



Project No.: TCS/00658/13

**HIGHWAY CONTRACT NO. HY/2011/13 –
IMPROVEMENT TO POK OI INTERCHANGE**

**QUARTERLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) SUMMARY REPORT (NO.12) –
DECEMBER 2015 TO FEBRUARY 2016**

PREPARED FOR
Leader Civil Engineering Corporation Limited

Quality Index Date	Reference No.	Prepared By (Assistant Environmental Consultant)	Certified by (Environmental Team Leader)
8 April 2016	TCS00658/13/600/R0237v2	 Donald Kwok	 T.W. Tam

Version	Date	Description
1	1 April 2016	First submission
2	8 April 2016	Amended against the ER's comments on 6 April 2016

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Our ref. : LES/J2013-01/CS/L53
Date : 12 April 2016

BY Fax (3188 3418) & Email

**Highway Department
Works Division
16th Floor, Skyline Tower,
39 Wang Kwong Road,
Kowloon Bay, Kowloon, H.K.**

Attn: Engineer, Mr. Ian Wan

**RE: Contract No. HY/2011/13
Improvement to Pok Oi Interchange (Sub-Contract No. 1205/5003)
Quarterly EM&A Summary Report – December 2015 to February 2016**

Dear Sir,

Referring to the Environmental Team's submission of the Quarterly EM&A Summary Report (document reference: TCS00658/13/600/R0237v2) received via email dated 8 April 2016, please be informed that we have no further comment on the captioned report.

We write to verify the captioned submission in accordance with Condition 3.6 in the captioned Environmental Permits

Thank you for your kind attention and please do not hesitate to contact the undersigned at 2839 5666 should you have any queries.

Yours truly,
For and On Behalf Of
Lam Environmental Services Limited

A handwritten signature in blue ink, appearing to read "Raymond Dai".

Raymond Dai
Independent Environmental Checker

c.c.: Leader Civil Engineering Corporation Limited (By fax: 2336 5076)
Action-United Environmental Services and Consulting (By fax: 2959 6079)

EXECUTIVE SUMMARY

REPORTING OF THE CONTRACT

- ES.01. Leader Civil Engineering Corporation Limited (hereinafter ‘Leader’) has been awarded by the Highways Department (HyD) of the Government of the Hong Kong Special Administrative Region (HKSAR) the Contract No. *HY/2011/13 – Improvement to Pok Oi Interchange* (hereinafter ‘the Project’) in November 2012. The Project is a designated project under Environmental Permit No. *EP-411-2011*.
- ES.02. As part of the EM&A programmes, baseline noise monitoring was carried out by the ET in accordance with the EM&A Manual and the EP requirements between *22 January 2013* and *6 February 2013* to determine the ambient environmental condition before commencement of construction works on *01 March 2013*. Furthermore, Landscape & Visual survey was undertaken on *28th* and *29th January 2013*. According to the EM&A Manual stipulation, impact monitoring also started to implement by the ET in March 2013.
- ES.03. This is the twelfth quarterly EM&A summary report for Road Improvement Works covering the construction period from *01 December 2015* to *29 February 2016*.

BREACH OF ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

- ES.04. In this reporting period, no exceedance of environmental quality performance limits for construction noise was recorded. Therefore, no Notification of Exceedance (NOE) issued and the remedial action did not to be required.

COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.05. No environmental complaints, notifications of summons and successful prosecutions were registered during the quarter.

CONCLUSIONS

- ES.06. The EM&A results for the Reporting Period confirmed that the monitoring work was effective and was generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.
- ES.07. Neither breaches of environmental quality performance limits nor written or verbal environmental complaints, notification of summons and successful prosecutions were recorded during the Reporting Period, indicating the implemented environmental mitigation measures were effective and efficient to alleviate adverse environmental impacts generated from the construction activities of the Works.

RECOMMENDATIONS

- ES.08. Construction noise would be the key environmental issue during the progress of construction work. The noise mitigation measures such as use of quiet plants and installation of temporary noise barrier at the construction noise predominate area should be fully implemented as accordance with the EM&A requirement.
- ES.09. It was reminded that water quality mitigation measures such as prevention of muddy water and other water quality pollutants via site surface water runoff get into public area should be avoided. Furthermore, mosquito control should be keep to maintain.
- ES.10. During the dry season, it is recommended to pay attention on potential construction dust impact since the construction site located nearby residential area of Yuen Long. It is reminded that mitigation measures for dust should be properly implemented.
- ES.11. Since the currently working areas are located at public road, site tidiness should be undertaken after every day work completion.

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1 INTRODUCTION

PROJECT BACKGROUND

- 1.01 Leader Civil Engineering Corporation Limited (hereinafter ‘Leader’) has been awarded by the Highways Department (HyD) of the Government of the Hong Kong Special Administrative Region (HKSAR) the Contract No. *HY/2011/13 – Improvement to Pok Oi Interchange* (hereinafter “the Project”) in November 2012. The total project time is expected to be 33 months. The Project location is shown [Appendix A](#).
- 1.02 The Project is a designated project under Environmental Permit No. *EP-411-2011*. Construction works of the Project under Environmental Permit are as follows:
- provision of a single lane flyover (approximately 140m in length) adjacent to the northbound carriageway of Pok Oi Flyover (POF);
 - construction of a slip road (approximately 410m in length) connecting the northbound carriageway of the ground level road of Yuen Long Highway (YLH) on the southern arm of POR to the proposed flyover;
 - construction of a slip road (approximately 100m in length) connecting the proposed flyover to the northbound carriageway of the ground level section of YLH on the northern arm of POR;
 - construction of a slip road (approximately 280m in length) connecting the southbound carriageway of POF to the southbound carriageway of the ground level section of YLH on the southern arm of POF;
 - resurfacing and re-marking of a stretch of the southbound carriageway (approximately 280m in length) of the ground level section of YLH on the northern arm of POF to increase the number of traffic lanes on the carriageway from three to four;
 - resurfacing and re-marking of a stretch of the northbound carriageway (approximately 470m in length) of the ground level section of YLH on the northern arm of POF;
 - construction of a segregated left-turn lane (approximately 110m in length) at the northern arm of POF; and
 - associated ancillary works.
- 1.03 For the Project, Action-United Environmental Services and Consulting (AUES) has been appointed as the independent environmental team (ET) to implement the relevant EM&A programme. Lam Environmental Services Limited as an Independent Environmental Checker (IEC), and Highway Department’s representative engineers (the Engineer) directly manage the Project. Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Appendix B](#).
- 1.04 Clause 3.5 EP-411/2011 stipulation, a Baseline Monitoring Report was submitted to EPD at least 2 weeks before the commencement of construction of the Project. In order to do so, baseline noise monitoring in accordance with the project EM&A Manual at the designated locations was carried out from *22 January 2013* to *6 February 2013* by ET to determine the ambient environmental condition of background noise before commencement of construction works. Furthermore, Landscape & Visual survey was undertaken on *28th* and *29th January 2013*. The baseline monitoring report was submitted on *15 February 2013* to EPD for endorsement. The major construction works was commenced on *01 March 2013*. According to the EM&A Manual stipulation, impact monitoring also started to implement by the ET in March 2013.
- 1.05 This is the twelfth quarterly EM&A summary report for Road Improvement Works covering the construction period from *01 December 2015* to *29 February 2015* (hereinafter “the Reporting Period”).

WORK UNDERTAKEN DURING THE QUARTER

- 1.06 Construction program is presented in [Appendix C](#), whereas construction activities undertaken during the Reporting Period is summarized in the following [Table 1-1](#).

Table 1-1 Major Construction Activities of the Works during the Reporting Period

Month	Major Construction Activities
December 2015	<ul style="list-style-type: none"> • Construction of Drainage System and Watermain for 2.5 m High Noise Barrier B at Slip Road A • Excavation and Construction of Retaining Wall A at Slip Road A • Excavation and Construction of Retaining Wall B at Slip Road B • Construction of South Abutment • Construction of Pier 1 • Construction of Deck C • Construction of Subway Extension and Planter Wall at Segregated Left Turn Lane • Construction of Road Furniture and Road Paving for Segregated Left Turn Lane and 3 m High Noise Barrier A
January 2016	<ul style="list-style-type: none"> • Construction of Drainage System and Watermain for 2.5 m High Noise Barrier B at Slip Road A • Construction of Retaining Wall A at Slip Road A • Construction of Retaining Wall B at Slip Road B • Backfilling and Compaction for Retaining Wall B at Slip Road B • Construction of South Abutment • Construction of Pier 1 • Construction of Deck C • Construction of Road Furniture and Road Paving for Segregated Left Turn Lane and 3 m High Noise Barrier A
February 2016	<ul style="list-style-type: none"> • Construction of Drainage System and Road Furniture for 2.5 m High Noise Barrier B at Slip Road A • Construction of Retaining Wall A at Slip Road A • Construction of Drainage System and Road Furniture at Slip Road B • Backfilling and Compaction for Retaining Wall B at Slip Road B • Construction of South Abutment • Construction of Deck B • Construction of Deck C • Construction of Road Furniture for Segregated Left Turn Lane and 3 m High Noise Barrier A

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

1.07 Summary of currently relevant permits, licenses, and/or notifications on environmental protection for this Reporting Period is presented in [Table 1-2](#).

Table 1-2 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status
1	Air pollution Control (Construction Dust) Regulation	Ref. Number: 1218-055-AGE-1
2	Chemical Waste Producer Registration	Waste Producers Number (WPN): 5213-5260-L2544-14
3	Water Pollution Control Ordinance	License No.: 352636
4	Waste Disposal Regulation	Billing Account for Disposal of Construction Waste Account No. 7016423
5	Construction Noise Permit	Permit No. GW-RN0629-15 Expiry Date: 4 March 2016
		Permit No. GW-RN0631-15 Expiry Date: 4 March 2016
		Permit No. GW-RN0589-15 Expiry Date: 31 March 2016
		Permit No. GW-RN0043-16 Expiry Date: 9 July 2016
		Permit No. GW-RN0088-16

Item	Description	License/Permit Status
		Expiry Date: 27 February 2016
		Permit No. GW-RN0629-15
		Expiry Date: 4 March 2016

Remark: CNP GW-RN0088-16 has been expired since 27 February 2016 and no renew is required.

