Issue No.	:	1
Issue Date	:	January 2011
Project No.	:	768

JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44, TUEN MUN

FINAL ENVIRONMENTAL MONITORING & AUDIT REPORT

Prepared By:

ALLIED ENVIRONMENTAL CONSULTANTS LTD.

COMMERCIAL-IN-CONFIDENCE

Allied Environmental Consultants Limited
Acousticians & Environmental Engineers

19/F., Kwan Chart Tower, 6 Tonnochy Road, Wan Chai, Hong Kong
Tel: (852) 2815 7028 Fax: (852) 2815 5399 Email: info@aechk.com

AEC 沛然環境評估工程顧問有限公司

Issue No.	:	1
Issue Date	:	January 2011
Project No.	:	768

JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44, TUEN MUN

FINAL ENVIRONMENTAL MONITORING & AUDIT REPORT

Prepared By:

ALLIED ENVIRONMENTAL CONSULTANTS LTD.

COMMERCIAL-IN-CONFIDENCE

Author: Nic Lam
Nic H. H. Lam
BSc(Hons) AMHKIOA

Checked:
Timothy W. H. Sze
BEng(Hons) MEng

Approved:
Grace M. H. Kwok
BEng(Hons) MHKIEIA MHKIOA
MISWA MIAIA MRAPA LEED AP

Table of Contents

List of Tables

List of Figures

List of Appendices

EXECUTIVE SUMMARY

Allied Environmental Consultants Limited (AEC) has been appointed to conduct an environmental monitoring and audit (EM&A) program for the Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun. Major construction works of the Project were substantially completed in September 2010 and handover works were completed in November 2010, thus the EM&A programme would be terminated effective from 23rd December 2010.

This is the Final Environmental Monitoring and Audit (EM&A) Summary Report and this report summarizes the EM&A works performed at Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun from 31st July 2008 to 23rd December 2010.

Environmental Monitoring Works

Air Quality

No exceedance of 1-hour and 24-hour Total Suspended Particulates (TSP) was recorded.
During the course of the Construction Phase, both 1-hour and 24-hour TSP monitoring were conducted at the designated location. No exceedances of Action Level and Limit Level of 24-hour TSP were recorded.

Noise

No exceedance of noise level was recorded.
During the course of the Construction Phase, weekly noise monitoring was undertaken at the designated location. No exceedances of Action Level and Limit Level of noise level were recorded.

The environmental monitoring data collected during the construction period were generally well below the prediction of mitigated scenario in the approved Environmental Impact Assessment (EIA) Report and did not find any exceedances of action and limit level. It agrees with EIA predictions and the Project is environmentally acceptable.

Environmental Complaints and Prosecutions

During the construction period, there was a successful prosecution to W. Hing Construction Company Limited from EPD dated 9th November 2010 regarding the use of powered mechanical equipment, for the purpose of carrying out construction work other than percussive piling in respect of which a construction noise permit was not in force on 16th May 2010 at Joint-User complex and Wholesale Fish Market in Area 44, Tuen Mun, New Territories. As precautionary measures, the contractor had held a verbal briefing section on 17th May 2010 to all sub-contractors / foremen that no works / operation using powered mechanical equipments are allowed to be carried out during restricted hours between 1900 and 0700 hours and any time on a general holiday, including Sunday. The reason for the non-compliance was anticipated to be lack of supervision of carrying out construction work on Sunday.

There was one successful prosecution and no environmental complaint, warning and summons received since commencement of the Project.

Site Inspections

Mitigation measures had been implemented by the Contractor to minimize the environmental impacts due to construction activities. Site inspections carried out by ET and IEC showed that the Contractor rectified most of the problems promptly, indicating the EIA process with its recommended mitigation measures and the EM&A programme were effective in protecting the environment. As such, the environmental performance of the Contractor during the construction period was considered satisfactory.

The monitoring results and statistics of non-compliance indicated that the EIA process with its recommended mitigation and EM&A programme were effective for protection of the environment and there was no unacceptable environmental impact posed by the Project.

1. PROJECT BACKGROUND

A Joint User Complex and Wholesale Fish Market (WFM Complex) at Area 44 in Tuen Mun is proposed to be designed and built by Architectural Services Department on behalf of Agriculture, Fisheries and Conservation Department, Marine Department, and Food and Environmental Hygiene Department of the Hong Kong SAR. The WFM Complex is to provide a permanent site for the relocation of the existing temporary wholesale fish market at Tuen Mun Area 27 and to accommodate a community hall and dragon boat racing spectator stand for public use. The proposed development is a 3-storey complex to accommodate the wholesale fish market at the ground floor, a community hall on the first and second floors, and an extensive landscaped deck on roof level. The proposed Wholesale Fish Market is categorized as a designated project under the Environmental Impact Assessment Ordinance (EIAO) and therefore a detailed Environmental Impact Assessment (EIA-085/2002) has been conducted in year 2002 and an Environmental Permit (EP-296/2007) was issued by Environmental Protection Department in December 2007.

The subject site is located at Castle Peak Bay of Tuen Mun given in Figure 1. The subject site is bounded to the north by a future local open space presently used as a temporary car park, to the east by Castle Peak Bay typhoon shelter, to the south by a future lorry park and to the west by Wu Shan Road. Yuet Wu Villa being the nearest residential establishment is located at around 85m from the site boundary.

1.1 Project Organization and Contact Personnel

Key personnel and contact particulars are summarized in Table 1.

Table 1 Contact Details of Key Personnel

Role	Department / Company	Names	Contact Number	Fax Number
Lead User Department	Agriculture, Fisheries, and Conservation Department	Mr. K.H. Chan Ms. Louise Li	2150 7092 2150 7104	2314 2866
Environmental Permit Holder	Architecture Services Department	Mr. S.W. Chow Ms. Susana Chan	2867 3716 2867 3706	2523 9622
Architect	P&T Architects and Engineers Ltd.	Ms. Sarah Ng Ms. Vivian Law	2835 3548 2832 3046	2891 3834
Main Contractor	W. Hing Construction Co. Ltd.	Mr. Andy Chan Mr. Jim Lee	9630 7404 6105 4076	8343 9188
Environmental Team Leader	Allied Environmental Consultants Ltd.	Ms. Grace Kwok	2815 7028	2815 5399
Independent Environmental Checker	Cinotech Consultants Ltd.	Dr. Priscilla Choy	2151 2089	3107 1388

1.2 Works Undertaken during the Construction Period

The synopsis of work undertaken during the entire construction period is summarized in Table 2.

Table 2 Synopsis of Works Undertaken during the Entire Construction Period

Month	***Works Undertaken***
Aug 2008	- Preboring works - Jack piling works - Drainage diversion works
Sept 2008	- Pre-boring works - Jack piling works - Drainage diversion works
Oct 2008	- Pre-boring works - Jack piling works - Drainage diversion works
Nov 2008	- Jack piling works - Drainage diversion works
Dec 2008	- Jack piling works - Drainage diversion works
Jan 2009	- Underground foundation works - Drainage diversion works
Feb 2009	- Foundation works - Underground drainage works
Mar 2009	- ELS and pile cap construction - Underground building services - ELS and concrete footing for tower crane - Ground floor superstructure
Apr 2009	- Pile cap and ELS construction - Underground building services - Ground floor superstructure - Tower crane erection
May 2009	- ELS and pile cap construction - U/G, G/F - M/F, G/F - 1/F E&M works construction - G/F - M/F, G/F - 1/F superstructure
Jun 2009	- ELS and pile cap construction - U/G, G/F - M/F, G/F - 1/F E&M works construction - G/F - M/F, G/F - 1/F superstructure
Jul 2009	- Construction of superstructure (wall/ column/ slab) from G/F to M/F, G/F to 1/F - Installation of concealed E&M conduit to wall/ slab - U/G drainage works - Manhole connection work - Construction of G/F on-grade slab
Aug 2009	- Formwork and rebar fixing for superstructure (G/F to M/F, G/F to 1/F)

