Factual Report on Hong Kong Rainfall and Landslides in 2013

GEO Report No. 321

R.W.H. Lee & S.M. Ting

Geotechnical Engineering Office
Civil Engineering and Development Department
The Government of the Hong Kong
Special Administrative Region

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Preface

In keeping with our policy of releasing information which may be of general interest to the geotechnical profession and the public, we make available selected internal reports in a series of publications termed the GEO Report series. The GEO Reports can be downloaded from the website of the Civil Engineering and Development Department (http://www.cedd.gov.hk) on the Internet. Printed copies are also available for some GEO Reports. For printed copies, a charge is made to cover the cost of printing.

The Geotechnical Engineering Office also produces documents specifically for publication in print. These include guidance documents and results of comprehensive reviews. They can also be downloaded from the above website.

The publications and the printed GEO Reports may be obtained from the Government's Information Services Department. Information on how to purchase these documents is given on the second last page of this report.

H.N. Wong
Head, Geotechnical Engineering Office
August 2016

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Foreword

This report presents a summary of the factual information on rainfall and landslides in Hong Kong throughout 2013. Details of the landslides were obtained from records of landslide incidents reported to the Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department (CEDD). Supplementary information was collected from the Agriculture, Fisheries and Conservation Department, Architectural Services Department, Drainage Services Department, Highways Department, Housing Department, Lands Department, Water Supplies Department, and the GEO's landslide investigation consultants. The Hong Kong Observatory provided weather and rainfall information.

Y. Lam
Chief Geotechnical Engineer/LPM Division 1

Abstract

This report presents a summary of the factual information on rainfall and landslides in Hong Kong throughout 2013. Rainfall information was obtained from the Hong Kong Observatory (HKO) to supplement the information available in the Geotechnical Engineering Office (GEO). Details of the landslides were obtained from records of landslide incidents reported to the GEO. Supplementary information was collected from the Agriculture, Fisheries and Conservation Department, Architectural Services Department, Drainage Services Department, Highways Department, Housing Department, Lands Department, Water Supplies Department, and the GEO's landslide investigation consultants, namely Fugro Scott Wilson Joint Venture and AECOM Asia Company Limited.

Rainfall recorded in 2013 at the HKO's Principal Raingauge at Tsim Sha Tsui amounted to 2,847.3 mm, a surplus of about 19 percent comparing to the mean rainfall of 2,398.5 mm between 1981 and 2010. One Black Rainstorm Warning was issued on 22 May 2013; two Red Rainstorm Warnings were issued on 22 May and 24 June 2013 and 23 Amber Rainstorm Warnings were issued between 19 March and 4 September 2013.

One Landslip Warning was issued on 22 May 2013. A total of 256 incidents were reported to the Government in 2013. Of these, 241 were classified as genuine landslides and nine of them were designated as major failure (i.e. with a failure volume of 50 m^3 or more, or where a fatality has occurred).

There were 28 landslides in 2013 with notable consequences. Of these landslides, one led to permanent evacuation of one squatter dwelling and two led to temporary evacuation of one squatter dwelling and two village houses on licensed land respectively. The remaining 25 landslides resulted in temporary closure of roads (two of which also affected a construction site at Sau Mau Ping). Other landslides in 2013 affected open areas, footpaths or minor access roads and catchwaters, without any significant direct or indirect consequence. No injury or fatality was reported as a result of the 2013 landslides.

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1 Introduction

This report summarises the factual information on rainfall and reported landslides in Hong Kong throughout 2013. Rainfall information was obtained from the Hong Kong Observatory (HKO) to supplement the information available in the Geotechnical Engineering Office (GEO). Details of the landslides were obtained from records of landslide incidents reported to the GEO. Supplementary information was collected from the Agriculture, Fisheries and Conservation Department (AFCD), Architectural Services Department (ArchSD), Drainage Services Department (DSD), Highways Department (HyD), Housing Department (HD), Lands Department (LandsD), Water Supplies Department (WSD), and the GEO's landslide investigation consultants, namely Fugro Scott Wilson Joint Venture (FSWJV) and AECOM Asia Company Limited (AECOM), under Agreement Nos. CE 12/2011 (GE) and CE 13/2011 (GE) respectively.

In this report, a landslide is defined as the detachment or excessive displacement of soil or rock mass, and includes failure of a fill slope, cut slope, retaining wall, natural hillside, or disturbed terrain, as well as rockfall and boulder fall. A 'major' landslide is defined as a failure in which the estimated/recorded volume of the detached or displaced mass is ≥ 50 m^3, or where a fatality has occurred. A 'very minor' landslide is defined as a failure that is small in scale (i.e. ≤ 5 m^3 for failures involving soil, or ≤ 0.1 m^3 for rockfalls/boulder falls) and does not give rise to any significant public nuisance or notable consequences (e.g. casualty, near-miss, evacuation of buildings or squatter dwellings, road closure, etc.). Landslides that are not classified as 'major' or 'very minor' are taken as 'minor'.

2 Rainfall

2.1 The Raingauge System

The GEO, in collaboration with the HKO, operates an automatic raingauge system that transmits rainfall data through either telephone lines or the General Packet Radio Service (GPRS) of the mobile network, viz. a wireless transmission technology, to the GEO and the HKO at 5-minute intervals. The system comprises 88 GEO raingauges and 22 HKO raingauges. The raingauges are of the tipping-bucket type, tipping for every 0.5 mm of rainfall. The locations of the automatic raingauges are shown in Figure 2.1.

2.2 Rainfall Records

The rainfall data from the raingauge system are checked, verified and stored by the GEO in a database, from which they can be extracted for analysis. This report presents a selection of rainfall parameters for the whole year of 2013, as well as individual months and individual rainstorms.

The weather in 2013, as described by the HKO (2014), is excerpted as follows:

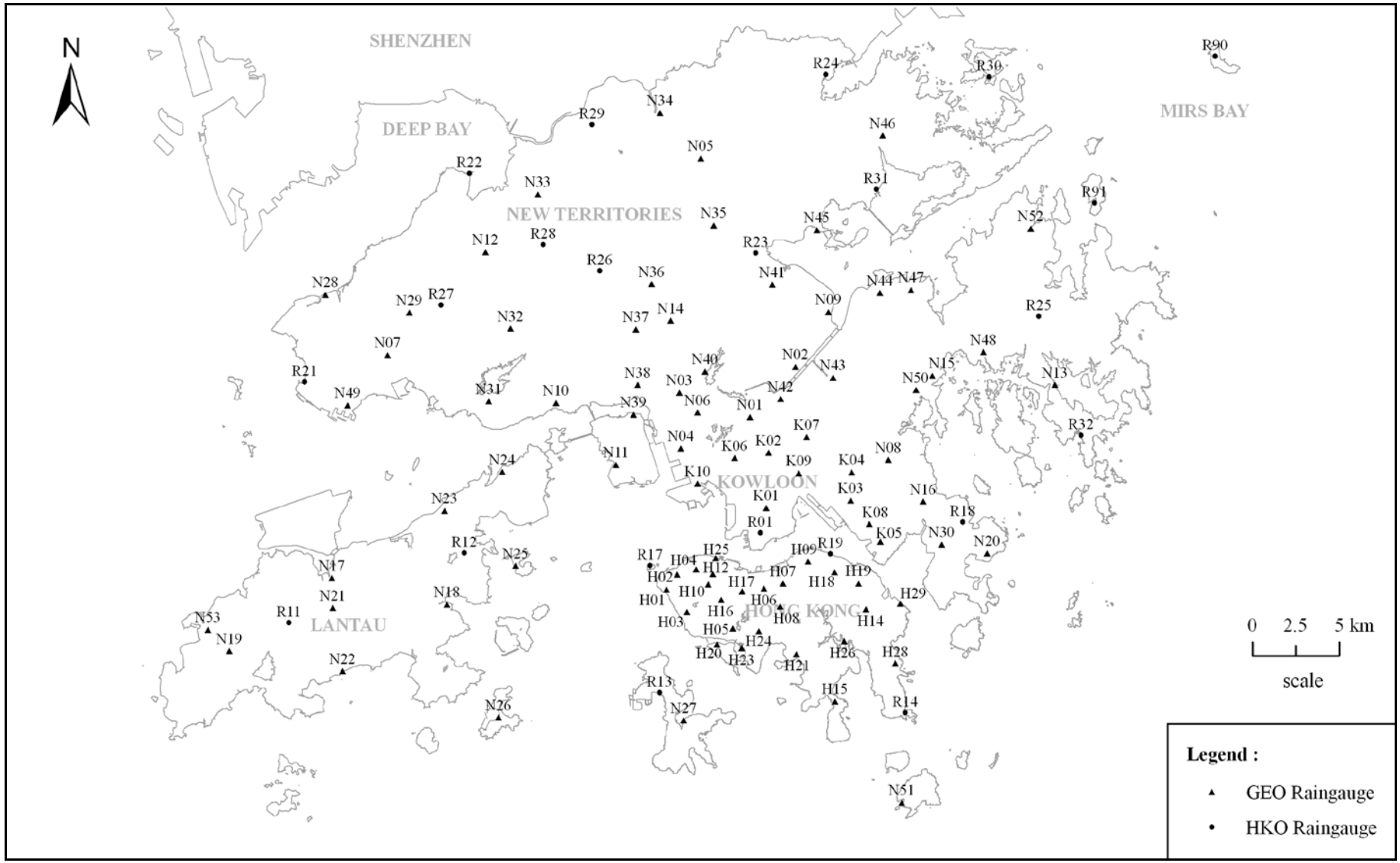

Figure 2.1 Locations of GEO and HKO Automatic Raingauges

> "Associated with the heavy rain episodes in the unsettled and stormy summer months, 2013 was also a wet and thundery year. The annual total rainfall was 2,847.3 millimetres, a surplus of about 19 percent comparing to the 1981-2010 normal of 2,398.5 millimetres (and about 29 percent above the 1961-1990 normal), and the total number of days with thunderstorms reported at the Hong Kong Observatory was 53 days, the highest since records began in 1947, tied with the record set in 1997. A trough of low pressure brought torrential rain and intense thunderstorms to Hong Kong on 22 May, necessitating the issuance of Black Rainstorm Warning by the Hong Kong Observatory, the first time since July 2010."

> "In Hong Kong, seven tropical cyclones necessitated the issuance of local tropical cyclone warning signals, slightly higher than the long term average of about six in a year. The No. 8 Gale or Storm Signal was issued during the passage of Super Typhoons Utor and Usagi in August and September respectively, of which Usagi was also the most intense tropical cyclone affecting Hong Kong in 2013. Furthermore, Severe Typhoon Krosa was the first tropical cyclone that necessitated the issuance of tropical cyclone warning signals in November since 2006."

The following are excerpts from the HKO's Monthly Weather Summary describing the weather condition when the most intense rainstorms occurred in the wet season (i.e. between April and September 2013). Further details on the monthly weather are available on the HKO Website (http://www.hko.gov.hk/wxinfo/pastwx/mws.htm).

> "A squall line swept across the Pearl River Estuary around noon on 21 May and brought heavy rain, thunderstorms and severe squalls to Hong Kong. Gusts exceeding 90 kilometres per hour were recorded in some parts of the territory. During the severe squalls, a gondola carrying two cleaners was smashed into a building in Wan Chai with one of the cleaners suffering injuries. In Tin Shui Wai, some stacked containers collapsed under the high winds, injuring one person. With a band of heavy rain spreading from west to east across the Pearl River Estuary, local weather deteriorated further with torrential rain and intense thunderstorms starting from the small hours of 22 May. The Hong Kong Observatory issued the Black Rainstorm Warning Signal at 4:10 a.m., the first time since July 2010. More than 150 millimetres of rain were recorded in many places over the territory. Rainfall recorded in Tseung Kwan O, eastern Kowloon, northern part of Hong Kong Island, Tuen Mun and Tung Chung even exceeded 200 millimetres."

> "An active southwesterly airstream and a trough of low pressure affected the South China coastal areas on 23 and 24 June

respectively, bringing mainly cloudy and showery weather to Hong Kong. The showers were particularly heavy in the morning on 24 June with more than 100 millimetres of rainfall generally recorded over the New Territories, Lantau Island and the northern part of Kowloon which necessitated the issuing of the Red Rainstorm Warning by the Observatory in that morning."

"Despite the presence of a ridge of high pressure over southern China, showers associated with a broad trough of low pressure over the South China Sea continued to affect Hong Kong for the ensuing four days. Showers became heavier and more frequent on 24 - 26 July as the trough moved closer to the coast of Guangdong. As a ridge of high pressure became well established over the region, the weather turned mainly fine apart from a few showers towards the end of the month."

"Over the western North Pacific, Utor intensified into a super typhoon on 11 August. It moved cross Luzon and weakened to a severe typhoon the next morning. On 13 August, Utor entered the northern part of the South China Sea and edged towards the coast of western Guangdong. Affected by the outer rainbands of Utor, the weather in Hong Kong became overcast and windy with heavy squally showers and a few thunderstorms. With Utor making landfall near Yangjiang on 14 August, local winds weakened gradually."

"Under the influence of a trough of low pressure over the northern part of the South China Sea, it was mainly cloudy and showery in Hong Kong on the first three days of the month. Local weather deteriorated further with occasional heavy rain and a few squally thunderstorms on 4 and 5 September as an easterly airstream converged with a southerly airstream in the vicinity of the Pearl River Estuary. The rain was particularly heavy on 5 September with more than 150 millimetres of rainfall over the eastern part of Hong Kong Island and the central part of Kowloon."

"Usagi passed the Luzon Strait on 21 September and weakened into a severe typhoon that night. Usagi tracked west-northwest and moved across the northeastern part of the South China Sea the next day, making landfall near Shanwei at night. Usagi skirted within 100 kilometres to the north of Hong Kong in the small hours of 23 September. It moved further inland afterwards and weakened into an area of low pressure over Guangxi in the afternoon. Locally, with the approach of Usagi, winds strengthened gradually and the weather deteriorated with squally showers during the day on 22 September. Winds reached gale force in many places of the territory with heavy

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> squally showers on the night of 22 September and in the early morning of 23 September when Usagi came closest to Hong Kong. Moreover, the storm surge induced by Usagi caused minor flooding in some of the low lying areas in Hong Kong. As Usagi moved away, local winds moderated gradually and rain eased off during the day."

The rainfall recorded at the HKO in the first quarter of 2013 is 135.4 mm (17% below the normal rainfall). The total rainfalls recorded in the second and third quarter are 1,201.7 mm (29% above normal) and 1,335.9 mm (18% above normal) respectively. For the last quarter of 2013, the total rainfall is 174.3 mm (4% above normal). The annual rainfall for 2013 is 2,847.3 mm, about 19 percent higher than the annual normal of 2,398.5 mm recorded between 1981 and 2010. The cumulative rainfall for 2013 is compared with the highest, lowest and mean rainfall in Figure 2.2.

Figure 2.3 shows the monthly rainfall distribution in 2013. Figure 2.4 shows the annual rainfall distribution in 2013, together with the locations of the reported landslides.

2.3 Rainstorms in 2013

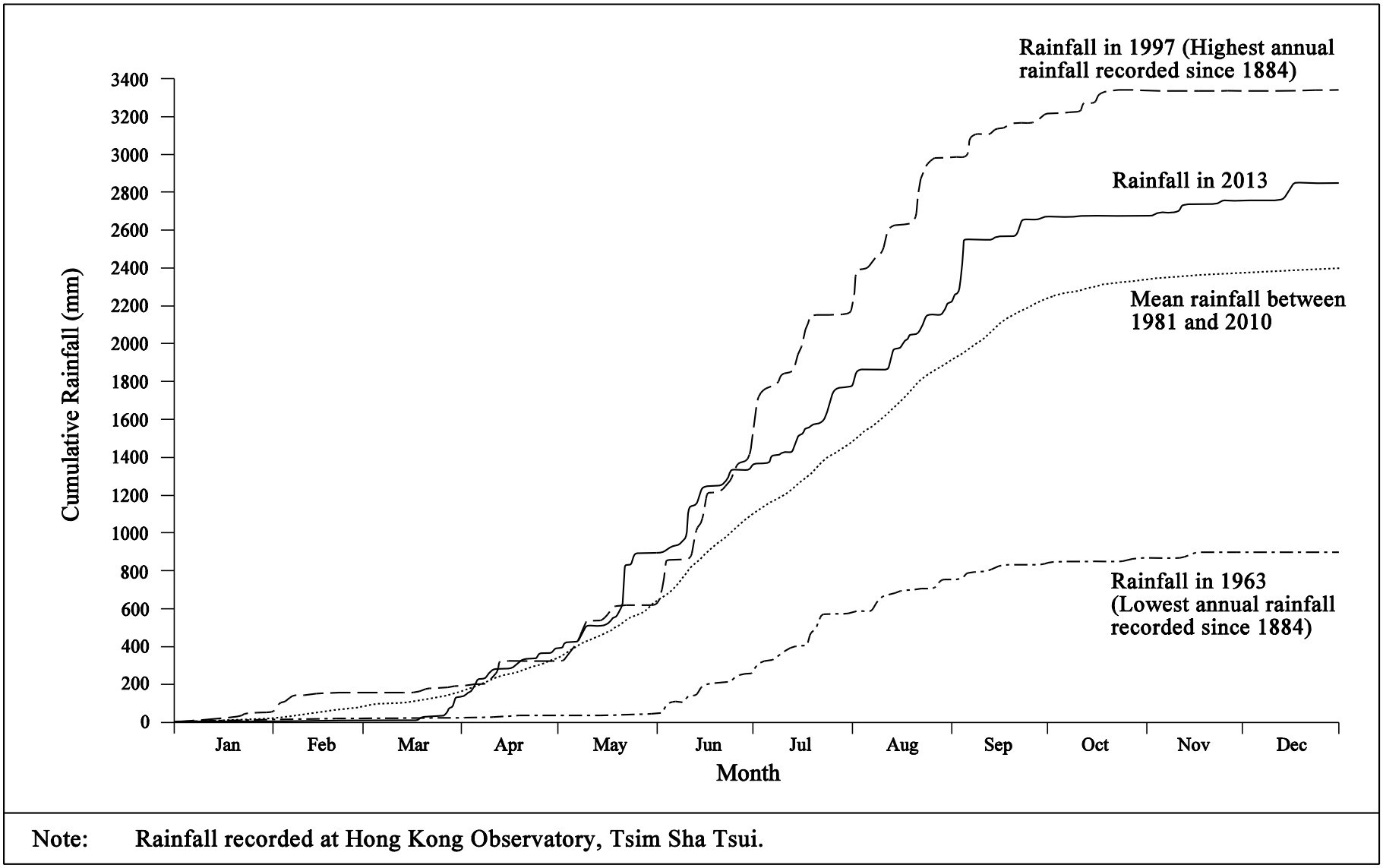
Table 2.1 tabulates the rainfall parameters for 16 rainstorms in 2013, during which the daily rainfall exceeded 100 mm at any of the HKO and the GEO raingauges. The parameters include the maximum 24-hour, 4-hour and 1-hour rolling rainfalls (based on 5-minute rainfall data). Table 2.1 also includes the 4-day and 15-day antecedent rainfalls at the HKO's Principal Raingauge. Similar data for selected major rainstorms in previous years are included in Table 2.1 for comparison. Other rainfall parameters for the above 16 rainstorms are also shown in Table A1 of Appendix A.

Figures A1 to A16 of Appendix A show the isohyets of the maximum rolling 24-hour rainfall during the above 16 rainstorms, together with the locations of reported landslides with reliable timing of occurrence that can be attributed to the rainstorm event, and the locations and values of maximum rolling rainfall for durations ranging from five minutes to 48 hours.

The rainstorms of 22 to 23 May 2013, 24 to 25 June 2013 and 30 August to 6 September 2013 had caused 58, 10 and 13 reported landslides respectively. Each of the other rainstorms in 2013 resulted in less than 10 reported landslides.

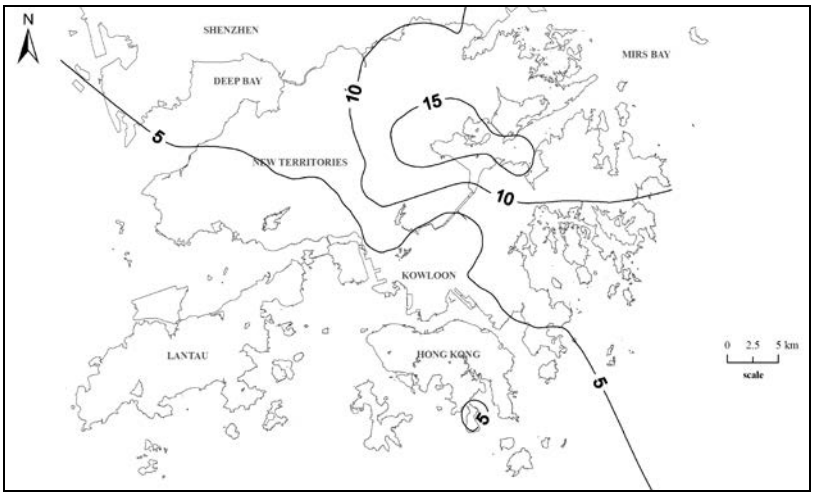
2.4 Warnings Issued by the Hong Kong Observatory

Table 2.2 summarises the details of the Thunderstorm, Flooding, Landslip, Tropical Cyclone and Rainstorm Warnings issued by the HKO in 2013. One Black Rainstorm Warning was issued on 22 May 2013. Two Red Rainstorm Warnings and 23 Amber Rainstorm Warnings were issued between 19 March and 4 September 2013. One Landslip Warning was issued on 22 May 2013.

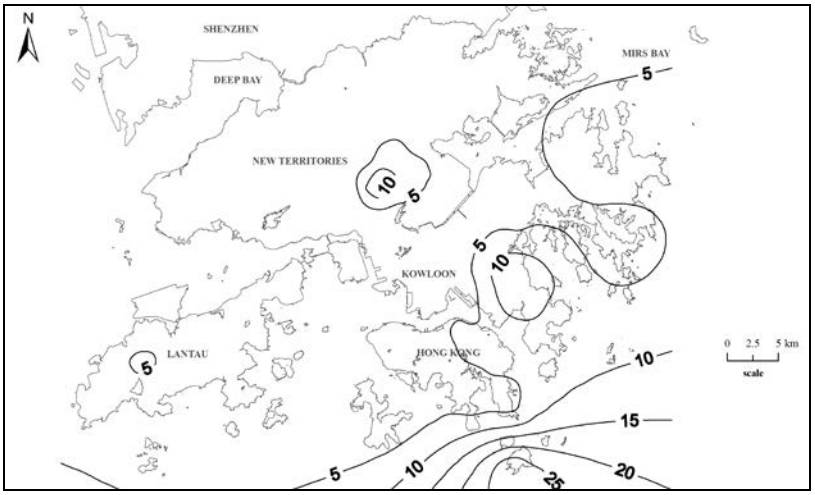


Note: Rainfall recorded at Hong Kong Observatory, Tsim Sha Tsui.

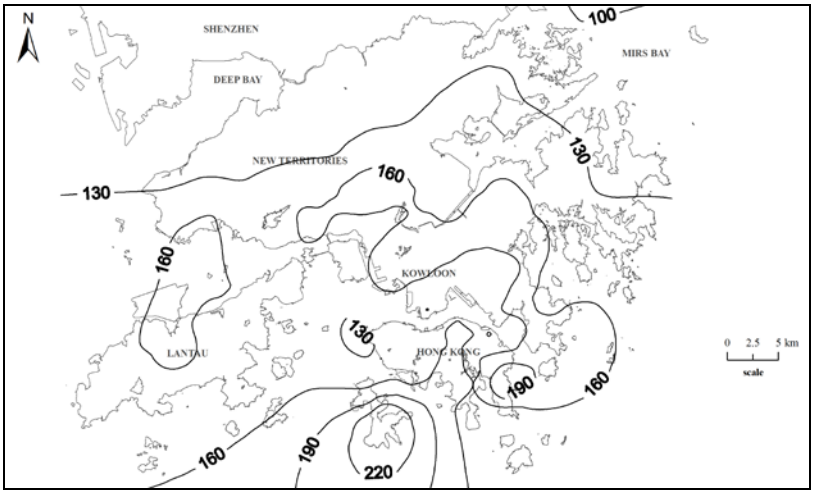
Figure 2.2 Cumulative Rainfall for 2013 at the Hong Kong Observatory and Its Recorded Highest, Mean and Lowest Cumulative Rainfalls



January 2013



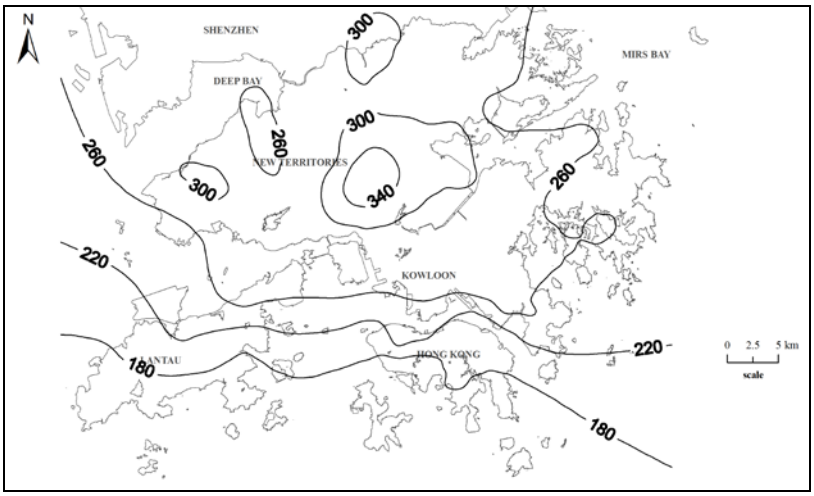
February 2013



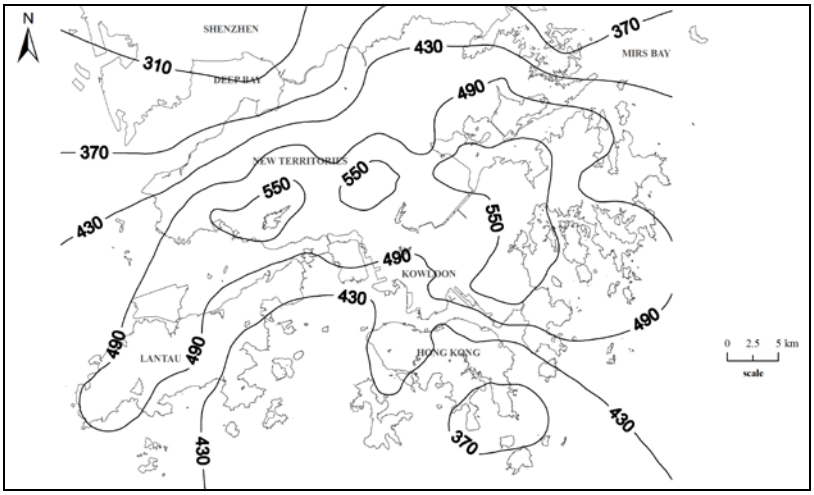
March 2013

Note: Isohyets are based on the GEO and HKO raingauges.

