

For Information

**The Legislative Council
Panel on Environmental Affairs**

**Emergency Sewage Discharge Incident
at Pillar Point Sewage Treatment Works
on 25 and 26 August 2014**

This note reports on the emergency sewage discharge incident at Pillar Point Sewage Treatment Works (PPSTW) due to equipment breakdown at the PPSTW and the follow-up actions taken.

The Pillar Point Sewage Treatment Works

2. The PPSTW, built in 1982, was designed for treatment of sewage from the Tuen Mun district before discharging to the marine waters at the Urmston Road channel to the south west of Tuen Mun. The Drainage Services Department (DSD) completed upgrading of the plant in May this year to enhance its sewage treatment level to chemically enhanced primary treatment (CEPT) together with ultra violet disinfection, and to increase the treatment capacity necessary for the future development of Tuen Mun district. At present, the daily sewage influent to the plant is about 180,000m³.

3. The upgraded PPSTW is equipped with dual power supply and standby facilities for the major treatment units in order to minimize the possibility of plant failure. In the event of an emergency mechanical or other plant failure which would prevent the incoming sewage to be delivered to the downstream sewage treatment units within the plant, the sewage would be bypassed at the plant inlet upstream for discharge through an emergency submarine outfall into the marine waters of Urmston Road, of about 700m offshore. A plan showing the treatment process configuration and the emergency submarine outfall of the plant is given in **Annex 1**.

Response Actions to the Incident on 25 & 26 August

4. On 25 August 2014 at about 2:30 p.m., mechanical failure occurred to all the four fine screens^{*1} at the PPSTW. The general design of the fine screen units is illustrated in **Annex 2**. The chains that drive scrappers for removing small sized particles caught on the fine screens fell apart. While emergency repair works commenced immediately, the small sized particles in the incoming sewage quickly accumulated and clogged the fine screens thus stopping the sewage from passing through them and continuing with the downstream sewage treatment process. As sewage continued to come to the PPSTW, after depleting the small temporary storage space upstream, there was no other alternative but to discharge the sewage influent through the emergency submarine outfall of the plant commencing from 3:36 p.m. Otherwise, overflowing of sewage in upstream urban areas might occur.

5. DSD notified EPD on sewage bypass at the plant via email at 3:18 p.m. Staff of EPD immediately travelled to the plant to conduct a joint inspection with DSD at about 4:00 p.m. to ascertain details of the incident, including the extent of the breakdown, the time required for the repair works, and details of the discharge etc., whilst the contractor was pressing on with the emergency repair works for the fine screens.

6. The joint inspection revealed that the emergency repair works would take some time to complete. It was noted that the tidal flow in the evening on 25 August 2014 was in general westward; therefore the discharged flows were carried further away from the beaches at Tsuen Wan and Tuen Mun. On the other hand, taking into account the proximity of the discharge location to the beaches, EPD considered that the discharge via the emergency submarine outfall might have an impact on the water quality in the coastal waters of Tuen Mun and Tsuen Wan, notwithstanding the high water circulation rate and the mixing effect in the Urmston Road waters.

7. DSD then alerted the Leisure and Cultural Services Department (LCSD) at 6:24 p.m. that sewage was being bypassed to the emergency submarine outfall due to the malfunction of the facility in the PPSTW. After seeking details of the incident and advice on likely impacts from DSD and EPD, LCSD decided to temporarily close the 14 beaches at Tuen Mun and Tsuen Wan as a

*1 Fine screens are common installations in sewage treatment plants to filter solid matters.

precaution for the sake of protecting public health and immediately arranged to post up notices and hoist red flags at the likely affected beaches. LCSD then sent an email to EPD and DSD at 8:27 p.m. to inform them of the action taken by LCSD. LCSD subsequently issued a press release to announce the closure of the 14 beaches at about 10:00 p.m. on 25 August 2014.

