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

**ENVIRONMENTAL MONITORING &  
AUDIT REPORT (MARCH 2010)**

Prepared By:

**ALLIED ENVIRONMENTAL CONSULTANTS LTD.**

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## EXECUTIVE SUMMARY

Allied Environmental Consultants Limited (AEC) has been appointed to conduct an environmental monitoring and audit (EM&A) program for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun. The construction works were commenced on 31<sup>st</sup> July 2008. This report is the twentieth monthly EM&A report, which detailed the environmental monitoring and audit results recorded during the period from 1<sup>st</sup> March 2010 to 31<sup>st</sup> March 2010.

Impact environmental monitoring for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun has been carried out on 2<sup>nd</sup>, 8<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup>, 25<sup>th</sup> and 31<sup>st</sup> March 2010 at Block 15, Yuet Wu Villa. 1-hr TSP and noise monitoring were conducted within the period of 0700-1900 hours, where 24-hr TSP monitoring was conducted continuously for a 24-hour period.

1-hour TSP monitoring results at the monitoring location ranged from 104 $\mu\text{g}/\text{m}^3$  to 147 $\mu\text{g}/\text{m}^3$  with an average of 126 $\mu\text{g}/\text{m}^3$ . 24-hour TSP monitoring results ranged from 69 $\mu\text{g}/\text{m}^3$  to 83 $\mu\text{g}/\text{m}^3$  with an average of 74 $\mu\text{g}/\text{m}^3$ .

Noise monitoring results at the monitoring location ranged from 60.9dB(A) to 62.7dB(A) with an average of 62.0dB(A).

Based on the monitoring results, the air quality and construction noise level complied with the environmental requirements in EM&A Manual. There were no breaches of the action and limit levels. There were no environmental complaints received in the reporting month. No notification of summons or prosecution was received.

Construction activities will be undertaken in April 2010 include internal & external finishing works, installation of metal roof, installation of architectural feature, 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, construction of hollow on-grade slab at G/F, timber & metal door frame installation, window & louvre installation, C&J installation works, lift installation, drainage pipe connection along Wu Shan Road, last manhole connection and dismantling of hoarding.. Potential environmental impacts include dust generation from stockpiles of dusty materials, concrete works and the internal finishes; noise from operation of the equipments, runoff from concrete works, drainage works and the storage of various C&D and chemical wastes. The Contractor should properly implement the required environmental mitigation measures as per the implementation schedule in the EM&A manual to ensure no significant adverse environmental impacts to be arisen from the construction works. The Contractor was reminded to maintain good housekeeping throughout the construction phase.

## 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, Home Affairs 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, a dragon boat racing spectator stand, and other community facilities for public use. The proposed development is a 3-storey complex to accommodate a wholesale fish market, a public toilet, a refuse collection point and a marine refuse collection point at the ground floor, a community hall on the first floor, and a dragon boat race spectator stand with 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

## 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, 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. CONSTRUCTION WORKS & PROGRAMME

The major works undertaken and/or completed during the monitoring period are listed below:

- 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; and
- Lift installation

Table 2 shows the interrelationship between construction activities and environmental mitigation measures for the reporting month.

*Table 2 Interrelationship between Construction Activities and Mitigation Measures*

Construction Works	Major Environmental Impact	Mitigation Measures
Superstructure	Air, noise and water quality impacts	Well-maintained plants were used, frequent watering for dust mitigation and waste water were reused when practicable
Concrete works	Air, noise and water quality impacts	Well-maintained plants were used and waste water were reused when practicable, cement bags were properly covered and use indoors as practicable
E&M services	Water quality impacts	Waste water were reused when practicable
Internal & external finishes	Noise impacts	Closely monitoring of noise impacts

#### 4. 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-hr TSP monitoring. For 1-hr 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.  $L_{eq(30\text{ min})}$  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-hr TSP value of  $129\mu\text{g}/\text{m}^3$  and 24-hr TSP value of  $65\mu\text{g}/\text{m}^3$  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 ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
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) <sup>1</sup> School 70dB(A) <sup>1</sup> (65dB(A) during examinations) <sup>1</sup>
1900-2300 on any day and 0700-2300 on Sunday and general holidays, for use of PME <sup>2</sup>	When one documented compliant is received	65dB(A) <sup>3</sup>
All days during the night-time (2300-0700 hours) <sup>2</sup>	When one documented compliant is received	50dB(A) <sup>3</sup>

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 in accordance with the proposed Event Action Plan given in the 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*