	- Underground services installation - Concreting to superstructure - Installation of conceal E&M services conduit - Construction of ground structure slab
Sept 2009	- Construction of superstructure from M/F to 1/F along GL 1-10/A-L - Construction of superstructure from G/F to M/F along GL 15-17/C-L, 13-17/ A-C - Construction of superstructure from G/F to 1/F along GL 10-13/B-L - Installation of concealed E&M service conduit to superstructure (wall and slab)
Oct 2009	- Construction of superstructure from G/F to M/F and M/F to 1/F - Installation of E&M services concealed conduit to wall and slab of superstructure - Construction of underground E&M services
Nov 2009	- Construction of superstructure from M/F to 1/F, 1/F to 2/F - Installation of E&M services concealed conduit to wall and slab of superstructure - Construction of underground E&M services
Dec 2009	- Construction of superstructure at 1/F, 2/F & R/F - Wall rendering at G/F and M/F - Erection of block wall at G/F - 1st fixing of E&M ceiling services - Erection of bamboo scaffolding - Installation of concealed E&M service pipe to superstructure
Jan 2010	- Construction of superstructure - Installation of concealed E&M services - 1st fixing of E&M services, Finishing Works - Installation of Metal Truss at Roof - Last Manhole Construction - Connection Works
Feb 2010	- Construction of superstructure - Installation of metal roof, internal & external wall & ceiling rendering and plastering - Floor screeding - Installation of metal works - 1st fixing of E&M services - Erection of bamboo scaffolding - Last manhole connection - Internal waterproofing works, internal wall & ceiling wall painting - Installation of window & louver; and installation of door frame
Mar 2010	- Internal & external finishing works - Installation of metal roof, waterproofing works - 1st & final fixing of E&M works, steel & metal works - Connection of U/G drainage pipe along G/F landscape plaza - Construction of on-grade slab along G/F fish market

	- Timber & metal door frame installation - window & louvre installation - Lift installation
Apr 2010	- Construction of hollow on-grade slab - Internal & external finishing works - Waterproofing works - Steel & metal works - Construction of underground drainage system - Installation of Kalzip Roof system - Connection & construction of manhole along Wu Shan Road - 1st & 2nd fixing of E&M services - Lift installation
May 2010	- Laying of floor screed at G/F Carpark & Fish Market - Internal wall/ floor/ ceiling finish - Laying of floor screed/ washed grano at 1/F landscape deck & spectator stand - Laying of external floor tile at 2/F - External waterproofing works - Installation of aluminium louvre & window - Installation of timber door & metal door - Installation of general metal works - Installation of Kalzip roof system - External wall spray painting - 2nd / final fixing of E&M services - Construction of underground drainage works at G/F landscape plaza - Dismantling of hoarding - Installation of fender - Installation of recycle plastic for architecture feature - Laying of planter sub-soil drain & aggregate - Connection of sewage manhole along Wu Shan Road
Jun 2010	- Construction of G/F RC planter wall - Minor concreting works - Internal finishing works - Installation of Kalzip Roof - C&J installation works - Metal works installation - Laying of underground drain pipe at G/F Entrance Plaza - Dismantling of hoarding - Last manhole connection works - Installation of fender - Dismantling of bamboo scaffolding - External landscape works - 2nd or final fixing for E&M services works - T&C for E&M services works
Jul 2010	- Internal and external finishing works - External landscape works - Installation of Kalzip Roof - Installation of metal works

	- Installation of carpentery & joinery works - Second and/ or final fixing of E&M works - Last manhole connection works & reinstatement of pavement (XP works along Wu Shan Road) - Installation of fender - Rebar fixing, erection of formwork & concreting to minor RC structure - Dismantling of hoarding - Dismantling of bamboo scaffolding - Installation of Spectator Stand seating - Installation of jib crane - Installation of Ice/ Cold Store
Aug 2010	- Stormwater last manhole connection along Wu Shan Road - Reinstatement of concrete pavement along Wu Shan Road - Installation of steel & metal works - Installation of joinery & carpentary works - Internal & external finishing works - Landscaping works - Plumbing & drainage works - E&M final fixing & T&C works
Sept 2010	- Defects rectification for internal / external finishing works - Construction of additional planter RC wall - Installation of minor steel & metal works - Installation of joinery & carpentery works - Planting work by ASD term contractor - Installation of signage works - Water tightness test for kalzip roof - Handover preparation works - Installation of additional E&M services works
Oct 2010	- Defects rectification for internal / external finishing works - Installation of additional / variation E&M works - Preparation works for handover to end user
Nov 2010	- Defects rectification for internal / external finishing works - Installation of additional / variation of E&M works - Preparation works for handover to end user

2. SENSITIVE RECEIVERS

Air Sensitive Receivers (ASRs) within 500m include Yuet Wu Villa, Lawn Bowling Field, Tennis Court, which are less than 100m away from the subject site. Tuen Mun Wu Hong Clinic is located to the west at about 100m to the site boundary. Two secondary schools, namely Ka Chi Secondary School and South Tuen Mun Government Secondary School, are approximately 300m to the south of the site boundary.

Noise Sensitive Receivers (NSRs) within 300m are Yuet Wu Villa, Siu Hei Court, Yan Chai Hospital Low Chan Chor Si Primary School and Wu King Estate. The nearest NSR will be Block 15 of Yuet Wu Villa.

3. SUMMARY OF EM&A REQUIREMENT

For regular impact monitoring, the sampling frequency of at least once in every six-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 three times in every six-days should be undertaken when the highest dust impact occurs. For noise monitoring, one set of measurement between 0700-1900 hours on normal weekdays. $Leq_{(30\ min)}$ shall be used as the monitoring parameter.

From baseline monitoring results, the proposed Action and Limit Levels for air quality are summarized in Table 3. The average baseline 1-hour TSP value of 129μg/m^3 and 24-hour TSP value of 65μg/m^3 measured at Block 15, Yuet Wu Villa was used to determine the action and limit level for air quality impact monitoring. The proposed Action and Limit Levels for construction noise are summarized in Table 4.

Table 3 Action and Limit Level for Air Quality Impact Monitoring at Yuet Wu Villa

Parameters	***Baseline Level (μg/m^3)***	***Action Level (μg/m^3)***	***Limit Level (μg/m^3)***
24-Hour TSP Level	65	173	260
1-Hour TSP Level	129	334	500

Table 4 Action and Limit Levels for Construction Noise Impact Monitoring

Time Period	***Action Level***	***Limit Level***
Daytime (0700-1900 hours) on weekdays	When one documented compliant is received	Dwelling 75dB(A)[1] School 70dB(A)[1] (65dB(A) during examinations)[1]
1900-2300 on any day and 0700-2300 on Sunday and general holidays, for use of PME[2]	When one documented compliant is received	65dB(A)[3]
All days during the night-time (2300-0700 hours) [2]	When one documented compliant is received	50dB(A)[3]

Note: 1. Construction noise criteria stipulated in the TM-EIAO
2. A Construction Noise Permit (CNP) shall be required for the carrying out of the construction work during the restricted hours (1900-2300 on any day and 0700-2300 on Sunday and general holidays, for use of PME; and All days during the night-time (2300-0700 hours))
3. Area sensitivity rating of the monitoring location is "B".

Should non-compliance of the above Action and Limit levels occurs, the contractor shall undertake corresponding action in accordance with the proposed Event Action Plan given in EM&A Manual. A summarized general Event Action Plan is given in Table 5. Details should be referred to the Event Action Plan in the EM&A Manual.

Table 5 Event Action Plan

Level	***Step 1***	***Step 2***	***Step 3***
Action	• Identify source • Check monitoring data and working methods	• Contact project manager to discuss and implement remedial action • Rectify any unacceptable practice • Amend working methods if appropriate • If exceedance continues, commence additional monitoring	• Notify client/project manager following correct of the situation • Cease additional monitoring if exceedance stops
Limit	• Identify source • Notify client/project manager • Check monitoring data and working methods • Repeat measurement to confirm finding • Commence additional monitoring	• Take immediate action to avoid further exceedance • Submit proposal for remedial actions to client/project manager within 3 working days • Implement the agreed proposal • If exceedance continues, amend and resubmit the proposal	• Notify client/project manager following correction of the situation • Cease additional monitoring if exceedance stops

4. MONITORING METHODOLOGY

4.1 Monitoring Station Set Up

Air quality monitoring and noise monitoring were conducted at Block 15, Yuet Wu Villa. Air quality monitoring station was set up at the roof top of the residential block and noise monitoring was conducted at 1.2m above ground level in front of the residential block and at the junction of Wu Sau Street and Wu On Street as given in Figure 2 and 3.

4.2 Air Quality Monitoring

1-hour and 24-hour TSP air quality monitoring was conducted at the designated air quality monitoring location using a High Volume TSP Sampler (Model No: Anderson GMWS-2310 ACCU-VOL) at the designated location. 24-hour TSP samples were taken every six days. 1-hour TSP samples were taken three times a day between 0700-1900 hours. The weighing of the filter paper used in the monitoring was undertaken by ALS Laboratory Group Environmental Division. (HOKLAS Registration No.: 066)

4.3 Noise Monitoring

Noise monitoring was conducted at the designated noise monitoring location between 0700-1900 hours using a sound level meter which complies with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Noise instrumentation details are given in Table 6.