ENVIRONMENTAL MITIGATION MEASURES AND ENVIRONMENTAL IMPLEMENTATION STATUS

1.08 In this quarterly period, environmental mitigation measures generally implemented by Leader are summarized in [Table 1-3](#).

Table 1-3 Environmental Mitigation Measures Implement in the Reporting Period

Issues	Environmental Mitigation Measures
Construction Noise	<ul style="list-style-type: none"> • Good site practices to limit noise emissions at the sources; • Well-maintained plants used on-site and plants serviced regularly; • All mobile plants onsite operation has been located far from NSRs, if possible; • Machines and plants switched off when it not in use; • To minimize plant number use at the worksite. • Quiet powered mechanical equipment provided on site; and • Temporary moveable noise barriers used for construction work.
Air Quality	<ul style="list-style-type: none"> • Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; • Site hoarding has been provided along the entire length of that portion of the site boundary; • Where a vehicle leaving the works site is carrying a load of dusty materials, the load covered clean impervious sheeting; • The construction plants regularly maintained to avoid the emissions of black smoke; and • The construction plants switched off when it not in use. • Public roads around the site entrance/exit had been kept clean and free from dust.
Water Quality	<ul style="list-style-type: none"> • Impervious sheeting paved on exposed soil surfaces to reduce the potential of soil erosion; • Debris and refuse generated on-site collected daily; • Stockpiles of the cement and other construction materials were covered when not being used; • Oils and fuels are stored in designated areas with locks; • The chemical waste storage as sealed area provided with locks; and • Portable chemical toilets are provided on-site. A licensed contractor is regularly disposal and maintenance of these facilities.
Waste and Chemical Management	<ul style="list-style-type: none"> • Excavated material reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; • Waste arising kept to a minimum and be handled, transported and disposed of in a suitable manner; • Disposal of C&D wastes to any designed public filling facility and/or landfill followed a trip ticket system; and • Chemical waste handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
General	<ul style="list-style-type: none"> • The site is generally kept tidy and clean.

REPORT STRUCTURE

1.09 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

- Section 1** Introduction
- Section 2** Requirements for Construction Impact monitoring
- Section 3** Summary of Monitoring Requirements
- Section 4** Construction Noise Monitoring Results

Section 5	<i>Air Quality Audit and Site Inspection</i>
Section 6	<i>Water Quality</i>
Section 7	<i>Landscape & Visual</i>
Section 8	<i>Waste Management</i>
Section 9	<i>Site Inspections</i>
Section 10	<i>Environmental Complaints and Non-Compliance</i>
Section 11	<i>Mitigation Measures Implementation and Impact Forecast</i>
Section 12	<i>Conclusions and Recommendations</i>

2 REQUIREMENTS FOR CONSTRUCTION IMPACT MONITORING

2.01 The EM&A requirements under the Project are set out in the EM&A Manual. Construction noise has been identified to be the key issues during the construction phase of the Project. A summary of the Impact EM&A requirements are presented in the sub-sections below.

MONITORING PARAMETERS

2.02 According to the Project EM&A Manual, the Impact monitoring program covers the following environmental issues:

- Construction noise;
- Air Quality;
- Water Quality; and
- Landscape & Visual

2.03 A summary of the monitoring parameters is presented in *Table 2-1* as below.

Table 2-1 Summary of EM&A Impact Monitoring Requirements

Environmental Issue	Parameters
Construction Noise	<ul style="list-style-type: none"> • A-weighted equivalent continuous sound pressure level (30min) (hereinafter 'Leq(30min)' during the normal working hours; and • A-weighted equivalent continuous sound pressure level (5min) (hereinafter 'Leq(5min)' for construction work during the Restricted Hours.
Air Quality	Regular environmental audits and site inspections
Water Quality	Regular environmental audits and site inspections
landscape & visual	Regular site inspections

MONITORING LOCATIONS

2.04 According to the EM&A Manual, the designated locations for construction noise monitoring is listed in *Table 2-2* and illustrated in *Appendix D*.

Table 2-2 Designated Noise Monitoring Locations

Location ID	Address
NM1	Fifth floor of Kwong Ming Ying Loi School
NM2	Roof of Jockey Club Care & Attention Home

MONITORING FREQUENCY

2.05 The requirement of impact noise monitoring as specified in the EM&A Manual *Section 4.6* are presented below.

Parameter: Leq(30min) & Leq(5min), L10 and L90.

Frequency: 6 consecutive Leq(5min) for once a week during 0700-1900 hours on normal weekdays

MONITORING EQUIPMENT

2.06 Construction noise monitoring equipment for impact EM&A Programme are listed in *Table 2-3*.

Table 2-3 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238 / Rion NL-52
Calibrator	B&K Type 4231 / Rion NC-73
Portable Wind Speed Indicator	Anemometer AZ Instrument 8908

DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

2.07 According to the EM&A Manual, construction noise criteria was set up, namely Action and Limit levels is listed in *Tables 2-4* as below.

Table 2-4 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level of Construction Noise	Maximum Acceptable Impact Noise Level
		0700-1900 hours on normal weekdays	
NM1 - Kwong Ming Ying Loi School	When one documented complaint is received	70 dB(A) / 65dB(A)*	73 dB(A) / 72dB(A)*
NM2 - Jockey Club Care & Attention Home		75 dB(A)	75 dB(A)
Remarks: (*) during school examination periods. Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.			

OTHER EM&A REQUIREMENTS

Air Quality

2.08 No adverse air quality impact is anticipated during the construction phase, the EIA Report has identified that construction dust is the only concern as the construction scale is relatively small, and dust emission from the site could be audited during the regular site inspection.

2.09 In order to ensure no adverse air quality impact will arise from the construction of the Project, it is necessary to undertake regular environmental audits and site inspections to ensure those recommended mitigation measures were properly implemented.

Water Quality

2.10 No adverse water quality impact is anticipated during the construction phase with the implementation of good site practices and appropriate mitigation measures in accordance with the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 1/94)* and other relevant guidelines.

2.11 In order to ensure no adverse water quality impact will arise from the construction of the Project, it is necessary to undertake regular environmental audits and site inspections to ensure those recommended mitigation measures were properly implemented.

Landscape & Visual

2.12 In order to ensure landscape and visual impact is controlled and mitigated during construction phase of the Project, regular site inspections should undertake to ensure those recommended mitigation measures were properly implemented.

2.13 Moreover, a competent Landscape Architect should be conducted the regular landscape audit

during both construction and operational stage. For the operational phase, all landscape and visual mitigation measures should be monitored monthly during the first year of the operational phase to ensure that the effectiveness of the mitigations.

SITE ENVIRONMENTAL INSPECTION AND AUDIT

- 2.14 Site surveillance shall be undertaken regularly and routinely by the independent ET to inspect the construction activities of the Contractor. It provides a direct means to trigger and enforce the specified environmental protection and pollution control measures. With well-defined environmental pollution control and mitigation specifications and a well-established environmental site inspection, deficiency and action reporting system, environmental site inspection is one of the most effective tools to enforce environmental protection requirements on the construction site.

EVENT ACTION PLAN

- 2.15 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in [Appendix E](#).

ENVIRONMENTAL MITIGATION MEASURES

- 2.16 The Environmental Mitigation Implementation Schedule (EMIS) such as air quality, construction noise, water quality and landscape & visual, as recommended by the EIA Study has been shown in [Appendix F](#).
- 2.17 In the event of complaints, or non-compliance / area of improvement is observed, the ET and the Contractor should be responsible for reviewing the effectiveness of these mitigation measures and for proposing to the Project Manager for approval, designing and implementing alternative or additional mitigation measures as appropriate.

3 CONSTRUCTION NOISE IMPACT MONITORING RESULTS

MONITORING RESULT IN THIS REPORTING PERIOD

- 3.01 In this Reporting Period, a total of **26** events of construction noise monitoring have been carried out by the ET.
- 3.02 The noise monitoring results are tabulated in *Table 3-1* and the graphical plots are shown in *Appendix G*.

Table 3-1 Summarized of Construction Noise Monitoring Results at NM1 and NM2, dB(A)

Date	NM1		NM2	
	Start Time	L _{eq30min}	Start Time	L _{eq30min}
3-Dec-15	10:26	66.7	11:21	64.2
12-Dec-15	9:18	65.4	10:16	64.8
18-Dec-15	10:18	64.8	11:25	63.7
23-Dec-15	9:18	66.2	10:19	64.4
31-Dec-15	9:18	65.3	10:19	64.1
8-Jan-16	10:14	65.5 *	9:13	63.5
14-Jan-16	9:53	65.4	11:01	64.5
23-Jan-16	9:17	65.5	10:16	64.6
30-Jan-16	11:23	65.3	10:26	63.4
1-Feb-16	13:01	67.0	13:59	65.3
13-Feb-16	9:58	65.9	11:13	64.5
19-Feb-16	10:00	64.0	11:02	63.4
27-Feb-16	11:29	65.3	10:47	62.9
Limit Level of Construction Noise	70dB(A)		75dB(A)	
Maximum Acceptable Impact Noise Level of the Monitoring Location	73dB(A)		75dB(A)	

Remarks (*) - School Examination Day

- 3.03 In the Reporting Period, school examination was undertaken at NM1 Kwong Ming Ying Loi School on 7th, 8th, 11th and 12th January 2016. Therefore, the Maximum Acceptable Impact Noise Level was reduced to 72 dB(A) during the examination date. 65.5 dB(A) was recorded on 8th Jan 2016 at NM1, however 65.5 dB(A) did not exceed the “*Maximum Acceptable Impact Noise Level*”. No Notification of Exceedance (NOE) of construction noise criteria or corrective action was therefore required.
- 3.04 Shown in *Table 3-1*, no noise measurement event was found to exceed “*Limit Level of Construction Noise*” or “*Maximum Acceptable Impact Noise Level*” at Monitoring Locations during the Reporting Period. No Notification of Exceedance (NOE) of construction noise criteria or corrective action was therefore required.
- 3.05 In the Reporting Period, the meteorological information extracted from the Hong Kong Observatory (Lau Fau Shan Station) is summarized in *Appendix H*.

