

MTR Corporation Limited

HONG KONG SECTION OF GUANGZHOU –
SHENZHEN – HONG KONG EXPRESS RAIL LINK
(No. EP-349/2009/B)

Groundwater Monitoring and Contingency Plan
for South Section of Approach Tunnel
(Contract 811B)
(Revision C)

Verified by:



Position:

Independent Environmental Checker

Date:

30 June 2011

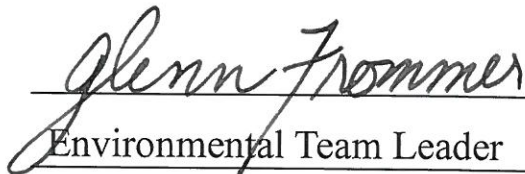
MTR Corporation Limited

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Position:

Environmental Team Leader

Date:

28 JUN 2011



金門 - 禮頓聯營
Gammon - Leighton Joint Venture

MTR XRL811B

Monitoring of Groundwater and
Emergency Response Plan

About this document

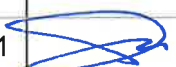


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The status of this plan is identified by a revision number and date on each page. Changes to the document are identified by a vertical single line in the right-hand margin. On revision, the plan will be uploaded as a whole to the project server. Technical Documents Module. The Quality Manager maintains a record of the revision status of the plan, which is available on request.

If you have any enquiry relating to this plan, please contact the Quality Manager.

Revision History and Plan Approval

Revision	Date	Prepared by:	Checked by	Approved by:	Section/Description
00		GC	CD	CW	Initial Issue
01		RF	CD	CW	Re-submission
02		RF	CD	CW	Re-submission
03	23 Jun 11	 GC	 CD	 CW	Re-submission

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- Appendix D – Communication Flow Chart in Emergency Situation

1 Scope of Monitoring of Groundwater and Emergency Response Plan

Excavation activities invariably result in affect the ground water level. To closely monitor the ground water level throughout the excavation of cofferdam of XRL811B, GLJV is proposing to implement an intensive monitoring regime to control dewatering activities. The plan is also prepared to fulfill the groundwater monitoring requirements stated in PS clause 11.52 to 11.56, and 22.22. Pursuant to Condition 2.11 of Environmental Permit No. EP-349/2009/B, the plan would be deposited to the Environmental Protection Department of HKSAR by the Permit Holder.

Ground water level is monitored in accordance with clause G2.7.1 of General Specification and clause 2.12 of the M&W specification (Civil), and controlled by means of recharge wells and pumps as per Clause P13 “Special precautions and Requirements”.

Ground water table monitoring shall be conducted on site as a precautionary measure against possible impact to adjacent existing structure due to the potential groundwater drawdown induced by excavation or dewatering.

Groundwater monitoring frequency

Instrumentation Type	Monitoring Frequency		
	Background	Standard	Active
Standpipe / Piezometer	Monthly	Weekly	Daily

2 Trigger and Action Level Definitions

As mentioned in the PS Appendix E “Geotechnical Baseline Report”, Section 6, the lower groundwater level is defined as -2.0 mPD.

The “AAA response values” of groundwater monitoring are defined as follow,

All Piezometer / Standpipe	Groundwater drawdown with respect to the lower baseline value		
	Alert (m)	Action (m)	Alarm (m)
	0.5	0.75	1.0

In line with the recommendation made in the EIA Report where its Appendix 11.8 “Hydrogeological Impact Assessment” refers, the “EIA action level” shall be set at 2.0m lower than the established lower baseline.

3 Monitoring Control of Construction Activities

3.1 General

To ensure that construction activities are controlled and therefore the potential risk of damage to existing buildings, structures and utilities such as water mains are mitigated, it is essential that all monitoring data is reviewed and any instruments that have reached trigger/ action levels or are developing a potentially adverse trend are reported to the Construction Team, Engineering Manager, Environmental Team (ET) Leader and MTR. Intense monitoring of the structures and utilities within the zone of influence of excavation / dewatering works, and review of the monitoring data will be used to control excavation activities.

3.2 Groundwater Monitoring

The Contractor shall monitor the standpipes and piezometers shown in the instrumentation and monitoring plans as well as the observation wells shown in the drawings 811B/T/308/GLJ/T04/312 and 313 with due regard to the excavation and dewatering process, groundwater level and any other construction constraints.

The monitoring phases are defined as follows:

(1) Baseline Monitoring - monitoring carried out over an initial phase to establish the existing groundwater level prior to commencement. It also allows the natural variations cause by considerable groundwater fluctuation due to seasonal change and specific rainfall events, and repeatability of the monitoring to be established.

(2) Active Monitoring - monitoring during active construction works within 50m of the observation well. Active monitoring is required for works such as dewatering and excavation, which may potentially lead to significant changes in the conditions of the groundwater level.

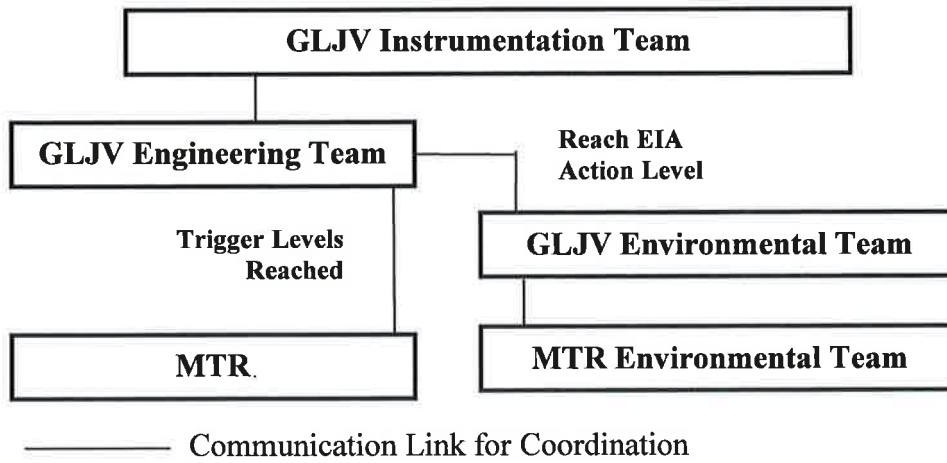
3.3 Dewatering Programme

The dewatering programme will generally follow the excavation below groundwater level presented in the master works programme.

4. Groundwater Management

- 4.1 Baseline reference shall be taken as lowest measured groundwater table from the standpipes, piezometers and observation wells before the commencement of dewatering works on site, or +0.2mPD as mentioned in section 2, whichever is lesser.
- 4.2 Abnormally high or abnormally lower groundwater levels may have an adverse effect on the adjacent existing structure and water mains by inducing either over dewatering or water-logged soil conditions, respectively.
- 4.3 It is expected that the dewatering for the construction of the tunnel may lower water levels locally, and in the short-term only. It is not anticipated that the construction of the tunnel would have a long term effect on groundwater levels as the hydro static pressures within the ground would allow the groundwater to equalise around the new structures.
- 4.4 When groundwater levels fall below or rises above the permitted tolerance ranges presented in Section 1, for any of the selected wells, for a period of more than 48 hours (without significant rainfall), then the contractor will, in accordance with the Event / Action Plan (Appendix B), formulate a proposal for, and implement, a course of action to rectify the situation and bring ground water levels back within range.
- 4.5 In general terms, where groundwater levels are observed to be too low within the selected well(s), additional water can be added through the recharge wells. Where the level is too high, excess groundwater can be pumped out of the ground and discharged into the mains drains.

