China Harbour Engineering Company Limited

Contract No. DC/2009/09 Construction of Tai Po Sewage Treatment Works – Stage V Phase II B

Quarterly Environmental Monitoring and Audit Summary Report (October to December 2010)

(Version 2.0)

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-	(Environ	nental Tear	n Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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EXECUTIVE SUMMARY

Introduction

- This is the 2nd Quarterly Environmental Monitoring and Audit (EM&A) Summary Report prepared by Cinotech Consultants Limited (the Environmental Team, ET) for DSD Contract no. DC/2009/09 "Construction of Tai Po Sewage Treatment Works – Stage V Phase IIB". This summary report presents EM&A works performed in the period between October and December 2010.
- 2. The construction activities undertaken in the reporting quarter include:
 - Confined Space Works;
 - Dismantling works;
 - Drainage and Excavation works;
 - Landscaping works;
 - Mini-piling works;
 - Pre-drilling works;
 - Pre-bored socketted H-pilings;
 - Pipeline works;

Environmental Monitoring and Audit Works

- 3. Environmental monitoring and audit works for the Project was performed regularly as stipulated in the EM&A Manual and the results were checked and reviewed. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked.
- 4. Summary of the events and action taken in the reporting quarter is tabulated in **Table I**.

Table I Summary Table for Events Recorded in the Reporting Quarter

Parameter	No. of Ex	ceedance	No. of Events	Action Taken		
1 al allietel	Action Level	Limit Level	due to this Project	Action Taken		
1-hr TSP	0	0	0	N/A		
24-hr TSP	0	0	0	N/A		
Noise	0	0	0	N/A		

Construction Noise

- 5. All construction noise monitoring was conducted as scheduled in the reporting quarter.
- 6. No Action Level (public complaint) / Limit Level exceedance was recorded in the reporting quarter.

Air Quality

7. The air quality monitoring was conducted as scheduled in this reporting period. No Action/Limit Level exceedance was recorded in the reporting period.

Landfill Gas

8. In the reporting period, excavation works were undertaken within the 250m Consultation Zone of Shuen Wan Landfill. Landfill gas monitoring was performed by the Safety Officer of the Contractor. No Action/Limit Level exceedance was recorded in the reporting period.

Environmental Complaint and Prosecution

9. No environmental complaint, prosecution or notification of summons was received in this reporting quarter.

Environmental Licensing and Permitting

10. Environmental related licenses/permits granted to the Project include the Environmental Permit (EP) for the Project, the Discharge Licence, Construction Noise Permit and the Waste Disposal (Chemical Waste) Licence.

Future Key Issues

- 11. The anticipated environmental impacts will be mainly on ponding water and surface runoff after rain as well as the noise nuisance and dust emission from the major construction activities will be undertaken in the coming quarter, including:
 - Confined Space Works;
 - Dismantling works;
 - Drainage and Excavation works;
 - Landscaping works;
 - Mini-piling works;
 - Pre-drilling works;
 - Pre-bored socketted H-pilings;
 - Pipeline works;

1. INTRODUCTION

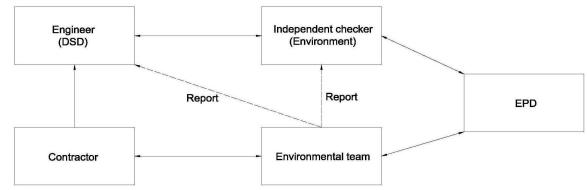
Background

- 1.1 Tai Po Sewage Treatment Works (TPSTW) is located within the Tai Po Industrial Estate. It currently comprises four Stages: I, II, IVA and IVB works. The TPSTW Stage V aims to upgrade the existing STW to provide additional sewage treatment capacity from the present design flow of 88,000 m³/day to 130,000 m³/day to meet the demands of both the existing and future developments, and to meet the revised discharge license requirements.
- 1.2 The TPSTW Stage V, Phase I and Phase II are Designated Projects under the Environmental Impact Assessment Ordinance (Cap. 449) with the same EIAO Register No. AEIAR – 081/2004. A study of environmental impact assessment (EIA) was undertaken to evaluate various environmental impacts associated with the works within these two Designed Projects. An EIA Report as well as an Environmental Monitoring and Audit (EM&A) Manual were approved by the Environmental Protection Department (EPD) on 28 October 2004.
- 1.3 The Stage V works will be implemented in 2 phases. The design capacities of Phase I and Phase II works are 100,000 m³/d and 130,000 m³/d respectively. An Environmental Permit (EP) No. EP-265/2007 was issued on 22 March 2007 for the TPSTW Stage V Phase II to the Drainage Services Department (DSD) as the Permit Holder. The project "Tai Po Sewage Treatment Works Stage V Phase IIB" formed part of the Phase II works, includes additional secondary treatment process units (1 primary clarifier; 3 bioreactors and 2 final clarifiers) in TPSTW for its future extended plant design capacity of 120,000 m³/day. A master construction programme of the Project is provided in Appendix A. A site layout plan is provided in Figure 1.1. The construction activities of the Project commenced on 3 July 2010.
- 1.4 Cinotech Consultants Ltd. was commissioned by the Contractor as the Environmental Team (ET) to undertake the EM&A works for the Project. Dr. Priscilla CHOY of Cinotech Consultants Ltd. was appointed as the ET Leader as per the Condition 2.1 of the EP. Ove Arup and Partners Hong Kong Limited. was appointed as the IEC under Condition 2.2 of the EP. This is the 2nd quarterly EM&A summary report summarizing the EM&A works for the Project between October and December 2010.

Project Organizations

- 1.5 Different parties with different levels of involvement in the project organization include:
 - Project Proponent / Engineer's Representative (ER) Drainage Services Department
 - Environmental Team (ET) Cinotech Consultants Ltd.
 - Independent Environmental Checker (IEC) Ove Arup and Partners Hong Kong Limited
 - E&M Contractor China Harbour Engineering Company Ltd.
- 1.6 The responsibilities of respective parties are detailed in Section 1.10 of the Final EM&A Manual of the Project.

1.7 The Project Organization during Construction Phase



1.8 The key contacts of the Project are shown in **Table 1.1**.

Party	Role	Name	Name Position		Fax No.	
		Mr. LAI cheuk-ho	Mr. LAI cheuk-ho Chief Engineer			
DSD	SP Division	Mr. IP Shu-kuen	Senior Engineer	2594 7502	2827 8700	
		Mr. TSANG Lap-kei	Engineer	2594 7459		
		Dr. Priscilla CHOY	ET Leader	2151 2089		
Cinotech	Environmental Team	Mr. TY Yeung	Project Coordinator and Audit Team Leader	2151 2099	3107 1388	
		Mr. Henry LEUNG	Monitoring Team Leader	2151 2087		
Arup	Independent Environmental	Mr. Coleman NG	Independent Environmental Checker	2268 3097	2528 3031	
Arup Environmental Checker		Mr. Cyrus LEUNG	Assistant to Independent Environmental Checker	2268 3456	2528 5051	
		Mr. TK CHEUNG	Project Manager	9863 2954		
CHEC	Civil Contractor	Mr. Aaron AU	Site Agent	6345 0754	2603 6899	
		Mr. Jason TSE	Environmental Offiecr	9320 3608		

Table 1.1Key Project Contacts

Construction Programme and Synopsis of Work

- 1.9 The construction programme is presented in **Appendix A**. The site activities undertaken during the reporting quarter included:
 - Confined Space Works;
 - Dismantling works;
 - Drainage and Excavation works;
 - Landscaping works;
 - Mini-piling works;
 - Pre-drilling works;
 - Pre-bored socketted H-pilings;
 - Pipeline works;

Summary of EM&A Requirements

- 1.10 The EM&A programme requires construction phase air quality, noise monitoring and landfill gas monitoring as well as environmental site audits. The EM&A requirements are described in the following sections, including:
 - All monitoring parameters;
 - 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.
- 1.11 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 4 of this report.
- 1.12 This report presents the monitoring results, observations, locations, equipment, period, methodology and QA/QC procedures of the required monitoring parameters, namely air quality and noise as well as audit works for the Project in the reporting period.

2. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

Monitoring Parameters and Monitoring Locations

- 2.1 The EM&A Manual designate locations for the ET to monitor environmental impacts in terms of noise and air quality due to the Project. The Project area and monitoring locations are depicted in **Figure 1.2**. Appendix B gives details of monitoring requirements.
- 2.2 In accordance with clause 8.8 of the EM&A Manual, the number and location of the monitoring stations and parameters can be referred to Monthly EM&A reports in order to cater for any changes in the surrounding environmental and the nature of works in progress. In the reporting months, there is no alteration made on changing the location of the monitoring stations.

Monitoring Methodology and Calibration Details

2.3 Monitoring works/equipments were conducted/calibrated regularly in compliance with the EM&A Manual's requirements. Monitoring methodologies and calibration details can be referred to Monthly EM&A reports. Valid calibration certificates were attached in the appendices of the relevant Monthly EM&A reports.

Environmental Quality Performance Limits (Action and Limit Levels)

2.4 The environmental quality performance limits, i.e. Action and Limit Levels were derived from the baseline monitoring results. Should the measured environmental quality parameters exceed the Action/Limit Levels, the respective action plans would be implemented. The Action/Limit Levels for each environmental parameter are given in **Appendix C**.

Environmental Mitigation Measures

2.5 Relevant mitigation measures as recommended in the project EIA report have been stipulated in the EM&A Manual for the Contractor to implement. A summary of the Updated Environmental Mitigation Implementation Schedule (EMIS) is given in **Appendix H**.

3. MONITORING RESULTS

Weather Conditions

3.1 The weather during monitoring sessions was mainly sunny or cloudy. The weather conditions for each individual monitoring session were presented in corresponding of Monthly EM&A Reports.

Air Quality

- 3.2 Air quality monitoring was conducted as scheduled in the reporting period.
- 3.3 Graphical presentations of 1-hr TSP and 24-hr TSP monitoring results are shown in **Appendices D** and **E**, respectively.
- 3.4 All measured 1-hr and 24-hr TSP levels were below the Action/Limit Levels. No exceedance was recorded in the reporting quarter.

Construction Noise

- 3.5 All construction noise monitoring was conducted as scheduled in the reporting period.
- 3.6 Graphical representations of the monitoring results are shown in **Appendix F**. No Action Level (public complaint) / Limit Level exceedance was recorded in the reporting period.

Landfill Gas

- 3.7 All Landfill gas measurements were performed by the Safety Officer of the civil works Contractor (CHEC) in the reporting period.
- 3.8 Graphical representations of the monitoring results are shown in **Appendix G**. No Action/Limit Level exceedance was recorded in the reporting period.

4. AUDIT RESULTS

Implementation Status of Environmental Mitigation Measures

4.1 The implementation status of environmental mitigation measures (EMIS) is given in Appendix H.

Site Audit Summary

4.2 During site inspections in the reporting period, no non-conformance was identified. The observations and recommendations made in each site audit session in the reporting period are summarized in **Table 4.1**.

Table 4.1 Observations and Recommendations of Site Audit

Parameters	Date	Observations and Recommendations	Follow-up
Water Quality	12-November- 2010	Slit water was direct discharge to hole which link to u-channel at outside sub-office. The Contractor was reminded to provide the mitigation measures to avoid discharging directly.	The situation was observed rectified in audit session 101118.
Air Quality	12-November- 2010	Dust generation was observed during breaking work and without watering continuously at Tank 7. The Contractor was reminded to ensure water spraying continuously during breaking work.	The situation was observed rectified in audit session 101118.
Reminder	8-October- 2010	The Contractor was reminded to reinforce with bund near the u-channel at near tank 7.	The situation was observed rectified in audit session 101014.
	8-October- 2010	The Contractor was reminded to cover with impervious material at stockpile at Sludge Sediment Tank and Biogas Holding Tank.	The situation was observed rectified in audit session 101014.
	8-October- 2010	Deposited mud should be cleared at soaking pit at A- Tank 5 and 6.	The situation was observed rectified in audit session 101014.
	14-October- 2010	Stagnant water was observed within the drip tray. The Contractor was reminded to clear it.	The situation was observed rectified in audit session 101021.
	21-October- 2010	General refuse should be stored within the recycling bin at tank 11 and 12.	The situation was observed rectified in audit session 101104.
	28-October- 2010	The Contractor was reminded to water the site regularly.	The situation was observed rectified in audit session 101104.
	28-October- 2010	The general refuse should be cleared at A-Tank.	The situation was observed rectified in audit session 101104.
	4-November- 2010	The wood material should be cleared at tank 7.	The situation was observed rectified in audit session 101112.
	4-November- 2010	Ponding water within the sedimentation tank should be cleared at Tank 11 and 12.	The situation was observed rectified in audit session 101112.