8. DSD and its contractor continued the emergency repair works throughout the night of 25 August 2014. At around 9:30 p.m., the fine screening operation was partially resumed thus allowing part of the incoming sewage to continue downstream to complete the proper sewage treatment process and discharge. All the emergency repair works was completed at 02:30 a.m. on 26 August 2014 and the sewage treatment works resumed its normal operation. As the emergency repair works had to be carried out in confined space requiring additional safety precautionary measures including dangerous gases monitoring and adequate ventilation, and with the need of dewatering, the works were more difficult than anticipated, and hence, the time taken for completion of the works was longer than anticipated.

9. To ascertain the water quality at the closed beaches, EPD collected two rounds of beach water samples at the 14 beaches, in the morning and in the afternoon of 26 August 2014. The laboratory analysis results available in the afternoon of 27 August 2014 confirmed that the levels of *E. coli* on 26 August 2014 in all 14 beaches were suitable for swimming, with 13 beaches rated as Grade 2 (Fair) and one beach rated as Grade 1 (Good).

10. Upon EPD's advice on the monitoring results confirming suitability for swimming at all 14 beaches, LCSD decided to re-open all 14 beaches in Tuen Mun and Tsuen Wan. A joint press release by EPD and LCSD was issued in the early evening of 27 August 2014 to inform the public of the re-opening.

11. Upon completion of the emergency repair works on 26 August 2014, DSD has immediately tightened its control. This includes warning the contractor that such incident of failure of all the four fine screens including the stand-by one was unacceptable and urged them to take proper and immediate steps to prevent recurrence. The contractor has immediately replaced all fine screens with new chains. They have also strengthened their resources for operation and maintenance of the plant and have increased the inspection frequency of the fine screens from once per day to three times per day. The

contractor has further carried out reinforcement works on the chains to further minimize the risk of their failure. Other than the above, DSD has also asked their consultants to further tighten the supervision of the plant operation and the essential installations.

Monitoring of PPSTW Discharge and the Marine Water Quality

12. The contractor of the PPSTW has been monitoring the quantity and quality of discharge from the plant to ensure compliance with the discharge standards, including a discharge limit on *E. coli* level which is a key indicator of suitability of the marine water quality for swimming at the beaches. A summary of the monitoring results by the contractor is given in **Annex 3**. Since commencement of operation of the upgraded PPSTW in May 2014, there has been no exceedance of the discharge standards, including the *E. coli* standard.

13. In addition, the contractor conducted daily marine water monitoring at 11 designated water monitoring stations soon after the emergency discharge was made by the PPSTW. The monitoring exercise by the contractor continued for 7 days after the emergency discharge had ceased. A summary of the monitoring results on *E.coli* is given in **Annex 4**. The monitoring results indicate that the impacts of the emergency discharge on nearby marine water quality were small and short term, and that the *E. coli* level in nearby marine water has been restored to the baseline level on 27 August 2014.

14. EPD has also conducted daily beach water quality monitoring at all 14 beaches in Tuen Mun and Tsuen Wan since the incident. A summary of the *E. coli* monitoring results is given in **Annex 5**. The test results of the water samples indicate that there was no material impact on the water quality of the nearby beaches due to the emergency discharge from the PPSTW.