4.6 The groundwater monitoring follow the organization structure as follow,



Appendix A – Drawings
811B/T/308/GLJ/T04/311, 811B/T/308/GLJ/T04/0074 and 0075
(For Reference Only)

GENERAL NOTES FOR PUMPING TEST

- THE CONTRACTOR SHALL SUBMIT METHOD STATEMENT AND PUMP WELL DESIGN TO MTR & BD FOR AGREEMENT PRIOR TO PUMPING TEST.
- PUMPING TEST SHALL BE CARRIED OUT AFTER THE COMPLETION OF A PORTION OF COFFERDAM.
- THE PUMPING TEST SHALL BE CARRIED OUT OVER A PERIOD TO BE AGREED WITH THE ENGINEER.
- PUMPING TEST RESULTS WITH INTERPRETATION REPORT SHALL BE SUBMITTED TO THE ENGINEER AFTER THE SUCCESSFUL COMPLETION OF THE PUMPING TEST.
- INSTALLATION RECORDS AND RESPONSE TEST RESULTS OF THE DEWATERING WELLS AND OBSERVATION WELLS SHALL BE SUBMITTED PRIOR TO THE COMMENCEMENT OF THE PUMPING TEST.
- THE MAXIMUM GROUNDWATER TABLE DRAWDOWN OUTSIDE DIAPHRAGM WALLS AS RECORDED BY THE OBSERVATION WELLS SHALL NOT EXCEED 1m BELOW THE EXISTING GROUND WATER LEVEL.
- DEWATERING WELLS AND OBSERVATION WELLS SHALL BE PROTECTED FROM DAMAGE. WORKS SHALL BE CARRIED OUT WITH DUE CARE IN PROXIMITY OF THESE WELLS.
- IF ANY DEWATERING/OBSERVATION WELL IS DAMAGED DURING THE PUMPING TEST, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY AND REINSTATEMENT SHALL BE CARRIED OUT AS SOON AS POSSIBLE.
- LEVELS OF FLOAT SWITCH SHALL BE PROPOSED BY CONTRACTOR, AND CONFIRMED BY THE ENGINEER.

5. PUMPING TEST CRITERIA

- 5.1 PUMPING TEST SHALL BE CONSIDERED ACCEPTABLE IF THE FOLLOWING CRITERIA ARE MET WHEN THE WATER LEVEL INSIDE THE SITE REACHES THE DESIGNATED LEVEL AS RECORDED BY THE OBSERVATION WELLS.
- | CRITERIA | MAXIMUM MAGNITUDE |
|--|--|
| GROUNDWATER LEVEL OBSERVED IN OBSERVATION WELLS OUTSIDE SITE | DROPS NOT MORE THAN 1m BELOW THE LOWEST MEASURED GROUNDWATER LEVEL |
- 5.2 IF GROUNDWATER LEVEL OUTSIDE THE SITE DROPS TO MORE THAN 1m BELOW THE LOWEST MEASURED GROUNDWATER LEVEL BUT THE GROUND SETTLEMENT DOES NOT EXCEED 10mm, THE PUMPING TEST SHALL CONTINUE TO PROCEED. AFTER COMPLETION OF THE PUMPING TEST, THE DESIGN ASSUMPTIONS SHALL BE REVIEWED BASED ON THE TEST RESULTS AND THE RESULTS SHALL BE INCLUDED IN THE ASSESSMENT REPORT AS STATED IN 6.
- 5.3 PUMPING TEST SHALL BE STOPPED IN CASE THE GROUND/BUILDING SETTLEMENT EXCEEDS THE LIMIT AS SPECIFIED IN TABLE 2 OF DRAWING NO. 811A/T/308/GLJ/T04/304 THE CONTRACTOR SHALL INVESTIGATE THE CAUSE OF THE SETTLEMENT AND IMPROVEMENT MEASURES SHALL BE PROPOSED AND IMPLEMENTED.
- 5.4 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF DEWATERING AND RECHARGE WELL SYSTEM (INCLUDING BUT NOT LIMITED TO RECHARGE RATE, RECHARGE HEAD, FLOAT SWITCH LEVELS IN OBSERVATION WELLS, SWITCH BOARD AND CONTROLLED VALVES, ETC.) IN ORDER TO MEET THE PERFORMANCE CRITERIA SET OUT IN CAUSE 5.1 TO 5.3)

6. ASSESSMENT REPORT

AFTER COMPLETION OF THE PUMPING TEST, THE CONTRACTOR SHALL PREPARE AN ASSESSMENT REPORT BASED ON THE TEST RESULTS DISCUSSING THE ASSUMED AND ACTUAL CONDITIONS ON SITE, INTERPRET THE RESULTS AND ASSESS THE EFFECTS TO THE SURROUNDING STRUCTURES AND UTILITIES. THIS REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

PUMPING TEST DETAILS

1. PROCEDURES

- SUBMIT DETAILED DESIGN OF DEWATERING WELLS AND OBSERVATION WELLS TO THE SATISFACTION OF THE ENGINEER.
- BEFORE INSERTION OF SUBMERSIBLE PUMPS, DEWATERING WELLS SHALL BE CLEANED, FLUSHED AND THE DEPTH OF WELLS SHALL BE ACCURATELY MEASURED.
- DEWATERING WELLS INCLUDING DISCHARGE PIPES SHALL THEN BE COMPLETED AND TESTED TO BE FUNCTIONAL.
- DEWATERING PUMPS INSTALLED SHALL HAVE SUFFICIENT DISCHARGE CAPACITY TO LOWER THE WATER LEVEL TO -25 MPD IMMEDIATELY BEHIND THE DIAPHRAGM WALL. THE CONTRACTOR SHALL TAKE RESPONSIBILITY TO ENSURE THE PUMPS HAVE THE REQUIRED CAPACITY.
- FLOW METERS AND GATE VALVES TO CONTROL FLOW SHALL BE INCORPORATED INTO EACH DEWATERING WELL.
- BEFORE COMMENCEMENT OF THE PUMPING TEST, WATER LEVELS IN ALL DEWATERING WELLS AND OBSERVATION WELLS SHALL BE MEASURED AT 4-HOUR INTERVALS FOR A PERIOD OF 24 HOURS. THESE SHOULD FORM THE BASE SET OF INITIAL DATA FOR THE PUMPING TEST.
- DURING THE TEST, WATER LEVELS IN ALL DEWATERING WELLS AND OBSERVATION WELLS SHALL BE RECORDED AT REGULAR INTERVALS (SEE "WATER LEVEL MEASUREMENT" IN NOTE (B)).
- DURING THE TEST, THE ACCUMULATED OPERATION TIME OF DEWATERING WELLS SHALL BE RECORDED AT 12 HOUR INTERVALS.
- ALL MONITORING DATA SHALL BE PRODUCED IN BOTH TABULAR AND GRAPHICAL FORM DURING THE COURSE OF THE PUMPING TEST. THE FORMAT OF THE TEST RESULTS SHALL BE AGREED WITH THE ENGINEER.
- WATER LEVELS SHALL BE MONITORED AFTER CESSATION OF PUMPING UNTIL RECOVERY TO INITIAL LEVELS IS COMPLETED OR AS INSTRUCTED BY THE ENGINEER.
- ANY UNDUCE GROUND/BUILDING MOVEMENT OR GROUNDWATER DRAWDOWN SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY FOR FOLLOW UP ACTION.

