

ATAL-Degrémont-China State Joint Venture

Contract No. DC/2008/03
Design, Build and Operate Pillar
Point Sewage Treatment Works:
*Final Environmental Monitoring and
Audit Review Report for Construction
Phase*

April 2016

Environmental Resources Management

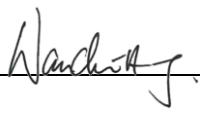

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Contract No. DC/2008/03
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Point Sewage Treatment Works:
*Final Environmental Monitoring and
Audit Review Report for Construction
Phase*

April 2016

Reference 0119806

For and on behalf of ERM-Hong Kong, Limited	
Approved by:	Frank Wan
Signed:	
Position:	Partner
Certified by:	
	(Environmental Team Leader - Mandy To)
Date:	21 April 2016

Your Ref:
Our Ref: 60017423/C/oylw16042601

By Hand & By Fax (2833 9162)

Drainage Services Department
Sewage Services Branch
Harbour Area Treatment Scheme Division
5/F., Western Magistracy,
2A Pok Fu Lam Road,
Hong Kong.

Attn: Ms. Carol Ho (T: 2159 3405)

26 April 2016

Dear Sir,

**Contract No. DC/2008/03
Design, Build and Operate
Pillar Point Sewage Treatment Works**

Final EM&A Review Report for Construction Phase

Reference is made to Environmental Team (ET)'s draft of the Final EM&A Review Report for Construction Phase provided by email dated 18 February, 8, 13 and 21 April 2016. We have no further comment.

We hereby verify the said Final EM&A Review Report as having complied with the requirement as set out in the Final EM&A Manual.

Should you have any queries, please feel free to contact the undersigned at 3922 9393.

Yours faithfully,

For and on behalf of
AECOM Asia Co. Ltd.



Y T Tang
Independent Environmental Checker

c.c. AECOM – Mr. C Y Hung (Fax No. 2404 2744)
ERM – Ms. Mandy To (Fax No. 2723 5660)
ATAL–Degremont–China State JV – Mr. Raymond Chan (Fax No. 2811 3321)

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EXECUTIVE SUMMARY

The construction phase of *DC/2008/03 of Design, Build and Operate Pillar Point Sewage Treatment Works* (the Project) commenced on 13 November 2010 and completed on January 2016. Major construction works and minor defects were completed in June 2015 and November 2015, respectively. A letter notifying the completion of main works and proposing the suspension of the environmental site inspection and dust monitoring, and supplemental letter proposing the suspension of monthly onsite landscape audit was sent to IEC on 3 and 18 July 2015, respectively. A letter stating no objection on the proposed suspension was verified by IEC and sent to DSD on 31 July 2015. The as-built drawing on landscape and visual mitigation measures with explanatory statement was certified and verified by ETL and IEC on 25 November and 2 December 2015, respectively, and was submitted to EPD on 7 January 2016 for deposit.

The Contractor proposed to terminate the construction phase Environmental Monitoring & Audit (EM&A) programme which was certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC) on 8 and 22 December 2015, respectively. The proposal of termination of construction phase EM&A programme was sent to EPD and approved on 28 January and 23 February 2016, respectively.

This is the *Final Environmental Monitoring and Audit (EM&A) Review Report* which presents the EM&A results of the construction phase of the Project and a review of the results of the EM&A against the prediction of the EIA Report or statutory requirements.

Key construction works undertaken for the Project include:

- Demolition of Existing Preliminary Treatment Works (PTW);
- Construction and E&M equipment installation at Administration Building, Sludge Dewatering Building, PTW, Chemically Enhanced Primary Treatment (CEPT), UV Building, Septic Waste Reception Station, Reuse Water Pump Room, Chemical Building, Sludge Skip Storage Building, Payment Flow Meter Chamber, Weighbridge, Deodourisation Units A and B, Electrical Building Nos. 1, 3 and 4;
- Drainage works and cable laying at the Project site;
- Refurbishment works at Existing Solid Handling Building, Existing Outfall Pumping Station and Existing Terminal Manhole; and
- Planting at the Project site.

Summary of EM&A Programme

EM&A activities undertaken during the construction phase of the Project include:

- 24-hour TSP Monitoring at each monitoring station (AM1 and AM2) – once every six days
- 1-hour TSP Monitoring at each monitoring station (AM1 and AM2) - 3 times for every six days
- Environmental Site Inspection – once per week
- Landscape & Visual Monitoring – once per month

Air Quality Monitoring

1-hour and 24-hour TSP measurements were carried out at the designated monitoring stations (AM1 and AM2) during the construction phase of the Project. No exceedance was recorded over the construction phase of the Project.

Construction Waste Management

Inert C&D materials (public fill) and non-inert C&D wastes (construction waste) were generated during the construction phase of the Project. The construction waste and public fill were disposed of at the WENT Landfill and Tuen Mun Area 38 Fill Bank, respectively. Recommended mitigation measures in the EIA Report were implemented by the Contractor and were considered effective in minimising the total quantity of wastes generated during the construction phase.

Regular Site Inspection

Regular site inspections including weekly site inspections and monthly landscape and visual monitoring site inspections were carried out by the ET over the construction phase. These inspections ensured that mitigation measures recommended in the EIA Report, the EM&A Manual and the requirements in the EP were properly implemented by the Contractor. The findings of site inspections showed that there were no non-conformance issues recorded and outstanding environmental issues for the construction phase of the Project, and the recommended mitigation measures had been implemented properly.

Environmental Exceedance/Non-conformance/Compliant/Summons and Prosecution

No exceedance of the Action and Limit Levels for 1-hour and 24-hour TSP was recorded during the construction phase of the Project.

No non-compliance event was recorded during the construction phase of the Project.

No environmental complaint and summons/prosecution was received throughout the construction phase of the Project.

The environmental monitoring results for the construction phase have been reviewed and compared with the findings of the EIA Report. The EIA Report concluded that the Project would not cause unacceptable environmental impacts, and the environmental monitoring results of the construction phase demonstrated no unacceptance impact. Mitigation measures recommended in the EP, EIA Report and EM&A Manual were implemented by the Contractor as far as practicable and were considered effective.

The construction phase had been completed on January 2016, which was certified by the Environmental Team Leader and verified by the Independent Environmental Checker on 8 and 22 December 2015, respectively. The proposal of termination of construction phase EM&A programme was sent to EPD and approved on 28 January and 23 February 2016, respectively. It is proposed to terminate the construction phase Environmental Monitoring & Audit (EM&A) programme.

ERM-Hong Kong, Limited (ERM) has been appointed by ATAL - Degrémont - China State Joint Venture (ADC-JV) (the Contractor) as the Environmental Team (ET) to undertake Environmental Monitoring and Audit (EM&A) programme for the construction phase of the Contract No. *DC/2008/03 of Design, Build and Operate Pillar Point Sewage Treatment Works* (the Project).

1.1 PROJECT BACKGROUND

The existing Pillar Point Sewage Treatment Works (PPSTW) is located to the north of the Tuen Mun River Trade Terminal and is abutting the Lung Mun Road to its north. The open area adjacent to the existing PPSTW has been designated for the upgrading works of the PPSTW. The location and layout of the Project is illustrated in *Annex A*.

The existing PPSTW is a preliminary treatment works (PTW) with screening and grit removal processes and the treated effluent will be discharged to the sea (North Western Water Control Zone) via a twin submarine outfall. The *Review of the Tuen Mun and Tsing Yi Sewerage Master Plan* (RTMTYSMP) commissioned in February 1999, recommended to expand the sewage treatment capacity and to upgrade the plant to chemically enhanced primary treatment (CEPT) with disinfection in order to cater for the projected ultimate population and planned developments in the Tuen Mun area, and to improve the effluent quality and hence to reduce the pollution loadings to the receiving waters.

The upgrading works of the PPSTW comprises the following items:

- expanding the treatment capacity of the existing PPSTW to cope with the increased peak wet-weather sewage flow in Tuen Mun area;
- upgrading the sewage treatment level of the existing PPSTW to incorporate chemical treatment with disinfection at minimum removal rates of 70%, 55% and 99.9% of suspended solids (SS), biochemical oxygen demand (BOD) and *E. coli*, respectively;
- upgrading existing septic waste reception facilities at PPSTW; and
- providing and upgrading ancillary facilities including the administration building, workshop, laboratory, odour control facilities, sludge handling and dewatering facilities, access roads and minor landscaping works within the Project site for the operation and maintenance of the upgraded PPSTW.

The potential environmental impacts of the Project have been studied in the *“Upgrading of Pillar Point Sewage Treatment Works”* (EIAO Register No: AEIAR-

145/2008). The EIA was approved on 10 June 2008 under the *Environmental Impact Assessment Ordinance* (EIAO) and an Environmental Permit (EP-321/2008) for the Project was granted on 17 November 2008. Variations of the Environmental Permit (EP-321/2008/A and EP-321/2008/B) were granted on 23 April 2013 and 30 May 2014, respectively. Under the requirements of Condition 3.1 of EP-321/2008/B, an EM&A programme as set out in the EM&A Manual shall be implemented.

The construction phase commenced on 13 November 2010 and completed in January 2016.

1.2 PROJECT ORGANISATION

The Project organisation chart and contact details are shown in *Annex B*.

1.3 CONSTRUCTION ACTIVITIES OF THE PROJECT

Major construction activities that have been carried out include:

- Demolition of existing PTW;
- Construction and E&M equipment installation at Administration Building, Sludge Dewatering Building, PTW, CEPT, UV Building, Septic Waste Reception Station, Reuse Water Pump Room, Chemical Building, Sludge Skip Storage Building, Payment Flow Meter Chamber, Weighbridge, Deodourisation Units A and B, and Electrical Building Nos. 1, 3 and 4;
- Drainage works and cable laying at the Project site;
- Refurbishment works at Existing Solid Handling Building, Existing Outfall Pumping Station and Existing Terminal Manhole; and
- Planting at the Project site.

Major construction works and minor defects were completed in June 2015 and November 2015, respectively. A letter notifying the completion of main works and proposing the suspension of the environmental site inspection and dust monitoring, and supplemental letter proposing the suspension of monthly onsite landscape audit was sent to IEC on 3 and 18 July 2015, respectively. A letter stating no objection on the proposed suspension was verified by IEC and sent to DSD on 31 July 2015.