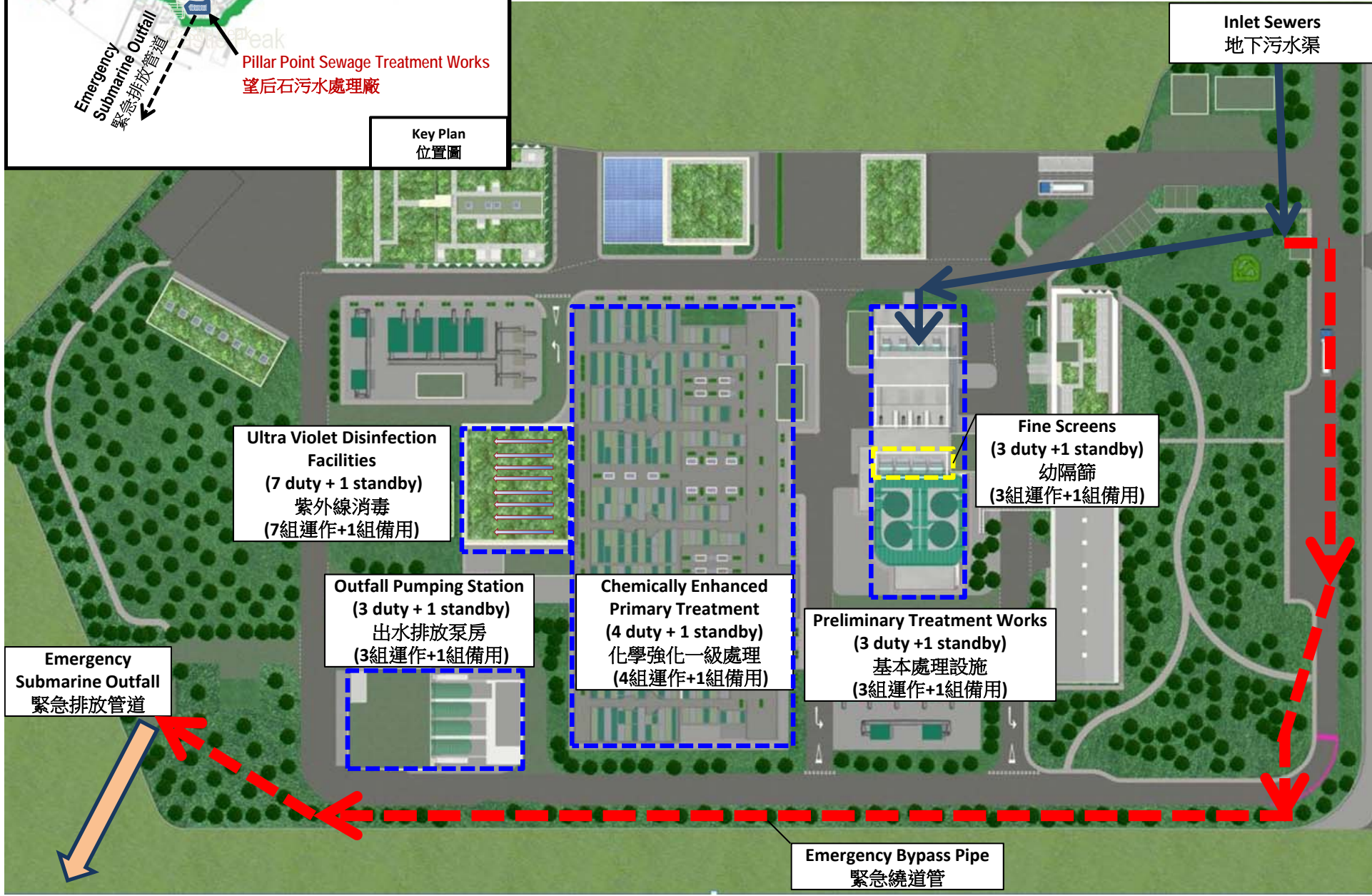
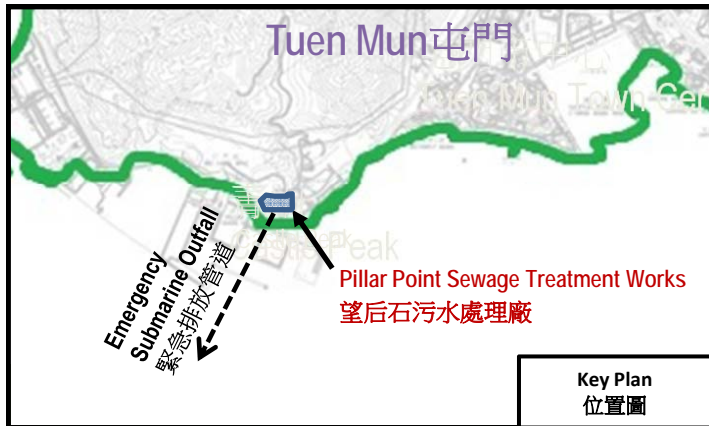
Follow up Actions

15. To prevent recurrence of similar incidents, as well as to enhance the co-ordination amongst government departments in responding to similar emergency incident in future, the departments are taking the following actions:-