NOISE COMPLAINT STATUS IN THIS REPORTING PERIOD

- 3.06 Noise complaint is an indication of Action Level for construction noise performance criteria. The Quarterly Period, no noise complaint was received by the EPD, HyD, the Project Manager, Leader and ET.

CONSTRUCTION NOISE MITIGATION MEASURES PROVIDED IN THIS REPORTING MONTH

- 3.07 The Reporting Period, noise mitigation measures as provided by Leader is listed below:

- Only well-maintained plants were operated on-site and plants were serviced regularly;
- If possible, all mobile plants onsite operation has been located far from NSRs;
- Machines and plants (such as trucks) switched off when it not in use;
- Wherever possible, plant was orientated to direct away from the nearby NSRs
- Quiet powered mechanical equipment has been provided on site;
- Moveable noise barriers were temporary used for construction work; and
- Weekly noise monitoring was conducted.

4 AIR QUALITY AUDIT AND SITE INSPECTION

4.01 The Reporting Period, no construction dust emission was arising from the construction of the Project.

CONSTRUCTION DUST MITIGATION MEASURES PROVIDED IN THIS REPORTING PERIOD

4.02 The Reporting Period, dust mitigation measures as provided by Leader is listed below:

- Any stockpile of dusty material was covered entirely with impervious sheeting or sprayed with water so as to maintain the entire surface wet;
- Site hoarding has been provided along the entire length of that portion of the site boundary;
- Where a vehicle leaving the works site is carrying a load of dusty materials, the load has covered entirely with clean impervious sheeting;
- The construction plants regularly maintained to avoid the emissions of black smoke; and
- The construction plants switched off when it not in use.

5 WATER QUALITY

5.01 The Reporting Period, no runoff was observation to passing through the Project site.

WATER QUALITY MITIGATION MEASURES PROVIDED IN THIS REPORTING PERIOD

5.02 The Reporting Period, water quality mitigation measures as provided by Leader is listed below:

- Impervious sheeting was paved on exposed soil surfaces to reduce the potential of soil erosion.
- Debris and refuse generated on-site collected daily;
- Stockpiles of the cement and other construction materials were covered when not being used;
- Oils and fuels are stored in designated areas with locks;
- The chemical waste storage as sealed area provided with locks;
- Sedimentation facilities was provided to remove silt particles from groundwater;
- Sand bags were provided surrounding the boundary of working site to prevent wastewater or site surface water runoff get into public areas; and
- Portable chemical toilets are provided on-site. A licensed contractor is regularly disposal and maintenance of these facilities.

5.03 In the coming month, ET will be regular to audit and inspection and reporting the status of water quality mitigation measures of the Project.

6 LANDSCAPE AND VISUAL

6.01 In this Reporting Month, construction activities undertaken on work areas are included the construction of road furniture and road paving, construction of retaining wall and construction of Pier 1 and superstructure of the flyover. During site inspections in this reporting month, no

issue was observed and currently mitigation measures implemented on-site is considered satisfactory.

7 WASTE MANAGEMENT

7.01 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

Records of Waste Quantities

7.02 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.

7.03 The quantities of waste for disposal in the Reporting Period are summarized in *Tables 7-1* and *7-2*. Whenever possible, materials were reused on-site as far as practicable

Table 7-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Dec 2015	Jan 2016	Feb 2016	
C&D Materials (Inert) ('000m ³)	0.134495	0.07913	0.06396	Tuen Mun 38
Reused in this Contract (Inert) ('000m ³)	0	0	0	Nil
Reused in other Projects (Inert) ('000m ³)	0	0	0	Nil
Disposal as Public Fill (Inert) ('000m ³)	0.134495	0.07913	0.06396	Tuen Mun 38

Table 7-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity			Disposal Location
	Dec 2015	Jan 2016	Feb 2016	
Metals ('000kg)	0	0	0	Nil
Paper / Cardboard Packing ('000kg)	0	0	0	Nil
Plastics ('000kg)	0	0	0	Nil
Chemical Wastes ('000kg)	0	0	0	Nil
General Refuses ('000m ³)	0.002345	0.010475	0.01246	WENT

7.04 There was no site effluent discharged but the estimated volume of surface runoff was less than 50m³ per each month.

8 SITE INSPECTIONS

8.01 Regular weekly environmental site inspections should be carried out to confirm the environmental performance. In this quarter month, there are total **13** events of weekly site inspection have performed by the ET, the Representatives Engineer and the Main-contractor. Furthermore, the IEC and HyD Representative attended weekly site inspection on **1, 8, 15, 22** and **30 December 2015; 5, 12, 19** and **27 January 2016; 2, 12, 17** and **24 February 2016**. During site inspection No non-compliance was noted. Observations and findings are summarized in [Table 8-1](#).

Table 8-1 Summarized Site Observation in the Reporting Period

Date	Findings / Deficiencies
1 December 2015	No adverse environmental issue was observed during the site inspection
8 December 2015	<ul style="list-style-type: none"> • The Contractor was reminded to check each machines whether the NRMM label are provided or not. (Reminder)
15 December 2015	<ul style="list-style-type: none"> • The Contractor was requested to fence off the tree protection zone and the material storage area. • The Contractor was reminded that all vehicles should be washed away all dusty materials from its body and wheels before leaving the site area. (Reminder)
22 December 2015	<ul style="list-style-type: none"> • The Contractor was reminded that all vehicles should be washed away all dusty materials from its body and wheels before leaving the site area. (Reminder)
30 December 2015	<ul style="list-style-type: none"> • The Contractor was reminded to keep clean at the site entrances/exits, and regular site cleaning should be provided. (Reminder)
5 January 2016	<ul style="list-style-type: none"> • The Contractor was reminded to provide regular plant maintenance (e.g. generator) to avoid smoke emission. (Reminder)
12 January 2016	<ul style="list-style-type: none"> • The Contractor was reminded to maintain a functional temporary drainage system to prevent surface run-off entering public road. (Reminder) • The Contractor was reminded that any dusty stockpile should be cover entirely by impervious sheets to minimise dust nuisance. (Reminder)
19 January 2016	<ul style="list-style-type: none"> • Stagnant water accumulated in the lifting eye of the concrete block was observed, the Contractor should fill the lifting eye with sand to prevent stagnant water. • The Contractor was reminded to enhance and review their tree protection measures. (Reminder)
27 January 2016	<ul style="list-style-type: none"> • The Contractor was reminded improve and maintain site tidiness and housekeeping. (Reminder) • The Contractor was reminded to provide vehicles washing at each site exits and maintain cleanliness at the site entrances/exits. (Reminder)
2 February 2016	No adverse environmental issue was recorded
12 February 2016	<ul style="list-style-type: none"> • The Contractor was reminded to cover any dusty stockpile with impervious sheeting to prevent dust generation. (Reminder)
17 February 2016	<ul style="list-style-type: none"> • Free standing chemical containers were observed, the Contractor should provide relevant labels and drip tray.
24 February 2016	<ul style="list-style-type: none"> • Stagnant water was found at Pier 1, the Contractor should clean up the stagnant water.

9 ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

9.01 No written or verbal environmental complaints, notification of summons and successful prosecutions were recorded in the Reporting Period. They are summarized in in *Tables 9-1, 9-2* and *9-3*.

Table 9-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
December 2015	0	0	NA
January 2016	0	0	NA
February 2016	0	0	NA

Table 9-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
December 2015	0	0	NA
January 2016	0	0	NA
February 2016	0	0	NA

Table 9-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
December 2015	0	0	NA
January 2016	0	0	NA
February 2016	0	0	NA