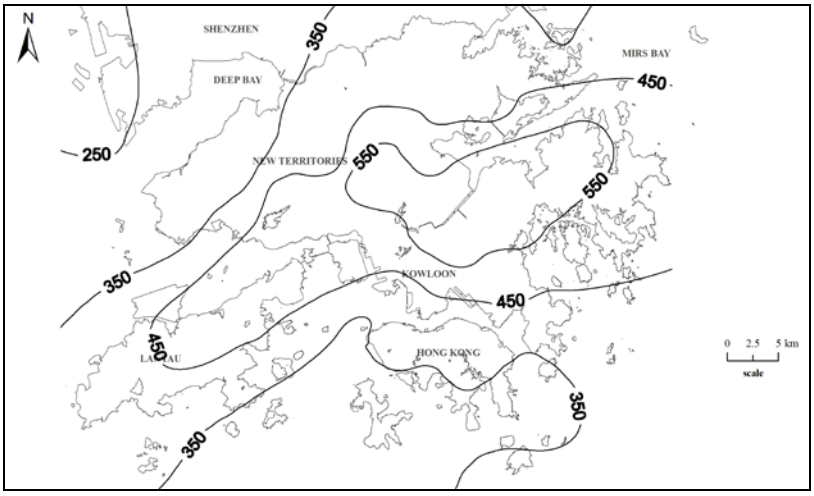
Figure 2.3 Monthly Rainfall Distribution in 2013 (Sheet 1 of 4)



April 2013



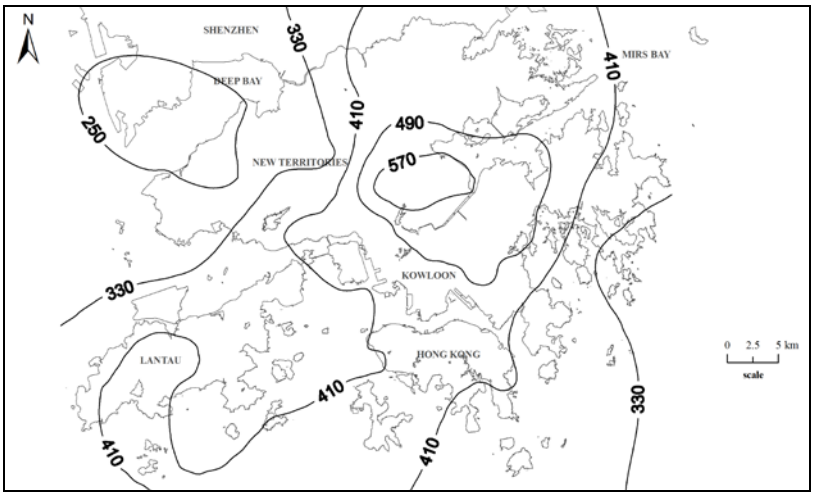
May 2013



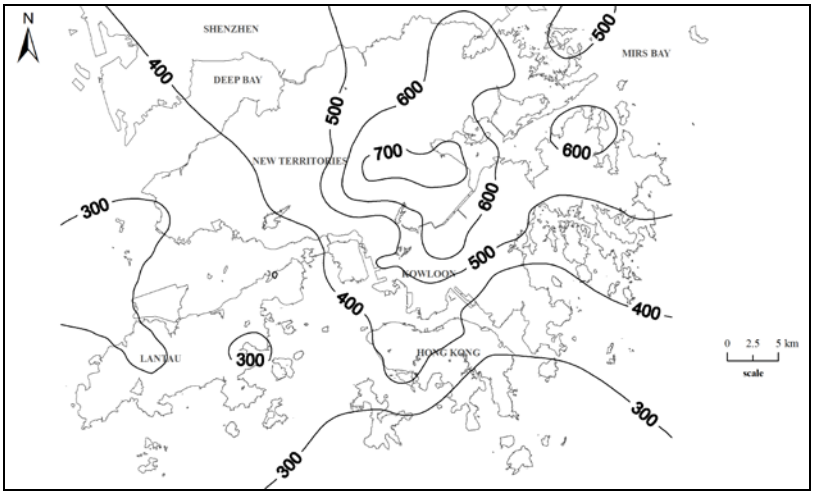
June 2013

Note: Isohyets are based on the GEO and HKO raingauges.

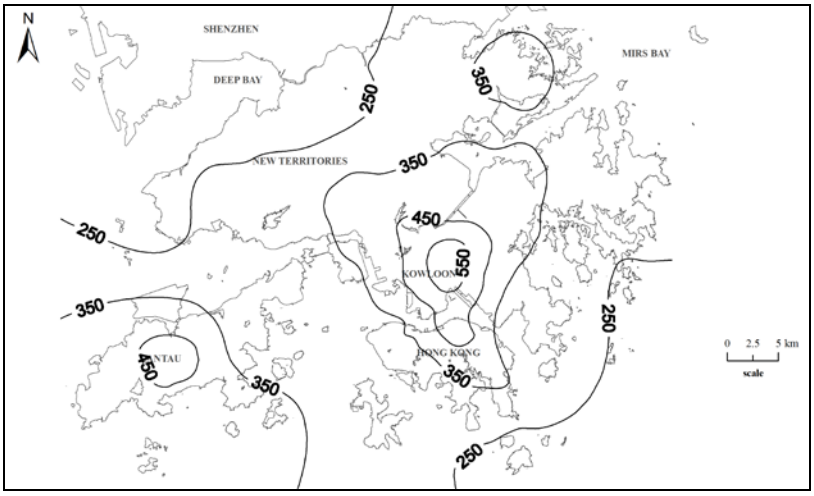
Figure 2.3 Monthly Rainfall Distribution in 2013 (Sheet 2 of 4)



July 2013



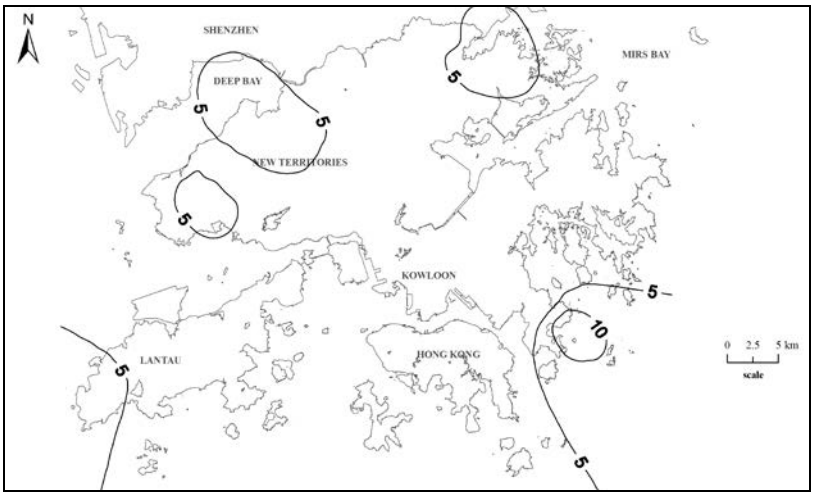
August 2013



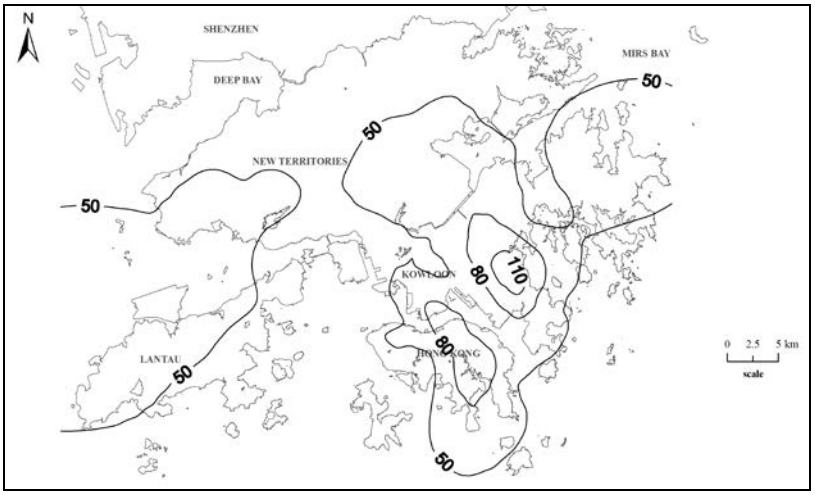
September 2013

Note: Isohyets are based on the GEO and HKO raingauges.

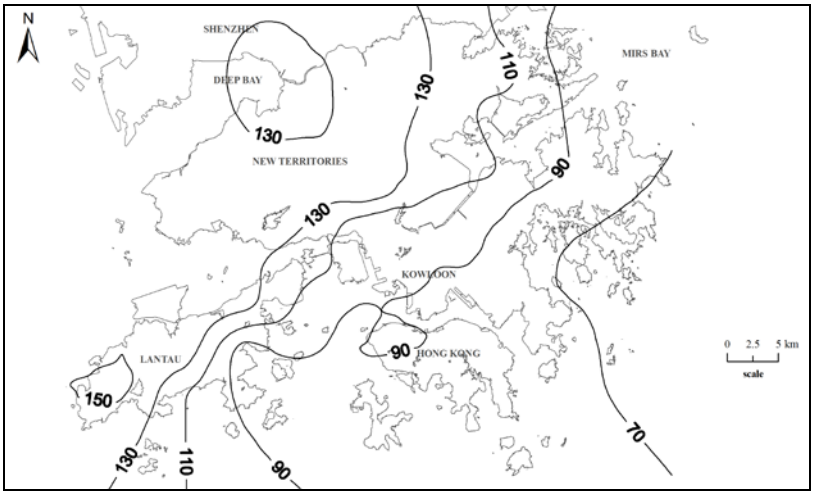
Figure 2.3 Monthly Rainfall Distribution in 2013 (Sheet 3 of 4)



October 2013



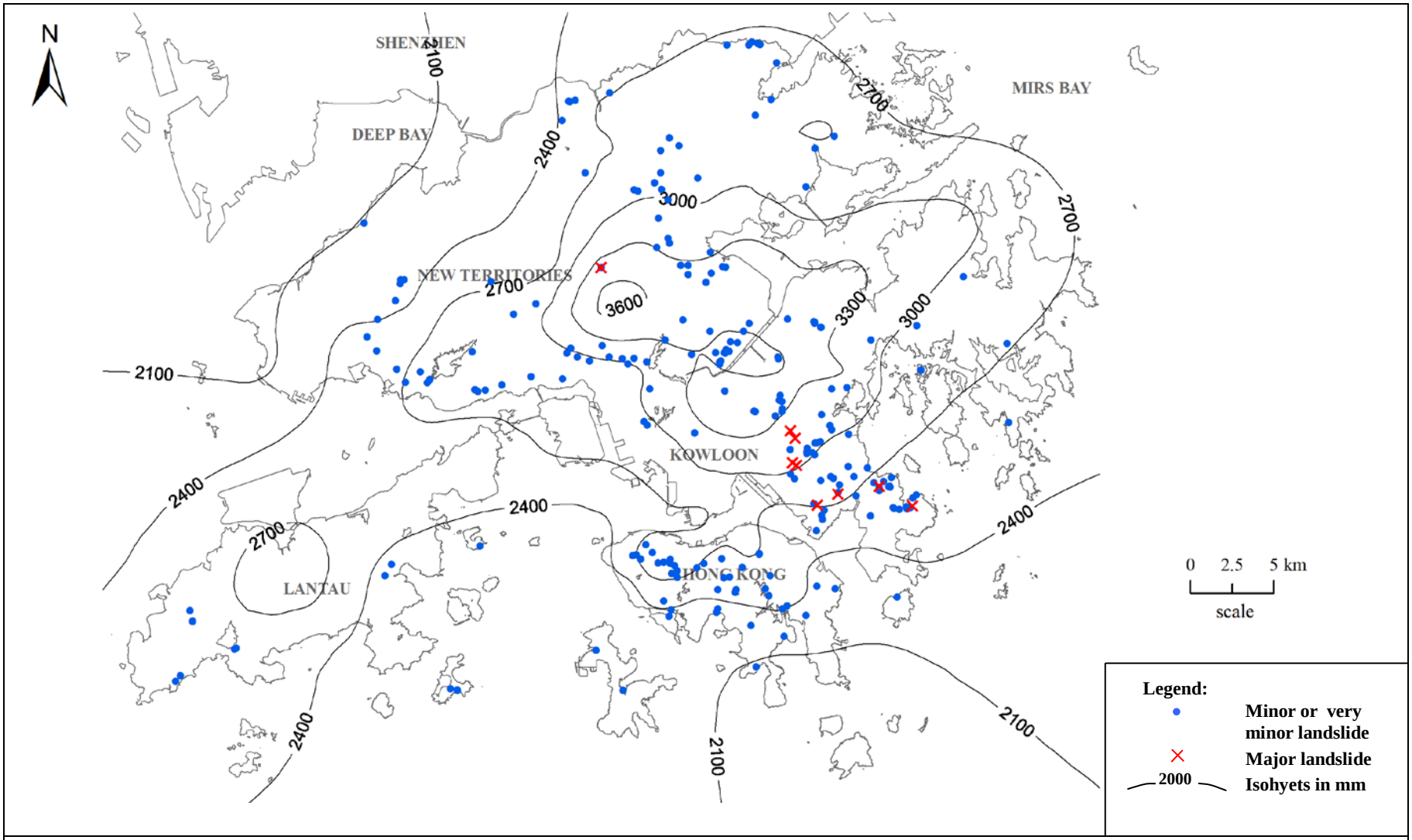
November 2013



December 2013

Note: Isohyets are based on the GEO and HKO raingauges.

Figure 2.3 Monthly Rainfall Distribution in 2013 (Sheet 4 of 4)



Notes: (1) Isohyets are based on the GEO and HKO raingauges.
(2) Only the genuine landslides in 2013 (241 nos.) reported to the GEO and other government departments are shown.

Figure 2.4 Annual Rainfall Distribution and Locations of Reported Landslides in 2013

Table 2.1 Rainfall and Landslides in 2013 and Selected Previous Major Rainstorms (Sheet 1 of 2)

Date of Rainstorm Event [1]	Maximum Rainfall (mm) [2]								Number of Landslides Reported [4]
	Hong Kong Observatory (HKO)					GEO Raingauges [3]			
	24-hr	4-hr	1-hr	Antecedent		24-hr	4-hr	1-hr	
				4-day	15-day				
29-31 March 2013	58.2	51.2	18.7	94	129.4	124 (N27)	113.5 (N27)	57 (N27)	1
6 April 2013	71.5	37.3	36.5	94.5	205	112.5 (N36)	49 (N45)	47.5 (N45)	3
3-4 May 2013	33.8	24.1	10.6	59.7	116.7	129.5 (N36)	71 (N07, N31)	48.5 (N31)	1
22-23 May 2013	233.5	166.4	84.7	283.2	409.6	274.5 (K03)	207.5 (N30)	153.5 (N16)	58
25-26 May 2013	58.9	44.7	29.1	283.1	400.4	181.5 (N19, N21)	45.5 (N34)	40 (N34)	7
11-12 June 2013	168.9	91.5	61.8	208.9	245.7	183 (H16)	112.5 (N17)	96 (H10)	9
15-16 June 2013	83.3	29.7	12.4	203.1	344.9	142.5 (K07)	53.5 (N50)	38.5 (N48)	4
24-25 June 2013	57.5	43.3	25.1	85.8	376.9	223 (N01)	174.5 (N01)	95.5 (N01)	10
15 July 2013	86.2	33.7	12.6	86.3	175.9	147 (H06)	80.5 (H09)	38 (N53)	2
24-26 July 2013	92.2	48	23.9	162.3	320.6	151 (N22)	83 (N22)	47 (H02)	3
2-3 August 2013	78.7	35.1	28.4	90.7	311.7	144 (N37)	62 (N14)	50 (N11)	3
14-15 August 2013	81.7	19.6	12.4	108.5	200.7	143 (N36)	47.5 (N36)	31 (N52)	0
17-18 August 2013	36	30.7	15.6	149.4	236.4	135.5 (N36)	23 (N47)	17.5 (H18)	3
23-24 August 2013	67	41.7	23	97.9	281.6	113.5 (N52)	77 (N52)	51 (N52)	3
30 August - 6 September 2013	217.6	113.6	39.1	332.5	503	323 (H09)	185 (H09)	111 (N22)	13
23-24 September 2013	87.2	46.1	15.7	88.8	105	225.5 (N40)	117.5 (N40)	52 (N26)	2

Notes:
(1) Rainstorms are arranged in order of the rolling 24-hour rainfall at the Hong Kong Observatory in Tsim Sha Tsui.
(2) The maximum rainfalls are calculated using 5-minute rainfall as the basic unit, except those recorded at the HKO, for which the rolling rainfall is calculated using one-clock hour rainfall as the basic unit.
(3) The maximum rainfalls are selected from the 88 GEO Raingauges for the rainstorms. The GEO Raingauge reference number is shown in brackets.
(4) Reported number of landslides refers to those genuine landslides that can be attributed to the rainstorm events.

Table 2.1 Rainfall and Landslides in 2013 and Selected Previous Major Rainstorms (Sheet 2 of 2)

Date of Rainstorm Event	Maximum Rainfall (mm) [1]								Number of Landslides Reported [2]
	Hong Kong Observatory (HKO)					GEO Raingauges [3]			
	24-hr	4-hr	1-hr	Antecedent		24-hr	4-hr	1-hr	
				4-day	15-day				
Selected Major Rainstorms in Previous Years (for comparison only)									
20-21 May 1989	387.8	119.3	37.3	27.9	41.7	566.0 (N14)	194.5 (N14)	61.5 (N14)	378
7-9 May 1992	324.7	195.0	109.9	4.2	9.1	386.5 (H10)	243.0 (H10)	144.5 (H19)	314
15-16 June 1993	155.1	122.3	54.1	155.8	296.1	285.0 (N13)	191.5 (N13)	111.0 (H13)	123
4-5 November 1993	106.6	27.8	9.4	0	0	745.0 (N17)	285.0 (N17)	114.0 (N17)	394
21-25 July 1994	310.2	141.9	70.4	18.7	310.1	956.0 (N14)	365.0 (N14)	211.5 (N14)	208
3-11 August 1994	74.1	44.9	27.1	8.1	759.1	381.0 (N14)	187.5 (N14)	103.5 (N14)	46
11-15 August 1995	325.7	109.1	43.8	5.1	436.9	468.0 (H08)	223.5 (H14)	106.0 (N14)	110
3-5 June 1997	150.2	83.7	46.4	0.9	33.6	367.5 (N04)	262.5 (N04)	128.5 (N04)	81
1-4 July 1997	148.8	106.7	45.4	33.5	362.7	800.0 (N09)	249.5 (N09)	125.0 (N01)	150
8-9 June 1998	428.4	152.4	71.7	86.6	246.8	562.0 (N15)	218.5 (N15)	98.0 (N09)	96
22-26 August 1999	313.1	127.4	50.7	6.8	170.3	565.0 (N14)	230.5 (N10)	120.5 (N10)	269
16-21 August 2005	416.4	122.9	39.1	110.7	214.1	570.0 (N01)	173.5 (N18)	82.0 (N25)	229
6-9 June 2008	417.6	246.3	145.5	99.9	242.5	622.5 (N19)	384.0 (N19)	153.5 (N21)	363

Notes:
(1) The maximum rainfalls are calculated using 5-minute rainfall as the basic unit, except those recorded at the HKO, for which the rolling rainfall is calculated using one-clock hour rainfall as the basic unit.
(2) Reported number of landslides refers to those genuine landslides that can be attributed to the rainstorm events.
(3) The maximum rainfalls are selected from all the available GEO Raingauges for the rainstorms. The GEO Raingauge reference number is shown in brackets.

Table 2.2 Warnings Issued by the Hong Kong Observatory in 2013

Month	Monthly Total Rainfall (mm)	Dates on which Warnings [1] were in Effect				
		Thunderstorm [2]	Flooding	Landslip [3]	Tropical Cyclone [4]	Rainstorm
January	3.4	-	-	-	-	-
February	1.5	-	-	-	-	-
March	130.5	13, 19, 20, 24, 26, 27, 28, 29, 30	-	-	-	19 (Amber), 26 (Amber)
April	253.8	2, 4, 5, 6, 9, 10, 12, 17, 18, 19, 20, 21, 25, 30	-	-	-	5 (Amber), 6 (Amber), 25 (Amber), 30 (Amber)
May	509.3	8, 9, 10, 11, 12, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30	22	22	-	8 (Amber), 16 (Amber), 20 (Amber), 21 (Amber), 22 (2 x Amber), 22 (Red), 22 (Black), 25 (Amber)
June	438.6	3, 4, 5, 6, 8, 9, 10, 11, 16, 17, 18, 21, 22, 23, 24, 25	24	-	21-22 (1-3, BEBINCA), 30 (1, RUMBIA)	11 (2 x Amber), 24 (2 x Amber), 24 (Red)
July	436.3	1, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29	-	-	1-2 (1-3, RUMBIA), 17-18 (1, CIMARON)	7 (Amber), 14 (Amber), 26 (Amber)
August	445.4	1, 2, 3, 7, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 25, 29, 30, 31	30	-	1-2 (1-3, JEBI), 12-15 (1-8, UTOR)	30 (2 x Amber)
September	454.2	2, 3, 4, 5, 6, 13, 15, 16, 23	-	-	21-23 (1-8, USAGI)	4 (Amber)
October	2.9	-	-	-	-	-
November	83.1	24	-	-	1-3 (1, KROSA)	-
December	88.3	-	-	-	-	-
Total	2,847.3	168 Warnings	3 Warnings	1 Warning	7 Warnings	26 Warnings (23 x Amber, 2 x Red & 1 x Black)

Notes:
(1) Warnings and signals were based on the information from the HKO.
(2) More than one Thunderstorm Warning may have been issued within a day but have only been shown once for clarity.
(3) Landslip Warning was issued after consultation between the GEO and the HKO.
(4) Tropical Cyclone Warning signal number hoisted is shown in the bracket followed by the name of the tropical cyclone.

3 Landslides

3.1 Landslides in 2013

Landslide incidents that occurred in 2013 and reported to the GEO and other government departments are summarised in Table 3.1.

Table 3.1 Breakdown of Landslides in 2013 Reported to Government Departments

Department	Reported Number of Landslides	Genuine Landslides
Agriculture, Fisheries and Conservation Department	14 (1)	14 (1)
Architectural Services Department	12 (0)	11 (0)
Drainage Services Department	0	0
Geotechnical Engineering Office, Civil Engineering and Development Department	199[(1)]	185[(1)]
Highways Department	58 (54)	58 (54)
Housing Department	0	0
Lands Department	2 (0)	2 (0)
Water Supplies Department	26 (0)	26 (0)
Total	311 (55)[(2)]	296 (55)[(2)]

Legend:

58 (54) Fifty-eight incidents were reported to the government department concerned, 54 of which were also reported to the GEO separately by other parties (i.e. duplicate cases)

Notes:
(1) A total of 199 landslide incidents that occurred in 2013 (discounting duplicate cases) were reported to the GEO, of which 185 were classified as genuine landslides.
(2) The number of reported landslide incidents that occurred in 2013 (discounting duplicate cases) is **256** [311-55]. The number of genuine landslides is **241** [296-55].

A total of 256 landslide incidents that occurred in 2013 were reported to various government departments. These include 199 incidents (discounting duplicate cases) reported to the GEO. Another 57 incidents were reported to other government departments (i.e. AFCD, ArchSD, HyD, LandsD and WSD). Of these 256 reported incidents, 241 were

genuine landslides (see details in Appendix B). The other reported incidents were non-landslide events such as tree falls and flooding.

Of the 241 genuine landslides, nine (3.7%) were major landslides (see Table B1 in Appendix B), 146 (60.6%) were minor landslides, and 86 (35.7%) were very minor landslides with negligible consequences (see Section 1).

Selected notable landslides are presented in Section 4 and illustrated in Figures 4.1 to 4.4. For those landslide incidents inspected by the GEO, the information on the landslides was recorded in incident reports prepared by the GEO. For those landslide incidents attended to by other government departments responsible for slope maintenance, landslide incident reports were prepared by the respective departments. The above information is available in the Slope Information System (SIS). Further details of these slope failures can be found in the relevant files of the three District Divisions and the Landslip Preventive Measures Division 1 of the GEO.

Wherever possible, the dates and times of the landslides were assessed by geotechnical professionals. Of the 241 landslides, the timing of occurrence was determined to within one day for 78 incidents based on the reported date of failure given in the incident reports. For the remaining landslide incidents, the timing of occurrence could not be ascertained due to lack of information or that the incidents were not reported to the GEO or other government departments until several days or even weeks after occurrence.

3.2 Consequence of Landslides

The consequence of landslides in terms of the types of facilities affected (e.g. buildings, roads, registered squatter dwellings, catchwaters, construction sites, etc.) in different regions is summarised in Table 3.2. In regard to the landslides with significant consequences (e.g. casualties, evacuation of buildings or squatter dwellings, temporary closure of roads, etc.), they are classified with respect to the types of slope failures, as shown in Table 3.3. The facility groups affected by the major landslide are presented in Table 3.4. Further descriptions of some selected notable landslides of 2013 are given in Section 4 below.