- (a) DSD is conducting an investigation on the cause of failure of the fine screens, with a view to introducing contractual and management measures to prevent and minimize the recurrence of any mechanical or plant failure which will lead to bypassing sewage from the treatment process for emergency discharge, and the investigation is carried out by a Task Force led by the Deputy Director of DSD;
- (b) DSD is examining the feasibility of modifying the process of the PPSTW so that incoming sewage flows could be channeled into the plant for treatment notwithstanding failure of the fine screens at the plant inlet;
- (c) EPD is investigating the incident on the compliance with the regulatory requirements; and
- (d) A review on the efficiency and effectiveness of communication and co-ordination amongst concerned government departments and the publicity arrangement is being carried out in order to identify improvement opportunities.

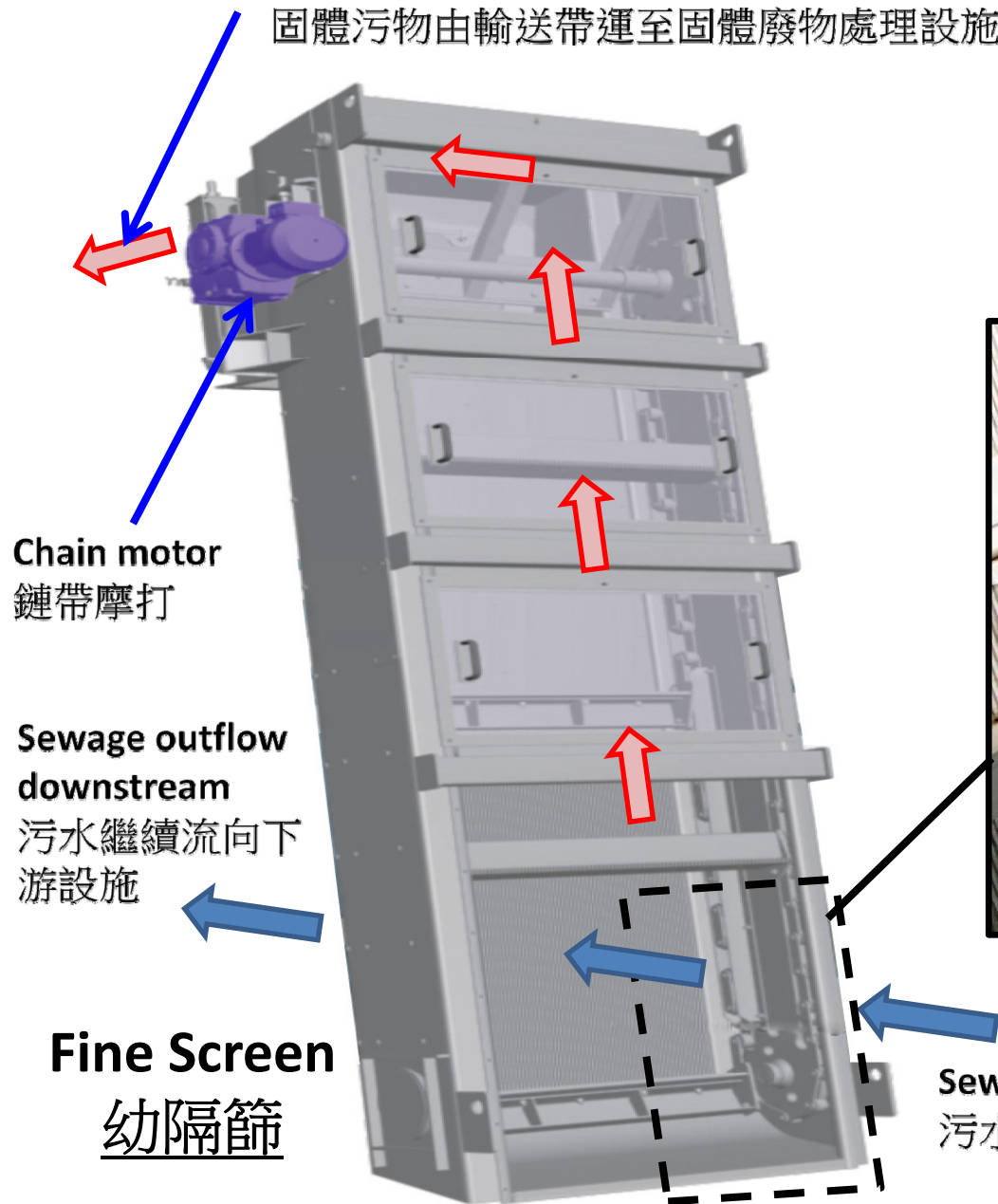
Environmental Protection Department
September 2014