10 CONCLUSIONS AND RECOMMENTATIONS

CONCLUSIONS

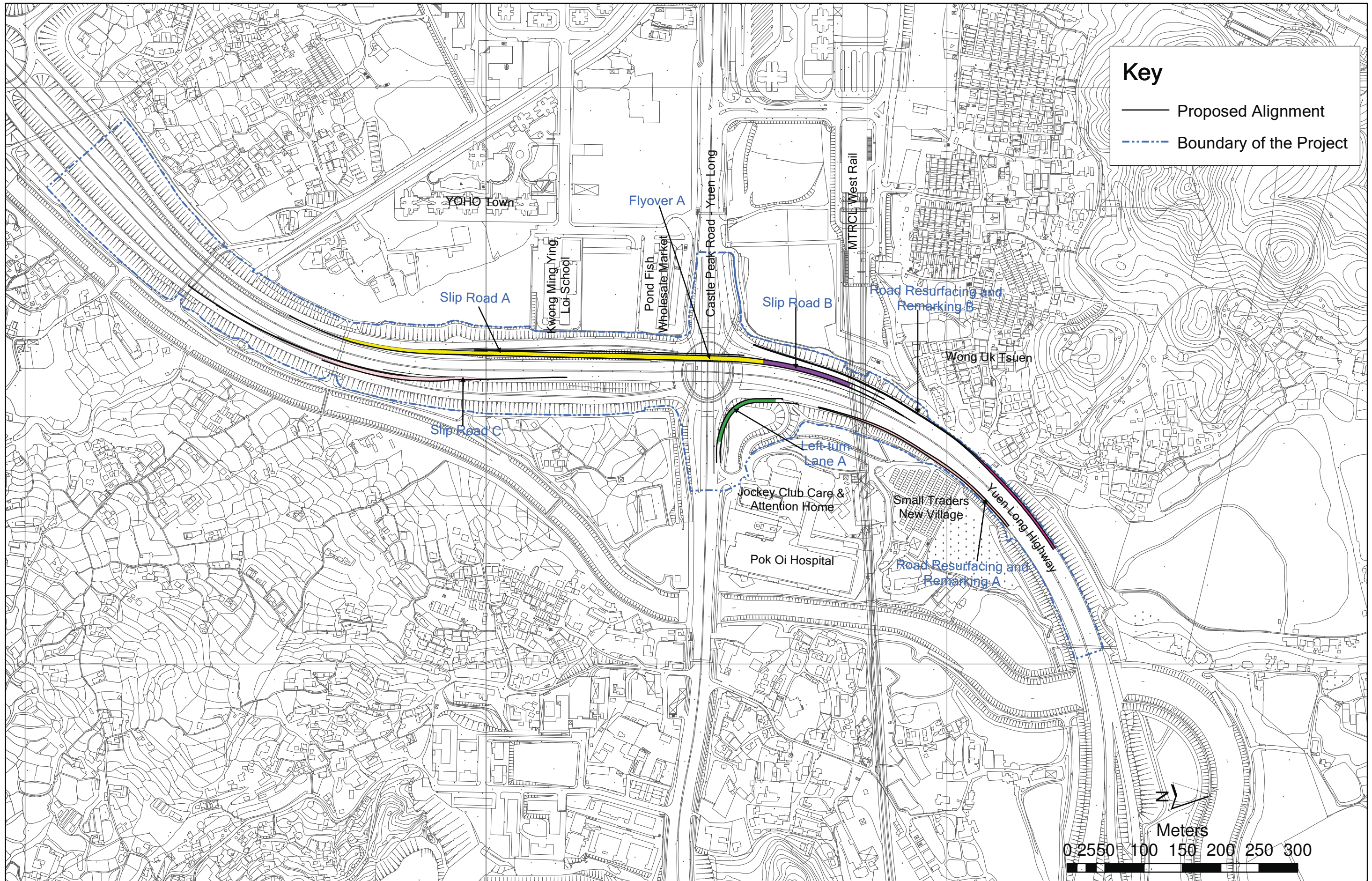
- 10.01 This is the **12th** Quarterly EM&A Summary Report presenting the monitoring results and inspection findings for the reporting period from **1 December 2015** to **29 February 2016**.
- 10.02 No construction noise monitoring results that triggered the Limit Level was recorded. No NOE or the associated corrective actions were therefore issued. Moreover, no noise complaint (which is an Action Level exceedance) was received by the HyD, EPD and the contractor.
- 10.03 Furthermore, no notification of summons or successful prosecution was received in this Reporting Period.
- 10.04 A total of thirteen weekly site inspections to evaluate the site environmental performance has been undertaken in the Reporting Period. The joint site inspection with IEC in reporting period was carried out on **30 December 2015**, **27 January 2016** and **24 February 2016**. No non-compliance was found in the quarterly period. Environmental performance of the Project was therefore considered satisfactory.

RECOMMENDATIONS

- 10.05 The Contractor is reminded to fully comply with all the required environmental mitigation measures, in particular construction dust suppression measures during dusty construction activities under dry and windy conditions and water quality mitigation measures during rainy conditions.
- 10.06 Construction noise should be a key environmental impact during the works. The noise mitigation measures such as use of quiet plants and installation of temporary noise barrier at the construction noise predominate area should be fully implemented as accordance with the EM&A requirement.
- 10.07 Water quality mitigation measures such as prevention of muddy water and other water quality pollutants via site surface water runoff get into public area should be avoided, especially at temporary steel platform for pilings works. Mitigation measures for water quality should be properly implemented.
- 10.08 As a general reminder, housekeeping of the site and site tidiness should be undertaken after every day work completion. Also, drip tray should be provided for chemical container to prevent land contamination. Addition, mosquito control should be keep to prevent mosquito breeding on site.

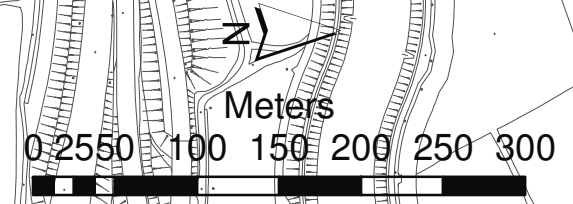
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Appendix A
Project Site Layout Plan



Key

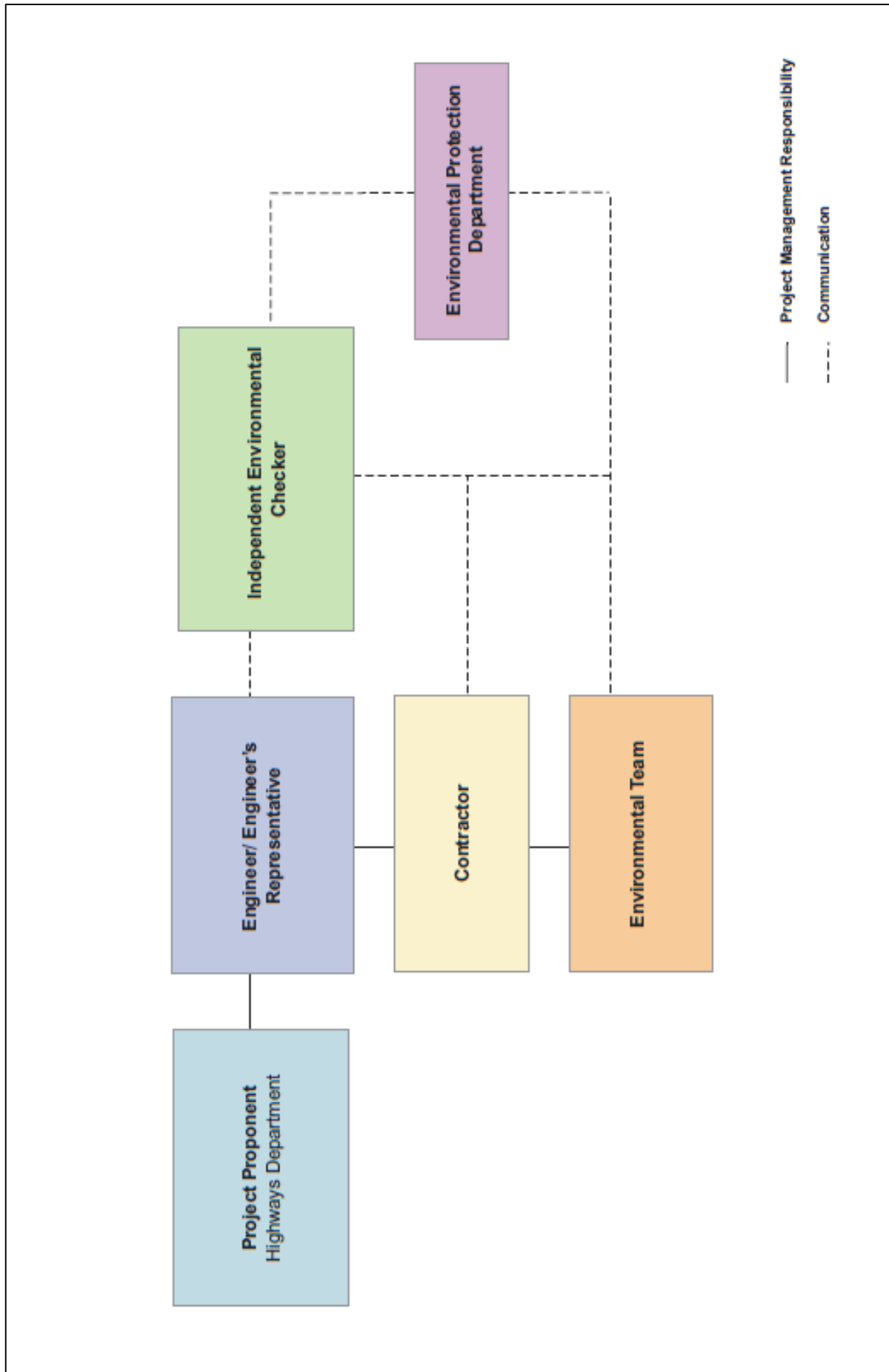
- Proposed Alignment
- - - Boundary of the Project



<p>Highways Department The Government of the Hong Kong Special Administrative Region</p>	<p>Consultant</p> <p>Environmental Resources Management</p>	<p>Halcrow China Ltd. As Engineering Sub-consultant</p>	Agreement No. : WD 6/2007	Environmental Monitoring and Audit Manual	FIGURE 1.1		
			Project Title: Improvement to Pok Oi Interchange - Environmental Impact Assessment Study	Figure Title: BOUNDARY AND THE PROPOSED ALIGNMENT OF THE PROJECT	Checked PS Designed TF	Scale - Drawn AM	Rev. Date 1/11/2007

Appendix B

**Project Organization Structure
and
Contact Details of Relevant Parties**



Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
HyD	<i>Engineer / Engineer's Representative</i>	Mr. Alex Y. K. Liu	3903 6790	3188 3418
HyD	<i>Engineer / Engineer's Representative</i>	Mr. Eric M.K. Lui	3903 6804	3188 3418
HyD	<i>Engineer / Engineer's Representative</i>	Mr. Daniel K. Chow	3903 6807	3188 3418
Lam	Independent Environmental Checker	Mr. Raymond Dai	2839 5666	2882 3331
Leader	Production Project Manager	Mr. Jackie Leung	2272 3113	2336 5076
Leader	Site Agent / Environmental Officer	Mr. Chris Lam	2473 8422	2336 5076
Leader	Safety Officer	Mr. Tong Choi	6131 3575	2336 5076
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Team Supervisor	Mr. Ben Tam	2959 6059	2959 6079