2. WATER LEVEL MEASUREMENT

DURING PUMPING AND RECOVERY TESTS, WATER LEVELS IN DEWATERING WELLS AND OBSERVATION WELLS SHALL BE MEASURED AT THE FOLLOWING INTERVALS:

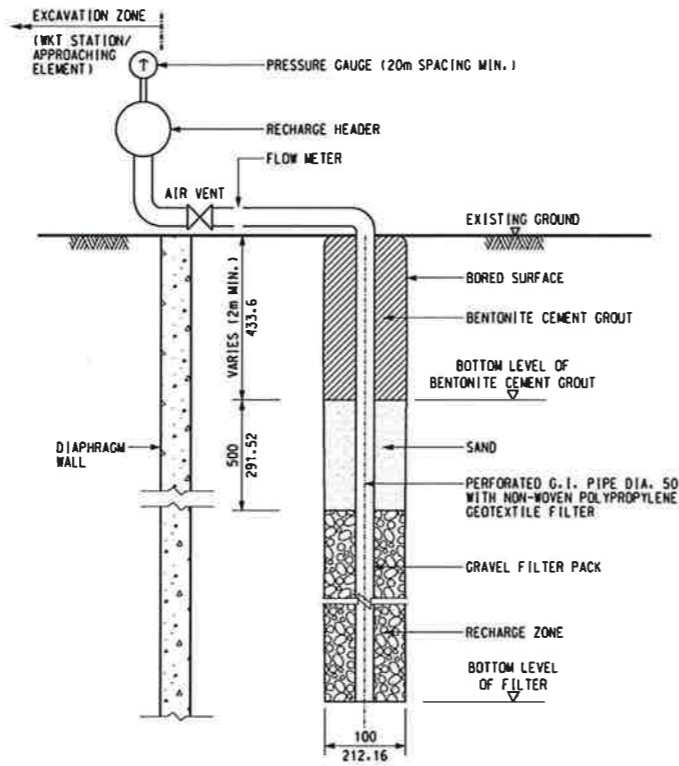
TIME FROM COMMENCEMENT OF PUMPING TEST (MINS)	INTERVAL BETWEEN READINGS (MINS)
0 - 10	1
10 - 30	2
30 - 60	5
60 - 120	10
120 - 360	30
360 - 600	60
600 - END OF TEST	120

DURING RECOVERY PHASE, READINGS SHALL BE TAKEN CONTINUOUSLY UNTIL WATER LEVELS IN ALL THE OBSERVATION WELLS HAVE RECOVERED TO THEIR PRE-TEST LEVELS FOR A PERIOD OF TWO DAYS, WHICHEVER IS SOONER, OR AS DIRECTED BY THE ENGINEER. PRIOR TO TERMINATING READINGS, THE ENGINEER SHALL BE NOTIFIED.

3. SETTLEMENT MONITORING POINTS

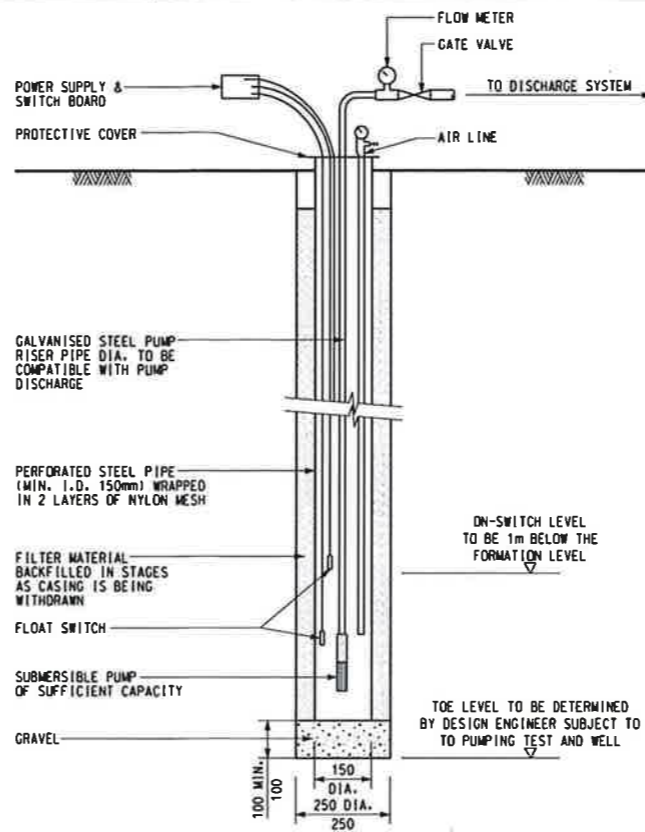
DURING THE PUMPING TEST AND UNTIL THE WATER LEVELS IN ALL THE OBSERVATION WELLS OUTSIDE THE SITE HAVE RECOVERED TO THEIR PRE-TEST LEVELS, THE SETTLEMENT MONITORING POINTS AS SHOWN ON DRAWING NO. 811A/T/308/AAT/C05/101, 104 TO 106 SHALL BE MONITORED ONCE PER DAY. THE RESULTS SHALL BE PRODUCED IN ACCORDANCE WITH NOTE 1.10.

4. DIAPHRAGM WALL MOVEMENT MONITORING POINT AT COMMENCEMENT, DURING THE PUMPING TEST AND UNTIL ONE DAY AFTER THE GROUNDWATER RECOVERED TO ITS ORIGINAL LEVEL, THE INCLINOMETERS INSIDE AND OUTSIDE THE DIAPHRAGM WALLS SHALL BE MONITORED DAILY. THE RESULTS SHALL BE PRODUCED IN ACCORDANCE WITH NOTE 1.10.