The proposal of termination of construction phase EM&A programme was certified by the ETL and verified by the IEC on 8 and 22 December 2015, respectively. The proposal was sent to EPD and approved on 28 January and 23 February 2016, respectively.

1.4

PURPOSE OF THE REPORT

This is the *Final EM&A Review Report* which summarises and reviews the impact monitoring results and audit findings of the EM&A programme over the construction phase of the Project.

2.1 AIR QUALITY MONITORING

2.1.1 Monitoring Locations

In accordance with the EM&A Manual, monitoring of ambient 24-hour and 1-hour Total Suspended Particles (TSP) was conducted at the monitoring stations listed in *Table 2.1*. Locations and photos of the air monitoring stations are presented in *Annex C*.

Table 2.1 Construction Phase Air Monitoring Stations

Monitoring ID	Air Quality Monitoring Station
AM1	Tuen Mun EMSD Servicing Vehicle Station
AM2	River Trade Terminal Office

2.1.2 Monitoring Parameter and Frequency

The construction phase air quality monitoring was conducted at the designated monitoring stations in accordance with the requirements stipulated in the EM&A Manual. 1-hour and 24-hour TSP levels were monitored at the frequency and duration stated in *Table 2.2*.

Table 2.2 Construction Phase Air Quality Monitoring Parameters and Frequency

Parameter	Frequency
24-hour TSP	Once every 6 days
1-hour TSP	3 times every 6 days

2.1.3 Action and Limit Levels

The Action and Limit levels have been established and presented in *Table 2.3*.

Table 2.3 Action and Limit Levels for Air Quality

Parameter	Air Monitoring Station	Action Level, $\mu\text{g m}^{-3}$	Limit Level, $\mu\text{g m}^{-3}$
24-hour TSP	AM1	183	260
	AM2	192	260
1-hour TSP	AM1	343	500
	AM2	383	500

2.1.4 Event and Action Plan

The Event/Action Plan (EAP) for air quality monitoring is presented in *Annex D*.

2.2 LANDSCAPE AND VISUAL MONITORING

In accordance with the EM&A Manual, monthly landscape and visual monitoring is required to ensure that the design, implementation and

maintenance of landscape and visual mitigation measures recommended in the approved EIA Report are fully achieved. The monitoring procedures and criteria as described in the EM&A Manual were adopted.

2.3 *ENVIRONMENTAL SITE INSPECTION*

In accordance with the EM&A Manual, weekly site inspection is required to ensure that the mitigation measures in the approved EIA Report, the EM&A Manual and the requirements in the EP are properly implemented by the Contractor.

IMPLEMENTATION STATUS ON ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contractor has implemented the environmental mitigation measures and requirements as stated in the EP, EIA Report and EM&A Manual. During the environmental site inspections, the implementation of the mitigation measures were inspected and reviewed. It is concluded that the environmental mitigation measures as recommended in the EIA Report were implemented satisfactorily. The implementation status of the measures during the construction phase is summarised in *Annex E*.

4.1 AIR QUALITY

The monitoring data for the 24-hour and 1-hour TSP levels at the monitoring stations AM1 and AM2 for the construction phase of the Project are presented in *Annex F*. No exceedance of action or limit level was recorded during the entire construction phase. The weather conditions during the air quality monitoring for the construction phase of the Project varied from sunny to rainy. Local influence near the monitoring stations was mainly associated with vehicular emissions from the road traffic along Lung Mun Road.

The monitoring results for the 24-hour and 1-hour TSP levels are compared to the Action and Limit Levels (see *Table 4.1*). In addition, a comparison between the baseline monitoring results and impact monitoring results was presented in *Table 4.2*.

Table 4.1 *Review of Air Quality Monitoring Results*

Monitoring Station	24-hour/1-hour	Action/ Limit Level, $\mu\text{g m}^{-3}$	Measured TSP Levels, $\mu\text{g m}^{-3}$ (a)
			Average (Range)
AM1	24-hour	183/260	74 (50 - 119)
	1-hour	343/500	122 (64 - 244)
AM2	24-hour	192/260	79 (47 - 133)
	1-hour	383/500	132 (63 - 303)

Note:
(a) The average and range of data were calculated from the period between the commencement and completion of the construction works for the Project.

Table 4.2 *Comparison of the Baseline Monitoring Results and Impact Monitoring Results*

Monitoring Station	24-hour/1-hour	Baseline TSP Monitoring Results, $\mu\text{g m}^{-3}$	Measured TSP Monitoring Results, $\mu\text{g m}^{-3}$ (a)
		Average (Range)	Average (Range)
AM1	24-hour	81 (68 - 91)	74 (50 - 119)
	1-hour	142 (82 - 209)	122 (64 - 244)
AM2	24-hour	96 (78 - 107)	79 (47 - 133)
	1-hour	205 (114 - 271)	132 (63 - 303)

Note:
(a) The average and range of data were calculated from the period between the commencement and completion of the construction works for the Project.

The comparison in *Table 4.1* shows that the 24-hour and 1-hour TSP levels recorded since the commencement of the construction works were well below the Action and Limit Levels. Moreover, the comparison in *Table 4.2* shows that the dust impact from the construction works towards the surrounding is minimal and also is similar to or less than the baseline monitoring results. Recommended mitigation measures in *Section 3.7.1.1* of EIA Report were implemented throughout the construction period and were considered sufficient and effective.

Wastes generated from this Project include inert construction and demolition (C&D) materials (public fill) and non-inert C&D materials (construction waste). Construction waste comprises general refuse, metals and paper/cardboard packaging materials. Metals generated from the Project are also grouped into construction waste as the materials were not disposed of with others at public fill. Reference has been made to the Monthly Summary Waste Flow Table prepared by the Contractor (*Annex G*). With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated during the construction phase of the Project are summarised in *Table 4.3*. The public fill and construction waste generated from the Project were disposed of at the Tuen Mun Area 38 Fill Bank and WENT Landfill, respectively.

Table 4.3 *Quantities of Waste Generated from the Project*

Reporting Period	Quantity		
	Total Inert C&D Materials Generated ^(a)	Non-inert C&D Materials Generated ^(b)	Chemical Waste
November 2010 - January 2016	245,390 tonnes	2,308 tonnes	810 Litres

Notes:

(a) Inert C&D materials (public fill) include bricks, concrete, building debris, rubble and excavated soil. The inert C&D materials were reused in this Contract and other projects, and other disposed of at the Tuen Mun Area 38 Fill Bank. The detail of waste flow is presented in *Annex G*.

(b) Non-inert materials (eg. general refuse) other than metals, paper/cardboard packaging, plastics and chemicals were disposed of at WENT Landfill by subcontractors.

During the variation of an Environmental Permit (VEP-398/2013), the estimate amount of C&D Material was revised taken into consideration of the updates in the excavation depths and the excavation methods. The estimated amount of waste generated from the Project predicted in the VEP and the actual cumulative quantities of waste generated from the construction phase of the Project are presented in *Table 4.4*. Mitigation measures recommended in *Sections 7.5.1.1 to 7.5.1.9* of the EIA Report were implemented by the Contractor as far as practicable and were considered effective in reducing the total quantity of wastes generated during the construction period.

Table 4.4 Comparison of Estimated and Actual Amounts of Waste Generated

Type of Material	Estimated Amount of Public Fill and Construction Waste in the EIA (inert & non-inert)	Estimated Amount of Public Fill and Construction Waste in the C&D Material Assessment (VEP-398/2013)	Accumulated Actual Amount of Public Fill and Construction Waste Recorded (inert & non-inert) ^{(a) (b)}
Total Amount of C&D Materials Arisings	61,489.00 m ³	116,400 m ³	136,328 m ³
Amount of inert C&D Materials Reused on other sites	-	-	3,164 m ³
Amount of inert C&D Materials Reused on site	14,926.00 m ³	20,150 m ³	24,359 m ³
Amount of inert C&D Materials Sent to Fill Banks	46,563.00 m ³	96,250 m ³	108,805 m ³
General Refuse disposed of at WENT Landfill	Small	-	2,308 tonnes
Chemical Waste	Small	-	810 Litres

Notes:
 (a) The actual amount of C&D Materials has been recorded since the commencement of construction works.
 (b) The density of soil and rock (bulked) is 1.8 tonnes/m³.

4.3 LANDSCAPE AND VISUAL MONITORING

Monthly landscape and visual monitoring site inspections were conducted by ET over the construction period. Review on landscape and visual mitigation measures was performed by Registered Landscape Architect (RLA) to ensure that the design, implementation and maintenance of landscape and visual mitigation measures recommended in the EIA Report were fully achieved. The monitoring was commenced since November 2010. The monitoring procedures and criteria as described in the EM&A Manual were adopted.

69 nos. of trees were transplanted from Project Site to nursery (close to Tuen Mun West Fresh Service Reservoir) before construction phase. Site inspections were also conducted to ensure that maintenance of tree nursery had been carried out as required by EP. 13 nos. of trees were fell during the construction period and had been compensated in accordance with the Condition 2.9 of the EP (EP-321/2008/B). No non-compliance was identified during construction period.

Major construction works and minor defects were completed in June 2015 and November 2015, respectively. All transplanted and compensatory trees were planted on-site in accordance with the Condition 2.9 of the EP-321/2008/B. Final landscape and visual audit was carried out and the as-built drawing on landscape and visual mitigation measures with explanatory statement was certified and verified by the ETL and IEC on 25 November and 2 December

2015, respectively, , and was submitted to EPD on 7 January 2016 for deposit. .

4.4 ENVIRONMENTAL SITE INSPECTION

Weekly site inspections were carried out by ET over the construction period. These inspections ensured that mitigation measures in the EIA Report, the EM&A Manual and the requirements in the EP were properly implemented by the Contractor. Findings in weekly site inspections revealed that there were no outstanding environmental issues for the construction phase of the Project. No follow-up actions by the Contractor are required.

4.5 CONCLUSION OF REVIEW

The environmental monitoring results for the construction phase have been reviewed and compared with the findings of the EIA Report. The EIA Report concluded that the Project would not cause unacceptable environmental impacts, and the environmental monitoring results of the construction phase demonstrated no unacceptance impact. Mitigation measures recommended in the EP, EIA Report and EM&A Manual were implemented by the Contractor as far as practicable and were considered effective.

