractor as far as practicable and were considered effective.

Site Audit

3.1.12. Site audit was carried out by representatives of the Contractor, Engineer and Contractor's ET on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site. The representative of the IEC joined the site inspections once per month.

3.1.13. No non-compliance was recorded during the site inspections throughout the construction period. Observations and recommendations recorded during the site inspections were summarized in each of the Monthly EM&A Reports.

3.1.14. According to the EIA Study Report, Environmental Permit and the EM&A Manual of the Project, the mitigation measures detailed in the documents were implemented during the construction phase. An updated summary of the Environmental Mitigation Implementation Schedule (EMIS) is provided in Appendix E.

3.1.15. There were no outstanding environmental issues and no follow-up action was needed.

4. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

4.1. When non-compliance of the Action and Limit Levels occurred, action was carried out in accordance with the Event and Action Plan in Appendix C or D. No non-compliance was reported in the construction period. One exceedance of the Action Level of construction noise was recorded on 11 July 2018 and no further exceedance of the Action Level was recorded. No exceedance of the Limit Levels of the regular construction noise was recorded during the construction period

4.2. No exceedance of the Limit Level of 1-hour TSP and 24-hour TSP monitoring was recording during the construction period.

4.3. One environmental complaint was received on 17 July 2018 regarding to construction noise. Investigation report was submitted and attached to the monthly report. After investigation, the complaint was concluded invalid. Additional mitigation measures was implemented, for example installing noise barrier oriented to NSR.

4.4. No notification of summons and prosecution was received in the reporting period.

4.5. Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix K.

5. CONCLUSION AND RECOMMENDATIONS

5.1. This Final Environmental Monitoring and Audit (EM&A) Review Report presents the EM&A works undertaken during the period from 20 February 2018 to 19 September 2019 in accordance with the EM&A Manual and the requirement under EP- 457/2013/C.

5.2. It is predicted in the EIA Report that with the implementation of the recommended mitigation measures, there would be no unacceptable or residual air quality and noise impacts arising from the Project-related construction works.

5.3. Air quality (including 1-hour TSP and 24-hour TSP) and construction noise impact monitoring were carried out in the construction period. All monitoring results are satisfactory.

5.4. One exceedance of the Action Level of construction noise was recorded on 11 July 2018 and no further exceedance of the Action Level was recoreded. No exceedance of Limit Levels of the regular construction noise was recorded during the construction period

5.5. No exceedance of the Action and Limit Level of 1-hour TSP and 24-hour TSP monitoring was recording during the construction period.

5.6. The Project was completed on 19 September 2019 and handed over to HY/2018/08 CKR-Central Tunnel on 20 September 2019.

5.7. One environmental complaint was received on 17 July 2018 regarding to construction noise. Investigation report was submitted and attached to the monthly report. After investigation, the complaint was concluded invalid. Additional mitigation measures was implemented, for example installing noise barrier oriented to NSR.

5.8. The EM&A programme was effective in monitoring environmental impacts arising from the Project. The findings of the environmental monitoring program suggest that no adverse impacts on sensitive receivers were brought about by the Project.

5.9. In conclusion, the Project was environmentally acceptable in terms of air quality and noise impact. The EM&A Programme was also covered other environmental aspects such as water quality, waste management and landscape & visual impact.

Appendix A
Alignment and Works Area For the Contract No. HY/2014/09

LEGENDS:

CCTV CAMERA

Rev. 修訂	Description 內容摘要	By 設計	Date 日期
A	SECOND ISSUE	JK	20/12/17
-	FIRST ISSUE	JK	11/12/17

ARUP Mott MacDonald
Joint Venture

Successfully Building a Better Future.
西松建設
NISHIMATSU CONSTRUCTION CO.,LTD.

Project title 工程名稱
Contract No. HY/2014/09
Central Kowloon Route -
Ho Man Tin Access Shaft

Drawing title 圖紙名稱
SITE LAYOUT PLAN
(PORTION 1A, 1B, 1C, 1D, 1E & 1F)