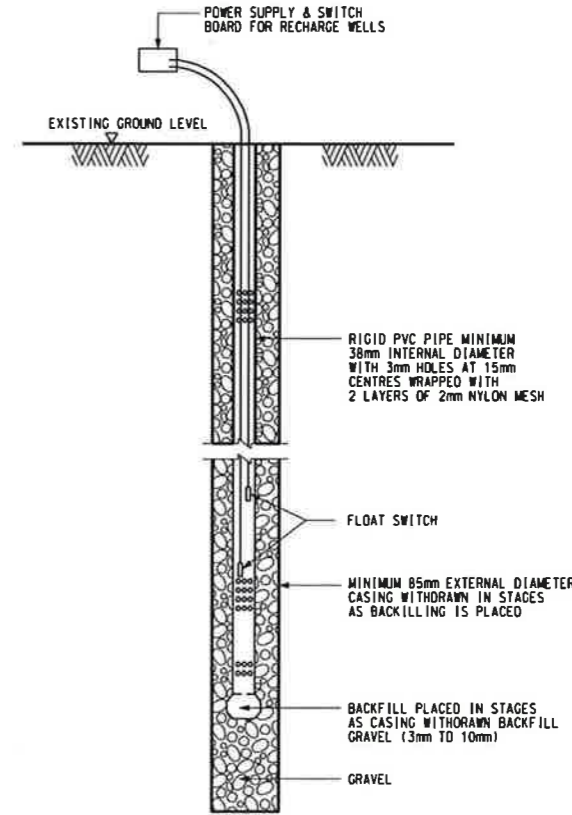
TYPICAL DETAIL OF RECHARGE WELL (RW)

N.T.S.



DETAIL OF DEWATERING WELL (DW)

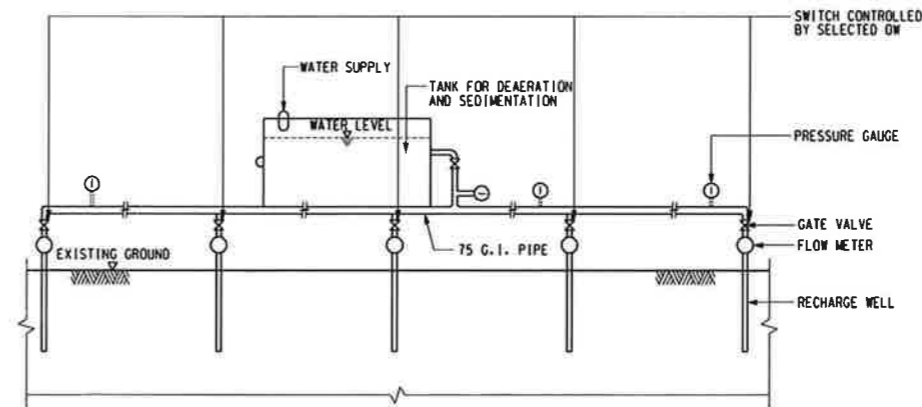
N.T.S.



TYPICAL DETAILS OF OBSERVATION WELL (OW)

N.T.S.

(NOTES : FLOAT SWITCH SHALL BE INSTALLED FOR SELECTED OW)



RECHARGE PIPING SYSTEM

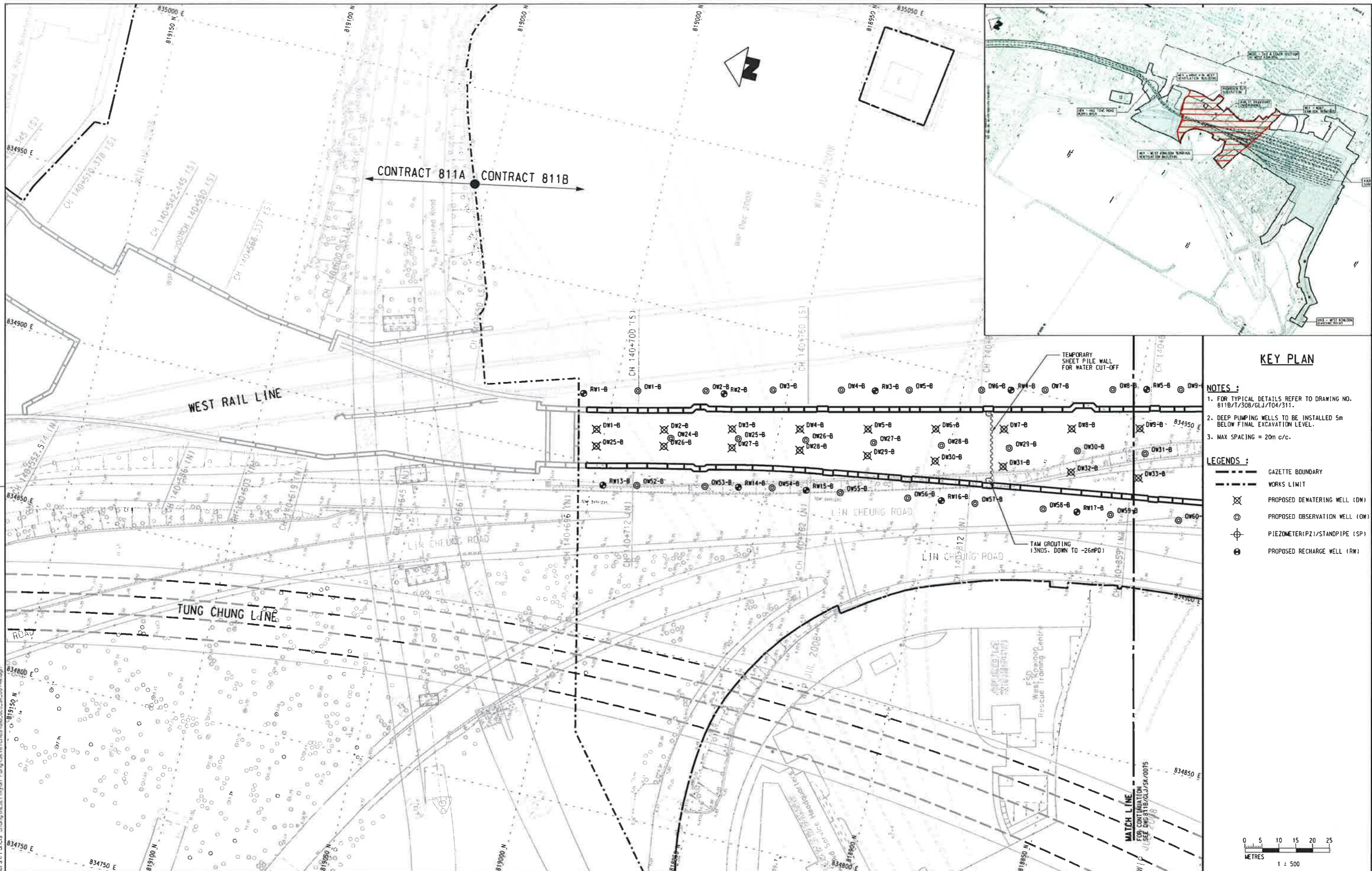
N.T.S.

NOTES:

- FOR DEWATERING CONTROL AND PUMPING TEST LAYOUT PLAN, REFER TO DRAWING NO. 811B/T/308/GLJ/T04/312 AND 313.