5 *ENVIRONMENTAL NON-CONFORMANCE*

5.1 *SUMMARY OF MONITORING EXCEEDANCE*

No exceedances of Action and Limit Levels of 1-hr and 24-hr TSP were recorded during the construction phase of the Project.

5.2 *SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE*

No non-compliance event was recorded during the construction phase of the Project.

5.3 *SUMMARY OF ENVIRONMENTAL COMPLAINT*

No complaint was received during the construction phase of the Project.

5.4 *SUMMARY OF ENVIRONMENTAL SUMMON AND PROSECUTION*

No summonses or prosecution on environmental matters were received during the construction phase of the Project.

The *Final Environmental Monitoring and Audit (EM&A) Review Report* summarised the findings of the EM&A programme of the construction phase of the Project and reviewed the results of the EM&A programme against the prediction of the EIA Report or statutory requirements according to the requirements of the EM&A Manual and the EP (EP-321/2008, EP-321/2008/A and EP-321/2008/B).

Environmental monitoring including air quality monitoring, and landscape and visual monitoring was conducted during the construction phase of the Project in accordance with the requirements of the EM&A Manual and of the EP. The monitoring programmes were considered effective in reflecting the environmental conditions at the designated representative sensitive receivers. The monitoring results showed in general comparable to the predictions or findings in the EIA Report and also indicate that the construction of the Project did not cause unacceptable impacts on the environment with the implementation of the mitigation measures recommended in the EIA Report.

Inert C&D materials (public fill) and non-inert C&D wastes (construction waste) were generated during the construction phase of the Project. Mitigation measures recommended in the EIA Report were implemented by the Contractor as far as practicable and were considered effective in reducing the total quantities of wastes generated from the construction works.

Regular weekly site inspections and monthly landscape and visual site inspections were conducted by ET to monitor the implementation status of environmental mitigation measures over the construction phase of Project. The site inspections found that the mitigation measures recommended in the EIA Report were implemented and there were no outstanding environmental issues upon completion of the construction phase of the Project.

No exceedance of Action and Limit Levels of 24-hour TSP and 1-hour TSP was recorded at the monitoring stations during the construction phase of the Project.

No complaint, summons or prosecution was received during the construction phase of the Project.

Annex A

Location of Project

PROPOSED FACILITIES AND BUILDINGS

SECTION 1 INLET PUMPING STATION AND PRELIMINARY TREATMENT WORKS

- ① INLET CHAMBER
- ② COARSE SCREENS AND INLET PUMPING STATION
- ③ FINE SCREEN CHANNELS
- ④ GRIT CHAMBERS
- ⑤ INLET FLOWMETER CHAMBER
- ⑥ PTW MCC ROOM

- ⑦ BLOWER ROOM
- ⑧ SCREENING SKIP HOUSE
- ⑨ ODOR DUCT SUPPORTING BRIDGE
- ⑩ SEPTIC WASTE RECEPTION STATION
- ⑪ WEIGHBRIDGE
- ⑫ ELECTRICAL BUILDING 1

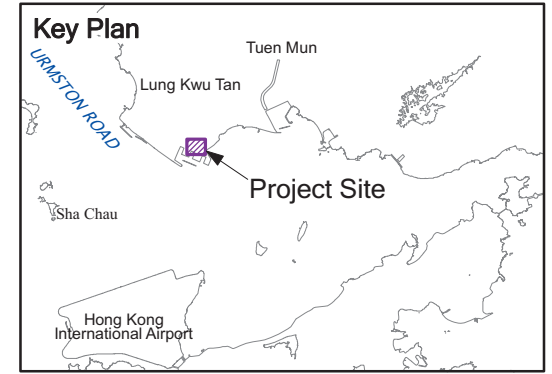
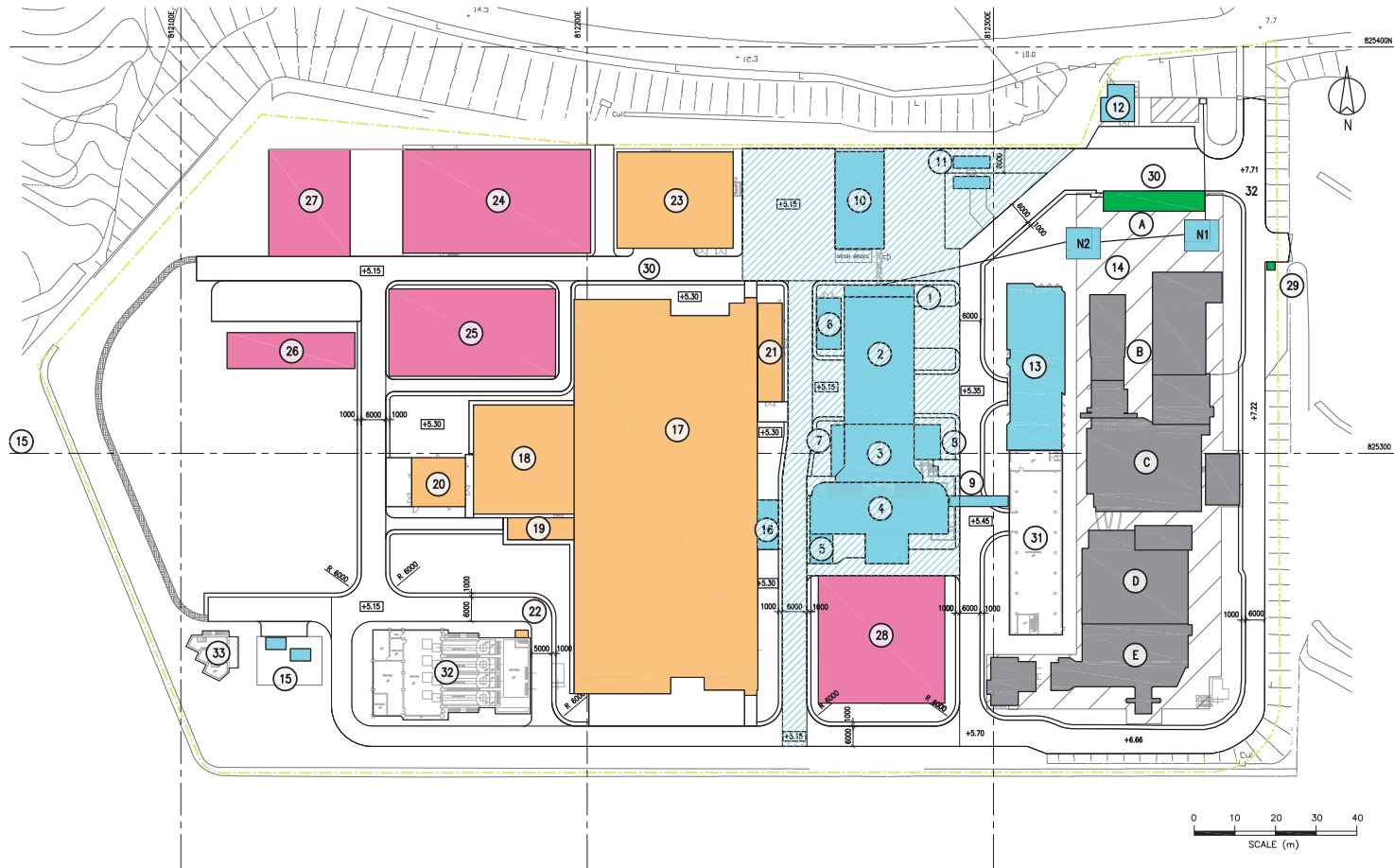
- ⑬ ADMINISTRATION BUILDING
- ⑭ INLET CHAMBERS
- ⑮ PAYMENT FLOWMETER CHAMBER
- ⑯ CEPT INLET CHAMBER

SECTION 2 CEPT TANKS UV DISINFECTION

- ⑰ CEPT TANKS
- ⑱ UV DISINFECTION CHANNELS
- ⑲ REUSE WATER PUMP ROOM
- ⑳ ELECTRICAL BUILDING 3
- ㉑ ELECTRICAL BUILDING 2
- ㉒ OUTFALL PUMPING STATION CONNECTION CHAMBER
- ㉓ CHEMICAL BUILDING

SECTION 3 SLUDGE TREATMENT & HANDLING AND ODOUR CONTROL

- ㉔ SLUDGE DEMATERING BUILDING
- ㉕ DEODORISATION UNITS (B)
- ㉖ SLUDGE SKIP STORAGE BUILDING
- ㉗ SLUDGE SKIP LOADING AREA
- ㉘ DEODORISATION UNITS (A)



SECTION 4 EXISTING BUILDINGS TO BE DEMOLISHED

- Ⓐ ADMINISTRATION BUILDING
- Ⓑ INLET SCREW PUMPING STATION AND MOTOR HOUSE
- Ⓒ COARSE SCREENS
- Ⓓ BLOWER HOUSE AND GRIT CHANNELS
- Ⓔ FINE SCREEN CHANNELS AND FLOWMETER CHAMBER