Table 6 Noise Monitoring Equipment

Manufacturer	***Type/Model No.***	***Equipment***
RION	Model NL 31	Precision Sound Level Analyzer with windshield
RION	Model NC 73	Calibrator

Noise levels measurements were recorded in terms of thirty minutes A-weighted equivalent continuous sound pressure level ($Leq_{(30min)}$) on a weekly basis. The sound level meter was calibrated immediately prior to and following each noise measurement. The meter was mounted on a tripod at a height of 1.2m and the microphone was positioned at 1m away the building façade of the noise monitoring station facing the construction site.

Noise measurements were not made in the presence of fog, rain, and wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed was checked with a portable anemometer capable of measuring the wind speed in m/s.

5. RESULTS

5.1. Air Quality

No exceedance was recorded in the whole construction period. Graphical plots of air quality monitoring record of 1-hour TSP levels and 24-hour TSP levels in comparison with baseline data are provided in Appendices A and B. Air monitoring results measured in October and November 2010 returned to ambient environmental conditions in comparison with baseline data. Therefore, no adverse environmental impacts to the surroundings are anticipated. The EPD agreed the completion of construction works and air monitoring of construction phase was completed in November 2010.

5.2. Noise

Noise monitoring results in terms of $L_{eq(30min)}$, $L_{10(30min)}$ $L_{90(30min)}$ were measured at the designated noise monitoring location. L_{10} and L_{90} represent sound levels that are exceeded 10% and 90% of the time respectively. Normally, L_{10} measurements can be considered as the average peak levels, whilst L_{90} levels can be considered as the average background noise levels.

No exceedance was recorded in the whole construction period. Graphical plot of noise monitoring record in comparison with baseline data is provided in Appendix C. Noise monitoring results measured in October and November 2010 returned to ambient environmental conditions in comparison with baseline data. Therefore, no adverse environmental impacts to the surroundings are anticipated. The EPD agreed the completion of construction works and noise monitoring of construction phase was completed in November 2010.

5.3. Weather Conditions

Weather data of the monitoring station were obtained from the nearest Hong Kong Observatory (HKO) Tuen Mun automatic weather station located at Tuen Mun Town Park (63 mPD).Table 7 summarizes the wind data during the monitoring dates.

Table 7 Summary of Weather Conditions during the Monitoring Period

Date	***Weather***	***Prevailing Wind Direction***	***Daily Average Wind Speed (m/s)***
1 Aug 2008	Cloudy	SSE	2.71
7 Aug 2008	Cloudy	SSE	4.47
13 Aug 2008	Sunny	SW	1.96
19 Aug 2008	Sunny	SSE	2.68
25 Aug 2008	Sunny	SSE	3.54
30 Aug 2008	Sunny	SW	1.94
5 Sept 2008	Sunny	S	1.78
11 Sept 2008	Sunny	NW	1.78
17 Sept 2008	Sunny	SE	2.03
23 Sept 2008	Cloudy	N	3.51
29 Sept 2008	Sunny	NE	4.14
4 Oct 2008	Sunny	SE	4.42
10 Oct 2008	Sunny	N	1.87
16 Oct 2008	Sunny	NE	1.45
22 Oct 2008	Sunny	S	2.07
28 Oct 2008	Sunny	SE	2.67
3 Nov 2008	Cloudy	NE	2.66
8 Nov 2008	Sunny	N	3.66
14 Nov 2008	Sunny	N	1.93
20 Nov 2008	Sunny	NE	3.07
26 Nov 2008	Sunny	N	2.34
2 Dec 2008	Sunny	S	2.22
8 Dec 2008	Sunny	N	2.20
13 Dec 2008	Cloudy	N	1.83
19 Dec 2008	Sunny	SE	1.78
23 Dec 2008	Sunny	NE	2.78
29 Dec 2008	Cloudy	NE	2.80
3 Jan 2009	Sunny	N	1.61
9 Jan 2009	Sunny	N	3.20
15 Jan 2009	Sunny	N	1.85
21 Jan 2009	Cloudy	N	1.47
29 Jan 2009	Cloudy	NW	1.75
4 Feb 2009	Sunny	S	2.11
10 Feb 2009	Sunny	SW	1.57
16 Feb 2009	Cloudy	S	2.97
21 Feb 2009	Sunny	SE	4.09
27 Feb 2009	Cloudy	S	2.41
5 Mar 2009	Cloudy	SE	2.91
11 Mar 2009	Cloudy	S	2.66
17 Mar 2009	Sunny	SE	2.29
23 Mar 2009	Cloudy	S	2.59
28 Mar 2009	Cloudy	SW	2.01

3 Apr 2009	Cloudy	S	2.44
9 Apr 2009	Sunny	SE	2.48
15 Apr 2009	Sunny	S	2.92
21 Apr 2009	Cloudy	NE	3.33
27 Apr 2009	Cloudy	SE	3.17
4 May 2009	Sunny	S	2.53
9 May 2009	Sunny	SE	3.74
15 May 2009	Sunny	SE	2.82
21 May 2009	Cloudy	S	2.19
27 May 2009	Cloudy	SE	3.54
2 Jun 2009	Cloudy	SE	4.15
8 Jun 2009	Cloudy	SE	4.48
13 Jun 2009	Cloudy	SE	1.93
19 Jun 2009	Cloudy	SE	2.34
25 Jun 2009	Cloudy	SE	3.13
2 Jul 2009	Sunny	SW	3.30
8 Jul 2009	Sunny	SE	2.21
14 Jul 2009	Cloudy	S	2.80
20 Jul 2009	Cloudy	SE	4.23
25 Jul 2009	Cloudy	SE	2.98
31 Jul 2009	Cloudy	SE	3.16
6 Aug 2009	Cloudy	SE	3.81
12 Aug 2009	Cloudy	S	1.60
18 Aug 2009	Fine	Maintenance*	Maintenance*
24 Aug 2009	Sunny	SE	1.93
29 Aug 2009	Sunny	S	1.78
4 Sep 2009	Sunny	SE	2.56
10 Sep 2009	Fine	NE	2.79
16 Sep 2009	Cloudy	SE	3.55
22 Sep 2009	Sunny	NE	3.36
28 Sep 2009	Cloudy	NE	3.18
2 Oct 2009	Sunny	N	1.98
8 Oct 2009	Sunny	SE	2.24
14 Oct 2009	Rainy	NE	2.14
20 Oct 2009	Cloudy	NE	2.01
27 Oct 2009	Sunny	SE	3.21
2 Nov 2009	Sunny	NE	4.92
7 Nov2009	Cloudy	S	2.19
13 Nov 2009	Cloudy	N	3.28
19 Nov 2009	Sunny	N	2.90
25 Nov 2009	Sunny	S	1.18
1 Dec 2009	Sunny	N	2.09
7 Dec 2009	Cloudy	N	1.50
12 Dec 2009	Sunny	S	2.51
18 Dec 2009	Cloudy	NE	3.76
24 Dec 2009	Sunny	N	1.15

30 Dec 2009	Cloudy	NE	1.35
5 Jan 2010	Cloudy	SE	2.73
11 Jan 2010	Cloudy	N	2.14
16 Jan 2010	Sunny	N	0.86
22 Jan 2010	Cloudy	NE	1.57
28 Jan 2010	Cloudy	N	0.02
3 Feb 2010	Cloudy	S	1.79
9 Feb 2010	Cloudy	SE	3.90
12 Feb 2010	Cloudy	NE	3.75
18 Feb 2010	Cloudy	NE	3.11
24 Feb 2010	Cloudy	SE	3.76
2 Mar 2010	Cloudy	SE	2.16
8 Mar 2010	Cloudy	N	1.72
13 Mar 2010	Cloudy	N	0.30
19 Mar 2010	Sunny	SE	1.46
25 Mar 2010	Cloudy	N	3.89
31 Mar 2010	Cloudy	SE	2.82
7 Apr 2010	Cloudy	S	2.22
13 Apr 2010	Sunny	SE	3.67
19 Apr 2010	Sunny	SW	2.33
24 Apr 2010	Sunny	SE	3.41
30 Apr 2010	Cloudy	S	2.49
6 May 2010	Cloudy	S	2.22
12 May 2010	Sunny	SE	3.67
18 May 2010	Cloudy	SW	2.33
24 May 2010	Sunny	SE	3.41
29 May 2010	Cloudy	S	2.49
4 Jun 2010	Cloudy	N	1.82
10 Jun 2010	Cloudy	W	0.89
15 Jun 2010	Cloudy	S	3.34
21 Jun 2010	Cloudy	SE	2.80
26 Jun 2010	Cloudy	SE	2.38
2 Jul 2010	Sunny	S	2.13
8 Jul 2010	Sunny	S	2.97
14 Jul 2010	Sunny	SE	2.14
20 Jul 2010	Sunny	SE	2.74
26 Jul 2010	Sunny	SE	2.52
31 Jul 2010	Sunny	SE	3.45
6 Aug 2010	Sunny	N	2.03
12 Aug 2010	Sunny	SE	2.94
18 Aug 2010	Sunny	N	1.74
24 Aug 2010	Cloudy	SE	1.95
30 Aug 2010	Sunny	N	1.97
4 Sept 2010	Cloudy	SE	2.92
10 Sept 2010	Cloudy	N	1.78
16 Sept 2010	Sunny	SE	1.85

22 Sept 2010	Cloudy	SE	2.60
28 Sept 2010	Sunny	SE	2.25
4 Oct 2010	Cloudy	NE	3.55
9 Oct 2010	Cloudy	N	1.52
15 Oct 2010	Cloudy	NE	3.61
21 Oct 2010	Cloudy	N	3.36
27 Oct 2010	Sunny	NE	4.27
2 Nov 2010	Sunny	N	2.10
8 Nov 2010	Sunny	NE	1.85
13 Nov 2010	Sunny	N	2.31
19 Nov 2010	Sunny	Maintenance*	Maintenance*
25 Nov 2010	Sunny	N	2.19

Remarks: *The HKO Tuen Mun automatic weather station is under maintenance on that day.