Parameters	Date	Observations and Recommendations	Follow-up
	4-November- 2010	The damaged tree should be removed at Sludge Sediment Tank.	The situation was observed rectified in audit session 101112.
	12-November- 2010	Non-used battery should be cleared at Tank 11 & 12.	The situation was observed rectified in audit session 101118.
	18-November- 2010	Access should be provided for allowing the worker can access to the chemical waste storage area at outside the sub-office.	The situation was observed rectified in audit session 101202.
	25-November- 2010	Access should be provided for allowing the worker can access to the chemical waste storage area at outside the sub-office.	The situation was observed rectified in audit session 101202.
	25-November- 2010	General refuse should be cleared at outside the sub- office.	The situation was observed rectified in audit session 101202.
		Sand and slit should be cleared regularly at main haul road.	The situation was observed rectified in audit session 101210.
	2-December- 2010	Drip tray should be provided at chemical oil storage tank in accordance with relevant WCO requirement.	The situation was observed rectified in audit session 101210.
	10-December- 2010	The Contractor was reminded to ensure the excavator can operate properly without oil leakage at Tank No.7.	The situation was observed rectified in audit session 101217.
	10-December- 2010	The general refuse should be cleared regularly at FC11B.	The situation was observed rectified in audit session 101217.
	10-December- 2010	Stockpile should be covered with impervious material at dewatering house, to avoid dust generation.	The situation was observed rectified in audit session 101217.
10-December 2010		The Contractor was reminded to avoid water spillage direct to u-channel at outside the site office.	The situation was observed rectified in audit session 101217.
	17-December- 2010	Stagnant water within the drip tray should be cleared at outside the Site Office.	The situation was observed rectified in audit session 101224.
	24-December- 2010	The haul road should be watered regularly, to avoid dust generation.	The situation was observed rectified in audit session 101230.
	30-December- 2010	General refuse should be cleared and disposed properly.	The situation required follow-up action during the coming audit session.
	30-December- 2010	The haul road should be watered regularly, to avoid dust generation.	The situation required follow-up action during the coming audit session.

Status of Environmental Licensing and Permitting

4.3 Environmental licenses and permits including the Environmental Permit (EP), the Construction Noise Permit and Waste Disposal (Chemical Waste) License were in place and valid during the reporting quarter. A summary of environmental licensing and permit status is given in **Appendix I**.

Advice on Waste Management Status

4.4 5130m³ of inert C&D waste and 30m³ of non-inert C&D waste were disposed in the reporting period. Excavated materials, as the main C&D materials generated in the reporting period, were stored inside the Site Area and Stockpiling Area of the Project. Besides, No chemical waste was generated in the reporting period. The amount of wastes generated by the activities of the Project in the reporting period fulfills the requirement of estimated volume of excavated material in EIA Report. The amount of wastes generated by the activities of the Project in the reporting period was attached in the appendices of the Monthly Reports for October 2010 to December 2010. Waste flow table please refer to **Appendix J**.

5. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)

Summary of Exceedances

- 5.1 Environmental monitoring works were performed in the reporting period and all monitoring results were checked and reviewed. A summary of exceedance is attached in **Appendix K**.
- 5.2 All measured 1-hr and 24-hr TSP levels were below the Action/Limit Levels. No exceedance was recorded in the reporting period.
- 5.3 No Action/Limit Level exceedance for the construction noise was recorded in the reporting period.
- 5.4 No Action/Limit Level exceedance for landfill gas monitoring was recorded in the reporting period.

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

5.5 There was no non-compliance from the site audits in the reporting quarter. The observations and recommendations made in each audit session were attached in the Monthly Reports.

6. ENVIRONMENTAL COMPLAINTS AND PROSECUTIONS

6.1 No environmental related complaint, prosecution or notification of summons was received in the reporting quarter.

7. COMMENTS, CONCLUSIONS AND RECOMMENDATIONS

7.1 Environmental monitoring and audit works were performed in the reporting quarter. The EM&A program was strictly following the requirement of methodology in EM&A manual. The monitoring work was considered as effective. In addition, site inspections were conducted on a weekly basis. The results were reviewed and checked.

Effectiveness of Mitigation Measures

7.2 The mitigation measures recommended in the EIA report and required by the EP are considered effective in minimizing environmental impacts. The Contractor has implemented the recommended mitigation measures except those mitigation measures not applicable at this stage.

Conclusion

- 7.3 All measured 1-hr and 24-hr TSP levels were below the Action/Limit Levels. No exceedance was recorded in the reporting quarter.
- 7.4 All measured noise levels were below the Action/Limit Levels. No exceedance was recorded in the reporting quarter.
- 7.5 All landfill gas monitoring levels were below the Action/Limit Levels. No exceedance was recorded in the reporting quarter.
- 7.6 There was no environmental complaint, prosecution or notification of summons received.
- 7.7 The anticipated environmental impacts will be mainly on ponding water and surface runoff after rain as well as the noise nuisance and dust emission from the major construction activities will be undertaken in the coming quarter, including:
 - Confined Space Works;
 - Dismantling works;
 - Drainage and Excavation works;
 - Landscaping works;
 - Mini-piling works;
 - Pre-drilling works;
 - Pre-bored socketted H-pilings; and
 - Pipeline works

Recommendations

7.8 According to the environmental audit sessions performed in the reporting period, the following recommendations were made:

Water Impact

- To provide sediment tank for settling runoff prior to disposal.
- To avoid accumulation of stagnant water on site.
- To maintain sand bags placed along the u-channel at good condition and replace the broken bags.

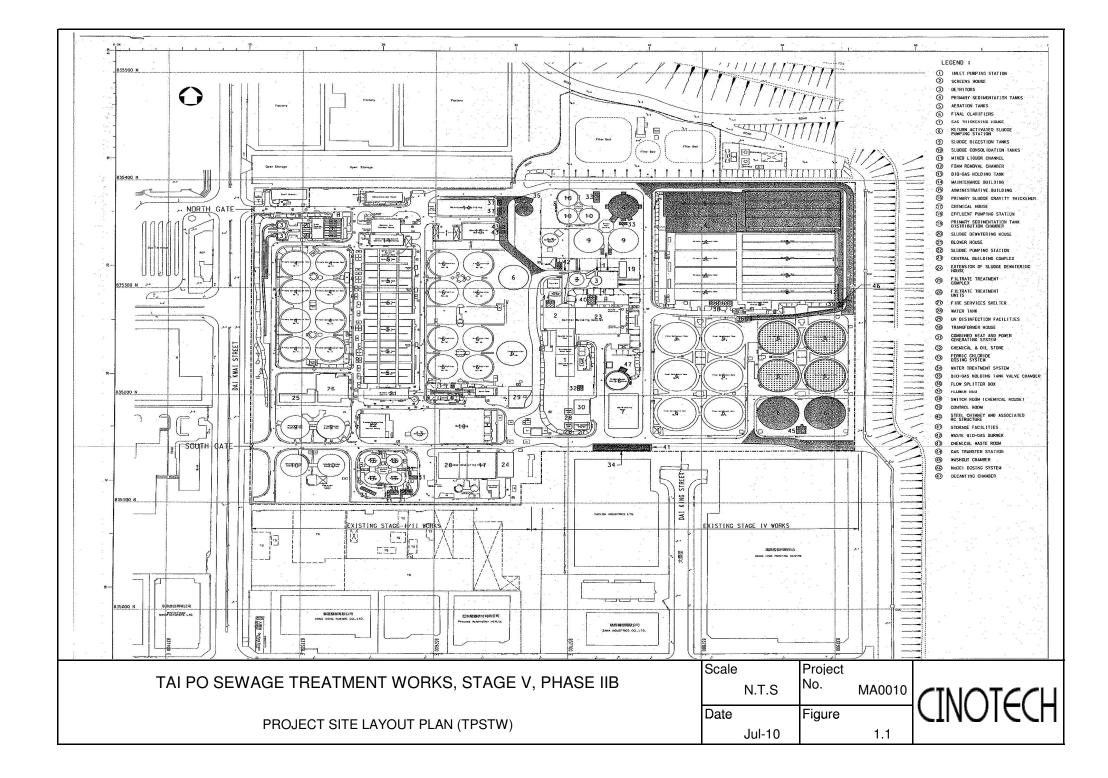
Dust Impact

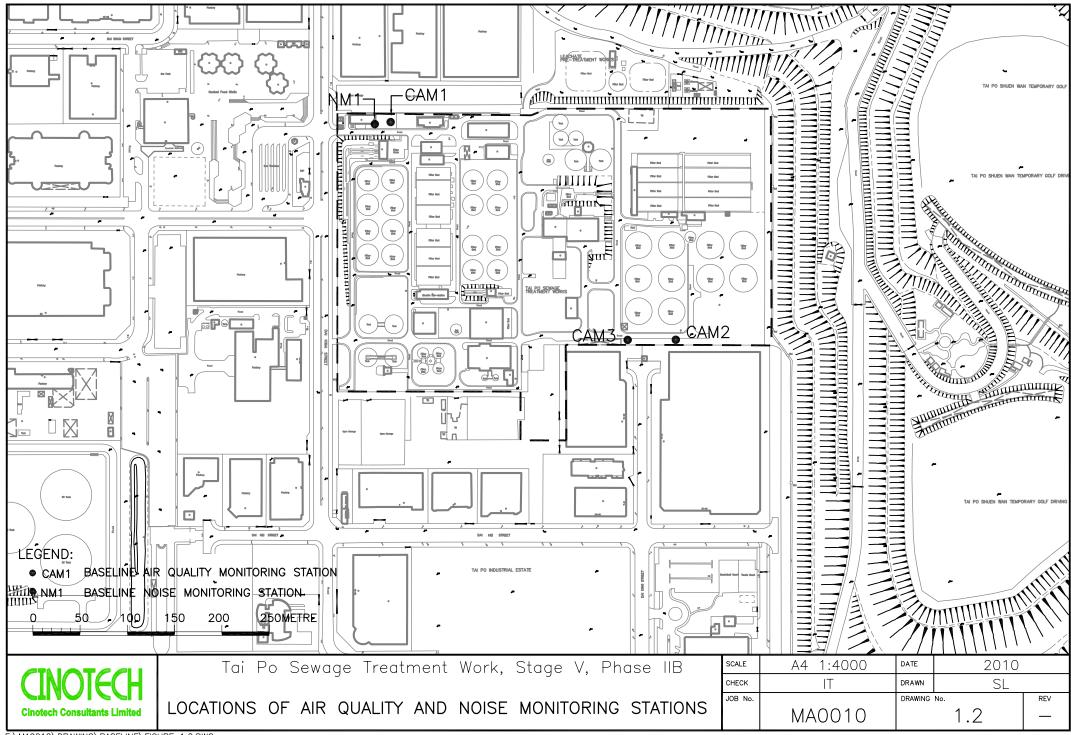
- To spray with water on the surface of concrete breaking and dry dust haul road.
- Excavated dusty materials or stockpile of dusty materials should be covered by impervious sheeting, or sprayed with water so as to maintain entire surface wet.