SECTION 5 EXTERNAL WORKS

- ⑳ GATE HOUSE
- ㉑ CAR PARK

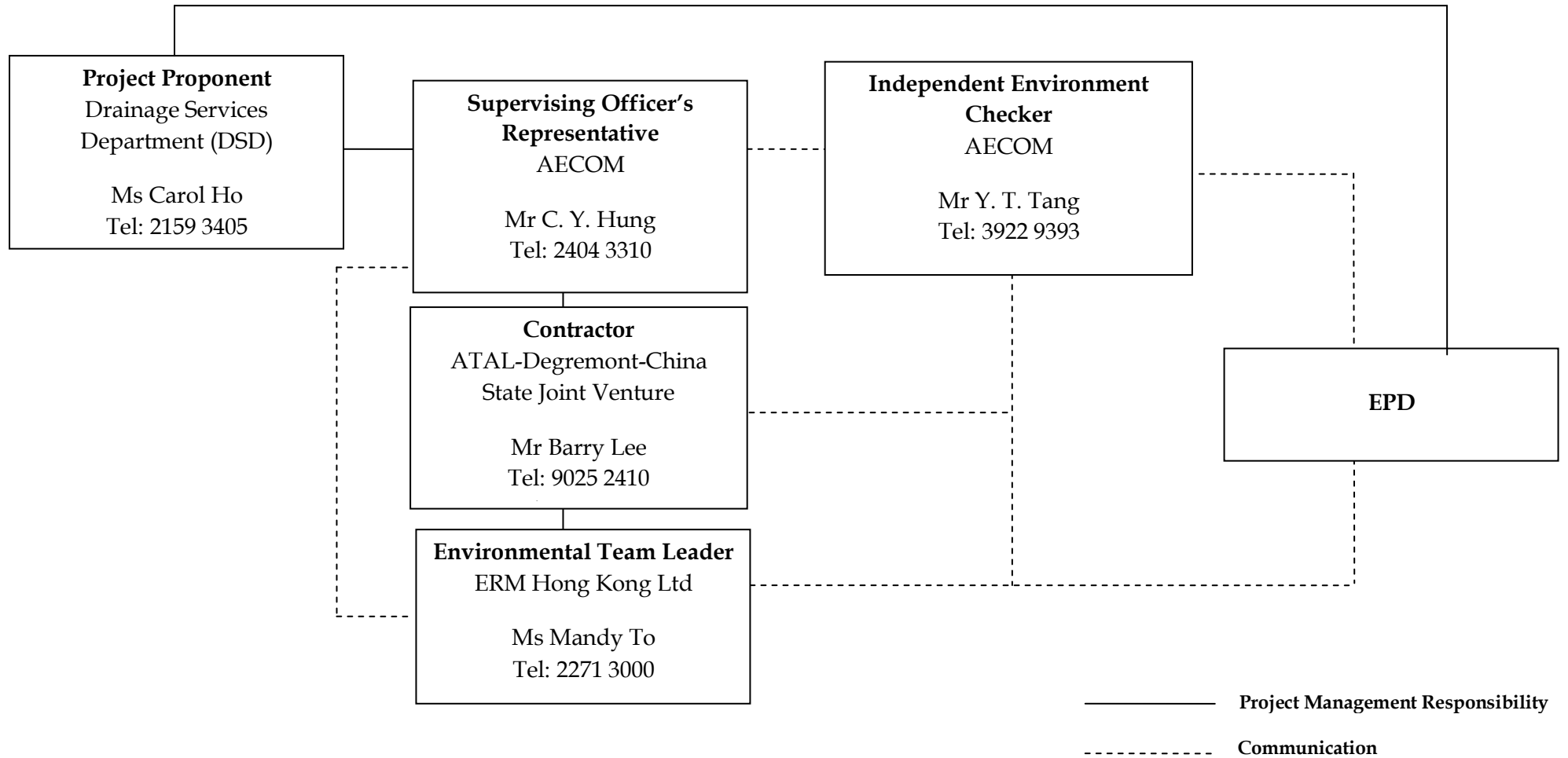
EXISTING BUILDING TO BE RETAINED

- ㉒ EXISTING SOLID HANDLING BUILDING
- ㉓ EXISTING OUTFALL PUMPING STATION
- ㉔ EXISTING TERMINAL MANHOLE

Annex B

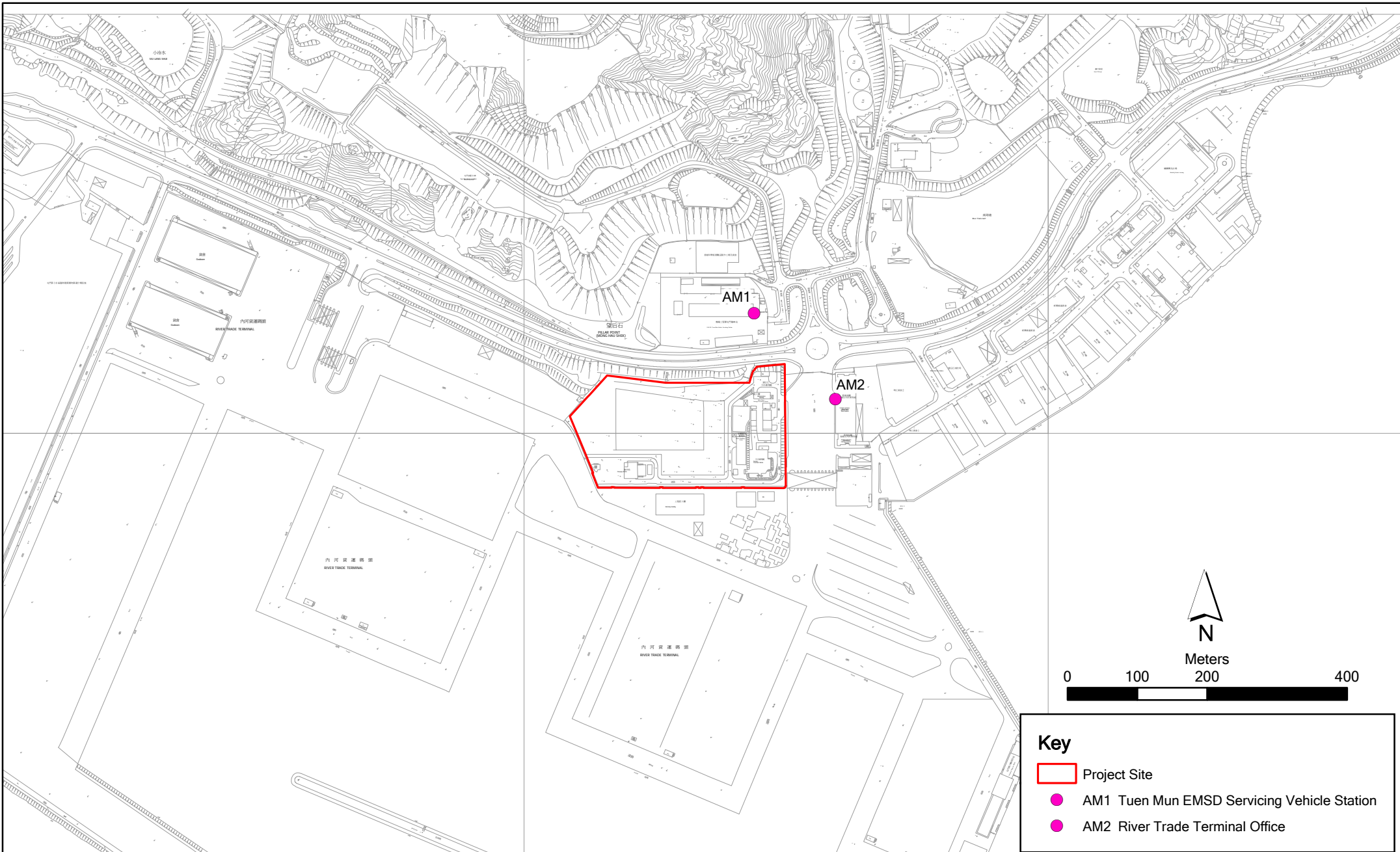
Project Organisation Chart with Contact Details

Project Organisation During Construction Phase (with contact details)



Annex C

Locations of Air Quality Monitoring Stations



Key

- Project Site
- AM1 Tuen Mun EMSD Servicing Vehicle Station
- AM2 River Trade Terminal Office

Annex C

Contract No. DC/2008/03 Design, Build and Operate of Pillar Point Sewage Treatment Works

File: 0119806_Site Boundary.mxd
Date: 15/12/2010

**Environmental
Resources
Management**





AM1 - Tuen Mun EMSD Servicing Vehicle Station



AM2 - River Trade Terminal Office

Annex D

Event and Action Plan

Table D1 *Event Action Plan for Air Quality Monitoring*

Action Level/Limit Level	Environmental Team Leader (ETL)	Independent Environmental Checker (IEC)	Supervising Officer Representative (SOR)	Contractor
<i>Action Level</i>				
Exceedance for one sample	<ul style="list-style-type: none"> Identify source, investigate the causes of complaint and propose remedial measures; Inform IEC and SOR; Repeat measurement to confirm findings; Increase monitoring frequency to daily. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method. 	<ul style="list-style-type: none"> Notify Contractor and DSD. 	<ul style="list-style-type: none"> Rectify any unacceptable practice; Amend working methods if appropriate.
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> Identify source; Inform IEC and SOR; Advise the SOR on the effectiveness of the proposed remedial measures; Repeat measurements to confirm findings; Increase monitoring frequency to daily; Discuss with IEC and Contractor on remedial actions required; If exceedance continues, arrange meeting with IEC and SOR; If exceedance stops, cease additional monitoring. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ET on the effectiveness of the proposed remedial measures; Supervise Implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor and DSD; Ensure remedial measures properly implemented. 	<ul style="list-style-type: none"> Submit proposals for remedial actions to IEC within three working days of notification; Implement the agreed proposals; Amend proposal if appropriate.

Action Level/Limit Level	Environmental Team Leader (ETL)	Independent Environmental Checker (IEC)	Supervising Officer Representative (SOR)	Contractor
<i>Limit Level</i>				
Exceedance for one sample	<ul style="list-style-type: none"> Identify source, investigate the causes of exceedance and propose remedial measures; Inform IEC, SOR, DSD and EPD; Repeat measurement to confirm finding; Increase monitoring frequency to daily; Assess effectiveness of Contractor's remedial actions and keep IEC, EPD, DSD and SOR informed of the results. 	<ul style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the SOR on the effectiveness of the proposed remedial measures; Supervise implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor; Ensure remedial measures properly implemented. 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IEC within three working days of notification; Implement the agreed proposals; Amend proposal if appropriate.
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> Notify IEC, SOR, DSD and EPD; Identify source; Repeat measurement to confirm findings; Increase monitoring frequency to daily; Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; Arrange meeting with IEC and SOR to discuss the remedial actions to be taken; Assess effectiveness of Contractor's remedial actions and keep IEC, EPD, DSD and SOR informed of the results; If exceedance stops, cease additional monitoring. 	<ul style="list-style-type: none"> Discuss amongst SOR, ET, and Contractor on the potential remedial actions; Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly; Supervise the implementation of remedial measures. 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Notify Contractor; In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; Ensure remedial measures properly implemented; 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. 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IEC within three working days of notification; Implement the agreed proposals; Resubmit proposals if problem still not under control; Stop the relevant portion of works as determined by the SOR until the exceedance is abated.