5.4. Comparison of Monitoring Results

During the construction period, the monitoring results did not show major variations due to the construction activities being carried out and weather conditions. The EM&A data was compared with the EIA predictions as summarized in Table 8.

Table 8 Comparison of EM&A data with EIA predictions

Parameters	***Predicted Level in EIA Report***	***Measured Level from EM&A data***
Mitigated maximum 1-hour average TSP concentration	147.4 μ g/m^3	226.0 μ g/m^3
Mitigated maximum 24-hour average TSP concentration	110.3 μ g/m^3	110.0 μ g/m^3
Mitigated maximum construction noise level	$L_{eq\ (30min)}$ of 73 dB(A)	$L_{eq\ (30min)}$ of 65.7 dB(A)

The maximum 24-hour average TSP concentration and maximum construction noise level collected during the construction period were generally well below the prediction of mitigated scenario in the approved Environmental Impact Assessment (EIA) Report and did not find any exceedances of action and limit level. However, the maximum 1-hour average TSP concentration collected during the construction period exceeds the prediction of mitigated scenario in the approved Environmental Impact Assessment (EIA) Report but did not exceed the action and limit level.

The discrepancy between the EM&A data and EIA predictions is probably due to the construction of the Junior Police Officers' Married Quarters at Wu Hong Street, which is 110m away from the monitoring location. The construction works from Junior Police Officers' Married Quarters can be a major source of the noise and TSP generation during the monitoring period from 31st July 2008 to 31st March 2010. Refer to Appendices A to C; the measured level from EM&A data was lower down since completion of construction works of Junior Police Officers' Married Quarters.

After completion of major construction works of the Project, the measured air and noise monitoring results returned to levels similar to that recorded during baseline monitoring. Therefore, no adverse environmental impacts to the surroundings are anticipated. As the monitored parameters were far below the Action and Limit Level under mitigation measures, the Project is considered environmentally acceptable.

6. ADVICE ON SOLID AND LIQUID WASTE MANAGEMENT STATUS

The solid waste generated from the Project included inert and non-inert C&D waste. Sorting and recycling of materials was encouraged at the site. A total of 29,470.21 tonnes of inert C&D material was disposed of at public fill. A total of 1,635.41 tonnes of waste including general refuse and non-inert C&D wastes were disposed of to landfill. The effluent discharge was disposed of according to the water discharge licence.

7. NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

During the construction period, there was a successful prosecution to W. Hing Construction Company Limited from EPD dated 9th November 2010 regarding the use of powered mechanical equipment, for the purpose of carrying out construction work other than percussive piling in respect of which a construction noise permit was not in force on 16th May 2010 at Joint-User complex and Wholesale Fish Market in Area 44, Tuen Mun, New Territories. As precautionary measures, the contractor had held a verbal briefing section on 17th May 2010 to all sub-contractors / foremen that no works / operation using powered mechanical equipments are allowed to be carried out during restricted hours between 1900 and 0700 hours and any time on a general holiday, including Sunday. The reason for the non-compliance was anticipated to be lack of supervision of carrying out construction work on Sunday.

There was one successful prosecution and no environmental complaint, warning and summons received since commencement of the Project.

8. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

The Contractor implemented mitigation measures to minimize the environmental impacts due to construction activities. The implementation status of environmental mitigation measures is given in Appendix D.

9. REVIEW

9.1. Review of Effectiveness and Efficiency of the Mitigation Measures

The environmental monitoring results indicated that the construction activities in general were in compliance with the relevant environmental requirements and were environmentally acceptable. The effectiveness and efficiency of the mitigation measures were high as evidenced by a small number of complaints and exceedances.

9.2. Review of Environmental Monitoring Methodology and EM&A Programme

The environmental monitoring methodologies and procedures were regularly reviewed by the ET. No modification to the existing monitoring methodology was made during the construction period. As effective follow up actions were promptly taken once non-compliance were recorded and the monitoring results were in general same as the predictions with mitigation measures in the EIA report after completion of construction works of Junior Police Officers' Married Quarters, the EM&A programme was considered to be successfully conducted during the course of the Construction Phase of the Project.

10. CONCLUSIONS

As the construction works of the Project were substantially completed in September 2010 and handover works were completed in November 2010, thus the EM&A programme would be terminated effective from 23rd December 2010. A certificate of completion from P&T Architects and Engineers Ltd. dated 17 September 2010 was given in Appendix E.

Air quality and noise monitoring had been undertaken during the construction period in accordance with the EM&A Manual. There was one monitoring stations for air quality and noise monitoring.

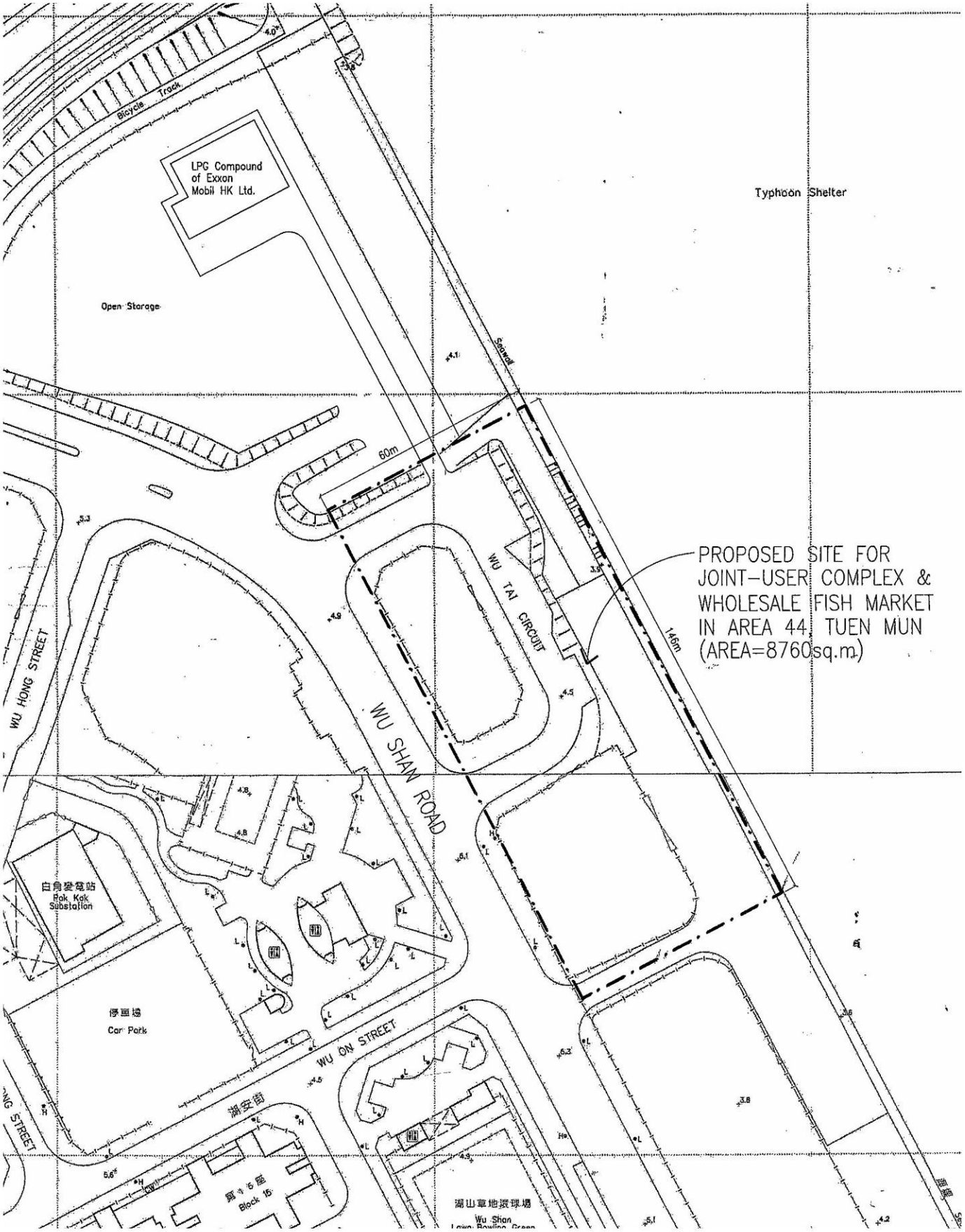
During the course of the project, no exceedances of Action and Limit levels for 1-hour TSP, 24-hour TSP and noise monitoring.