3.3 Types of Slope Failures

Landslides reported to the GEO and other government departments have been classified into five major types of slope failures, i.e. fill slopes, cut slopes, retaining walls, natural hillside and registered disturbed terrain. The breakdown of different types of slope failures is shown in Table 3.5.

Table 3.2 Breakdown of Landslides by Types of Affected Facilities

Types of Affected Facilities	Hong Kong Island	Kowloon	New Territories and Outlying Islands	All
Buildings (including village houses)	0	0	19 (1)	19 (1)
Registered Squatter Dwellings	0	0	13 (0)	13 (0)
Roads	9 (0)	6 (2)	28 (5)	43 (7)
Transportation Facilities (e.g. railways, tramways, etc.)	0	0	0	0
Pedestrian Pavements/Footways	3 (0)	0	2 (0)	5 (0)
Minor Footpaths/Access Paths/ Access Roads	16 (0)	1 (0)	73 (0)	90 (0)
Construction Sites	0	2 (2)	0	2 (2)
Open Areas	5 (0)	0	40 (1)	45 (1)
Catchwaters	3 (0)	0	15 (0)	18 (0)
Others (e.g. carparks, parks, playgrounds, gardens, backyards, etc.)	3 (0)	1 (0)	19 (0)	23 (0)
Nil	1 (0)	1 (0)	2 (0)	4 (0)
Total	40 (0)	11 (4)	211 (7)	262 (11)

Legend:

19 (1) Nineteen landslides of which one was a major failure

Notes:
(1) Incidents that were not genuine landslides have been excluded.
(2) A given landslide may affect more than one type of facility.
(3) Nil consequence refers to incidents where the landslide debris came to rest on the slopes, not affecting any facilities.

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Table 3.3 Breakdown of Landslide Consequences by Types of Slope Failures

Types of Slope Failures		Number of Squatter Dwellings[(1)] Evacuated		Number of Floors, Houses or Flats Evacuated or Partially Closed	Number of Incidents Involving Closure			Deaths	Injuries reported to GEO
		Permanent	Temporary		Roads	Pedestrian Pavements	Footpaths, Alleyways or Private Access Paths		
Fill Slopes		0	0	0	3	0	1	0	0
Cut Slopes	Soil	1 (1)	0	0	9	0	5	0	0
	Soil/Rock	0	0	0	10	1	2	0	0
	Rock	0	0	0	0	0	0	0	0
Retaining Walls		0	1 (1)	2[(3)]	2	0	1	0	0
Natural Hillside		0	0	0	1	0	4	0	0
Registered Disturbed Terrain		0	0	0	0	0	0	0	0
Total		1 (1)	1 (1)	2	25	1	13	0	0

Legend:

1 (1) Number of squatter dwellings evacuated, with the number of tolerated squatter structures evacuated shown in brackets

Notes:

(1) A squatter dwelling is defined as a place of residence that contains one or more tolerated squatter structures, i.e. all structures registered in 1982 Housing Department's Squatter Structure Survey (GEO, 2010).

(2) A failure may give rise to more than one type of consequence.

(3) A retaining wall failure (Incident No. 2013/06/1390) resulted in temporary evacuation of three residents from two village houses on a licensed land at Ma Tso Lung.

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Table 3.4 Breakdown of Facility Groups Affected by Major Landslides

Types of Major Landslides	Facility Group Affected by Major Landslides (Group No.)						
	1a	1b	2a	2b	3	4	5
All Major Landslides	0	1	0	0	4	3	1
Major Landslides on Man-made Slopes	0	1	0	0	4	3	0
Major Landslides on Registered Disturbed Terrain	0	0	0	0	0	0	0
Major Landslides on Natural Hillside	0	0	0	0	0	0	1

Note: Facility groups are classified in accordance with the GEO Technical Note No. 15 (GEO, 2007).

Table 3.5 Breakdown of Landslides by Types of Slope Failures

Types of Slope Failures		Number	Percentage (%)
Fill Slopes		10 (2)	4.1
Cut Slopes	Soil	108 (4)	44.8
	Soil/Rock	48 (1)	19.9
	Rock	5 (0)	2.1
Retaining Walls		22 (1)	9.1
Natural Hillside		45 (1)	18.7
Registered Disturbed Terrain		3 (0)	1.3
Total		241 (9)	100.0

Legend:

48 (1) Forty-eight landslides, one of which was a major failure

Notes:
(1) Where a landslide involved more than one type of failure, the predominant type of failure has been considered in the above classification.
(2) Incidents that were not genuine landslides have been excluded.

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3.4 Landslide Volume Distribution

Tables 3.6 and 3.7 show the distribution of failure volumes for all the reported landslides. A total of 154 landslides (63.9%) involved less than 5 m^3 of material. There were nine major landslides (with a failure volume of 50 m^3 or more), one of which occurred on natural hillside and the other eight occurred on man-made features including one fill slope and one reinforced fill retaining wall which were both being constructed at the time of failures. The largest incident occurred on the said reinforced fill retaining wall with a total soil loss of 1,300 m^3. It resulted in prolonged closure of a road below the wall toe (refer to Section 4.2).

Table 3.6 Landslide Volume Distribution with Respect to Geographical Locations

Volume of Failure (m^3)	Hong Kong Island	Kowloon	New Territories and Outlying Islands	All
< 5	28	4	122	154 (63.9%)
≥ 5 to < 10	3	0	33	36 (14.9%)
≥ 10 to < 20	7	0	19	26 (10.9%)
≥ 20 to < 50	2	3	11	16 (6.6%)
≥ 50 to < 200	0	0	6	6 (2.5%)
≥ 200 to < 500	0	0	1	1 (0.4%)
≥ 500 to < 1,000	0	1	0	1 (0.4%)
≥ 1,000	0	1	0	1 (0.4%)
Total	40	9	192	241 (100%)

Legend:

6 (2.5%) Six landslides, which amount to 2.5% of the total 241 genuine landslides reported to the Government

Table 3.7 Landslide Volume Distribution with Respect to Types of Slope Failures

Volume of Failure (m^3)	Fill Slopes	Cut Slopes			Retaining Walls	Natural Hillside	Registered Disturbed Terrain	Total
		Soil	Soil/Rock	Rock				
< 5	3	73	32	5	10	28	3	154 (63.9%)
≥ 5 to < 10	1	16	8	0	5	6	0	36 (14.9%)
≥ 10 to < 20	1	10	3	0	3	9	0	26 (10.9%)
≥ 20 to < 50	3	5	4	0	3	1	0	16 (6.6%)
≥ 50 to < 200	0	3	1	0	1	1	0	6 (2.5%)
≥ 200 to < 500	0	1	0	0	0	0	0	1 (0.4%)
≥ 500 to < 1,000	1	0	0	0	0	0	0	1 (0.4%)
≥ 1,000	1	0	0	0	0	0	0	1 (0.4%)
Total	10	108	48	5	22	45	3	241 (100%)

Legend:

6 (2.5%) Six landslides, which amount to 2.5% of the total 241 genuine landslides reported to the Government

4 Notable Landslides

4.1 General

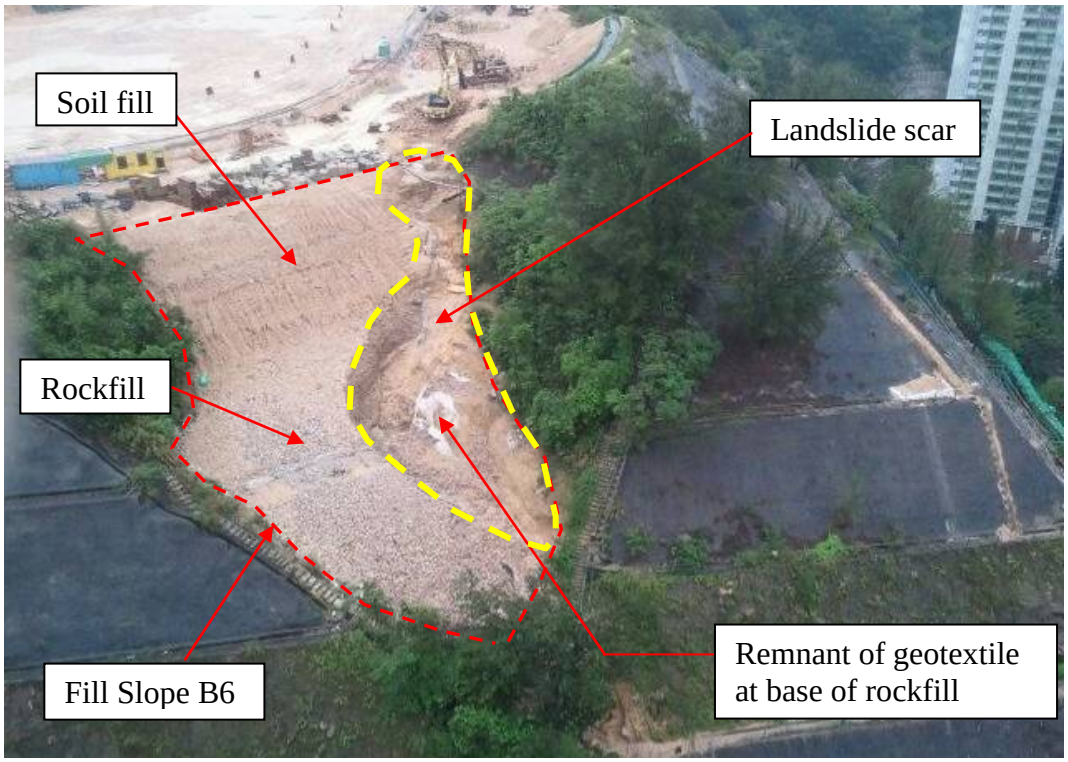
Of the 241 genuine landslides reported to the Government that occurred in 2013, four incidents are described in more detail below. These four incidents have been selected on the basis of their consequences.

4.2 The 22 May 2013 Landslide on a Fill Slope and Distress of a Reinforced Fill Retaining Wall within a Construction Site at Sau Mau Ping (Incident Nos. 2013/05/1293 and 2013/06/1367)

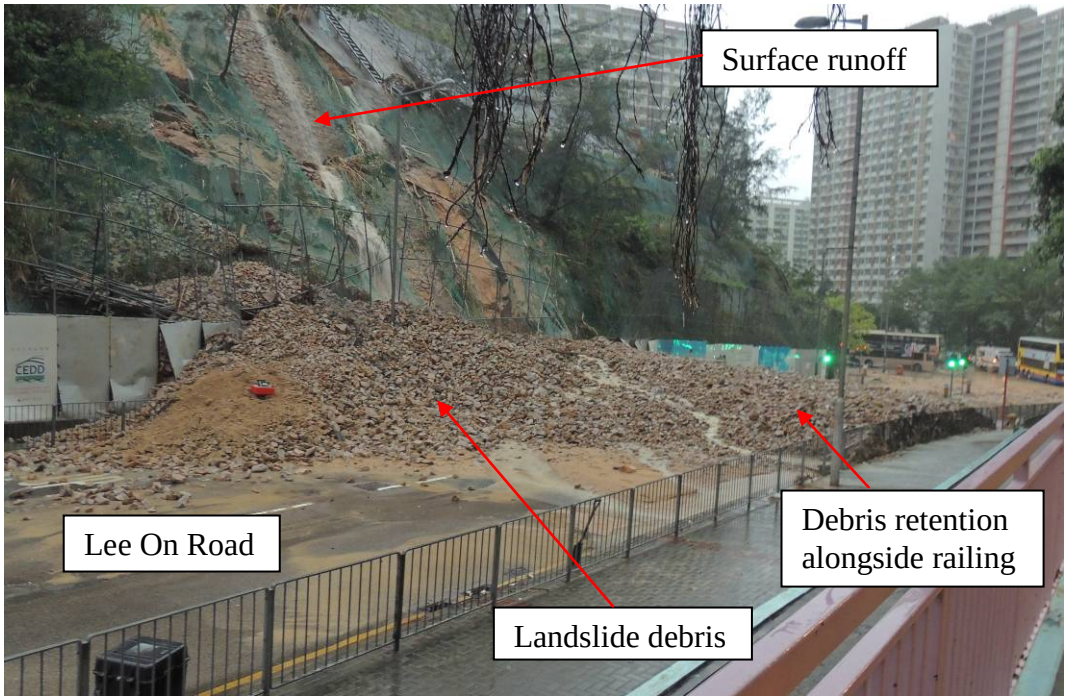
At about 4:00 a.m. on 22 May 2013, a major washout failure (Incident No. 2013/05/1293) occurred on a fill slope (Slope B6) within the construction site of the Development at Anderson Road (DAR) project, above Lee On Road, Sau Mau Ping (Figure 4.1). Slope B6, comprising general fill and rockfall at its upper and lower portions respectively, was under construction at the time of the failure where works on the slope surface cover and surface drainage measures were not yet implemented. The estimated failure volume was about 530 m^3 with the majority of the landslide debris deposited on Lee On Road (FSWJV, 2013a). No casualty or injury was reported, but both lanes of Lee On Road were temporarily closed for about 13 hours as a result of the failure.

At almost the same period of time when Slope B6 failed, another major incident (Incident No. 2013/06/1367) occurred within the same construction site on a reinforced fill retaining wall (Wall R22) above Shun On Road (Figure 4.2). Wall R22 was under construction at the time of the incident and would be 36.5 m in height upon completion. By the time of the incident, it was constructed up to about 30 m high. The incident involved a soil loss of about 1,300 m^3 and a distressed groundmass of approximately 5,500 m^3 (FSWJV, 2013b). Seventy-eight facing panels were dislodged and a sinkhole of approximate 8 m wide by 12.5 m long was formed at the distressed zone. The majority of the soil debris was deposited over the hillside in front of Wall R22 with a minor amount of debris overspilling the culvert below the wall onto Shun On Road. No casualty or injury was reported, but a section of Shun On Road was temporarily closed for 18 days.

The two incidents both occurred in the early hours of the day and were ‘near-miss’ cases that could have resulted in much more serious consequence.

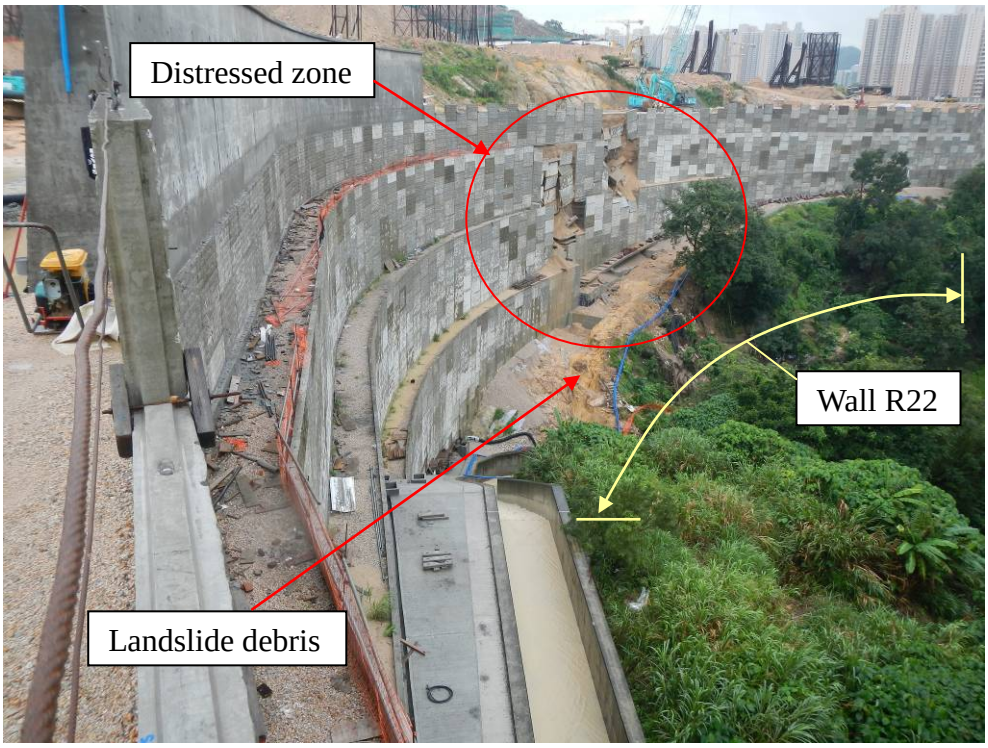


(a) General View of the Washout Failure on Fill Slope B6

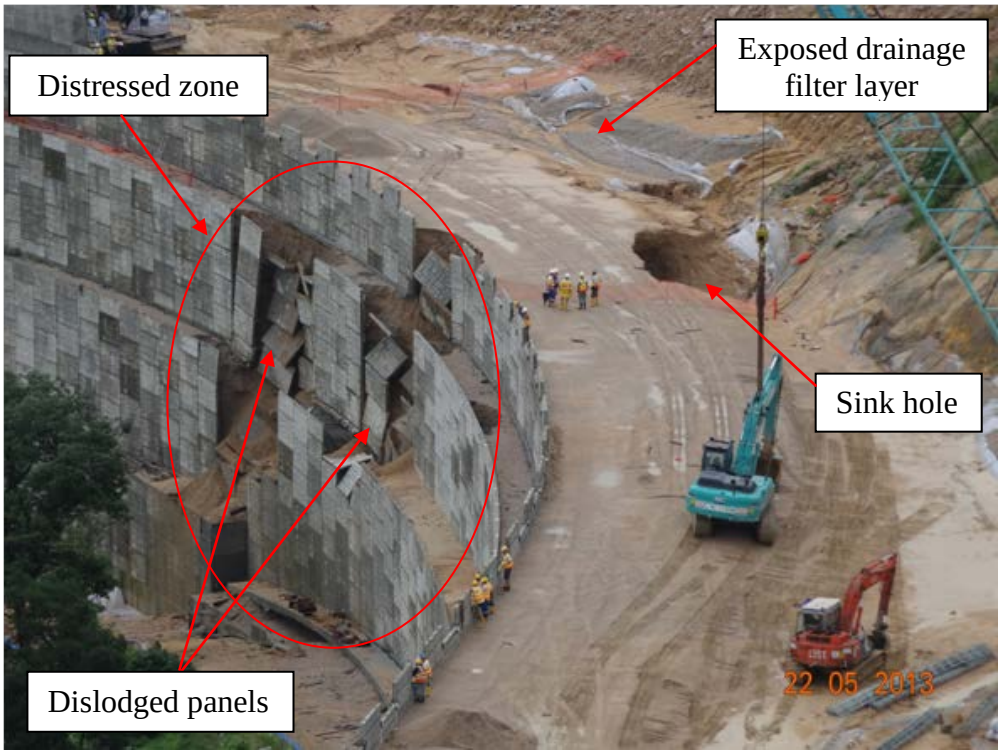


(b) Landslide Debris on Lee On Road below Fill Slope B6

Figure 4.1 Views of the 22 May 2013 Washout Failure on Fill Slope B6 within a Construction Site above Lee On Road, Sau Mau Ping (Incident No. 2013/05/1293)



(a) General View of the Incident on Wall R22



(b) View on the Distressed Zone and Backyard of Wall R22

Figure 4.2 Views of the 22 May 2013 Incident on Wall R22 within a Construction Site above Shun On Road, Sau Mau Ping (Incident No. 2013/06/1367)

4.3 The 3 August 2013 Landslide on Slope No. 6NE-D/C2 at Lam Kam Road, Yuen Long (Incident No. 2013/08/1424)

At about 6:14 a.m. on 3 August 2013, a major landslide occurred on a soil/rock cut slope (Feature No. 6NE-D/C2) at Lam Kam Road, Yuen Long (Figure 4.3). The landslide scar measured about 11 m wide, 14 m high and 2 m deep, with an estimated failure volume of about 120 m^3. It was a structural controlled failure with two persistent failure planes exposed on the scar which formed the sliding planes of the wedge of failed weathered rock materials. The landslide debris completely blocked Lam Kam Road at the slope toe and the failure resulted in temporary closure of a section of Lam Kam Road for a day. No injury or casualty was reported. The incident occurred in the early hours of the day. It was another 'near-miss' case which could have resulted in much more serious consequence.

Figure 4.3 General View of the 3 August 2013 Landslide on Slope No. 6NE-D/C2 at Lam Kam Road, Yuen Long (Incident No. 2013/08/1424)

4.4 The 14 June 2013 Rockfall on Slope No. 11NE-A/C351 at Shatin Pass Road, Tsz Wan Shan (Incident No. 2013/06/1376)

At about 11:00 p.m. on 14 June 2013, a rockfall incident occurred on the bare rock portion of a soil/rock cut slope (Feature No. 11NE-A/C351) at Shatin Pass Road, Tsz Wan Shan (Figure 4.4). The failure scar measured about 5 m wide, 8 m high and up to 1 m deep, with an estimated failure volume of about 25 m^3. The debris comprised fallen rock fragments with size up to 1.5 m^3. Shatin Pass Road, approximately 2.5 m wide, at the slope

toe was completely blocked by the debris. The incident resulted in temporary closure of a section of Shatin Pass Road for a day in undertaking the emergency repair works. No injury or casualty was reported. It was a recurrent rockfall incident. A relatively small scale rockfall incident with a failure volume of 2 m^3 (Incident No. 2013/05/1347) occurred earlier on 30 May 2013 adjoining the June 2013 failure scar.

Figure 4.4 General View of the 14 June 2013 Rockfall on Slope No. 11NE-A/C351 at Shatin Pass Road, Tsz Wan Shan (Incident No. 2013/06/1376)

5 Conclusion

Rainfall recorded at the HKO's Principal Raingauge at Tsim Sha Tsui amounted to 2,847.3 mm in 2013, a surplus of about 19 percent comparing to the mean rainfall of 2,398.5 mm between 1981 and 2010. In 2013, one Landslip Warning and one Black Rainstorm Warning were issued on 22 May 2013. Two Red Rainstorm Warnings were issued on 22 May and 24 June 2013, and 23 Amber Rainstorm Warnings were issued between 19 March and 4 September 2013. Of the 241 genuine landslides, nine were major failures, 146 were minor failures and 86 were very minor failures with negligible consequences.

There were 28 landslides in 2013 with notable consequences. Of these landslides, one led to permanent evacuation of one squatter dwelling and two led to temporary evacuation of one squatter dwelling and two village houses on licensed land respectively. The remaining 25 landslides resulted in temporary closure of roads (two of which also affected a construction site at Sau Mau Ping). Other landslides in 2013 affected open areas, footpaths or minor access roads and catchwaters, without any significant direct or indirect consequence. No injury or fatality was reported as a result of the 2013 landslides.

6 References

FSWJV (2013a). *Report on the 22 May 2013 Landslide on a Fill Slope at a Construction Site above Lee On Road, Sau Mau Ping*. Prepared by Fugro Scott Wilson Joint Venture. Geotechnical Engineering Office, Hong Kong, 48 p.