Legend:

HyD (the Employer and the Engineer/Engineer's Representative) – Highways Department

Leader (Main Contractor) – Leader Civil Engineering Corporation Limited

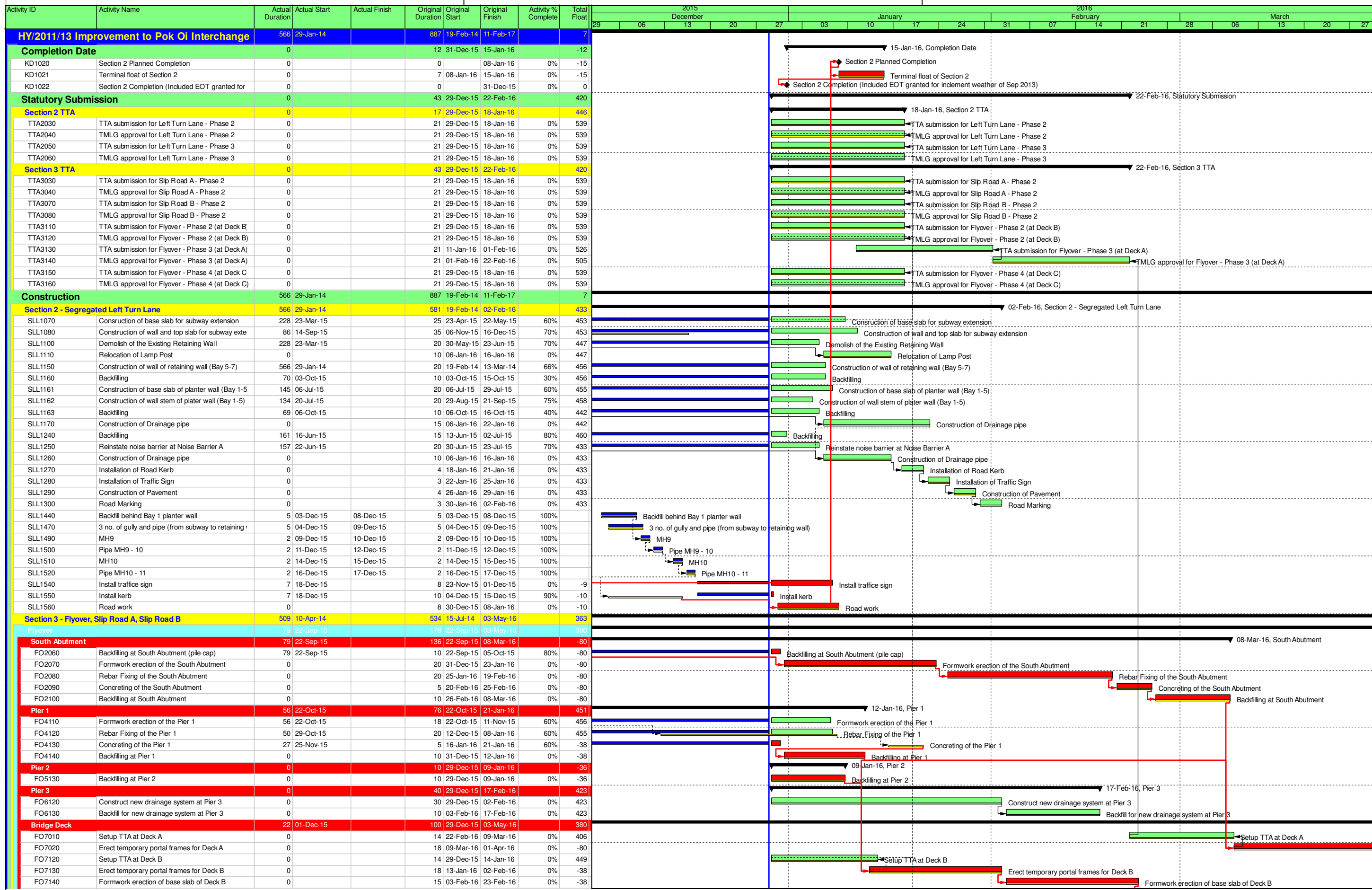
Lam (IEC) – Lam Environmental Services Limited

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

Hotline telephone number for the public to make enquiries:	(852) 2319 5855
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Appendix C

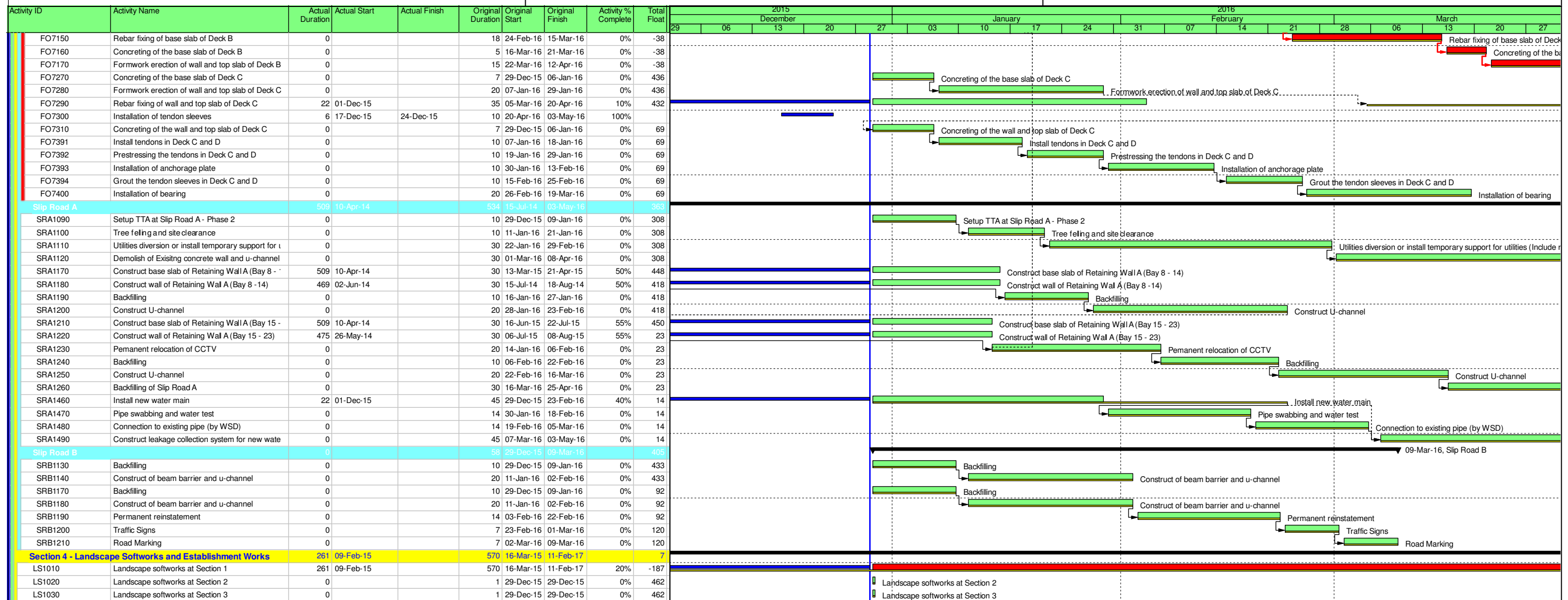
Three Months Construction Rolling Program



█ Remaining Level of Effort █ Remaining Work
█ Primary Baseline ◆ Critical Remaining Work
█ Actual Work ◆ Milestone

Data Date: 29-Dec-15
 Print Date: 29-Dec-15
 Page 1 of 2

Date	Revision	Checked	Approved
15-Oct-15	33		
15-Nov-15	34		
15-Dec-15	35		



■ Remaining Level of Effort ■ Remaining Work
 Primary Baseline Critical Remaining Work
 Actual Work ◆ ◆ Milestone

