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TEST REPORT

China Harbour – China State Joint Venture

**CONTRACT NO. CV/2009/02
HANDLING OF SURPLUS PUBLIC FILL**

TUEN MUN 38 FILL BANK

**QUARTERLY EM&A SUMMARY REPORT
NO.15**

(JUNE TO AUGUST 2013)

Prepared by:

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Senior Environmental Officer

Checked by:

LAU, Chi Leung
Environmental Team Leader

Issue Date: 14 September 2013

Report No.: ENA31764



Ref.: CEDPFRSFEM00_0_1468L.13

24 September 2013

ETS-Testconsult Limited
8/F, Block B
Veristrong Industrial Centre
34-36 Au Pui Wan Street
Fo Tan, Hong Kong

By E-mail and Fax No.: 2695 3944

Attention: Mr. C. L. Lau

Dear Mr. Lau,

**Re: Contract No. CV/2009/02
Handling of Surplus Public Fill – Tuen Mun Area 38 Fill Bank
Quarterly EM&A Summary Report No. 15 (June 2013 to August 2013)**

Reference is made to your submission of the draft Quarterly EM&A Summary Report (June 2013 to August 2013) for the captioned by E-mail on 14 September 2013.

We are pleased to inform you that we have no comment on the quarterly report.

Thank you very much for your attention and please do not hesitate to contact our Jason Lai or the undersigned should you have any queries.

Yours faithfully,

A handwritten signature in black ink, appearing to be "Tony Cheng".

Tony Cheng
Independent Environmental Checker

c.c. CEDD
CHCSJV

Attn: Mr. Panda Liu / Mr. Jason Wong
Attn: Mr. Dennis Tang

Fax No.: 2714 0113
Fax No.: 2247 4108

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EXECUTIVE SUMMARY

This is the fifteen Quarterly Environmental Monitoring and Audit (EM&A) Summary Report prepared by ETS-Testconsult Ltd (ET) for the "Contract No. CV/2009/02 Handling of Surplus Public Fill – Tuen Mun Area 38 Fill Bank" (The Project).

This report documents the findings of EM&A Works conducted during the operation phase of Fill Bank at Tuen Mun Area 38 from June to August 2013.

Site Activities

As informed by the Contractor, the site activities in this reporting quarter were as below:

- *Removal & delivery of public fill stockpiled material to Mainland*
- *Operation of the road water lorries and the road sweeper*
- *Operation of the Tipping Halls (B2 & B3)*

Environmental Monitoring Works

Air Monitoring

No exceedance of Action and Limit levels was recorded for 1-hr and 24-hr TSP monitoring in this quarter.

Marine Water Quality Monitoring

According to the summary of marine water monitoring results, no exceedance of Action and Limit Levels was recorded in this quarter.

Noise Monitoring

No exceedance of Action and Limit levels for noise monitoring was recorded in this quarter.

Environmental Complaints, Notification of summons and successful prosecutions

No complaint, notification of summon and prosecution with respect to environmental issue was received in this quarter.

1.0 INTRODUCTION

China Harbour – China State Joint Venture (CHCSJV) appointed Environmental Team (ET) of ETS-Testconsult Limited (ETL) to undertake the Environmental Monitoring and Audit (EM&A) for the “Contract No: CV/2009/02 –Handling of Surplus Public Fill – Tuen Mun Area 38 Fill Bank” (The Project).

In accordance with the Condition 5 of Part C of Environmental Permit (No.: EP-210/2005/B) (the EP), an EM&A programme as set out in the Project Profile should be implemented. The EM&A programme requires environmental monitoring for air quality, water quality and environmental site inspections for air quality, water quality, landscape and visual, and waste management.

Baseline monitoring was completed in May 2003 by Stanger Asia Ltd. Action and Limit Levels were established for air and water quality parameters based on the baseline monitoring results.

This quarterly report documented the findings of EM&A Works conducted during the operation phase of Fill Bank at Tuen Mun Area 38 from June to August 2013.

2.0 PROJECT INFORMATION

2.1 Project Activities in this Reporting Quarter

Details of project activities are shown in Appendix G.

2.2 Project Organization and Management Structure

The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in Appendix A.

2.3 Contact Details of Key Personnel

The key personnel contact names and telephone numbers are shown in Table 2.1.

Table 2.1 Contact Details of Key Personnel

Organization	Name of Key Staff	Project Role	Tel. No.	Fax No.
CEDD	Mr. Lawrence Ng Mr. Liu Chi Yuen Mr. Liu Kai Chun Mr. Wong Kai Chung Mr. C T Chock	Engineer's Representative	2762 5545	2714 0113
IEC (Materialab) *	Mr Tony Cheng	IEC	3465 2888	3465 2899
IEC (Environ) *	Mr Joseph Poon	IEC	2450 8238	2450 6138
Contractor (CHCSJV)	Mr. Wah Fung Lok	Contractor's Agent	9772 7055	2243 4089
ET (ETL)	Mr C. L. Lau	ET Leader	2946 7791	2695 3944

Remark (*): Materialab was being as IEC of this Project until 31 January 2010 and was replaced by Environ from 01 February 2010.

3.0 SUMMARY OF EM&A REQUIREMENTS

3.1 EM&A Programme

The EM&A programme required environmental monitoring for air, marine water and environmental site inspections for air, marine water, landscape and visual, and waste management. The EM&A requirements for each parameter described in the following sections include:

- All monitoring parameters;
- Monitoring schedules for the reporting month and forthcoming months;
- Action and Limit levels for all environmental parameters;
- Event/Action Plans;
- Environmental mitigation measures, as recommended in the Project EIA study final report; and
- Environmental requirements in contract documents.

The advice on implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 5 of the Report.

3.2 Monitoring Stations and Parameters

The EM&A Manual designates several locations to monitor environmental impacts in terms of air quality, noise and water quality due to the Project. The description and detailed locations of monitoring stations for air quality, noise and marine water quality are shown in Figures 1, 2 and 3 and relevant sections of this Report.

3.3 Monitoring Methodology and Calibration Details

All monitoring works were conducted and monitoring equipment was calibrated in according with the EM&A Manual.

3.4 Environmental Quality Performance Limits (Action/Limit Levels)

The environmental quality performance limits, i.e. Action/Limit Levels (AL Levels) were derived from the baseline monitoring results. If the measured environmental quality parameters exceed the AL Levels, the respective action plan will be implemented. The AL Levels for each monitoring parameter are given in Appendix E. The event action plan is given in Appendix F.

3.5 Environmental Mitigation Measures

Relevant mitigation measures were recommended in the EM&A Manual for the Contractor to implement. A list of mitigation measures is given in Appendix H.

4.0 MONITORING RESULTS

4.1 Air Quality

In accordance with the EM&A Manual, 1-hr and 24-hr TSP air quality monitoring are to be conducted three times and one time per six days correspondingly. In the reporting quarter, no exceedances of Action and Limit levels were recorded for 1-hr and 24-hr TSP monitoring. The monitoring trend of air quality during the reporting quarter are given in Appendix B.

Major dust sources in the Fill Bank were dump truck traffic and hauling activities.

Table 4.1 presents the number of exceedances recorded in each month of the reporting quarter. The number of monitoring event included regular monitoring events and additional ones.

Table 4.1 Summary of Number of Exceedances for 1-hr and 24-hr TSP Monitoring

Monitoring Parameter	Level of Exceedance	June 2013	July 2013	August 2013
24-hr TSP	No of monitoring events	5	5	6
	Action Level	0	0	0
	Limit Level	0	0	0
1-hr TSP	No of monitoring events	16	15	16
	Action Level	0	0	0
	Limit Level	0	0	0

4.2 Noise

Since Lands Dept did not approve to carry out noise monitoring at their own area where the noise monitoring stations TM-N1 and TM-N2 located due to the security, noise monitoring carried out at two noise monitoring stations TM-RN1 and TM-RN2 (refer to the figure attached) from 18 December 2007.

No exceedance was recorded in this reporting quarter.

4.3 Marine Water Quality

In accordance with the Project Profile, impact marine water quality monitoring was conducted at two control monitoring stations (TM-FC1 and TM-FC2) and two impact monitoring stations (TM-FM1 and TM-FM2) in this quarter.

Impact marine water quality monitoring was conducted three days per week. Measurements were taken at both mid-ebb and mid-flood tides at three depths (i.e. 1m below surface, mid depth and 1m above seabed). The AL Levels are included in Appendix E.

No exceedance of all marine water quality monitoring parameters was recorded in this quarter.

Table 4.2 presents the total number of marine water quality exceedances in the reporting quarter. The trend of marine water quality in the past three months is depicted in Appendix D.

Table 4.2 Total Number of Marine Water Quality Exceedances in this quarter

Parameter	Exceedance Level	June 2013	July 2013	August 2013
<i>Number of monitoring days</i>		13	13	13
<i>Dissolved Oxygen, DO (S&M)</i>	<i>Action</i>	0	0	0
	<i>Limit</i>	0	0	0
<i>Dissolved Oxygen, DO (B)</i>	<i>Action</i>	0	0	0
	<i>Limit</i>	0	0	0
<i>Turbidity</i>	<i>Action</i>	0	0	0
	<i>Limit</i>	0	0	0
<i>Suspended Solids, SS</i>	<i>Action</i>	0	0	0
	<i>Limit</i>	0	0	0

A comparison between the quarterly mean/median of SS and the 1.3 times of the baseline mean was made for each tide at each station. The statistical analysis results are given in Appendix I. Monitoring stations with significant difference ($p < 0.05$) is summarized in Table 4.3.

Table 4.3 Summary of Statistically Significant Results of SS

<i>Monitoring Station</i>		<i>Significant difference?</i>	
		<i>Mid-flood</i>	<i>Mid-ebb</i>
<i>Designated Control Station</i>	<i>FC1</i>	X	X
	<i>FC2</i>	X	X
<i>Designated Monitoring Station</i>	<i>FM1</i>	X	X
	<i>FM2</i>	X	X

5.0 INSPECTION RESULTS

5.1 Implementation Status of Environmental Mitigation Measures

ET conducted weekly site inspections to monitor the Contractor's implementation of environmental mitigation measures.

Air quality was the major environmental issue in the reporting quarter. The Contractor generally implemented most of the environmental mitigation measures in the reporting quarter. Dump truck traffic was the major dust source in the Fill Bank. Generally, the Contractor implemented adequate dust mitigation measures in the reporting quarter including dampening of haul roads, water spraying on the truckloads, during loading and unloading of material and for crushing plant, operation of automatic wheel washing facilities, dampening of fill material prior to handling or stockpiling, etc.

The major noise source was dump truck traffic in the Fill Bank. All site equipment and machinery were well maintained and no noise nuisance was observed during operating.

Drainage channels and wastewater treatment facilities were found maintained in good condition for merit function. The Contractor arranged site workers to clean up the silt and mud regularly.

Although there were a few observations regarding improper handling of oil drums and chemical containers, such as lack of drip tray and accumulated of stagnant water in the drip tray, the Contractor rectified most of these problems. Besides, the Contractor should provide tarpaulin sheets before repairing and maintenance works and also carry out proper cleaning activities immediately after such works.

Overall site area was found tidy and clean. The Contractor was reminded to collect and dispose of the general refuse and other C&D waste in a timely manner.

5.2 Status of Environmental Licensing and Permitting

The status of licences and permits is summarized in Table 5.1.

Table 5.1 Summary of environmental licensing and permit status

Description	Permit No.	Valid Period		Section
		From	To	
Amended Environmental Permit	EP-210/2005/B	08/04/13	---	(Valid)
Chemical Waste Producer	5296-421-C3577-03	18/12/09	---	Spent Lubricating Oil, Spent Flammable Liquid, Spent Battery and Surplus Paint
Effluent Discharge License	WT00005978-2010	10/05/10	31/05/15	Discharge of Industrial Trade Effluent arising from public fill reception facilities, screen and sedimentation tank
Marine Dumping Permit	EP/MD/13-131	01/04/13	30/06/13	Approval for dumping 3,000,000 tons (approximately equal to 1,666,666 cu.m. bulked quantity) of Public Fill (Reclamation Materials) from Tseung Kwan O Area 137 Fill Bank and Tuen Mun Area 38 Fill Bank to designated dumping area at Guanghaiwan of Taishan
Marine Dumping Permit	EP/MD/14-023	01/07/13	30/09/13	Approval for dumping 2,500,000 tons (approximately equal to 1,388,888 cu.m. bulked quantity) of Public Fill (Reclamation Materials) from Tseung Kwan O Area 137 Fill Bank and Tuen Mun Area 38 Fill Bank to designated dumping area at Guanghaiwan of Taishan

5.3 Advice on Solids and Liquid Waste Management Status

Table 5.2 summarizes data on offsite waste disposal in the quarter.

