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

**ENVIRONMENTAL MONITORING &
AUDIT REPORT
(DECEMBER 2008)**

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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 31st July 2008. This report is the fifth monthly EM&A report, which detailed the environmental monitoring and audit results recorded during the period from 1st December 2008 to 31th December 2008.

Impact environmental monitoring for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun has been carried out on 2nd, 8th, 13th, 19th, 23th and 29th December 2008 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 146 $\mu\text{g}/\text{m}^3$ to 201 $\mu\text{g}/\text{m}^3$ with an average of 184 $\mu\text{g}/\text{m}^3$. 24-hour TSP monitoring results ranged from 78 $\mu\text{g}/\text{m}^3$ to 99 $\mu\text{g}/\text{m}^3$ with an average of 87 $\mu\text{g}/\text{m}^3$.

Noise monitoring results at the monitoring location ranged from 61.1dB(A) to 61.3dB(A) with an average of 61.2dB(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.

Constructions activities will be undertaken in January 2009 include jack piling and drainage diversion. Potential environmental impacts include dust generation from stockpiles of dusty materials and the drainage diversion work; noise from operation of the equipments and jack piling, runoff from drainage diversion 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 7140	2314 2866
Environmental Permit Holder	Architecture Services Department	Mr. S.W. Chow Ms. Susana Chan	2867 3716 2867 6706	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. Tim Wong	9630 7404 6478 4623	8343-9188
Environmental Team Leader	Allied Environmental Consultants Ltd.	Ms. Grace Kwok	2815 7028	2815 5399
Independent Environmental Checker	Cinotech Consultants Ltd.	Mr. Alex Ngai	2151 2083	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:

- Jack piling works
- Drainage diversion works

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
Jack piling	Noise impact	Well-maintained plants were used
Drainage diversion	Air quality, and water quality impacts	Water spraying, avoided rainy days

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. 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-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) 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 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*

Level	Step 1	Step 2	Step 3
Action	<ul style="list-style-type: none"> Identify source Check monitoring data and working methods 	<ul style="list-style-type: none"> Contact project manager to discuss and implement remedial action Rectify any unacceptable practice Amend working methods if appropriate If exceedance continues, commence additional monitoring 	<ul style="list-style-type: none"> Notify client/project manager following correct of the situation Cease additional monitoring if exceedance stops
Limit	<ul style="list-style-type: none"> Identify source Notify client/project manager Check monitoring data and working methods Repeat measurement to confirm finding Commence additional monitoring 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Notify client/project manager following correction of the situation Cease additional monitoring if exceedance stops

5. MONITORING METHODOLOGY

5.1 Monitoring Programme

Air quality monitoring and noise monitoring were conducted at Block 15, Yuet Wu Villa on 2nd, 8th, 13th, 19th, 23th and 29th December 2008. 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 at the junction of Wu Sau Street and Wu On Street as given in Figure 2 and 3. Figure 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. Figure 6 shows the photos 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 A. 24-hour TSP samples were taken every six days. 1-hour TSP samples were taken three times a day between 0700-1900 hours.

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 B.

Table 6 Noise Monitoring Equipment

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

Noise levels 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 Table 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 $146\mu\text{g}/\text{m}^3$ and $201\mu\text{g}/\text{m}^3$ respectively with an average of $184\mu\text{g}/\text{m}^3$. The minimum and maximum 24-hour TSP measured was $78\mu\text{g}/\text{m}^3$ and $99\mu\text{g}/\text{m}^3$ respectively with an average of $87\mu\text{g}/\text{m}^3$. Summary of air quality monitoring record is provided in Appendix C and D.

Table 7 *1-Hour TSP Monitoring Results*

Day	Date	1-hr TSP ($\mu\text{g}/\text{m}^3$)				Average ($\mu\text{g}/\text{m}^3$)
		Reading 1	Reading 2	Reading 3	Average	
1	2 Dec 2008	171	184	190	182	184
2	8 Dec 2008	164	146	164	158	
3	13 Dec 2008	199	197	200	199	
4	19 Dec 2008	175	193	201	190	
5	23 Dec 2008	201	196	194	197	
6	29 Dec 2008	177	177	180	178	

Table 8 *24-Hour TSP Monitoring Results*

Day	Date	24-hr TSP ($\mu\text{g}/\text{m}^3$)
1	2 Dec 2008	80
2	8 Dec 2008	78
3	13 Dec 2008	86
4	19 Dec 2008	95
5	23 Dec 2008	99
6	29 Dec 2008	83
	Average	87

6.2. Noise

Noise monitoring results in terms of $L_{\text{eq}(30\text{min})}$, $L_{10(30\text{min})}$ $L_{90(30\text{min})}$ measured at the designated noise monitoring location are summarized in Table 9. 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.

During the reporting month, the minimum and maximum noise level measured at Yuet Wu Villa was 61.1dB(A) $L_{\text{eq}(30\text{min})}$ and 61.3dB(A) $L_{\text{eq}(30\text{min})}$ respectively with an average of 61.2dB(A) $L_{\text{eq}(30\text{min})}$. No exceedance was recorded in this reporting period. Summary of noise monitoring record will be provided in Appendix E.

Table 9 *Noise Monitoring Results*

Day	Date	L_{10(30mins)} (dB(A))	L_{90(30mins)} (dB(A))	L_{eq(30mins)} (dB(A))
1	2 Dec 2008	63.7	58.9	61.2
2	8 Dec 2008	63	57.9	61.3
3	13 Dec 2008	63.7	57.9	61.2
4	19 Dec 2008	63.6	58.2	61.2
5	23 Dec 2008	63.2	58	61.1
6	29 Dec 2008	62.9	58.3	61.2
	Average	63.4	58.2	61.2

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 F.

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

Date	Weather	Prevailing Wind direction	Daily Average Wind speed (m/s)
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

7. SITE INSPECTION & AUDIT

4 site inspections on 4, 12, 19 and 23 December 2008 were conducted by the Environmental Team (ET) in this reported period. There were no major observations raised by the ET.

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 G.

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

266.69 m³ of inert C&D waste was disposed at public fill. 3.76 tonnes of waste was 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 1st December 2008 to 31st December 2008.

The average 1-hour TSP level is 184µg/m³ and average 24-hour TSP level is 87µg/m³. For impact noise monitoring, the 30-minute average noise level is 61.2dB(A).