Waste / Chemical Management

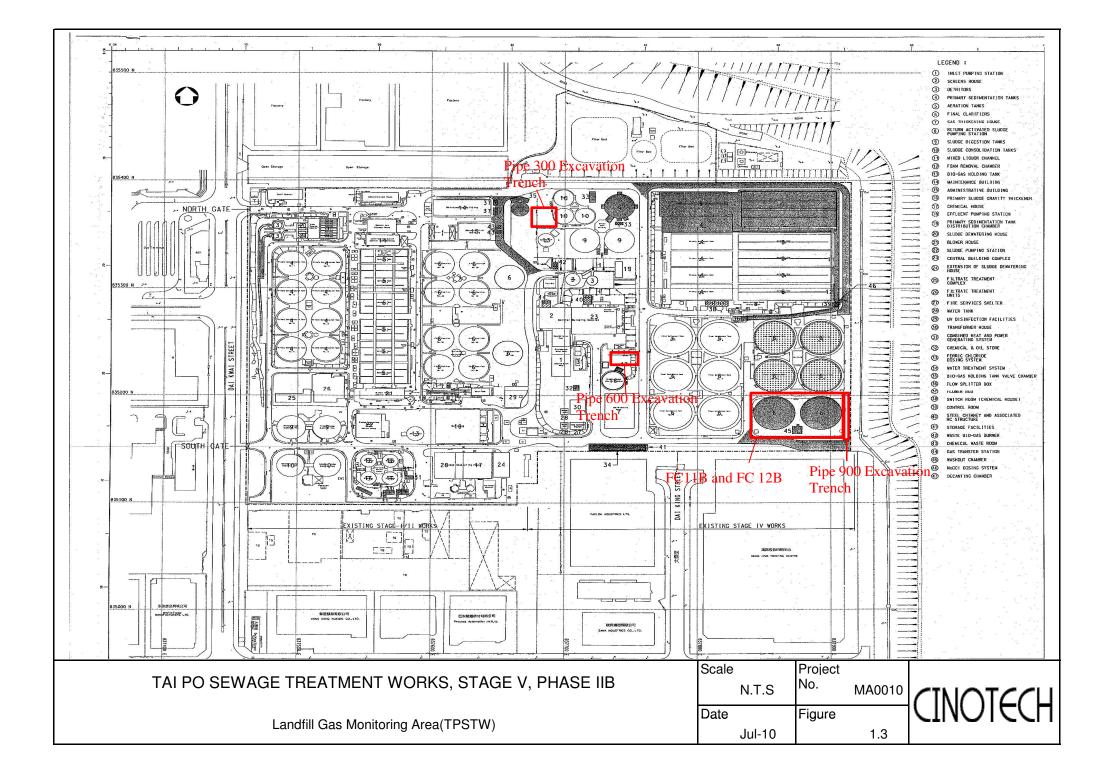
- To provide proper rubbish bins / skips for waste collection.
- To provide proper storage area for oil container on site.
- To avoid and check for any accumulation of waste materials or rubbish on site.
- Provide drip tray with adequate capacity and maintain well for equipment and chemical waste.

FIGURES





F:\MA0010\DRAWING\BASELINE\FIGURE 1.2.DWG



APPENDIX A CONSTRUCTION PROGRAMME

ૺૼઌૻૺ૾ૺ	Description	Orig Early Dur Start	Early Finish	Total Float	2010 FEB MAR APR MAY JUN JUI	2011 AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC	2012
	Base Slab of FC11B	22 19OCT10	0 09NOV10	0		Base Slab of FC11B	
	Structural Wall for FC11B	35 10NOV10	D 14DEC10	0		Structural Wall for FC11B	• • • • • • •
	Watertightness Test for FC11B	20 15DEC10	03JAN11	0		Watertightness Test for FC11B	
	Concrete Coating for FC11B	10 09JAN11	18JAN11	10d		Concrete Coating for FC11B	
	Backfilling for FC11B	20 04JAN11	23JAN11	0		Backfilling for FC11B	
A CONTRACTOR OF THE PARTY OF THE	Works						
	DN700 DI Pipe % FC12B & extg chamber	50 19OCT10	07DEC10	52d		► DN700 DI Pipe % FC12B & extg chamber	
13020	DN700 DI Pipe % FC11B & extg chamber	50 10NOV10		30d		► Manual DN700 DI Pipe % FC11B & extg chamber	
	Sludge Drawoff Chamber (C1B~C4B) & Pipework	30 23DEC10		7d		► Sludge Drawoff Chamber (C1B~C4B) & Pipework	
13040	Sludge Drawoff Chamber C5B & Pipework	15 14JAN11	28JAN11	0		Sludge Drawoff Chamber C5B & Pipework	
13050	Cable Ducting at Sludge Dewatering House	150 30MAR10	26AUG10	155d		Cable Ducting at Sludge Dewatering House	
ection II o							
Drilling W	/orks						
20001	Notification from Engineer	90 29JAN11	28APR11	0		► Notification from Engineer	
20010	Section II of Works	460 28FEB11		90d			Section
20110	Removal of extg Final Clarifier FC9 & FC10	25 28FEB11		0		Removal of extg Final Clarifier FC9 & FC	
	Pre-drilling Works for FC9B & FC10B (18 nos)	45 25MAR11		0		Pre-drilling Works for FC9B & FC1	
	Removal of extg Final Clarifier FC7 & FC8	25 25MAR11		20d		► ■ Removal of extg Final Clarifier FC7 &	
	Pre-drilling Works for FC7B & FC8B (18 nos)	45 09MAY11		0	الم التي التي التي التي التي التي التي التي	Reinoval of exig Final Clamer FC7 &	A state of the second stat
	Socketted H-piling (80 nos)	120 23JUN11		0			• •
	Proof Drilling for Socketted H-pile (4 nos)	28 210CT11		0			H-piling (80 nos) Drilling for Socketted H-pile (4
	Load Test for extg Steel Pile (4 nos)	28 210CT11					
	Load Test for Socketted H-pile (1 no)	14 18NOV11		183d			Fest for extg Steel Pile (4 nos
	Pre-drilling Works for Washout Chamber (4 nos)	14 18NOV11		7d			d Test for Socketted H-pile (1
0190 N	Mini-piling for Washout Chamber (10 nos)	90 07JUL11	040CT11	70 70		Pre-drilling Works for Was	• •
0200 L	Load Test for Mini-pile (1 no)	14 050CT11				Mini-piling fo	· · ·
	ffer No. FC7B to FC10B			7d		Load Test	for Mini-pile (1 no)
1	Excavation for FC10B	15 10101/44	0205044				
	Pile Head Construction for FC10B	15 18NOV11		0			avation for FC10B
	Base Slab for FC10B	20 03DEC11		0			ile Head Construction for FC
	Structural Wall for FC10B	22 23DEC11		30d		i I I I I I	Base Slab for FC10B
	Watertightness Test for FC10B	35 14JAN12		30d			Structural Wall for FC
	Concrete Coating for FC10B	20 18FEB12		45d	· · · · · · · · · · · · · · · · · · ·		Watertightness Tes
	Excavation for FC9B	10 09MAR12		45d			Concrete Coating
	the second s	15 03DEC11		5d			cavation for FC9B
	Pile Head Construction for FC9B Base Slab for FC9B	20 23DEC11		0			Pile Head Construction for I
	Structural Wall for FC9B	22 12JAN12		5d			Base Slab for FC9B
		35 03FEB12		5d	· · · · · · · · · · · · · · · · · · ·		Structural Wall for I
	Vatertightness Test for FC9B	20 09MAR12		f			Watertightness
	Concrete Coating for FC9B	10 29MAR12		35d			🖓 🕞 🔤 Concrete Coati
	xcavation for FC8B	15 18DEC11		10d	· · · · · · · · · · · · · · · · · · ·	i i i i i i i i i i i i i i i i i i i	Excavation for FC8B
	Pile Head construction for FC8B	20 12JAN12		. 0			Pile Head construction for
	Base Slab for FC8B	22 01FEB12		25d	· · · · · · · · · · · · · · · · · · ·		Base Slab for FC8B
	Structural Wall for FC8B	35 23FEB12		25d			Structural Wall f
	Vatertightness for FC8B	20 29MAR12		25d			Watertightnes
	Concrete Coating for FC8B	10 18APR12		25d			Concrete Co
	xcavation for FC7B	15 02JAN12		15d			Excavation for FC7B
	ile Head Construction for FC7B	20 01FEB12		0			Pile Head Construction
	ase Slab for FC7B	22 21FEB12		0			Base Slab for FC7
	tructural Wall for FC7B	35 14MAR12	17APR12	0			Structural Wa
	/atertightness Test for FC7B	20 18APR12	07MAY12	- 0			Watertight
THE REPORT OF A PROPERTY OF	oncrete Coating for FC7B	10 08MAY12		15d			Concrete
peline Wo							
2010 E>	xcavation for Washout Chamber	15 19OCT11	02NOV11	7d		- Evoluati	on for Washout Chamber
	ile Cap of Washout Chamber	30 03NOV11		7d			Cap of Washout Chamber
	ic cap of washout champer						
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China Harbour Engineering Co. Ltd. TPSTW Stage 5 Phase 2B

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025 Base Slab of FC12B 22 180CT10 180CT10 7d 030 Structural Wall for FC12B 35 190CT10 22NOV10 7d 040 Watertightness Test for FC12B 20 23NOV10 12DEC10 7d 050 Concrete Coating for FC12B 20 23NOV10 12DEC10 7d 050 Concrete Coating for FC12B 20 13DEC10 01JAN11 7d 050 Backfilling for FC12B 20 13DEC10 01JAN11 7d 050 Backfilling for FC12B 20 13DEC10 01DCT10 0 050 Backfilling for FC12B 20 13DEC10 01DCT10 0 050 Pile Head Construction for FC11B 11 01OCT10 0 0 0500 Pile Head Construction for FC11B 17 02OCT10 18OCT10 0 0500 Critical bar 17 02OCT10 18OCT10 0 18OCT10 0 0500 Critical bar 17 02OCT10 18OCT10 0 18OCT10 0 18OCT10 18OCT10 18OCT10 <td></td> <td></td> <td>21AUG10</td> <td>10SEP10</td> <td>0</td> <td>Excavation for FC12B</td> <td>1.</td>			21AUG10	10SEP10	0	Excavation for FC12B	1.
030 Structural Wall for FC12B 35 190CT10 22NOV10 7d 040 Watertightness Test for FC12B 20 23NOV10 12DEC10 7d 050 Concrete Coating for FC12B 10 18DEC10 27DEC10 32d 060 Backfilling for FC12B 20 13DEC10 01AN11 7d 060 Backfilling for FC12B 20 13DEC10 01AN11 7d 070 Excavation for 11B 21 11SEP10 010OCT10 0 070 Pile Head Construction for FC11B 17 02OCT10 18OCT10 0 071 Atate 29JAN10 Early bar Freises bar Freises bar 071 Mate 29JAN10 Freises bar Freises bar 071 Mate 70DEC10 70DEC10 70DEC10 70DEC10 070DEC10 180EC10				27SEP10		Pile Head Construction for FC12B	
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1050 Concrete Coating for FC12B 10 18DEC10 27DEC10 32d 1060 Backfilling for FC12B 20 13DEC10 01JAN11 7d 2010 Excavation for 11B 21 11SEP10 01OCT10 0 2020 Pile Head Construction for FC11B 17 02OCT10 18OCT10 0 11date 29JAN10 Image: Critical bar Frogress bar Critical bar Critical bar 10ate 06APR10 Summary bar Start milestone point Frogress 200 Start milestone point Frogress 200		- 35	19OCT10	22NOV10	7d		
1060 Backfilling for FC12B 20 13DEC10 01JAN11 7d 2010 Excavation for 11B 21 11SEP10 01OCT10 0 2020 Pile Head Construction for FC11B 17 02OCT10 18OCT10 0 1 date 29JAN10 Early bar Progress bar Progress bar 1 date 29JAN10 Critical bar Critical bar Critical bar 9 number 1A Start milestone point Start milestone point TPSTW Stage 5 Phase 2B					7d	Watertightness Test for FC12B	
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a date 29JAN10 date 06APR10 e number 1A Summary bar Start milestone point China Harbour Engineering Co. Ltd. TPSTW Stage 5 Phase 2B	Edity i		· · ·				\neg
date 06APR10 Childal bar e number 1A Image: State milestone point			an Alian An			Obine Hankerin Frantsson of the	05
e number 1A Start milestone point TPSTW Stage 5 Phase 2B	data 06APP10		1.5			· · · ·	07
	e number 1A Start r					TPSTW Stage 5 Phase 2B	\vdash