Annex E

Implementation Schedule of Mitigation Measures

Annex E **Summary of Mitigation Measures Implementation Schedule**

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
<i>Summary of Environmental Mitigation Measures in the EIA and EM&A Manual</i>			
<i>Construction Phase</i>			
Air Quality	Dust mitigation measures stipulated in <i>the Air Pollution Control (Construction Dust) Regulation</i> shall be incorporated to control Post emission. Notice shall be given to authority prior to commencing of work.	Work sites / during construction period	√ Notice of works commencement was submitted to EPD on 3 August 2010.
Water Quality	The practices outlined in ProPECC PN 1/94 Construction Site Drainage should be adopted. It is recommended to install perimeter channels in the works areas to intercept runoff as site boundary prior to the commencement of any earthwork. To prevent storm runoff from washing across exposed soil surfaces, intercepting channels should be provided. Drainage channels are also required to convey site runoff to sand/silt traps and oil interceptors. Provision of regular cleaning and maintenance can ensure the normal operation of these facilities throughout the construction period. Any practical options for the diversion and re-alignment of drainage should comply with both engineering and environmental requirements in order to ensure adequate hydraulic capacity of all drains.	Work site/During the construction period	√
Water Quality	There is a need to apply to EPD for a discharge license under the WPCO for discharging effluent from the construction site. The discharge quality is required to meet the requirements specified in the discharge license. All the runoff and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. Reuse and recycling of the treated effluent can minimize water consumption and reduce the effluent discharge volume. The beneficial uses of the treated effluent may include dust suppression, wheel washing and general cleaning. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the WPCO license which is under the ambit of regional office (RO) of EPD.	Work site/During the construction period	√ Discharge licence was awarded by EPD on 7 December 2010.
Water Quality	The construction programme should be properly planned to minimise soil excavation, if any, in rainy seasons. This prevents soil erosion from exposed soil surfaces. Any exposed soil surfaces should also be properly	Work site/During the construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	protected to minimize dust emission. In areas where a large amount of exposed soil exists, earth bunds or sand bags should be provided. Exposed stockpiles should be covered with tarpaulin or impervious sheets at all times. The stockpiles of materials should be placed at locations away from any stream course so as to avoid releasing materials into the water bodies. Final surfaces of earthworks should be compacted and protected by permanent work. It is suggested that haul roads should be paved with concrete and the temporary access roads protected using crushed stone or gravel, wherever practicable. Wheel washing facilities should be provided at all site exists to ensure that earth, mud and debris would not be carried out of the works areas by vehicles.		
Water Quality	Good sites practices should be adopted to clean the rubbish and litter on the construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.	Work site/During the construction period	√
Water Quality	The presence of construction workers generates sewage. It is recommended to provide sufficient chemical toilets in the works areas. The toilet facilities should be more than 30m from any watercourse. A licensed water collector should be deployed to clean the chemical toilets on a regular basis. The construction workers can also make use of the existing toilet facilities within the PPSTW as necessary.	Work site/During the construction period	√
Water Quality	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the project. Regular environmental audit on the construction phase of the project. Regular environmental audit on the construction site can provide an effective control of any malpractices and can achieve continual improvement of environmental performance on site.	Work site/During the construction period	√
Waste Management	Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	Work site/During the construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
Waste Management	Any service shop and maintenance facilities should be located on hard standings within a bunded area, and stumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	Work site/ During the construction period	√
Waste Management	<p>Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with the chemical wastes. General requirements are given as follows:</p> <ul style="list-style-type: none"> • Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. • Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area. 	Work site/ During the construction period	√
Waste Management	<p><i>Good Site Practices</i> Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> • Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site • Training of site personnel in proper waste management and chemical handling procedures • Provision of sufficient waste disposal points and regular collection of waste • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. 	Work site/ During the construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	<ul style="list-style-type: none"> Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Facility. 		
Waste Management	<p><i>Waste Reduction Measures</i></p> <p>Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force Proper storage and site practices to minimise the potential for damage or contamination of construction materials. Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste. 	Work site/ During planning & design stage, and construction stage	√
Waste Management	<p><i>General Refuse</i></p> <p>General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.</p>	Work site / During the construction period	√
Waste Management	<p><i>Construction and Demolition Material</i></p> <p>In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material generated from site formation works for the proposed new facilities and units at the STW should be reused on-site as far as practicable. The surplus excavated material should be disposed of at the</p>	Work site / During design stage & construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	designated public fill reception facility, as agreed with the Secretary of the Public Fill Committee, for other beneficial uses.		
Waste Management	<p>Mitigation measures and good site practices should be followed to control potential environmental impact from handling and transportation of C&D material. The mitigation measures include:</p> <ul style="list-style-type: none"> • Where it is unavoidable to have transient stockpiles of C&D material pending collection for disposal, the transient stockpiles shall be located away from waterfront or storm drains as far as possible. • Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric. • Skip hoist for material transport should be totally enclosed by impervious sheeting. • Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site • The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores. • The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle. • All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. • The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading. 	Work site / During design stage & construction period	√
Waste Management	When disposing C&D material at a public filling facility, it shall be noted that the material shall only consist of earth, building debris and broken rock and concrete. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor. In order to monitor the disposal of the surplus C&D material at the designed public fill reception facility and to control fly tipping, a trip-ticket system should be included as one of the	Work site/ During design stage & construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work with reference to the ETWB TCW No. 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Materials" as attached in Appendix 7-1. An Independent Environmental Checker should be responsible for auditing the results of the system.		
Waste Management	<p><i>Chemical Waste</i></p> <p>If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Work site / During the construction period	√
Landscape & Visual	<p><u>Temporary Tree Nurseries</u></p> <p>Temporary tree nurseries may be set up for the transplanted tree and proposed trees at an early stage to allow small trees to grow during the construction periods. By the time when planting area becomes available, trees mature and increase in trunk & spread size. They will require minimal pruning and suffer much less damage during transplanting when comparing the travel distance from an on-site nursery to an off-site nursery.</p> <p>Besides, these trees may also be positioned as visual mitigation during the construction period.</p>	Work site/ During design stage & construction period	√. A tree nursery has been set up off-site near the site office.
Landscape & Visual	<u>No-intrusion Zone</u>	Work site/ During design stage & construction	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	To maximise protection to existing trees and ground vegetation, construction contracts may designate “No-intrusion Zone” to various areas within the site boundary with rigid and durable fencing for each individual no-intrusion zone. The contractor should close monitor and restrict the site working staff not to enter the “no-intrusion zone”, even for non-direct construction activities and storage of equipment.	period	
Landscape & Visual	<u>Hoarding</u> Hoarding or boundary fencing for construction shall be considered. It should be sensitively designed, subtle, camouflaged and more ‘permeable’ so that they fit into the existing environment when looking from outside.	Work site/ During design stage & construction period	√
Landscape & Visual	<u>Dust and Erosion Control for Exposed Soil</u> Excavation works and demolition of existing building blocks and which will be highly visible form surrounding areas should be well planned and with precautions to suppress dust. Exposed soil shall be covered or ‘camouflaged’ and watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Silt and erosion shall be controlled by ground barriers around the slope cutting area..	Work site/ During design stage & construction period	√
Landscape & Visual	<u>Existing Tree Record Inventory</u> All retained trees should be record photographically at the commencement of the Contract, and carefully protected during the construction period. Detailed tree protection specification shall be allowed and included in the Contract Specification, which specifying the tree protection requirement, submission and approval system, and the tree monitoring system.	Work site/ During design stage & construction period	√
Landscape & Visual	<u>Construction Light</u>	Work site / During design stage & construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	All security floodlights for construction sites shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimize light pollution and night-time glare to nearby residences and GIC users. The Contractor shall consider other security measures which shall minimize the visual impacts.		
Landscape & Visual	<p><u>Tree Transplanting</u></p> <p>Apart from the 18 numbers of “<i>Leucaena leucocephala</i>”, which are proposed to be felled in accordance with ETWB TCW No. 3/2006, all the affected trees shall be transplanted. Where practicable, trees shall be directly transplanted to permanent on-site locations. The location of the transplanted tree is shown in Figure 8.9.1.</p>	Work site / During design stage & construction period	√.
Landscape & Visual	<p><u>Tree Compensation Ratio</u></p> <p>The total number of compensatory trees planted in the project area shall not be less than 1:1 ratios by new trees. Required numbers and locations of compensatory trees shall be determined and agreed with Government during the tree felling application process under ETWCTC 3/2006. Compensatory trees shall be at least heavy standard size to create “immediate” greening effect. 81 numbers of “<i>Cassia surattensis</i>” will be provided as the additional compensatory planting for loss of greenery in the area due to removal of the affected trees. The location of the additional compensatory planting is shown in Figure 8.9.1.</p>	Work site / During design stage & construction period	N/A
Landscape & Visual	<p><u>Re-use of Existing Soil and Advance formation of Planting Area</u></p> <p>Existing topsoil shall be re-used where possible for new planting areas within the project. Advance formation of planting area and early implementation of the plating works can minimize adverse impact on trees. The construction program shall consider using the soil removed from one phase for backfilling another. Suitable storage ground, gathering ground and mixing ground may be set up on-site as necessary.</p>	Work site / During design stage & construction period	√
Landscape & Visual	<p><u>Establishment Period</u></p>	Work site/ During operation period	N/A. To be implemented during operation phase of Project.