Drawing no. 圖紙編號	Rev. 修訂
NCC/HMTS/01/0001	A

Drawn By 繪圖	Checked By 複核	Approved By 批准人
TC	JK	OI

Scale 比例	Status 階段
1:1000 @ A3	WORKING

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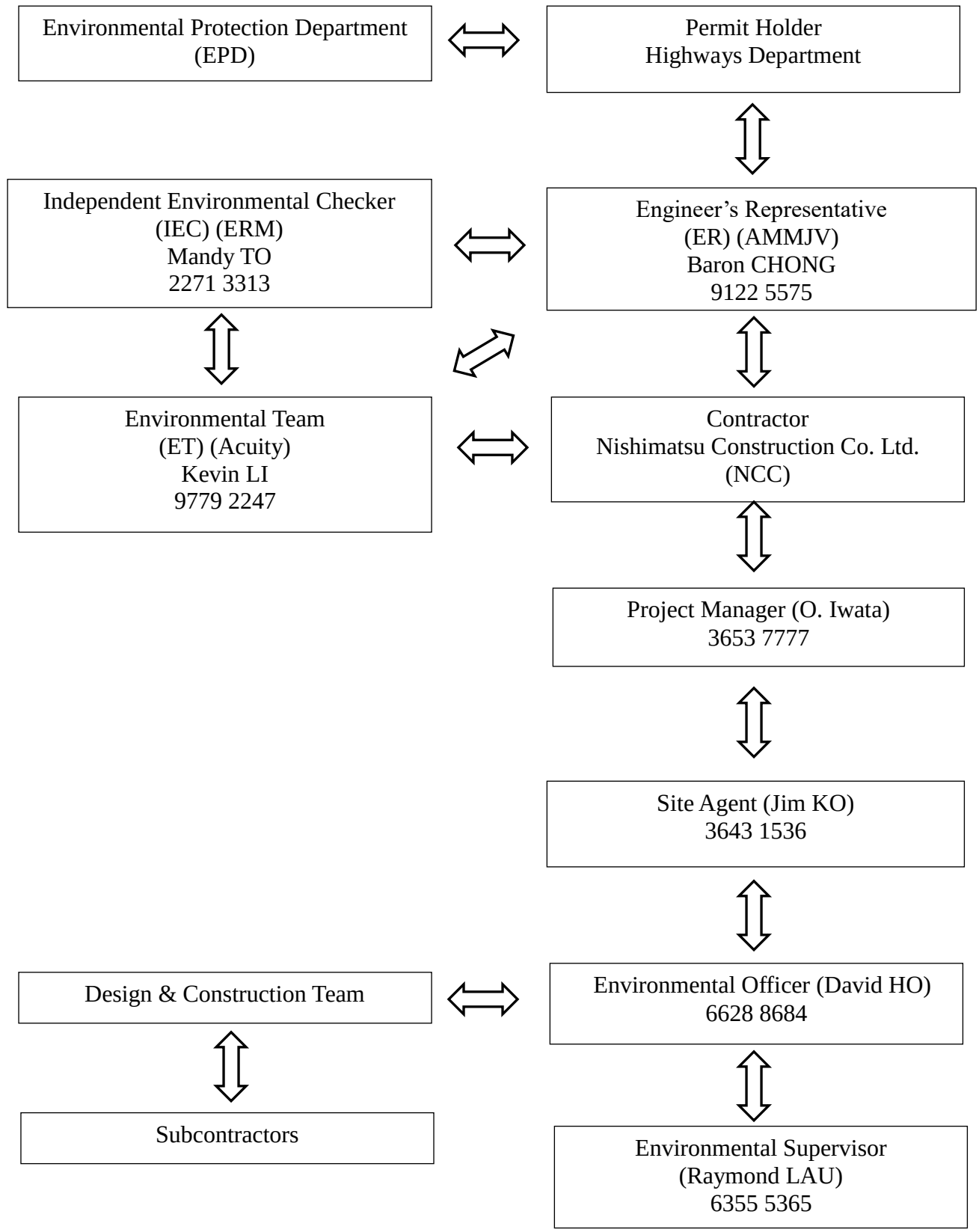
路政署 HIGHWAYS DEPARTMENT
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE

Appendix B
Project Organization Chart

Project Organisation Chart



LEGEND:

Line of Communication

Appendix C
Dust Event-Action Plan (EAP)

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
ACTION LEVEL				
1.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.
2.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				
1.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	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible 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;

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
	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.	4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.		Implement the agreed proposals; 4. Amend proposal if appropriate.
2.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

ER – Engineer's Representative

IEC – Independent Environmental Checker

Appendix D
Noise Event-Action Plan (EAP)

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
Action Level	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Notify IEC and Contractor; 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 analysed 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 analysed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	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	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 analysed noise problem; 4. 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. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER

EVENT	ACTION			
	ET	**IEC**	**ER**	**CONTRACTOR**
	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.		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.	until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Appendix E
Environmental Mitigation Implementation Schedule (EMIS)

EIA Ref.	EM&A Log 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	Implementation Status
Construction Dust Impact								
S4.3.10	D1	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction stage	• APCO • To control the dust impact To meet HKAQO and TM-EIA criteria	• Implemented
S4.3.10	D2	• Mitigation measures in form of regular watering under a good site practice should be adopted. Watering once per hour on exposed worksites and haul road should be conducted to achieve dust removal efficiencies of 91.7%. While the above watering frequencies are to be followed, the extent of watering may vary depending on actual site conditions but should be sufficient to maintain an equivalent intensity of no	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction stage	• APCO • To control the dust impact To meet HKAQO and TM-EIA criteria	• Implemented

EIA Ref.	EM&A Log 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	Implementation Status
		less than 1.3 L/m^2 to achieve the dust removal efficiency.						
S4.3.10	D3	• Proper watering at exposed spoil should be undertaken throughout the construction phase; • 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	Minimize dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction stage	• APCO • To control the dust impact To meet HKAQO and TM-EIA criteria	• Implemented.

EIA Ref.	EM&A Log 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	Implementation Status
		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. • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • When there are open excavation and						

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		reinstatement works, hoarding of not less than 2.4m high should be provided and properly maintained as far as practicable along the site boundary with provision for public crossing. 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						

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		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						

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		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, shotcrete or other suitable surface stabilizer within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.						
S4.3.10	D6	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitoring of dust impact	Contractor	Selected rep. dust monitoring	Construction stage	• TM-EIA	• Implemented

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					station			
Construction Noise (Airborne)								
S5.4.1	N1	Implement the following good site 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	Control construction airborne noise	Contractor	All construction sites	Construction stage	• Annex 5, TM-EIAO	• Implemented

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		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 utilized, where practicable, to screen noise from on-site construction activities.						
S5.4.1	N2	Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of 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	Construction stage	• Annex 5, TM-EIAO	• Implemented
S5.4.1	N3	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered on a skid footing with	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where	Construction stage	• Annex 5, TM-EIAO	• Implemented

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		25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators and handheld breakers, etc.			practicable			
S5.4.1	N4	Use 'Quiet plant'	Reduce the noise levels of plant items	Contractor	All construction sites where practicable	Construction stage	• Annex 5, TM-EIAO	• Implemented
S5.4.1	N5	Loading/ unloading activities should be carried out inside the full enclosure of mucking out points.	Reduce the noise levels of loading/ unloading activities	Contractor	Mucking out locations	Construction stage	• Annex 5, TM-EIAO	• Implemented
S5.4.1	N6	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	• Annex 5, TM-EIAO	• Implemented
S5.4.1	N7	Implement a noise monitoring programme under EM&A programme.	Monitor the construction noise levels at the selected representative location	Contractor	Selected rep. noise monitoring	Construction stage	• TM-EIAO	• Implemented