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Description	Orig Dur	Early Start	Early Finish	Total Float	2010 2011 2013
					FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV I
of Site	0		28JAN10	1155d	Possession of Site
of Section I of Works (365d)	0		28JAN11	790d	Completion of Section 1 of Works (365d)
of Section II of Works (460d) of Section III of Works (670d)	0		01JUN12		-► Completion of Section II of Works (460d)
of Section IV of Works (365d)	0	-	28DEC11	486d	Completion of Section III of Works (670d)
of Section V of Works (1185d)			28JAN11 27APR13	820d	♦ Completion of Section IV of Works (365d)
		Sec. 1			
1Ce	30 29	JAN10	27FEB10	0	Site Clearance
Site Office Set-up		FEB10	28APR10	84d	Contractor Site Office Set-up
Accommodation	60 28	FEB10	28APR10	1035d	► Engineer's Accommodation
y	60 29	JAN10	29MAR10		Initial Survey
urvey		JAN10	29MAR10		Condition Survey
ital Baseline Monitoring	14 30	MAR10	12APR10	1111d	Revironmental Baseline Monitoring
war Green Roof					
and Lateral Support (ELS)			27JUN10		Engineer's Green Roof
iboard			28MAY10 28MAY10		Excavation and Lateral Support (ELS)
est Set-up			28MAY10 28APR10	1065d 2d	→ Project Signboard
wk for Pile Cap			27JUN10	90d	File Load Test Set-up
Fwk for Wall Structure	30 28		27JUL10	90d	Falsewk & Fwk for Wall Structure
Fwk for Top Slab	30 28.		26AUG10		Falsewk & Fwk for Top Slab
over		AUG10	100CT10	840d	Multi-part Cover
ail, Stair & Floor	45 110	OCT10	24NOV10	840d	FRP Handrail, Stair & Floor
· · · · · · · · · · · · · · · · · · ·			09NOV10	900d	→ mass FRP Cover
Flooring			08JAN11	840d	Aluminium Flooring
System at Sludge Dewatering House			27JUN10	310d	Green Roof System at Sludge Dewatering House
System at Transformer House	60 29/	APR10	27JUN10	1035d	Green Roof System at Transformer House
/ini-pile	55120	APR10		470.1	
ocketted H-pile	55 28		22JUN10 23APR10	173d	Casing for Mini-pile
er for Socketted H-pile	55 28		23APR10		
pe Puddle & Tee	180 29		27JUL10	004	► Terminal Steel Member for Socketted H-pile
peline	180 29.	1000 000 0000	27JUL10	1005d	Di Water Pipeline
er for Shelter				1125d	Steel Member for Shelter
	$\pi^{1/N} = \{ 0, 1, 2, \dots, N\}$				
		100.00000000000000000000000000000000000			
Work	365 * 29		<u>.</u>	0	Section I of Work
Vorks (18 nos)			23APR10	· · · 0	Pre-drilling Works (18 nos)
Socketted H-pile			30APR10	0	Preliminary Socketted H-pile
r Preliminary Pile		-	14MAY10	· 0	
-piling (56 nos)			06AUG10	0	Socketted H-piling (56 nos)
) (4 nos) r Main Pile (1 no)			20AUG10 20AUG10	0	Proof Drilling (4 nos)
DN525 & DN900 conc. pipe			20AUG10 17AUG10	1044	Load Test for Main Pile (1 no)
MB.& FC12B	1 40 040			164d	
or FC12B	21 214	UG10	30000000000000000000000000000000000000	0	Excavation for FC12B
onstruction for FC12B	1 · · · · · · · · · · · · · · · · · · ·		27SEP10	 4d	Pile Head Construction for FC12B
f FC12B			180CT10	7d	► Base Slab of FC12B
all for FC12B			22NOV10	7d	Structural Wall for FC12B
ss Test for FC12B			12DEC10	7d	→ Watertightness Test for FC12B
ating for FC12B			27DEC10	32d	Concrete Coating for FC12B
r FC12B			01JAN11	7d	► Backfilling for FC12B
or 11B			01OCT10	0	Excavation for 11B
enstruction for FC11B	17 020	OCT10	18OCT10	0	- Pile Head Construction for FC11B
0 Early bar 3 Progress bar 0 Critical bar 0 Summary bar 0 Start milestone point Inc. Finish milestone point	44 47 48 49 49 49 49 49 49 49 49 49 49 49 49 49			-	Date Revision Checked Approv 05FEB10 0 WML TKC 07APR10 1 AA TKC TPSTW Stage 5 Phase 2B - - -