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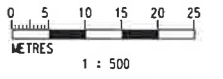
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CADD REF: 811B.T_308_GLJ.T04.311.dgn				SCALE: AS SHOWN				DRAWING NO. 811B/T/308/GLJ/T04/311			
FOR TENDER SUBMISSION				GT 07JUN10 PJC				REV. -			



KEY PLAN

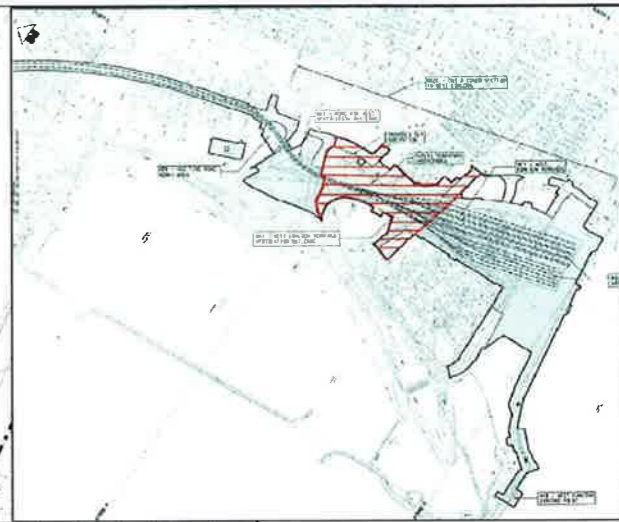
- NOTES :**
1. FOR TYPICAL DETAILS REFER TO DRAWING NO. 811B/T/308/GLJ/T04/311.
 2. DEEP PUMPING WELLS TO BE INSTALLED 5m BELOW FINAL EXCAVATION LEVEL.
 3. MAX SPACING = 20m c/c.

- LEGENDS :**
- GAZETTE BOUNDARY
 - - - WORKS LIMIT
 - ⊗ PROPOSED DEWATERING WELL (DW)
 - ⊙ PROPOSED OBSERVATION WELL (OW)
 - ⊕ PIEZOMETER (PZ) / STANDPIPE (SP)
 - ⊗ PROPOSED RECHARGE WELL (RW)

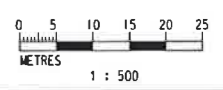


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DESIGNED AI			CONTRACT 811B				
CHECKED GT			WKT APPROACH TUNNEL (SOUTH)				
APPROVED PJC			DEWATERING CONTROL AND PUMPING TEST				
DATE			LAYOUT PLAN				
<small>DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE TAKEN FROM THIS DRAWING. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION PROVIDED IN THIS DRAWING. NO LIABILITY SHALL BE ACCEPTED BY THE USER FOR ANY LOSS OR DAMAGE CAUSED BY THE USE OF THIS DRAWING. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY INFORMATION FROM THE RELEVANT AUTHORITIES. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY INFORMATION FROM THE RELEVANT AUTHORITIES.</small>		CONTRACTOR 		(SHEET 1 OF 2)			
FOR TENDER SUBMISSION	GT	07JUN10	PJC	CADD REF: 811B_GLJ_SK_0074A.dgn	SCALE: 1:500 @ A1	DRAWING NO. 811B/GLJ/SK/0074	REV. A



- KEY PLAN**
- NOTES :**
- FOR TYPICAL DETAILS REFER TO DRAWING NO. 811B/T/308/GLJ/T04/311.
 - DEEP PUMPING WELLS TO BE INSTALLED 5m BELOW FINAL EXCAVATION LEVEL.
 - WHERE EXCAVATION LEVEL IS BELOW BEDROCK LEVEL, DEEP PUMPING WELLS TO BE INSTALLED 2m BELOW BEDROCK.
 - MAX. SPACING = 20m c/c.
- LEGENDS :**
- GAZETTE BOUNDARY
 - - - WORKS LIMIT
 - ⊗ PROPOSED DEWATERING WELL (DW)
 - ⊕ ADDITIONAL DEWATERING WELL (ADW)
 - ⊙ PROPOSED OBSERVATION WELL (OW)



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FOR CONTINUATION
SEE DRAWING NO. 811B/T/308/GLJ/T04/311
MATCH LINE

CONTRACT 811B / CONTRACT 810A

DRAWN	KM
DESIGNED	AI
CHECKED	GT
APPROVED	PJC
DATE	

MTR

EXPRESS RAIL LINK

CONTRACTOR: **Gammon - Leighton Joint Venture**

ORIGINATOR:

CADD REF.: 811B-GLJ-SK-0075A.dgn

TITLE		CONTRACT 811B WKT APPROACH TUNNEL (SOUTH) DEWATERING CONTROL AND PUMPING TEST LAYOUT PLAN (SHEET 2 OF 2)	
SCALE	DRAWING NO.	REV.	
1 : 500 @ A1	811B/GLJ/SK/0075	A	

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
	FOR TENDER SUBMISSION				GT	07JUN10	PJC		



**Appendix B –
Event / Action Plan for Excessive / Insufficient Groundwater Levels**

Appendix B – Event / Action Plan for Excessive / Insufficient Groundwater Levels

	Event	Engineering Manager	MTR	MTR's ET leader	Contractor
	Groundwater level at the selected monitoring wells is observed to be outside the permitted range.	<ul style="list-style-type: none"> ▪ Notify the MTR. ▪ Carry out investigation and repeat monitoring of the well to clarify the result. ▪ Report results of the investigation to the MTR and direct contractor to formulate remedial action. ▪ Increase monitoring frequency to check mitigation measures 	<ul style="list-style-type: none"> ▪ Review and analyse results informed by ET. ▪ Review the proposed remedial actions by the contractor. ▪ Supervise the implementation of the remedial actions 		<ul style="list-style-type: none"> ▪ Reduce and recharge ▪ Suspend the recharge until groundwater falls back within the permitted tolerance range
Trigger Levels	(a) Alert level more than 0.5m below lower baseline level	<ul style="list-style-type: none"> ▪ Continue to monitor, if <ul style="list-style-type: none"> i. groundwater level rises again to within tolerance range within 48 hours, then (a1) ii. groundwater level does not rise again to within tolerance range within 48 hours, then (a2) ▪ Review the construction method to minimize the groundwater drawdown 			(a1) No Action (a2) Increase groundwater recharge rate. Daily monitoring until groundwater levels return to within tolerances
	(b) Action level more than 0.75m below lower baseline level	<ul style="list-style-type: none"> ▪ Continue to monitor, if <ul style="list-style-type: none"> iii. groundwater level rises again to within tolerance range within 48 hours, then (b1) iv. groundwater level does not rise again to within tolerance range within 48 hours, then (b2) ▪ Investigate the ground movements and building movements in the adjacent areas. 			(b1) No Action (b2) Increase groundwater recharge rate. Daily monitoring until groundwater levels return to within tolerances. Review dewatering and recharging rates to identify the suspected leakage location. Submit remedial proposal to MTR.

	Event	Engineering Manager	MTR	MTR's ET leader	Contractor
	(c) Alarm level more than 1.0m below lower baseline level	<ul style="list-style-type: none"> ▪ Continue to monitor, if <ul style="list-style-type: none"> v. groundwater level rises again to within tolerance range within 48 hours, then (b1) vi. groundwater level does not rise again to within tolerance range within 48 hours, then (b2) ▪ Review the construction method and suspend the work if necessary 			(c1) No Action (c2) Increase groundwater recharge rate. Increase the monitoring frequency of ground, water mains and building settlement markers in the adjacent areas. Daily monitoring until groundwater levels return to within tolerances. Implement the remedial proposals and suspend the works until the groundwater level rises to within tolerance range.

