

Unusual Settlement in Tseung Kwan O

Bi-monthly Report to LegCo on Monitoring Results

Report No. 3

(for the period August to September 2000)

Territory Development Department
October 2000

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Introduction

This is the third report submitted to LegCo. The following monitoring results clearly demonstrate that the unusual settlement has stabilised.

In the developed area, 38 out of 40 settlement monitoring points recorded movement of 1 mm or less in the period under review. At two locations next to a deep excavation for construction of a pedestrian subway a settlement of 5 mm was recorded in the same period.

In the newly developed area (Tong Ming Court, Beverly Garden and seven schools), 41 out of 43 settlement monitoring points recorded movement of 3 mm or less in the period under review. Two monitoring points close to a deep basement excavation recorded settlement of 4 mm and 7 mm and we are investigating the cause of this localised settlement.

In the developing area, the monthly settlement figures are greater than in the developed area but the rate of settlement has slowed significantly. We have not yet built the roads and drains in this area so the consequences of the settlement are not significant.

The geology in the Tseung Kwan O (TKO) Area is complex. We have undertaken further ground investigations and completed the installation of additional instruments. The investigation study into the cause of the unusual settlement is now well advanced and we expect to be able to report the findings before the end of the year.

1. Locations of Monitoring Stations

The locations of monitoring stations are marked on Drawing No. TKZ101C.

2. Monitoring Results

(i) Developed Area

- (a) Table 1 - Wan Po Road
- (b) Table 2 - Po Hong Road
- (c) Table 3 - Po Shun Road
- (d) Table 4 - Po Shun Road Extension
- (e) Table 5 - Sheung Tak Estate / Po Ming Court / Kwong Ming Court
- (f) Table 6 - Tong Ming Street

Maximum settlement in the month ending early September 2000 (at 2 locations) = 5 mm

Average settlement in the month ending early September 2000 (40 monitoring points) = 0.4 mm

Maximum cumulative settlement from early December 1999 to early September 2000 = 28 mm

Average cumulative settlement from early December 1999 to early September 2000 = 3.8 mm

(ii) Newly Developed Area

- (a) Table 7 - Beverly Garden
- (b) Table 8 - Tong Ming Court
- (c) Table 9 - Footpath adjacent to Tong Ming Court
- (d) Table 10 - Tong Chun Street
- (e) Table 11 - Tong Yin Street
- (f) Table 12 - Tong Tak Street

Maximum settlement in the month ending early September 2000 (at 1 location) = 7 mm

Average settlement in the month ending early September 2000 (43 monitoring points) = 1.4 mm

Maximum cumulative settlement from early December 1999 to early September 2000 = 79 mm

Average cumulative settlement from early December 1999 to early September 2000 = 28.8 mm

(iii) Developing Area

(a) Table 13 - Road D4

Maximum settlement in the month ending early September 2000 (at 1 location) = 16 mm

Average settlement in the month ending early September 2000 (16 monitoring points) = 7.0 mm

Maximum cumulative settlement from early December 1999 to early September 2000 = 116 mm

Average cumulative settlement from early December 1999 to early September 2000 = 55.4 mm

(iv) Seawall

(a) Table 14 - Seawall

Maximum settlement in the month ending early September 2000 (at 3 locations) = 6 mm

Average settlement in the month ending early September 2000 (19 monitoring points) = 1.0 mm

Maximum cumulative settlement from early December 1999 to early September 2000 = 73 mm

Average cumulative settlement from early December 1999 to early September 2000 = 22.2 mm

3. Summary of Results

(i) In the month ending early September 2000:

89% of monitoring stations have recorded settlement of 5 mm or less.

76% of monitoring stations have recorded settlement of 2 mm or less

66% of monitoring stations have recorded settlement of 1 mm or less

(ii) In the period from early December 1999 to early September 2000:

84% of monitoring stations have recorded settlement of 50 mm or less

59% of monitoring stations have recorded settlement of 20 mm or less

50% of monitoring stations have recorded settlement of 10 mm or less

Territory Development Department

October 2000

Table 1 Monitoring Stations along Wan Po Road 表一 環保大道監測站

DATE	A		B		C		D		E	
	A	B	A	B	A	B	A	B	A	B
09-12-99	-	-	-	-	-	-	-	-	-	-
06-01-00	0	0	0	0	0	0	0	0	0	0
10-02-00	0	0	0	0	0	0	0	0	0	0
09-03-00	0	0	0	0	0	0	0	0	0	0
06-04-00	0	0	0	0	0	0	0	0	0	0
02-05-00	0	0	0	0	0	0	0	0	0	0
05-06-00	0	0	0	0	0	0	0	0	0	0
03-07-00	0	0	0	0	0	0	0	0	0	0
07-08-00	0	0	0	0	0	0	0	0	0	0
04-09-00	0	0	0	0	0	0	0	0	0	0