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					station			
Water Quality (Construction Phase)								
S6.9.1.1	W1	• 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>Construction Runoff</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	• To minimize water quality impact from the construction site runoff and general construction activities	Contractor	All construction sites where practicable	Construction stage	• Water Pollution Control Ordinance • ProPECC PN 1/94 • TM-EIAO • TM-DSS	• Implemented

EIA Ref.	EM&A Log 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	Implementation Status
		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; • 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 silt/ sediment trap. The sediment/ silt traps should be incorporated in the permanent drainage channels to enhance deposition rates;						

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		• The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/ sand traps should be 5 minutes under maximum flow conditions. Sizes may vary depending upon the flow rate, but for a flow rate of 0.1 m3/s a sedimentation basin of 30 m3 would be required and for a flow rate of 0.5 m3/s the basin would be 150 m3. The detailed design of the sand/ silt traps shall be undertaken by the contractor prior to the commencement of construction; • All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been						

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		completed, or alternatively, within 14 days of the cessation of earthworks where practicable. Exposed slope surfaces should be covered by tarpaulin or other means; • The overall slope of the site should be kept to a minimum to reduce the erosive potential of surface water flows, and all traffic areas and access roads protected by coarse stone ballast. An additional advantage accruing from the use of crushed stone is the positive traction gained during prolonged periods of inclement weather and the reduction of surface sheet flows; • All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to						

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		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; • Measures should be taken to minimize the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, they 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; • Open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than						

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		50m3 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 should always be adequately 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 summarized in Appendix A2 of						

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		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; • 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 site 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							

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		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;						

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		• 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; • Adopt best management practices; • All earth works should be conducted sequentially to limit the amount of construction runoff generated from exposed areas during the wet season (April to September) as far as practicable.						
S6.9.1.2	W2	<u>Underground Works</u> • Uncontaminated discharge should pass through sedimentation tanks prior to of-site discharge; • The wastewater with a high	To minimize construction water quality impact from the works	Contractor	All access shaft location	Construction stage	• Water Pollution Control Ordinance • ProPECC PN 1/94	• Implemented

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		concentration of SS should be treated (e.g. by sedimentation tanks with sufficient retention time) before discharge. Oil interceptors would also be required to remove the oil, lubricants and grease from the wastewater; • Direct discharge of the bentonite slurry (as a result of D-wall) is not allowed. It should be reconditioned and reused wherever practicable. Temporary storage locations (typically a properly closed warehouse) should be provided on site for any unused bentonite that needs to be transported away after all the related construction activities area completed. The requirements in ProPECC PN 1/94 should be adhered					• TM-DSS • TM-EIAO	

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		to in the handling and disposal of bentonite slurries.						
S6.9.1.3	W3	Sewage Effluent • 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 minimize water quality from sewage effluent	Contractor	All construction sites where practicable	Construction stage	• Water Pollution Control Ordinance • TM-DSS	• Implemented
S6.9.1.6	W6	Accidental Spillage In order to prevent accidental spillage of chemicals, the following is recommended: • All the tanks, containers, storage area should be bunded and the locations should be locked as far as possible	To minimize water quality impact from accidental spillage	Contractor	All construction site where practicable	Construction stage	• Water Pollution Control Ordinance • ProPECC PN 1/94 • TM-EIAO • TM-DSS	• Implemented

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		from the sensitive watercourse and stormwater drains; • The Contractor should register as a chemical waste producer if chemical wastes would be generated. Storage of chemical waste arising from the construction activities should be stored with suitable labels and warnings. • Disposal of chemical wastes should be conducted in compliance with the requirements as stated in the Waste Disposal (Chemical Waste) (General) Regulation.						
Waste Management (Construction Waste)								
S7.4.1	WM1	<u>On-site sorting of C&D material</u> • Geological assessment should be carried out by competent persons on site during excavation to identify	Separation of unsuitable rock from ending up at concrete batching plants and be turned into concrete for structural use	Contractor	All construction sites	Construction stage	• DEVB (W) No. 6/2010	• Implemented

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		materials which are not suitable to use as aggregate in structural concrete (e.g. volcanic rock, Aplite dyke rock, etc.). Volcanic rock and Aplite dyke rock should be separated at the source sites as far as practicable and stored at designated stockpile area preventing them from delivering to crushing facilities. The crushing plant operator should also be reminded to set up measures to prevent unsuitable rock from ending up at concrete batching plants and be turned into concrete for structural use. Details regarding control measures at source site and crushing facilities should be submitted by the Contractor for the Engineer to review and agree. In addition, site records should also be						

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		kept for the types of rock materials excavated and the traceability of delivery will be ensured with the implementation of Trip Ticket System and enforced by site supervisory staff as stipulated under DEVB TC(W) No. 6/2010 for tracking of the correct delivery to the rock crushing facilities for processing into aggregates. Alternative disposal option for the reuse of volcanic rock and Aplite Dyke rock, etc. should be explored.						
S7.5.1	WM2	<u>Construction and Demolition Material</u> • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the	Good site practice to minimize 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 stage	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TCW	• Implemented

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		use of recycled aggregates where appropriate; • Adopt 'selective demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and • Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and					No. 19/2005	

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		to minimize their generation during the course of construction.						
S7.5.1	WM3	<u>C&D Waste</u> • Standard formwork or pre-fabrication should be used as far as practicable in order to minimize the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage; • The Contractor should recycle as much of the C&D materials as	Good site practice to minimize 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 stage	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TCW No. 19/2005	• Implemented