	Event	Environmental Manager	MTR	MTR's ET leader	Contractor
EIA Action Level	(c) more than 2.0m below lower baseline level	<ul style="list-style-type: none"> ▪ Notify the MTR's ET Leader. ▪ 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ Carry out investigation and repeat monitoring of the well to clarify the result. Record the investigation results and satisfactory remedial action implementation on the contemporaneous log-book. 	<ul style="list-style-type: none"> ▪ Action per (a1), (a2) (b1), (b2), (c1) and (c2) as above. ▪ Submit the respective remedial mitigation proposal to MTR's ET Leader.

**Appendix C –
Standpipe Monitoring Record Sheet Sample**



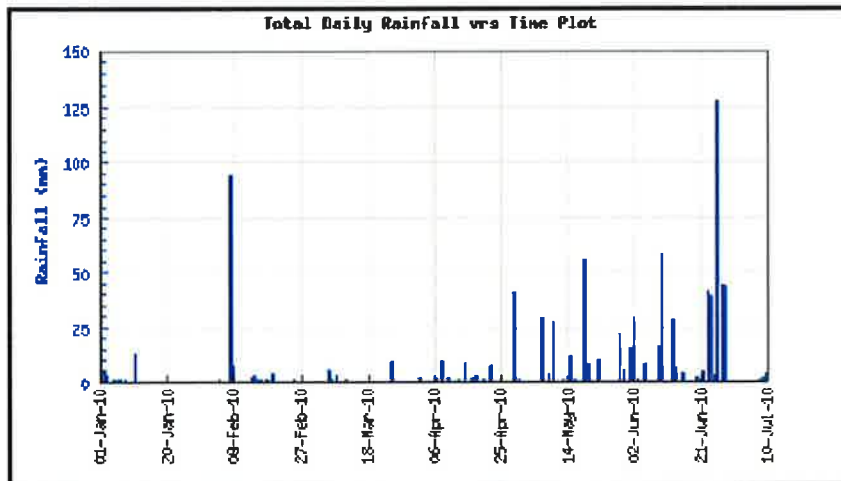
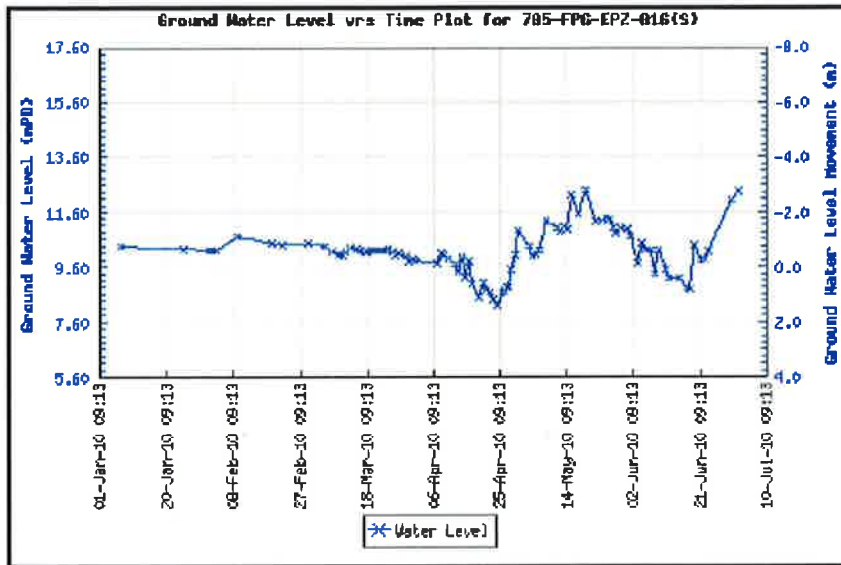
Appendix C – Standpipe Monitoring Record Sheet Sample



MTR Corporation
C705 (GCL J3295)
KET Station and Overrun Tunnel

STANDPIPE MONITORING RECORD SHEET

Instrument ID : 705-FPG-EPZ-016(S) Type : Stand Pipe
Easting : 831167.080 Northing : 815784.850 Initial Level : 12.660 mPD
Location : Forbes Street Playground
Remark : GI reference 1024/WILD297(S)



STANDPIPE MONITORING RECORD SHEET

Instrument ID : 705-FPG-EPZ-016(S) Type : Stand Pipe
 Easting : 831167.060 Northing : 815784.850 Initial Level : 12.860 mPD
 Location : Forbes Street Playground
 Remark : GI reference 1024/WIL/D297(S)

Reading Date	Reading (m)	Offset (m)	Water Level (mPD)	Drawdown From Last (m)	Drawdown From Base (m)	Remarks
2009-05-22	3.06	-	9.80	-	0.00	Base reading
2010-01-07	2.30	0.00	10.36	-0.76	-0.76	
2010-01-25	2.41	0.00	10.25	0.11	-0.65	
2010-02-01	2.44	0.00	10.22	0.03	-0.62	
2010-02-02	2.45	0.00	10.21	0.01	-0.61	
2010-02-03	2.45	0.00	10.21	0.00	-0.61	
2010-02-09	1.96	0.00	10.70	-0.49	-1.10	
2010-02-19	2.22	0.00	10.44	0.26	-0.84	
2010-02-22	2.24	0.00	10.42	0.02	-0.82	
2010-03-01	2.23	0.00	10.43	-0.01	-0.83	
2010-03-06	2.31	0.00	10.35	0.08	-0.75	
2010-03-08	2.49	0.00	10.17	0.18	-0.57	
2010-03-10	2.63	0.00	10.03	0.14	-0.43	
2010-03-11	2.60	0.00	10.06	-0.03	-0.46	
2010-03-12	2.51	0.00	10.15	-0.09	-0.55	
2010-03-13	2.35	0.00	10.31	-0.16	-0.71	
2010-03-15	2.42	0.00	10.24	0.07	-0.64	
2010-03-16	2.47	0.00	10.19	0.05	-0.59	
2010-03-17	2.51	0.00	10.15	0.04	-0.56	
2010-03-18	2.49	0.00	10.17	-0.02	-0.57	
2010-03-19	2.47	0.00	10.19	-0.02	-0.59	
2010-03-20	2.45	0.00	10.21	-0.02	-0.61	
2010-03-22	2.47	0.00	10.19	0.02	-0.59	
2010-03-23	2.48	0.00	10.18	0.01	-0.58	
2010-03-24	2.43	0.00	10.23	-0.05	-0.63	
2010-03-25	2.49	0.00	10.17	0.06	-0.57	
2010-03-26	2.62	0.00	10.04	0.13	-0.44	
2010-03-27	2.59	0.00	10.07	-0.03	-0.47	
2010-03-29	2.68	0.00	9.98	0.09	-0.38	
2010-03-30	2.86	0.00	9.80	0.18	-0.20	
2010-03-31	2.78	0.00	9.88	-0.08	-0.28	
2010-04-01	2.81	0.00	9.85	0.03	-0.25	
2010-04-07	2.94	0.00	9.72	0.13	-0.12	
2010-04-08	2.57	0.00	10.09	-0.37	-0.49	
2010-04-09	2.64	0.00	10.02	0.07	-0.42	
2010-04-10	2.76	0.00	9.90	0.12	-0.30	
2010-04-12	2.98	0.00	9.68	0.22	-0.08	
2010-04-13	3.24	0.00	9.42	0.26	0.18	
2010-04-14	2.71	0.00	9.95	-0.53	-0.36	
2010-04-15	3.43	0.00	9.23	0.72	0.37	
2010-04-16	2.85	0.00	9.81	-0.58	-0.21	
2010-04-17	3.68	0.00	8.98	0.83	0.62	
2010-04-19	4.15	0.00	8.51	0.47	1.09	HB Alert(1.00m)
2010-04-20	3.63	0.00	9.03	-0.52	0.57	
2010-04-21	3.89	0.00	8.77	0.26	0.83	