Annex 1 附件一

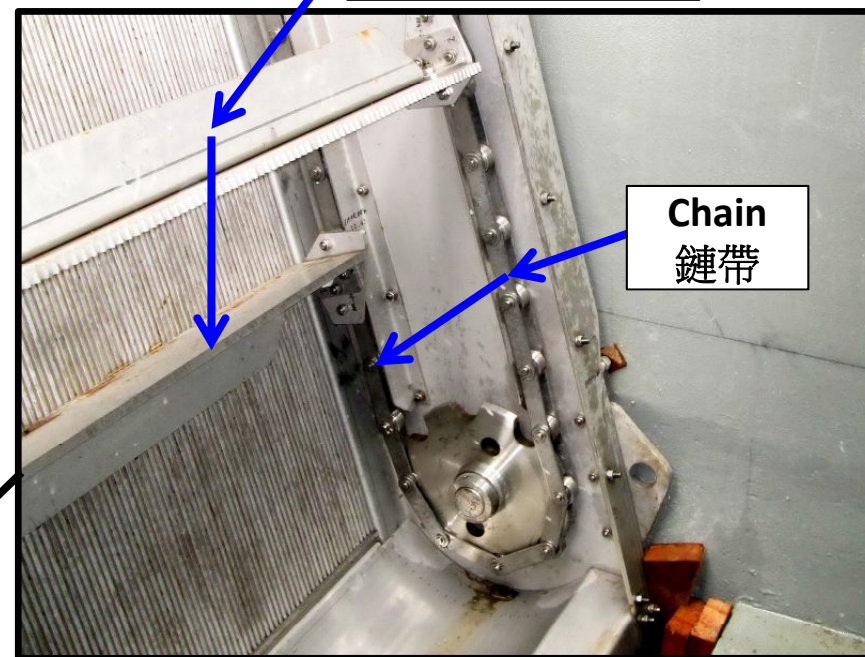


Annex 2
附件二

Solid waste to be conveyed to Solid Handling Building by screw conveyor
固體污物由輸送帶運至固體廢物處理設施



Scraper
固體廢物移除器



Monitoring Results of Effluent Quality of PPSTW

望后石污水處理廠排放廢水水質監測結果

	平均數 Mean			
	Daily Flow 每日流量 (x 1,000m ³ /day, 千立方米/ 日)	BOD ₅ (Biochemical Oxygen Demand (5 days)) 生化需氧量 (5 天) (mg O ₂ /L, 毫克/升)	TSS (Total Suspended Solids) 總懸浮固體 (mg/L, 毫克/升)	<i>E.coli</i> 大腸桿菌 (count/100mL, 個/百毫升)
July 2014 2014 年 7 月*	183	75	25	8,200[@]
August 2014 2014 年 8 月 [#]	183	76	23	4,417[@]

Discharge Standard (Upper Limit) 排放標準 (上限)	525	360	240	20,000 [@]
Discharge Standard (Percentile) 排放標準 (百分比)	N/A (不適用)	180	120	300,000

Notes 註 : The quantity and composition of discharge shall not exceed the above upper limits and shall also comply with the percentile standards. For the purpose of determining compliance with the percentile standards, the number of samples allowed to exceed the percentile standards is 9 for BOD₅ and TSS, and 13 for *E. coli* based on a rolling 12 months monitoring data.