There was a successful prosecution to W. Hing Construction Company Limited from EPD dated 9th November 2010 regarding the use of powered mechanical equipment, for the purpose of carrying out construction work other than percussive piling in respect of which a construction noise permit was not in force on 16th May 2010 at Joint-User complex and Wholesale Fish Market in Area 44, Tuen Mun, New Territories. As precautionary measures, the contractor had held a verbal briefing section on 17th May 2010 to all sub-contractors / foremen that no works / operation using powered mechanical equipments are allowed to be carried out during restricted hours between 1900 and 0700 hours and any time on a general holiday, including Sunday. The reason for the non-compliance was anticipated to be lack of supervision of carrying out construction work on Sunday.

There was one successful prosecution and no environmental complaint, warning and summons received since commencement of the Project.

Mitigation measures had been implemented by the Contractor to minimize the environmental impacts due to construction activities. Site inspections carried out by ET showed that the Contractor rectified the problems observed and no major environmental deficiency was induced. The environmental performance of the Contractor during the construction period was considered satisfactory.

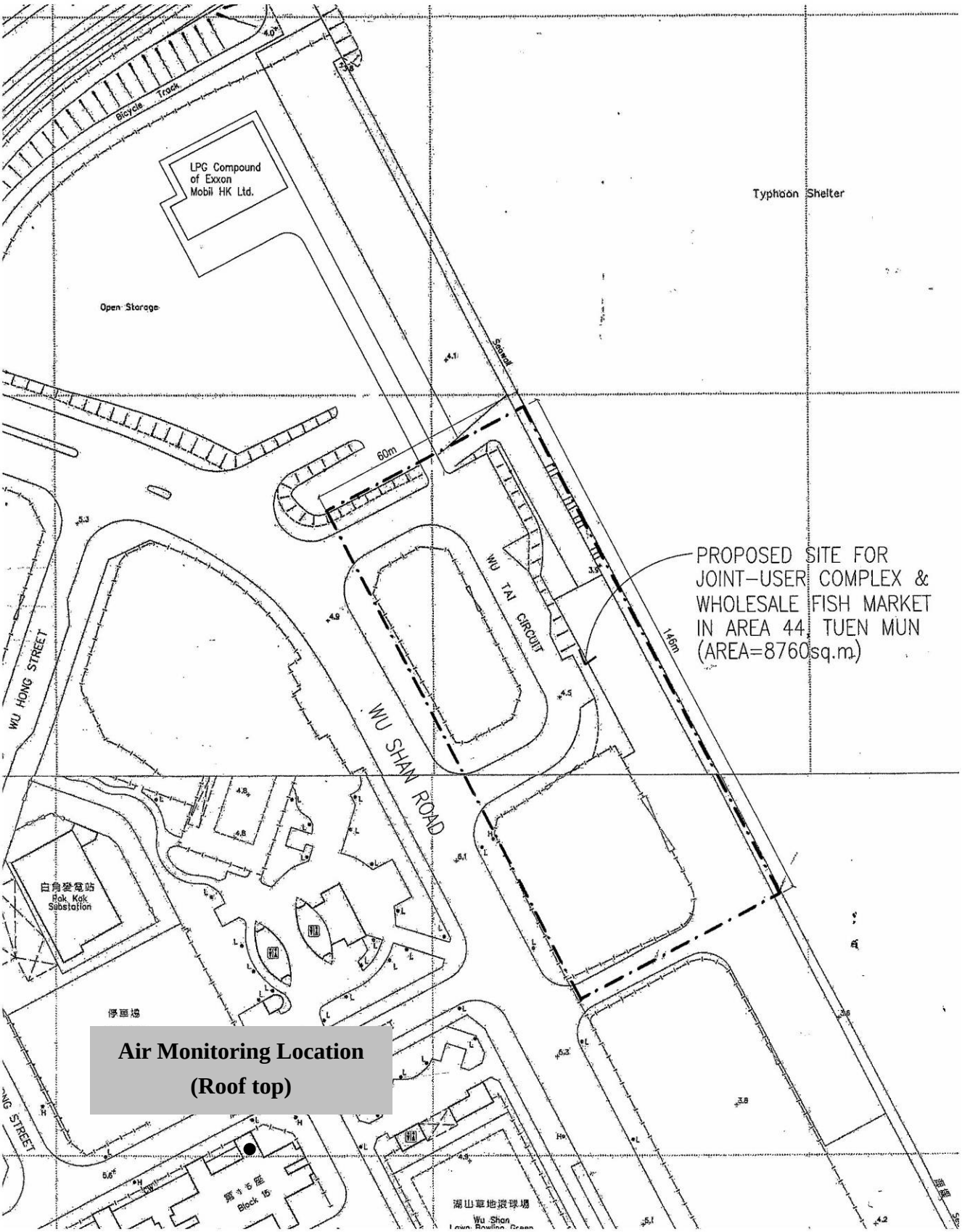
The monitoring results and statistics of non-compliance indicated that the EIA process with its recommended mitigation and EM&A programme were effective for protection of the environment and there was no unacceptable environmental impact posed by the Project.



JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44, TUEN MUN

SITE LOCATION PLAN

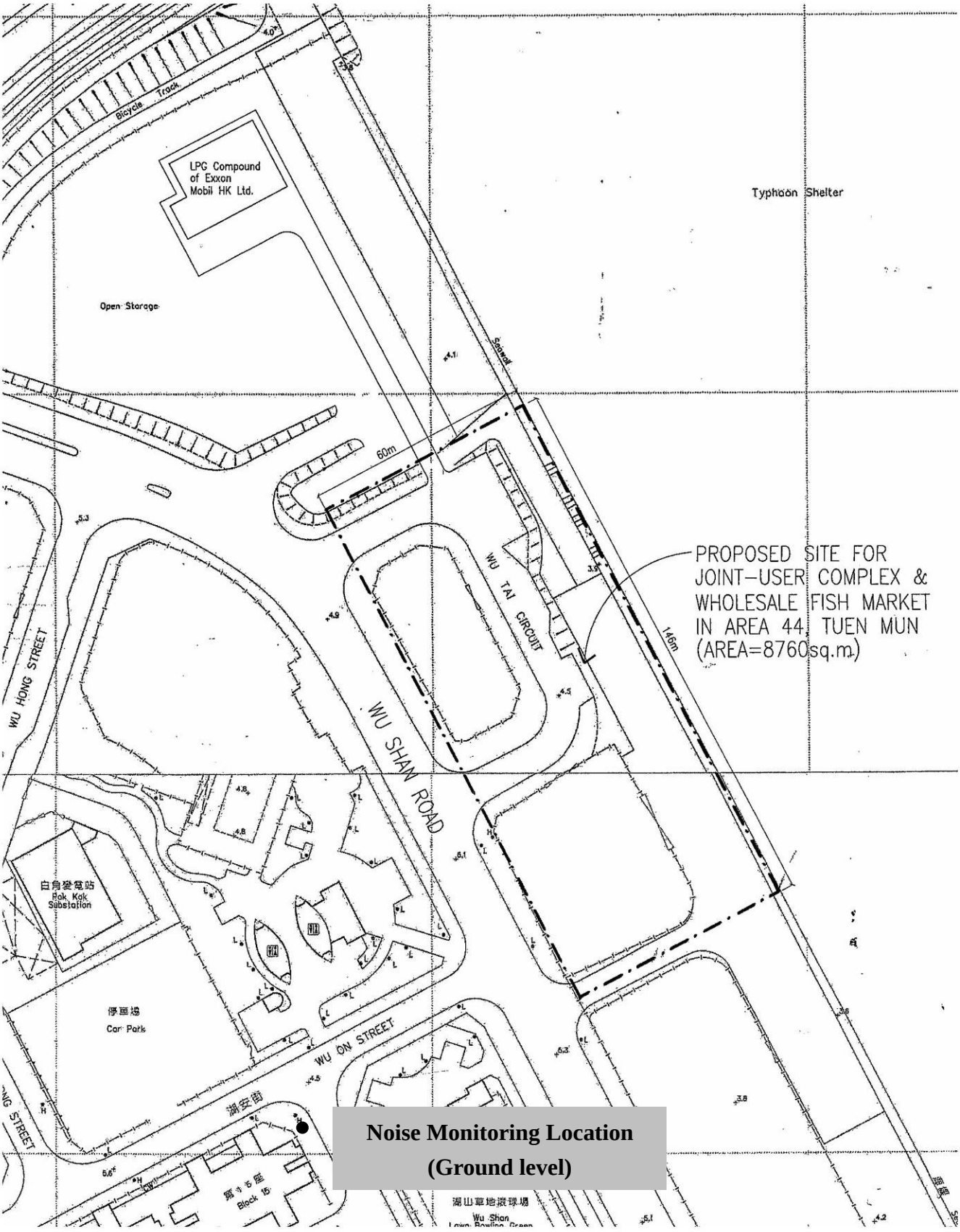
Figure No.	Rev.:
1	0
Scale	Date
NTS	12/10



JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44, TUEN MUN

LOCATION OF AIR QUALITY MONITORING STATION

Figure No.	Rev.:
2	0
Scale	Date
NTS	12/10



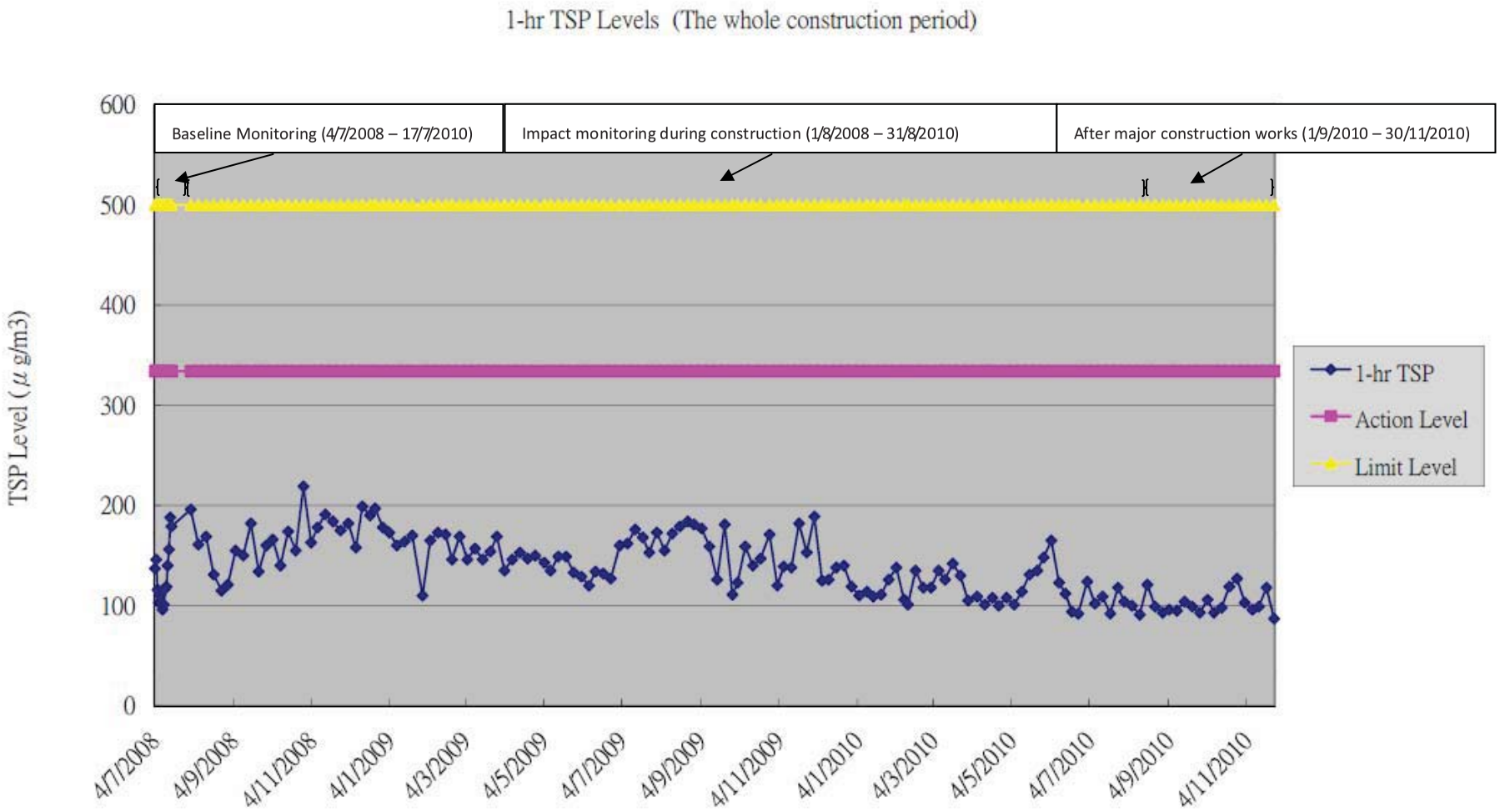
JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44, TUEN MUN

LOCATION OF NOISE MONITORING STATION

Figure No.	Rev.:
3	0
Scale	Date
NTS	12/10

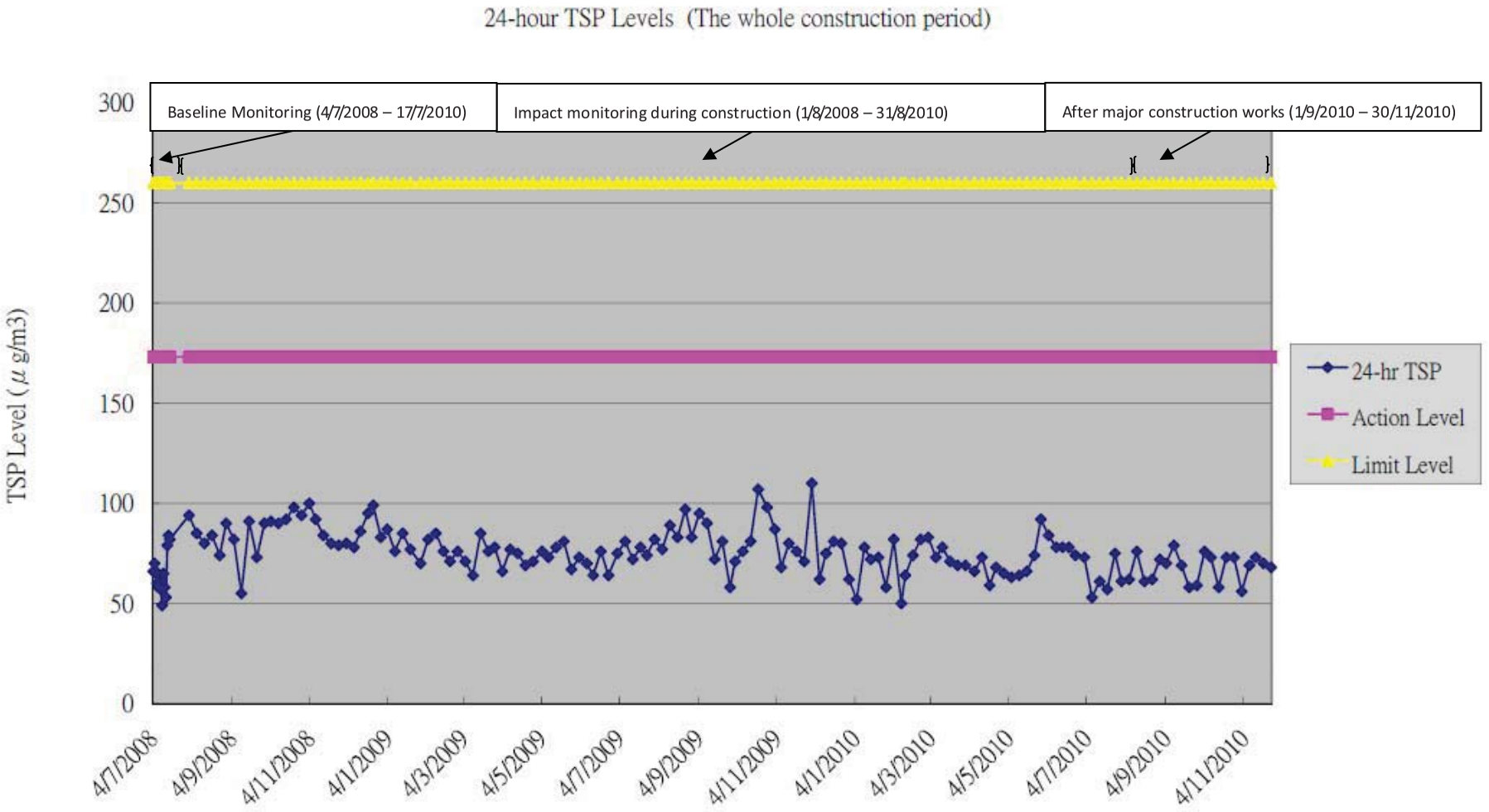
Appendix A

Graphical Plot of 1-Hour TSP Monitoring Record


1-hr TSP Levels (The whole construction period)
Baseline Monitoring (4/7/2008 – 17/7/2010)
Impact monitoring during construction (1/8/2008 – 31/8/2010)
After major construction works (1/9/2010 – 30/11/2010)
TSP Level (μg/m3)
600
500
400
300
200
100
0
4/7/2008
4/9/2008
4/11/2008
4/1/2009
4/3/2009
4/5/2009
4/7/2009
4/9/2009
4/11/2009
4/1/2010
4/3/2010
4/5/2010
4/7/2010
4/9/2010
4/11/2010
1-hr TSP
Action Level
Limit Level