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Appendix A

Some Selected Rainfall Parameters for the 16 Rainstorms in 2013 with Daily Rainfall Exceeding 100 mm

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Table A1 Some Selected Rainfall Parameters for the 16 Rainstorms in 2013 with Daily Rainfall Exceeding 100 mm (Sheet 1 of 3)

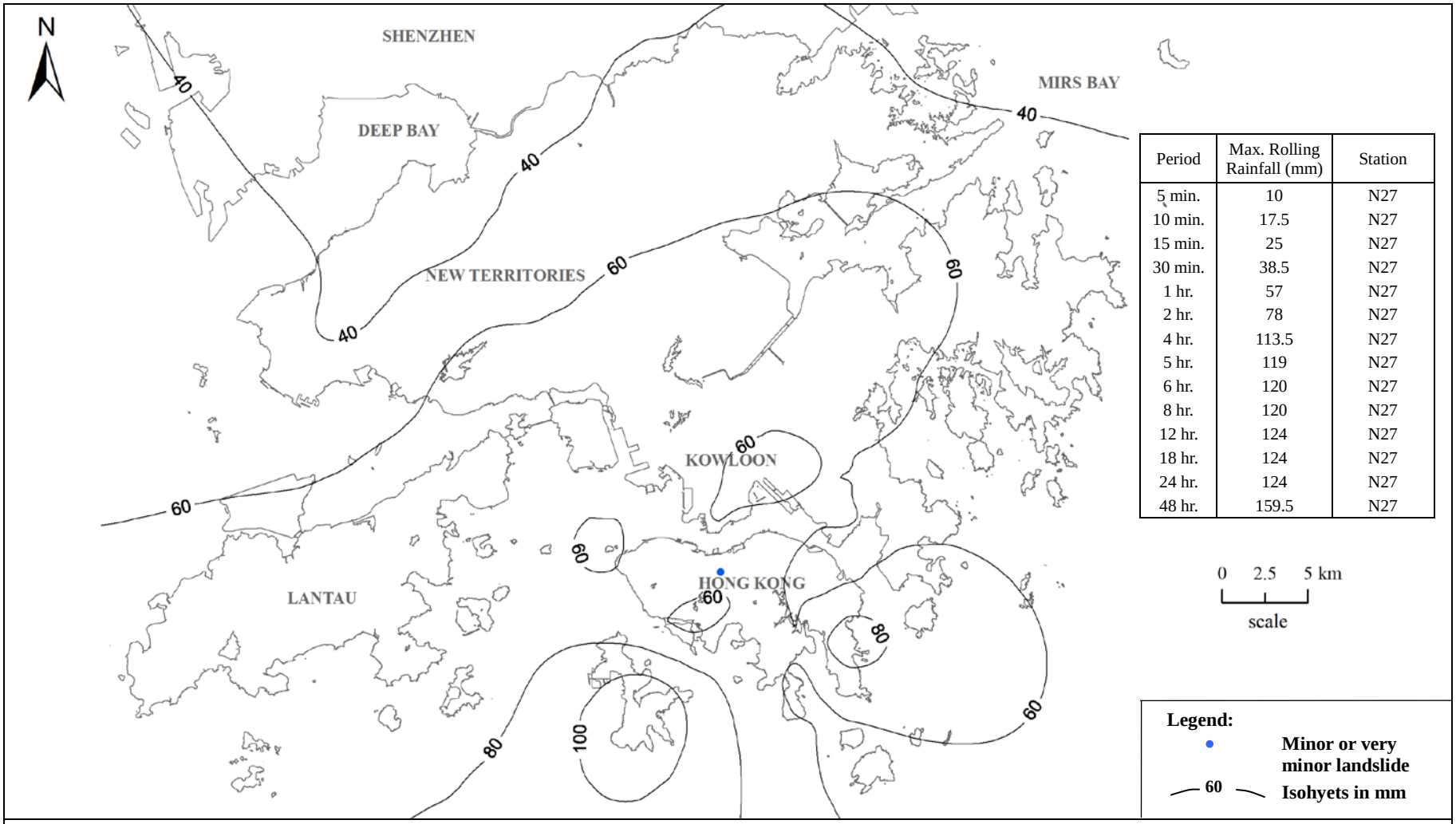
Rainstorm		5-min		10-min		15-min		30-min	
		Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station
1	29-31 March 2013	10	N27	17.5	N27	25	N27	38.5	N27
2	6 April 2013	15.5	K07	27.5	K07	32.5	N45	44	N45
3	3-4 May 2013	8.5	N10, N27, N31	16	N27	20	K05	31	K05
4	22-23 May 2013	22	N20	38.5	N20	51.5	H14, N20, N30	89.5	N30
5	25-26 May 2013	11	H04	15.5	H12	19	N34	20.5	N34
6	11-12 June 2013	17	H10	31.5	H10	45.5	H10	75	H10
7	15-16 June 2013	8.5	N08	13.5	N44	16.5	N44	24.5	N48, N50
8	24-25 June 2013	14.5	N23	24.5	N24	31.5	N21	56	N42
9	15 July 2013	10	H20, N19	15	N53	22.5	N24	36	N24
10	24-26 July 2013	13	N27	22.5	N27	27	N10	44	H02
11	2-3 August 2013	15.5	N19	24	N40	31	N40	47.5	N11
12	14-15 August 2013	13	N09	20	N52	23	N52	28	N52
13	17-18 August 2013	9.5	H18	13.5	H18	17.5	H18	17.5	H18
14	23-24 August 2013	9.5	N41	16.5	N36	23.5	N36	30	N52
15	30 August- 6 September 2013	17	N45	31.5	N35	42	N35	69.5	N22
16	23-24 September 2013	9	N26, N37	16	N26	22	N26	36.5	N26

Table A1 Some Selected Rainfall Parameters for the 16 Rainstorms in 2013 with Daily Rainfall Exceeding 100 mm (Sheet 2 of 3)

Rainstorm		1-hr		2-hr		4-hr		5-hr		6-hr	
		Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station
1	29-31 March 2013	57	N27	78	N27	113.5	N27	119	N27	120	N27
2	6 April 2013	47.5	N45	49	N45	49	N45	49	N45	49	N45
3	3-4 May 2013	48.5	N31	62	N31	71	N07, N31	77.5	N07	93	N36
4	22-23 May 2013	153.5	N16	184	N16	207.5	N30	214	N16	231	K03
5	25-26 May 2013	40	N34	42.5	N34	45.5	N34	46.5	N34	47	N34
6	11-12 June 2013	96	H10	99	H10	112.5	N17	112.5	N17	112.5	N17
7	15-16 June 2013	38.5	N48	46	N48	53.5	N50	66	N50	74	N50
8	24-25 June 2013	95.5	N01	134	N04	174.5	N01	192.5	N42	204	N01, N42
9	15 July 2013	38	N53	60.5	N51	80.5	H09	87.5	H06	87.5	H06
10	24-26 July 2013	47	H02	54	H02	83	N22	84.5	N22	84.5	N22
11	2-3 August 2013	50	N11	50	N11	62	N14	63	N11	89.5	N14
12	14-15 August 2013	31	N52	36	N36	47.5	N36	58	N36	66.5	N36
13	17-18 August 2013	17.5	H18	20.5	N47	23	N47	23	N47	23	N47
14	23-24 August 2013	51	N52	65.5	N52	77	N52	78	N52	84.5	N52
15	30 August- 6 September 2013	111	N22	124.5	N35	185	H09	207	H09	241	H09
16	23-24 September 2013	52	N26	74	N21	117.5	N40	138	N40	151	N40

Table A1 Some Selected Rainfall Parameters for the 16 Rainstorms in 2013 with Daily Rainfall Exceeding 100 mm (Sheet 3 of 3)

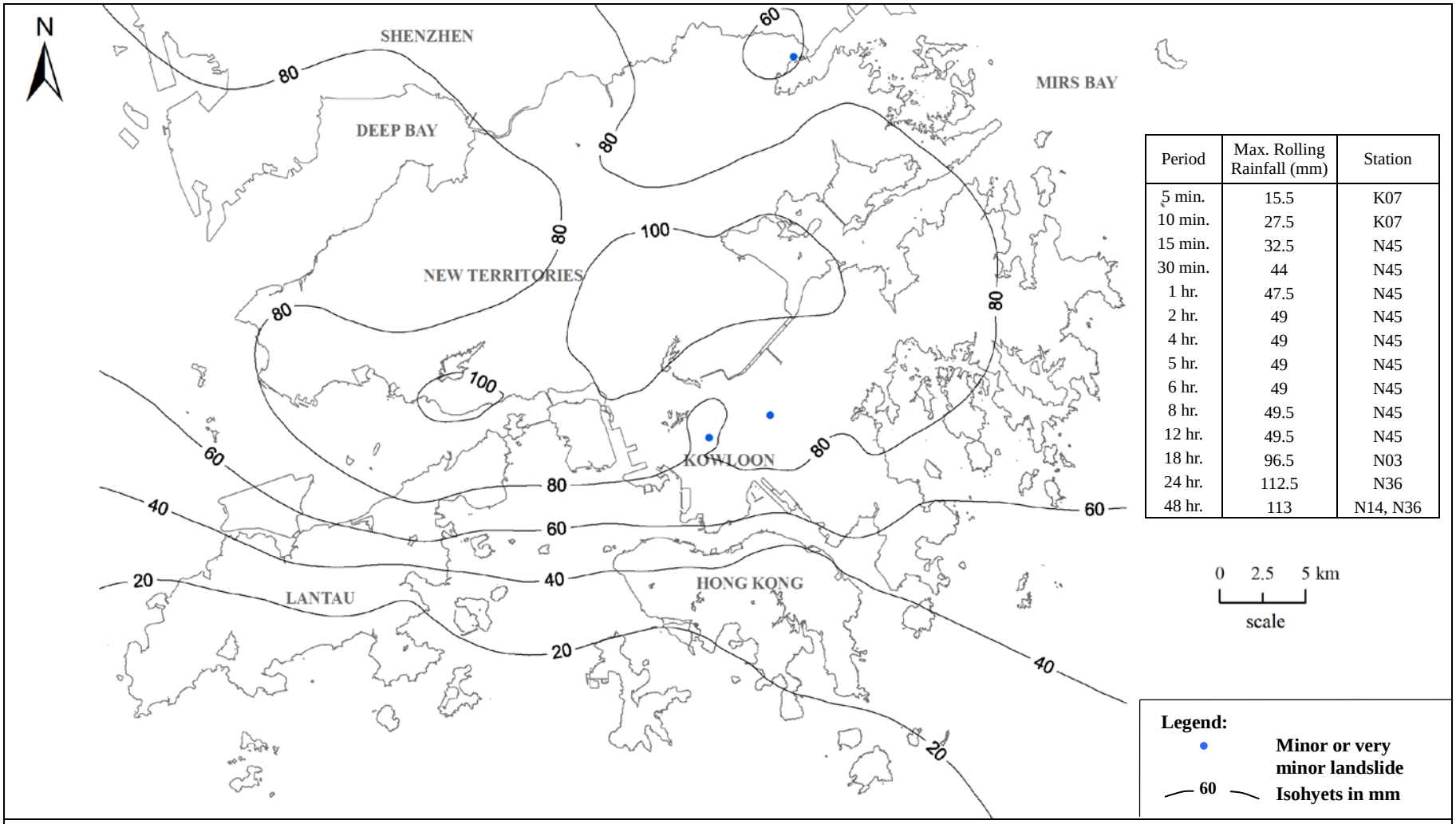
Rainstorm		8-hr		12-hr		18-hr		24-hr		48-hr	
		Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station	Max. rainfall (mm)	Raingauge Station
1	29-31 March 2013	120	N27	124	N27	124	N27	124	N27	159.5	N27
2	6 April 2013	49.5	N45	49.5	N45	96.5	N03	112.5	N36	113	N14, N36
3	3-4 May 2013	120.5	N31	128	N31, N36	129.5	N36	129.5	N36	131.5	N36
4	22-23 May 2013	245.5	K03	262.5	K03	267.5	K03	274.5	K03	328.5	K03
5	25-26 May 2013	47	N34	47	N34	141.5	N19	181.5	N19, N21	190.5	N21
6	11-12 June 2013	123.5	N17	154.5	H16	182	H16	183	H16	202	H16
7	15-16 June 2013	84	N50	114.5	N50	116.5	N50	142.5	K07	183	N14
8	24-25 June 2013	212	N24	220.5	N24	220.5	N24	223	N01	265.5	N52
9	15 July 2013	87.5	H06	92	H06	121	H06	147	H06	147.5	H06
10	24-26 July 2013	87	N22	124.5	N22	131.5	N22	151	N22	236	N19
11	2-3 August 2013	91.5	N14	103.5	N14	127	N14	144	N37	158	N36
12	14-15 August 2013	76.5	N36	94.5	N36	119.5	N36	143	N36	189.5	N36
13	17-18 August 2013	24.5	N47	27	N47	63.5	N52	135.5	N36	150.5	N36
14	23-24 August 2013	94	N52	108	N52	109	N52	113.5	N52	169	N52
15	30 August - 6 September 2013	251.5	H09	252.5	H09	319	H09	323	H09	379.5	H09
16	23-24 September 2013	164.5	N40	197	N40	218	N40	225.5	N40	227.5	N40



Period	Max. Rolling Rainfall (mm)	Station
5 min.	10	N27
10 min.	17.5	N27
15 min.	25	N27
30 min.	38.5	N27
1 hr.	57	N27
2 hr.	78	N27
4 hr.	113.5	N27
5 hr.	119	N27
6 hr.	120	N27
8 hr.	120	N27
12 hr.	124	N27
18 hr.	124	N27
24 hr.	124	N27
48 hr.	159.5	N27

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) A genuine landslide reported to have occurred within the period between 29 March and 31 March 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

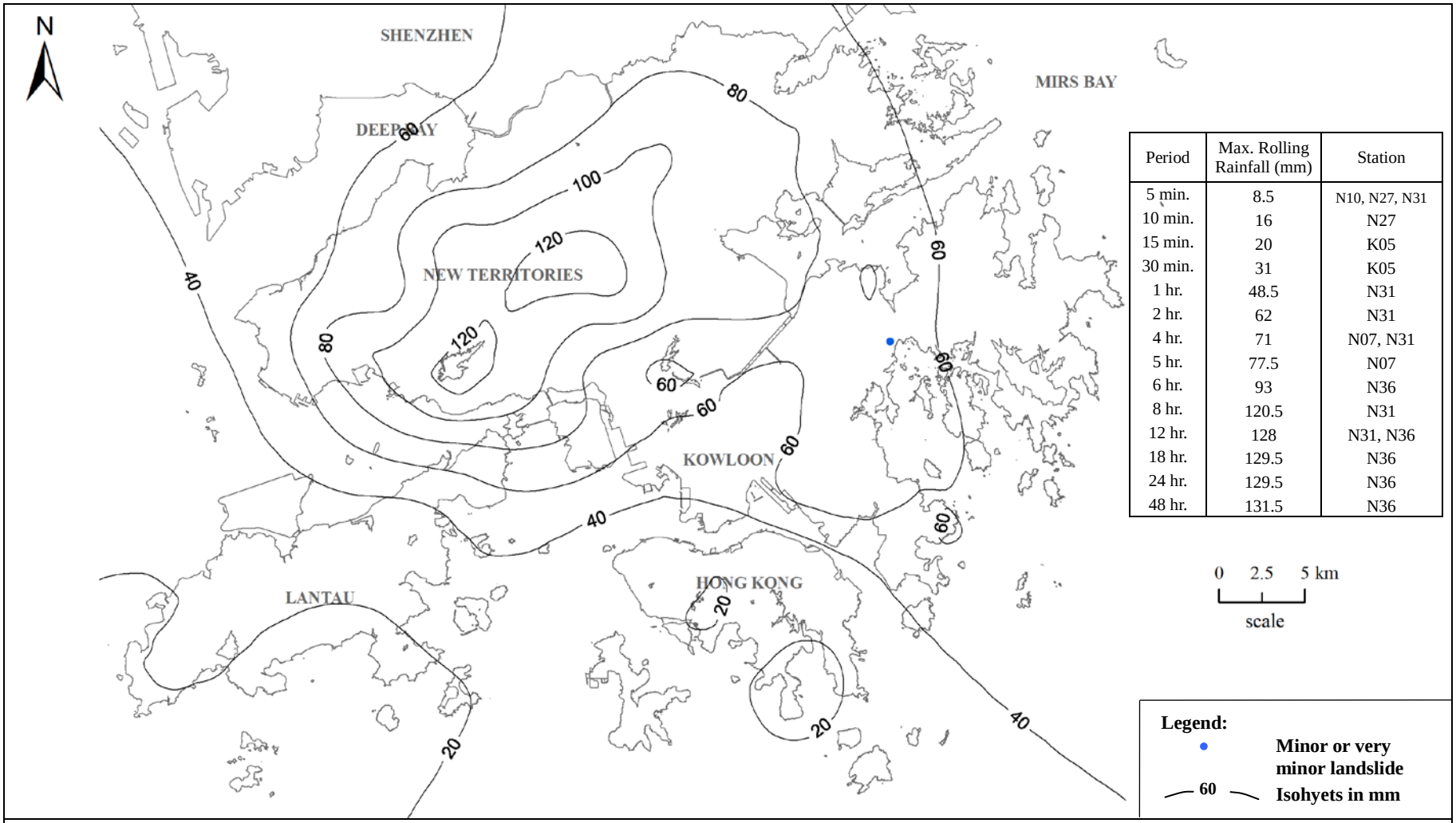
Figure A1 Maximum Rolling 24-hour Rainfall Distribution for the Period between 29 March (00:00) and 31 March 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	15.5	K07
10 min.	27.5	K07
15 min.	32.5	N45
30 min.	44	N45
1 hr.	47.5	N45
2 hr.	49	N45
4 hr.	49	N45
5 hr.	49	N45
6 hr.	49	N45
8 hr.	49.5	N45
12 hr.	49.5	N45
18 hr.	96.5	N03
24 hr.	112.5	N36
48 hr.	113	N14, N36

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Three genuine landslides reported to have occurred on 6 April 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

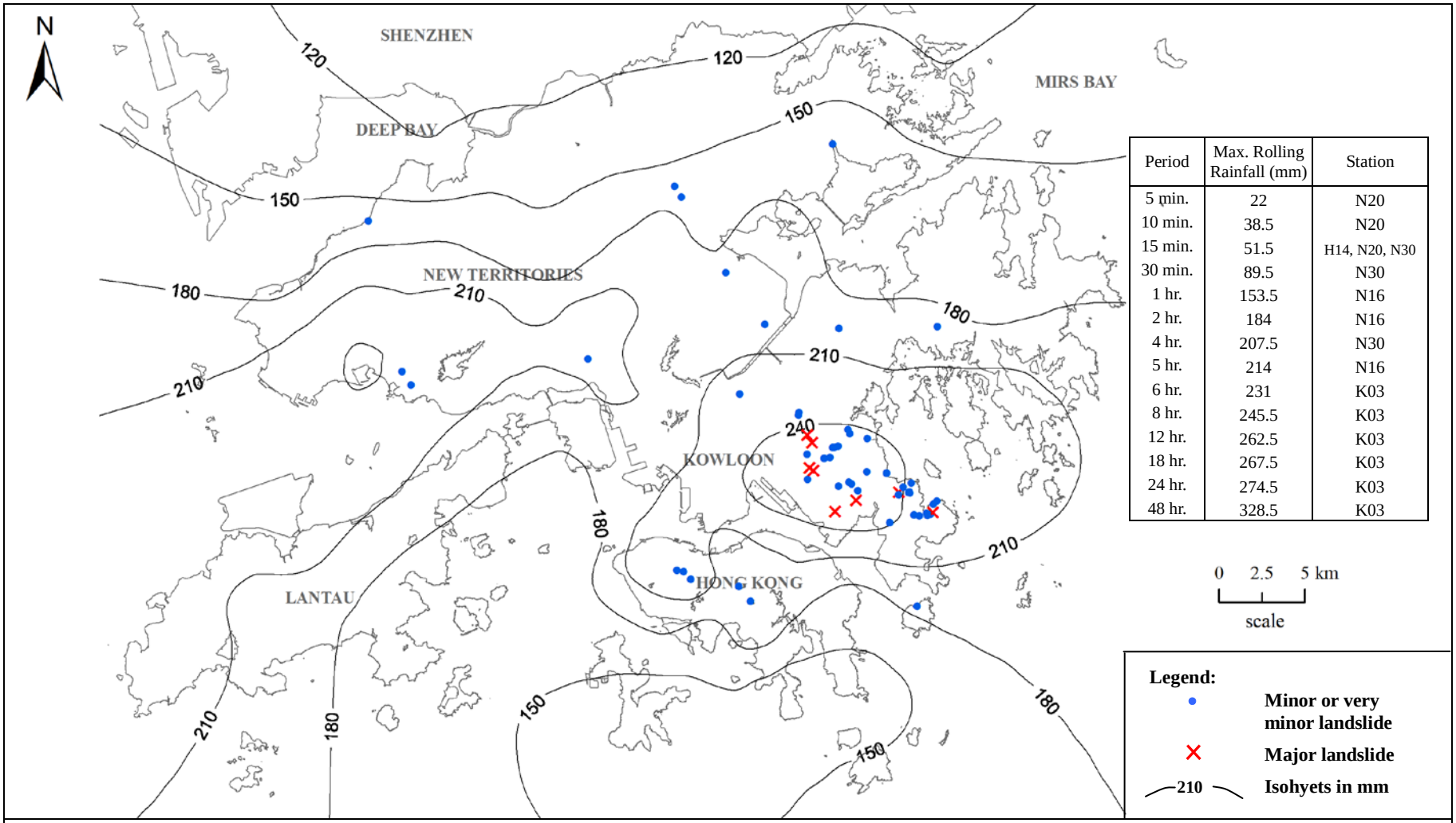
Figure A2 Maximum Rolling 24-hour Rainfall Distribution for the Period between 6 April (00:00) and 6 April 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	8.5	N10, N27, N31
10 min.	16	N27
15 min.	20	K05
30 min.	31	K05
1 hr.	48.5	N31
2 hr.	62	N31
4 hr.	71	N07, N31
5 hr.	77.5	N07
6 hr.	93	N36
8 hr.	120.5	N31
12 hr.	128	N31, N36
18 hr.	129.5	N36
24 hr.	129.5	N36
48 hr.	131.5	N36

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) A genuine landslide reported to have occurred within the period between 3 May and 4 May 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

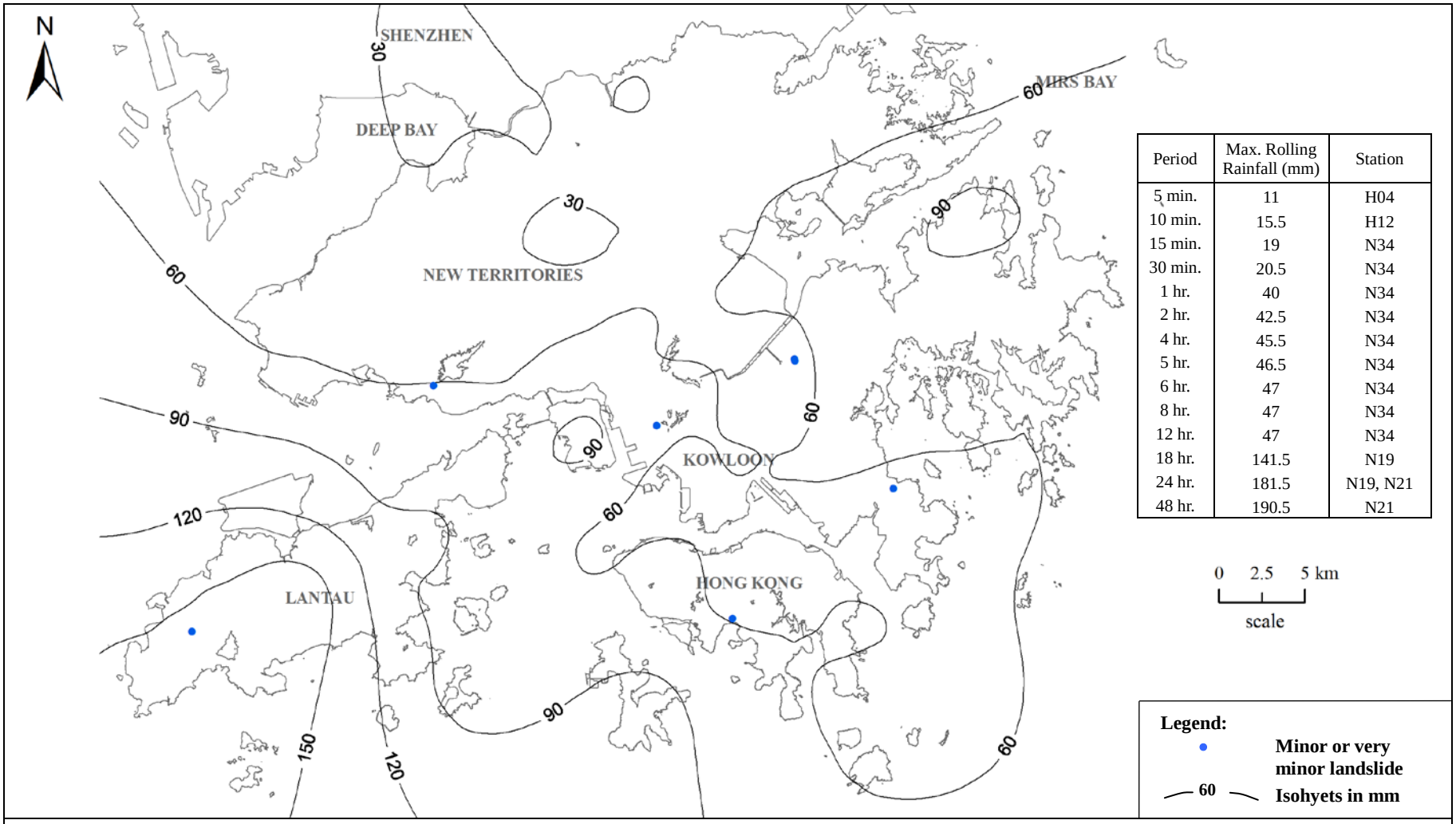
Figure A3 Maximum Rolling 24-hour Rainfall Distribution for the Period between 3 May (00:00) and 4 May 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	22	N20
10 min.	38.5	N20
15 min.	51.5	H14, N20, N30
30 min.	89.5	N30
1 hr.	153.5	N16
2 hr.	184	N16
4 hr.	207.5	N30
5 hr.	214	N16
6 hr.	231	K03
8 hr.	245.5	K03
12 hr.	262.5	K03
18 hr.	267.5	K03
24 hr.	274.5	K03
48 hr.	328.5	K03

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Fifty-eight genuine landslides reported to have occurred within the period between 22 May and 23 May 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

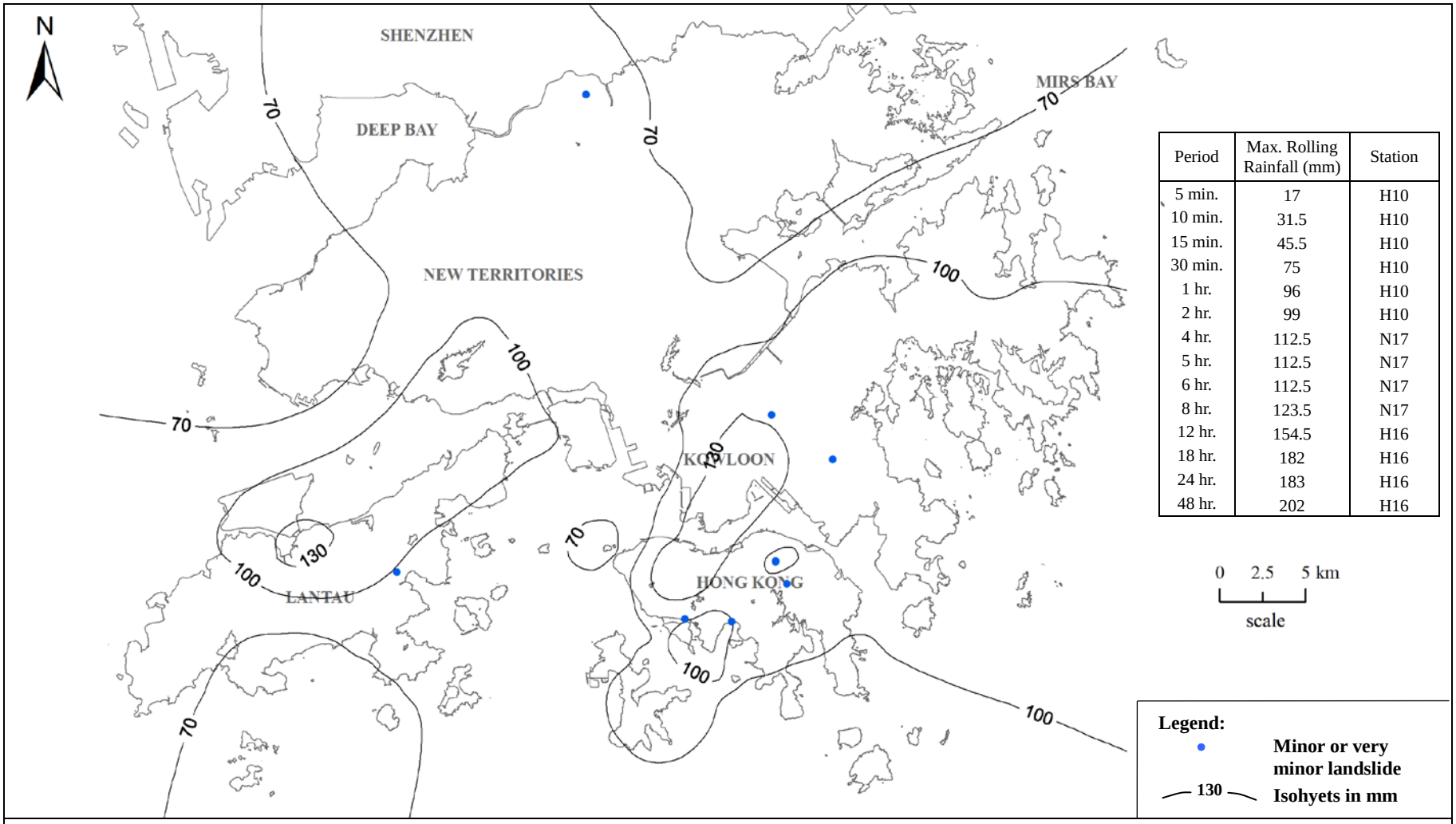
Figure A4 Maximum Rolling 24-hour Rainfall Distribution for the Period between 22 May (00:00) and 23 May 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	11	H04
10 min.	15.5	H12
15 min.	19	N34
30 min.	20.5	N34
1 hr.	40	N34
2 hr.	42.5	N34
4 hr.	45.5	N34
5 hr.	46.5	N34
6 hr.	47	N34
8 hr.	47	N34
12 hr.	47	N34
18 hr.	141.5	N19
24 hr.	181.5	N19, N21
48 hr.	190.5	N21