Data Date: 29-Dec-15

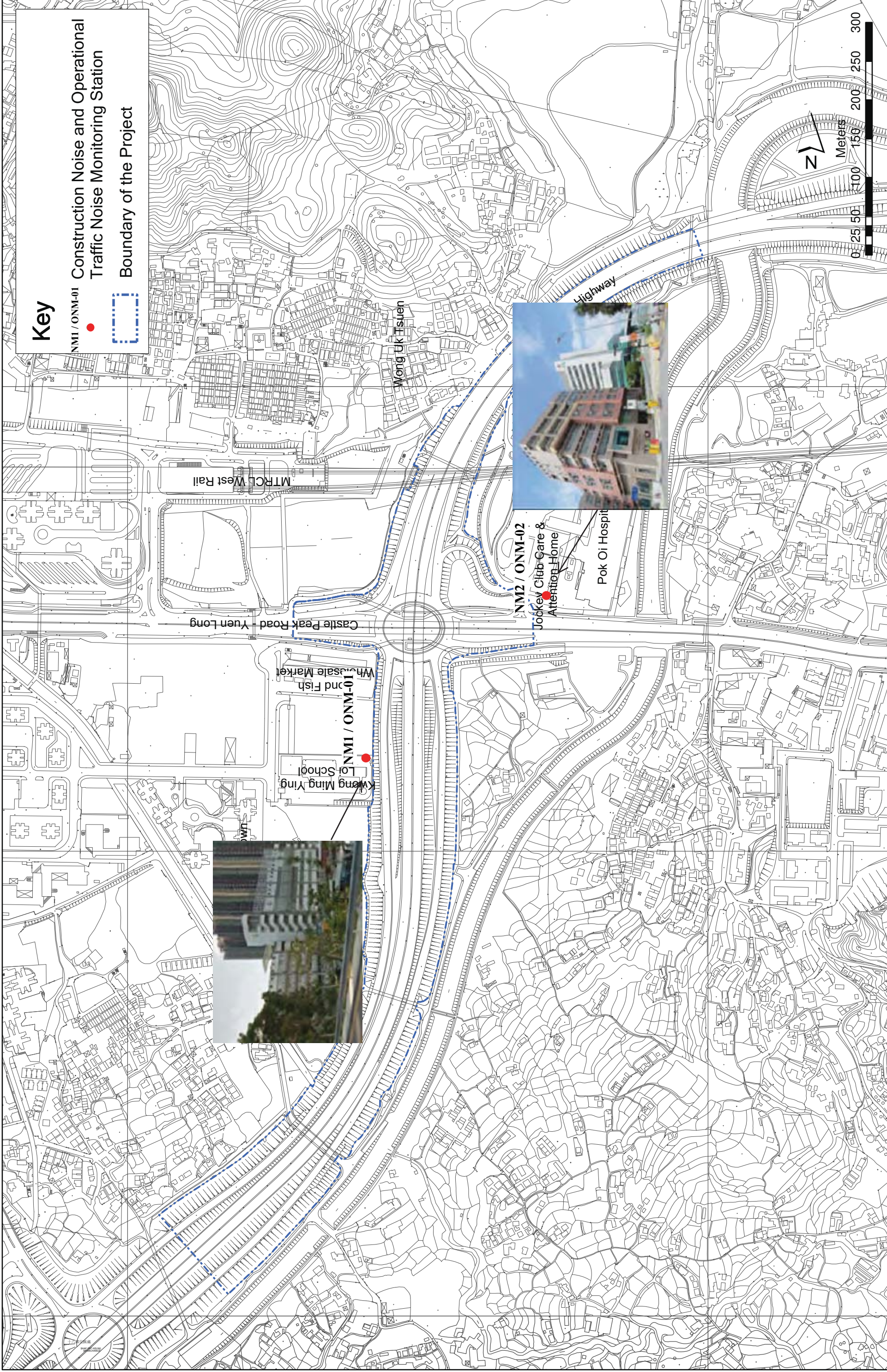
Print Date: 29-Dec-15

Page 2 of 2

Date	Revision	Checked	Approved
15-Oct-15	33		
15-Nov-15	34		
15-Dec-15	35		

Appendix D

Designated Construction Noise Monitoring Location



Key

- NM1 / ONM-01 Construction Noise and Operational Traffic Noise Monitoring Station
- NM2 / ONM-02 Construction Noise and Operational Traffic Noise Monitoring Station
- Boundary of the Project



FIGURE 4.1

Environmental Monitoring and Audit Manual

Figure Title: LOCATIONS OF NOISE MONITORING STATIONS

Checked	PS	Scale	-	Rev.	
Designed	TF	Drawn	AM	Date	1/11/2007

Agreement No.: WD 6/2007

Project Title:
Improvement to Pok Oi Interchange -
Environmental Impact Assessment Study

Consultant

Environmental Resources Management
ERM

Halcrow China Ltd.
As Engineering Sub-consultant

Highways Department
The Government of the Hong Kong Special Administrative Region

Appendix E

Event Action Plan

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	1. Notify IEC 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; 2. Implement noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IEC and ER; 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.

Appendix F

Environmental Mitigation Implementation Schedule (EMIS)

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
Noise – Construction Phase									
4.7.1	N1	Adopt good site practice listed below: <ul style="list-style-type: none"> • Only well-maintained plant will be operated on-site and plant should be serviced regularly during the construction program; • Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program; • Mobile plant, if any, will be sited as far from NSRs as possible; • Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities. • Noisy construction activities, including piling, excavation and earth-breaking works, will be carried out outside the examination periods of Kwong Ming Ying Loi School. 	To minimise potential construction noise nuisance.	All construction work areas	Contractor		√		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>
4.7.1	N2	Use of quiet powered mechanical equipment	To minimise potential construction noise nuisance.	All construction work areas	Contractor		√		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>
4.7.1	N3	Use of acoustic enclosure	To minimise potential construction noise nuisance.	All construction work areas	Contractor		√		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>
4.7.1	N4	Adoption of Movable Noise Barriers. The barrier material shall have a surface mass of not less than 7 kg/m ² on skid footing.	To minimise potential construction noise nuisance.	At locations shown in <i>Figure 4.7</i> of the <i>EIA Report</i>	Contractor		√		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>
4.9.1	N5	Weekly noise monitoring	Ensure noise generated from the Project meets the criteria	At monitoring locations shown in <i>Figure 4.1</i> of the <i>EM&A Manual</i>	ET		√		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
Noise – Operation Phase									
4.9.2	N6	Traffic noise monitoring - twice at 6-month intervals within the first year upon completion of the Project.	Ensure noise generated from the Project meets the criteria	At monitoring locations shown in <i>Figure 4.1</i> of the <i>EM&A Manual</i>	ET			√	<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>
Air Quality – Construction Phase									
5.7.1	AQ1	Adopt good site practices and dust control measures listed below: <ul style="list-style-type: none"> Any stockpile of dusty material will be covered entirely with impervious sheeting or sprayed with water so as to maintain the entire surface wet; Where a site boundary adjoins a road, or other area accessible to the public, hoarding shall be provided along the entire length of that portion of the site boundary; All dusty materials will be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet; Where a vehicle leaving the works site is carrying a load of dusty materials, the load will be covered entirely with clean impervious sheeting to ensure that the dusty materials do not leak from the vehicles; The working area of any demolition, excavation or earth moving operation will be sprayed with water or dust suppression chemicals immediately after the operation so as to maintain the entire surface wet; The construction plants will be regularly maintained to avoid the emissions of black smoke; and The construction plants will be switched off when not in use to avoid gaseous emissions 	To minimise potential dust nuisance	All construction work areas	Contractor		√		<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>
Water Quality – Construction Phase									
6.6.1	WQ1	<u>Construction Site Run-off and Drainage</u> <ul style="list-style-type: none"> Silt removal facilities such as silt traps or sedimentation facilities should be provided to remove silt particles from runoff to meet the requirements of the WPCO-TM standard. The design of silt removal facilities should be based on the guidelines provided in <i>ProPECC PN 1/94</i>. All drainage facilities and erosion and sediment control structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and 	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor		√		<i>ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6</i>

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
		<p>particularly during rainstorms.</p> <ul style="list-style-type: none"> Careful programming of the works to minimize surface excavations for the Project during the wet season. If excavation of soil cannot be avoided during the wet season, exposed slope surfaces should be covered by tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarised in <i>ProPECC PN 1/94</i>. Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce the potential of soil erosion. Open stockpiles of construction materials or construction wastes on-site of more than 50m³ should be covered with tarpaulin or similar fabric during rainstorms. These materials should not be placed near water courses. A Drainage Management Plan (DMP) should be prepared by the Contractor and submitted to EPD before the commencement of any construction works to detail the procedures for control of construction site runoff. No site run-off or drainage should be allowed enter the nearby WSRs. 							
6.6.1	WQ2	<p><u>General Construction Activities</u></p> <ul style="list-style-type: none"> Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the nearby WSRs. Stockpiles of cement and other construction materials should be kept covered when not being used. Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest. The bund should be drained of rainwater after a rain event 	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor		√		<i>ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6</i>
6.6.1	WQ3	<p><u>Sewage generated from On-site Workforce</u></p> <ul style="list-style-type: none"> Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor would be responsible for appropriate disposal and regular maintenance of these facilities. 	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor		√		<i>ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6</i>

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
6.6.1	WQ4	<p><u>Piling Activities</u></p> <ul style="list-style-type: none"> Silt removal facilities such as silt traps or sedimentation facilities should be provided to remove silt particles from groundwater to meet the requirements of the WPCO-TM standard. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures should be inspected and maintained on a regular basis to ensure proper and efficient operation at all times and particularly during rainstorms. 	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor		√		ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6
Water Quality – Operation Phase									
6.6.2	WQ5	Standard HyD road gullies will be installed along the road drainage system to trap any silt and grit in the first flush of runoff.	To minimise potential water quality impacts on surface water.	All construction work areas	HyD / Contractor	√	√	√	WPCO Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM) EIAO-TM Annex 6
Waste Management – Construction Phase									
7.5.1	WM1	All the necessary waste disposal permits are obtained prior to the commencement of construction work.	To ensure compliance with relevant statutory requirements	Before construction works commence	Contractor	√	√		WDO
7.5.1	WM2	<p><u>Management of Waste Disposal</u></p> <ul style="list-style-type: none"> The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Government waste disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid “chit” which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and 	To ensure that adverse environmental impacts are prevented	All construction work areas	Contractor		√		WDO Waste Disposal (Charges for Disposal of Construction Waste) Regulation; Works Bureau Technical Circular No.31/2004; and Annex 5 and Annex 6 of Appendix G of