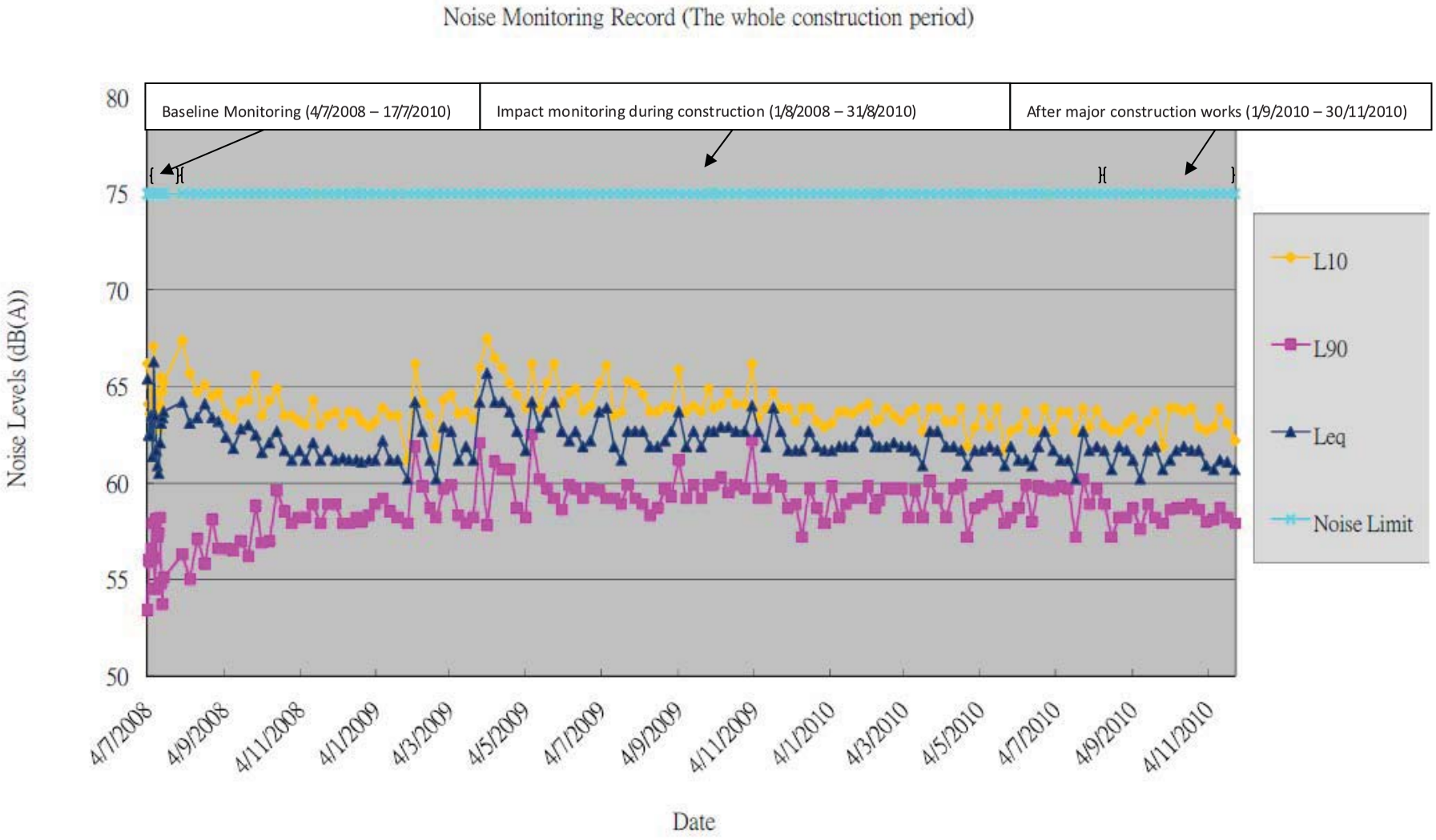
Appendix B

Graphical Plot of 24-Hour TSP Monitoring Record


24-hour TSP Levels (The whole construction period)
Baseline Monitoring (4/7/2008 – 17/7/2010)
Impact monitoring during construction (1/8/2008 – 31/8/2010)
After major construction works (1/9/2010 – 30/11/2010)
TSP Level (μ g/m3)
300
250
200
150
100
50
0
4/7/2008
4/9/2008
4/11/2008
4/1/2009
4/3/2009
4/5/2009
4/7/2009
4/9/2009
4/11/2009
4/1/2010
4/3/2010
4/5/2010
4/7/2010
4/9/2010
4/11/2010
24-hr TSP
Action Level
Limit Level

Appendix C

Graphical Plot of Noise Monitoring Record


Noise Monitoring Record (The whole construction period)
Baseline Monitoring (4/7/2008 – 17/7/2010)
Impact monitoring during construction (1/8/2008 – 31/8/2010)
After major construction works (1/9/2010 – 30/11/2010)
Noise Levels (dB(A))
80
75
70
65
60
55
50
L10
L90
Leq
Noise Limit
4/7/2008
4/9/2008
4/11/2008
4/1/2009
4/3/2009
4/5/2009
4/7/2009
4/9/2009
4/11/2009
4/1/2010
4/3/2010
4/5/2010
4/7/2010
4/9/2010
4/11/2010
Date

Appendix D

Implementation of Environmental Mitigation Measures

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Status
4.7	2.8	**Air Quality** • Hoarding of not less than 2.4m high shall be provided along the site boundary section adjoins a road, street, service land or other area accessible to the public • Spray water to where excavation to be taken place immediately prior to, during and after excavation • Any stockpile of dusty material shall be either: (a) covered entirely by impervious sheeting; (b) placed in an area sheltered on the top and the three sides; or (c) sprayed with water or a dust suppression chemical so as to maintain the entire surface wet • Cement bags or any other dusty materials collected during the work should be disposed of in totally enclosed containers • All dusty materials should be sprayed with water immediately prior to any loading, unloading or transfer operation so as to minimise the dusty materials wet • Any dusty material remaining after a stockpile of cement or other materials is removed should be wetted and removed from the surface of roads • Where a vehicle leaving the construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle • Conveyor belts shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed and fitted with belt cleaners • Skip hoist for the transport of construction wastes should be properly enclosed • Vehicle washing facilities including a high pressure water jet shall be provided at the designated vehicle exit point and every vehicle immediately before leaving the construction site shall be washed to remove any dusty materials from its body and wheels • Every main haul road, vehicle washing areas and the section of road between the washing facilities and the exit point shall be paved with concrete, bituminous materials, hardcore or metal plates and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet • Debris from the construction of the WFM shall be covered entirely by impervious sheeting or stored in a sheltered debris collection area	Implemented Implemented Implemented Implemented Implemented Implemented Implemented N/A N/A Implemented Implemented N/A