<b>Level</b>	<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b>
Action	<ul style="list-style-type: none"> <li>● Identify source</li> <li>● Check monitoring data and working methods</li> </ul>	<ul style="list-style-type: none"> <li>● Contact project manager to discuss and implement remedial action</li> <li>● Rectify any unacceptable practice</li> <li>● Amend working methods if appropriate</li> <li>● If exceedance continues, commence additional monitoring</li> </ul>	<ul style="list-style-type: none"> <li>● Notify client/project manager following correct of the situation</li> <li>● Cease additional monitoring if exceedance stops</li> </ul>
Limit	<ul style="list-style-type: none"> <li>● Identify source</li> <li>● Notify client/project manager</li> <li>● Check monitoring data and working methods</li> <li>● Repeat measurement to confirm finding</li> <li>● Commence additional monitoring</li> </ul>	<ul style="list-style-type: none"> <li>● Take immediate action to avoid further exceedance</li> <li>● Submit proposal for remedial actions to client/project manager within 3 working days</li> <li>● Implement the agreed proposal</li> <li>● If exceedance continues, amend and resubmit the proposal</li> </ul>	<ul style="list-style-type: none"> <li>● Notify client/project manager following correction of the situation</li> <li>● Cease additional monitoring if exceedance stops</li> </ul>

## 5. MONITORING METHODOLOGY

### 5.1 Monitoring Programme

Air quality monitoring and noise monitoring were conducted at Block 15, Yuet Wu Villa on 2<sup>nd</sup>, 8<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup>, 25<sup>th</sup> and 31<sup>st</sup> March 2010. The air quality monitoring and noise monitoring for April 2010 will be scheduled on 7<sup>th</sup>, 13<sup>th</sup>, 19<sup>th</sup>, 24<sup>th</sup> and 30<sup>th</sup> April 2010. Appendix A displayed the detail schedule of the monitoring programme. 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 Figures 2 and 3. Figures 4 and 5 show photos taken during monitoring at the two locations.

A construction site for the proposed Junior Police Officers' Married Quarters is located at Wu Hong Street which is 110m away from the monitoring location, which can be a major source of the noise and TSP generation during the monitoring period. The construction works of proposed Junior Police Officers' Married Quarters were completed in March 2010. Figure 6 shows the photo of the construction site.

### 5.2 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. The Calibration Record of the High-Volume TSP Sampler is given in Appendix B. 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)

### 5.3 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 and the Calibration Certificate for the sound level meter and calibrator is given in Appendix C.

*Table 6 Noise Monitoring Equipment*

<b>Manufacturer</b>	<b>Type/Model No.</b>	<b>Equipment</b>
RION	Model NL 31	Precision Sound Level Analyser with windshield
RION	Model NC 73	Calibrator

Noise level measurements were recorded in terms of thirty minutes A-weighted equivalent continuous sound pressure level ( $L_{eq(30min)}$ ) on a daily 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.

## 6. RESULTS

### 6.1. Air Quality

1-hour and 24-hour TSP monitoring results are summarized in Tables 7 and 8 and serve as the basis for determining the action and limit levels. The minimum and maximum 1-hour TSP measured at Yuet Wu Villa was 104 $\mu\text{g}/\text{m}^3$  and 147 $\mu\text{g}/\text{m}^3$  respectively with an average of 126 $\mu\text{g}/\text{m}^3$ . The minimum and maximum 24-hour TSP measured was 69 $\mu\text{g}/\text{m}^3$  and 83 $\mu\text{g}/\text{m}^3$  respectively with an average of 74 $\mu\text{g}/\text{m}^3$ . Summary of air quality monitoring record is provided in Appendices D and E.

*Table 7 1-Hour TSP Monitoring Results*

Date	1-hr TSP ( $\mu\text{g}/\text{m}^3$ )				Average ( $\mu\text{g}/\text{m}^3$ )
	Reading 1	Reading 2	Reading 3	Average	
2 <sup>nd</sup> March 2010	126	113	115	118	126
8 <sup>th</sup> March 2010	136	136	132	135	
13 <sup>th</sup> March 2010	116	125	137	126	
19 <sup>th</sup> March 2010	147	133	146	142	
25 <sup>th</sup> March 2010	130	137	122	130	
31 <sup>st</sup> March 2010	105	106	104	105	

*Table 8 24-Hour TSP Monitoring Results*

Date	24-hr TSP ( $\mu\text{g}/\text{m}^3$ )
2 <sup>nd</sup> March 2010	83
8 <sup>th</sup> March 2010	73
13 <sup>th</sup> March 2010	78
19 <sup>th</sup> March 2010	71
25 <sup>th</sup> March 2010	69
31 <sup>st</sup> March 2010	69
Average	74

## 6.2. Noise

Noise monitoring results in terms of  $L_{eq(30min)}$ ,  $L_{10(30min)}$   $L_{90(30min)}$  measured at the designated noise monitoring location are summarized in Table 9.  $L_{10(30min)}$  and  $L_{90(30min)}$  represent sound levels that are exceeded 10% and 90% of the time respectively. Normally,  $L_{10(30min)}$  measurements can be considered as the average peak levels, whilst  $L_{90(30min)}$  levels can be considered as the average background noise levels.