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 2 Monitoring Stations along Po Hong Road 表二 寶康路監測站

DATE	B0		B4		D1A		D1B		D1C	
	A	B	A	B	A	B	A	B	A	B
10-12-99	-	-	-	-	-	-	-	-	-	-
06-01-00	0	0	0	0	1	1	1	1	1	1
09-02-00	1	1	0	0	1	2	1	2	1	2
08-03-00	1	2	0	0	0	2	0	2	0	2
05-04-00	1	3	0	0	0	2	0	2	0	2
02-05-00	0	3	0	0	0	2	0	2	0	2
07-06-00	0	3	0	0	0	2	0	2	0	2
04-07-00	0	3	0	0	0	2	0	2	0	2
08-08-00	0	3	0	0	0	2	0	2	0	2
05-09-00	0	3	0	0	0	2	0	2	0	2

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 3 Monitoring Stations along Po Shun Road 表三 寶順路監測站

DATE	A		B		C		D		M/H A		M/H B		M/H C		M/H D		M/H E	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
09-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05-01-00	1	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0
09-02-00	1	2	0	0	0	0	0	0	1	2	0	0	1	2	0	0	0	0
09-03-00	0	2	1	1	1	1	1	1	1	3	0	0	0	2	1	1	1	1
06-04-00	0	2	0	1	0	1	0	1	0	3	0	0	0	2	0	1	0	1
03-05-00	1	3	0	1	0	1	0	1	1	4	0	0	1	3	1	2	1	2
08-06-00	0	3	0	1	0	1	0	1	0	4	0	0	0	3	0	2	0	2
05-07-00	0	3	0	1	0	1	0	1	1	5	0	0	0	3	0	2	0	2
09-08-00	0	3	0	1	0	1	0	1	0	5	0	0	0	3	0	2	0	2
06-09-00	0	3	0	1	0	1	0	1	0	5	0	0	0	3	0	2	1	3

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 4 Monitoring Stations along Po Shun Road extension 表四 寶順路延展監測站

DATE	DM		IM	
	A	B	A	B
09-12-99	-	-	-	-
06-01-00	1	1	0	0
10-02-00	1	2	0	0
09-03-00	-4	-2	0	0
06-04-00	2	0	0	0
03-05-00	2	2	1	1
08-06-00	5	7	0	1
05-07-00	3	10	1	2
09-08-00	13	23	0	2
06-09-00	5	28	0	2

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 5 Monitoring Stations in Sheung Tak Estate, Po Ming Court, Kwong Ming Court 表五 尙德邨, 寶明苑, 廣明苑監測站

DATE	SM1(59)		SM4(59)		SM5(59)		SM6(59)		SM7(59)		SM8(59)		SM9(59)		SM10(59)	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
08-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03-04-00	8	8	9	9	8	8	6	6	7	7	8	8	5	5	5	5
09-05-00	-1	7	-1	8	0	8	-1	5	1	8	0	8	0	5	0	5
05-06-00	1	8	3	11	3	11	3	8	2	10	2	10	2	7	1	6
03-07-00	2	10	0	11	0	11	-1	7	0	10	-1	9	1	8	1	7
02-08-00	-3	7	-2	9	-2	9	-2	5	-2	8	-2	7	-3	5	-2	5
02-09-00	1	8	-1	8	-1	8	0	5	0	8	0	7	0	5	-1	4

DATE	SM11(59)	
	A	B
08-12-99	-	-
03-04-00	5	5
09-05-00	0	5
05-06-00	0	5
03-07-00	1	6
02-08-00	-2	4
02-09-00	2	6

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 6 Monitoring Stations along Tong Ming Street 表六 唐明街監測站

DATE	463C1		463B3		463B2		A7A		A5		A1B		463B1		463B		463A1		463A	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
08-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05-01-00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	1
09-02-00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	1	2
08-03-00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	-	-	2	4
05-04-00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7	-	-	5	9
02-05-00	-	-	1	1	1	1	-	-	1	1	-	-	0	0	0	7	1	1	1	10
07-06-00	-	-	0	1	1	2	-	-	0	1	-	-	0	0	0	7	0	1	1	11
04-07-00	-	-	0	1	0	2	-	-	0	1	-	-	1	1	0	7	0	1	0	11
08-08-00	0	0	2	3	1	3	-	-	1	2	-	-	1	2	0	7	0	1	1	12
05-09-00	0	0	0	3	1	4	1	1	0	2	1	1	0	2	0	7	1	2	1	13