EIA Ref.	EM&A Log 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	Implementation Status
		possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.						
S7.5.1	WM6	<u>Chemical Waste</u> • Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes;	Control the chemical waste and ensure proper storage, handling and disposal	Contractor	All construction sites	Construction stage	• Waste Disposal (Chemical Waste) (General) Regulation • Code of Practice on the Packaging,	• Implemented

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		• Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed, have a capacity of less than 450 L unless the specification has been approved by EPD, and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation; • The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste, enclosed on at least 3 sides, have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20% of the					Labelling and Storage of Chemical Waste	

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		total volume of waste stored in that area, whichever is the greatest, have adequate ventilation, covered to prevent rainfall entering, and arranged so that incompatible materials are adequately separated; • Disposal of chemical waste should be via a licensed waste collector, be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers, or be to a reuser of the waste, under approval from EPD.						
S7.5.1	WM7	<u>General Refuse</u> • General refuse generated on-site should be stored in enclosed bins or compaction units separately from	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	• Waste Disposal Ordinance	• Implemented

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		construction and chemical wastes; • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminum cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible; • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection							

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		scheme should be considered by the Contractor.						
Hazard to Life								
S9.18	H1	Blasting activities regarding transport and use of explosives should be supervised and audited by competent site staff to ensure full compliance with the blasting permit conditions.	To ensure that the risks from the proposed explosives handling and transport would be acceptable	Contractor	Works areas at which explosives would be used	Construction stage	• Dangerous Goods Ordinance	• Implemented
S9.6, para.4	H2	Detonators shall not be transported in the same vehicle with other Category 1 Dangerous Goods.	To reduce the risk of explosion during the transport of cartridged emulsion	Contractor	-	Construction stage	• Dangerous Goods Ordinance	• Implemented
S9.6, para.8	H3	The explosives delivery trucks should be approved by Mines Division and should meet the regulatory requirements for transport of explosives.	To comply with the requirements for approval of an explosives delivery vehicle	Contractor	-	Construction stage	• Dangerous Goods Ordinance	• Implemented
S9.10, para.7 and S9.18	H4	Blast cover should be provided for shaft at HMT, and kept closed during blasting. Provision of blast doors or heavy duty	To ensure safe use of explosives	Contractor	Shaft	Construction stage	-	• Implemented

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		blast curtains should be implemented at the shaft to prevent flyrock and control the air overpressure.						
S9.16	H5	Only the required quantity of explosives for a particular blast should be transported to avoid the return.	To reduce risks during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H7	The approved truck dedicated for transport of explosives should comply with the "Guidance Note on Requirements for Approval of an Explosives Delivery Vehicle" issued by CEDD Mines Division. The truck should be periodically inspected and properly maintained in good operation conditions. The fuel carried in the fuel tank should be minimized to reduce the duration of fire. Adequate fire fighting equipment shall be provided, inspected	To reduce the risk during explosives transport	Contractor	Works areas of which explosives would be used	Construction stage	• Dangerous Goods Ordinance	• Implemented

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		and replaced periodically (e.g. fire extinguishers).						
S9.18	H8	The driver and his assistant should be physically healthy, experienced and have good safe driving records. The driver should hold a proper driving licence for the approved transport truck. Dedicated training programme and regular road safety briefing sessions/ workshops should be provided to enhance their safe driving attitude and practice. Smoking should be strictly prohibited.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H9	Emergency response plans in case of road accident should be prepared and implemented. The driver and his assistant should be familiar with the emergency procedures including evacuation, and proper communication/ fire-fighting equipment should be	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented

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		provided to the driver and his assistant.						
S9.18	H10	Close liaison and communication among Mines Division, Contractors for transport of explosives, and working staff of the blasting should be established. In case of any change of work schedule leading to cancellation or variation of explosives required, relevant parties should be informed in time to avoid unused explosives at the work sites.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H11	Close liaison and communication with Fire Services Department should be established to reduce the accidental detonation escalated from a fire. The contractors for transport of explosives should use the preferred transport routes as far as practicable.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H12	Contingency plan should be prepared for transport of explosives under severe	To reduce the risk during explosives transport	Contractor	Works areas at which	Construction stage	-	• Implemented

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		weather conditions such as rainstorms and thunderstorms.			explosives would be used			
S9.18	H13	For explosive transport, all packages of explosives on the truck should be properly stored in the truck compartment as required. Packaging of the explosives should remain intact (i.e. damage free) until they are transferred to the blasting site.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H14	Availability of a parking space should be ensured before commencement of transport of explosives. Location for loading and unloading of explosives should be as close as possible to the shaft. No hot work should be performed in the vicinity during the time of loading and unloading.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
S9.18	H22	It is recommended to explore to minimize the use of the cartridged emulsion	To reduce the risk during explosives transport	Contractor	Works areas at which	Construction stage	-	• Implemented

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		explosives and maximize the use of bulk emulsion explosive as far as practicable.			explosives would be used			
S9.18	H24	It is recommended to explore to use smaller explosive charges such as 'cast boosters' or 'mini-cast booster' instead of cartridged emulsion as primers for bulk emulsion. This option reduces the quantity of explosives required for transportation for the sections where bulk emulsion will be used.	To reduce the risk during explosives transport	Contractor	Works areas at which explosives would be used	Construction stage	-	• Implemented
Landscape & Visual								
S10.10.1 Table 10.11	LV1	<u>Good Site Management</u> • Large temporary stockpiles of excavated material shall be covered with unobtrusive sheeting to prevent dust and dirt spreading to adjacent landscape areas and vegetation, and to create a neat and tidy visual appearance.	Minimize visual impact	Contractor	Within Project site	Construction stage	-	• Implemented