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	12 month establishment period for the soft landscape works will be allowed in the main contract. Most construction contracts in Hong Kong require the Contractor to carry out routine horticultural operations, including watering, pruning, weeding, pest control, replacement of dead plants etc. to ensure healthy establishment of new planting during a 12 month establishment period. This period also serves as a kind of warranty / guarantee on the quality of the plants supplied and installed by the Contractor. Monthly monitoring during the first year of establishment period is recommended.		
Landscape & Visual	<u>Re-instatement of excavated Area</u> All excavated area and disturbed area for utilities diversion, temporary road diversion, and pipeline works will be reinstated to former conditions, subject to applicable Government Standards.	Work site / During design stage & operation period	N/A. To be implemented during operation phase of Project.
Landscape & Visual	<u>Appearance and Greening for the proposed structures</u> Compatible design, construction materials and surface finishes of the proposed structure should match with the nearby existing external appearance of PPSTW buildings for achieving visual uniformity. Finishing materials shall have due consideration to form, basic color, color/ tone variation, micro-and macro-texture, and reflectivity/light absorbance to avoid glare. Planting, such as turf, low groundcovers and climbers, may also be planted on top of these elements to provide greening and aesthetic effect.	Work site / During design stage & operation period	N/A. To be implemented during operation phase of Project.
<i>Summary of Key Environmental Mitigation Measures in Contract Requirements</i>			
Air Quality	Only Ultra-low-sulphur diesel (ULSD) should be used for all diesel-operated plants and equipments on site	Work sites / during construction period	√
Air Quality and Noise	Plants and equipments of good operation conditions should be used on site.	Work sites / during construction period	√
Noise	No diesel hammers should be used for piling works	Work sites / during construction period	√
Noise	Construction Noise Permits (CNP) should be applied for works conducted outside non-restricted hours.	Work sites / during construction period	√
Noise	Quiet construction equipments and the quietest practicable working methodologies should be adopted for works whenever feasible. Noise labels should be provided for air compressors. Hoods and cover panels	Work sites / during construction period	√

Type of Impact	Environmental Protection Measures	Location/ Timing	Status
	of generators and air compressors should be closed during operation. Noise labels should be provided for air compressors and hand-held percussive breakers.		
Waste Management	Temporary works construction on site should minimize the use of timber to reduce the quantity of C&D waste generated during works period.	Work sites / during construction period	√
Landscape and Visual	Retained or to-be-transplanted trees on site should be properly protected from physical damages and soil compacts with temporary fencing or hessian armouring whenever feasible.	Work sites / during construction period	√

Remark:

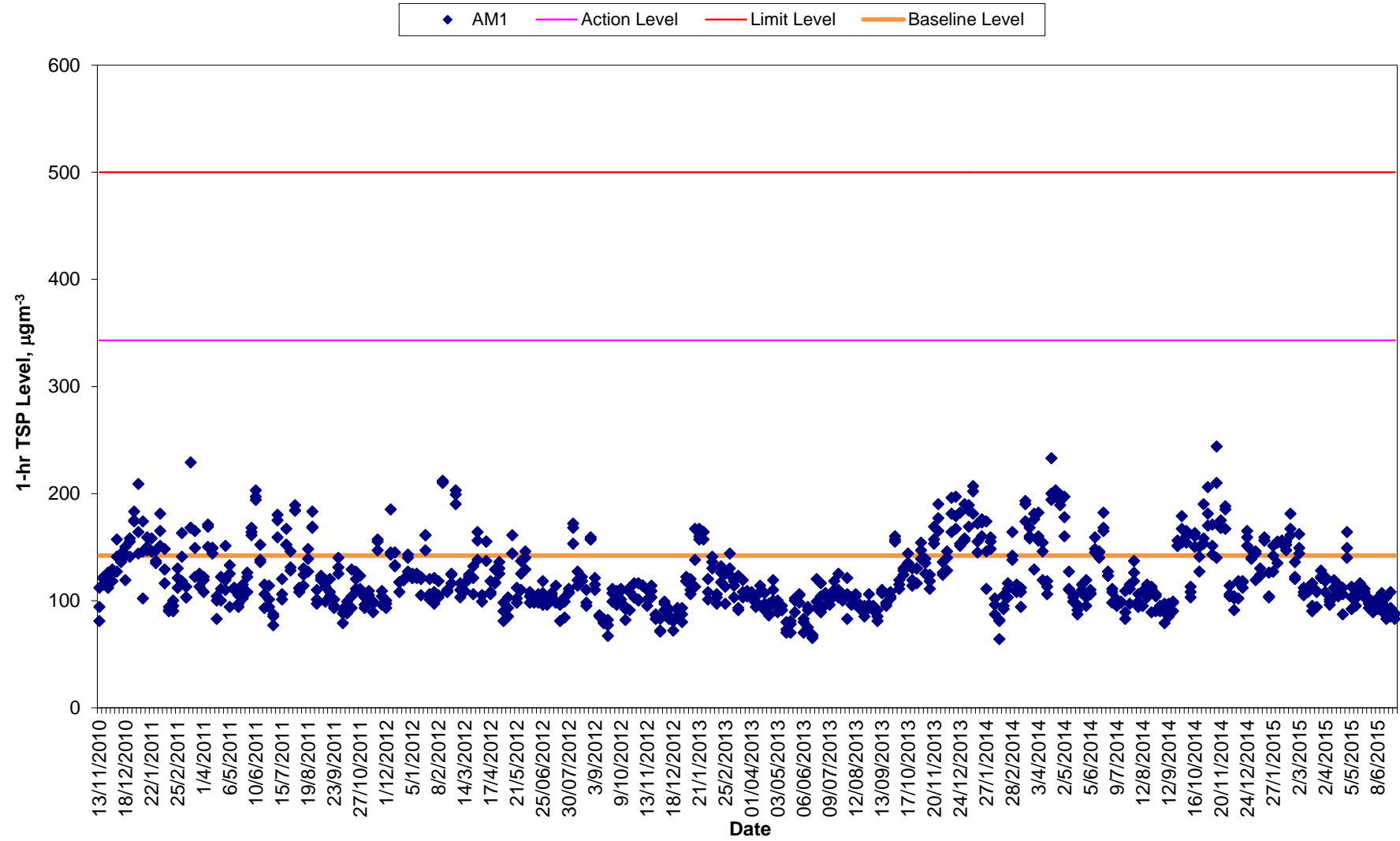
- √ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by ATAL-Degrémont-China State JV
- Δ Deficiency of Mitigation Measures but rectified by ATAL-Degrémont-China State JV
- N/A Not Applicable in Reporting Period

Annex F

24-hour and 1-hour TSP Monitoring Results

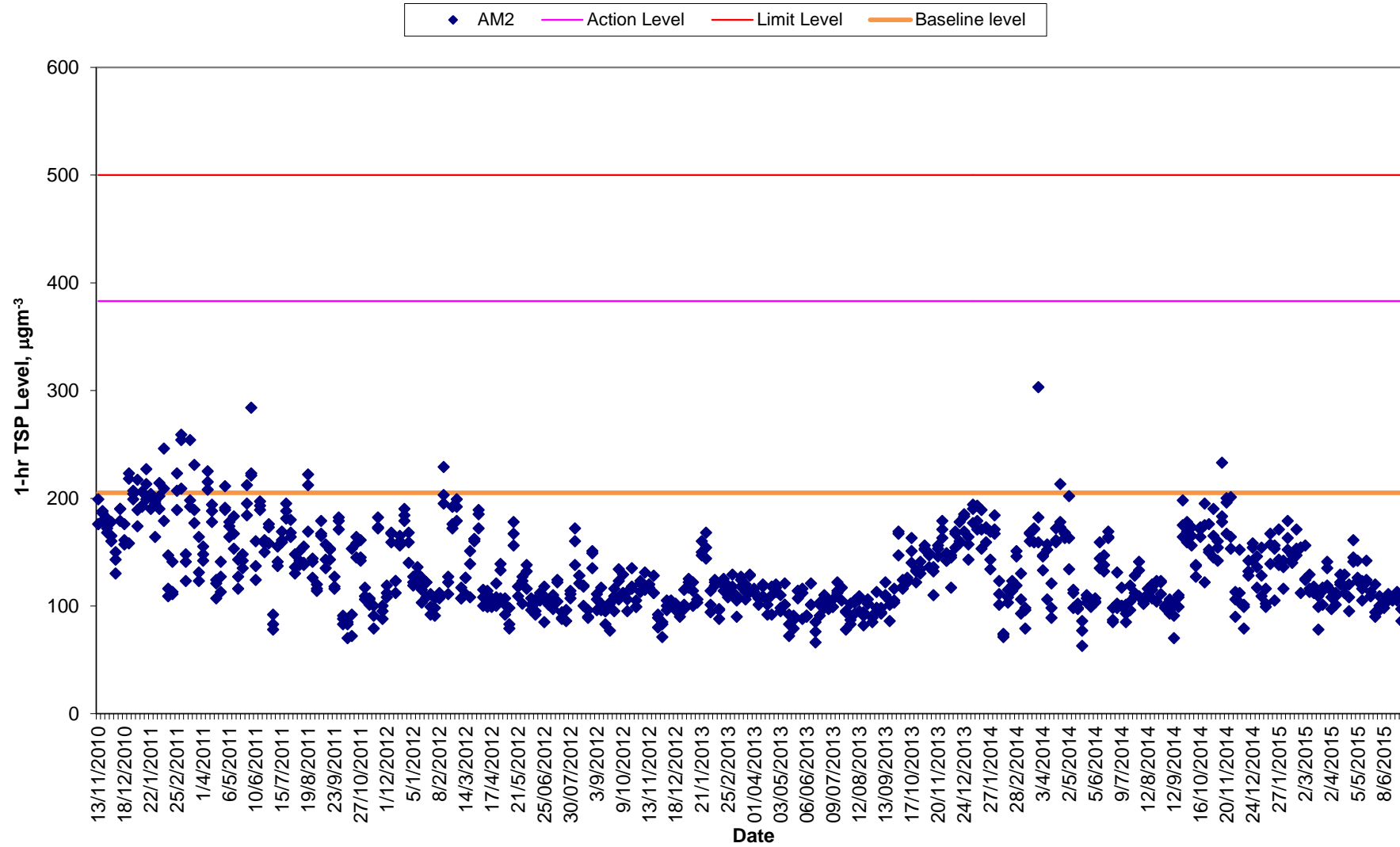
Annex F TSP Monitoring Results

1-hr TSP Levels over Construction Phase AM1 (Tuen Mun EMSD Vehicle Servicing Station)