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Status
5.7	3.7	**Noise**	
		• Use quiet construction equipment	Implemented
		• Use silencers / mufflers, noise barriers / enclosure where practicable	Implemented
		• The Contractor is required to determine the number and type of construction equipment taking into account the use of quiet plant while devising a feasible work programme	Implemented
		• Only well-maintained plant shall be operated on-site and all equipment shall be routinely checked	Implemented
		• Turn off or throttle down idle plant	Implemented
		• Plants known to emit noise strongly shall be oriented away from NSRs	Implemented
		• Mobile plants shall be sited as far away from NSRs as possible	Implemented
		• Stockpiles and other structures shall be effectively utilised as practicable to screen noise from on-site construction activities	Implemented
		• Obtain valid noise permits for construction work during restricted hours	Implemented
6.7	4.1	**Water Quality**	
		• Site shall be kept clean and tidy to avoid construction materials and waste being washed off from site	Implemented
		• Works shall be planned to avoid rainy season so as to minimize the runoff and reduce the amount of soil that can be carried offsite	Implemented
		• Surface run-off from the construction site shall be directed to silt traps or sedimentation basin before reuse or discharge with help of channels, earth bunds or sand bag barriers for suspended solids removal prior to its being discharged to storm water drain. Silt trap design shall conform to the guidelines laid down in Appendix A1 of ProPECC PN 1/94	Implemented
		• Wastewater likely to be contaminated with oil or grease should be passed through an oil separator or grease trap before entering the site drainage system	Implemented
		• Hoarding gaps should be tightly sealed to avoid the seepage of wastewater to the nullah and outside the site	Implemented
		• Perimeter channels shall be provide at site boundaries, where necessary, to intercept storm-water runoff from outside the site	N/A
		• Silt traps, sedimentation basins, channels and manholes shall be regularly cleaned to remove the deposited silt and grit	Implemented
		• Temporarily exposed slope surfaces and construction material stockpiles shall be covered with tarpaulin or similar fabric to prevent erosion	Implemented
		• Wastewater generated from bored-piling shall be re-circulated after sedimentation as practicable. The final discharge of the wastewater shall be via silt removal facilities.	Implemented
		• All fuel tanks and chemical storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity	

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Status
		of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters	Implemented
		• Obtain valid discharge license for construction site discharges	Implemented
		• Chemical toilets shall be provided on site	Implemented
		• Monitor the quality of water discharge to ensure compliance of the license condition	Implemented
		• Surface drainage channels of operational areas shall be easily cleaned and connected to foul sewerage	Implemented
7.2	5.1	**Waste Management**	
		• Reuse of excavated soils for back-filling and landscaping purposes	Implemented
		• All reusable and recyclable waste materials shall be segregated and stored in different containers, skips or stockpiled	Implemented
		• Separate the inert and non-inert portions of construction material for disposal of public fill and landfill respectively	Implemented
		• Employ approved licensed waste collectors to collect the inert construction materials to be disposed of at public fill	Implemented
		• Provide a temporary storage areas for storing and stockpiling reusable and recyclable materials.	Implemented
		• Contractor should register as chemical waste producer should chemical waste is produced.	Implemented
		• Licensed waste collectors shall be employed for collecting chemical wastes for disposal.	Implemented
		• Handling and Disposal of chemical waste shall be in accordance with the Code of Practice on the Practice on the Packaging, Labelling and Storage of Chemical Wastes issued under the Waste Disposal Ordinance..	Implemented
		• Quantities of waste materials generated on site and disposal record (e.g. trip ticket) shall be kept on site for inspection	Implemented
		• A Waste Management Plan (WMP) shall be prepared to set out waste handling and disposal strategy and submitted for the architect's approval	Implemented
		• Material being temporary used for construction shall be recyclable as possible	Implemented
		• Design and provide an area within the construction site to allow on-site sorting and segregation of waste materials	Implemented
		• Training shall be provided to site staff on waste minimisation practices including waste reduction, reuse and recycling	Implemented
		• Disposal of C&D material shall be monitored by Trip-Ticket System	Implemented
		• In order to minimize the amount of waste disposal, durable and reusable containers should be used, where practicable, instead of plastic bags	Implemented

8.7	6.1	**Hazard to Life** • Cranes shall be located away from the LPG compound and its access as far as possible • Before excavation work is undertaken, the gas company should be contacted to obtain information (drawings, plans) of all gas pipes in the vicinity of the site. Suitable pipe locating devices must be used to locate underground pipes. Hand dug trial holes must then be used to confirm the position of underground pipes. Excavation must be carried out with extreme care following any advice given by the Gas Authority or Gas Company. • Sufficient guidance shall be given to all workers before carrying out excavation in the vicinity of pipelines • Manually operated warning siren shall be installed to instruct people to take timely shelter • Fire drill exercises shall be organized for the users of the WFM.	Implemented Implemented Implemented Implemented Implemented

Appendix E
Certificate of Completion

P&T Architects and Engineers Ltd

By (F: 8343 9177) & to be collected
W. Hing Construction Ltd.
14/F, Yau Lee Centre,
45 Hoi Yuen Road,
Kwun Tong, Kowloon

Attn: Mr. Andy Chan

17 September 2010

Dear Sir,

ASD CONSULTANCY AGREEMENT NO. 9A P002
JOINT-USER COMPLEX AND WHOLESALE FISH MARKET IN AREA 44, TUEN MUN
Certificate of Completion
Our Ref: 3959/4/539/kc

In accordance with Clause 53 of the General Conditions of Contract, I hereby certify that, in my opinion, the Works were substantially completed on 19 August 2010. The Maintenance Period commenced on 20 August 2010 and will expire on 19 August 2011.

Yours faithfully,

Janette Chan
for P&T Architects and Engineers Ltd

cc:	ArchSD- Mr. S.W. Chow	F: 2523 9622
	ER (COW) - Mr. H. P. Chan	F: 2461 1209
	PCOW - Mr. Y. C. Tang	F: 8343 9188
	JRP - Mr. Victor Cheung	F: 2565 7795
	PTSE - Mr. Patrick Lam	
	ACLA - Mr. Alan Liang	F: 2832 2110
	HAB - Ms. Winnie Peng	F: 2834 0376

JC/JLC/AAC/SNG/VLAW/kc

33/F, 633 King's Road, North Point, Hong Kong Tel: 852-25756575 Fax: 852-28913834 E-mail: ptaehk@p-t-group.com

Architectural : Directors - N.Burns R.Riva K.Lui S.Vithespongse B.Kwan C.Che J.Chan M.Lui H.Yip J.Lee W.Yuen J.Abbott A.Chan B.Ip C.S.J.Chan L.C.Li C.Pang E.Chow S.Franzlen J.Smalley J.Wong J.Ng Z.Chan
Structural Engineering : Directors - D.Tsang J.Lau M.Chew P.Lam

HONG KONG : P&T ARCHITECTS AND ENGINEERS LTD / P&T GROUP INTERNATIONAL LTD TEL: 852-2575 6575 FAX: 852-2891 3834
P&T (M&E) LTD TEL: 852-2836 0662 FAX: 852-2836 0132
SINGAPORE : P&T CONSULTANTS PTE LTD TEL: 65-6535 2011 FAX: 65-6535 1283
VIETNAM : P&T CONSULTANTS PTE LTD, HANOI REPRESENTATIVE OFFICE TEL: 844-2221 0374 FAX: 844-2221 0375
P&T CONSULTANTS (VIETNAM) CO. LTD TEL: 848-3910 3097 FAX: 848-3910 3057
BEIJING : PALMER & TURNER CONSULTANTS (SHANGHAI) LTD BEIJING BRANCH TEL: 8610-85879851 FAX: 8610-85879812
DALIAN : PALMER & TURNER CONSULTANTS (SHANGHAI) LTD DALIAN BRANCH TEL: 86411-39668833 FAX: 86411-39668998
DUBAI : P&T ARCHITECTS AND ENGINEERS LTD (DUBAI BRANCH) TEL: 971-4-3635430 FAX: 971-4-3635429
AJMAN : P&T ARCHITECTS AND ENGINEERS LTD (AJMAN BRANCH) TEL: 971-4-3635430 FAX: 971-4-3635429
BANGKOK : PALMER & TURNER (THAILAND) LTD TEL: 66-2-6519180 (10 LINES) FAX: 66-2-6519170
SHANGHAI : PALMER & TURNER CONSULTANTS (SHANGHAI) LTD TEL: 8621-62372808 FAX: 8621-62372220
WUHAN : PALMER & TURNER CONSULTANTS (SHANGHAI) LTD WUHAN BRANCH TEL: 8627-59523030 FAX: 8627-59523003
MACAU : P&T ARCHITECTS & ENGINEERS LTD MACAU BRANCH TEL: 853-28550341 FAX: 853-28314214
ABU DHABI : P&T ARCHITECTS & ENGINEERS LTD (ABU DHABI BRANCH) TEL: 971-2-6787773 FAX: 971-2-6787782
RAS AL KHAIMAH : P&T ARCHITECTS & ENGINEERS LTD (RAS AL KHAIMAH BRANCH) TEL: 971-4-3635430 FAX: 971-4-3635429

OTHER OFFICE / ASSOCIATIONS : MALAYSIA, INDONESIA, AUSTRALIA

Website : www.p-t-group.com