During the reporting month, the minimum and maximum noise level measured at Yuet Wu Villa was 60.9dB(A)  $L_{eq(30min)}$  and 62.7dB(A)  $L_{eq(30min)}$  respectively with an average of 62.0dB(A)  $L_{eq(30min)}$ . No exceedance was recorded in this reporting period. Summary of noise monitoring record will be provided in Appendix F.

*Table 9 Noise Monitoring Results*

Date	$L_{10(30mins)}$ (dB(A))	$L_{90(30mins)}$ (dB(A))	$L_{eq(30mins)}$ (dB(A))
2 <sup>nd</sup> March 2010	63.2	59.7	61.9
8 <sup>th</sup> March 2010	63.7	58.2	61.9
13 <sup>th</sup> March 2010	63.9	59.6	61.7
19 <sup>th</sup> March 2010	62.7	58.2	60.9
25 <sup>th</sup> March 2010	63.9	60.1	62.7
31 <sup>st</sup> March 2010	63.9	59.2	62.7
<b>Average</b>	<b>63.6</b>	<b>59.2</b>	<b>62.0</b>

## 6.3. 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 10 summarizes the wind data during the monitoring dates. Wind record from HKO is shown in Appendix G.

*Table 10 Summary of Weather Conditions during the Monitoring Period*

Date	Weather	Prevailing Wind direction	Daily Average Wind speed (m/s)
2 <sup>nd</sup> March 2010	Cloudy	SE	2.16
8 <sup>th</sup> March 2010	Cloudy	N	1.72
13 <sup>th</sup> March 2010	Cloudy	N	0.30
19 <sup>th</sup> March 2010	Sunny	SE	1.46
25 <sup>th</sup> March 2010	Cloudy	N	3.89
31 <sup>st</sup> March 2010	Cloudy	SE	2.82

## 7. SITE INSPECTION & AUDIT

4 site inspections were conducted by the Environmental Team (ET) in this reporting period. Major observations by the ET, actions by the Contractor and outcome are summarized in the Table 11.

*Table 11 Summary of Site Inspections*

<b>Date</b>	<b>Observations</b>	<b>Action taken by Contractor</b>	<b>Outcome</b>
5 <sup>th</sup> March 2010	No observations during inspection.	Contractor was required to keep up with the mitigation measures.	
12 <sup>th</sup> March 2010	Haul road appeared dry.	Contractor was requested to increase the frequency of watering.	Sufficient water spraying was given to dry haul road.
19 <sup>th</sup> March 2010	No observations during inspection.	Contractor was required to keep up with the mitigation measures.	
26 <sup>th</sup> March 2010	No observations during inspection.	Contractor was required to keep up with the mitigation measures.	

During site inspections in the reporting month, no non-conformance of implementation of environmental mitigation measures was identified. All environmental mitigation measures for construction stages stated in approved EIA Report, EM&A Manual and Environmental Permit shall be carried out throughout the whole construction period as shown in Appendix H.

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

In this reporting period, no complaint, inspection notice, notification of summons or prosecution was received. No non-compliance was recorded.

## 9. OTHERS

A total of 2062.4 tonnes of inert C&D material was disposed of at public fill. A total of 338.1 tonnes of waste including general refuse and non-inert C&D wastes such as timber and bamboo were disposed to landfill. No chemical waste was transported off site in this reporting period.

## **10. CONCLUSIONS**

Environmental monitoring has been carried out for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun. 1-hour and 24-hour TSP air quality monitoring and noise monitoring was conducted at Block 15, Yuet Wu Villa during the period from 1<sup>st</sup> March 2010 to 31<sup>st</sup> March 2010.

The average 1-hour TSP level is  $126\mu\text{g}/\text{m}^3$  and average 24-hour TSP level is  $74\mu\text{g}/\text{m}^3$ . For impact noise monitoring, the average  $L_{\text{eq}(30\text{min})}$  is 62.0dB(A). All monitoring results complied with the relevant action and limit levels.