22050 C 22060 B 22070 C 22075 M 22080 D 22090 R 22100 B 22100 R 22100 B 22100 B 22100 R 22100 R 22100 R 30001 N 30101 S 30110 S 30110 S 30110 S 30110 Pr 30120 Pr 30180 Lc 30210 Pr 30220 S 30230 Lc		30 25 45 30 60 30 670 10 106 20 7 14 263 14 15 90	03DEC11 17JAN12 16FEB12 16APR12 16MAY12 29JAN10 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10	31MAR12 30APR12 01JUN12 16JAN12 15FEB12 15APR12 15APR12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10 26JUN11	7d 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Motificatio	n from Engir	eer		R MAY JUN JUL AUG SEP OCT	Constr Constr	DN300 DI Pipeline Connection of D Connection of D Connection of E Backfilling DN1000 DI Sludg DN1000 DI Sludg Backfilling Backfilling
22060 B 22070 C 22075 M 22075 M 22090 R 22100 B 30001 N 30120 Pr 30140 Pr 30150 Lc 30160 Sc 30170 Pr 30200 Sc 30210 Pr 30220 Pr 30230 Lc	Backfilling Construction of FMC1B & FMC2B Modification of RAS Pumping Station DN1000 DI Sludge Pipe Removal of DN600 & DN800 Sludge Pipe Backfilling for Sludge Pipe f Works InkS Backfilling for Sludge Pipe f Works inte Clearance Pre-drilling for PST5, AT5~AT7 (41 nos) tre-drilling for PST5, AT5~AT7 (41 nos) tre-drilling for Mixed Liquor Channel (8 nos) tre-drilling for Mixed Liquor Channel (8 nos) tre-drilling for PST5, AT5~AT7 (174 nos) tre-drilling for PST5, AT5~AT7 (174 nos) tre-drilling for PST5, AT5~AT7 (174 nos) tre-drilling for PST5 & AT5~AT7 (174 nos) noof Drilling for PST5 & AT5~AT7 (4 nos) cocketted H-piling for PST5 & AT5~AT7 (4 nos) cod Test for Socketted H-pile (2 nos) tre-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) coad Test for Sludge Digestion Tank (1 no)	25 45 30 60 30 17 30 670 10 10 106 20 7 14 263 14 14 15 90	08MAY12 03DEC11 17JAN12 16FEB12 16APR12 16MAY12 29JAN10 03MAY10 03MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	01JUN12 16JAN12 15FEB12 15APR12 15MAY12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Notificatio	Site Clearar	lice			Constr Ma	Libert Backfilling uction of FMC1B & FMC odification of RAS Pump DN1000 DI Sludg Removal of D Backfilling
22070 C 22075 M 22080 D 22090 R 22100 B 22100 B ection III of D Dilling ₩0 30001 30001 N 30005 S 30110 Si 30120 Pr 30130 Pr 30140 Pr 30150 Lc 30160 Sa 30170 Pr 30180 Lc 30190 Pr 30200 Sa 30210 Pr 30220 Pr 30220 Pr 30230 Lc	Construction of FMC1B & FMC2B Addification of RAS Pumping Station DN1000 DI Sludge Pipe Removal of DN600 & DN800 Sludge Pipe Backfilling for Sludge Pipe Backfilling for Sludge Pipe Investigation Investigation Addification of RAS Pumping Station DN1000 DI Sludge Pipe Removal of DN600 & DN800 Sludge Pipe Backfilling for Sludge Pipe Investigation Investigation <td>45 30 60 30 17 30 670 10 10 20 7 14 263 14 14 15 90</td> <td>03DEC11 17JAN12 16FEB12 16APR12 16APR12 16MAY12 29JAN10 03MAY10 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11</td> <td>16JAN12 15FEB12 15APR12 15MAY12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10</td> <td>0</td> <td>·>E</td> <td>Site Clearar</td> <td>lice</td> <td></td> <td>·</td> <td>Constr Ma</td> <td>Libe Backfilling uction of FMC1B & FMC odification of RAS Pump DN1000 DI Sludg Removal of D Backfilling</td>	45 30 60 30 17 30 670 10 10 20 7 14 263 14 14 15 90	03DEC11 17JAN12 16FEB12 16APR12 16APR12 16MAY12 29JAN10 03MAY10 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	16JAN12 15FEB12 15APR12 15MAY12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice		·	Constr Ma	Libe Backfilling uction of FMC1B & FMC odification of RAS Pump DN1000 DI Sludg Removal of D Backfilling
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22080 D 22090 R 22100 B action III of Dilling Vo 30001 N 30005 30110 Si 30120 Pr 30130 Pr 30140 Pr 30150 Lc 30160 Si 30170 Pr 30180 Lc 30190 Pr 30210 Si 30210 Pr 30220 Pr 30230 Lc	DN1000 DI Sludge Pipe Removal of DN600 & DN800 Sludge Pipe Backfilling for Sludge Pipe f Works orks Jotification from Engineer section III of Works Bre-drilling for PST5, AT5~AT7 (41 nos) tre-drilling for Mixed Liquor Channel (8 nos) trelimiary Socketted H-piling oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (4 nos) roof Drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	60 30 17 30 670 10 106 20 7 14 263 14 14 15 90	16FEB12 16APR12 16MAY12 29JAN10, 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	15APR12 15MAY12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice				DN1000 DI Sludg
22090 R 22100 B ection III of Diffing W 30001 N 30005 S 30110 Si 30120 Pr 30130 Pr 30140 Pr 30150 Lc 30160 Sr 30170 Pr 30180 Lc 30190 Pr 30210 Sr 30210 Pr 30210 Pr 30220 Sc 30210 Pr 30210 Pr 30220 Sc 30220 Sc 30230 Lc	Removal of DN600 & DN800 Sludge Pipe Backfilling for Sludge Pipe f Works inks lotification from Engineer section III of Works bite Clearance tre-drilling for PST5, AT5~AT7 (41 nos) tre-drilling for PST5, AT5~AT7 (41 nos) tre-drilling for Mixed Liquor Channel (8 nos) trelimiary Socketted H-piling oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	30 17 30 670 10 106 20 7 14 263 14 14 15 90	16APR12 16MAY12 29JAN10 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	15MAY12 01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice				Removal of D
22100 B action III of Drilling ₩/0 30001 N 30005 S 30110 Si 30120 Pr 30130 Pr 30150 Lc 30160 Sr 30160 Sr 30170 Pr 30180 Lc 30190 Pr 30200 Sr 30210 Pr 30215 Lc 30220 Pr 30230 Lc	Backfilling for Sludge Pipe I Works Investigation from Engineer Section III of Works Site Clearance Pre-drilling for PST5, AT5~AT7 (41 nos) Pre-drilling for Mixed Liquor Channel (8 nos) Pre-drilling for PST5, AT5~AT7 (41 nos) road Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) roof Drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no)	17 30 670 10 106 20 7 14 263 14 14 14 15 90	16MAY12 29JAN10. 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	01JUN12 27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice			-	Backfilling
action III of Ditiling: Vio 30001 N 30005 S 30110 Si 30110 Si 30120 Pri 30130 Pri 30140 Pri 30150 Lc 30160 Sa 30170 Pri 30180 Lc 30190 Pri 30200 Sa 30215 Lc 30220 Pri 30230 Lc	f Works Inks Inks Inks Interfection from Engineer Section III of Works Site Clearance Pre-drilling for PST5, AT5~AT7 (41 nos) Pre-drilling for Mixed Liquor Channel (8 nos) Pre-drilling for PST5, AT5~AT7 (41 nos) road Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) re-drilling for Studge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no)	30 670 10 20 7 14 263 14 14 15 90	29JAN10, 03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	27FEB10 02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice		•		
Diulling Wo 30001 N 30005 S 30110 Si 30120 Pi 30130 Pi 30140 Pi 30150 Lc 30160 Si 30170 Pi 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30220 Pr 30230 Lc	Interference Inter	670 10 200 7 14 263 14 14 14 15 90	03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice			-	Section III of Works
30001 Ni 30005 Si 30110 Si 30110 Si 30110 Si 30120 Pi 30130 Pi 30140 Pi 30150 Lc 30160 Si 30170 Pi 30180 Lc 30190 Pi 30200 Si 30210 Pi 30215 Lc 30220 Pi 30230 Lc	Iotification from Engineer iection III of Works ite Clearance Pre-drilling for PST5, AT5~AT7 (41 nos) Pre-drilling for Mixed Liquor Channel (8 nos) Pre-drilling for Mixed Liquor Channel (8 nos) Pre-drilling for Mixed Liquor Channel (8 nos) Pre-drilling for PST5, AT5~AT7 (41 nos) recketted H-pilling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) re-drilling for SLudge Digestion Tank (6 nos) ocketted H-pilling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no)	670 10 200 7 14 263 14 14 14 15 90	03MAY10 03MAY10 13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	02MAR12 12MAY10 26AUG10 15SEP10 22SEP10 06OCT10	0	·>E	Site Clearar	lice			-	Section III of Works
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30120 Pr 30130 Pr 30140 Pr 30150 Lc 30160 Sr 30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30230 Lc	re-drilling for PST5, AT5~AT7 (41 nos) re-drilling for Mixed Liquor Channel (8 nos) relimiary Socketted H-piling oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no)	106 20 7 14 263 14 14 14 15 90	13MAY10 27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	26AUG10 15SEP10 22SEP10 06OCT10		` ▲'		ICe	DOTE		-	
30130 Pr 30140 Pr 30150 Lc 30160 Sc 30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30230 Lc	re-drilling for Mixed Liquor Channel (8 nos) relimiary Socketted H-piling oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	20 7 14 263 14 14 14 15 90	27AUG10 16SEP10 23SEP10 07OCT10 27JUN11	15SEP10 22SEP10 06OCT10	0	· · · · · ·		Big Pro_drilling for				1
30140 Pr 30150 Lc 30160 Sc 30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30220 Pr 30220 Pr	relimiary Socketted H-piling oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	7 14 263 14 14 14 15 90	16SEP10 23SEP10 07OCT10 27JUN11	22SEP10 06OCT10	0				rələ, Alə~Al7 (4	1 nos)		. *
30150 Lc 30160 Sc 30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30220 Pr 30220 Pr	oad Test for Preliminary Socketted H-pile ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	14 263 14 14 15 90	23SEP10 07OCT10 27JUN11	06OCT10	0				for Mixed Liquor Ch	annel (8 nos)	· · · · · · · · · · · · · · · · · · ·	
30160 Sa 30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30220 Pr 30220 Lc	ocketted H-piling for PST5, AT5~AT7 (174 nos) roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	263 14 14 15 90	07OCT10 27JUN11						Socketted H-piling			
30170 Pr 30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30220 Pr 30230 Lc	roof Drilling for PST5 & AT5~AT7 (4 nos) oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	14 14 15 90	27JUN11	26JUN11	0				st for Preliminary So			
30180 Lc 30190 Pr 30200 Sc 30210 Pr 30215 Lc 30220 Pr 30230 Lc	oad Test for Socketted H-pile (2 nos) re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	14 15 90			0					Socketted H-pilin		
30190 Pr 30200 So 30210 Pr 30215 Lc 30220 Pr 30230 Lc	re-drilling for Sludge Digestion Tank (6 nos) ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	15 90	27JUN11	10JUL11	0					► ■ Proof Drilling fo		
30200 So 30210 Pr 30215 Lc 30220 Pr 30230 Lc	ocketted H-piling for SD Tank (29 nos) roof Drilling for Sludge Digestion Tank (1 no) oad Test for Sludge Digestion Tank (1 no)	90		10JUL11	0	•••••		-		Load Test for S	ocketted H-pile (2	10s) -
30210 Pr 30215 Lc 30220 Pr 30230 Lc	roof Drilling for Sludge Digestion Tank (1 no) pad Test for Sludge Digestion Tank (1 no)			30SEP10 29DEC10	225d 225d				g for Sludge Digest			
30215 Lc 30220 Pr 30230 Lc	oad Test for Sludge Digestion Tank (1 no)			29DEC10 05JAN11						ng for SD Tank (29 nos)		
30220 Pr 30230 Lo		- t t	30DEC10	12JAN11	232d 225d					or Sludge Digestion Tank (1	no)	
30230 Lo	File for filled Eldor Onutrific		16SEP10	22SEP10	88d					Sludge Digestion Tank (1 n	10)	
	pad Test for Mini-pile (1 no)		23SEP10	060CT10	88d	·			Mini-pile for Mixed			
	lini-piling for Mixed Liquor Channel (79 nos)		070CT10	24APR11	88d				st for Mini-pile (1 no) Mini-piling for Mixed Liquo	- Ohannal (70	
	roof Drilling for Mixed Liquor Channel (1 no)			01MAY11	111d					Proof Drilling for Mixed Liquo	r Channel (79 nos)	
	bad Test for Mixed Liquor Channel (2 nos)	[·····]	25APR11	08MAY11	104d	1			2 I	Broof Drilling for Mixed L 		(
	re-drilling for Bio-gas Holding Tank (3+1 nos)		16SEP10	25SEP10	250d				for Bio-gas Holding		uor Channel (2 nos)	
	ini-piling for Bio-gas Holding Tank (12+8 nos)		25APR11	15JUN11	145d					Mini-piling for Bio-c	non Holding Took //	12+9 200
	roof Drilling for Bio-gas Holding Tank (1 no)			22JUN11	145d					Proof Drilling for E	Bio-gas Holding Tark (1	$\frac{270 \text{ hos}}{100}$
	dimentation Tank & Aeration Tank										no-gas noiding rai	
31010 Ex	cavation for AT5 & AT6	30	11JUL11	09AUG11	0						for AT5 & AT6	
31020 Pil	le Head for AT5 & AT6 (22 nos)		10AUG11		· · · · ·	a a la caracteria.					d for AT5 & AT6 (2)	
	le Head for AT5 & AT6 (86 nos remained)		03SEP11		0							
	le Cap for AT5 & AT6		260CT11		32d							& AT6 (86 nos remaine
	ructural Wall for AT5 & AT6			13JAN12	32d						Pile Cap for A	
	atertness Test for AT5 & AT6		14JAN12		32d							ral Wall for AT5 & AT6
	cavation for Effluent Chamber		10AUG11		4d						on for Effluent Chan	ertness Test for AT5 &
	le Head for Effluent Chamber (15 nos)			02SEP11							ad for Effluent Chan	
	le Cap for Effluent Chamber			22SEP11	65d						Cap for Effluent Cha	nber (15 nos)
	ructural Wall for Effluent Chamber		23SEP11		73d							r Effluent Chamber
	p Slab & Upstand Wall of Effluent Chamber		02NOV11		73d	•••••••••••••••••••••••••••••••••••••••					JI la ne	r Eπiuent Champer
	atertightness for Effluent Chamber		02DEC11		730 77d	 					1.11	hess for Effluent Chaml
	cavation for PST5 & AT7		20AUG11		47d						ation for PST5 & A	1
	e Head for PST5 & AT7 (51 nos)		260CT11		-+/u ^	1						PST5 & AT7 (51 nos)
	e Cap for PST5 & AT7	1	27NOV11								Pile Read for I	010 0 ATT (01 1105)
	ructural Wall for PST5 & AT7			14FEB12								ructural Wall for PST5
	atertightness Test for PST5 & AT7			02MAR12	0	l						Watertightness Test fo
	version of DN80 Fire Fighting Main		01JUL10 *		242d	. 1	1 1 1 1 1 1 81859/0644	Piversion of D	N80 Fire Fighting M	ain		waterugntness Test to
	cavation for Sludge Digestion Tank No.3 (SDT3)	1		01FEB11	2420 225d	1						
	e Head Construction for SDT3 (29 nos)			21FEB11	225d					for Sludge Digestion Tank		
	se Slab for SDT3			23MAR11	225d			· · · · · · · · · · · · · · · · · · ·		d Construction for SDT3 (2		
	uctural Wall for SDT3			22APR11	225d	1				e Slab for SDT3 Structural Wall for SDT3		
	lined Top Slab for SDT3	· · · · · · · · · · · · · · · · · · ·	23APR11		225d					Structural Wall for SD13		
date	29JAN10 Eady bar						<u></u>			The line of the stability		<u> </u>
sh date	27APR13											-
a date 1 date	29JAN10 Critical bar						China H	arbour Eng	ineering Co.	. Ltd.		-
e number	06APR10 Summary bar								5 Phase 2B			-
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SEP OCT NOV DEC JAN FEB MAR APR N300 DI Pipe to FC7B~FC12B	2013 May Jun Jul aug Sep	OCT NOV DEC
2B ng Station Pipe V600 & DN800 Sludge Pipe		
or Sludge Pipe	-	
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31220 Watertightness Test for SDT3	20 07JUN11 26JUN11		FEB MAR APR MAY	JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG S
31230 Air Tightness Test for SDT3	2007JUN11 28JUN11 2 27JUN11 28JUN11	248d 248d		→ Watertightness Test for SDT3
31240 Excavation for Mixed Liquor Channel (MLC)	30 25MAY11 23JUN11	2460 88d		Excavation for Mixed Liquor Channel (MLC)
31250 Pile Cap for MLC	60 24JUN11 22AUG11			Pile Cap for MLC
31260 Structural Wall for MLC	60 23AUG11 210CT11			
31265 Watertightness Test for MLC	15 220CT11 05NOV11			► Watertightness Test for MLC
31270 Excavation for Bio-gas Holding Tank Support	10 24JUN11 03JUL11	144d		
31280 Pile Cap for Tank Support & Valve Chamber	30 04JUL11 02AUG11	144d		Pile Cap for Tank Support & Valve Chamber
31290 Structural Wall for Valve Chamber	40 03AUG11 11SEP11	144d		Structural Wall for Valve Chamber
31300 Watertightness Test for Valve Chamber	15 12SEP11 26SEP11	158d		→
Pipeline Works				
32005 Pipework for PST5, AT5 ~ AT7	120 13JAN11 12MAY11			► Pipework for PST5, AT5 ~ AT7
32010 Pipework Connection to AT5 & AT6	10 14JAN12 23JAN12	39d		Pipework Connection to AT5 & A
32020 Pipework for Effluent Chamber	19 02DEC11 20DEC11	73d	· · · · · · · · · · · · · · · · · · ·	Pipework for Effluent Chamber
32030 Pipework Connection to PST5 & AT7 32040 Pipework for SDT3	15 15FEB12 29FEB12	2d		Pipework Connection to PS
32040 Pipework for MLC	45 07JUN11 21JUL11	225d		Pipework for SDT3
32070 Pipework for Valve Chamber	45 220CT11 05DEC11	b88		
Modification / Removal Works	29 12SEP11 10OCT11	144d	· · · · · · · · · · · · · · ·	→ Pipework for Valve Chamber
33010 Removal of extg Control Room	30 25APR11 24MAY11	88d		
33020 Modification of extg Chemical House for SwitchRM	30 25APR11 24MAY11	283d		Removal of extg Control Room
33030 Modification of extg Flow Splitter Box	30 25MAY11 23JUN11	253d		Modification of extg Flow Splitter Box
33040 Modification of extg Aeration Tanks	60 25NOV11 23JAN12	39d		Modification of extg Aeration Tar
33050 Modification of extg Effluent Launder	60 25NOV11 23JAN12	39d		Modification of extg Aeraton 1 ar
33060 Shelter for NaOCI Dosing System	60 09MAY11 07JUL11	224d	· · · · · · · · · · · · · · · · · · ·	Shelter for NaOCI Dosing System
33070 Watertightness Test for NaOCI Dosing Shelter	15 08JUL11 22JUL11	224d		Section Secti
33080 Modification of Primin. Sludge Gravity Thickener	30 15JUN10 * 14JUL10	113d		Modification of Primin. Sludge Gravity Thickener
Section IV of Works				
Dilling-Works				
40010 Section IV of Works	365 29JAN10 28JAN11	0		Section IV of Works
40015 Diversion of DN600 Concrete Pipe	45 01JUN10 * 15JUL10	49d		Diversion of DN600 Concrete Pipe
40110 Pre-drilling for Decanting Chamber (1 no)	7 16JUL10 22JUL10	49d		Pre-drilling for Decanting Chamber (1 no)
40120 Mini-piling for Decanting Chamber (4 nos)	28 23JUL10 19AUG10	49d		Mini-piling for Decanting Chamber (4 nos)
40130 Proof Drilling (4 nos)	28 20AUG10 16SEP10	49d		Proof Drilling (4 nos)
40140 Load Test for Mini-pile (1 no) Structural Works	14 20AUG10 02SEP10	63d		► Eload Test for Mini-pile (1 no)
41010 Excavation for Decanting Chamber	10 17SEP10 26SEP10	49d		► ■ Excavation for Decanting Chamber
41020 Pile Cap for Decanting Chamber 41030 Structural Wall for Decanting Chamber		54d		Pile Cap for Decanting Chamber
41040 Top Slab for Decanting Chamber	30 170CT10 15NOV10	54d		Structural Wall for Decanting Chamber
41040 Top Stab for Decanting Champer 41050 Excavation for Chemical & Oil Store	20 16NOV10 05DEC10 10 27SEP10 06OCT10	54d		→ ₩ Top Slab for Decanting Chamber.
41060 Base Slab for Chemical & Oil Store	15 070CT10 210CT10	49d		Excavation for Chemical & Oil Store
41070 Structural Wall for Chemical & Oil Store	30 220CT10 20NOV10	49d 49d		Base Slab for Chemical & Oil Store
41080 Top Slab for Chemical & Oil Store	20 21NOV10 10DEC10	49d		Top Slab for Chemical & Oil Store
41090 Valve Chamber & Conc. Plinth at PSGT Stage I/II	120 03SEP10 31DEC10	28d		Valve Chamber & Conc. Plinth at PSGT Stage I/II
Modification / Removal Works			<u> </u>	
43010 Removal of Chemical Waste Room	30 01JUN10 * 30JUN10	362d		Removal of Chemical Waste Room
43020 Removal of Flower Bed	20 01JUL10 20JUL10	362d		► Removal of Flower Bed
43025 Removal of Waste Bio-gas Burner	30 02JUL10 * 31JUL10	121d		Removal of Waste Bio-gas Burner
43030 Removal of Chimney & Associated RC Structure	60 01AUG10 29SEP10	121d		Removal of Chimney & Associated RC Structure
43040 Removal of Storage Facilities	30 28JUN10 27JUL10	65d	· -	→ Removal of Storage Facilities
43050 Shelter for Water Treatment System	120 28JUL10 24NOV10	65d		Shelter for Water Treatment System
43070 Shelter for FeCl3 Dosing System	60 01JUN10 * 30JUL10	76d		Shelter for FeCl3 Dosing System
43080 Watertightness Test for FeCl3 Dosing Shelter	16 31JUL10 15AUG10	76d		watertightness Test for FeCI3 Dosing Shelter
43090 Steelwork for FeCl3 Dosing Shelter	30 16AUG10 14SEP10	76d		Steelwork for FeCl3 Dosing Shelter
43100 Removal of FeCI3 Dosing System	60 15SEP10 13NOV10	76d		Removal of FeCl3 Dosing System
Start data 20 IAN10				
Start date 29JAN10 Early bar				