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 7 Monitoring Stations in Beverly Garden 表七 富康花園監測站

DATE	BG17		BG18		BG19		BG20		BG21		BG22	
	A	B	A	B	A	B	A	B	A	B	A	B
08-12-99	-	-	-	-	-	-	-	-	-	-	-	-
05-01-00	4	4	8	8	14	14	3	3	3	3	2	2
09-02-00	2	6	6	14	14	28	2	5	1	4	2	4
08-03-00	3	9	9	23	6	34	1	6	1	5	0	4
05-04-00	6	15	10	33	10	44	3	9	6	11	1	5
02-05-00	1	16	5	38	7	51	0	9	1	12	1	6
07-06-00	1	17	5	43	11	62	1	10	1	13	0	6
04-07-00	1	18	3	46	4	66	0	10	0	13	0	6
08-08-00	2	20	4	50	5	71	0	10	1	14	0	6
05-09-00	1	21	4	54	7	78	0	10	1	15	0	6

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 8 Monitoring Stations in Tong Ming Court 表八 唐明苑監測站

DATE	SM1(57)		SM2(57)		SM3(57)		SM4(57)		SM5(57)		SM6(57)		SM7(57)		SM8(57)		SM9(57)		SM10(57)	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
06-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06-03-00	9	9	24	24	5	5	8	8	9	9	18	18	14	14	12	12	7	7	21	21
03-04-00	2	11	6	30	1	6	3	11	1	10	5	23	3	17	3	15	2	9	6	27
09-05-00	0	11	3	33	-1	5	0	11	0	10	1	24	0	17	0	15	-1	8	1	28
05-06-00	4	15	6	39	3	8	4	15	4	14	6	30	4	21	4	19	3	11	6	34
03-07-00	-1	14	4	43	-1	7	-1	14	1	15	1	31	1	22	1	20	0	11	0	34
02-08-00	3	17	3	46	1	8	3	17	2	17	4	35	0	22	1	21	0	11	5	39
02-09-00	1	18	2	48	-1	7	1	18	0	17	1	36	1	23	1	22	0	11	1	40

DATE	SM11(57)		SM12(57)		SM13(57)		SM14(57)		SM15(57)	
	A	B	A	B	A	B	A	B	A	B
06-12-99	-	-	-	-	-	-	-	-	-	-
06-03-00	25	25	29	29	21	21	22	22	25	25
03-04-00	6	31	7	36	6	27	7	29	7	32
09-05-00	2	33	3	39	1	28	1	30	3	35
05-06-00	5	38	6	45	6	34	6	36	6	41
03-07-00	1	39	2	47	1	35	2	38	4	45
02-08-00	5	44	4	51	5	40	4	42	5	50
02-09-00	2	46	2	53	2	42	1	43	0	50

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 9 Monitoring Stations along Footpath Adjacent to Tong Ming Court 表九 唐明苑行人路監測站

DATE	MH26A		MH27		MH28		MH29	
	A	B	A	B	A	B	A	B
09-12-99	-	-	-	-	-	-	-	-
06-01-00	-	-	1	1	0	0	2	2
10-02-00	-	-	0	1	2	2	3	5
09-03-00	-	-	0	1	0	2	1	6
06-04-00	-	-	0	1	0	2	2	8
03-05-00	-	-	0	1	0	2	0	8
07-06-00	-	-	4	5	4	6	4	12
05-07-00	-	-	3	8	2	8	3	15
09-08-00	-	-	6	14	5	13	5	20
06-09-00	1	1	1	15	1	14	1	21

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 10 Monitoring Stations along Tong Chun Street 表十 唐俊街監測站

DATE	461A		461A1		461B		461B1	
	A	B	A	B	A	B	A	B
10-12-99	-	-	-	-	-	-	-	-
07-01-00	2	2	-	-	14	14	-	-
10-02-00	2	4	-	-	9	23	-	-
09-03-00	0	4	-	-	3	26	-	-
06-04-00	4	8	-	-	5	31	-	-
02-05-00	0	8	1	1	5	36	5	5
07-06-00	0	8	2	3	3	39	6	11
04-07-00	0	8	0	3	1	40	4	15
08-08-00	2	10	5	8	11	51	8	23
05-09-00	0	10	1	9	3	54	3	26

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 11 Monitoring Stations along Tong Yin Street 表十一 唐賢街監測站