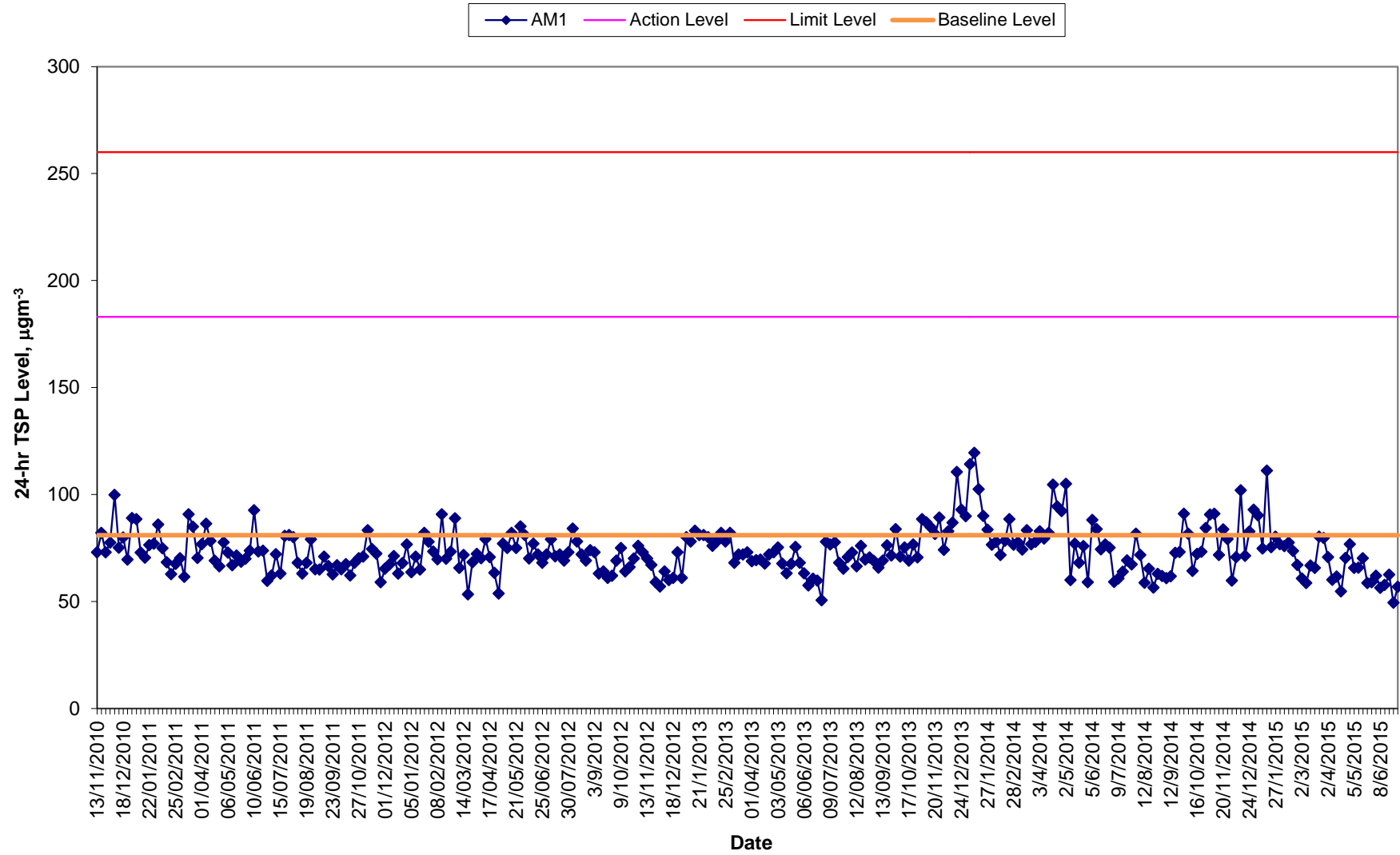
Annex F TSP Monitoring Results

1-hr TSP Levels over Construction Phase AM2 (River Trade Terminal Office)



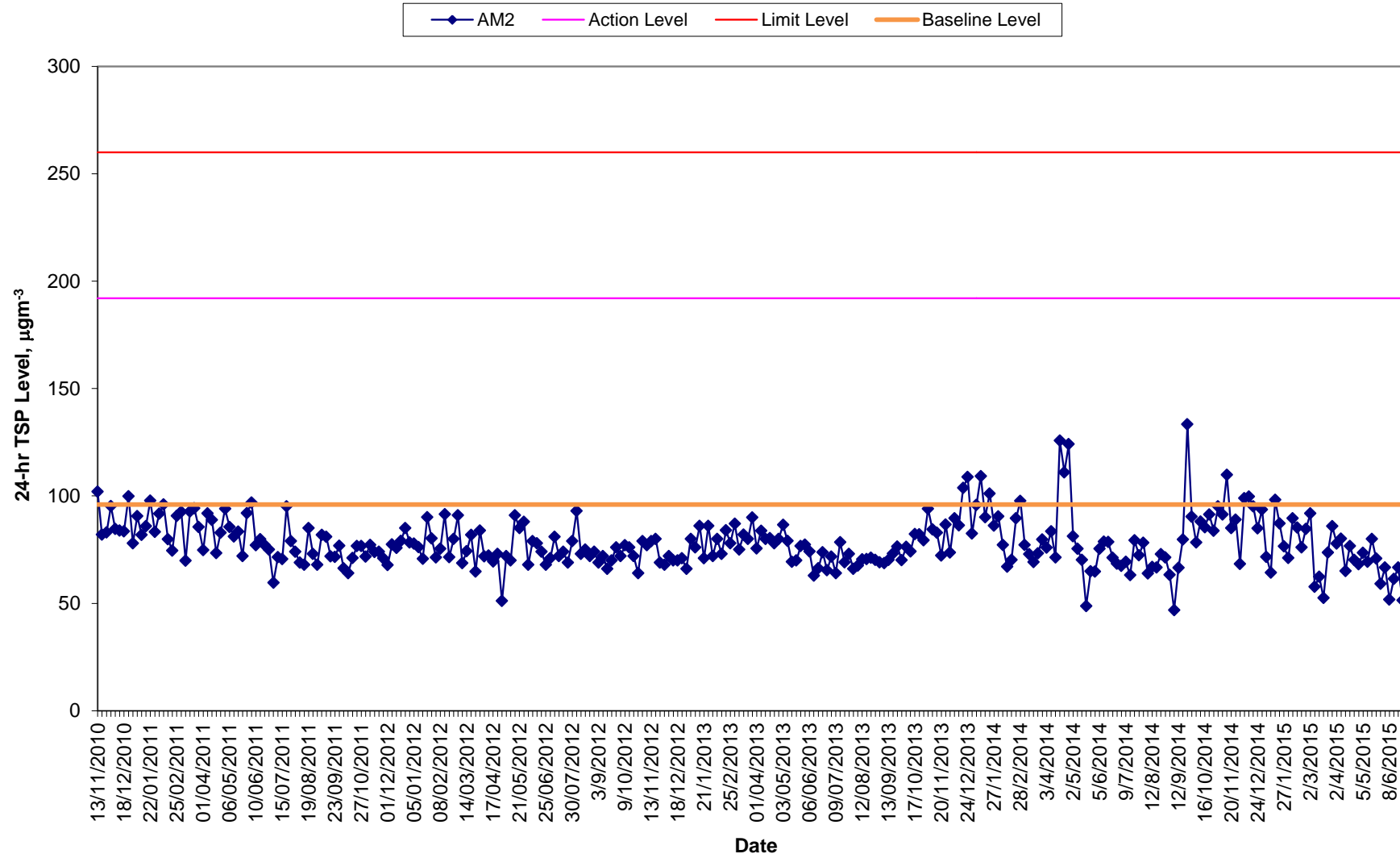
Annex F TSP Monitoring Results

24-hr TSP Levels over Construction Phase AM1 (Tuen Mun EMSD Vehicle Servicing Station)



Annex F TSP Monitoring Results

24-hr TSP Levels over Construction Phase AM2 (River Trade Terminal Office)



Annex G

Waste Flow Table

**Contract No. : DC/2008/03 - Design, Build and Operate Pillar Point Sewage Treatment Works
Monthly Summary Waste Flow Table**

Month	Actual Quantities of Inert C&D Materials Generated (see Note 13)					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated (see Note 13)				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
Nov 2010	2,248.00	0.00	0.00	55.00	2248.00	60.00	100.00	0.00	0.00	18.05 (see Note 4)
Dec 2010	11,314.00 (see Note 4)	0.00	0.00	225.00	11314.00	100.00	120.00	20.00	0.00	28.40 (see Note 4)
Jan 2011	58,383.00 (see Note 4)	0.00	0.00	3,000.00	58,382.90	250.00	280.00	60.00	0.00	4.59 (see Note 4)
Sub-total	71,945.00	0.00	0.00	3280.00	71944.90	410.00	500.00	80.00	0.00	51.04
Feb 2011	12,855.00	0.00	0.00	1,050.00	12,854.70	100.00	150.00	50.00	0.00	2.43 (see Note 4)
Mar 2011	22,859.00	0.00	0.00	1,500.00	22,858.70	150.00	180.00	55.00	0.00	9.02
Apr 2011	8,547.00 (see Note 7)	0.00	5,684.00(see Note 5, 7)	550.00	2,863.30	50.00	30.00	15.00	0.00	5.78
Sub-total	44,261.00	0.00	5684.00	3100.00	38576.70	300.00	360.00	120.00	0.00	17.23
May 2011	6,293.00 (see Note 7)	0.00	11.00 (see Note 5, 7)	425.00	6,282.00 (see Note 7)	45.00	25.00	10.00	360.00 (see Note 7)	8.83
Jun 2011	4,587.00 (see Note 7)	0.00	0.00 (see Note 7)	313.00	4,586.00 (see Note 7)	40.00	30.00	15.00	0.00	7.10
Jul 2011	523.00	0.00	0.00	25.00	522.90	15.00	5.00	10.00	0.00	7.20
Sub-total	11,403.00	0.00	11.00	763.00	11391.50	100.00	60.00	32.00	360.00	23.13
Aug 2011	571.00 (see Note 11)	0.00	0.00	50.00	571.00 (see Note 11)	0.00	0.00	15.00	450.00 (see Note 8)	6.12
Sept 2011	235.00	0.00	0.00	25.00	235	20.00	0.00	0.00	0.00	12.15 (see Note 9)
Oct 2011	5,705.00 (see Note 10)	0.00	0.00	650.00	5,705.00 (see Note 10)	100.00	0.00	0.00	0.00	2.98
Sub-total	6,511.00	0.00	0.00	725.00	6511.00	120.00	0.00	15.00	450.00	21.25
Nov 2011	6,294.00	0.00	0.00	775.00	6,294.00	50.00	0.00	0.00	0.00	44.84
Dec 2011	3,011.00	0.00	0.00	263.00	3,011.00	20.00	0.00	0.00	0.00	17.14
Jan 2012	349.00	64.00	0.00	25.00	284.60	20.00	150.00	0.00	0.00	49.01