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Seven genuine landslides reported to have occurred within the period between 25 May and 26 May 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

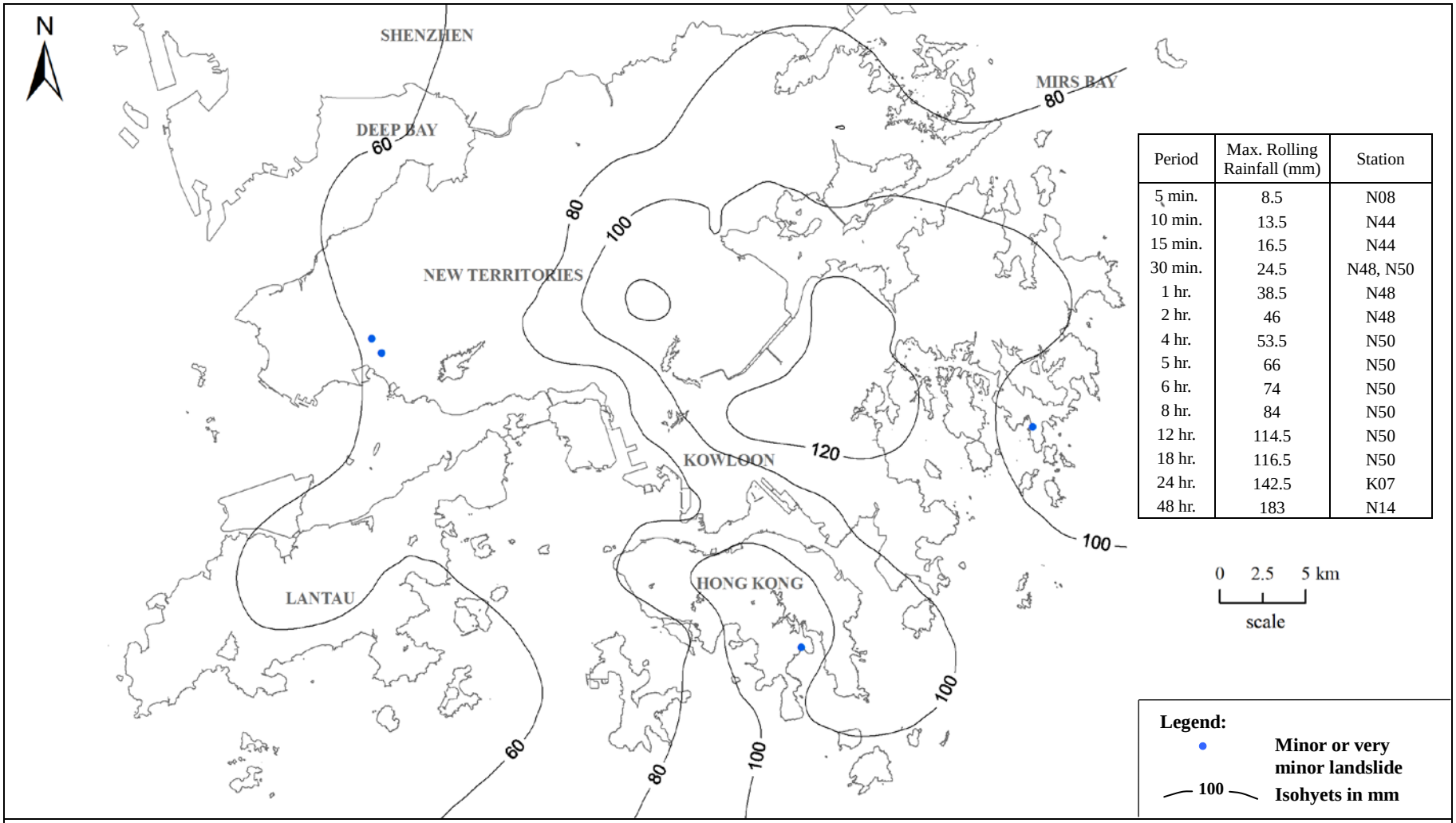
Figure A5 Maximum Rolling 24-hour Rainfall Distribution for the Period between 25 May (00:00) and 26 May 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	17	H10
10 min.	31.5	H10
15 min.	45.5	H10
30 min.	75	H10
1 hr.	96	H10
2 hr.	99	H10
4 hr.	112.5	N17
5 hr.	112.5	N17
6 hr.	112.5	N17
8 hr.	123.5	N17
12 hr.	154.5	H16
18 hr.	182	H16
24 hr.	183	H16
48 hr.	202	H16

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Nine genuine landslides reported to have occurred within the period between 11 June and 12 June 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

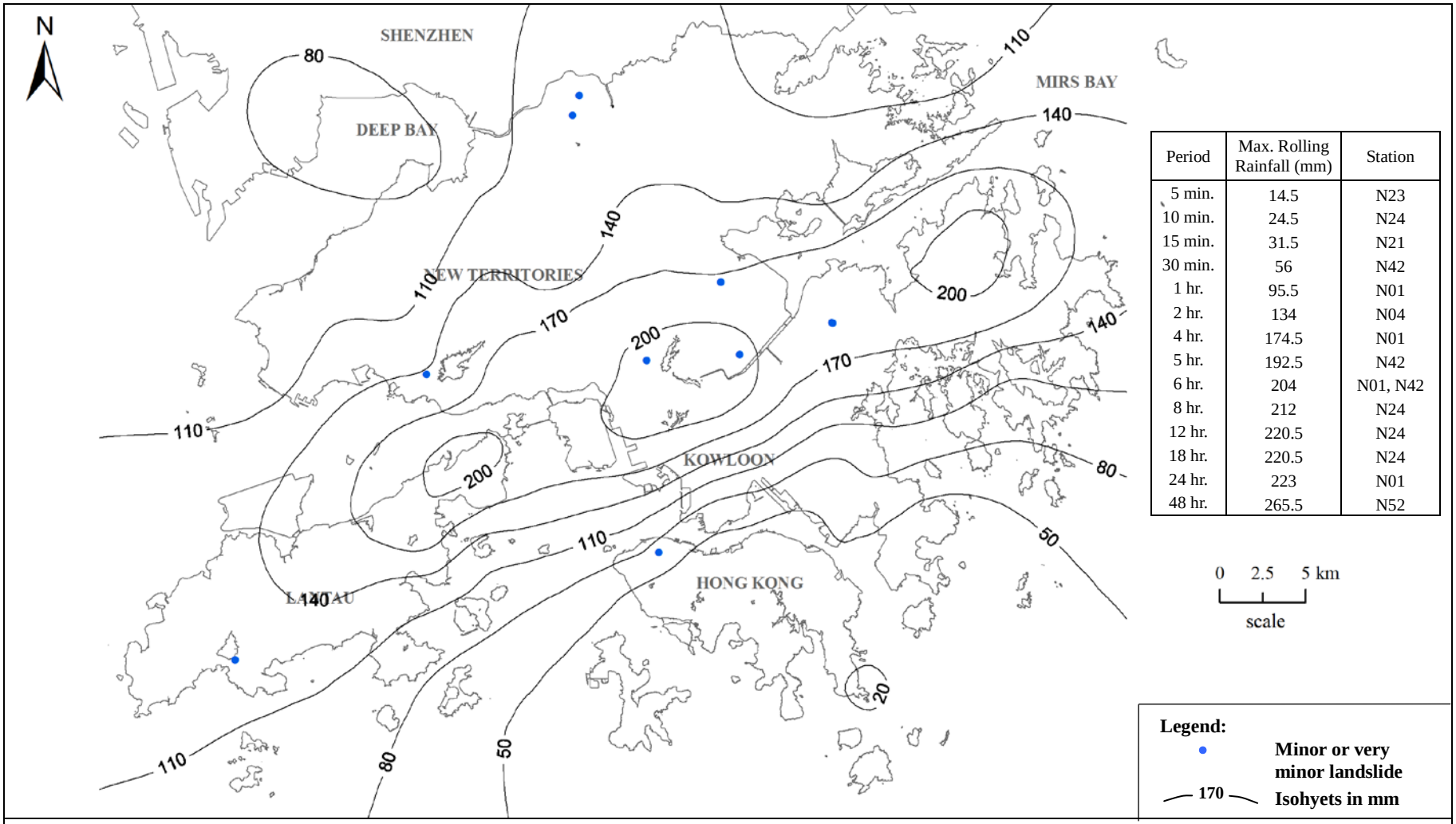
Figure A6 Maximum Rolling 24-hour Rainfall Distribution for the Period between 11 June (00:00) and 12 June 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	8.5	N08
10 min.	13.5	N44
15 min.	16.5	N44
30 min.	24.5	N48, N50
1 hr.	38.5	N48
2 hr.	46	N48
4 hr.	53.5	N50
5 hr.	66	N50
6 hr.	74	N50
8 hr.	84	N50
12 hr.	114.5	N50
18 hr.	116.5	N50
24 hr.	142.5	K07
48 hr.	183	N14

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Four genuine landslides reported to have occurred within the period between 15 June and 16 June 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

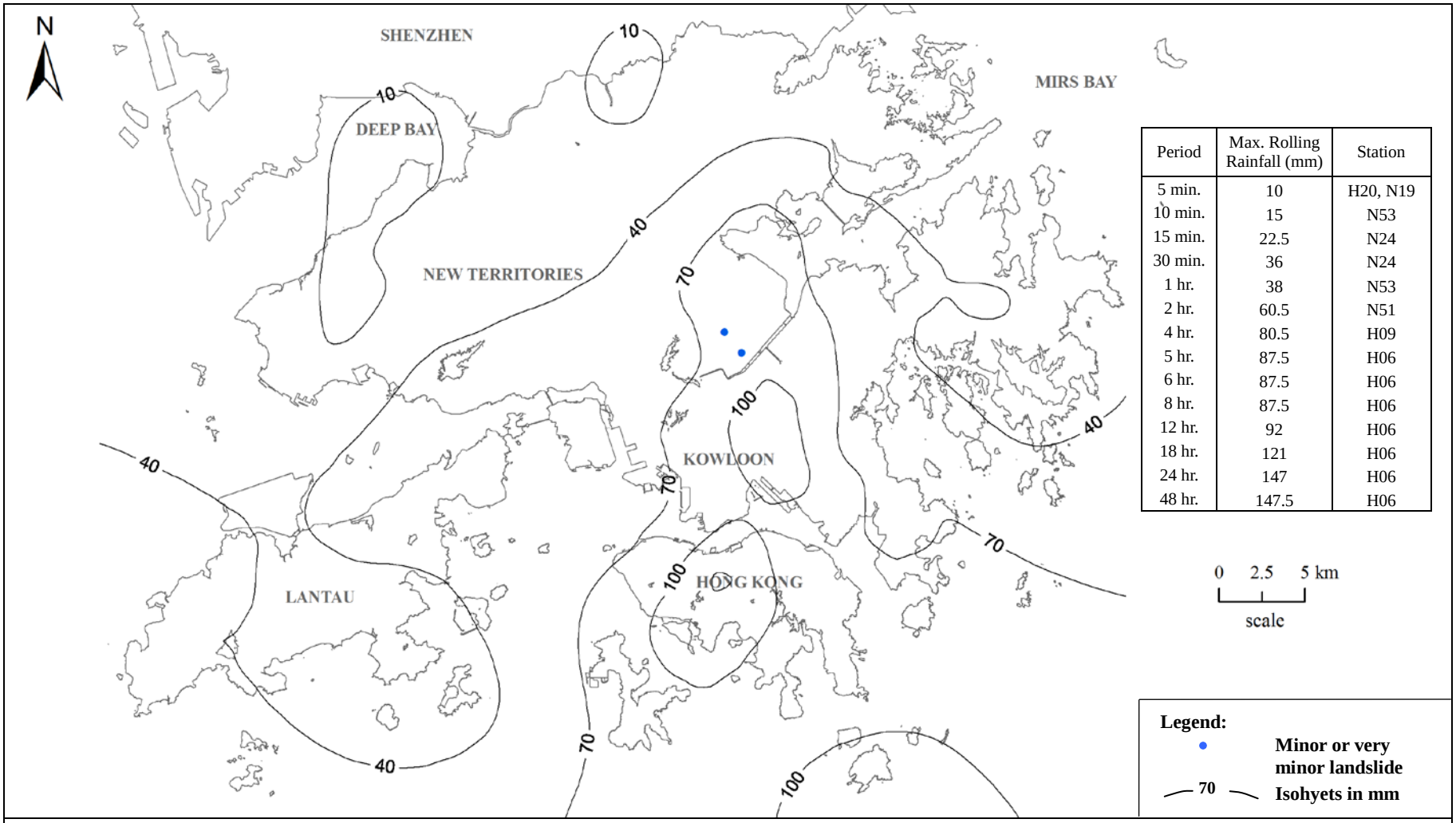
Figure A7 Maximum Rolling 24-hour Rainfall Distribution for the Period between 15 June (00:00) and 16 June 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	14.5	N23
10 min.	24.5	N24
15 min.	31.5	N21
30 min.	56	N42
1 hr.	95.5	N01
2 hr.	134	N04
4 hr.	174.5	N01
5 hr.	192.5	N42
6 hr.	204	N01, N42
8 hr.	212	N24
12 hr.	220.5	N24
18 hr.	220.5	N24
24 hr.	223	N01
48 hr.	265.5	N52

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Ten genuine landslides reported to have occurred within the period between 24 June and 25 June 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

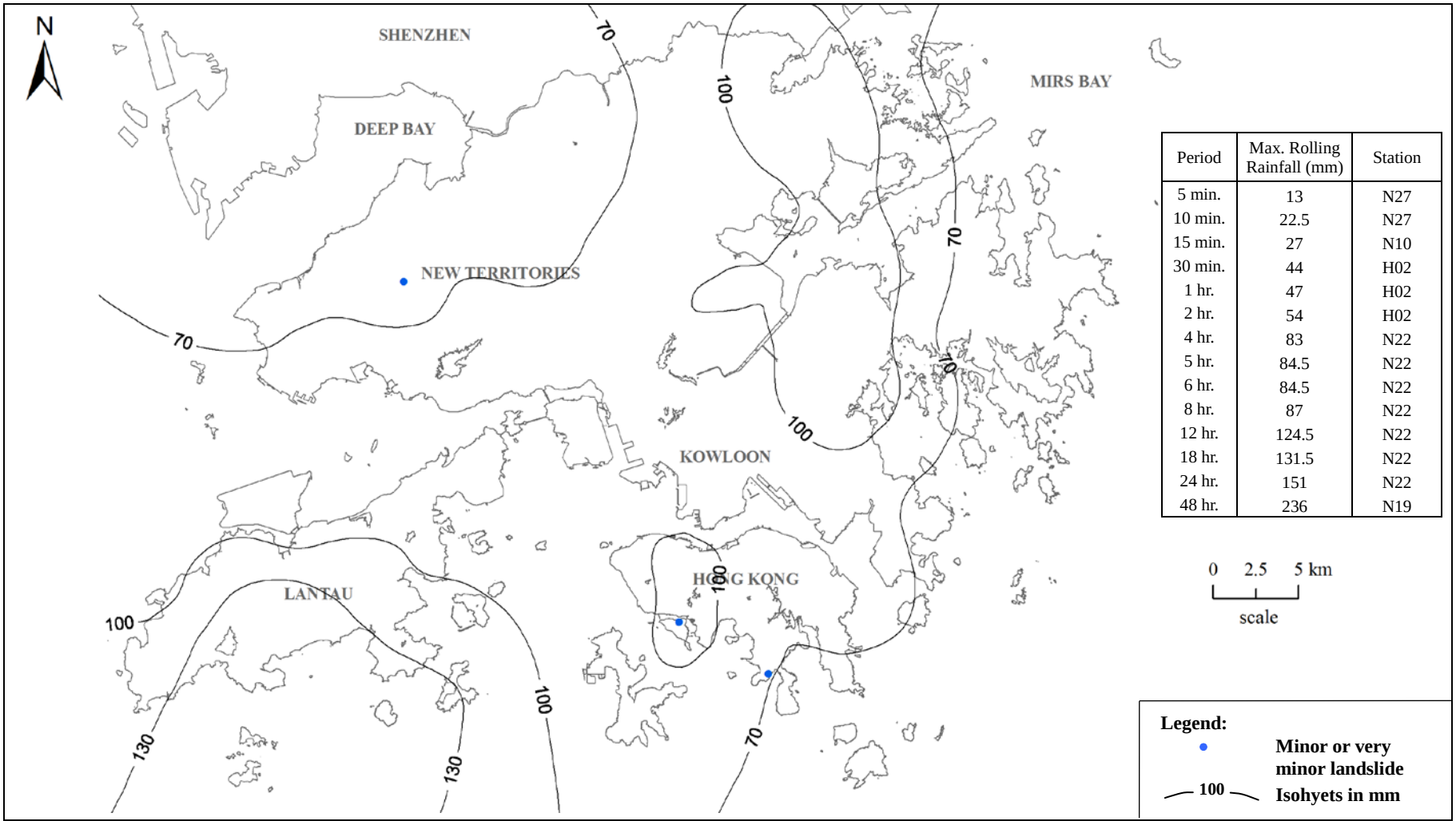
Figure A8 Maximum Rolling 24-hour Rainfall Distribution for the Period between 24 June (00:00) and 25 June 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	10	H20, N19
10 min.	15	N53
15 min.	22.5	N24
30 min.	36	N24
1 hr.	38	N53
2 hr.	60.5	N51
4 hr.	80.5	H09
5 hr.	87.5	H06
6 hr.	87.5	H06
8 hr.	87.5	H06
12 hr.	92	H06
18 hr.	121	H06
24 hr.	147	H06
48 hr.	147.5	H06

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Two genuine landslides reported to have occurred on 15 July 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

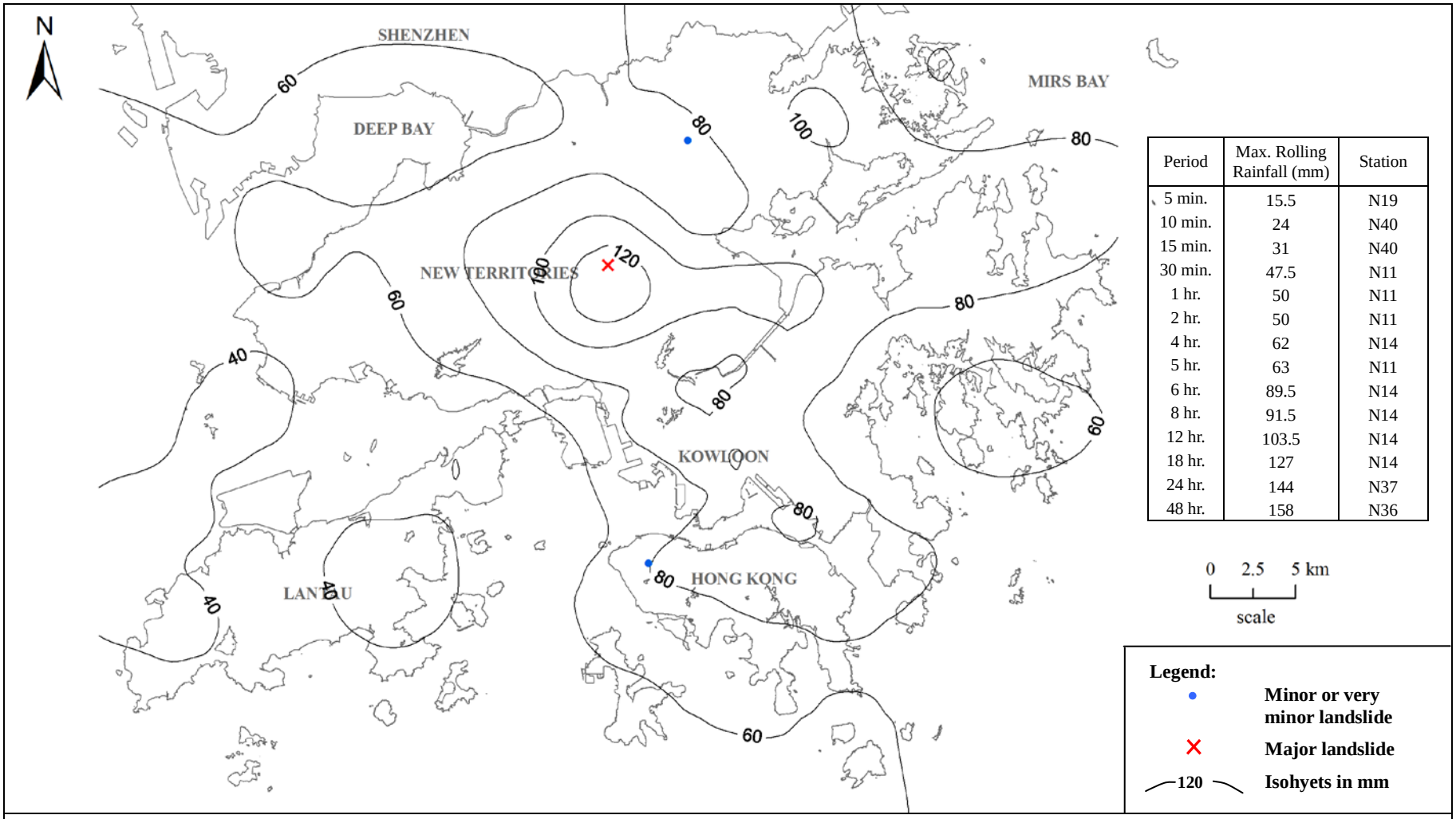
Figure A9 Maximum Rolling 24-hour Rainfall Distribution for the Period between 15 July (00:00) and 15 July 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	13	N27
10 min.	22.5	N27
15 min.	27	N10
30 min.	44	H02
1 hr.	47	H02
2 hr.	54	H02
4 hr.	83	N22
5 hr.	84.5	N22
6 hr.	84.5	N22
8 hr.	87	N22
12 hr.	124.5	N22
18 hr.	131.5	N22
24 hr.	151	N22
48 hr.	236	N19

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Three genuine landslides reported to have occurred within the period between 24 July and 26 July 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

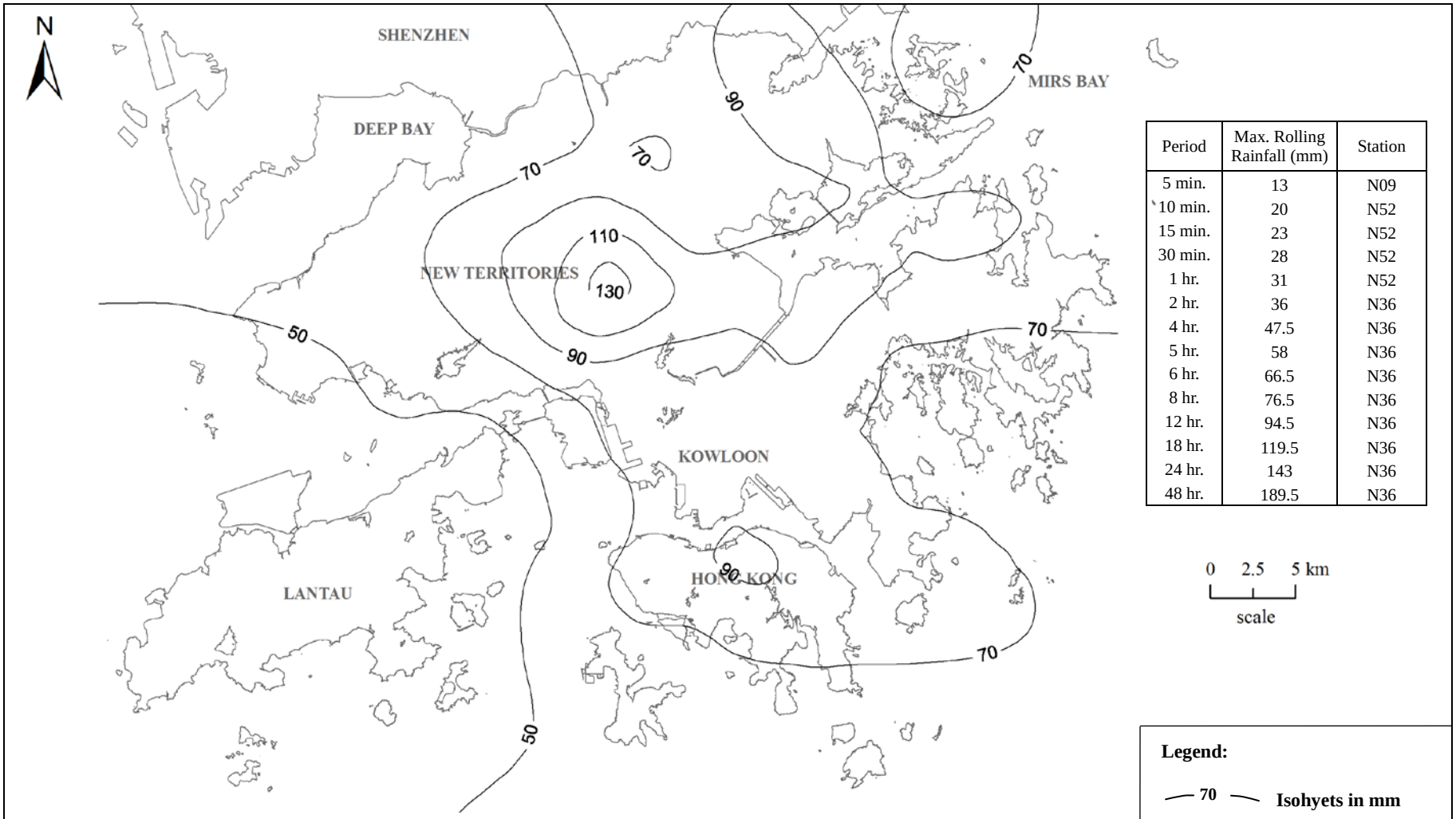
Figure A10 Maximum Rolling 24-hour Rainfall Distribution for the Period between 24 July (00:00) and 26 July 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	15.5	N19
10 min.	24	N40
15 min.	31	N40
30 min.	47.5	N11
1 hr.	50	N11
2 hr.	50	N11
4 hr.	62	N14
5 hr.	63	N11
6 hr.	89.5	N14
8 hr.	91.5	N14
12 hr.	103.5	N14
18 hr.	127	N14
24 hr.	144	N37
48 hr.	158	N36