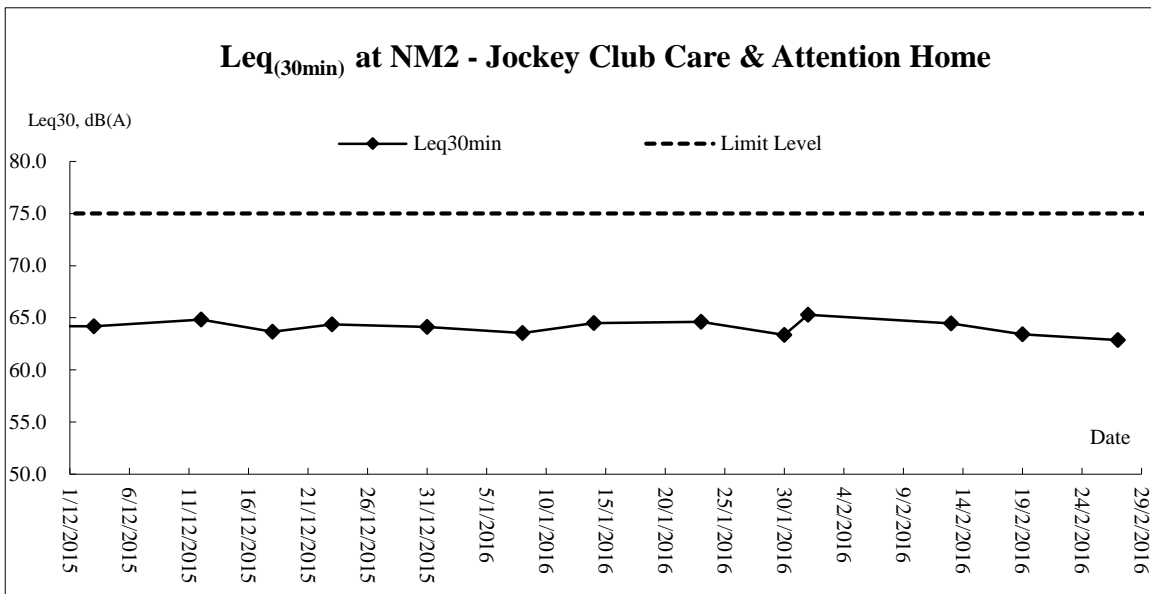
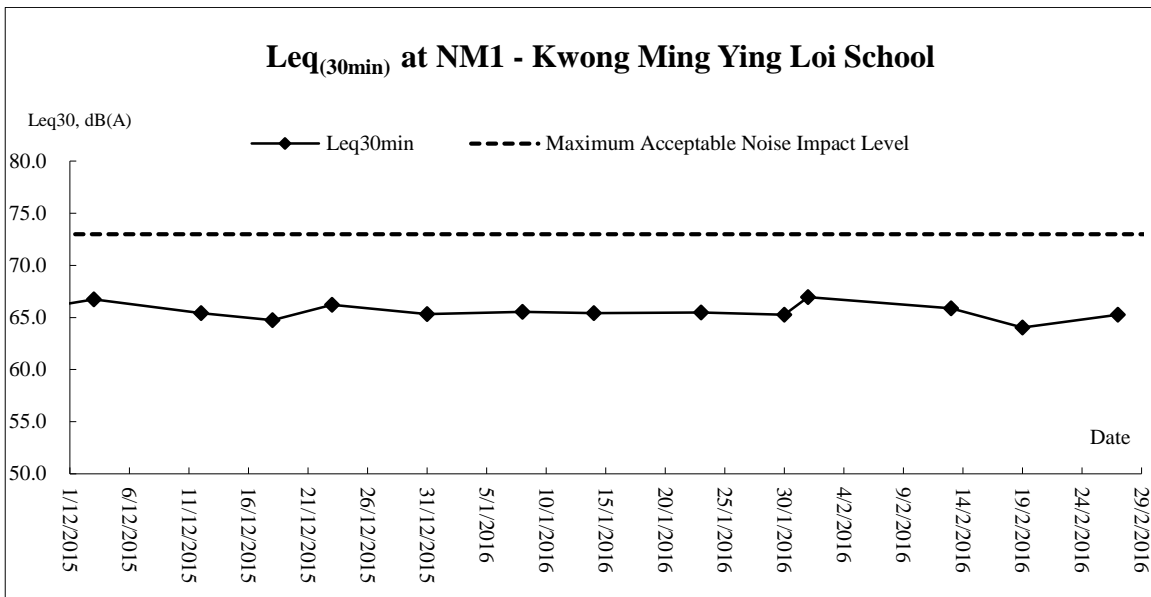
EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
		implemented by the contractor. • A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.							ETWBTC No. 19/2005
7.5.1	WM3	<u>Measures for the Reduction of Construction Waste Generation</u> Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.	To reduce construction waste generation	All construction work areas	Contractor		√		WDO EIAO-TM Annex 7
7.5.1	WM4	<u>Management of Waste Disposal</u> The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Tuen Mun Area 38 Public Filling Area or other approved designated public fill facilities will require a valid “chit”. A trip-ticket system will also be established to monitor the disposal of construction waste at the Tuen Mun Area 38 Public Filling Area or other approved designated public fill facilities, and to control fly tipping.	To reduce construction waste generation	All construction work areas	Contractor		√		WDO Waste Disposal (Charges for Disposal of Construction Waste) Regulation & Works Bureau Technical Circular No.31/2004
7.5.1	WM5	<u>Chemical Waste</u> The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	To ensure proper handling of chemical waste	All construction work areas	Contractor		√		WDO Code of Practice on the Packaging, Handling and Storage of Chemical Wastes
7.5.1	WM6	<u>Staff Training</u> At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	To ensure that adverse environmental impacts are prevented	All construction work areas	ET		√		NA
7.5.1	WM7	<u>Environmental Monitoring & Audit Requirements</u> Monthly audits of the waste management practices will be carried out during the construction phase to determine if wastes are being managed in accordance with the good site practices described in this <i>EIA Report</i> . The audits examine all aspects of waste management including waste generation,	To ensure that adverse environmental impacts are prevented	All construction work areas	Contractor		√		WDO

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
		storage, recycling, transport and disposal.							
Landscape and Visual – Construction Phase									
8.7.11	LV1	<i>LMM 5 – Early Planting Works.</i> Where technically feasible, new plantings are to be installed as early as possible during the construction works	To reduce construction impacts on Landscape	Where technically feasible	Contractor	√	√		<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV2	<i>LMM 6 – Site hoardings to be compatible with the surrounding environment.</i> Where possible site hoardings to be coloured to complement the surrounding areas. Colours such as green and light brown are recommended.	To reduce construction impacts on Landscape	All construction work areas	Contractor		√		<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
Landscape and Visual –Operation Phase									
8.7.11	LV3	<i>Cultivation of areas compacted during construction.</i> Areas compacted during the construction phase that are not required during the operation phase, are to be cultivated to a depth of up to 300mm in accordance with the future Landscape Specification.	To assist in establishment of vegetation to reduce landscape impacts	All construction work areas where new plantings are to be installed	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV4	<i>Soil stabilisation and planting.</i> During the design phase, a soil stabilisation and embankment planting strategy will be developed to ensure that land affected by slope excavation can be replanted. Soil preparation and the selection and provision of suitable growing medium is to be completed in accordance with the relevant best practice guidelines.	To reduce visual impacts	All construction work areas in slope areas	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV5	<i>Tree and Shrub Planting.</i> All planting of trees and shrubs is to be carried out in accordance with the relevant best practice guidelines. Plant densities are to be provided in future detailed design documents and are to be selected so as to achieve a finished landscape that matches the surrounding, undisturbed, equivalent landscape types	To reduce visual impacts	All available following construction	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV6	<i>LMM 4 - Relocation.</i> Landscape Resources of value to be re-located where practically feasible.	To reduce landscape impacts and retain valuable LRs	As required	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV7	<i>Design of Structures.</i> Built structures, in particular noise barriers that will be setback and reprovisioned will be utilise appropriate designs to complement the surrounding landscape. Materials and finishes will also be considered during detailed design.	To reduce visual impacts	Noise barriers	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
8.7.11	LV8	<i>Design of noise barriers.</i> The 2.5m high vertical noise barrier for the planned schools will be in the form of concrete structure installed with barrier panels to align with the existing provision in the vicinity and to integrate into the landscape.	To reduce visual impacts	Noise barriers	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>
8.7.11	LV9	<i>Plantings</i> In addition to the landscape mitigation plantings proposed, appropriate new plantings will be installed as appropriate to help integrate the new structures into the surrounding landscape.	To reduce visual impacts	All construction work areas	HyD / Contractor	√	√	√	<i>EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/200</i>

Appendix G

Graphical Plot of Noise Monitoring Results



Appendix H

Meteorological Information

Lau Fau Shan Automatic Weather Station, December 2015

Date		Weather	Total Rainfall (mm)	Lau Fau Shan Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Dec-15	Tue	Mainly cloudy. Bright periods in the afternoon. Moderate to fresh northeasterly winds,.	0	23.1	9.2	79	N/NE
2-Dec-15	Wed	Mainly cloudy. Bright periods in the afternoon. Moderate to fresh northeasterly winds,.	Trace	24.5	9.6	75.5	E/SE
3-Dec-15	Thu	Mainly cloudy. Bright periods in the afternoon. Moderate to fresh northeasterly winds,.	Trace	18.3	18	79.2	N/NE
4-Dec-15	Fri	Mainly cloudy. Bright periods in the afternoon. Moderate to fresh northeasterly winds,.	Trace	18.3	15.9	79	N/NE
5-Dec-15	Sat	Mainly cloudy. Bright periods in the afternoon. Moderate to fresh northeasterly winds,.	15.7	17.8	15	76	N/NE
6-Dec-15	Sun	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	1	15.2	17.7	75	N/NE
7-Dec-15	Mon	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	0	15.9	13.6	72	N/NW
8-Dec-15	Tue	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	0.7	16	11.8	78	N/NE
9-Dec-15	Wed	Mainly fine apart from relatively low visibility in some areas at first. Moderate north to northeasterly winds	44.6	15.8	15	97	E/NE
10-Dec-15	Thu	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	Trace	18.2	10.5	89.5	N/NW
11-Dec-15	Fri	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	0	18.9	13	78.5	NE
12-Dec-15	Sat	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	0	20.6	9.5	80	E/NE
13-Dec-15	Sun	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	Trace	22.4	10.5	88.2	E/NE
14-Dec-15	Mon	Cloudy with a few rain patches. Moderate northeasterly winds, fresh at times	Trace	18.7	11.2	87.2	E/NE
15-Dec-15	Tue	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	Trace	16.8	17.2	70	N/NE
16-Dec-15	Wed	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	0	14.5	29.2	55.3	N/NE
17-Dec-15	Thu	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	0	12.7	25.6	37	N/NE
18-Dec-15	Fri	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	0	12.4	13.6	50	E/NE
19-Dec-15	Sat	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	0	14.7	11.5	61	E/NE
20-Dec-15	Sun	It will be fine. Very dry in the afternoon. Moderate northeasterly winds, fresh at times offshore.	0.7	15.6	7.7	81.5	E/NE
21-Dec-15	Mon	Mainly cloudy. One or two light rain patches with relatively low visibility in some areas at first. Moderate easterly winds, fresh overnight.	Trace	Maintenance	10.8	Maintenance	E/NE
22-Dec-15	Tue	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	0.6	20.8	13	84	E/NE
23-Dec-15	Wed	Mainly cloudy with coastal fog. One or two light rain patches in the morning and at night.	Trace	21.9	12	85	E/NE
24-Dec-15	Thu	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	Trace	23.3	9.2	83	E/SE
25-Dec-15	Fri	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	0.2	16.6	21.5	78	N/NE
26-Dec-15	Sat	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	0	Maintenance	17	Maintenance	N/NE
27-Dec-15	Sun	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	0.4	Maintenance	10	Maintenance	N/NE
28-Dec-15	Mon	Mainly cloudy. Moderate northeasterly winds, fresh at times later.	Trace	17.1	18.3	69.5	N/NE
29-Dec-15	Tue	Sunny periods. Cloudy tonight. Moderate to fresh east to northeasterly winds.	Trace	17.2	10.5	71.7	E/NE
30-Dec-15	Wed	Mainly fine. Dry in the afternoon. Cloudy periods tonight. Moderate northeasterly winds, fresh tonight.	0.4	16.2	12.8	80.5	N/NE
31-Dec-15	Thu	Mainly fine. Dry in the afternoon. Cloudy periods tonight. Moderate northeasterly winds, fresh tonight.	Trace	16.4	20.8	74	N/NE