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		• Construction plant and building material shall be orderly and carefully stored in order to create a neat and tidy visual appearance.						
S10.10.1 Table 10.11	LV4	<u>Screen Hoarding</u> • Decorative screen hoarding should be erected to screen the public from the construction area. It should be designed to be compatible with the existing urban context.	Minimize visual impact	Contractor	Within Project site	Construction stage	-	• Implemented
S10.10.1 Table 10.11	LV5	<u>Lighting Control during Construction</u> • All lighting in the construction site shall be carefully controlled to minimize light pollution and night-time glare to nearby residencies and GIC. The Contractor shall consider other security measures, which shall minimize the visual impacts.	Minimize visual impact	Contractor	Within Project site	Construction stage	-	• Implemented

Environmental Mitigation Implementation Schedule –
Contract No. HY/2014/09 (Ho Man Tin Access Shaft)

EIA Ref.	EM&A Log 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	Implementation Status
S10.10.1 Table 10.11	LV6	<u>Erosion Control</u> • The potential for soil erosion shall be reduced by minimizing the extent of vegetation disturbance on site and by providing a protective cover over newly exposed soil.	Minimize landscape impact	Contractor	Within Project site	Construction stage	-	• N/A
S10.10.1 Table 10.11	LV7	<u>Tree Protection & Preservation</u> • Carefully protected during construction. Tree protection measures will be detailed at the Tree Removal Application stage and plans submitted to the relevant Government Department for approval in due course in accordance with ETWB TC no. 3/2006.	Minimize landscape and visual impact	Contractor	Within Project site	Construction stage	• 'Guidelines for Tree Risk Management and Assessment Arrangement on an Area Basis and on a Tree Basis', Greening, Landscape and Tree Management (GLTM)	• Implemented.

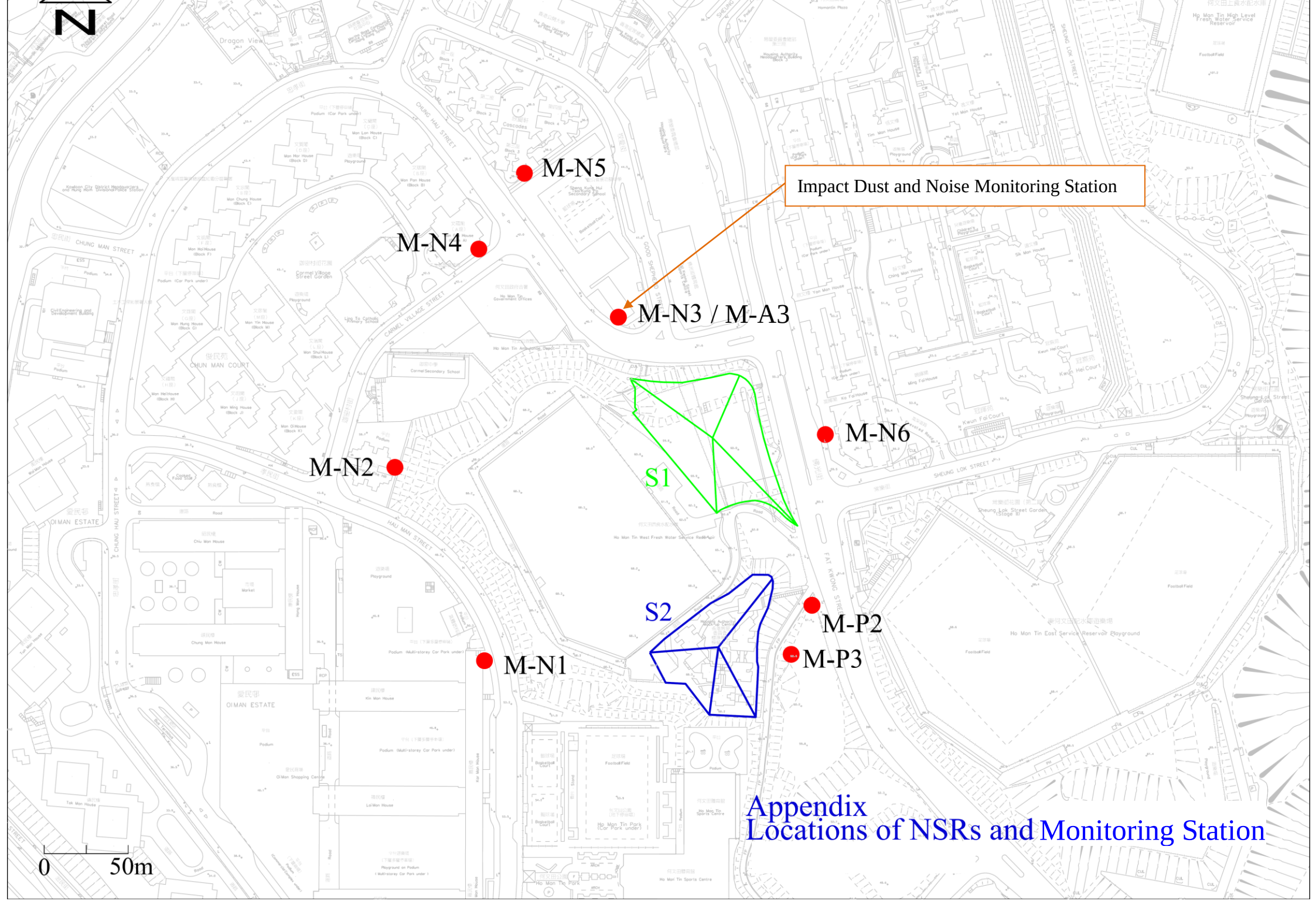
EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and/ or standards to be achieved	Implementation Status
							Section, DEVB • Latest recommended horticultural practices from GLTM Section, DEVB	
S10.10.1 Table 10.11	LV8	<u>Tree Transplantation</u> • For trees unavoidably affected by the Project that have to be removed, where practical transplantation will be chosen as the top priority method of removal. If this is not possible or practical compensatory planting will be provided for trees unavoidably felled (See LV10). For trees unavoidably affected by the Project works that are transplanted, transplantation must be carried out in	Minimize landscape and visual impact	Contractor	Within Project site and designated off-site locations	Prior to Construction stage	• ETWB TCW 3/2006 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DEVB	• N/A