排放量及成份須不得超逾上述排放標準上限，並須符合排放標準百分比。就評估是否符合標準百分比時，須根據在 12 個月期內不斷收集的監測數據確定。就生化需氧量及總懸浮固體的監測數據而言，超逾上述標準百分比的樣本數目不可以超出 9 個；而大腸桿菌的監測數據超逾上述標準百分比的樣本數目則不可以超出 13 個。

* The upgraded PPSTW started its initial commissioning on 18 May 2014 with full operation on 10 July 2014. 提升工程後的望后石污水處理廠於 2014 年 5 月 18 日展開初始運作，並由 2014 年 7 月 10 日起全面運作。

Based on the latest available data in August 2014. 根據 2014 年 8 月的現有水質監測數據計算。

@ The upper limit of *E. coli* is in monthly geometric mean. 大腸桿菌的上限是以每月幾何平均數計算。

Monitoring Results of Nearby Marine Water Quality
附近海域水質監測結果

<i>E. coli</i> levels (cfu/100mL) 大腸桿菌的水平(個/100毫升)							
Monitoring Dates 監測日期	Tide* 潮汐	Monitoring Location 監測位置					
		Butterfly Beach 蝴蝶灣泳灘	Castle Peak Beach 青山灣泳灘	Kadoorie Beach 加多利灣泳灘	Cafeteria Old Beach 舊咖啡灣泳灘	Cafeteria New Beach 新咖啡灣泳灘	Golden Beach 黃金泳灘
26/8/2014	F	26	38	38	33	33	25
	E	26	16	59	810 [#]	430 [#]	32
27/8/2014	F	34	10	44	23	28	18
	E	43	22	12	22	23	18
28/8/2014	F	63	78	70	96	73	57
	E	57	56	13	14	18	25
29/8/2014	F	91	41	59	50	41	54
	E	32	27	11	4	12	22
30/8/2014	F	22	12	14	18	14	23
	E	16	4	4	3	1	3
31/8/2014	F	7	47	9	22	40	25
	E	16	22	9	6	2	5
1/9/2014	F	9	22	3	7	16	11
	E	20	38	7	1	2	4

***E. coli* levels (cfu/100mL)**
 大腸桿菌的水平(個/100毫升)

Monitoring Dates 監測日期	Tide* 潮汐	Monitoring Location 監測位置				
		Flushing Water Intake (near Butterfly Beach) 海水取水口 (近蝴蝶灣)	Flushing Water Intake near LRT Terminus 海水取水口 (近屯門碼頭輕鐵總站)	Secondary Contact Recreation Subzone at Lung Kwu Tan 龍鼓灘次級接觸 康樂活動分區	Control Station 水質監測站 (NM1)	Control Station 水質監測站 (NM6)
26/8/2014	F	8	1,680 [@]	3	59	19
	E	16	2,571 [@]	11	43	25
27/8/2014	F	29	25	33	33	20
	E	25	125	35	34	12
28/8/2014	F	61	68	14	72	8
	E	15	45	26	9	4
29/8/2014	F	60	70	106	77	42
	E	38	68	18	28	10
30/8/2014	F	17	29	18	34	94
	E	14	19	65	22	9
31/8/2014	F	19	115	71	45	14
	E	25	18	10	48	3
1/9/2014	F	29	24	81	34	17
	E	9	8	15	2	29

Notes 註：*

øFö and øEö represent flood and ebb tides respectively. øFö 及 øEö 分別代表潮漲和潮退。

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Due to exceedance of the baseline action level of 333 cfu/100mL (derived from baseline monitoring conducted during wet seasons in May and July 2013), the contractor stepped up surveillance of the plant operation to ensure proper functioning of all plant equipment. In parallel, the monitoring exercise continued for 7 days after the emergency discharge had ceased. 由於監察結果超逾基線監測的行動水平 333 個/100 毫升 (根據最近在 2013 年 5 月及 7 月雨季進行的基線監測)，承辦商已加強監控廠房的運作，以確保所有廠房設備運作正常。同時，在緊急排放停止後，持續 7 天進行監測。