MTR/XRL811B

West Kowloon Terminus Approach Tunnel (South)



MTR Corporation
C705 (GCL J3295)
KET Station and Overrun Tunnel

STANDPIPE MONITORING RECORD SHEET

Instrument ID : 705-FPG-EPZ-016(S) Type : Stand Pipe Initial Level : 12.660 mPD
 Easting : 831167.090 Northing : 815784.850
 Location : Forbes Street Playground
 Remark : GI reference 1024/WILD207(S)

Reading Date	Reading (m)	Offset (m)	Water Level (mPD)	Drawdown From Last (m)	Drawdown From Base (m)	Remarks
2010-04-22	4.02	0.00	8.64	0.13	0.96	
2010-04-23	4.26	0.00	8.40	0.24	1.20	HB Alert(1.00m)
2010-04-24	4.48	0.00	8.18	0.22	1.42	HB Alert(1.00m)
2010-04-26	4.01	0.00	8.65	-0.47	0.95	
2010-04-26	3.89	0.00	8.77	-0.12	0.83	
2010-04-27	3.77	0.00	8.89	-0.12	0.71	
2010-04-27	3.78	0.00	8.88	0.01	0.72	
2010-04-28	3.18	0.00	9.48	-0.60	0.12	
2010-04-29	2.64	0.00	10.02	-0.54	-0.42	
2010-04-30	1.77	0.00	10.89	-0.87	-1.29	
2010-05-03	2.32	0.00	10.34	0.55	-0.74	
2010-05-04	2.67	0.00	9.99	0.35	-0.39	
2010-05-05	2.61	0.00	10.05	-0.06	-0.45	
2010-05-06	2.47	0.00	10.19	-0.14	-0.59	
2010-05-08	1.37	0.00	11.29	-1.10	-1.69	
2010-05-11	1.65	0.00	11.01	0.28	-1.41	
2010-05-12	1.81	0.00	10.85	0.16	-1.25	
2010-05-13	1.59	0.00	11.07	-0.22	-1.47	
2010-05-14	1.71	0.00	10.95	0.12	-1.35	
2010-05-15	0.48	0.00	12.18	-1.23	-2.58	LB Action(-2.40m)
2010-05-17	1.13	0.00	11.53	0.65	-1.93	LB Alert(-1.90m)
2010-05-19	0.28	0.00	12.38	-0.85	-2.78	LB Action(-2.40m)
2010-05-22	1.40	0.00	11.26	1.12	-1.66	
2010-05-24	1.37	0.00	11.29	-0.03	-1.69	
2010-05-25	1.29	0.00	11.37	-0.08	-1.77	
2010-05-26	1.35	0.00	11.31	0.06	-1.71	
2010-05-27	1.65	0.00	11.01	0.30	-1.41	
2010-05-28	1.86	0.00	10.80	0.21	-1.20	
2010-05-29	1.67	0.00	10.99	-0.19	-1.39	
2010-05-31	1.72	0.00	10.94	0.05	-1.34	
2010-06-01	1.96	0.00	10.70	0.24	-1.10	
2010-06-03	2.94	0.00	9.72	0.98	-0.12	
2010-06-04	2.23	0.00	10.43	-0.71	-0.83	
2010-06-05	2.44	0.00	10.22	0.21	-0.62	
2010-06-07	2.46	0.00	10.20	0.02	-0.60	
2010-06-08	3.34	0.00	9.32	0.88	0.28	
2010-06-09	2.47	0.00	10.19	-0.67	-0.59	
2010-06-11	3.16	0.00	9.50	0.69	0.10	
2010-06-12	3.46	0.00	9.20	0.30	0.40	
2010-06-15	3.51	0.00	9.15	0.05	0.45	
2010-06-17	3.84	0.00	8.82	0.33	0.78	
2010-06-18	3.90	0.00	8.76	0.06	0.84	
2010-06-19	2.25	0.00	10.41	-1.65	-0.81	
2010-06-21	2.83	0.00	9.83	0.58	-0.23	
2010-06-22	2.76	0.00	9.90	-0.07	-0.30	



STANDPIPE MONITORING RECORD SHEET

Instrument ID : 705-FPG-EPZ-010(S) Type : Stand Pipe
Easting : 831187.000 Northing : 815784.850 Initial Level : 12.660 mPD
Location : Forbes Street Playground
Remark : GI reference 1024/WILD297(S)

Reading Date	Reading (m)	Offset (m)	Water Level (mPD)	Drawdown From Last (m)	Drawdown From Base (m)	Remarks
2010-06-23	2.51	0.00	10.15	-0.25	-0.55	
2010-06-30	0.61	0.00	12.05	-1.90	-2.45	LB Action(-2.40m)
2010-07-02	0.32	0.00	12.34	-0.29	-2.74	LB Action(-2.40m)

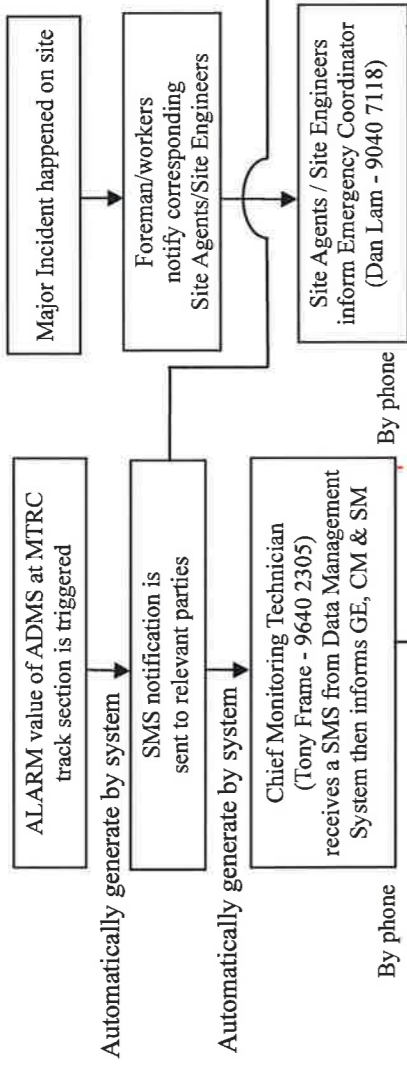
Appendix D
Communication Flow Chart in Emergency Situation