EIA Ref.	EM&A Log 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	Implementation Status
		accordance with ETWB TCW 2/2004 and 3/2006.					• ETWB TCW 2/2004	
S10.10.1 Table 10.11	LV9	<u>Compensatory Planting</u> • For trees unavoidably affected by the Project that have to be removed, where practical transportation will be chosen as the top priority method of removal but if this is not possible or practical compensatory planting will be provided for trees unavoidably felled. All felled trees shall be compensated for by planting trees to the satisfaction of relevant Government projects. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under	Minimize visual impact and also enhance landscape	Contractor	Within Project site	Construction stage	• ETWB TCW 3/2006 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DEVB • ETWB TCW 2/2004	• Implemented

EIA Ref.	EM&A Log 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	Implementation Status
		ETWBTC 3/2006. • Compensatory tree planting may be incorporated into public open spaces and along roadside amenity areas affected by the construction works and therefore be part of the bigger wider planting plans. Onsite compensation planting is preferred but if necessary, additional receptor sites outside the Works Area shall be agreed separately with Government during the Tree Felling Application process.						
Cultural Heritage Impact (Construction Phase)								
S11.4.4	CH1	The contractor should be alerted during the construction on the possibility of locating archaeological remains and as a precautionary measure, AMO shall be informed immediately in case of	To preserve any cultural heritage items which may be removed and damaged by the excavation	Contractor	During construction works	Construction stage	• AMOs requirements	• Implemented

EIA Ref.	EM&A Log 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	Implementation Status
		discovery of antiquities or supposed antiquities in the subject sites.						
EM&A Project								
S13.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual	Control EM&A Performance	Highways Department	All construction sites	Construction stage	• EIAO Guidance Note No. 4/2010 • TM-EIAO	• Implemented
S13.2-13.4	EM2	• An Environmental Team needs to be employed as per the EM&A Manual; • Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures; • An environmental impact monitoring needs to be implemented 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 stage	• EIAO Guidance Note No. 4/2010 • TM-EIAO	• Implemented

Appendix F
Location Plan of Noise and Air Quality Monitoring Station



Appendix
Locations of NSRs and Monitoring Station

Appendix G
Action and Limit Levels

Action and Limit Levels for Air Quality Monitoring

Monitoring Location	Parameter	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
M-A3	1-hour TSP	333	500
M-A3	24- hour TSP	153	260

Action and Limit Levels for Noise

Monitoring Location	Action Level	Limit Level dB(A), $L_{eq\ (30\ mins)}$
M-N3	When one documented complaint is received	70 dB(A) during normal teaching period and 65 dB(A) during examination period.

Appendix H
Monitoring Data (Air Monitoring)