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Three genuine landslides reported to have occurred within the period between 2 August and 3 August 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

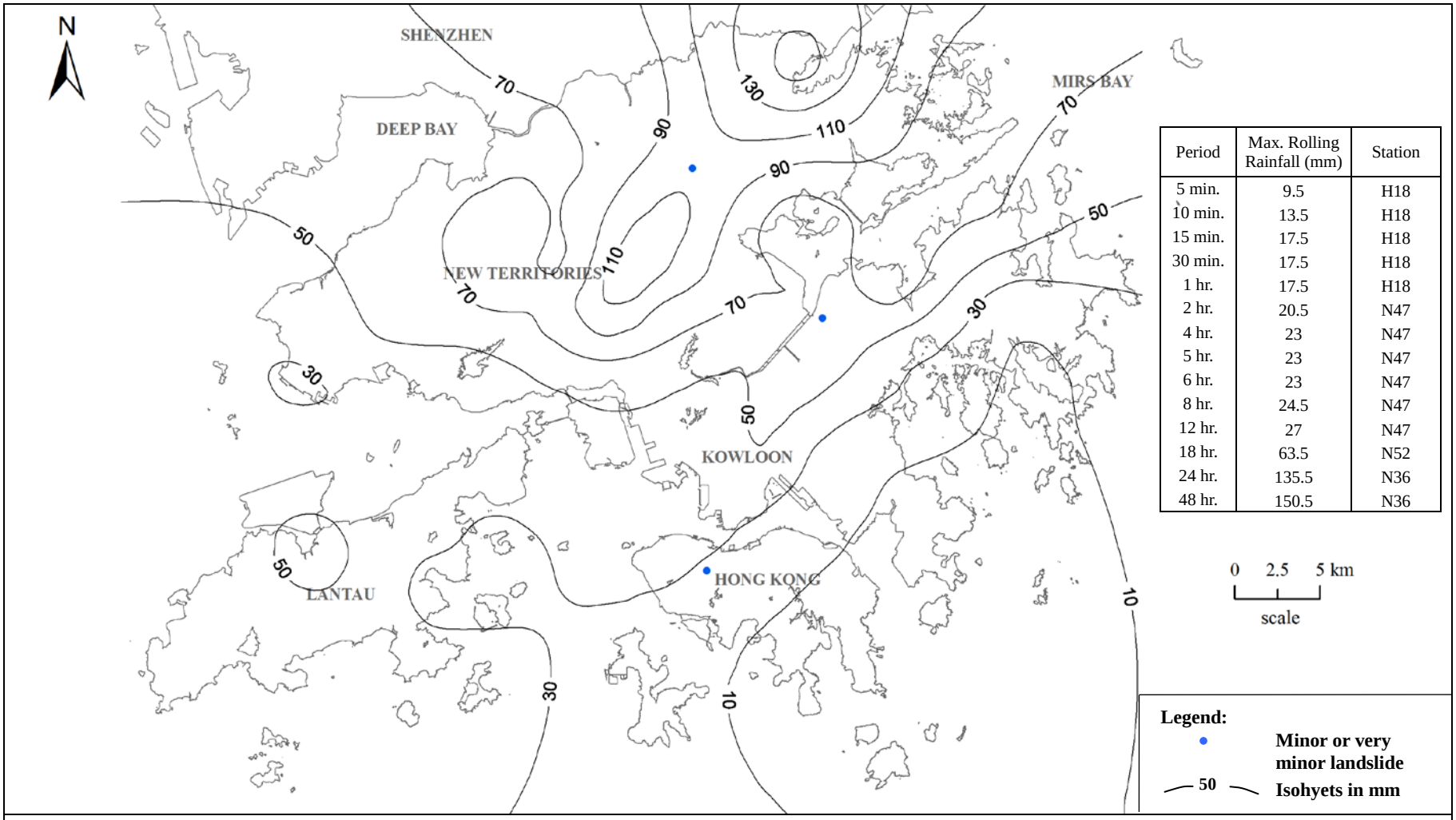
Figure A11 Maximum Rolling 24-hour Rainfall Distribution for the Period between 2 August (00:00) and 3 August 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	13	N09
10 min.	20	N52
15 min.	23	N52
30 min.	28	N52
1 hr.	31	N52
2 hr.	36	N36
4 hr.	47.5	N36
5 hr.	58	N36
6 hr.	66.5	N36
8 hr.	76.5	N36
12 hr.	94.5	N36
18 hr.	119.5	N36
24 hr.	143	N36
48 hr.	189.5	N36

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) No genuine landslide reported to have occurred within the period between 14 August and 15 August 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

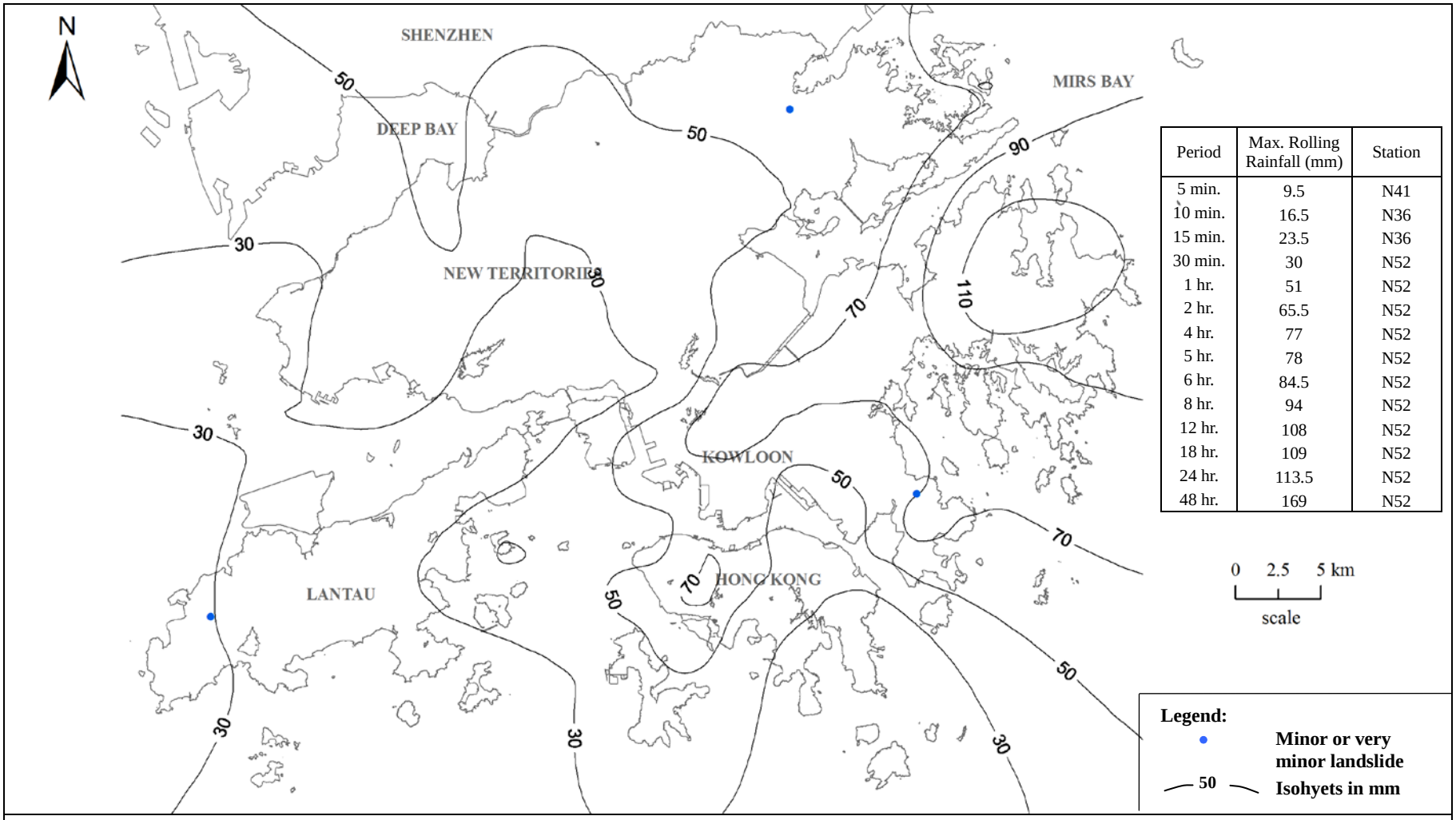
Figure A12 Maximum Rolling 24-hour Rainfall Distribution for the Period between 14 August (00:00) and 15 August 2013 (24:00)



Period	Max. Rolling Rainfall (mm)	Station
5 min.	9.5	H18
10 min.	13.5	H18
15 min.	17.5	H18
30 min.	17.5	H18
1 hr.	17.5	H18
2 hr.	20.5	N47
4 hr.	23	N47
5 hr.	23	N47
6 hr.	23	N47
8 hr.	24.5	N47
12 hr.	27	N47
18 hr.	63.5	N52
24 hr.	135.5	N36
48 hr.	150.5	N36

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Three genuine landslides reported to have occurred within the period between 17 August and 18 August 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

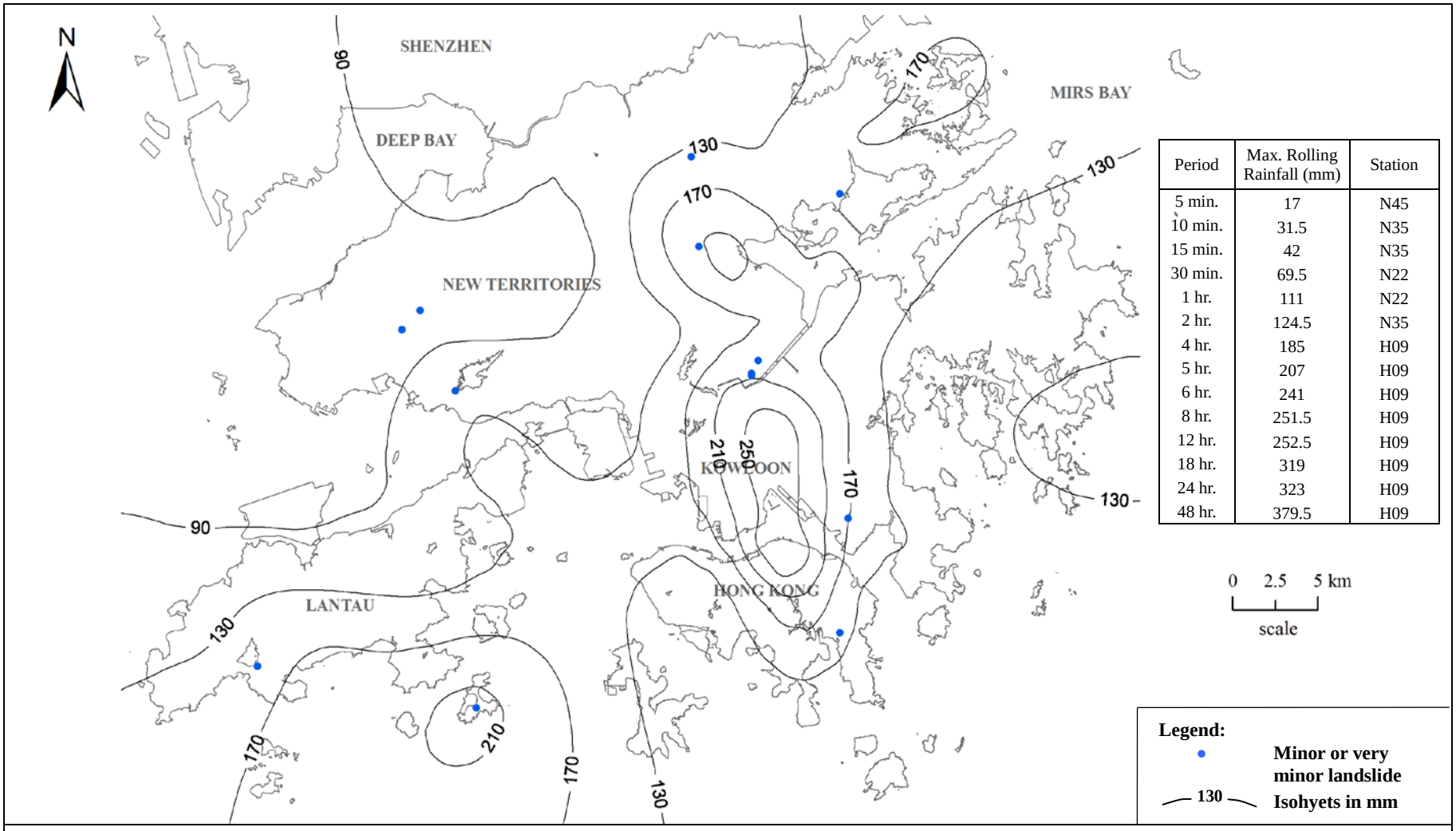
Figure A13 Maximum Rolling 24-hour Rainfall Distribution for the Period between 17 August (00:00) and 18 August 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	9.5	N41
10 min.	16.5	N36
15 min.	23.5	N36
30 min.	30	N52
1 hr.	51	N52
2 hr.	65.5	N52
4 hr.	77	N52
5 hr.	78	N52
6 hr.	84.5	N52
8 hr.	94	N52
12 hr.	108	N52
18 hr.	109	N52
24 hr.	113.5	N52
48 hr.	169	N52

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Three genuine landslides reported to have occurred within the period between 23 August and 24 August 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

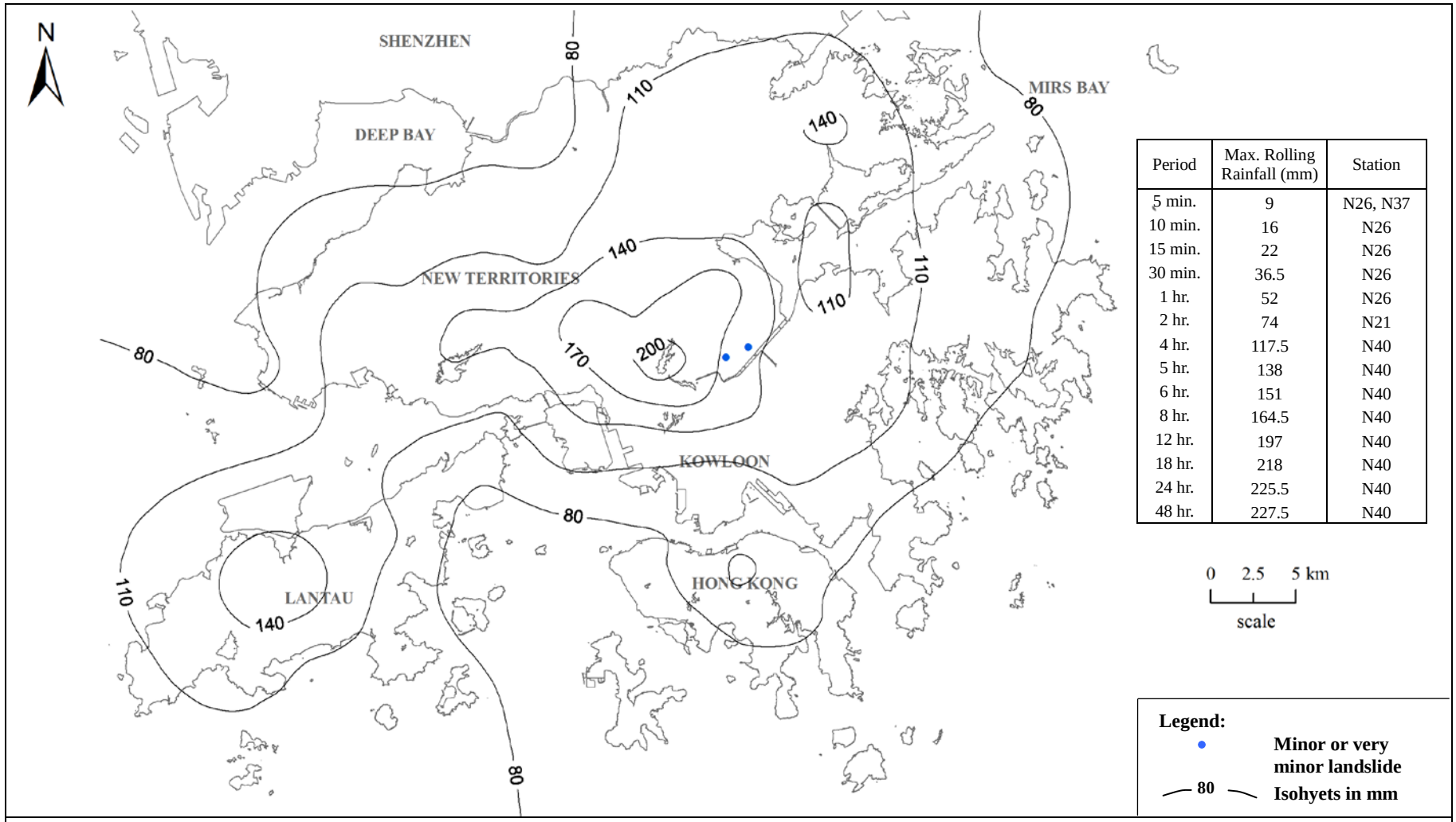
Figure A14 Maximum Rolling 24-hour Rainfall Distribution for the Period between 23 August (00:00) and 24 August 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	17	N45
10 min.	31.5	N35
15 min.	42	N35
30 min.	69.5	N22
1 hr.	111	N22
2 hr.	124.5	N35
4 hr.	185	H09
5 hr.	207	H09
6 hr.	241	H09
8 hr.	251.5	H09
12 hr.	252.5	H09
18 hr.	319	H09
24 hr.	323	H09
48 hr.	379.5	H09

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Thirteen genuine landslides reported to have occurred within the period between 30 August and 6 September 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

Figure A15 Maximum Rolling 24-hour Rainfall Distribution for the Period between 30 August (00:00) and 6 September 2013 (24:00) and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	9	N26, N37
10 min.	16	N26
15 min.	22	N26
30 min.	36.5	N26
1 hr.	52	N26
2 hr.	74	N21
4 hr.	117.5	N40
5 hr.	138	N40
6 hr.	151	N40
8 hr.	164.5	N40
12 hr.	197	N40
18 hr.	218	N40
24 hr.	225.5	N40
48 hr.	227.5	N40

Notes:
(1) Isohyets are based on the GEO and HKO raingauges. The maximum rainfalls in the table are selected from the GEO Raingauges.
(2) Two genuine landslides reported to have occurred within the period between 23 September and 24 September 2013.
(3) Please refer to Figure 2.1 for locations of raingauge stations.

Figure A16 Maximum Rolling 24-hour Rainfall Distribution for the Period between 23 September (00:00) and 24 September 2013 (24:00) and Location of Landslide

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Appendix B

List of Landslide Incidents Reported to the Government

List of Tables

Table B1 List of Major Landslide Incidents (Sheet 1 of 2)

Incident No.	Location	Feature Registration No. (if any)	Failure			Facility Affected	Consequence
			Date (Time)	Feature Type	Scale (m^3)		
2013/05/1290	Behind Nos. 65-68 Hung Uk, Mang Kung Uk	12NW-C/C529	22/5 (09:41)	Soil cut	280	Village house	-
2013/05/1293	Lee On Road, opposite On Yat House of Shun On Estate (within the construction site of the Development at Anderson Road Project)	Fill slope B6 under construction (15 m high)	22/5 (04:00)	Fill	530	Construction site and road	All two lanes of Lee On Road and Shun On Road temporarily closed
2013/05/1294	Near Equestrian & Education Centre, Lung Ha Wan Road, Clear Water Bay	12NW-C/C349	22/5 (05:00)	Soil cut	95	Road	Lung Ha Wan Road (one lane road) temporarily closed
2013/05/1296	Near Lamp Post No. N2281, Po Lam Road South	11NE-D/FR454	22/5 (05:00)	Fill and retaining wall (Masonry)	50	Road	Po Lam Road South (one lane road) temporarily closed
2013/05/1300	Lamp Post No. CE3206, near Fei Ngo Shan Road	11NE-B/C894	22/5 (12:00)	Soil cut	50	Road	Fei Ngo Shan Road (one lane road) temporarily closed
2013/05/1301	Black Hill Wilson Trail Section 3 (above Kwong Tin Estate)	Natural hillside	22/5 (05:00)	Natural hillside	80	Open area	-
2013/05/1318	Fei Ngo Shan Road	11NE-B/C649	22/5	Soil cut	60	Road	Fei Ngo Shan Road (one lane road) temporarily closed

Table B1 List of Major Landslide Incidents (Sheet 2 of 2)

Incident No.	Location	Feature Registration No. (if any)	Failure			Facility Affected	Consequence
			Date (Time)	Feature Type	Scale (m^3)		
2013/06/1367	Shun On Road, opposite Tin Wan House of Shun Tin Estate (within the construction site of the Development at Anderson Road Project)	Reinforced fill wall R22 under construction (Up to about 30 m high at the time of failure)	22/5	Fill	1,300 (Soil loss) 5,500 (Distressed ground)	Construction site and road	All two lanes of Shun On Road temporarily closed
2013/08/1424	Near Kadoorie Farm, Lam Kam Road, Yuen Long	6NE-D/C2	3/8 (06:14)	Soil/rock cut	120	Road	All two lanes of Lam Kam Road temporarily closed

Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 1 of 5)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/04/1271	Adjacent to No. 8 Shiu Fai Terrace, Wan Chai	11SW-D/C398	31/3	HyD	30/3 (20:00)	Soil/rock cut	0.5	Access road	-
2013/05/1279	Mount Butler Road	11SE-C/C135	13/5	HyD	Unknown	Soil/rock cut	0.1 (Rockfall)	Road	-
2013/05/1284	Hillside above Feature No. 11SW-D/C702, Craigmin Road	Natural hillside	21/5	Public	Unknown	Natural hillside	13	Access road	Access road/ footpath (Craigmin Road) temporarily closed
2013/05/1291	Hillside above Chatham Path	Natural hillside	22/5	Police	22/5 (05:00)	Natural hillside	10	Road	One lane of May Road temporarily closed
2013/05/1292	No. 19 Severn Road (near Lamp Post No. 43121)	11SW-D/R639	22/5	Police	22/5	Retaining wall	10	Road	Severn Road (one lane road) temporarily closed
2013/05/1311	Nos. 4-12 Broom Road, Hong Kong	1.8 m high retaining wall	22/5	Police	22/5 (04:30)	Retaining wall	20	Open area	Retaining wall at Nos. 4-12 Broom Road broken and debris deposited at an open car park
2013/05/1312	Tregunter Path (near Lamp Post No. 18073)	11SW-C/C318	22/5	Public	22/5	Soil cut	1	Pedestrian pavement	-
2013/05/1315	Hillside above Lugard Road (near Lamp Post No. 14617)	Natural hillside	21/5	Public	21/5	Natural hillside	0.3 (Boulder fall)	Access road	A section of Lugard Road temporarily closed
2013/05/1320	Bowen Road (near junction with Wan Chai Gap Road)	11SW-D/C423	23/5	HyD	Unknown	Soil cut	1.5	Road	-

Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 2 of 5)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1324	Mount Butler Road	11SE-C/C555	24/5	BD	Unknown	Soil cut	0.1	Pedestrian pavement	-
2013/05/1350	Hillside above Guildford Road Rest Garden	Natural hillside	27/5	LCSD	20/5	Natural hillside	0.3 (Boulder fall)	Other	Some garden facilities damaged
2013/06/1368	Behind No. 92 Aberdeen Main Road	11SW-D/CR78	11/6	Public	11/6	Soil cut	0.6	Open area	-
2013/06/1370	Island Road, Southern District	15NW-B/C117	11/6	TD	11/6 (17:00)	Soil cut	1.5	Road	One lane of Island Road temporarily closed
2013/06/1378	Peel Rise, Aberdeen (near Aberdeen Chinese Permanent Cemetery)	4 m high cut slope	16/6	Police	Unknown	Soil cut	6	Access road	Minor access/ footpath partially blocked
2013/06/1385	Babington Path	11SW-A/C93	24/6	HyD	24/6	Soil cut	0.01 (Detachment of shotcrete cover)	Road	-
2013/06/1389	Beach Office, Turtle Cove Beach	Natural hillside	19/6	Public	15/6	Natural hillside	0.05 (Boulder fall)	Other (Manned temporary structure)	Wall of beach office (temporary structure) damaged
2013/07/1413	Feature No. 11SE-D/C204, Leaping Dragon Walk near Cape Collinson Road	11SE-D/C204	15/7	Public	Unknown	Soil/rock cut	40	Open area	-
2013/07/1419	Behind No. 71, Ap Lei Chau Main Street, Ap Lei Chau	15NW-B/C136	25/7	Police	25/07 (16:45)	Soil cut	< 5	Nil	-

Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 3 of 5)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/07/1420	Footpath between the roundabout at Chung Hom Kok Road and Stanley Ma Hang Park	Natural hillside	26/7	Public	24/7	Natural hillside	0.5 (Boulder fall)	Access road	-
2013/08/1423	Unregistered slope at 34B Lugard Road (near Lamp Post No. 16724)	3.5 m high cut slope	2/8	HyD	2/8	Soil cut	1.5	Access road	-
2013/08/1427	Lugard Road	Natural hillside	12/8	HyD	Unknown	Natural hillside	0.1 (Boulder fall)	Access road	-
2013/09/1443	Lan Nai Wan Village, Shek O Road	15NE-B/C26	5/9	Police	5/9 (13:03)	Soil/rock cut	12	Road	All two lanes of Shek O Road temporarily closed
2013/09/1448	Brewin Path	1.2 m high cut slope	10/9	Public	10/9	Soil cut	0.5	Pedestrian pavement	-
2013/11/1464	Opposite to No. 88 Caroline Hill Road (South China Athletic Association), Causeway Bay	11SW-B/C283	5/11	Police	Unknown	Soil/rock cut	2	Road	One lane of Caroline Hill Road temporarily closed
2014/02/1471	Chatham Path, below Barker Road, the Peak	< 3 m high cut slope	23/1	Public	19/8 (09:00)	Soil cut	0.2	Minor footpath	-
2013/05/1009AD (ArchSD/S/2013/05/0003)	Wong Nai Chung Reservoir Park Fitness Trail	11SE-C/C91	28/5	ArchSD	22/5 (15:00)	Soil/rock cut	2 (Rockfall)	Open area	-
2013/05/1015AF (AFCD/2013/05/0003)	Opposite Feature No. 11SW-A/F71, Hatton Road, Lung Fu Shan Country Park	< 3 m high cut slope	29/5	AFCD	29/5	Soil cut	0.5	Other	-

Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 4 of 5)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1016AF (AFCD/2013/05/0004)	Next to Feature No. 11SW-A/C519, Lung Fu Shan Country Park	< 3 m high cut slope	29/5	AFCD	29/5	Soil cut	0.5	Access road	-
2013/05/1018HY (HyD/HK/2013/05/0011)	Opposite No. 66 Deep Water Bay Road	Natural hillside	11/7	HyD	26/5	Natural hillside	10	Open area	-
2013/05/1021WS (WSD/2013/5/2/HKI)	Mount Parker Road, southeast of Tai Tam Upper Reservoir, Tai Tam	11SE-C/C683	23/5	WSD	Unknown	Soil/rock cut	8	Access road	Access road temporarily closed
2013/06/1027AF (AFCD/2013/05/0006)	Sir Cecil's Ride, Tai Tam Country Park	11SE-A/C877	14/6	AFCD	13/6	Soil cut	5	Access road	-
2013/06/1028AF (AFCD/2013/05/0007)	Sir Cecil's Ride, Tai Tam Country Park	Natural hillside	13/6	AFCD	13/6	Natural hillside	1 (Boulder fall)	Access road	-
2013/06/1029AF (AFCD/2013/05/0008)	Mount Parker Road, Tai Tam Country Park	11SE-C/C226	18/6	AFCD	13/6	Soil/rock cut	10	Access road	-
2013/06/1032WS (WSD/2013/6/1/HKI)	Stanley East Catchwater, junction of Headland Road and Stanley Gap Road	15NE-A/C219	4/6	WSD	Unknown	Soil/rock cut	0.6	Catchwater	-
2013/06/1036WS (WSD/2013/6/5/HKI)	Adjoining Catchwater within Shek O Country Park	11SE-D/C523	19/6	WSD	Unknown	Soil/rock cut	1.5	Access road	-
2013/06/1037WS (WSD/2013/6/6/HKI)	Black's Link, 510 m northeast of South Island School, Nam Fung Road	11SW-D/C2171	17/6	WSD	Unknown	Rock cut	0.2 (Rockfall)	Access road	-

Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 5 of 5)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/09/1049WS (WSD/2013/9/3/HKI)	Natural hillside below slope No. 11SE-C/C212, east of Tai Tam Reservoir, Mount Parker Road	Natural hillside	6/9	WSD	Unknown	Natural hillside	12.8	Road	-
2013/09/1051WS (WSD/2013/9/5/HKI)	CH. 260-670, Tai Tam East Catchwater	11SE-C/CR230	16/9	WSD	Unknown	Soil/rock cut	4.8 (Rockfall)	Catchwater	-
2013/09/1052WS (WSD/2013/9/6/HKI)	CH. 130-260, Tai Tam East Catchwater	11SE-C/CR233	16/9	WSD	Unknown	Soil/rock cut	0.5	Catchwater	-
2013/10/1056AF (AFCD/2013/11/0001)	Sir Cecil's Ride	11SE-C/C389	18/11	AFCD	28/10	Soil cut	0.3	Access road	-

Note: (1) The bracket denotes the landslide number adopted by the government department concerned, other than the GEO.

Table B3 List of Landslide Incidents in Kowloon (Sheet 1 of 2)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/04/1273	Lung Cheung Road, near Lung Cheung Lookout	11NW-B/C126	8/4	Police	8/4	Soil cut	1	Road	One lane of Lung Cheung Road temporarily closed
2013/05/1280	Above Shatin Pass Road, Tsz Wan Shan	11NE-A/DT21	16/4	Public	8/4 (10:30)	Disturbed terrain	0.2 (Boulder fall)	Road	-
2013/05/1293	Lee On Road, opposite On Yat House of Shun On Estate (within the construction site of the Development at Anderson Road Project)	Fill slope B6 under construction (15 m high)	22/5	FSD	22/5 (04:00)	Fill	530	Construction site and road	All two lanes of Lee On Road and Shun On Road temporarily closed
2013/05/1323	Fei Ngo Shan Road	11NE-A/C508	23/5	Police	22/5 (12:00)	Soil cut	0.3	Road	-
2013/06/1367	Shun On Road, opposite Tin Wan House of Shun Tin Estate (within the construction site of the Development at Anderson Road Project)	Reinforced fill wall R22 under construction (Up to about 30 m high at the time of failure)	22/5	FSD	22/5	Fill	1,300 (Soil loss) 5,500 (Distressed ground)	Construction site and road	All two lanes of Shun On Road temporarily closed
2013/06/1376	Shatin Pass Road, Tsz Wan Shan	11NE-A/C351	14/6	FSD	14/6 (23:00)	Soil/rock cut	25 (Rockfall)	Road	Shatin Pass Road (one lane road) temporarily closed

Table B3 List of Landslide Incidents in Kowloon (Sheet 2 of 2)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/04/1006HY (HyD/K/2013/04/001)	Jat's Incline	11NE-A/C360	17/4	HyD	10/4	Rock cut	2 (Rockfall)	Nil (Rock debris trapped by the rock mesh)	-
2013/05/1008AD (ArchSD/KT/2013/05/0002)	Sau Nga Road Playground, Sau Mau Ping	11NE-D/F99	22/5	ArchSD	22/5	Fill	20	Other (Playground)	-
2013/05/1011AD (ArchSD/KT/2013/05/0005)	Sau Mau Ping Memorial Park	11NE-D/FR23	28/5	ArchSD	Unknown	Fill	30	Access road	-

Note: (1) The bracket denotes the landslide number adopted by the government department concerned, other than the GEO.

Table B4 List of Landslide Incidents in the New Territories (Sheet 1 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/01/1264	Behind House No. 7 Uk Tau, Sai Kung North (Lot 973 in DD289)	4 m high cut slope	24/1	DLO	24/1 (09:00)	Soil cut	8	Village house	-
2013/02/1265	Natural hillside at Zone 234 of Lin Ma Hang Road, Sha Tau Kok (Opposite to feature 3NE-A/C64)	Natural hillside	31/1	HyD	31/1 (17:00)	Natural hillside	7	Road	-
2013/03/1268	Tai Po Road - Tai Wo Section, Tai Po	7NW-A/C200	19/3	Public	19/3 (14:05)	Soil/rock cut	0.5	Road	One lane of Tai Po Road - Tai Wo Section temporarily closed
2013/03/1269	Opposite of Tak Chak House, Hau Tak Estate, Po Ning Road, Tseung Kwan O	12NW-C/CR93	20/3	Police	19/3 (21:15)	Soil/rock cut	0.05 (Rockfall)	Pedestrian pavement	Partial closure of pedestrian pavement
2013/03/1270	Above Sam Tung Uk Road and Wo Yi Hop Interchange	7SW-C/C353	20/3	HyD	20/3	Soil/rock cut	0.02 (Rockfall)	Footpath	-
2013/04/1272	Fuk Lok Tsuen in Pak Tin near Lamp Post No. VE2028	3.2 m high retaining wall	5/4	Public	5/4	Retaining wall (Masonry)	3	Footpath	-
2013/04/1274	House No. 530 Shui Fu Road, Hung Shui Kiu, Yuen Long	6NW-C/C183	12/4	LandsD	11/4 (16:00)	Rock cut	0.2 (Rockfall)	Squatter structure	-
2013/04/1275	House No. 67, Sheung Wo Che Village, Sha Tin	7SE-A/C571	15/4	Public	12/4 (20:00)	Soil cut	0.1	Building	-

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Table B4 List of Landslide Incidents in the New Territories (Sheet 2 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/04/1276	Southwest of Lot 174 s.B R.P in D.D.40, Tam Shui Hang Village, Sha Tau Kok	2.5 m high cut slope	11/4	Public	7/4 (15:32)	Soil cut	15	Open area	-
2013/05/1277	Chuk Yeung Road, Sai Kung (near Lamp Post No. V5509)	1.3 m high cut slope	7/5	Public	4/5 (10:00)	Soil cut	0.5 (Boulder fall)	Road	Partially blockage of road
2013/05/1282	Footpath to Shui Hau Village, Sai Kung	11NE-B/C1003	8/5	DO	Unknown	Soil cut	8	Footpath	-
2013/05/1283	House No. 313, Tan Kwai Tsuen, Yuen Long	6NW-C/C265	15/5	LandsD	14/5 (10:00)	Soil/rock cut	1.8 (Rockfall)	Footpath	-
2013/05/1285	Lamp Post No. EA0988, Lung Ha Wan Road, near Tai Hang Hau, Tseung Kwan O	12NW-C/C347	22/5	FSD	22/5 (07:00)	Soil/rock cut	5	Road	Lung Ha Wan Road (one lane road) temporarily closed
2013/05/1286	Tiffany Court, DD21 Lot 28, Wun Yiu Road, Tai Po	7NW-D/CR395	22/5	Police	Unknown	Retaining wall (Masonry)	13	Road	Three cars damaged
2013/05/1287	Buddhist Tai Kwong Middle School, Kam Shan Road, Tai Po	Natural hillside	22/5	Police	Unknown	Natural hillside	2	Open area	-
2013/05/1288	A footpath near Lamp Post No. W5007, Sham Tseng	2.2 m high cut slope	22/5	FSD	Unknown	Soil cut	20	Footpath	Blockage of footpath

Table B4 List of Landslide Incidents in the New Territories (Sheet 3 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1290	Behind Nos. 65-68 Hung Uk, Mang Kung Uk	12NW-C/C529	22/5	FSD	22/5 (09:41)	Soil cut	280	Village house	-
2013/05/1294	Near Equestrian & Education Centre, Lung Ha Wan Road, Clear Water Bay	12NW-C/C349	22/5	FSD	22/5 (05:00)	Soil cut	95	Road	Lung Ha Wan Road (one lane road) temporarily closed
2013/05/1295	Near No.8, Hang Hau Wing Lung Road (100 m away from Clear Water Bay Road)	12NW-C/C357	22/5	Police	22/5	Soil cut	10	Road	One lane of Hang Hau Wing Lung Road temporarily closed
2013/05/1296	Near Lamp Post No. N2281, Po Lam Road South	11NE-D/FR454	22/5	Police	22/5 (05:00)	Retaining wall (Masonry)	50	Road	Po Lam Road South (one lane road) temporarily closed
2013/05/1297	So Kwun Wat Road towards Wilson Path (pass Lee Kam Primary School), near Lamp Post No. VD7625	2.6 m high cut slope	22/5	Police	22/5	Soil cut	0.5 (Rockfall)	Road	So Kwun Wat Road (one lane road) temporarily closed
2013/05/1299	Near No. 100 Lok Lo Hu Village, Lamp Post No. BE2168	Natural hillside	22/5	Police	22/5	Natural hillside	2	Footpath	-
2013/05/1300	Lamp Post No. CE3206, near Fei Ngo Shan Road	11NE-B/C894	22/5	Police	22/5 (12:00)	Soil cut	50	Road	Fei Ngo Shan Road (one lane road) temporarily closed
2013/05/1301	Black Hill Wilson Trail Section 3 (above Kwong Tin Estate)	Natural hillside	22/5	Police	22/5 (05:00)	Natural hillside	80	Open area	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 4 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1302	Behind No. 33A Pik Shui Sun Tsuen, Hiram's Highway	2.5 m high cut slope	22/5	Police	22/5 (07:00)	Soil cut	8	Open area and building	-
2013/05/1304	Junction between New Clear Water Bay Road & Clear Water Bay Road (toward to Sai Kung side)	Natural hillside	22/5	Police	22/5 (14:45)	Natural hillside	1	Road	-
2013/05/1305	No. 38 Sha Kong Miu Road, Lau Fau Shan, Yuen Long	6NW-A/C66	22/5	DLO	22/5 (10:00)	Soil cut	16	Village house on licensed land and open area	Argicultural land blocked by the landslide debris
2013/05/1307	No. 39 Tai Hang Hau Tsuen, Sai Kung	1.7 m high cut slope	22/5	DLO	22/5 (16:50)	Soil cut	0.9	Open area	-
2013/05/1309	Near No. 90 Sheung Sze Wan, Sai Kung	12NW-C/C78	22/5	Police	22/5 (17:10)	Soil cut	0.1	Open area and access road	-
2013/05/1313	Po Lam Road South between Lamp Post Nos. N2286 and N2287	1.9 m high cut slope	22/5	Police	Unknown	Soil cut	2	Open area	-
2013/05/1314	Po Lam Road South near Lamp Post No. AE4979	11NE-D/C571	22/5	Police	22/5 (05:00)	Soil cut	18	Open area	-
2013/05/1316	No. 46A Siu Sau Village	6SW-C/R156	22/5	HyD	22/5 (11:00)	Retaining wall (Masonry)	10	Open area	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 5 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1317	About 400 m from Tso Kung Tam Outdoor Recreation Centre and 15 m from wall No. 6SE-B/R44	4.5 m high cut slope	22/5	Public	22/5 (10:00)	Soil cut	15	Squatter structure	-
2013/05/1318	Fei Ngo Shan Road	11NE-B/C649	23/5	Police	22/5	Soil cut	60	Road	Fei Ngo Shan Road (one lane road) temporarily closed
2013/05/1321	No. 69 Tong Kung Leng, Sheung Shui	1.1 m high cut slope	20/5	DLO	15/5 (12:00)	Soil cut	5	Other (Illegal structure)	-
2013/05/1322	Fei Ngo Shan Road	7SE-C/FR188	23/5	Police	22/5 (12:00)	Fill	20	Road	Partial closure of a traffic lane at Fei Ngo Shan Road
2013/05/1325	Behind a toilet at Luk Keng Road	3NE-C/C232	22/5	DO	Unknown	Soil cut	2	Building	-
2013/05/1326	Pak Shek Wo San Tuen	2 m high cut slope	23/5	DO	22/5 (12:00)	Soil cut	2.5	Access road	-
2013/05/1327	Tai Po Kau near Feature No. 7NW-D/CR184	2 m high cut slope	21/4	Public	12/4 (16:30)	Soil cut	0.6	Footpath	-
2013/05/1328	Silverstrand Garden, Sai Kung	12NW-C/C67	22/5	Private	22/5 (12:00)	Soil/rock cut	2.5 (Rockfall)	Access road	Private driveway blocked
2013/05/1330	Near House No. 5 Pun Shan Chau, Tai Po	7NW-D/CR400	25/4	Public	Unknown	Retaining wall (Masonry)	22.5	Squatter structure and road	-

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Table B4 List of Landslide Incidents in the New Territories (Sheet 6 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1331	House No. 71A Kau Wah Keng Cheung Hang Village	11NW-A/R171	25/5	Police	25/5 (10:00)	Retaining wall (Masonry)	3	Squatter structure and footpath	-
2013/05/1332	Near Lamp Post No. VE4565 within Lot 570 in D.D.253 at Sum Long Tsuen, Sai Kung	2.46 m high fill slope	24/5	DO	22/5 (06:00)	Fill	10	Footpath	-
2013/05/1334	Pan Long Wan Road (opposite Lamp Post No. V0947)	1.6 m high cut slope	24/5	DO	22/5 (09:00)	Soil cut	2.5	Access Road	-
2013/05/1335	No. 84 Mok Tse Che	11NE-B/DT43	24/5	Public	22/5 (12:00)	Disturbed terrain	1	Village house	-
2013/05/1336	Shek Kok Road	Natural hillside	24/5	DLO	22/5 (12:00)	Natural hillside	4	Open area	-
2013/05/1337	No. 53 Leung Fai Tin, Clear Water Bay Road	3.9 m high cut slope	23/5	Public	22/5	Soil cut	5	Open area	-
2013/05/1338	Near Feature No. 12NW-C/R161, No. 73 Tai Hang Hau Tsuen, Clearwater Bay, Sai Kung	1.4 m high retaining wall	24/5	DO	22/5 (06:00)	Retaining wall (Masonry)	2	Other (Surface channel)	-
2013/05/1339	Pan Long Wan (adjacent to Lamp Post No. V5494)	2 m high fill slope	24/5	DO	22/5 (09:00)	Fill	4.5	Footpath	-
2013/05/1340	Adjacent to House No. 71 Pan Long Wan	Natural hillside	24/5	DO	22/5 (09:00)	Natural hillside	38	Access road and other (Car park)	Debris spread over car park area and minor damage on cars

Table B4 List of Landslide Incidents in the New Territories (Sheet 7 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1341	Pik Uk Prison, Sai Kung	11NE-B/F291	27/5	CSD	22/5	Fill	1	Open area	-
2013/05/1342	Ta Ku Ling San Tsuen	11NE-B/R368	27/5	Public	Unknown	Retaining wall (Masonry)	5.5	Open area	-
2013/05/1343	Chung Mei Carpark, Bride's Pool Road	3SE-B/C161	27/5	AFCD	23/5 (09:00)	Soil cut	15	Footpath	-
2013/05/1344	Near House No. 34 Yim Tin Tsai Village, Sai Kung	3.5 m high retaining wall	23/5	Public	Unknown	Retaining wall (Masonry)	5.5	Squatter structure and footpath	Damage of footpath which led to temporary closure
2013/05/1345	House No. 35 Sha Tin Tau New Village	7SW-D/C1004	28/5	LandsD	24/5	Soil cut	3.5	Squatter structure	-
2013/05/1346	Road leading to Tam Wat (Adjacent to Lamp Post No. VA4993)	1.9 m high cut slope	23/5	Public	23/5 (16:00)	Soil cut	2.5	Access road	-
2013/05/1347	Shatin Pass Road	11NE-A/C351	30/5	Police	30/5 (00:30)	Soil/rock cut	2 (Rockfall)	Road	Shatin Pass Road (one lane road) temporarily closed
2013/05/1348	Adjacent to No. 1 Ta Ku Ling San Tsuen	2.5 m high retaining wall	27/5	Public	22/5 (12:00)	Retaining wall	8	Open area	-
2013/05/1349	No. 42 Ma On Shan Tsuen, Ma On Shan	7SE-B/C155	28/5	LandsD	24/5 (10:15)	Soil cut	0.1 (Boulder fall)	Open area	-
2013/05/1351	Lung Ha Wan Road, Sai Kung	12NW-D/C3	27/5	Public	22/5	Soil/rock cut	40	Road	Lung Ha Wan Road (one lane road) temporarily closed

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Table B4 List of Landslide Incidents in the New Territories (Sheet 8 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1352	Lung Ha Wan Road, Sai Kung	12NW-C/C209	28/5	LandsD	22/5	Soil cut	2.7	Road	-
2013/05/1353	Abacus Kindergraten, Mang Kung Uk Village, Clear Water Bay Road, Sai Kung	12NW-C/C264	25/5	HyD	25/5 (17:14)	Soil cut	2	Village house	-
2013/05/1354	House Nos. 70-71 Leung Fai Tin Village, Clear Water Bay, Sai Kung	1.8 m high cut slope	26/5	Police	Unknown	Soil cut	7.25	Access road	-
2013/06/1356	Northwest of Nos. 11A-12B Nam Wa Po Tsuen, Tai Po	3SW-C/C897	24/5	Public	22/5 (09:00)	Soil cut	1	Open area	-
2013/06/1357	Mung Kung Wo Road, Sai Kung	7SE-D/R141	28/5	Public	Unknown	Retaining wall (RC)	31	Open area and other (River)	-
2013/06/1359	Lam Kam Road near the entrance of Kadoorie Farm (near Lamp Post No. EA7121)	6NE-D/C2	6/6	Police	6/6 (09:00)	Soil/rock cut	0.5	Road	Partial closure of one lane of Lam Kam Road
2013/06/1360	Shek Kwu Lung Village	1.9 m high cut slope	27/5	DO	27/5 (09:30)	Soil cut	1 (Boulder fall)	Other (Surface channel)	-
2013/06/1361	House No. 44 Siu Lam Tsuen	6SW-D/CR675	28/5	LandsD	27/5 (09:15)	Soil cut	0.6 (Rockfall)	Open area	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 9 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/06/1362	Shek Kwu Lung Village	1.6 m high cut slope	27/5	DO	27/5 (09:30)	Soil cut	1 (Boulder fall)	Footpath	-
2013/06/1363	Siu Lam Road, So Kwun Wat	6SW-D/C581	5/6	LandsD	3/6 (13:00)	Soil cut	0.3	Footpath	-
2013/06/1364	Above Feature No. 12NW-C/CR394, No. 62A Hung Uk Chuen, Mang Kung Uk, Sai Kung	Natural hillside	4/6	LandsD	Unknown	Natural hillside	2.1	Open area and building	-
2013/06/1365	House No. 269, Pai Tau Village, Sha Tin	1.5 m high brick wall	5/6	Public	5/6 (00:00)	Retaining wall (Brick)	1	Open area	-
2013/06/1366	Above Lamp Post Nos. EA5927 and EA5928, King Yin Lane, Tseung Kwan O	Natural hillside	31/5	Public	22/5	Natural hillside	5	Open area and footpath	-
2013/06/1369	House No. 189A Sheung Wo Che Village, Sha Tin	7SW-B/C362	11/6	Police	10/6 (09:00)	Soil cut	2	Open area and footpath	-
2013/06/1371	Behind No. 30 Pak Shek Wo San Tsuen	2.1 m high retaining wall	13/6	Public	22/5	Retaining wall (Masonry)	1	Squatter structure	-
2013/06/1372	14 m south of House No. 25 Chan Uk Village, Mang Kung Uk, Sai Kung	5 m high cut slope	14/6	Public	22/5	Soil cut	4	Open area and footpath	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 10 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/06/1373	Behind House No. 4F Tan Shan Village, Sai Kung	2.8 m high cut slope	13/6	DLO	22/5	Soil cut	0.12	Footpath	-
2013/06/1374	Near Lamp Post No. EA0989 at Lung Ha Wan Road, Clear Water Bay, Sai Kung	12NW-C/C347	15/6	HyD	Unknown	Soil/rock cut	8	Road	Lung Ha Wan Road partially blocked
2013/06/1375	House No. 64 Tai Wo, Tai Po	Natural hillside	24/5	DLO	24/5 (14:00)	Natural hillside	5	Footpath	-
2013/06/1379	Near House No. 60A Tseng Tau Sheung Tsuen, Tuen Mun	1.5 m high retaining wall	16/6	FSD	16/6 (21:00)	Retaining wall (Masonry)	4	Squatter structure and footpath	Six persons temporarily evacuated
2013/06/1380	Behind No. 26E Tseng Lan Shue	Natural hillside	18/6	Public	Unknown	Natural hillside	0.5	Village house	-
2013/06/1381	Above Feature No. 6SW-A/CR210, Tai Lam Chung Catchwater (Section I)	Natural hillside	17/6	WSD	16/6 (14:00)	Natural hillside	3 (Boulder fall)	Footpath & catchwater	-
2013/06/1382	South of House No. 113 Ma Yau Tong Village, Tseung Kwan O	2.89 m high cut slope	18/6	Public	23/5	Soil cut	5	Open area and footpath	-
2013/06/1383	House Nos. 15-18 So Kwun Wat San Tsuen	6SW-D/C210	24/6	Public	24/6 (14:30)	Soil cut	1	Village house	-
2013/06/1386	Along a Footpath above Feature No. 7SW-A/C186 at Wo Yi Hop Village, Tsuen Wan	4 m high cut slope	24/6	Police	24/6	Soil cut	12	Footpath	Footpath temporarily closed