Major Incident / Alarm Value Emergency Notification

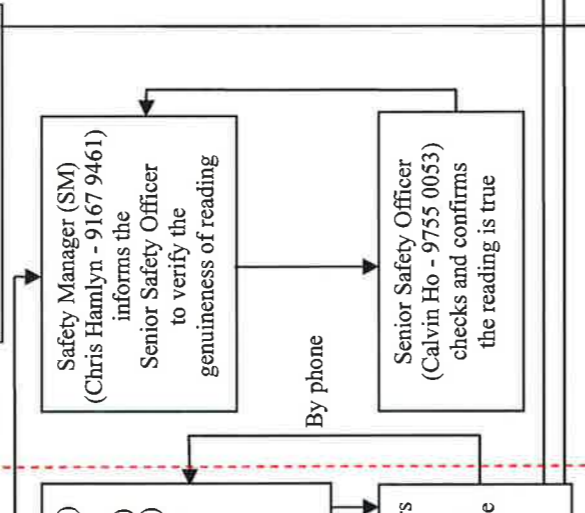
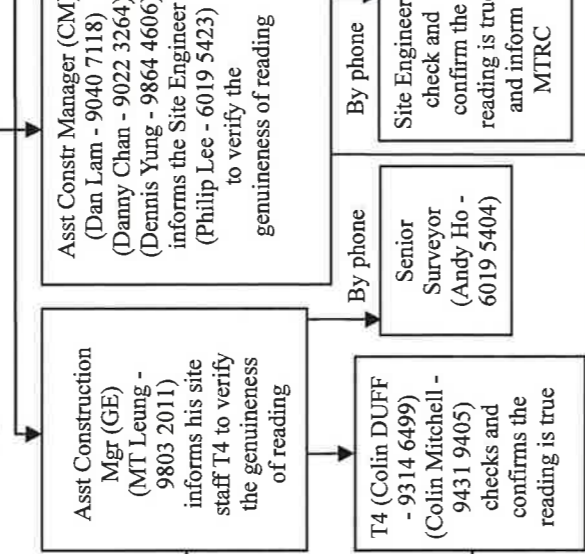
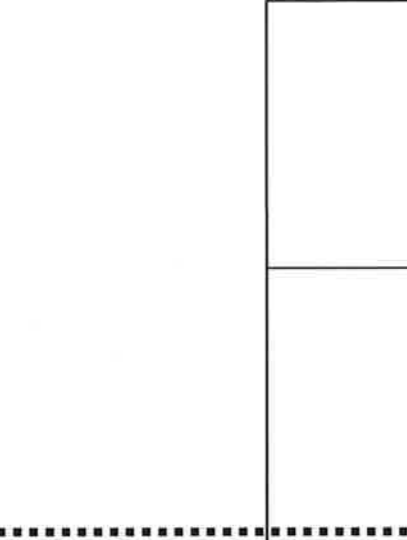
Alert and Action Incident Notification (marked thus [Yellow Box])

Contractor Side

AAA Exceedance



Major Incident



TRUE READING CONFIRMED BY GE, CM & SM

MAJOR INCIDENT CONFIRMED BY EMERGENCY COORDINATOR (DAN LAM - 9040 7118)

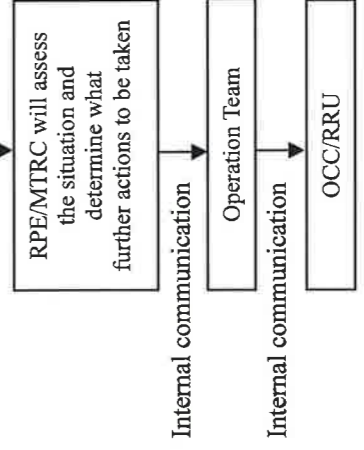
Emergency Coordinator (Dan Lam 9040 7118) Instantly Informs MTRC and GLJ Emergency Team Leaders

Construction Manager
(Anthony Zervaas - 6011 8178)
Project Manager
(Chris Williams - 9669 2665)

GLJ Emergency Leaders:
SM - Chris Hamlyn (9167 9461)
ACM - Colin Duff (9314 6499)
ACM - Danny Chan (9022 3264)
Other Action Parties:
Envir / TWC/ Training Officer / Site Nurse / First Aider

1 RPE/MTRC (K.M Yu - 9172 8364)
2 SLOW/MTRC (Dick Kung - 9199 6973)
3 Group Station Manager/MTRC (Andy Lee - 2624 2806)
Major Emergency Only:
Operations Control Centre (OCC WRL) / MTRC - 2208 2000

Utility Undertakers
• CLP - 2678 6704/2678 7721
• Gas - 2963 3777
• WSD - 2824 5000
• DSD - 2300 1110
• PCCW - 2888 1055
• Hutchison - 2121 2210
• New World Tel - 2133 1254



URGENT SITE MEETING WILL BE HELD AMONG RPE/MTRC, SCONE/MTRC, CONE/MTRC, GE/MTRC AND CM/CONTRACTOR TO SEE WHAT FURTHER ACTION ARE REQUIRED

REVIEW MEETING @ 811 CM Office

END

MTRC Side

- Traffic Related Parties**
- RMO Office - 2773 5240
 - SIP/RMO - 9269 0521
 - Traffic Kowloon West Console - 3472 7411 / 3472 7412
- Stakeholders**
- RPE/WR - 9172 8364
 - West Harbour Crossing - 2302 5760
 - CLP Substation (S C Ng - 9108 0127) (C K Poon - 9716 7748)
 - Sorrento
 - Se-To Wai Shing - 3426 9900
 - Man King Bldg - 2771 7256

SLE/MTRC (Fung Wai Chung - 6713 7002)

CONE /MTRC - Contract 811B
(Patrick Chan - 9180 0272)
(Raymond K.wong - 9756 6633)
(Jaacky Lee - 9028 7900)

SLOW/MTRC
(Dick Kung - 9199 6973)
received the SMS and confirmation from site engineer

SCONE/MTRC
(K H Lee - 9685 0154)
(Larry Wong - 9263 0669)

CM/MTRC
(Albert Lam - 6401 9440)

Sr. Construction Manager/MTRC
(Henry Young - 9267 7892)

Project Manager/MTRC
(Calum Smith - 9613 8429)

General Manager/MTRC
(David Sorton - 9018 0679)
(Paul Lo - 9091 2622)

CSA (Safety)/MTRC
(Stephen Wan - 6799 9279)

Senior Construction Safety Adviser/MTRC
(Dennis Ip - 6620 7601)

Asst Public Relation Officer/MTRC
(Chloe Chow - 2208 3094)

Asst PR Manager / MTRC
(Gloria Woo - 2208 3091 / 9180 0277)

- (Day Shift - within 4 hours)
(Night Shift - within 6 hours)
- 1 SE/RDO (Norman Li - 6131 0729)
 - 2 CE/RDO (Alex Chan - 2762 4070)
 - 3 E/RDO (Finky Cho - 2762 4039)

Legend
P - Phone Only
S - SMS

— Alert & Action Notification