Figure 1: Graphical Illustration of Measured 1-hour TSP (μg/m^3) Levels at M-A3

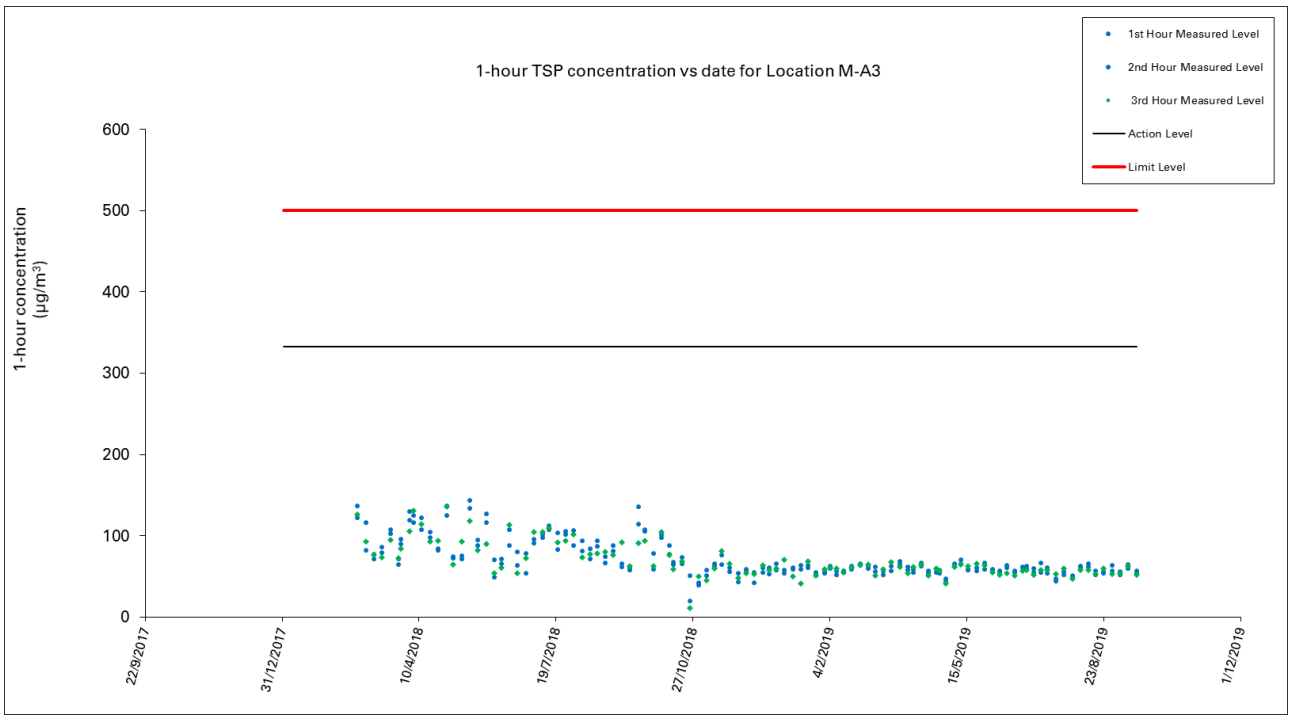
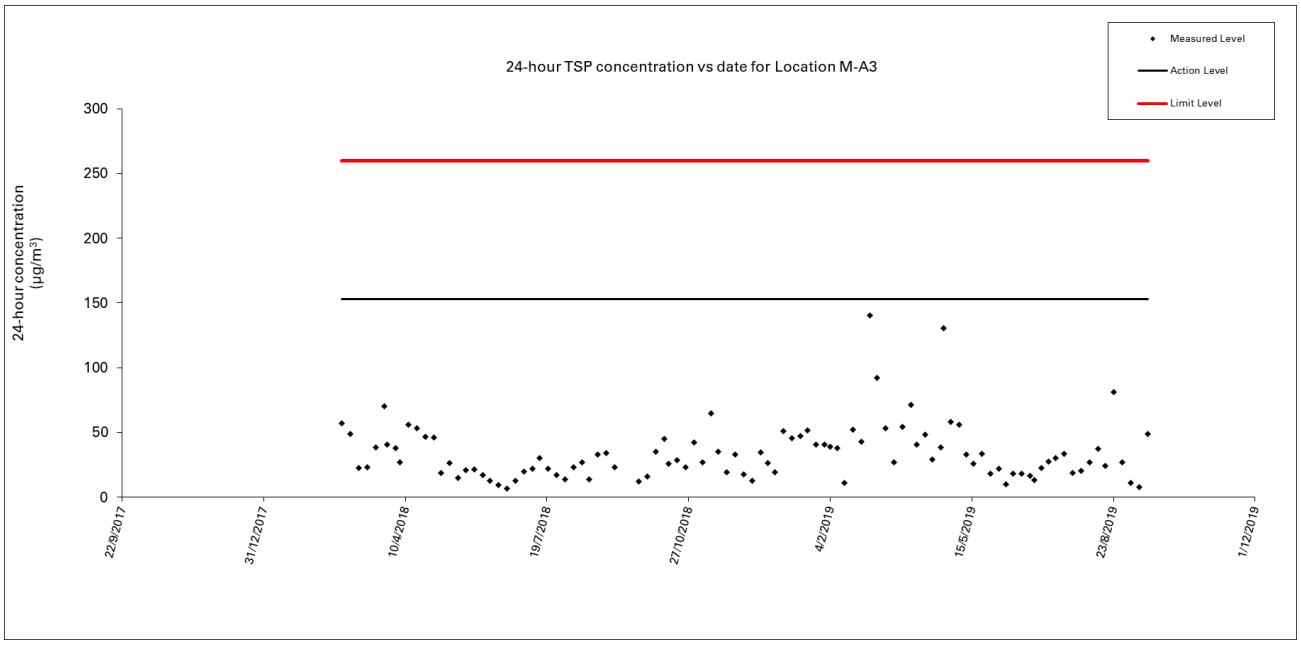
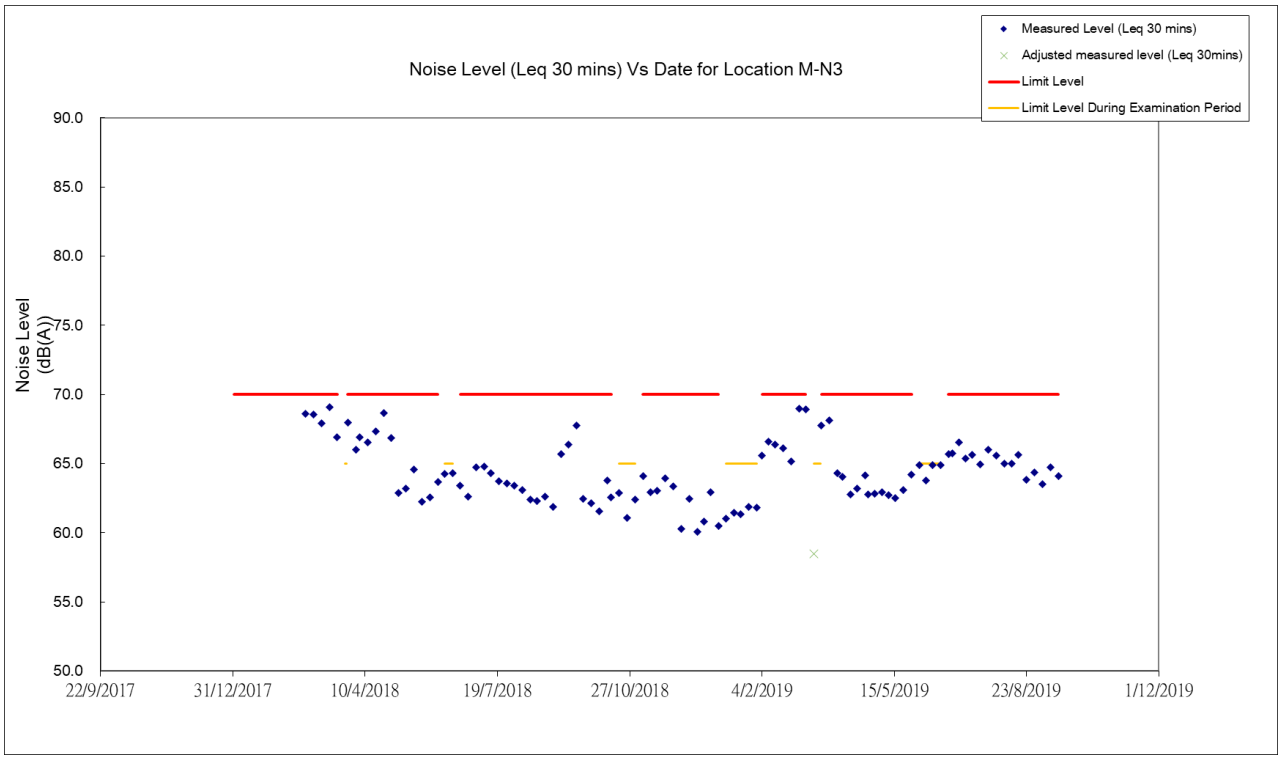