Table 5.2 Estimated Offsite Waste Disposal in the Reporting Quarter

Waste Type	June 2013	July 2013	August 2013
Public Fill (m ³)	0	56.8	0
C&D Waste (m ³)	0	0	0
Chemical Waste e.g. Waste oil (L) / Chemical Waste (kg)	0	0	0

6.0 NON-COMPLIANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

6.1 Summary of Non-compliance

In this reporting quarter, no exceedance of Action and Limit Level of marine water quality, noise, 1-hr and 24-hr TSP monitoring results was recorded.

6.2 Review of the Reasons for and the Implications of Non-compliance

Since there were no exceedance recorded in this monitoring quarter, the review of the reasons for the non-compliance was not required.

6.3 Summary of Actions Taken

Since there were no exceedance recorded in this monitoring quarter, no further action was required.

6.4 Summary of Environmental Complaint, Notification of Summon and Successful Prosecution Handling

No complaint, notification of summon and prosecution with respect to environmental issue was received in this quarter.

A summary of environmental complaints and prosecutions was given in Table 6.1.

Table 6.1 Summary of Environmental Complaints and Prosecutions

<i>Period</i>	<i>Complaints logged</i>	<i>Summon served</i>	<i>Successful Prosecution</i>
<i>June 2013</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>July 2013</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>August 2013</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Cumulative</i>	<i>9</i>	<i>0</i>	<i>0</i>

7.0 COMMENTS, CONCLUSIONS AND RECOMMENDATION

Major activity in the Fill Bank was the import and dumping of fill materials in this quarter. Air quality was the major environmental issue in the Fill Bank. Generally, the Contractor implemented most of the mitigation measures to minimize the dust impact.

No exceedance of Action and Limit Levels of 1-hr and 24-hr TSP, noise and marine water quality monitoring was recorded in this reporting quarter.

The noise level measured at the monitoring station complied with the Limit Level. No complaint regarding noise issue was received in this quarter.

No complaint, notification of summon and prosecution with respect to environmental issue was received in this quarter.

According to the ET weekly site inspection and IEC site audits carried out in this quarter, it was indicated that site practices of the Contractor were generally undertaken in an environmentally acceptable manner and the overall site environmental performance was up to standard.

According to the environmental site inspections performed in the reporting quarter, the following recommendations were provided:

Air Quality

- Ensure the frequency of water spraying on haul roads, unloading areas and stockpiles to be sufficient to suppress the dust sources;
- Provide proper maintenance for the powered mechanical equipment and barges to avoid emission of dark smoke;
- Provide water spraying onto the truckloads during inspection of fill material;
- Conduct road sweeping on all paved haul roads and public roads especially outside and near the site egress by the road sweeper. Undertake water spraying on stockpiling area by water bowsers;
- Erect adequate speed limit signs to advise the truck drivers of the speed limit;
- Operate mist spraying systems and automatic water sprinklers in the Fill Bank;
- Implement the dust mitigation measures for the construction activities;
- Designate proper haul roads to ensure effective water spraying; and
- Ensure all vehicles to be washed before leaving the site egress by provision, operation and maintenance of automatic wheel washing facilities.



Noise

- Conduct noisy activities at a farther location from the NSRs.

Water Quality

- Maintain the drainage system, including the trapezoidal channels and permanent desilting chambers regularly; and
- Remove the stagnant water or provide approved pesticides for the stagnant water in the permanent desilting chambers, if any.

Chemical and Waste Management

- Remove waste materials from the site to avoid accumulation regularly;
- Handle and store chemical wastes properly;
- Remove unwanted material in the existing stockpiles and avoid further dumping of such material;
- Provide and maintain sufficient drip trays for diesel drums, chemical containers, chemical waste storage drums and diesel operated generator set;
- Maintain good housekeeping at the workshop area;
- Ensure sufficient tarpaulin sheets are provided to cover drip trays; and
- Avoid soil being polluted during oil filling and equipment maintenance; hence, properly remove and store the contaminated soil, if any.

Landscape and Visual

- Provide hydroseeding on the exposed slopes, on which the final profile has been formed;
- Erect all the site hoarding/chaining fences in accordance with agreed design at proper location; and
- Maintain the hydroseeding slopes in accordance with the Landscape Plan.

- END OF REPORT -



Appendix A

Organization Chart and Lines of Communication

JOINT VENTURE MANAGEMENT BOARD
CHEN Fen Jian, WANG Yan, PAN Shu Jie, George CHAN

- Project Director: **Yang Min**
- Project Manager: **Shuzi Hoga Saigo**
- Deputy Project Manager: **Zhou Chang Ying**

QA Team
Allan D Herrera

Health & Safety Manager
S. L. So, Lawrence

Environmental Engineer
Jimmy K.W. Ng

Environmental Officer
Tang Hai Fung

Safety Advisor
John Lau Chi Wing

Environmental Team Leader
C.L. Lau

Environmental Supervisor(s)
Sing Sau Wang

Contractor's Agent
LUK HAN ONG

Safety Officers
Francis Lau/Kiri Chung & Ho Chi Yua

Environmental Team
EIS - Technisult Ltd.

Environmental Supervisor(s)
Sing Sau Wang

Environmental Supervisor(s)
Sing Sau Wang

CONSTRUCTION & OPERATION TEAM

Operational Manager (MVI & TM)
Zhou Chang Ying

Senior Planning Engineer
Stan CHEUNG

Operation Manager (TKO & CW)
Simon Pan

Chief Surveyor
S. P. Kwok

Assistant Operation Manager
Feng Hai Fung

Graduate Engineer
Alan Lo

Graduate Engineer
Jack Chan

Surveyor
Wan Chi

Liaison & Logistic (L & L) Manager (KT)
Phillip Leung

Engineer
Tam Wing Lim

L & L Coordinators
Wai Yeung, Andy Kwok, Sunny Yu

Project Engineer
Tommy Chu

Operation Manager
CHEN Gur Tin

Survey Team (TKO & QB)
Wan Chi

Survey Team (TM & MV)
Wan Chi

MAINTENANCE TEAM

Operation Manager
CHEN Gur Tin

Coordinator
Peng Yao Nan

Construction Manager
ZOU Xue Ming

Design Manager
WANG Wen Ping

Sr. Design Engineer
ZHOU Qing Wah

Design Engineer
SUN Da Yang

Engineering Assistants

Draughting Team

Plant Manager
WANG Fang Yang

Section Agent
WANG Shi Yon

Chief Surveyor
Qi Ke

Survey Team (Maine)

Survey Team (Land)

QA Engineer
LIU Yi Shuan

Environmental Officer
ZHANG Sur Tao

Planning Engineer

Environmental Officer
ZHANG Sur Tao

Safety Officer
SHE Shi Lin

L & L Coordinator x2 (Mainland)

Plant Operation Team

Computer Operator

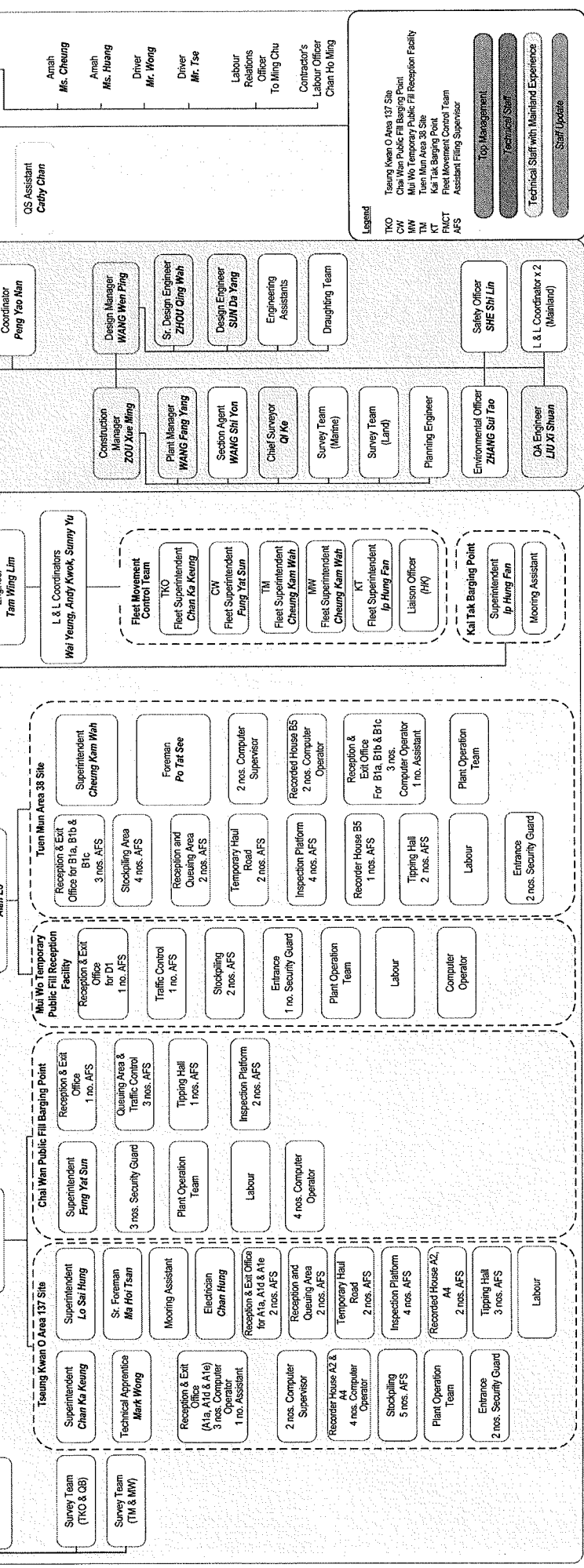
Labour

Entrance

2 nos. Security Guard

2 nos. Computer Supervisor

2 nos. Computer Operator



Legend

- TKO Tsuing Kwan O Area 137 Site
- MW Mui Wo Temporary Public Fill Reception Facility
- TM Tuen Mun Area 38 Site
- KT Kai Tak Barging Point
- FNCT Fleet Movement Control Team
- AFS Assistant Filing Supervisor

Staff Update

- Top Management
- Technical Staff
- Technical Staff with Mainland Experience

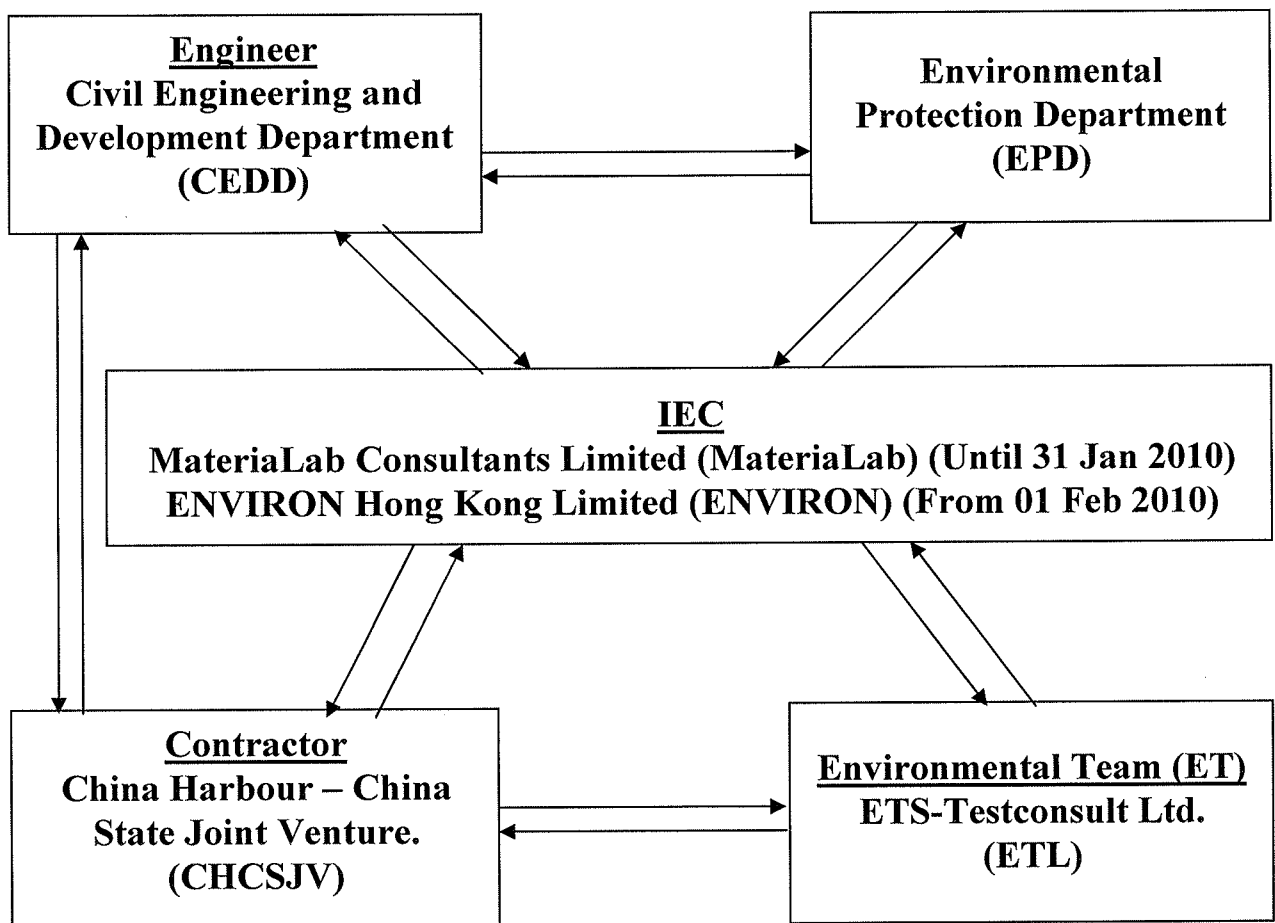
Organisation Chart (Rev.9)
 Contract No. CV/2009/02
 Handling of Surplus Public Fill
 (Revised on 13 August 2012)