Start date	29JAN10	Early bar
Finish date	27APR13	Progress bar
Data date	29JAN10	Critical bar
Run date	06APR10	
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China Harbour Engineering Co. Ltd. TPSTW Stage 5 Phase 2B

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ST5 & AT7		
AT6		
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Act CID	Description	Orig Dur	Early Start	Early Finish	Total Float	2010 FEB MAR APR MAY JUN JUL A	2011 UG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB M	2012 AR APR MAY JUN JUL AUG S
43110	Modification of Central Blg Complex	150	01JUN10*	280CT10	92d		Modification of Central Blg Complex	
43120	Modification of SAS Thickening House	120	15JUN10 *	120CT10	48d	(And the second s	Modification of SAS Thickening House	
43130	Modification of Primary Sludge Thickener	60	130CT10	11DEC10	48d		Modification of Primary Sludge Thickener	
43140	Modification of Filtrate Treatment Plant	120	01JUL10 *	280CT10	92d		Modification of Filtrate Treatment Plant	
43150	Modification of Chlorination House	150	15JUL10 *	11DEC10	48d	5.000	Modification of Chlorination House	
43160	Floor Opening at Service Tower Building (16 nos)	30	01JUN10 *	30JUN10	92d	Floor	Opening at Service Tower Building (16 nos)	·····
43165	S S Louvre at Inlet Works at Stage IV	60	01JUL10	29AUG10	92d		S S Louvre at Inlet Works at Stage IV	
43170		60	30AUG10	280CT10	92d		Covered Walkway at Sludge Dewatering House	
	Dracinage Works		nin kontente	Han yorkana		· · · ·		
42010	g · · · · · · · · · · · · · · · · · · ·	120	21JUL10	17NOV10	362d		Road & Drainage Works in Portion A	
42020	Road & Drainage Works along MLC	135	16SEP10	28JAN11	0		Road & Drainage Works along MLC	
CONTRACTOR CONTRACTORS IN	/ of Works							-
	aping Works					·	·	•
50010	Section V of Works	1185	29JAN10	27APR13	0			
50110	Tree Survey	60	29JAN10	29MAR10	20d	Tree Survey		
50120	Tree Transplanting & Felling Tree	90	30MAR10	27JUN10	20d	Tree	Transplanting & Felling Tree	
50130	Establishment Works to Transplanted Tree	365	28JUN10	27JUN11	670d		Establishment Works to Transplante	d Tree
50140	Landscaping Softworks	650	28JUN10	07APR12	20d			Landscaping Softwork
50150	Establishment Works to Softworks	650	28JUN11,	07APR13	20d			
50160	Irrigation System for Green Roof at TPSTW	120	28JUN10	250CT10	310d		Irrigation System for Green Roof at TPSTW	-
50170	Green Roof at Sludge Dewatering System	120	26OCT10	22FEB11	310d		Green Roof at Sludge Dewatering System	
50180	Green Roof at Transformer House	120	23FEB11	22JUN11	310d		Green Roof at Transformer House	·
BOO CONTRACTOR OF A	Establishment Works to Green Roof	365	23JUN11	21JUN12	310d			Establishm
1533				A second and		· · · ·		
51010	Removal of Waste Bio-burner at PSGT Stage I/II	60	05JUL10 *	02SEP10	28d		Removal of Waste Bio-burner at PSGT Stage I/II	· ·
51020	Road & Drainage Works	120	26OCT11	22FEB12	430d			oad & Drainage Works
51030	Cable Ducting and Drawpits	350	01APR12	16MAR13	42d			
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China Harbour Engineering Co. Ltd. **TPSTW Stage 5 Phase 2B**

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Early bar 27APR13 Progress bar . 29JAN10 Critical bar 06APR10 - Summary bar Page number 5A c Primavera Systems, Inc. ۲

29JAN10

Start date

Finish date

Data date

Run date

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2013 P OCT NOV DEC JAN FEB MAR APR MAY AUG SEP OCT NOV I Section V of Works /orks Establishment Works to Softworks hment Works to Green Roof Cable Ducting and Drawpits and the second a ta ta ta construction. A ta ta ta construction de la construction de la construction de la construction de la م مربعهرها جارد آند از از داد د Date Revision Checked Approved 5FEB10 WML TKC 0 7APR10 TKC AA 1

APPENDIX B MONITORING REQUIREMENTS

APPENDIX B – MONITORING REQUIREMENTS

Type of Monitoring	Parameter	Frequency	Duration	Location of Measurement
Noise ⁽¹⁾	L _{eq} (30 min.) (0700-1900 hrs. on normal weekdays)	Once per week	30 mins	• NM1 (Outside the corridor of 1/F of Government Staff Quarter)
	1-hour TSP	3 times every six days	1 hour	CAM1 (on flat roof of Government Staff Quarters)
Air	24-hour TSP	Once every six days	24 hours	 CAM2 (on ground within TPSTW and just next to the Printing Centre of Hung Hing Printing Centre) CAM3 (on ground within TPSTW and just next to Talcon Industrial Ltd.)
Landfill Gas	Methane (v/v) Carbon Dioxide (v/v) Oxygen (v/v)	2 times per day	N/A	 <u>The Locations where the excavation is 1m depth or more and within the 250m</u> <u>Consultation Zone of Shuen Wan Landfill</u> FC11B and FC12B Pipe 600 Excavation Trench (Conducted in November 2010 only) ional weekly impact monitoring shall be carried out during evening and night-time works.

APPENDIX C ACTION AND LIMIT LEVELS

APPENDIX C – Action and Limit Levels

<u>1-Hour TSP</u>

Location	Action Level, μg/m ³	Limit Level, µg/m ³
CAM1	315	
CAM2	336	500
CAM3	344	

24-Hour TSP

Location	Action Level, μg/m ³	Limit Level, µg/m ³
CAM1	171	
CAM2	177	260
CAM3	192	

Construction Noise

Time Period	Action Level	Limit Level
0700-1900 hrs on normal weekdays		75 dB(A)
0700-2300 hrs on holidays; and 1900- 2300 hrs on all other days	When one documented complaint is received	70* dB(A)
2300-0700 hrs of next day	r i i i i i i i i i i i i i i i i i i i	55* dB(A)

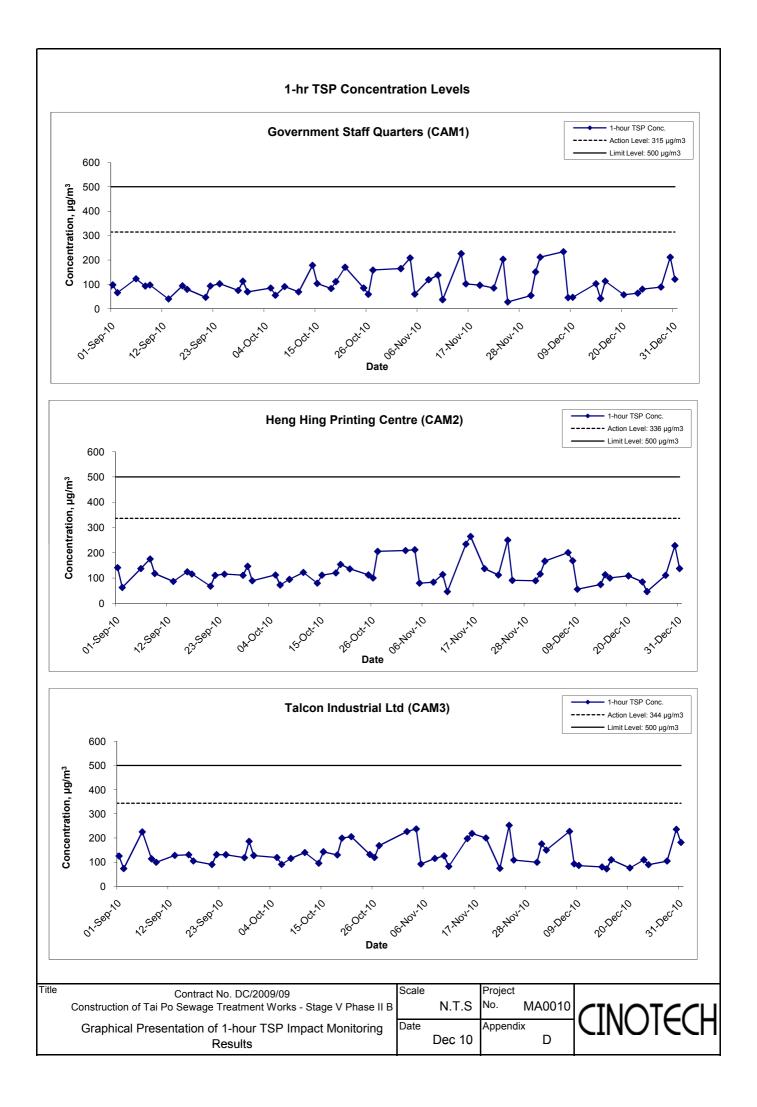
Notes:

* The Area Sensitivity Rating for Station NM1 is taken as C, due to the nearby industrial area, according to Table 1 of EPD's Technical Memorandum on Noise from Construction Work other than Percussive Piling.

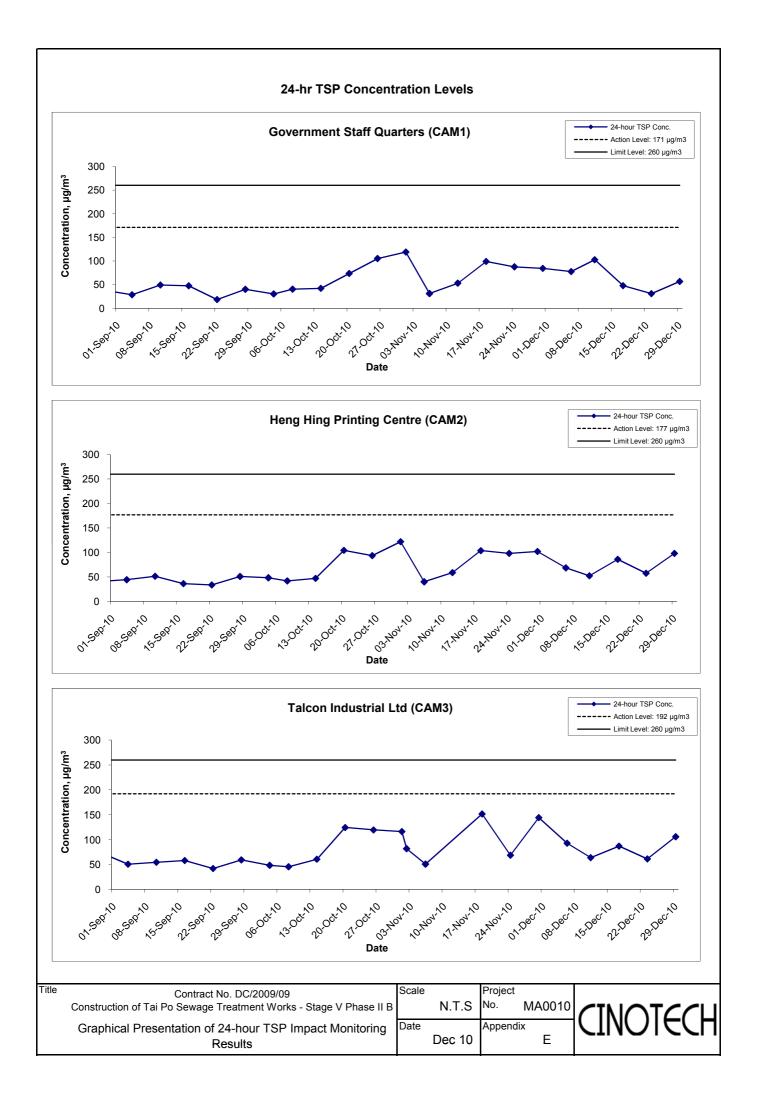
Landfill Gas

Parameter	Limit Level	Action
	<19%	Ventilate to restore oxygen to >19%
Oxygen	<18%	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore oxygen to >19%
Methane	>10% LEL (i.e. >0.5% by volume)	Post "No Smoking" signs Prohibit hot works Ventilate to restore methane to <10% LEL
	>20% LEL (i.e. >1% by volume)	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore methane to <10%
Carbon Dioxide	>0.5%	Ventilate to restore carbon dioxide to <0.5%
	>1.5%	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore carbon dioxide to <0.5%