Figure 2: Graphical Illustration of Measured 24-hour TSP (μg/m^3) Levels at M-A3



Appendix I
Monitoring Data (Noise)

Figure 1: Graphical Illustration of Measured Noise Levels at M-N3



Remark:

1. Measured noise level on 26/3/2018 was below the measured baseline level. Therefore, it is not shown in the graph.

2. Measured noise level on 15/3/2019 was adjusted by subtracting the measured baseline level.

Appendix J
Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: Highways Department **Contract No. / Works Order No.: HY/2014/09**

Monthly Summary Waste Flow Table for 2018-2019

[to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 2 decimal places.)

Month	Actual Quantities of Inert Construction Waste Generated					
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill	Imported Fill
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)
Jan-2018	0.309	0.127	0.000	0.000	0.182	0.000
Feb -2018	1.343	1.156	0.000	0.000	0.187	0.000
Mar -2018	0.871	0.061	0.000	0.000	0.810	0.000
Apr -2018	0.315	0.000	0.000	0.000	0.315	0.000
May -2018	1.218	0.000	0.000	0.000	1.218	0.000
Jun -2018	1.218	0.000	0.000	0.000	1.218	0.000
Sub-total	5.274	1.344	0.000	0.000	3.930	0.000
Jul-2018	1.669	0.000	0.000	0.000	1.669	0.000
Aug-2018	1.037	0.010	0.000	0.000	1.027	0.000
Sep-2018	1.469	0.000	0.000	0.000	1.469	0.000
Oct-2018	1.558	0.011	0.000	0.000	1.547	0.000
Nov-2018	1.079	0.030	0.000	0.000	1.049	0.000
Dec-2018	0.567	0.298	0.000	0.000	0.269	0.000
Sub-total	12.653	1.693	0.000	0.000	10.960	0.000
Jan -2019	4.507	0.755	0.000	0.000	3.752	0.000
Feb -2019	5.032	0.242	0.000	0.000	4.790	0.000
Mar -2019	7.887	0.148	0.000	0.000	7.739	0.000
Apr -2019	3.591	0.251	0.000	0.000	3.340	0.000

May -2019	4.927	0.951	0.000	0.465	3.511	0.000
Jun -2019	4.758	1.234	0.000	2.334	1.190	0.000
Sub-total	43.355	5.274	0.000	2.799	35.282	0.000
Jul-2019	5.552	0.459	0.000	4.859	0.234	0.000
Aug-2019	4.795	0.374	0.000	4.154	0.267	0.000
*Sep-2019	0.042	0.000	0.000	0.000	0.042	0.000
Total	53.744	6.107	0.000	11.812	35.825	0.000

Month	**Actual Quantities of Non-inert Construction Waste Generated**								
	Metals		Paper/ cardboard packaging		Plastics		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m^3)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
Feb -2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016
Mar -2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
Apr -2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
May -201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
Jun -2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
Sub-total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
Jul-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
Aug-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004 0.005 (yard waste for recycle)
Sep-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017 0.008 (yard waste for recycle)
Oct-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
Nov-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Dec-2018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Sub-total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.107
Jan-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003

Feb-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002 0.002 (yard waste for recycle)
Mar-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004 0.003 (yard waste for recycle)
Apr-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
May-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
Jun-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010 0.001(yard waste recycle)
Sub-total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.145
Jul-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002 0.005 (yard waste for recycle)
Aug-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002 0.016 (yard waste for recycle)
*Sep-2019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015 0.009 (yard waste for recycle)
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.194

Remarks: *Construction waste record was provided only for 1-19 September 2019.

Appendix K
Statistics on Complaint, Notifications of Non-compliance, Summons and Successful Prosecutions

Statistical Summary of Exceedances

Air Quality			
Location	**Action Level**	**Limit Level**	**Total**
M-A3	0	0	0
Noise			
Location	**Action Level**	**Limit Level**	**Total**
M-N3	1	0	1

Statistical Summary of Environmental Complaints

Reporting Period	**Environmental Complaint Statistics**				
	Frequency	**Cumulative**	**Complainant**	**Complaint Nature**	**Investigation/ Mitigation Action**
Feb 2018 – Sep 2019	1	1	A resident nearby the construction site	Complaint on daytime construction noise at the hillside of Yau Ma Tei Kai Fong Association School of 11 July, 2018	The Contractor had taken the following actions: • Went to the site on 14 July 2018 morning to inspect and understand the site situation as well as to visit the 4 nos. of building immediately opposite to the drilling rig working location. • The Contractor had left name card to the security guards of each of the 4 buildings for the immediate contact if there are any residents who raised the noise issue to them. • Mitigation measures were implemented, for example installing noise barriers oriented to NSR. • The complaint was concluded as invalid and the file was closed.

Statistical Summary of Environmental Non-compliance

Reporting Period	Environmental Non-compliance Statistics		
	Frequency	**Cumulative**	**Details**
Feb 2018 – Sep 2019	0	0	N/A

Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	**Cumulative**	**Details**
Feb 2018 – Sep 2019	0	0	N/A

Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	**Cumulative**	**Details**
Feb 2018 – Sep 2019	0	0	N/A