Civil Engineering and Development Department

China Harbour – China State Joint Venture

Lines of Communication

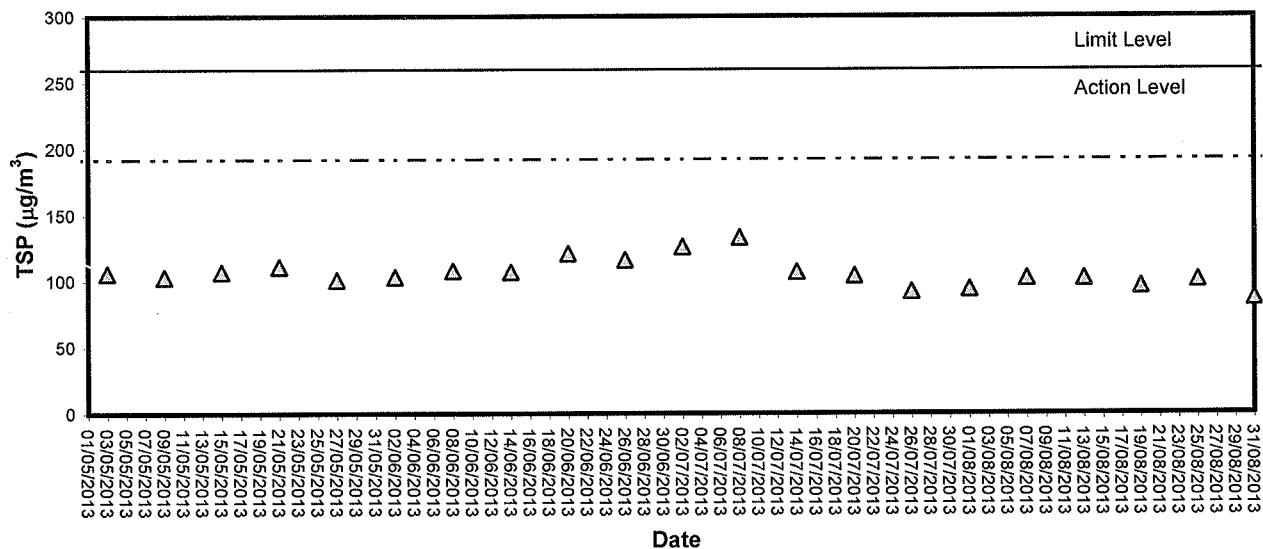




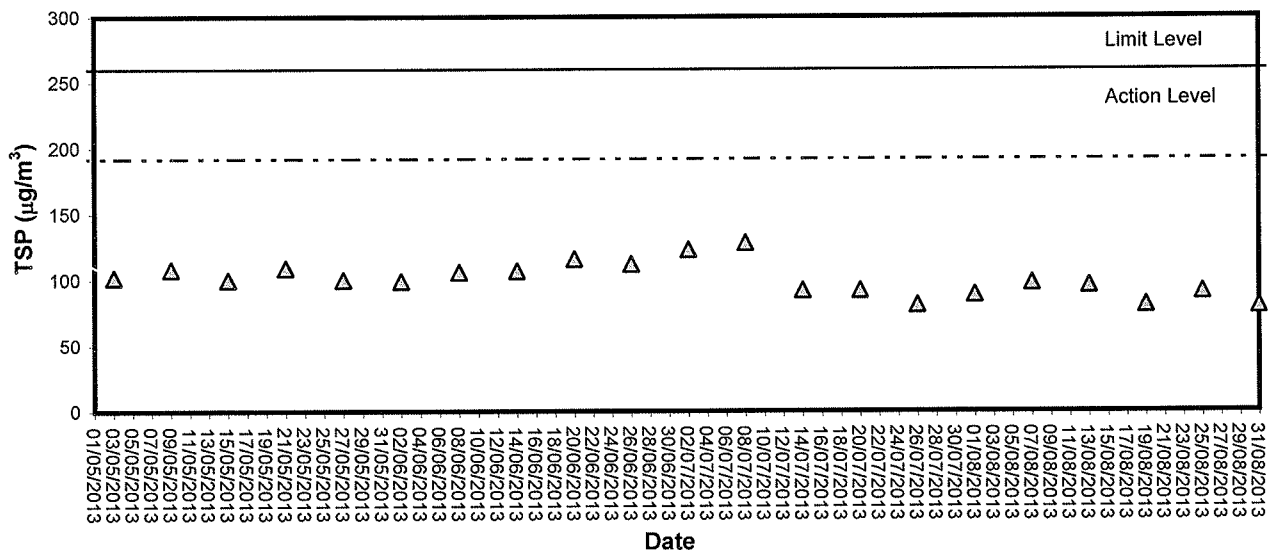
Appendix B

Graphical Plots of Air Quality Monitoring Data

24-hour TSP level at TM-A1

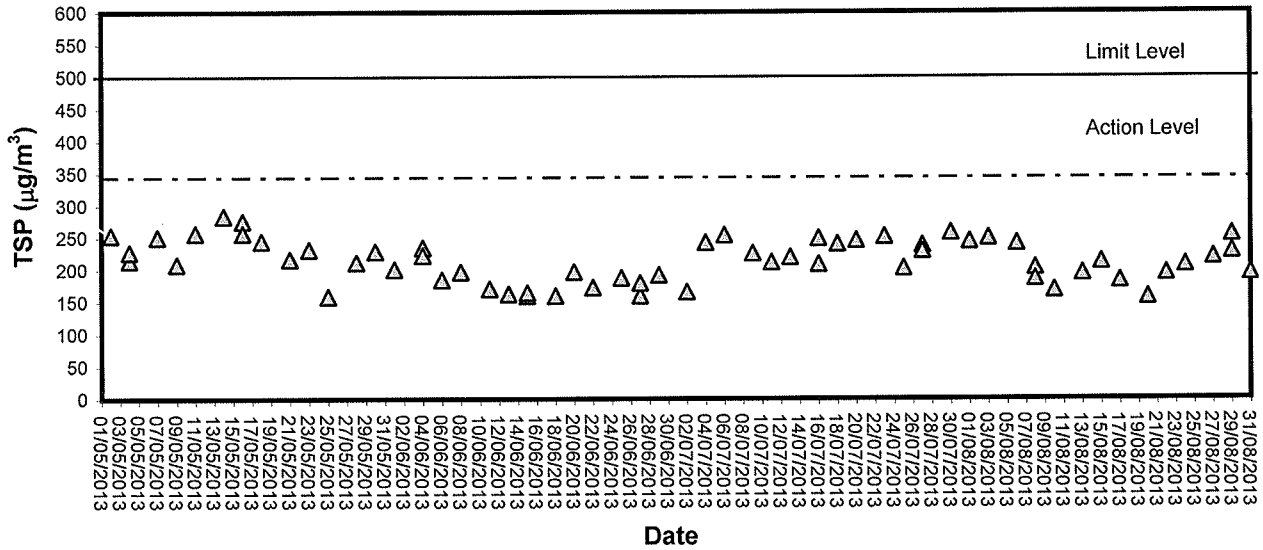


24-hour TSP level at TM-RA2

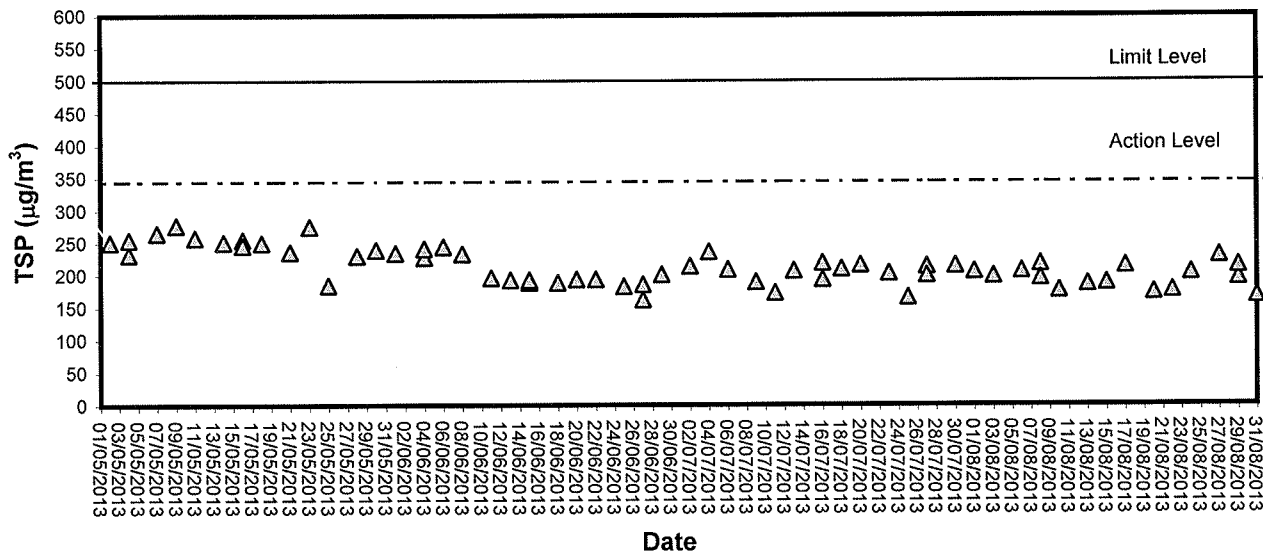




1-hour TSP level at TM-A1



1-hour TSP level at TM-RA2



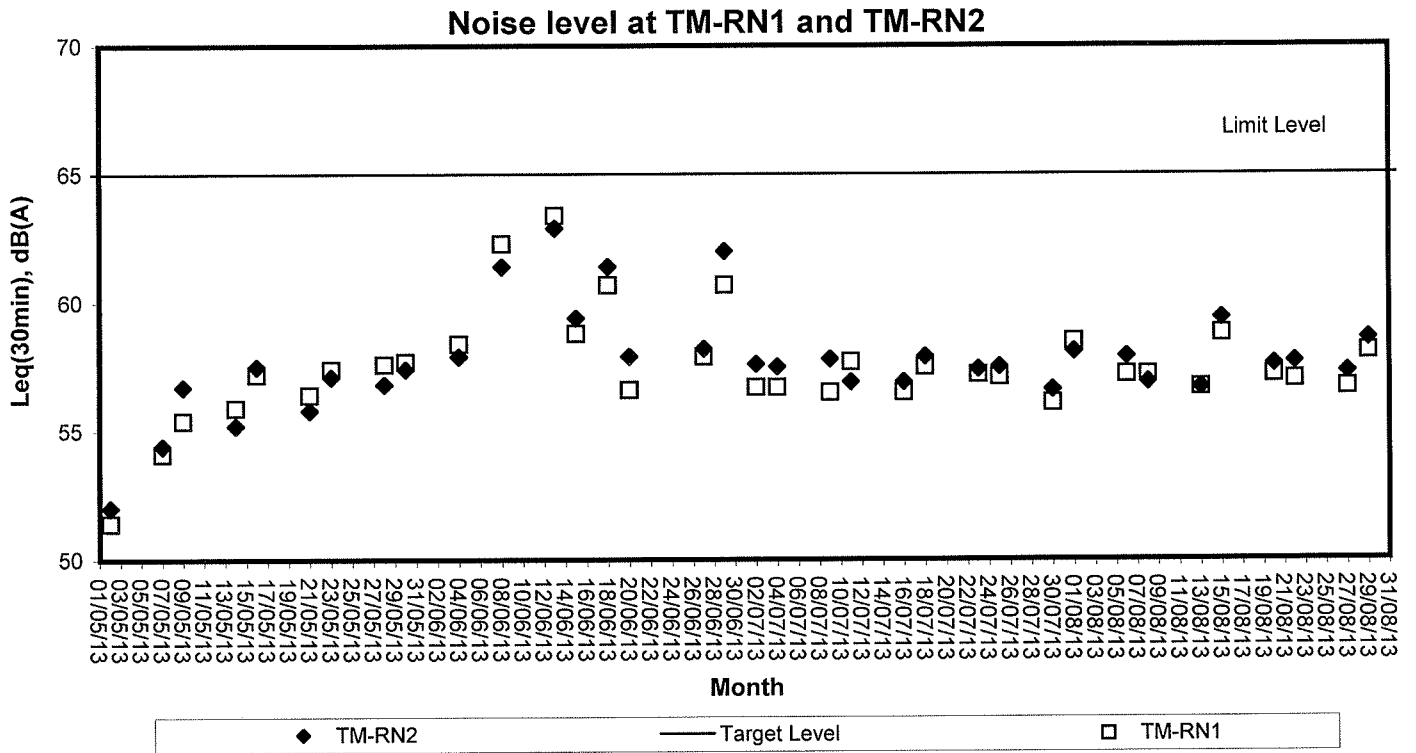


Appendix C

Graphical Plots of Impact Noise Monitoring Data



Noise Monitoring (Day-time)