Lau Fau Shan Automatic Weather Station, January 2016

Date		Weather	Total Rainfall (mm)	Lau Fau Shan Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jan-16	Fri	Mainly fine. Light to moderate northeasterly winds.	Trace	18.5	8.8	74.7	E/NE
2-Jan-16	Sat	Mainly fine. Light to moderate northeasterly winds.	0.3	18.6	5.5	76	E/NE
3-Jan-16	Sun	Sunny periods. Mainly cloudy tonight. Moderate east to northeasterly winds.	5.6	18.6	6.5	94.5	E/NE
4-Jan-16	Mon	Sunny periods. Mainly cloudy tonight. Moderate east to northeasterly winds.	Trace	21.6	7.5	88.5	E/NE
5-Jan-16	Tue	Sunny periods. Mainly cloudy tonight. Moderate east to northeasterly winds.	46.2	21.4	16	90.5	E/SE
6-Jan-16	Wed	Mainly fine. Moderate east to northeasterly winds, occasionally fresh tomorrow.	Trace	20.7	14.2	85	E/NE
7-Jan-16	Thu	Sunny periods. Mainly cloudy tonight. Moderate east to northeasterly winds.	0	18.6	14.2	85	E/NE
8-Jan-16	Fri	Mainly fine. Light to moderate northeasterly winds.	0	17.1	10	75.5	E/NE
9-Jan-16	Sat	Sunny periods. Mainly cloudy tonight. Moderate east to northeasterly winds.	0	18.1	17.7	75	E/NE
10-Jan-16	Sun	Mainly fine. Light to moderate northeasterly winds.	6.9	18.7	11.6	85.5	E/NE
11-Jan-16	Mon	Mainly cloudy with sunny periods. Moderate north to northeasterly winds, fresh offshore.	30.7	18.2	16.5	85.5	E/NE
12-Jan-16	Tue	Mainly cloudy with sunny periods. Moderate north to northeasterly winds, fresh offshore.	0	15.8	16.5	80.5	N/NE
13-Jan-16	Wed	Mainly fine. Cool in the morning. Moderate northeasterly winds.	0	15.3	13.2	74	NE
14-Jan-16	Thu	Mainly fine. Light to moderate northeasterly winds.	1.1	15.7	14.1	76.5	E/NE
15-Jan-16	Fri	Mainly cloudy with sunny periods. Moderate north to northeasterly winds, fresh offshore.	38.8	13.7	14	87	E/NE
16-Jan-16	Sat	Mainly cloudy with sunny periods. Moderate north to northeasterly winds, fresh offshore.	12.3	16.5	13.6	92.5	E/NE
17-Jan-16	Sun	Mainly fine. Cool in the morning. Moderate northeasterly winds.	24.6	15.8	18.7	86.2	N/NW
18-Jan-16	Mon	Mainly cloudy. Sunny intervals in the afternoon. Moderate to fresh east to northeasterly winds.	0	14.2	14.2	69	N/NE
19-Jan-16	Tue	Mainly cloudy. Sunny intervals in the afternoon. Moderate to fresh east to northeasterly winds.	0	15.4	13.1	73.7	NE
20-Jan-16	Wed	Cloudy to overcast with a few rain patches. It will be cool. Fresh easterly winds, strong offshore and on high ground.	3.3	15	17.7	88	E/NE
21-Jan-16	Thu	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	0.1	14.9	12.1	95.5	N/NE
22-Jan-16	Fri	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	12.9	10.9	15	96.3	E/NE
23-Jan-16	Sat	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	0.5	6.9	18.5	37	N/NE
24-Jan-16	Sun	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	4	3.9	17.7	55	N/NE
25-Jan-16	Mon	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	0	6.6	18.5	37	N/NE
26-Jan-16	Tue	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	Trace	8.2	13.7	58	E/NE
27-Jan-16	Wed	Cloudy to overcast. It will be humid with occasional rain. Moderate easterly winds, fresh at times at first.	3.5	10.3	12.7	93	E/NE
28-Jan-16	Thu	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	42.5	14.6	11.2	95.5	E/NE
29-Jan-16	Fri	Mainly cloudy with occasional rain. It will be cold. Moderate to fresh northeasterly winds.	32.8	16.1	10.5	93.5	E/NE
30-Jan-16	Sat	Cloudy to overcast. It will be humid with occasional rain. Moderate easterly winds, fresh at times at first.	0	17.5	10.9	86.2	E/NE
31-Jan-16	Sun	Cloudy to overcast. It will be humid with occasional rain. Moderate easterly winds, fresh at times at first.	0.3	16.5	22.5	83.2	E/NE

Lau Fau Shan Automatic Weather Station, February 2016

Date		Weather	Total Rainfall (mm)	Lau Fau Shan Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Feb-16	Mon	It will be fine. Light to moderate northerly winds.	11.3	11.7	17.7	93.5	N/NE
2-Feb-16	Tue	It will be fine. Light to moderate northerly winds.	Trace	12.8	14.7	91.2	N/NW
3-Feb-16	Wed	It will be fine. Light to moderate northerly winds.	Trace	10.5	12.5	75.5	N/NE
4-Feb-16	Thu	It will be fine. Light to moderate northerly winds.	0	14	11.9	76	E/NE
5-Feb-16	Fri	It will be fine and dry. Cold tonight. Moderate to fresh northerly winds.	0	13.7	19.2	66.5	N/NW
6-Feb-16	Sat	It will be fine and dry. Cold tonight.	0	12.9	14	40	N/NW
7-Feb-16	Sun	The Chinese New Year Holiday					
8-Feb-16	Mon						
9-Feb-16	Tue						
10-Feb-16	Wed						
11-Feb-16	Thu	It will be fine. Light to moderate northerly winds.	Trace	18.7	11.2	82.5	W/SW
12-Feb-16	Fri	It will be fine. Light to moderate northerly winds.	0.1	22.5	11.1	82	SE
13-Feb-16	Sat	It will be fine. Light to moderate northerly winds.	0	23.2	12	80	NE
14-Feb-16	Sun	Public Holiday					
15-Feb-16	Mon	It will be fine. Light to moderate northerly winds.	0.3	12.3	19.5	68.7	NE
16-Feb-16	Tue	It will be fine. Light to moderate northerly winds.	0	11	15	57.5	N/NE
17-Feb-16	Wed	Humid and foggy. A few rain patches in the morning and at night. Bright periods in the afternoon. Moderate southeasterly winds.	1.7	11.5	11.3	83	E/NE
18-Feb-16	Thu	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight. Moderate northerly winds, fresh later.	3.4	11.9	8.4	92.5	E/NE
19-Feb-16	Fri	Cloudy and cold. Moderate northerly winds, fresh later.	4.4	14.1	10	89	E/NE
20-Feb-16	Sat	Cloudy and cold. Moderate northerly winds, fresh later.	2.4	15.8	12	80	E/NE
21-Feb-16	Sun	Public Holiday					
22-Feb-16	Mon	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight. Moderate northerly winds, fresh later.	0.5	16.2	12.9	88.7	W/SW
23-Feb-16	Tue	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight. Moderate northerly winds, fresh later.	0.5	14.8	14.2	87.5	N/NE
24-Feb-16	Wed	Cloudy. Moderate to fresh north to northeasterly winds.	Trace	12.9	18.7	76.7	N/NE
25-Feb-16	Thu	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight. Moderate northerly winds, fresh later.	0	13.7	12.5	73.7	N/NE
26-Feb-16	Fri	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight. Moderate northerly winds, fresh later.	Trace	14.1	10.5	80.5	N/NE
27-Feb-16	Sat	Cloudy with a few light rain patches. Foggy at first. Rather cool tonight.	Trace	15.3	11	79	N/NE
28-Feb-16	Sun	Public Holiday					
29-Feb-16	Mon	Mainly fine apart from some haze. It will be cool tomorrow morning. Moderate easterly winds, fresh at times at first.	0	18.7	13.6	62.2	N/NE