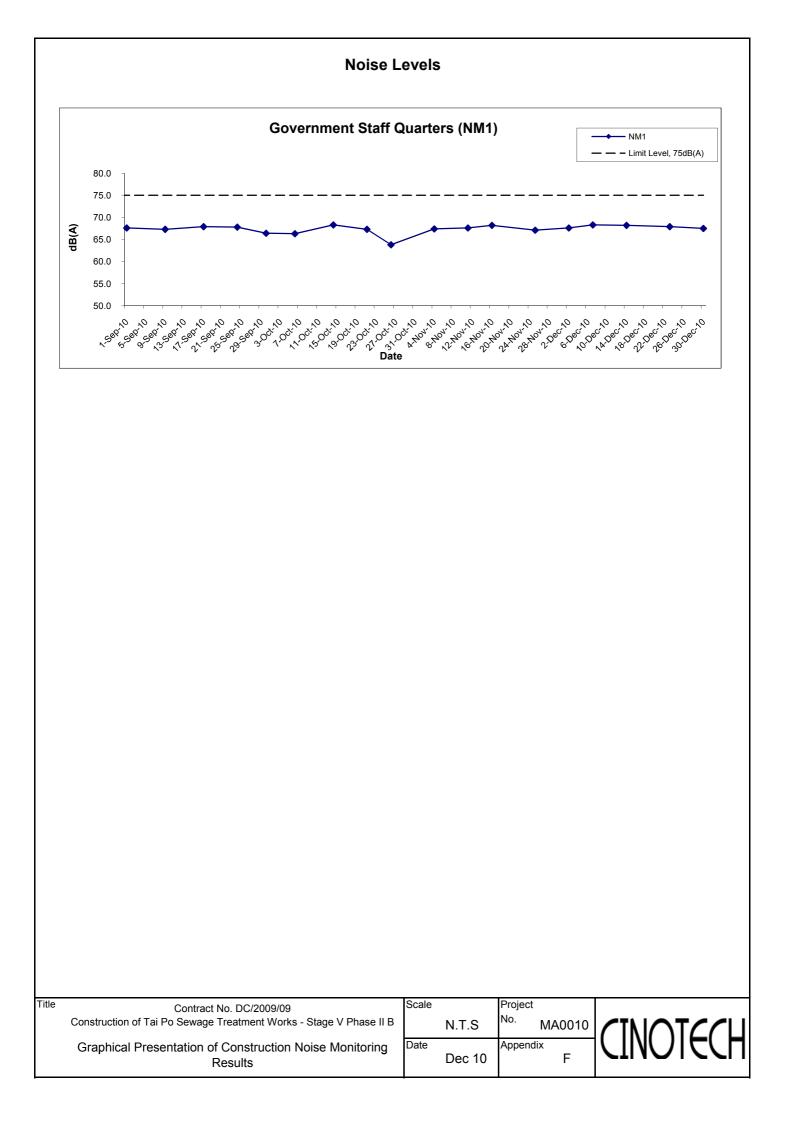
APPENDIX D GRAPHICAL PRESENTATION OF 1-HOUR TSP MONITORING RESULTS



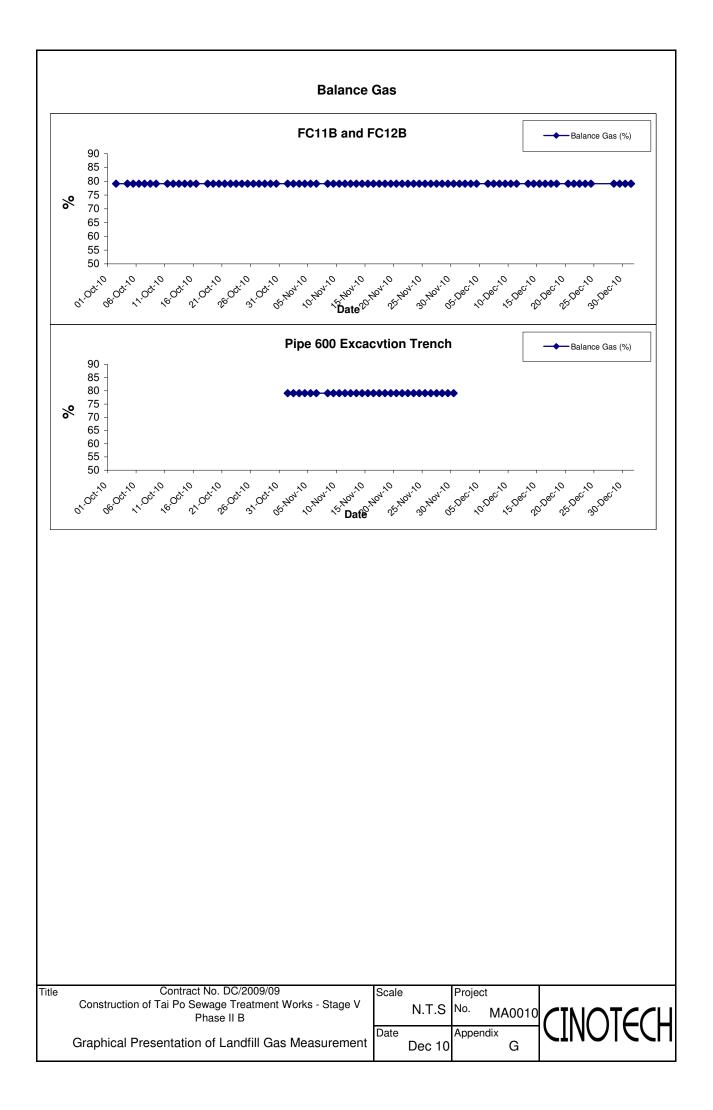
APPENDIX E GRAPHICAL PRESENTATION OF 24-HOUR TSP MONITORING RESULTS

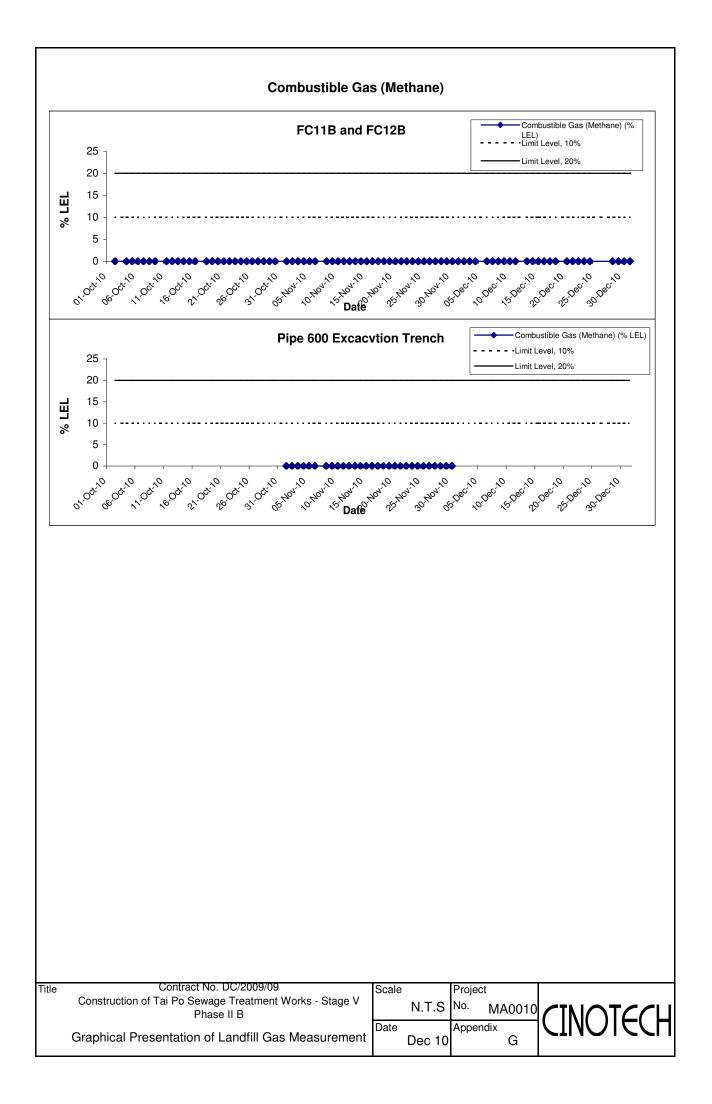


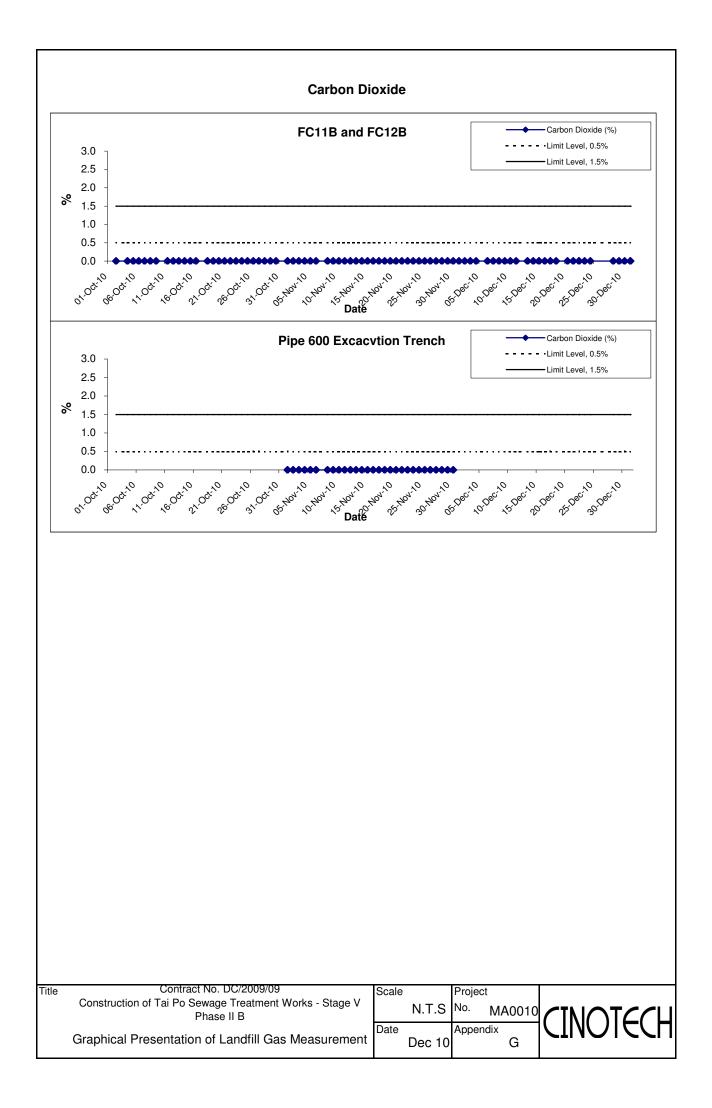
APPENDIX F GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS

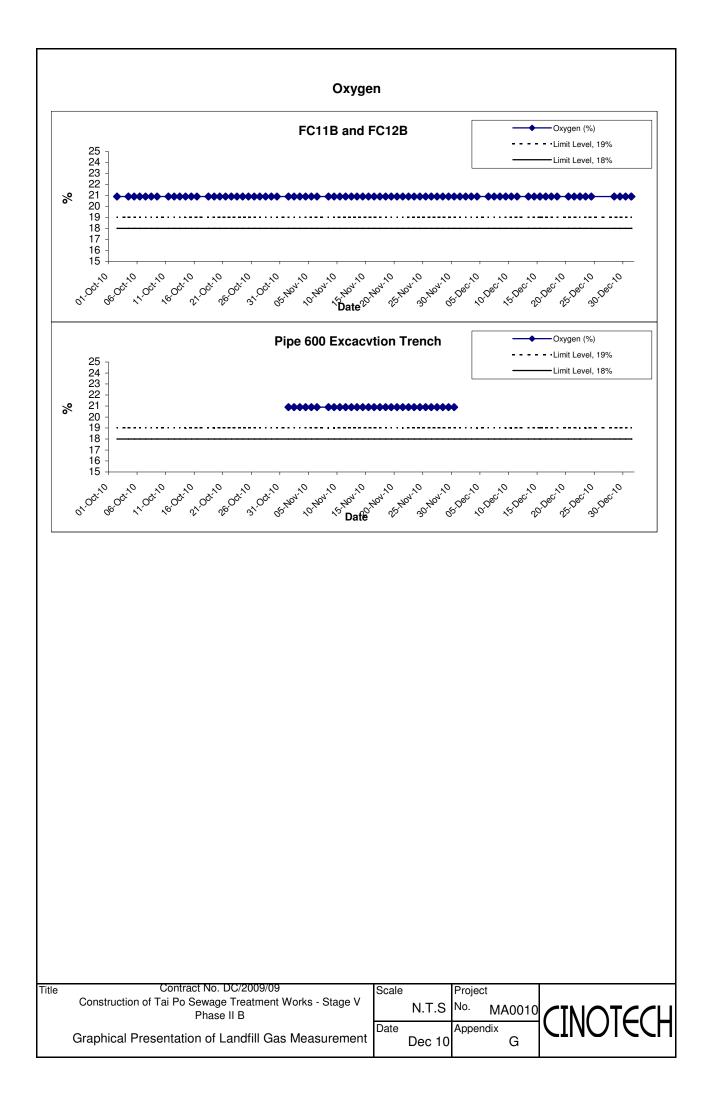


APPENDIX G GRAPHICAL PRESENTATION OF LANDFILL GAS MEASUREMENT BY BY THE CONTRACTOR









APPENDIX H UPDATED ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

Type of Impact	Recommended Mitigation Measures	Status
Air Quality	Dust mitigation measures stipulated in <i>the Air Pollution Control (Construction Dust) Regulation</i> shall be incorporated to control dust emission. Notice shall be given to authority prior to commencing of work	V
Noise	Use of quiet PME	N/A
	 Good Site Practice Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program; Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program; Mobile plant, if any, should be sited as far from NSRs as possible; Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. 	V
Water Quality	The practices outlined in ProPECC PN 1/94 Construction Site Drainage should be adopted to minimize the potential water quality impacts from construction site runoff and various construction activities. The recommendation to install perimeter drains to collect site runoff and to properly treat the runoff by settlement tank/treatment system shall apply to all sites including those for mainlaying works. Minimum distances of 100 m should be maintained between the discharge points of construction site runoff and the existing WSD saltwater intake at Tai Po.	V
	A discharge licence needs to be applied from EPD for discharging effluent from the construction site. The discharge quality is required to meet the requirements specified in the discharge licence. All the runoff and wastewater generated from the works areas should be treated so that it satisfies with all the standards listed in the TM. 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. Monitoring of the discharge quality of treated effluent should be part of the Environmental Monitoring and Audit (EM&A) programme. Detailed effluent sampling programme for water quality control during construction phase should be submitted to EPD, AFCD and WSD for approval prior to commencement of the construction works.	V
	The construction programme should be properly planned to minimize soil excavation, if any, in rainy seasons. This prevents soil erosion from exposed soil surfaces. Any exposed soil surfaces should also be properly protected to minimize dust emission. In areas where a large amount of exposed soils exist, earth bunds or sand bags should be provided. Exposed stockpiles should be covered with tarpaulin or impervious sheets at all time. The stockpiles of materials should be placed in the locations away from any stream courses 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 are protected using crushed stone or gravel, wherever practicable. Wheel washing facilities should be provided at all site exits to ensure that earth, mud and debris would not be carried out of the works areas by vehicles.	V
	Good site practices should be adopted to clean the rubbish and litter on the construction sites so as to prevent the rubbish and litter from dropping into the nearby environment. It is recommended to clean the construction sites on a regular basis.	N

APPENDIX H – Updated Environmental Mitigation Implementation Schedule (During Construction Phase)

Type of Impact	Recommended Mitigation Measures					
	It is recommended to provide sufficient chemical toilets in the works areas. The toilet facilities should not be less than 30 m from any watercourse. A licensed waste 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 TPSTW as necessary.					
	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. Implementation of environmental audit on the construction site can provide an effective control of any malpractices and can achieve continual improvement of environmental performance on site.	\checkmark				
	It is required to 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.	\checkmark				
	Any service shop and minor maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken with the areas appropriately equipped to control these discharges.	\checkmark				
	 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 chemical wastes. General requirements are given as follows: 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. 	V				
	Marine water quality monitoring should be carried out under emergency condition or during maintenance of the THEES tunnel to verify the findings of the water quality modelling. It is recommended that the maintenance of the THEES tunnel, if unavoidable, should be conducted during winter season or low flow periods and to avoid the "blooming" season of algae (normally from April to June) if practicable. Details of the monitoring requirements are specified in the EM&A Manual.	N/A				

Type of Impact	Recommended Mitigation Measures					
Waste Management	 Good site practices during the construction activities include: Nomination of approved personnel, 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 waste handling procedures. Provision of sufficient waste disposal points and regular collection for disposal. Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Facility. Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. A Waste Management Plan shall be prepared and this WMP shall be submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details. In order to monitor the disposal of C&D materials at landfills and public filling areas, and to control fly tipping, a trip-ticket system shall be included as one of the contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. One may make reference to WBTC No. 21/2002 for details. A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) shall be proposed. 	1				
	 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: 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. To encourage collection of aluminum cans by individual collectors, separate labelled bins shall be provided to segregate this waste from other general refuse generated by the work force. Any unused chemicals or those with remaining functional capacity shall be recycled. Maximize the use of reusable steel formwork to reduce the amount of C&D material. Prior to disposal of C&D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimize the quantity of waste to be disposed of to landfill. Proper storage and site practices to minimize the potential for damage or contamination of construction materials. Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste. Minimize over ordering of concrete, mortars and cement grout by doing careful check before ordering 	~				
	<i>General Refuse</i> General refuse shall be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from C&D material. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.	V				
	Construction & Demolition (C&D) Material C&D material generated from the site formation and demolition works shall be sorted on-site into inert C&D material (i.e. public fill) and C&D waste. In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material comprising fill material shall be reused on-site as backfilling material as far as practicable. C&D waste, such as wood, plastic, steel and other metals shall be reused or recycled and, as a last resort, disposed of to landfill. A suitable area shall be designated within the site for temporary stockpiling of C&D material and to facilitate the sorting process.	1				

Type of Impact	Recommended Mitigation Measures					
	Bentonite Slurry Bentonite slurries used in construction works should be reconditioned and reused wherever practicable. Residual used bentonite slurry should be disposed of from the site as soon as possible. The Contractor should explore alternative disposal outlets for the residual used bentonite slurry and disposal at landfill should be the last resort.					
Landfill Gas Hazard	All personnel who work on the site and all visitors to the site should be aware of the possibility of ignition of gas in the vicinity of excavations. Safety notices should be displayed at prominent position around the site. Adequate fire extinguisher equipment and fire resistant clothing should be made available on site.	V				
	Service runs within the consultation zone should be designated as "special routes" and utilities companies should be informed of this and should implement precautionary measures.	\checkmark				
	 Precautionary measures to minimize landfill gas hazard during excavation: No smoking or burning shall be allowed No worker shall work alone at any time in the confined space or any excavation trenches Construction equipment shall be equipped with a vertical exhaust at least 0.6 m above ground level and /or with a park arrestors Electrical motors and electrical extension cords shall be explosive-proof or intrinsically safe Permit to Work procedures to be adopted for welding, flame cutting or other hot works in trenches or confined spaces Forced ventilation if working in a trench deeper than 1 m Close all valves immediately after piping assembly or conduiting construction. For the large diameter pipes, pipe end shall be capped on one side. Forced ventilation shall also be provided before commissioning of the pipeline and staff entering and working in it Routine monitoring shall be conducted in all excavations to ensure the works area to be free of landfill gas precautionary measures involved with excavation and piping works shall be included in the Safety Plan Monitoring shall be conducted at the cracks on the ground floor during ground-works construction 	V				
	 Where there are any temporary site offices, or any other buildings which have enclosed spaces with the capacity to accumulate landfill gas, then they should either: be located on an area which has been proven to be free of landfill gas (by survey with portable gas detectors) and monitored manually by the Safety Officer or an approved wand appropriately qualified person to ensure that hazardous concentration of landfill gas does not occur; or be raised clear of the ground. If buildings are raised clear of the ground, a minimum, clear separation (as measured from the highest point on the ground surface to the underside of lowest floor joist) should be 500mm 	V				

Note: $\sqrt{-}$ Compliance of mitigation measures X - Non-compliance of mitigation measures N/A - Not applicable

APPENDIX I SUMMARY OF ENVIRONMENTAL LICENSING AND PERMIT STATUS

APPENDIX I – Summary of Environmental Licensing and Permit St	atus
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Permit / License No.	Valid	Period	- Details	Status	
Permit / License No.	From To		Details	Status	
Environmental Permi	it (EP)				
EP-265/2007	22/3/2007 N/A		 Expansion and upgrading of existing <u>Tai Po Sewage Treatment Works from</u> <u>100,000 m³/day to 130,000 m³/day</u>: (a) additional secondary treatment process units(1 primary clarified; 3 bioreactors and 2 final clarifiers); (b) reconstruction of 4 existing final clarified; (c) provision of ultraviolet disinfection facilities; (d) additional sludge treatment facilities; and (e) ancillary works to existing treatment facilities. 	Valid	
Consruction Noise Pe	rmit (CNP)		1		
GW-RN0137-10	17/5/2010	16/11/2010	Use of powered mechanical equipment for carrying out construction work at 7 Dai Kwai Street, Tai Po Industrial Estate, Tai Po, N.T. during 0000 – 2400 hours on general holidays (including Sundays), 0000 – 0700 hours and 1900 – 2400 hours on any day not being a general holiday.	Expired	
GW-RN0387-10	17/11/10	16/5/11	Use of powered mechanical equipment for carrying out construction work at 7 Dai Kwai Street, Tai Po Industrial Estate, Tai Po, N.T. during 0000 – 2400 hours on general holidays (including Sundays), 0000 – 0700 hours and 1900 – 2400 hours on any day not being a general holiday.	Vaild	
Discharge Licence			1		
WT00007782-2010	25/10/10	31/10/15	Discharge of industrial trade effluent: Water Control Zone: Tolo Harbour and Channel Discharge Points: Communal drain for the carriage of surface drainage water	Valid	
Waste Disposal (Cher					
WPN : 5213-727-C2397-16	09/7/10	End of Project	Disposal of Chemical Waste including spent oil, lubricating oil, diesel oil and methanol, surplus paint, thinner	Valid	

APPENDIX J WASTE GENERATION IN THE REPORTING QUARTER

APPENDIX J – WASTE GENERATION IN THE REPORTING QUARTER

Monthly Summary Waste Flow Table October to December 2010 (Year)

	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly					
Month	Total Quantity Generated	Broken Concrete (see Note 3)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastic (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
Jan											
Feb											
Mar											
Apr											
May											
June											
Sub-total											
July	3.11	0	0	0	3.11	0	0	0	0	0	0.01
Aug	0.04	0	0	0	0.04	0	0	0	0	0	0
Sept	0.07	0	0	0	0.07	0	0	0	0	0	0.01
Oct	0.17	0	0	0	0.17	0	1.2	0	0	0	0.01
Nov	1.25	0	0	0	1.25	0	1.4	0	0	0	0.01
Dec	3.71	0	0	2.23	3.71	0	1.4	0	0	0	0.01
Total	8.35	0	0	2.23	8.35	0	4.00	0	0	0	0.05

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

(3) Broken concrete for recycling into aggregates.

APPENDIX K SUMMARY OF EXCEEDANCE

APPENIDX K – SUMMARY OF EXCEEDANCE

Reporting Period: October to December 2010

- a) Exceedance Report for 1-hr TSP (NIL)
- b) Exceedance Report for 24-hr TSP (NIL)
- c) Exceedance Report for Construction Noise (NIL)
- d) Exceedance Report for Landfill Gas (NIL)

APPENDIX L COMPLAINT LOG

APPENDIX L – COMPLAINT LOG

Reporting Period: October to December 2010

Log Ref.	Location	Received Date	Details of Complaint	Investigation/Mitigation Action	Status
N/A	N/A	N/A	N/A	N/A	N/A

Remarks: No environmental complaint was received in the reporting period.