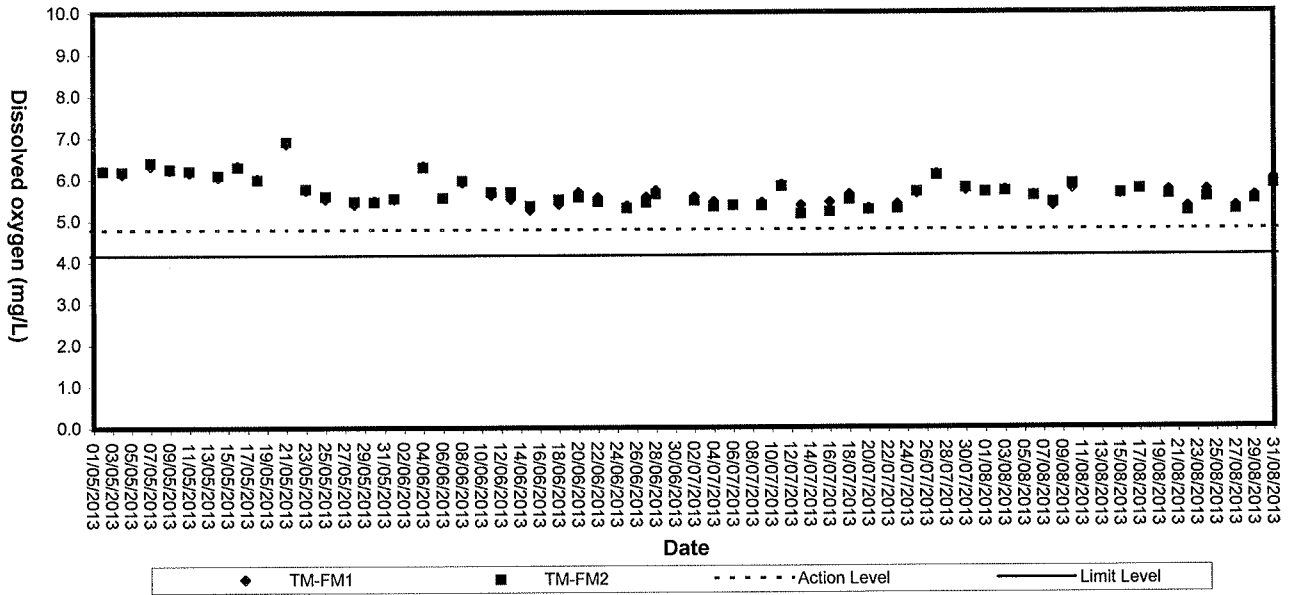


Appendix D

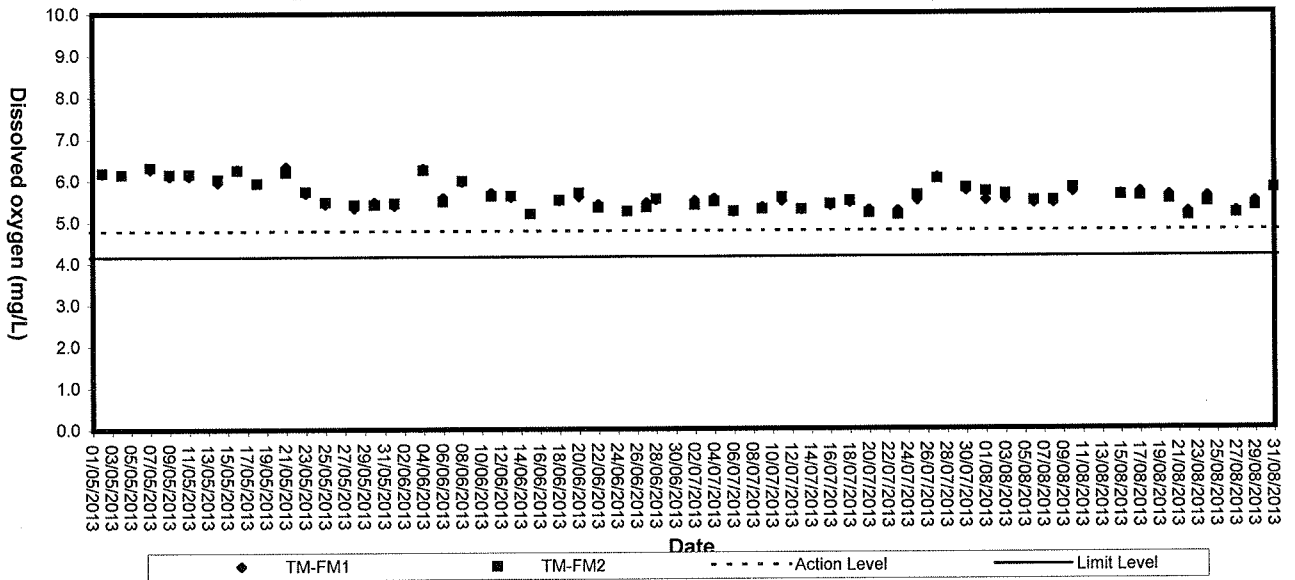
Graphical Plots of Impact Marine Water Quality Monitoring Data



Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

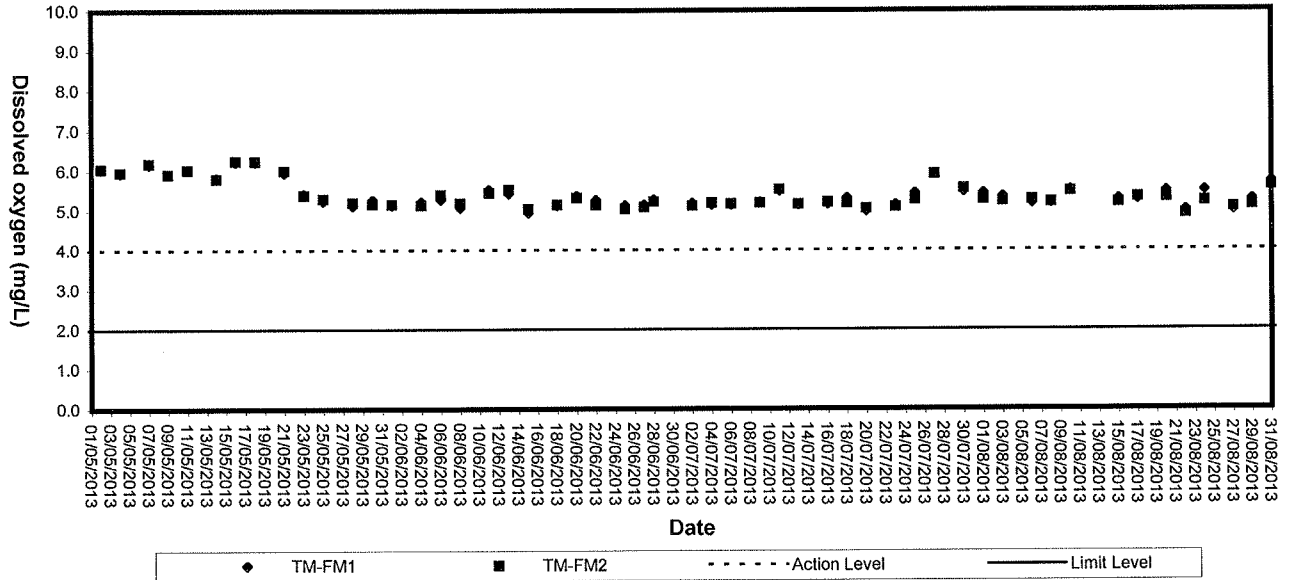


Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

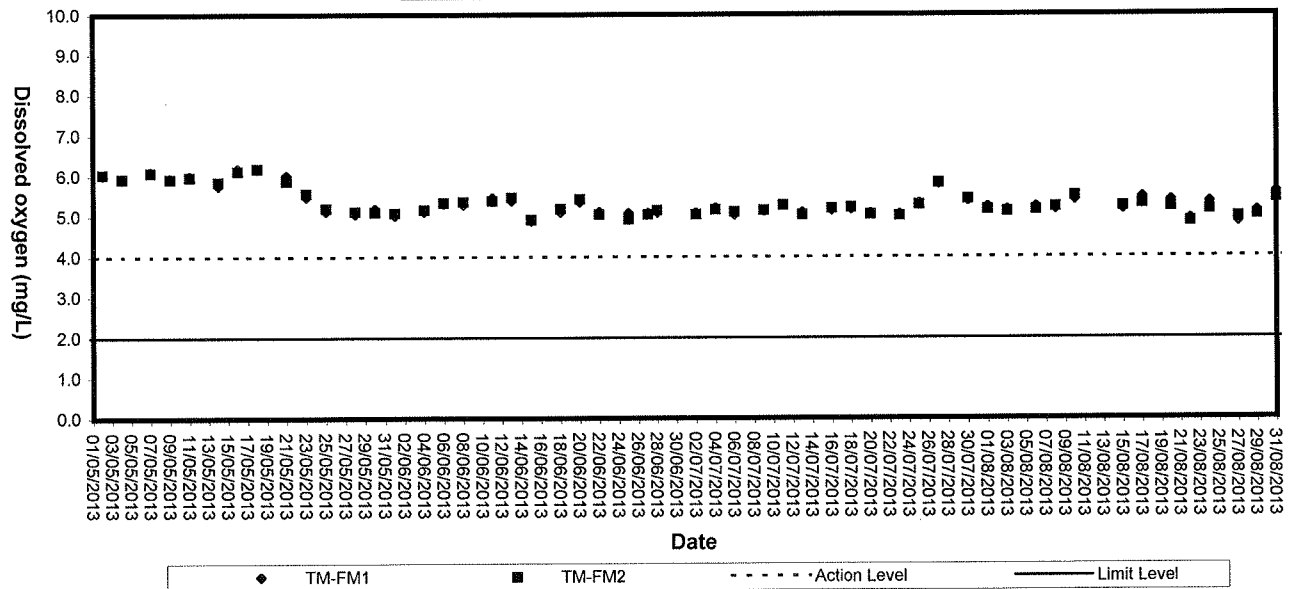




Dissolved Oxygen (Bottom) at Mid-Flood Tide

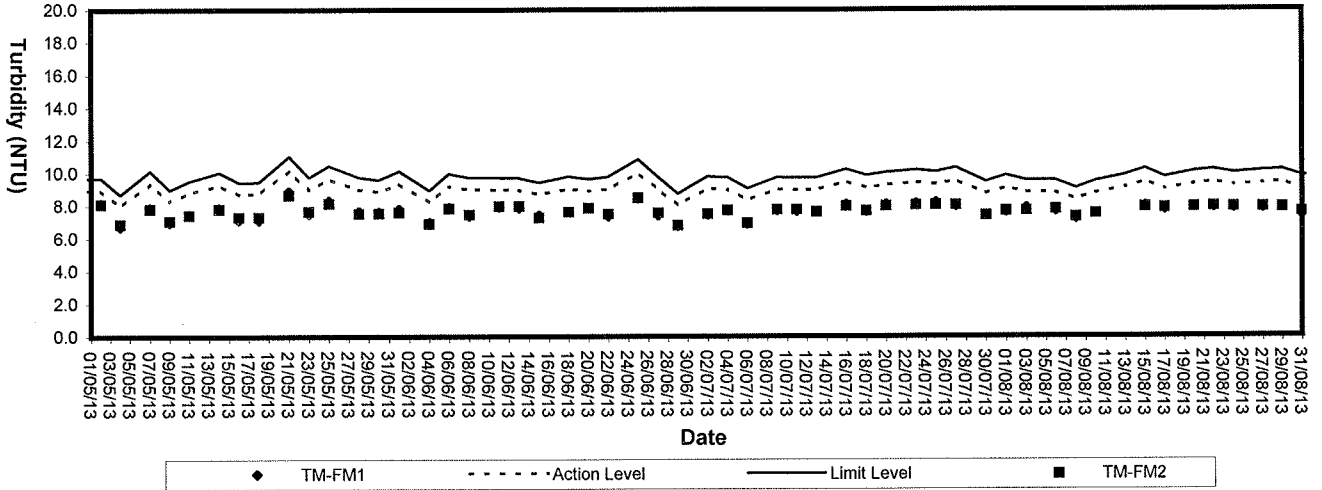


Dissolved Oxygen (Bottom) at Mid-Ebb Tide

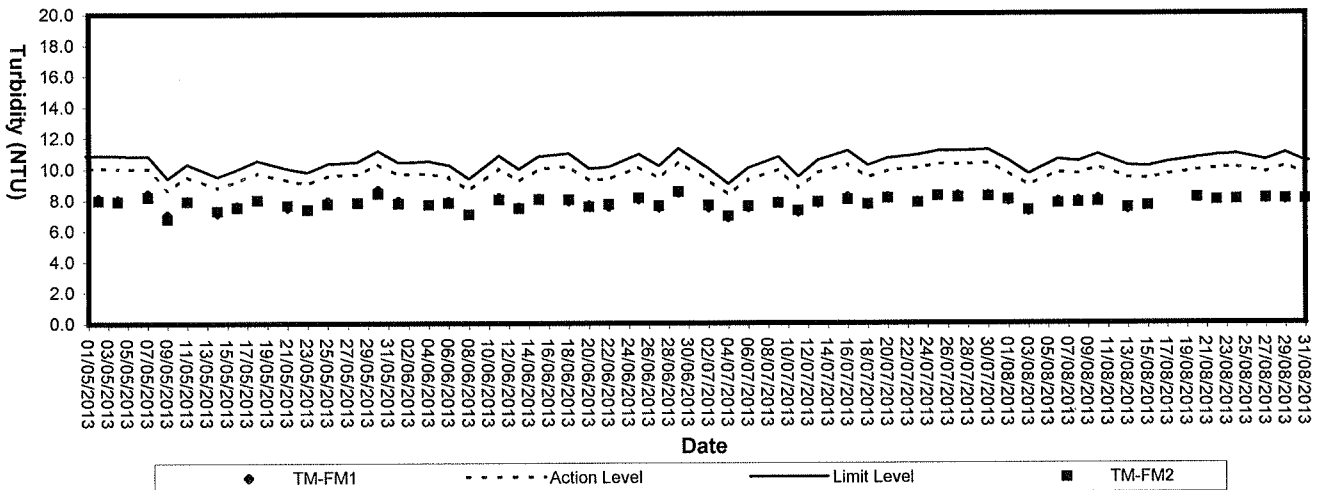




Turbidity (Depth-average) at Mid-Flood Tide

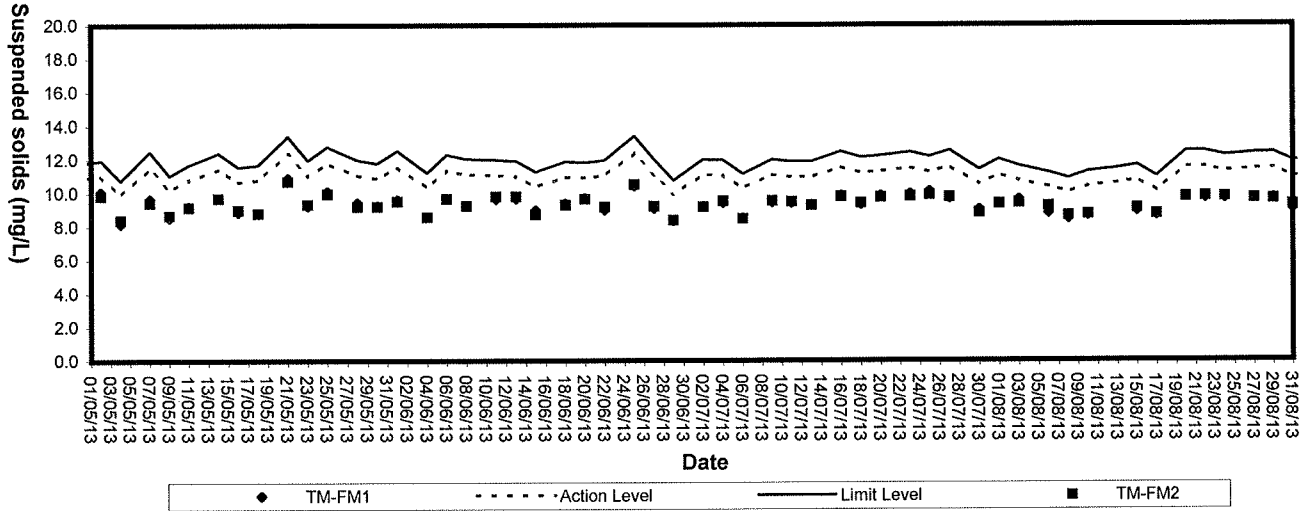


Turbidity (Depth-average) at Mid-Ebb Tide

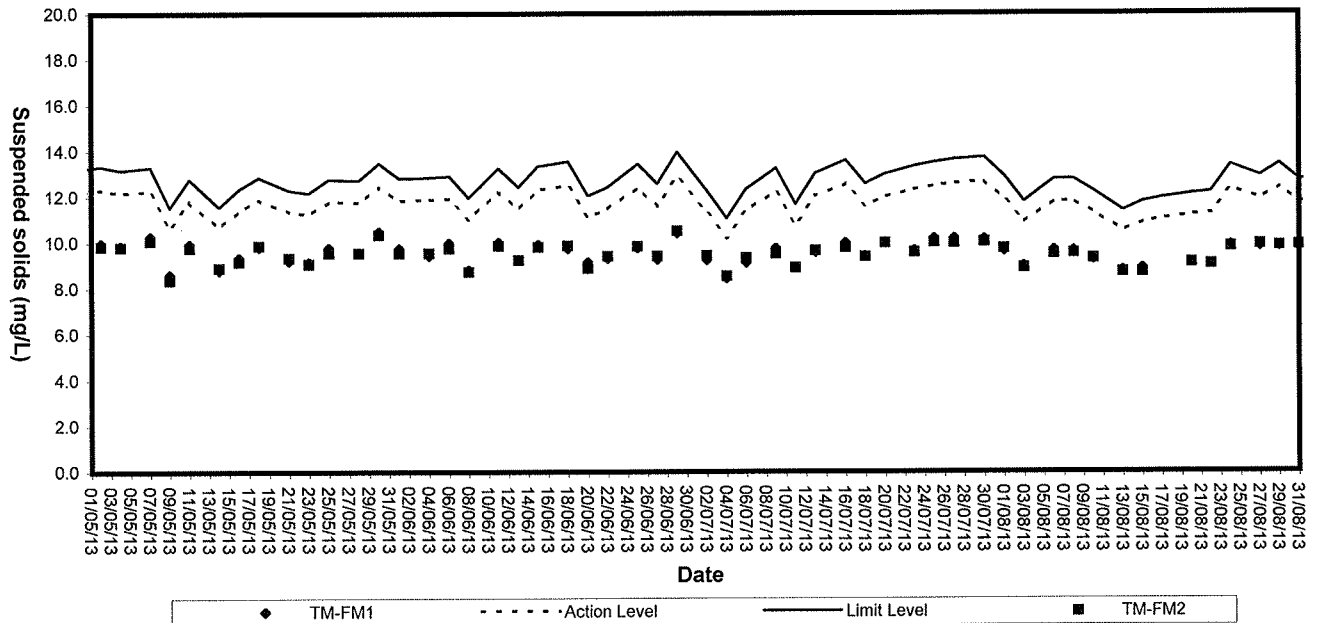




Suspended solids (Depth-average) at Mid-Flood Tide



Suspended Solids (Depth-average) at Mid-Ebb Tide



Appendix E

Environmental Quality Performance (Action / Limit Levels)



Action and Limit Levels for 1-hour TSP and 24-hour TSP Monitoring

Monitoring Location	24-hr TSP ($\mu\text{g}/\text{m}^3$)		1-hr TSP ($\mu\text{g}/\text{m}^3$)	
	Action Level	Limit Level	Action Level	Limit Level
TM-A1	192	260	344	500
TM-A2	192	260	344	500

Action and Limit Levels for Marine Water Quality Monitoring

Parameter	Action Level	Limit Level
DO (mg/L)	<u>Surface & Middle</u> <4.78 mg/L (5%-ile of baseline data) <u>Bottom</u> <4.16 mg/L (5%-ile of baseline data)	<u>Surface & Middle</u> <4.00 mg/L (1%-ile of baseline data) <u>Bottom</u> <2.00 mg/L
SS (mg/L) (Depth-averaged)	>120% of the upstream control station's SS at the same tide on the same day	>130% of the upstream control station's SS at the same tide on the same day
Turbidity (NTU) (Depth-averaged)	>120% of the upstream control station's turbidity at the same tide on the same day	>130% of the upstream control station's turbidity at the same tide on the same day

Action and Limit Levels for Noise Monitoring

Time Period	Action *	Limit *
0700-1900 hrs on normal weekdays	When one documented complaint is received	65 dB(A)

Remark (*): The Action and Limit Levels refer to the Table 26.2 – Action and Limit Levels for Noise in the Particular Specification of Contract No.CV/2005/01.



Appendix F

Event-Action Plans

EVENT/ACTION PLAN FOR AIR QUALITY EXCEEDANCE

EVENT	ACTION			Contractor
	ET Leader	IC(E)	ER	
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures 2. Notify IC(E), ER, EPD and Contractor 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Carry out analysis of contractor's working procedures to determine possible mitigation to be implemented 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented 4. Ensure remedial measures are properly implemented 5. If exceedances continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedances 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated

EVENT/ACTION PLAN FOR NOISE EXCEEDANCE

EVENT	ACTION			
	ET Leader	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify the IC(E) and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IC(E) and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IC(E). 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Notify the IC(E), the ER, the EPD and the Contractor. 2. Identify source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IC(E), the ER and the EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results 8. If exceedance due to the construction works stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst the ER, the ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedances continue, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedances is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedances is abated.

EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Action level being exceeded by one sampling day</p>	<ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with Contractor if exceedance is due to the construction works within 4 working days 8. Repeat measurement on next day of exceedance if exceedance is due to the construction works 	<ol style="list-style-type: none"> 1. Notify the ER and IEC in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance 5. Consider changes of working method if exceedance is due to the construction works 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER if exceedance is due to the construction works within 4 working days of identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Supervise the implementation of mitigation measures

EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Action level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> 1. Identify source(s) of impact; 2. Repeat in-situ measurement to confirm findings 3. Notify Contractor in writing within 24 hours of identification 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC and Contractor within 4 working of identification of an exceedance 8. Ensure mitigation measures are implemented; 9. Prepare to increase the monitoring frequency to daily; 10. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Notify IEC and ER in writing within 24 hours of identification of exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Require contractor to propose remedial measures for the analysed problem if related to the construction works 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measure 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly 5. Assess the effectiveness of the implemented mitigation measures.

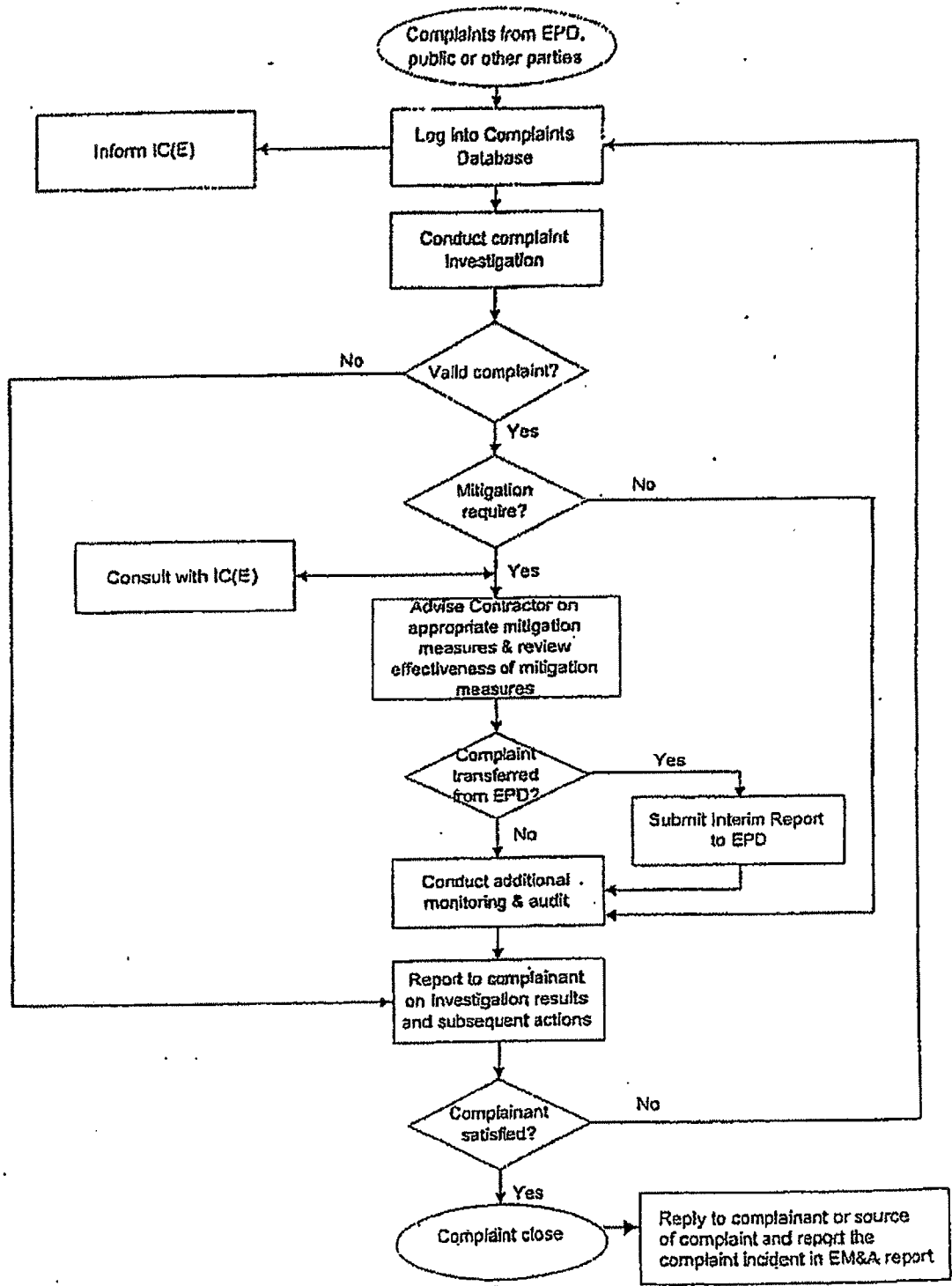
EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC, ER and Contractor within 4 working of identification of an exceedance 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Notify IEC and ER in writing; within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of the identification of an exceedance 7. Implement the agreed mitigation measures within reasonable time scale 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ET, ER and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures

EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

ACTION

Event	ET Leader	Contractor	ER	IEC
<p>Limit Level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Notify Contractor in writing within 24 hours of identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Carry out investigation 6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works 7. Discuss mitigation measures with IEC, ER and Contractor; 8. Ensure mitigation measures are implemented; 9. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> 1. Notify ER and IEC in writing within 24 hours of the identification of the exceedance and Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 8. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days; 6. Implement the agreed mitigation measures within reasonable time scale 7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities. 	<ol style="list-style-type: none"> 1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 6. Ensure remedial measures are properly implemented 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Confirm ET assessment if exceedance is due / not due to the works 3. Discuss with ER, ET and Contractor on the mitigation measures. 4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly. 5. Assess the effectiveness of the implemented mitigation measures.



Contract No. CV/2009/02
 Handling of Surplus Public Fill

Figure 4
 Environmental Complaint Handling Procedure –
 Tuen Mun Area 38 Fill Bank



東業德勤測試顧問有限公司
 ETS-TESTCONSULT LIMITED

Appendix G

Project Activities

Master Programme of Contract No. CV/2009/02 - Handling of Surplus Public Fill

Site Location : Tuen Mun Area 38 Fill Bank

ID	Activity	Original Duration	Start	Finish
S201000	Takeing Over the Existing Facilities	0	19/01/2010	
S202000	Operation	1096	19/01/2010	18/01/2013
S203000	Operation and Maintenance Tipping Halls	1096	19/01/2010	18/01/2013
S204000	Handing Over the Facilities to the Employer	0		18/01/2013



Appendix H

Implementation Schedule of Environmental Mitigation Measures (EMIS)



Environmental Mitigation Implementation Schedule

Environmental Protection Measures	Location	Implementation Status		
		Implemented	Partially implemented	Not implemented
Air Quality				
<ul style="list-style-type: none"> ▪ Dust control / mitigation measures shall be provided to prevent dust nuisance. ▪ Water sprays shall be provided and used to dampen materials. ▪ All stockpile of aggregate or spoil should be enclosed or covered and water applied in dry or windy condition. ▪ Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. ▪ Unpaved areas should be watered regularly to avoid dust generation. ▪ The designated site main haul road shall be paved or regular watering. ▪ The public road around the site entrance should be kept clean and free from dust. ▪ Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site. ▪ Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank. ▪ The temporary slope surfaces shall be covered with impermeable sheet or sprayed with water. ▪ Vehicle and equipment should be switched off while not in use. ▪ All plant and equipment should be well maintained e.g. without black smoke emission. ▪ Open burning should be prohibited. 			√	
Noise Impact				
<ul style="list-style-type: none"> ▪ The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted. ▪ Only well maintained plant should be operated on-site and plant should be serviced regularly during the site works. ▪ Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials. ▪ Air compressors and hand held breakers should have noise labels. ▪ Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. ▪ Noisy equipment and mobile plant shall always be site away from NSRs. 			√	

Remark: √ = Implemented, ∇ = Partially Implemented X = Not Implemented N/A = Not Applicable



	Location	Implementation Status			
		Implemented	Partially implemented	Not implemented	Not Applicable
Water Quality					
<ul style="list-style-type: none"> ▪ The existing / realigned intercepting channels and the sand / silt removal facilities shall be used and maintained. ▪ Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels. ▪ The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge. ▪ The material shall be properly covered to prevent washed away especially before rainstorm. ▪ Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding. ▪ The temporary slope surfaces shall be covered with impermeable sheet or sprayed with water. ▪ Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times. ▪ A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains. ▪ The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcores to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains. ▪ Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. ▪ The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities. ▪ Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water. ▪ Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer. ▪ A waste collection vessel shall be deployed to remove floating debris. 					
Landscape and Visual					
<ul style="list-style-type: none"> • The maximum stockpiling height at the fill bank shall be limited to a maximum of +40mPD. • Surface of outer slopes of the Fill Bank shall preferably be hydroseeded. • Stockpile of public fill shall be removed in a sequence to allow the outer hydroseeded to be removed later than other portions as far as practicable. • Casuarina equisetifolia were planted as buffer tree along the northern perimeter of the Site. The height of Casuarina equisetifolia was maintained at least 3m above soil level. • Lighting shall be set to minimise night-time glare. 		√			
Waste Management					
<ul style="list-style-type: none"> • Relevant licence / permits for disposal of construction waste or excavated materials available for inspection. 		√			

Remark: √ = Implemented, ∇ = Partially Implemented, X = Not Implemented, N/A = Not Applicable

Environmental Protection Measures	Location	Implementation Status			
		Implemented	Partially implemented	Not implemented	Not Applicable
<ul style="list-style-type: none"> Excavated material to be generated from construction works to be re-used on-site as far as practicable to reduce off-site disposal. 	All areas	√			
<ul style="list-style-type: none"> Mud and debris should be removed from waterworks access roads and associated drainage systems. 	All areas	√			
<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. 	All areas	√			
<ul style="list-style-type: none"> Prior to disposal of C&D waste, recyclable materials should be salvaged for reuse (such as wood and metal) and inert waste utilised as public fill to minimise the quantity of waste to be disposed of to landfill. 	All areas	√			
<ul style="list-style-type: none"> In order to monitor the disposal of C&D material and solid wastes at public filling areas and landfills, and to control fly-tipping, a trip-ticket system should be included as one of the contractual requirements. 	All areas	√			
<ul style="list-style-type: none"> Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials. 	All areas	√			
Chemical Waste Management					
<ul style="list-style-type: none"> It is required to register as a chemical waste producer if chemical wastes would be produced from the site 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. 	Waste Storage Area	√			
<ul style="list-style-type: none"> After use, chemical wastes (e.g. cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Spent chemicals should be stored and collected by an approved operator for disposal at the Chemical Waste Treatment Facility or other licensed facility in accordance with the Chemical Waste (General) Regulation. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Chemical wastes should be separated for special handling and appropriate treatment at the Chemical Waste Treatment Facility. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Chemical wastes including waste oil should be stored properly in designated areas, e.g. chemical waste storage area. 	Waste Storage Area		√		
<ul style="list-style-type: none"> The designated chemical waste storage area should only be used for storing chemical wastes. 	Waste Storage Area	√			
The set-up of chemical waste storage area should					
<ul style="list-style-type: none"> Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Be enclosed on at least 3 sides and securely closed. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Have adequate ventilation. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Be covered to prevent rainfall entering (water collected within the bund must be tested and disposal as chemical waste if necessary). 	Waste Storage Area	√			
<ul style="list-style-type: none"> Be arranged so that incompatible materials are adequately separated. 	Waste Storage Area	√			
<ul style="list-style-type: none"> Warning panels should be displayed at the waste storage area. 	Waste Storage Area	√			

Remark: √ = Implemented, ▽ = Partially Implemented, X = Not Implemented, N/A = Not Applicable

Environmental Protection Measures	Location	Implementation Status			
		Implemented	Partially implemented	Not implemented	Not Applicable
<ul style="list-style-type: none"> Waste storage area should be cleaned and maintained regularly. Chemical waste should be transported by a registered chemical waste collector to a facility licensed to receive chemical waste. All generators, fuel and oil storage should be within bundle areas. Oil leakage from machinery, vehicle and plant should be prevented. In the event of chemical waste / dangerous goods / chemicals spillage or leakage, the procedures as outlined in the Spillage Response Plan should be followed. The dangerous goods / chemical spillage or leakage procedures (including equipments) should be in place. 	<p>Waste Storage Area</p> <p>All areas</p> <p>All areas</p> <p>All areas</p> <p>All areas</p> <p>All areas</p>	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>	<p></p> <p></p> <p>√</p> <p>√</p> <p></p>	<p></p> <p></p> <p></p> <p></p> <p></p>	<p></p> <p></p> <p></p> <p></p> <p></p>
Good Site Practices					
2.2 Nomination of approved personnel, such as 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.	All areas	√			
2.3 Training of site personnel in proper waste management and chemical handling procedures should be provided.	All areas	√			
2.4 Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.	All areas		√		
2.5 Proper storage and site practices to minimise the potential for damage or contamination of construction materials.	All areas	√			
2.6 The Environmental Permit should be displaced conspicuously on site.	Site Entrance	√			
2.7 Construction noise permits should be posted at site entrance or available for site inspection.	Site Entrance				√
2.8 Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	All areas	√			
2.9 Chemical storage area provided with lock and located on sealed areas.	Chemical Storage Area	√			
2.10 All chemicals should be placed at the banded area with adequate band capacity (>110% of largest tank).	Chemical Storage Area	√			
2.11 Any unused chemicals or those with remaining functional capacity should be recycled.	All areas	√			
2.12 Regular cleaning and maintenance programme for waste storage area, drainage systems, silt traps, sumps and oil interceptors.	All areas	√			
<ul style="list-style-type: none"> To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce. A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be used, e.g. trip ticket system for chemical waste disposal. Quantities could be determined by weighing each load or other suitable methods. A collection area should be provided where waste can be stored and loaded prior to removal from site. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material. If an open area is unavoidable for the storage or loading/unloading of wastes, then the area should be banded and all the polluted surface run-off collected within this area should be diverted into wastewater treatment system. Remove wastes in a timely manner. 	All areas	√			
<ul style="list-style-type: none"> Remove wastes in a timely manner. 	All areas	√			

Remark: √ = Implemented, ∇ = Partially Implemented, X = Not Implemented, N/A = Not Applicable



Appendix I

Statistical Analysis of the Trend of Suspended Solids in the Quarter

Statistical Analysis of the Trend of Suspended Solids

For Mid-Flood Tide

Station: TM-FM1

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	5.9733	1.3518	0.3902
Quarterly Mean	39	0	9.3239	0.4870	0.078

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 3.3506 (Std Dev = 1.3722 and SE = 0.3979)
(95% CI : 2.5706 < Diff < 4.1306)

t-value of difference = 8.42 (11.4 degrees of freedom)
P = 1 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Station: TM-FM2

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	6.0267	1.1748	0.3391
Quarterly Mean	39	0	9.3530	0.4627	0.0741

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 3.3263 (Std Dev = 1.2059 and SE = 0.3471)
(95% CI : 2.6459 < Diff < 4.0067)

t-value of difference = 9.582 (11.6 degrees of freedom)
P = 1 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Statistical Analysis of the Trend of Suspended Solids

For Mid-Flood Tide

Station: TM-FC1

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	6.6942	1.8839	0.5438
Quarterly Mean	39	0	9.6291	0.5423	0.0868

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.9349 (Std Dev = 1.8729 and SE = 0.5507)
(95% CI : 1.8555 < Diff < 4.0143)

t-value of difference = 5.329 (11.1 degrees of freedom)
P = 0.99992 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Station: TM-FC2

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	6.3067	1.8674	0.5391
Quarterly Mean	39	0	9.1658	0.4190	0.0671

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.8591 (Std Dev = 1.8295 and SE = 0.5432)
(95% CI : 1.7944 < Diff < 3.9238)

t-value of difference = 5.263 (10.8 degrees of freedom)
P = 0.99992 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.