DATE	462A		462A1		462B2		462B1	
	A	B	A	B	A	B	A	B
10-12-99	-	-	-	-	-	-	-	-
07-01-00	3	3	-	-	-	-	-	-
10-02-00	5	8	-	-	-	-	-	-
09-03-00	2	10	-	-	-	-	-	-
06-04-00	3	13	-	-	-	-	-	-
03-05-00	1	14	1	1	1	1	3	3
07-06-00	2	16	1	2	2	3	3	6
04-07-00	1	17	1	3	1	4	3	9
08-08-00	2	19	5	8	4	8	2	11
05-09-00	2	21	1	9	2	10	2	13

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 12 Monitoring Stations along Tong Tak Street 表十二 唐德街監測站

DATE	M1		M3		M4		M5		M6		M8		M9		M10		M11		M17	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
09-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06-01-00	5	5	3	3	0	0	0	0	2	2	2	2	5	5	5	5	4	4	13	13
10-02-00	11	16	8	11	7	7	8	8	9	11	7	9	8	13	9	14	13	17	18	31
09-03-00	2	18	3	14	1	8	1	9	2	13	1	10	1	14	2	16	4	21	8	39
06-04-00	5	23	1	15	2	10	1	10	1	14	2	12	1	15	4	20	0	21	9	48
02-05-00	5	28	10	25	5	15	7	17	8	22	10	22	11	26	8	28	17	38	15	63
05-06-00	3	31	1	26	0	15	0	17	1	23	0	22	0	26	1	29	0	38	2	65
03-07-00	3	34	4	30	2	17	1	18	3	26	0	22	1	27	1	30	4	42	5	70
08-08-00	4	38	3	33	2	19	4	22	5	31	4	26	4	31	6	36	8	50	6	76
05-09-00	2	40	3	36	3	22	0	22	1	32	0	26	0	31	2	38	1	51	3	79

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

Table 13 Monitoring Stations along Road D4 表十三 D4道路監測站

DATE	PS2B		PS3C		PS4B		PS5B		PS5D		PS6B		PS7B		PS10B		PS11B		PS12B		PS13B	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
10-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06-01-00	0	0	-	-	30	30	-	-	-	-	-	-	-	-	19	19	11	11	3	3	8	8
10-02-00	12	12	-	-	28	58	7	7	-	-	-	-	-	-	21	40	13	24	6	9	8	16
09-03-00	11	23	-	-	21	79	3	10	-	-	-	-	-	-	12	52	7	31	3	12	4	20
06-04-00	10	33	-	-	10	89	2	12	-	-	-	-	-	-	11	63	6	37	1	13	2	22
03-05-00	8	41	-	-	11	100	6	18	-	-	-	-	-	-	11	74	7	44	3	16	4	26
07-06-00	13	54	-	-	10	110	relocated		-	-	9	9	1	1	12	86	9	53	2	18	3	29
05-07-00	8	62	-	-	8	118	relocated		-	-	14	23	7	8	8	94	6	59	4	22	4	33
09-08-99	12	74	21	21	obstructed		relocated		obstructed		19	42	1	9	13	107	8	67	5	27	6	39
06-09-00	8	82	16	37	relocated		relocated		6	6	15	57	5	14	7	114	6	73	2	29	3	42

	PS19A		PS20A		PS21A		PS22A		PS23B		PS24B		PS24C		PS25B		BBPS6A		BBPS5		BBPS5A	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
10-12-99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06-01-00	-	-	6	6	14	14	15	15	9	9	12	12	-	-	12	12	14	14	9	9	-	-
10-02-00	9	9	3	9	13	27	17	32	8	17	11	23	-	-	11	23	11	25	6	15	-	-
09-03-00	obstructed		3	12	6	33	7	39	4	21	6	29	-	-	4	27	obstructed		5	20	-	-
06-04-00	11	20	2	14	10	43	12	51	3	24	3	32	-	-	5	32	15	40	6	26	-	-
03-05-00	1	21	1	15	8	51	16	67	3	27	6	38	-	-	4	36	4	44	7	33	-	-
07-06-00	1	22	3	18	13	64	10	77	4	31	7	45	-	-	7	43	6	50	8	41	-	-
05-07-00	4	26	4	22	11	75	12	89	4	35	18	63	-	-	5	48	obstructed		23	64	-	-
09-08-00	3	29	4	26	13	88	15	104	4	39	obstructed		-	-	4	52	obstructed		obstructed		-	-
06-09-00	3	32	2	28	8	96	12	116	4	43	relocated		-	-	3	55	12	62	relocated		-	-

Legend 圖例

Column A = Settlement in Period (mm) A欄 = 該段期間之沉降量(毫米)

Column B = Cumulative Settlement since early December 1999 (mm) B欄 = 自1999年12月初之累積沉降量(毫米)