Month	Actual Quantities of Inert C&D Materials Generated (see Note 13)					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated (see Note 13)				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
Sub-total	9,654.00	64.00	0.00	1063.00	9589.60	90.00	150.00	0.00	0.00	110.99
Feb 2012	3,371.00	30.00	0.00	2,810.00	3,341.00	150.00	0.00	0.00	0.00	48.72
Mar 2012	6,460.00	3,000.00	0.00	625.00	3,459.70	30.00	0.00	0.00	0.00	41.10
Apr 2012	3,774.00	3,000.00	0.00	250.00	774.40	40.00	0.00	0.00	0.00	40.01
Sub-total	13,605.00	6,030.00	0.00	3685.00	7575.10	220.00	0.00	0.00	0.00	129.83
May 2012	7,936.00	5,600.00	0.00	750.00	2,336.20	40.00	0.00	10.00	0.00	75.19
Jun 2012	13,091.00	7,500.00	0.00	875.00	5,590.80	40.00	35.50	8.00	0.00	66.74
Jul 2012	11,972.00	8,600.00	0.00	825.00	3,372.50	40.00	36.40	5.00	0.00	100.50
Sub-total	32,999.00	21,700.00	0.00	2450.00	11299.50	120.00	70.90	23.00	0.00	242.43
Aug 2012	11,660.00	11,000.00	0.00	950.00	659.80	30.00	10.00	6.00	0.00	78.77
Sept 2012	3,055.00	1,500.00	0.00	920.00	1,555.38	30.00	40.00	5.00	0.00	118.80
Oct 2012	2,657.00	200.00	0.00	500.00	2,457.01	30.00	59.40	8.00	0.00	124.04
Sub-total	17,372.00	12,700.00	0.00	2370.00	4672.19	90.00	109.40	19.00	0.00	321.61
Nov 2012	2,691.00	250.00	0.00	750.00	2,441.01	50.00	25.00	10.00	0.00	128.08
Dec 2012	4,319.00	400.00	0.00	200.00	3,919.13	60.00	20.00	15.00	0.00	165.28
Jan 2013	4,442.00	100.00	0.00	200.00	4,341.56	200.00	40.00	20.00	0.00	111.23
Sub-total	11,452.00	750.00	0.00	1150.00	10701.70	310.00	85.00	45.00	0.00	404.59
Feb 2013	1,286.00	85.00	0.00	50.00	1,201.23	180.00	35.00	16.00	0.00	99.44
Mar 2013	900.00	900.00	0.00	120.00	0.00	120.00	45.00	10.00	0.00	97.43
Apr 2013	680.00	680.00	0.00	300.00	0.00	22.00	50.00	15.00	0.00	80.21
Sub-total	2866.00	1665.00	0.00	470.00	1201.23	322.00	130.00	41.00	0.00	277.08
May 2013	1443.37	100.00	0.00	1020.00	1343.37	40.00	43.00	9.00	0.00	46.88 (see Note 16)

Month	Actual Quantities of Inert C&D Materials Generated (see Note 13)					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated (see Note 13)				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
June 2013	1993.06	50.00	0.00	850.00	1943.06	100.00	60.00	5.00	0.00	53.89
July 2013	1246.64	100.00	0.00	1100.00	1146.64	100.00	60.00	10.00	0.00	71.15
Sub-total	4683.07	250.00	0.00	2970.00	4433.07	240.00	163.00	24.00	0.00	171.92
August 2013	873.73	120.00	0.00	700.00	753.73	50.00	60.00	8.00	0.00	63.95
September 2013	748.43	50.00	0.00	650.00	698.43	40.00	60.00	5.00	0.00	41.28
October 2013	1701.99	45.00	0.00	1500.00	1656.99	20.00	60.00	5.00	0.00	34.79
Sub-total	3324.15	215.00	0.00	2850.00	3109.15	110.00	180.00	18.00	0.00	140.02
November 2013	1602.35	60.00	0.00	1490.00	1542.35	18.00	60.00	50.00	0.00	36.44
December 2013	1357.16	80.00	0.00	1100.00	1277.16	35.00	60.00	50.00	0.00	16.84
January 2014	714.34	20.00	0.00	690.00	694.34	16.00	60.00	97.00	0.00	27.82
Sub-total	3,673.85	160.00	0.00	3,280.00	3,513.85	69.00	180.00	197.00	0.00	81.10
February 2014	944.11	20.00	0.00	900.00	924.11	50.00	60.00	1120.00	0.00	7.66
March 2014	1200.95	50.00	0.00	1100.00	1150.95	40.00	50.00	5.00	0.00	19.78
April 2014	1803.58	50.00	0.00	1700.00	1753.58	40.00	30.00	5.00	0.00	12.13
Sub-total	3948.64	120.00	0.00	3700.00	3828.64	130.00	140.00	1130.00	0.00	39.57
May 2014	576.53	50.00	0.00	500.00	526.53	40.00	30.00	5.00	0.00	14.07
June 2014	707.48	30.00	0.00	640.00	677.48	30.00	20.00	0.00	0.00	11.65
July 2014	675.82	20.00	0.00	640.00	655.82	20.00	10.00	0.00	0.00	25.28
Sub-total	1959.83	100.00	0.00	1780.00	1859.83	90.00	60.00	5.00	0.00	51.00
August 2014	758.68	10.00	0.00	740.00	748.68	10.00	5.00	0.00	0.00	14.77

Month	Actual Quantities of Inert C&D Materials Generated (see Note 13)					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated (see Note 13)				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
September 2014	1171.44	20.00	0.00	1145.00	1151.44	20.00	10.00	0.00	0.00	15.71
October 2014	448.84	20.00	0.00	415.00	428.84	20.00	5.00	0.00	0.00	8.32
Sub-total	2378.96	50.00	0.00	2300.00	2328.96	50.00	20.00	0.00	0.00	38.8
November 2014	768.33	10.00	0.00	740.00	758.33	10.00	5.00	0.00	0.00	30.89
December 2014	766.77	10.00	0.00	740.00	756.77	5.00	3.00	0.00	0.00	17.94
January 2015	575.41	10.00	0.00	550.00	545.41	3.00	3.00	0.00	0.00	12.23
Sub-total	2110.51	30.00	0.00	2030.00	2060.51	18.00	11.00	0.00	0.00	61.06
February 2015	374.73	5.00	0.00	360.00	369.73	2.00	2.00	0.00	0.00	15.68
March 2015	678.52	5.00	0.00	665.00	673.52	1.00	2.00	0.00	0.00	40.00
April 2015	30.89	1.00	0.00	28.00	29.89	1.00	1.00	0.00	0.00	31.45
Sub-total	1084.14	11.00	0.00	1053.00	1073.14	4.00	5.00	0.00	0.00	87.13
May 2015	113.26	1.00	0.00	111.00	112.26	1.00	1.00	0.00	0.00	15.70
June 2015	17.01	0.00	0.00	15.00	17.01	0.00	0.00	0.00	0.00	11.32
July 2015	12.41 (see Note 17)	0.00	0.00	6.00	12.41	0.00	0.00	0.00	0.00	10.79
Sub-total	142.68	1.00	0.00	132.00	141.68	1.00	1.00	0.00	0.00	37.81
August 2015	16.69	0.00	0.00	16.00	16.69	0.00	0.00	0.00	0.00	0.62
September 2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October 2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	16.69	0.00	0.00	16.00	16.69	0.00	0.00	0.00	0.00	0.62
November 2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month	Actual Quantities of Inert C&D Materials Generated (see Note 13)					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated (see Note 13)				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
December 2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
January 2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	245,389.70	43,846.00	5,694.96	39,167.00	195,848.74	2,794.00	2,225.30	1,752.00	810.00	2,308.21

- Notes:
- (1) Metal and paper/cardboard packaging were collected by recycler for recycling.
 - (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material collected by recycler for recycling.
 - (3) General refuse was disposed of at WENT by subcontractors.
 - (4) The waste flow data for November and December 2010, January and February 2011 was updated in March 2011 based on SOR's comments and has been confirmed by the Contractor.
 - (5) The inert C&D materials were reused in the Contract No. EP/SP/58/08 at Tuen Mun Tsang Tsui.
 - (6) Chemical waste was collected through the licensed chemical waste collector, Dunwell Ind. (Holdings) Ltd, with the waste collection licence number 7111-757-W0015-WC.
 - (7) The waste flow data for April, May and June 2011 was updated in August 2011 based on SOR's comments and has been confirmed by the Contractor.
 - (8) The waste flow data of chemical waste for August 2011 was updated in October 2011 based on Contractor's revised waste flow summary.
 - (9) The waste flow data of general refuse for September 2011 was updated in November 2011 based on Contractor's revised waste flow summary.
 - (10) The waste flow data of C&D material for October 2011 was updated in December 2011 based on Contractor's revised waste flow summary.
 - (11) The waste flow data of C&D material for August 2011 was updated in January 2011 based on SOR's comments and has been confirmed by the Contractor.
 - (12) The waste flow data of metal and paper/cardboard packaging for June 2011 was revised in August 2012.
 - (13) The quantity of inert and non-inert C&D material generated from May 2012 to December and imported fill material was updated by the Contractor on 6 November 2012.
 - (14) The quantity of Rocks & Broken Concrete from November 2010 to November 2012 was updated by the Contractor on 12 December 2012.
 - (15) The quantity of C&D material reused in this Contract in Oct, Nov and Dec 2012 were updated by the Contractor on 5 January 2013.
 - (16) The quantity of general refuse in this Contract for May 2013 was updated by the Contractor in June 2013.
 - (17) The waste flow data for July 2015 was updated in August 2015 based on SOR's comments and has been confirmed by the Contractor.