Statistical Analysis of the Trend of Suspended Solids

For Mid-Ebb Tide

Station: TM-FM1

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	7.0008	1.6394	0.4733
Quarterly Mean	39	0	9.5179	0.4666	0.0747

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.5171 (Std Dev = 1.6285 and SE = 0.4791)
(95% CI : 1.578 < Diff < 3.4562)

t-value of difference = 5.254 (11.1 degrees of freedom)
P = 0.99991 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Station: TM-FM2

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	7.2758	1.5293	0.4415
Quarterly Mean	39	0	9.4983	0.4511	0.0722

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.2225 (Std Dev = 1.5232 and SE = 0.4473)
(95% CI : 1.3457 < Diff < 3.0993)

t-value of difference = 4.968 (11.1 degrees of freedom)
P = 0.99986 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Statistical Analysis of the Trend of Suspended Solids

For Mid-Ebb Tide

Station: TM-FC1

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	7.6392	1.5074	0.4351
Quarterly Mean	39	0	9.8077	0.5459	0.0874

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.1685 (Std Dev = 1.5311 and SE = 0.4438)
(95% CI : 1.2986 < Diff < 3.0384)

t-value of difference = 4.886 (11.4 degrees of freedom)
P = 0.99982 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.

Station: TM-FC2

t-test

Group Name	N	Missing	Mean	Std Dev	SE
130% Baseline Mean	12	0	6.6950	1.9561	0.5647
Quarterly Mean	39	0	9.3137	0.4516	0.0723

Result:

Probability that two variances are equal (f-test) = 1

Difference between means = 2.6187 (Std Dev = 1.919 and SE = 0.5693)
(95% CI : 1.5029 < Diff < 3.7345)

t-value of difference = 4.6 (10.9 degrees of freedom)
P = 0.99975 (>0.05)

Conclusion:

There is no statistically significant difference between the groups.



Appendix J

Site General Layout plan

Appendix K

Weather Condition

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, June 2013

Date	Mean Pressure at M.S.L. (hPa)	Air Temperature			Mean Dew Point Temperature (deg C)	Relative Humidity		
		Max. (deg C)	Mean (deg C)	Min. (deg C)		Max. (%)	Mean (%)	Min. (%)
Jun 1	*****	33.8	29.7	26.7	23.9	86	72	48
Jun 2	*****	33.4	30.2	27.4	24.2	86	71	57
Jun 3	*****	34.5	30.1	27.4	24.4	85	72	51
Jun 4	*****	32.7	28.2	25.0	23.6	90	77	55
Jun 5	*****	29.9	26.2	24.5	23.4	92	85	69
Jun 6	*****	30.0	27.1	24.6	23.9	92	83	72
Jun 7	*****	33.5	29.6	26.8	24.4	88	74	55
Jun 8	*****	33.1	29.6	27.4	24.6	84	75	61
Jun 9	*****	33.0	29.8	27.3	25.7	90	79	64
Jun 10	*****	33.4	28.6	24.6	24.8	87	81	63
Jun 11	*****	27.9	23.7	22.3	21.7	92	89	83
Jun 12	*****	28.0	25.1	22.7	19.4	87	71	59
Jun 13	*****	27.4	24.9	22.2	20.7	90	78	67
Jun 14	*****	28.2	25.1	23.8	22.8	92	87	71
Jun 15	*****	27.3	26.1	25.1	24.0	93	88	82
Jun 16	*****	31.5	27.9	25.4	24.5	90	82	67
Jun 17	*****	32.9	29.2	27.2	24.4	84	76	61
Jun 18	*****	33.3	29.4	26.8	24.5	88	75	57
Jun 19	*****	34.8	30.2	26.5	24.3	87	72	47
Jun 20	*****	35.6	30.7	27.1	24.2	87	70	45
Jun 21	*****	35.3	30.6	26.9	23.5	84	67	46
Jun 22	*****	30.8	28.2	25.5	23.6	91	77	66
Jun 23	*****	30.2	27.4	25.0	24.0	92	82	71
Jun 24	*****	28.7	26.6	24.6	24.0	93	86	76
Jun 25	*****	31.8	29.4	27.2	24.9	85	77	68
Jun 26	*****	32.0	29.6	28.1	24.8	84	75	66
Jun 27	*****	32.2	29.8	28.5	24.4	80	73	63
Jun 28	*****	31.8	29.6	28.2	24.3	80	74	64
Jun 29	*****	33.4	30.1	28.5	24.7	81	73	59
Jun 30	*****	32.8	29.7	27.9	23.5	82	70	51
Mean	*****	31.8	28.4	26.0	23.8	87	77	62
Maximum	*****	35.6	30.7	28.5	25.7	93	89	83
Minimum	*****	27.3	23.7	22.2	19.4	80	67	45

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, June 2013

Date	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
Jun 1	0.0	***	*****
Jun 2	0.0	***	*****
Jun 3	0.0	***	*****
Jun 4	4.5	***	*****
Jun 5	41.0	***	*****
Jun 6	6.0	***	*****
Jun 7	0.0	***	*****
Jun 8	0.0	***	*****
Jun 9	1.0	***	*****
Jun 10	7.5	***	*****
Jun 11	61.0	***	*****
Jun 12	0.0	***	*****
Jun 13	1.0	***	*****
Jun 14	25.5	***	*****
Jun 15	26.0	***	*****
Jun 16	6.0	***	*****
Jun 17	0.0	***	*****
Jun 18	0.0	***	*****
Jun 19	0.0	***	*****
Jun 20	0.0	***	*****
Jun 21	3.5	***	*****
Jun 22	15.5	***	*****
Jun 23	11.5	***	*****
Jun 24	100.0	***	*****
Jun 25	1.0	***	*****
Jun 26	0.0	***	*****
Jun 27	0.0	***	*****
Jun 28	0.0	***	*****
Jun 29	0.0	***	*****
Jun 30	0.0	***	*****
Mean	-----	***	*****
Total	311.0	---	-----
Maximum	100.0	---	*****
Minimum	0.0	---	*****

*** unavailable

missing (less than 24 hourly observations a day)

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, July 2013

Date	Mean Pressure at M.S.L. (hPa)	Air Temperature			Mean Dew Point Temperature (deg C)	Relative Humidity		
		Max. (deg C)	Mean (deg C)	Min. (deg C)		Max. (%)	Mean (%)	Min. (%)
Jul 1	*****	34.1	29.0	25.7	23.6	91	74	50
Jul 2	*****	30.4	28.8	27.9	24.0	85	75	66
Jul 3	*****	32.6	29.6	27.6	24.3	83	74	59
Jul 4	*****	32.7	29.7	27.1	23.8	83	71	56
Jul 5	*****	33.0	30.0	27.0	23.1	81	67	46
Jul 6	*****	30.5	27.9	26.8	24.0	88	80	69
Jul 7	*****	31.5	27.4	24.8	23.6	91	81	61
Jul 8	*****	32.1	28.8	26.1	23.4	87	73	59
Jul 9	*****	32.6	29.1	26.6	23.1	85	71	53
Jul 10	*****	31.5	28.2	26.6	23.5	85	76	56
Jul 11	*****	32.7	29.2	26.0	23.2	86	71	52
Jul 12	*****	33.7	30.3	27.5	24.1	81	70	50
Jul 13	*****	33.5	30.6	27.9	25.1	84	73	54
Jul 14	*****	32.5	29.8	26.8	24.7	83	75	61
Jul 15	*****	30.4	26.7	25.1	23.9	91	85	68
Jul 16	*****	27.0	26.1	25.0	23.5	92	86	81
Jul 17	*****	31.0	27.0	25.2	23.3	87	80	63
Jul 18	*****	30.7	27.7	24.8	22.8	88	75	59
Jul 19	*****	31.6	28.5	24.9	23.5	93	75	62
Jul 20	*****	30.7	27.5	25.7	24.6	90	84	72
Jul 21	*****	31.3	28.4	26.6	23.9	84	77	64
Jul 22	*****	31.9	28.9	27.3	23.8	81	74	59
Jul 23	*****	31.6	28.4	26.9	23.9	84	77	65
Jul 24	*****	28.5	26.0	24.5	23.7	92	87	75
Jul 25	*****	26.5	25.5	24.4	23.8	93	90	84
Jul 26	*****	28.1	26.5	24.8	23.7	92	85	75
Jul 27	*****	29.8	26.7	24.3	24.0	92	85	72
Jul 28	*****	30.4	27.4	24.9	24.2	92	83	70
Jul 29	*****	32.2	28.5	25.1	23.9	89	77	58
Jul 30	*****	32.5	29.1	25.7	23.1	86	71	52
Jul 31	*****	32.6	29.7#	27.6	24.1#	81	72#	57
Mean	*****	31.3	28.3#	26.0	23.8#	87	77#	62
Maximum	*****	34.1	30.6#	27.9	25.1#	93	90#	84
Minimum	*****	26.5	25.5#	24.3	22.8#	81	67#	46

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, July 2013

Date	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
Jul 1	17.5	***	*****
Jul 2	0.5	***	*****
Jul 3	0.0	***	*****
Jul 4	0.0	***	*****
Jul 5	0.0	***	*****
Jul 6	6.5	***	*****
Jul 7	13.5	***	*****
Jul 8	0.0	***	*****
Jul 9	0.0	***	*****
Jul 10	0.0	***	*****
Jul 11	0.0	***	*****
Jul 12	0.0	***	*****
Jul 13	0.0	***	*****
Jul 14	0.0	***	*****
Jul 15	9.0	***	*****
Jul 16	32.5	***	*****
Jul 17	0.0	***	*****
Jul 18	0.0	***	*****
Jul 19	30.0	***	*****
Jul 20	9.5	***	*****
Jul 21	0.0	***	*****
Jul 22	0.0	***	*****
Jul 23	0.5	***	*****
Jul 24	48.0	***	*****
Jul 25	44.0	***	*****
Jul 26	22.5	***	*****
Jul 27	13.0	***	*****
Jul 28	10.5	***	*****
Jul 29	0.0	***	*****
Jul 30	0.0	***	*****
Jul 31	0.0#	***	*****
Mean	-----	***	*****
Total	257.5#	---	-----
Maximum	48.0#	---	*****
Minimum	0.0#	---	*****

*** unavailable

missing (less than 24 hourly observations a day)

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, August 2013

Date	Mean Pressure at M.S.L. (hPa)	Air Temperature			Mean Dew Point Temperature (deg C)	Relative Humidity		
		Max. (deg C)	Mean (deg C)	Min. (deg C)		Max. (%)	Mean (%)	Min. (%)
Aug 1	*****	32.7	29.4	27.1	23.9	86	73	60
Aug 2	*****	29.5	27.2	24.3	24.5	96	85	71
Aug 3	*****	29.8	27.7	25.5	25.5	97	88	78
Aug 4	*****	32.4	29.0	26.8	24.6	94	78	60
Aug 5	*****	32.6	29.0	25.5	24.3	90	77	57
Aug 6	*****	32.2	29.1	26.2	24.8	90	78	63
Aug 7	*****	33.0	28.8	25.7	25.1	94	81	63
Aug 8	*****	32.5	29.4	27.0	24.9	90	77	63
Aug 9	*****	33.5	29.8	26.6	25.1	91	77	54
Aug 10	*****	33.5	30.0	27.1	26.0	93	80	64
Aug 11	*****	33.5	29.6	26.4	24.7	85	75	60
Aug 12	*****	33.5	30.0	26.8	24.8	89	74	60
Aug 13	*****	30.1	27.6	25.5	24.2	96	82	67
Aug 14	*****	28.6	27.2	25.7	24.6	96	86	76
Aug 15	*****	28.7	28.1	26.5	25.2	93	84	79
Aug 16	*****	28.5	27.6	26.3	25.7	98	90	83
Aug 17	*****	29.1	27.6	25.4	25.7	98	90	77
Aug 18	*****	28.9	27.8	26.5	26.3	97	92	85
Aug 19	*****	30.9	27.7	26.5	25.7	97	89	77
Aug 20	*****	31.8	28.4	26.1	26.0	96	88	71
Aug 21	*****	32.7	29.4	26.0	25.8	95	81	66
Aug 22	*****	31.1	28.9	25.3	26.5	97	87	74
Aug 23	*****	28.8	28.2	26.6	25.9	98	88	82
Aug 24	*****	29.3	27.6	25.9	25.8	98	90	81
Aug 25	*****	30.1	27.7	25.5	25.5	98	88	76
Aug 26	*****	32.6	28.9	25.7	25.2	95	81	65
Aug 27	*****	33.1	29.2	26.2	25.4	94	81	62
Aug 28	*****	33.2	29.5	26.0	24.9	92	77	61
Aug 29	*****	33.0	29.5	26.6	25.0	91	78	59
Aug 30	*****	29.2	27.3	24.6	25.4	98	90	81
Aug 31	*****	30.0	26.4	23.9	25.1	98	93	76
Mean	*****	31.2	28.5	26.0	25.2	94	83	69
Maximum	*****	33.5	30.0	27.1	26.5	98	93	85
Minimum	*****	28.5	26.4	23.9	23.9	85	73	54

Extract of Meteorological Observations for Tuen Mun Automatic Weather Station, August 2013