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Due to exceedance of the baseline limit level of 1,002 cfu/100mL (derived from baseline monitoring conducted during wet seasons in May and July 2013), the contractor stepped up surveillance of the plant operation to ensure proper functioning of all plant equipment. In parallel, the monitoring exercise continued for 7 days after the emergency discharge had ceased. 由於監察結果超逾基線監測的限定水平 1,002 個/100 毫升 (根據最近在 2013 年 5 月及 7 月雨季進行的基線監測)，承辦商已加強監控廠房的運作，以確保所有廠房設備運作正常。同時，在緊急排放停止後，持續 7 天進行監測。

Analysis Results of Water Quality of Beaches in Tuen Mun and Tsuen Wan
屯門及荃灣泳灘水質測試結果

<i>E. coli</i> levels (cfu/100mL) of Recent Sampling Events in Beach Waters						
最近採樣所顯示泳灘海水中大腸桿菌的水平(個/100毫升)						
Sampling Date 採樣日期	Butterfly Beach 蝴蝶灣泳灘	Castle Peak Beach 青山灣泳灘	Kadoorie Beach 加多利灣泳灘	Cafeteria Old Beach 舊咖啡灣泳灘	Cafeteria New Beach 新咖啡灣泳灘	Golden Beach 黃金泳灘
29-July-14	170	80	7	90	39	54
06-August-14	34	60	80	80	16	16
11-August-14	90	33	65	56	18	16
18-August-14	16	55	30	35	220	37
26-August-14 (Morning data)	430	10	50	40	60	110
26-August-14 (Afternoon data)	140	100	110	610	270	130
27-August-14	250	120	6	28	54	48
28-August-14	36	120	120	420	250	320
29-August-14	24	72	12	28	30	34
30-August-14	2	310	2	10	10	22
31-August-14	58	90	2	14	4	28
1-September-14	80	330	14	12	16	32
2-September-14	6	120	4	24	40	16
3-September-14	36	8	6	16	4	490
4-September-14	10	130	18	44	24	2

Notes 註： Beaches with *E. coli* levels exceeding 1,600 cfu/100ml are not suitable for swimming. 泳灘海水每 100 毫升超過 1,600 個大腸桿菌的水平則不適宜游泳。

***E. coli* levels (cfu/100mL) of Recent Sampling Events in Beach Waters**

最近採樣所顯示泳灘海水中大腸桿菌的水平(個/100毫升)

Sampling Date 採樣日期	Approach Beach 近水灣泳灘	Ting Kau Beach 汀九灣泳灘	Lido Beach 麗都灣泳灘	Casam Beach 更生灣泳灘	Hoi Mei Wan Beach 海美灣泳灘	Gemini Beaches 雙仙灣泳灘	Anglers' Beach 釣魚灣泳灘	Sampling Date 採樣日期	Ma Wan Tung Wan Beach 馬灣東灣泳灘
01-August-14	72	12	9	5	16	120	173	29-July-14	16
07-August-14	40	59	19	31	6	19	32	06-August-14	16
14-August-14	339	491	110	76	80	220	220	11-August-14	70
19-August-14	484	25	24	71	24	40	110	18-August-14	5
26-August-14 (Morning data)	50	80	10	10	40	50	80	26-August-14 (Morning data)	20
26-August-14 (Afternoon data)	70	22	25	44	28	43	37	26-August-14 (Afternoon data)	2
27-August-14	120	76	16	48	28	270	130	27-August-14	12
28-August-14	94	*	58	38	570	82	58	28-August-14	32
29-August-14	64	26	44	30	28	210	100	29-August-14	10
30-August-14	36	16	12	8	50	110	44	30-August-14	24
31-August-14	30	36	18	22	12	130	42	31-August-14	40
1-September-14	6	16	24	14	18	350	200	1-September-14	16
2-September-14	<2	<2	<2	2	10	14	8	2-September-14	8
3-September-14	7	8	2	6	2	20	10	3-September-14	6
4-September-14	18	98	18	6	4	10	46	4-September-14	4

Notes 註： Beaches with *E. coli* levels exceeding 1,600 cfu/100ml are not suitable for swimming. 泳灘海水每 100 毫升超過 1,600 個大腸桿菌的水平則不適宜游泳。

* Sample invalidated. 樣本未能通過品質檢定。