Table B4 List of Landslide Incidents in the New Territories (Sheet 11 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/06/1388	Cheung Yuen Road, Lai Chi Kok	11NW-A/C287	24/6	FSD	Unknown	Soil cut	3	Access road	-
2013/06/1390	Shun Yee San Tsuen, near Lamp Post No. N4010, Ma Tso Lung	2.1 m high retaining wall	24/6	BD	24/6 (10:00)	Retaining wall (Masonry)	8	Village house on licensed land	Three persons temporarily evacuated
2013/06/1391	About 90 m to the west of Feature No. 7SE-B/R17, Shatin	Natural hillside	25/6	Police	25/6 (10:30)	Natural hillside	12.6	Open area	-
2013/06/1392	Ma On Shan Tsuen Road	7SE-B/C74	25/6	Police	25/6 (10:30)	Soil cut	3.6	Open area	-
2013/06/1393	Tit Hang, near Lamp Post No. VD6619, Ma Tso Lung	Natural hillside	25/6	Police	25/6 (09:00)	Natural hillside	7.5	Other (Streamcourse)	-
2013/06/1396	Hiking trail east of Tseung Kwan O High Level No. 2 Fresh Water Pumping Station, Tseung Kwan O	11NE-D/C531	24/6	LandsD	22/5	Soil/rock cut	5	Footpath	-
2013/06/1397	Hiking trail west of Hong Sing Garden, Po Lam Road North, Tseung Kwan O	2 m high cut slope	24/6	LandsD	22/5	Soil cut	1.3	Footpath	-
2013/06/1398	Near the crest of Feature No. 11NE-D/C884, Lamp Post No. TKO31, O King Road, Tseung Kwan O	Natural hillside	25/6	Public	23/6	Natural hillside	10	Other (Drainage culvert)	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 12 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/06/1399	Near Distance Post No. W022 of Wilson Trail Section 3, Tseung Kwan O	1.5 m high cut slope	26/6	DLO	Unknown	Soil cut	1.3	Footpath	-
2013/06/1400	Lam Tin Morning Walking Trail, Lam Tin	11NE-D/C426	26/6	DLO	Unknown	Soil cut	4	Footpath	-
2013/07/1401	Near House No. 12, Sum Long Village, Sai Kung	2 m high cut slope	21/6	Public	13/6	Soil cut	0.01	Open area	-
2013/07/1402	Between Distance Post Nos. W023 and W022 of Wilson Trail Section 3, Tseung Kwan O	2.6 m high cut slope	26/6	DLO	Unknown	Soil/rock cut	5	Footpath	-
2013/07/1403	Liu Pok Road, near Lamp Post No. EB3879	2.5 m high cut slope	27/6	Public	13/6 (15:00)	Soil cut	4	Access road	-
2013/07/1404	Block B, Shun Yee San Tsuen, Ma Tso Lung	2NE-D/C49	2/7	LandsD	Unknown	Soil cut	6	Squatter structure	Category 1 NDC[2] recommendation on a squatter structure made to LandsD
2013/07/1405	Hang Hau Wing Lung Road, Clear Water Bay, Sai Kung	12NW-C/C298	4/7	DLO	22/5	Soil cut	4.4	Road	Hang Hau Wing Lung Road partially blocked
2013/07/1406	House No. 191, Sheung Wo Che, Shatin	7SW-B/C735	28/6	LandsD	25/6 (09:00)	Soil/rock cut	3	Open area	-
2013/07/1407	Hing Keng Shek, Sai Kung	Natural hillside	19/6	Public	Unknown	Natural hillside	0.1 (Boulder fall)	Building	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 13 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/07/1408	No. 7 Tan Shan Road, Sai Kung	11NE-B/CR276	15/7	Public	8/7 (12:00)	Soil cut	0.004 (Detachment of chunam cover)	Other (Carpark)	-
2013/07/1410	Opposite Feature No. 3NE-A/C103, Zone 248 of Lin Ma Hang Road, Sha Tau Kok	Natural hillside	10/7	HyD	Unknown	Natural hillside	16	Road	-
2013/07/1411	Zone 253 Lin Ma Hang Road, Sha Tau Kok	3NE-A/C119	10/7	HyD	Unknown	Soil/rock cut	5	Road	-
2013/07/1412	Slope to the east of Lamp Post No. V5540, Sai Kung	4.8 m high cut slope	6/7	Public	18/6 (09:00)	Soil/rock cut	0.5 (Rockfall)	Village house	-
2013/07/1414	5 m to the west of Feature No. 7SE-B/C155	Natural hillside	9/7	LandsD	4/7 (10:45)	Natural hillside	2	Open area	-
2013/07/1415	30 m southeast of No. 42 Ma On Shan Tsuen, Ma On Shan	7SE-B/C201	9/7	LandsD	4/7 (10:45)	Soil cut	0.3	Open area	-
2013/07/1416	House No. 52 (or 1052), Wong Chuk Yeung Chuen Path	7SW-B/CR286	19/7	Public	17/7 (11:45)	Soil/rock cut	3	Open area	-
2013/07/1417	Lamp Post No. VE0048, Sheung Wo Che Village, Sha Tin	1 m high cut slope	17/7	Public	16/7 (18:15)	Soil cut	0.5	Footpath	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 14 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/07/1418	Footpath behind Shek Kwu Lung Village, Siu Lek Yuen, Sha Tin	2.75 m high cut slope	8/7	DO	5/7	Soil cut	0.5	Footpath	-
2013/07/1421	Adjacent to Feature No. 6NW-C/C128, Tan Kwai Tsuen	1.5 m high cut slope	26/7	LandsD	24/7 (19:15)	Soil cut	0.4	Pedestrian pavement	-
2013/08/1424	Near Kadoorie Farm, Lam Kam Road, Yuen Long	6NE-D/C2	3/8	HyD	3/8 (06:14)	Soil/rock cut	120	Road	All two lanes of Lam Kam Road temporarily closed
2013/08/1425	Zone 257 Lin Ma Hang Road, Sha Tau Kok	3NE-A/C134	8/8	HyD	Unknown	Soil cut	2	Road	-
2013/08/1426	Zone 255 Lin Ma Hang Road, Sha Tau Kok	3NE-A/C129	8/8	HyD	Unknown	Soil/rock cut	3.5	Road	-
2013/08/1429	Behind House No. 231, Ma On Shan Tsuen, Ma On Shan	7SE-B/C134	8/8	Public	1/7 (16:00)	Soil cut	0.5	Village house	-
2013/08/1430	Tai Shui Hang Village, Sha Tin	7SE-A/C572	19/8	Police	19/8 (15:00)	Rock cut	0.28 (Boulder fall)	Open area	-
2013/08/1431	No. 303 Wo Hop Shek Village, Fanling	2.56 m high cut slope	20/8	LandsD	19/8 (09:30)	Soil cut	2	Other (A small disused underground tank)	-

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Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/08/1433	Lamp Post No. VA8088 near Gilwell Campsite, Fei Ngo Shan	7SE-C/C607	21/8	FSD	21/8 (11:30)	Soil/rock cut	1	Road	-
2013/09/1434	Access Road to House No. 18 Heng Mei Deng Village, Mang Kung Uk, Sai Kung	Natural hillside	29/8	DLO	23/8	Natural hillside	1.5	Access road	-
2013/09/1435	Approximately 8 m at the downhill side of No. 25 Chung Wong Toi, Tuen Mun	6SW-A/F75	3/9	Police	3/9 (09:00)	Fill	5.5	Footpath	Chain link fence at toe damaged and footpath fully blocked
2013/09/1436	Near No. 402 Shung Him Tong	3SW-A/C208	31/8	Public	30/8 (03:00)	Soil cut	10.5	Footpath	-
2013/09/1439	Near No. 39 Po Kat Tsai, Fanling	2.3 m high cut slope	29/8	DLO	5/8	Soil cut	5	Squatter structure	-
2013/09/1440	East of House Nos. 328-334, Pai Tau Village, Sha Tin	7SW-D/FR408	4/9	FSD	4/9 (11:30)	Fill	2	Footpath	-
2013/09/1441	3 m to the south of Feature No. 6NW-C/C216, Tuen Mun	2.9 m high cut slope	4/9	Police	4/9 (12:00)	Soil cut	3	Access road	Access road partially blocked
2013/09/1444	Lam Tin Morning Walking Trail, Lam Tin	11NE-D/C426	5/9	LandsD	5/9	Soil cut	4	Footpath	Footpath blocked

Table B4 List of Landslide Incidents in the New Territories (Sheet 16 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/09/1445	House No. 105 Sheung Wo Che Village, Sha Tin	2 m high retaining wall	5/9	FSD	5/9 (08:00)	Retaining wall (RC)	2	Open area	-
2013/09/1449	Below Feature No. 6SW-D/C595, Tuen Mun	Natural hillside	9/9	Public	5/9 (14:00)	Natural hillside	0.5	Other (Streamcourse)	-
2013/09/1450	House Nos. 392-395, Pai Tau Village, Sha Tin	7SW-D/C143	6/9	Public	5/9 (09:00)	Soil cut	2	Village house	-
2013/09/1452	Between Feature Nos. 6SW-D/C122 and 6SW-D/C125, Tai Lam Chung Catchwater	Natural hillside	19/9	WSD	16/9 (00:00)	Natural hillside	0.5 (Boulder fall)	Access road	Casacade along the access road damaged
2013/09/1453	About 5 m southwest of Feature No. 6SE-C/C772, Tsing Lung Tau	4.2 m high cut slope	19/9	GEO	Unknown	Soil cut	1.5	Access road	-
2013/09/1454	Wu Kau Tang	Natural hillside	19/9	AFCD	Unknown	Natural hillside	10	Country park and footpath	-
2013/09/1455	Tai Lam Chung Catchwater Section K	6SW-D/C125	19/9	WSD	Unknown	Rock cut	1 (Rockfall)	Access road	-
2013/09/1456	House No. 432A Ha Wo Che Village, near Feature No. 7SE-A/C409, Sha Tin	1 m high retaining wall	23/9	DO	22/9 (23:15)	Retaining wall (Masonry)	1	Squatter structure	-

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Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/09/1457	Pai Tau Village, Sha Tin	Natural hillside	23/9	DO	23/9 (08:00)	Natural hillside	2 (Rockfall)	Footpath	-
2013/10/1458	Wan Poon Path, Sai Kung	12NW-C/C507	18/9	LandsD	9/9 (11:45)	Soil/rock cut	0.6 (Rockfall)	Open area	-
2013/10/1459	No. 98A1 Shek Kwu Lung (near Lamp Post No. VE3041)	1.5 m high cut slope	13/9	Public	30/8 (14:00)	Soil cut	1	Footpath	-
2013/10/1460	Near Footpath to Sui Wo Court, Fo Shan, Sha Tin	1.5 m high cut slope	3/10	Public	23/9 (09:00)	Soil cut	2	Other (Ruin)	-
2013/10/1461	Tai Po Kau Village near Lamp Post Nos. V4572 and V2604	2.5 m high cut slope	3/10	Public	3/10 (13:58)	Soil cut	1	Footpath	-
2013/10/1462	Adjoining access road to Mau Tso Ngam, Sha Tin	2 m high retaining wall	8/10	Public	Unknown	Retaining wall (Reinforced concrete)	2	Road	-
2013/10/1463	No. 214 Hill Top Garden, Tai Po	Natural hillside	27/5	Public	Unknown	Natural hillside	4	Open area	-
2013/11/1465	10 m east of Feature No. 11SE-B/C107, access road to Tseung Kwan O Chinese Permanent Cemetery	4.3 m high cut slope	6/11	LandsD	Unknown	Soil cut	7	Footpath	-
2013/11/1467	Tai Po Road, Tai Po	2.8 m high cut slope	8/11	Public	Unknown	Soil cut	0.4	Other (Grave)	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 18 of 22)

Incident No.(1)	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/01/1001HY (HyD/NT/YL/ 2013/03)	In front of House No. 62 Shun Shan San Village, Yuen Long	Natural hillside	5/9	HyD	21/1	Natural hillside	10	Catchwater	-
2013/01/1002WS (WSD/2013/1/ 1/NTW)	At CH. 1312, Tai Lam Chung Catchwater (Section A)	6SE-A/C120	18/1	WSD	Unknown	Soil/rock cut	0.5 (Rockfall)	Access road and catchwater	-
2013/02/1003AD (ArchSD/F/2013/ 02/0001)	Wo Hop Shek Cemetery, Fanling	3SW-C/C466	1/2	ArchSD	Unknown	Soil cut	20	Other (Grave area)	-
2013/02/1004AD (ArchSD/F/2013/ 02/0002)	Wo Hop Shek Cemetery, Fanling	3SW-C/C467	1/2	ArchSD	Unknown	Soil cut	40	Other (Grave area)	-
2013/03/1005WS (WSD/2013/3/ 1/NTW)	Tsuen Wan West Lower Level Fresh Water Service Reservoir	6SE-D/C54	21/3	WSD	Unknown	Soil/rock cut	0.3 (Rockfall)	Other (Service reservoir)	-
2013/05/1007AD (ArchSD/F/2013/ 05/0001)	Southeast of Gullant Garden, 87U District, Wo Hop Shek Cemetery	3SW-C/C342	2/5	ArchSD	Unknown	Soil cut	1	Footpath	-
2013/05/1010AD (ArchSD/F/2013/ 05/0004)	Cloudy Hill Jeep Track, Fanling	3SW-D/C126	23/5	ArchSD	Unknown	Soil cut	3	Access road	-
2013/05/1012AD (ArchSD/F/2013/ 06/0001)	Wo Hop Shek Cemetery, Fanling	3SW-C/DT84	22/5	ArchSD	Unknown	Disturbed terrain	1	Other (Cemetery)	-

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Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1013AF (AFCD/2013/05/0001)	Shing Mun Country Park	7SW-B/C582	14/5	AFCD	Unknown	Soil cut	5	Nil	-
2013/05/1014AF (AFCD/2013/05/0002)	Wilson Trail (KK069792), Shing Mun Jogging Trail	Natural hillside	15/5	AFCD	15/5	Natural hillside	0.5	Footpath	-
2013/05/1017AF (AFCD/2013/05/0005)	Tai Po Kau Forest Track - Kau Lead Section	7NW-D/C239	23/5	AFCD	23/5	Soil cut	5	Access road	-
2013/05/1019LD (LandsD/2013/05/0047)	Between Spot Levels 396.1 & 390.4, adjoining road to Heung Shek Cemetery, Chuen Lung, Tsuen Wan	7SW-A/C242	10/5	LandsD	Unknown	Soil cut	1.4	Access road	-
2013/05/1020WS (WSD/2013/5/1/NTW)	Shing Mun Catchwater, access road to Jubliee Reservoir, Tsuen Wan	7SW-A/CR95	10/5	WSD	Unknown	Soil cut	0.4	Catchwater	-
2013/05/1022WS (WSD/2013/5/3/NTE)	Along Catchwater CH. 0-210, Golden Hill	7SW-C/C984	22/5	WSD	Unknown	Soil/rock cut	8	Catchwater	-
2013/06/1026AD (ArchSD/ST/2013/06/0002)	Lok Shun Path Barbecue Area, Fo Tan	7SE-A/C126	27/6	ArchSD	Unknown	Soil cut	20	Open area	-
2013/06/1030AF (AFCD/2013/06/0001)	Tai Po Kau Nature Reserve	7NW-D/C251	25/6	AFCD	25/6	Soil cut	1.4	Access road	-

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Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/06/1031LD (LandsD/2013/06/0077)	Near Spot Level 216.1, Shing Mun Country Park, Tsuen Wan	7SW-C/C841	4/6	LandsD	Unknown	Soil cut	5	Access road	-
2013/06/1033WS (WSD/2013/6/2/NTW)	CH. 3650-3780, Tai Lam Chung Catchwater (Section L)	6SE-C/CR374	4/6	WSD	Unknown	Soil/rock cut	30	Catchwater	Existing steel decking damaged
2013/06/1034WS (WSD/2013/6/3/NTW)	Shing Mun Catchwater near O/F 47, Tsuen Wan	6SE-B/CR224	4/6	WSD	Unknown	Soil/rock cut	1.6	Catchwater	-
2013/06/1035WS (WSD/2013/6/4/NTW)	Adjoining WSD access road NT31, Tai Lam Country Park, Tai Lam	6SW-B/C136	19/6	WSD	Unknown	Soil cut	0.3	Access road	-
2013/07/1038AD (ArchSD/F/2013/07/0001)	Sha Ling Cemetery, Lo Wu	3SW-C/C434	10/7	ArchSD	10/7	Soil cut	20	Other (Cemetery)	Graves damaged
2013/07/1039AF (AFCD/2013/08/0001)	Maclehose Trail near Gilwell Scout Campsite, between Poles Nos. 94 & 95	Natural hillside	29/7	AFCD	29/7	Natural hillside	5 (Boulder fall)	Access road	-
2013/07/1041WS (WSD/2013/7/2/NTW)	Shing Mun Catchwater near SMOF 43, Tsuen Wan	6SE-B/C263	5/7	WSD	Unknown	Soil/rock cut	4	Catchwater	-
2013/07/1042WS (WSD/2013/7/3/NTE)	Adjoining Sai Kung Sai Wan Road, WSD access road NT 79 near Spot Level 160.5	8SE-A/C75	25/7	WSD	Unknown	Soil/rock cut	1.3 (Rockfall)	Access road	-

Table B4 List of Landslide Incidents in the New Territories (Sheet 21 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/08/1043AF (AFCD/2013/08/0002)	Nam Chung Country Trail, Pat Sin Leng Country Park	Natural hillside	23/8	AFCD	23/8	Natural hillside	4	Access road	Trail temporarily closed
2013/09/1045AD (ArchSD/F/2013/09/0001)	Queen's Hill Camp, Sha Tau Kok	3SW-B/CR125	5/9	ArchSD	Unknown	Soil cut	10	Open area	-
2013/09/1046AF (AFCD/2013/09/0001)	Tai Mei Tuk Management Centre	Natural hillside	4/9	AFCD	4/9	Natural hillside	1	Other (Storage area)	-
2013/09/1047WS (WSD/2013/9/1/NTW)	Adjoining Tai Lam Chung Catchwater within Tai Lam Country Park to the north of GLA-TW334	6SE-D/CR237	3/9	WSD	Unknown	Soil/rock cut	2	Catchwater	-
2013/09/1048WS (WSD/2013/9/2/NTE)	Upon unallocated government land along Shek Lin Road near Spot Level 132.1	7NW-A/C283	4/9	WSD	Unknown	Soil cut	1 (Rockfall)	Access road	-
2013/09/1050WS (WSD/2013/9/4/NTW)	CH. 2540-2580, Tai Lam Chung Catchwater (Section B)	6NE-C/CR210	10/9	WSD	Unknown	Soil cut	1.5 (Rockfall)	Catchwater	-
2013/09/1053WS (WSD/2013/9/7/NTW)	Between Feature Nos. 6SW-D/C122 and 6SW-D/C125, Tai Lam Chung Catchwater	Natural hillside	16/9	WSD	Unknown	Natural hillside	0.5 (Boulder fall)	Access road	Existing road and parapet damaged

Table B4 List of Landslide Incidents in the New Territories (Sheet 22 of 22)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/09/1054WS (WSD/2013/9/8/NTW)	CH. 1040 - 1085, Tai Lam Chung Catchwater (Section K)	6SE-C/C520	19/9	WSD	Unknown	Soil/rock cut	0.1 (Rockfall)	Catchwater	-
2013/09/1055WS (WSD/2013/9/9/NTW)	CH. 52100, along Catchwater, above Hilltop Road, North Tsuen Wan	7SW-A/CR141	26/9	WSD	Unknown	Soil/rock cut	2 (Rockfall)	Catchwater	-

Notes:
(1) The bracket denotes the landslide number adopted by the governemt department concerned, other than the GEO.
(2) Category 1 Non-development Clearance (NDC) recommendations are issued to squatter structures that are in 'immediate and obvious' danger; the clearance is compulsory and will be backed up by force if necessary.

Table B5 List of Landslide Incidents on Outlying Islands (Sheet 1 of 3)

Incident No.(1)	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/05/1278	No. 24, Sha Po New Village, Lamma Island	Natural hillside	8/5	Public	Unknown	Natural hillside	0.02 (Boulder fall)	Village house	-
2013/05/1329	Sai Loi Yee Temple, Keung Shan, Tai O, Lantau	2.2 m high cut slope	27/5	Public	25/5 (13:00)	Soil cut	10	Footpath	-
2013/05/1333	Lamp Post No. LP 36933, Sok Kwu Wan, Lamma Island	Natural hillside	26/5	Police	Unknown	Natural hillside	1.2 (Boulder fall)	Footpath	-
2013/06/1377	No. 17D Nam Tong Middle Village, Tung Lung Chau	Natural hillside	18/6	Public	23/5 (10:00)	Natural hillside	8	Squatter structure, minor footpath	Minor footpath temporarily closed
2013/06/1384	Along South Lantau Road near Shek Pik Reservoir, Lantau	13NE-A/C102	24/6	HyD	24/6 (11:30)	Soil cut	1.5	Nil	-
2013/06/1394	Village footpath near Lamp Post No. V6017 Wang Tong, Mui Wo, Lantau	Natural hillside	19/6	HyD	11/6	Natural hillside	2	Open area	-
2013/07/1409	Behind No. 26 Cheung Chau Peak Road, Cheung Chau	14NW-D/C195	10/7	LandsD	28/6	Soil/rock cut	3	Building	-

Table B5 List of Landslide Incidents on Outlying Islands (Sheet 2 of 3)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/08/1428	Tai Tei Tong Village, Mui Wo, Lantau	10SW-C/C40	13/8	CEDD	Unknown	Soil cut	5	Open area	-
2013/09/1437	No. 139B Middle Hill Road, Cheung Chau	2.5 m high retaining wall	4/9	Police	4/9 (07:30)	Retaining wall (Masonry)	2.75	Village house	-
2013/09/1438	South Lantau Road	13NE-A/C100	4/9	HyD	4/9	Soil cut	3	Road	-
2013/11/1466	No. 24 Peak Road, Cheung Chau	2.5m high brick wall	7/11	LandsD	Unknown	Retaining wall (Brick)	8	Squatter structure (One dwelling with six structures)	-
2013/05/1023WS (WSD/2013/5/4/HKI)	Lautau South Catchwater along WSD access road, west of Shek Pik Reservoir, Lantau	13NW-D/CR58	23/5	WSD	Unknown	Soil/rock cut	9	Catchwater	-
2013/05/1024WS (WSD/2013/5/5/HKI)	CH. 0730 - 0860, Shek Pik Reservoir (Section C)	13NW-B/C173	25/5	WSD	Unknown	Soil/rock cut	15	Catchwater, access road	-
2013/05/1025WS (WSD/2013/5/6/HKI)	Lantau South Catchwater, southwest of Tai Long Wan Village, Shek Pik, Lantau	13NW-D/CR37	25/5	WSD	Unknown	Soil/rock cut	3	Catchwater	-

Table B5 List of Landslide Incidents on Outlying Islands (Sheet 3 of 3)

Incident No.[1]	Location	Feature Registration No. (if any)	Reported		Failure			Facility Affected	Consequence
			Date	By	Date (Time)	Feature Type	Scale (m^3)		
2013/07/1040WS (WSD/2013/7/1/HKI)	Along access road to Peng Chau Fresh Water Service Reservoir	10SE-A/C6	5/7	WSD	Unknown	Soil/rock cut	0.3	Access road	-
2013/08/1044HY (HyD/NTE/2013/08/0045)	Access road to Ling Yan Monastery near Lamp Post No. VA2696, Keung Shan, Lantau	Natural hillside	30/9	HyD	25/8	Natural hillside	1 (Boulder fall)	Access road	-

Notes: (1) The bracket denotes the landslide number adopted by the government department concerned, other than the GEO.

GEO PUBLICATIONS AND ORDERING INFORMATION
土力工程處刊物及訂購資料

A selected list of major GEO publications is given in the next page. An up-to-date full list of GEO publications can be found at the CEDD Website http://www.cedd.gov.hk on the Internet under "Publications". Abstracts for the documents can also be found at the same website. Technical Guidance Notes are published on the CEDD Website from time to time to provide updates to GEO publications prior to their next revision.

部份土力工程處的主要刊物目錄刊載於下頁。而詳盡及最新的土力工程處刊物目錄，則登載於土木工程拓展署的互聯網網頁 http://www.cedd.gov.hk 的"刊物"版面之內。刊物的摘要及更新刊物內容的工程技術指引，亦可在這個網址找到。

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MAJOR GEOTECHNICAL ENGINEERING OFFICE PUBLICATIONS
土力工程處之主要刊物

GEOTECHNICAL MANUALS

Geotechnical Manual for Slopes, 2nd Edition (1984), 302 p. (English Version), (Reprinted, 2011).

斜坡岩土工程手冊(1998)，308頁(1984年英文版的中文譯本)。

Highway Slope Manual (2000), 114 p.

GEOGUIDES

Geoguide 1	Guide to Retaining Wall Design, 2nd Edition (1993), 258 p. (Reprinted, 2007).
Geoguide 2	Guide to Site Investigation (1987), 359 p. (Reprinted, 2000).
Geoguide 3	Guide to Rock and Soil Descriptions (1988), 186 p. (Reprinted, 2000).
Geoguide 4	Guide to Cavern Engineering (1992), 148 p. (Reprinted, 1998).
Geoguide 5	Guide to Slope Maintenance, 3rd Edition (2003), 132 p. (English Version).
岩土指南第五冊	斜坡維修指南，第三版(2003)，120頁(中文版)。
Geoguide 6	Guide to Reinforced Fill Structure and Slope Design (2002), 236 p.
Geoguide 7	Guide to Soil Nail Design and Construction (2008), 97 p.

GEOSPECS

Geospec 1	Model Specification for Prestressed Ground Anchors, 2nd Edition (1989), 164 p. (Reprinted, 1997).
Geospec 3	Model Specification for Soil Testing (2001), 340 p.

GEO PUBLICATIONS

GCO Publication No. 1/90	Review of Design Methods for Excavations (1990), 187 p. (Reprinted, 2002).
GEO Publication No. 1/93	Review of Granular and Geotextile Filters (1993), 141 p.
GEO Publication No. 1/2006	Foundation Design and Construction (2006), 376 p.
GEO Publication No. 1/2007	Engineering Geological Practice in Hong Kong (2007), 278 p.
GEO Publication No. 1/2009	Prescriptive Measures for Man-Made Slopes and Retaining Walls (2009), 76 p.
GEO Publication No. 1/2011	Technical Guidelines on Landscape Treatment for Slopes (2011), 217 p.

GEOLOGICAL PUBLICATIONS

The Quaternary Geology of Hong Kong, by J.A. Fyfe, R. Shaw, S.D.G. Campbell, K.W. Lai & P.A. Kirk (2000), 210 p. plus 6 maps.

The Pre-Quaternary Geology of Hong Kong, by R.J. Sewell, S.D.G. Campbell, C.J.N. Fletcher, K.W. Lai & P.A. Kirk (2000), 181 p. plus 4 maps.

TECHNICAL GUIDANCE NOTES

TGN 1	Technical Guidance Documents