Date	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
Aug 1	0.5	***	*****
Aug 2	28.0	***	*****
Aug 3	29.5	***	*****
Aug 4	0.5	***	*****
Aug 5	0.0	***	*****
Aug 6	0.0	***	*****
Aug 7	2.5	***	*****
Aug 8	0.5	***	*****
Aug 9	0.0	***	*****
Aug 10	0.0	***	*****
Aug 11	0.0	***	*****
Aug 12	0.0	***	*****
Aug 13	22.5	***	*****
Aug 14	35.0	***	*****
Aug 15	5.5	***	*****
Aug 16	19.0	***	*****
Aug 17	26.5	***	*****
Aug 18	18.5	***	*****
Aug 19	2.0	***	*****
Aug 20	8.5	***	*****
Aug 21	0.0	***	*****
Aug 22	19.0	***	*****
Aug 23	24.5	***	*****
Aug 24	16.0	***	*****
Aug 25	6.5	***	*****
Aug 26	0.0	***	*****
Aug 27	0.0	***	*****
Aug 28	0.0	***	*****
Aug 29	0.0	***	*****
Aug 30	33.5	***	*****
Aug 31	12.5	***	*****
Mean	-----	***	*****
Total	311.0	---	-----
Maximum	35.0	---	*****
Minimum	0.0	---	*****

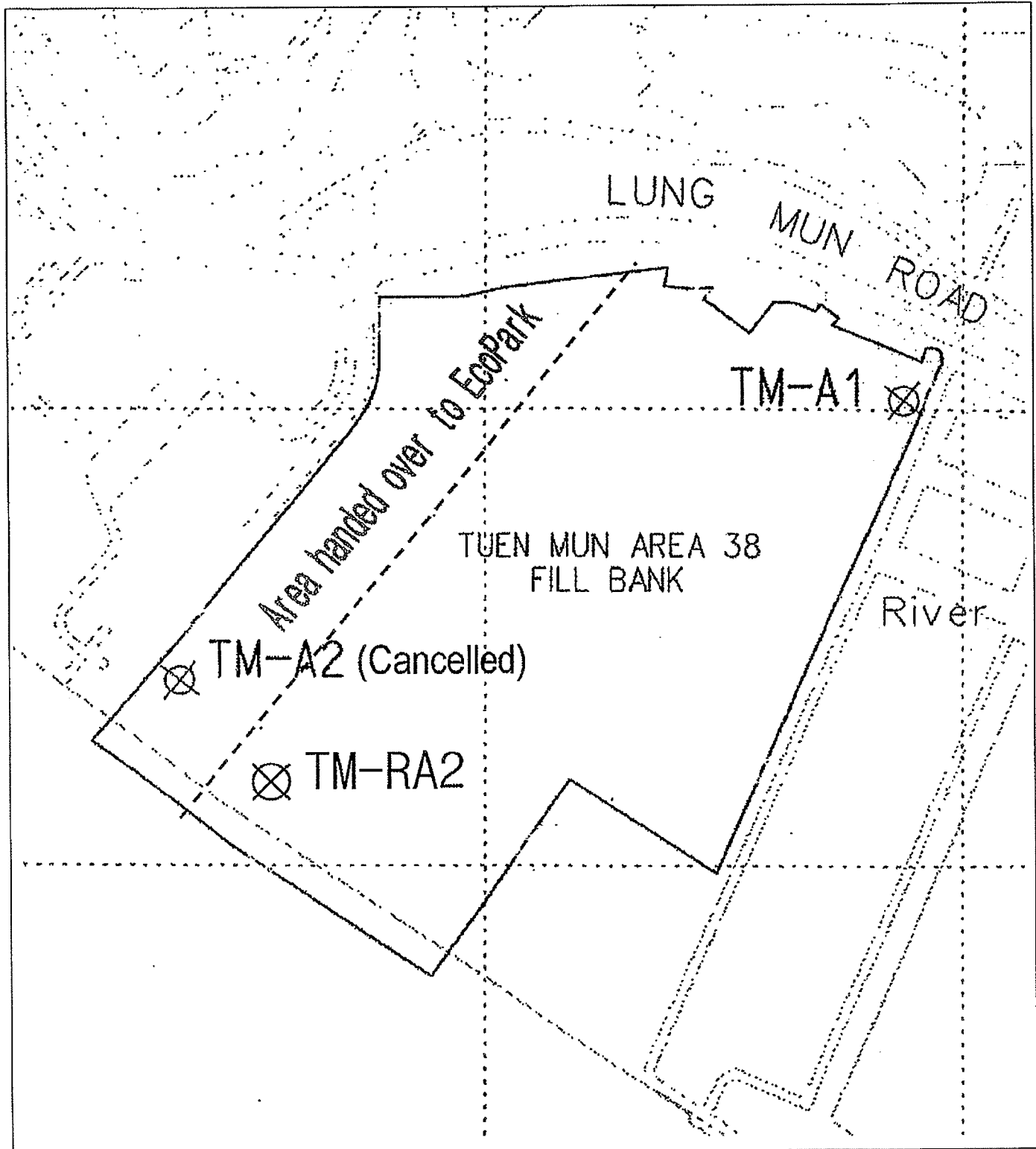
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missing (less than 24 hourly observations a day)

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected



Figures

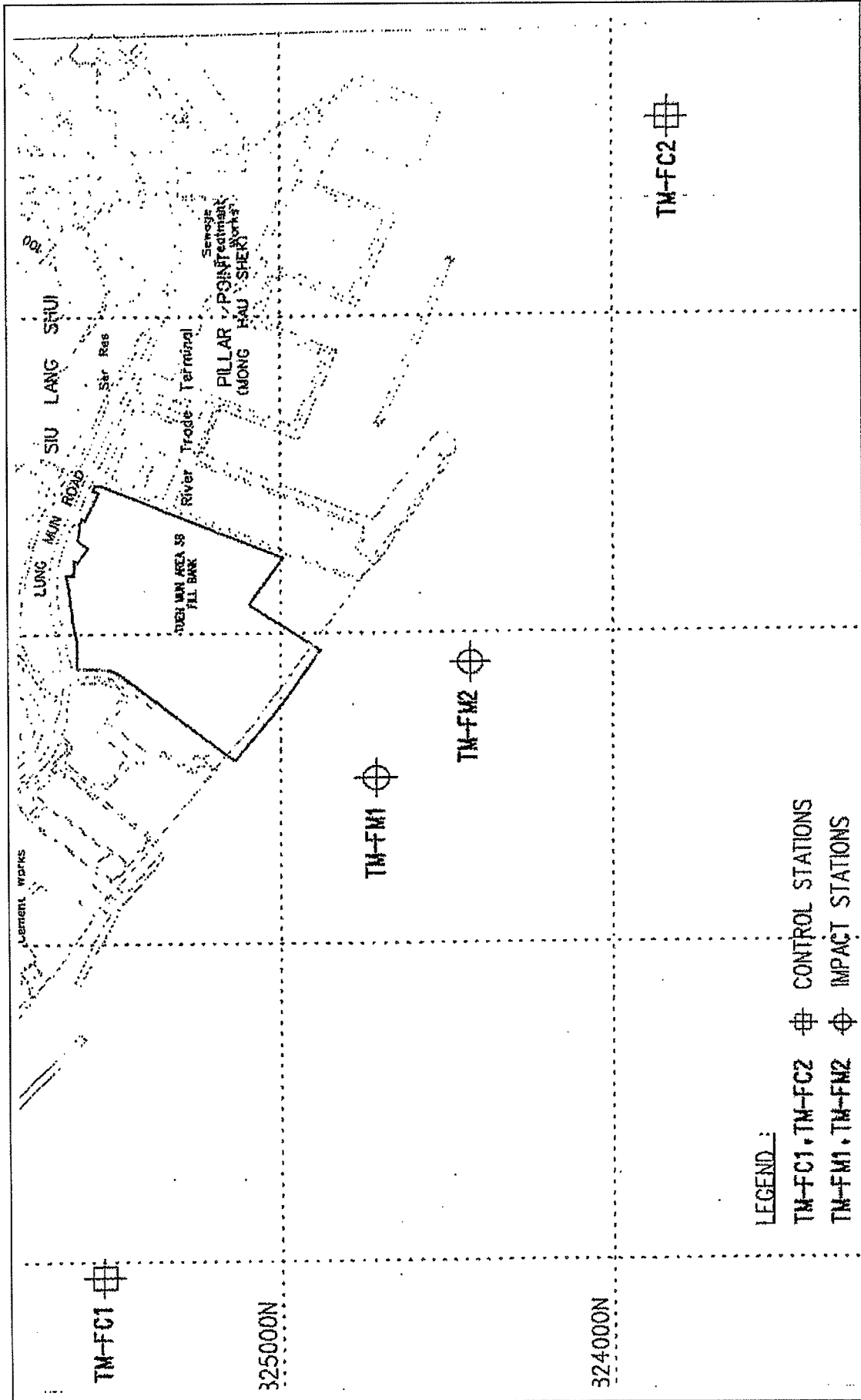


Contract No. CV/2009/02
 Handling of Surplus Public Fill

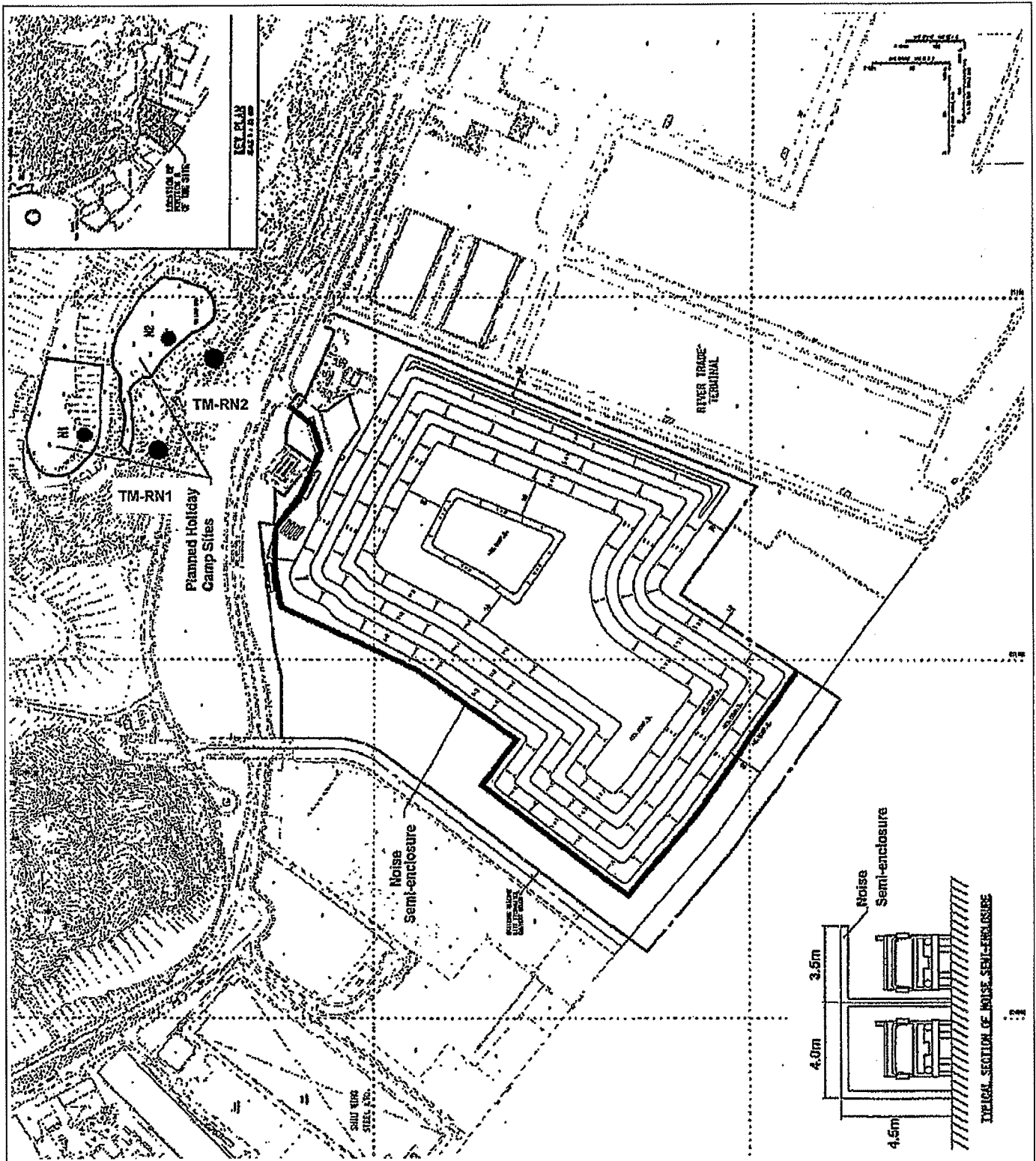
Figure 1
 Locations of Air Quality Monitoring Stations –
 Tuen Mun Area 38 Fill Bank



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Figure 3
 Locations of Noise Quality Monitoring Stations –
 Tuen Mun Area 38 Fill Bank



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