

# **Factual Report on Hong Kong Rainfall and Landslides in 2015**

**GEO Report No. 330**

**R.C.T. Wai, R.W.H. Lee & V.W.W. Kong**

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

# **Factual Report on Hong Kong Rainfall and Landslides in 2015**

**GEO Report No. 330**

**R.C.T. Wai, R.W.H. Lee & V.W.W. Kong**

**This report was originally produced in May 2016  
as GEO Special Project Report No. SPR 1/2016**

© The Government of the Hong Kong Special Administrative Region

First published, August 2017

Prepared by:

Geotechnical Engineering Office,  
Civil Engineering and Development Department,  
Civil Engineering and Development Building,  
101 Princess Margaret Road,  
Homantin, Kowloon,  
Hong Kong.

## 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.

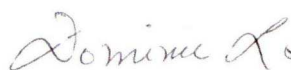
These publications and the printed GEO Reports may be obtained from the Government's Information Services Department. Information on how to purchase these documents is given on the second last page of this report.



W.K. Pun  
Head, Geotechnical Engineering Office  
August 2017

## Foreword

This report presents a summary of the factual information on rainfall and landslides in Hong Kong throughout 2015. 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. The Standards and Testing Division of the GEO carried out a review of the available rainfall records as well as rainfall analyses, and prepared Section 2 of this report. All contributions are gratefully acknowledged.



Dominic O.K. Lo  
Chief Geotechnical Engineer/LPM 1

## **Abstract**

This report presents a summary of the factual information on rainfall and landslides in Hong Kong throughout 2015. 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 ACSL Joint Venture and Halcrow China Limited.

Rainfall recorded in 2015 at the HKO's Principal Raingauge at Tsim Sha Tsui amounted to 1,874.5 mm, a deficit of 22 percent comparing to the mean rainfall of 2,398.5 mm between 1981 and 2010. One Black Rainstorm Warning was issued on 26 May 2015. Four Red Rainstorm Warnings and 21 Amber Rainstorm Warnings were issued between 20 May and 15 August 2015, and between 11 May and 4 October 2015 respectively.

Two Landslip Warnings were issued on 20 May and 22 July 2015. A total of 182 incidents were reported to the Government in 2015. Of these, 161 were classified as genuine landslides and ten of them were designated as major failure (i.e. with a failure volume of 50 m<sup>3</sup> or more, or where a fatality has occurred).

There were 12 landslides in 2015 with notable consequences. Of these landslides, one led to minor injuries of four persons due to a fallen rock block punching through the window of a tour bus and one led to permanent evacuation of a squatter dwelling. The remaining ten landslides resulted in temporary closure of roads. Other landslides in 2015 affected open areas, footpaths or minor access roads, construction site and catchwaters without any significant direct or indirect consequence. No fatality was reported as a result of the 2015 landslides.

## Contents

|   | Page<br>No. |
|---|-------------|
| Title Page  | 1           |
| Preface   | 3           |
| Foreword  | 4           |
| Abstract  | 5           |
| Contents  | 6           |
| List of Tables  | 8           |
| List of Figures   | 9           |
| 1 Introduction  | 10          |
| 2 Rainfall  | 10          |
| 2.1 The Raingauge System  | 10          |
| 2.2 Rainfall Records  | 10          |
| 2.3 Rainstorms in 2015  | 14          |
| 2.4 Warnings Issued by the Hong Kong Observatory  | 15          |
| 3 Landslides  | 24          |
| 3.1 Landslides in 2015  | 24          |
| 3.2 Consequence of Landslides   | 25          |
| 3.3 Types of Slope Failures   | 25          |
| 3.4 Landslide Volume Distribution   | 29          |
| 4 Notable Landslides  | 31          |
| 4.1 General   | 31          |
| 4.2 The 19 February 2015 Rockfall from Slope No. 15NE-A/C425 at Stanley Gap Road near Chung Hom Kok Road, Stanley (Incident No. 2015/02/1659)   | 31          |
| 4.3 The 15 August 2015 Landslide at an Unregistered Cut Slope below a Squatter Structure at Pai Tau Village, Shatin (Incident No. 2015/08/1733) | 31          |
| 4.4 The 24 July 2015 Landslide on Slope No. 3SW-B/F59 at Hok Tau Road, Fanling (Incident No. 2015/07/1715)                                      | 32          |

|   | Page<br>No. |
|---|-------------|
| 5 Conclusion  | 33          |
| 6 References  | 34          |
| Appendix A: Some Selected Rainfall Parameters for the 13 Rainstorms<br>with Daily Rainfall Exceeding 100 mm in 2015 | 35          |
| Appendix B: List of Landslide Incidents Reported to the Government  | 55          |



## List of Tables

| Table<br>No. |  | Page<br>No. |
|--------------|--|-------------|
| 2.1          | Rainfall and Landslides in 2015 and Selected Previous Major Rainstorms | 21          |
| 2.2          | Warnings Issued by the Hong Kong Observatory in 2015                   | 23          |
| 3.1          | Breakdown of Landslides in 2015 Reported to Government Departments     | 24          |
| 3.2          | Breakdown of Landslides by Types of Affected Facilities                | 26          |
| 3.3          | Breakdown of Landslide Consequences by Types of Slope Failures         | 27          |
| 3.4          | Breakdown of Facility Groups Affected by Major Landslides              | 28          |
| 3.5          | Breakdown of Landslides by Types of Slope Failures                     | 28          |
| 3.6          | Landslide Volume Distribution with Respect to Geographical Locations   | 29          |
| 3.7          | Landslide Volume Distribution with Respect to Types of Slope Failures  | 30          |

## List of Figures

| Figure<br>No. |   | Page<br>No. |
|---------------|---|-------------|
| 2.1           | Locations of GEO and HKO Automatic Raingauges   | 11          |
| 2.2           | Cumulative Rainfall for 2015 at the Hong Kong Observatory and its Recorded Highest, Mean and Lowest Cumulative Rainfalls                            | 15          |
| 2.3           | Monthly Rainfall Distribution in 2015   | 16          |
| 2.4           | Annual Rainfall Distribution and Locations of Reported Landslides in 2015   | 20          |
| 4.1           | Views of the 19 February 2015 Rockfall from Slope No. 15NE-A/C425 at Stanley Gap Road near Chung Hom Kok Road (Incident No. 2015/02/1659)           | 31          |
| 4.2           | General View of the 15 August 2015 Landslide at an Unregistered Cut Slope below a Squatter Structure at Pai Tau Village (Incident No. 2015/08/1733) | 32          |
| 4.3           | General View of the 24 July 2015 Landslide on Slope No. 3SW-B/F59 at Hok Tau Road (Incident No. 2015/07/1715)                                       | 33          |

## 1 Introduction

This report summarises the factual information on rainfall and reported landslides in Hong Kong throughout 2015. 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 ACSL Joint Venture and Halcrow China Limited under Agreement Nos. CE 37/2013 (GE) and CE 38/2013 (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  $\geq 50 \text{ m}^3$ , or where a fatality has occurred. A 'very minor' landslide is defined as a failure that is small in scale (i.e.  $\leq 5 \text{ m}^3$  for failures involving soil, or  $\leq 0.1 \text{ m}^3$  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

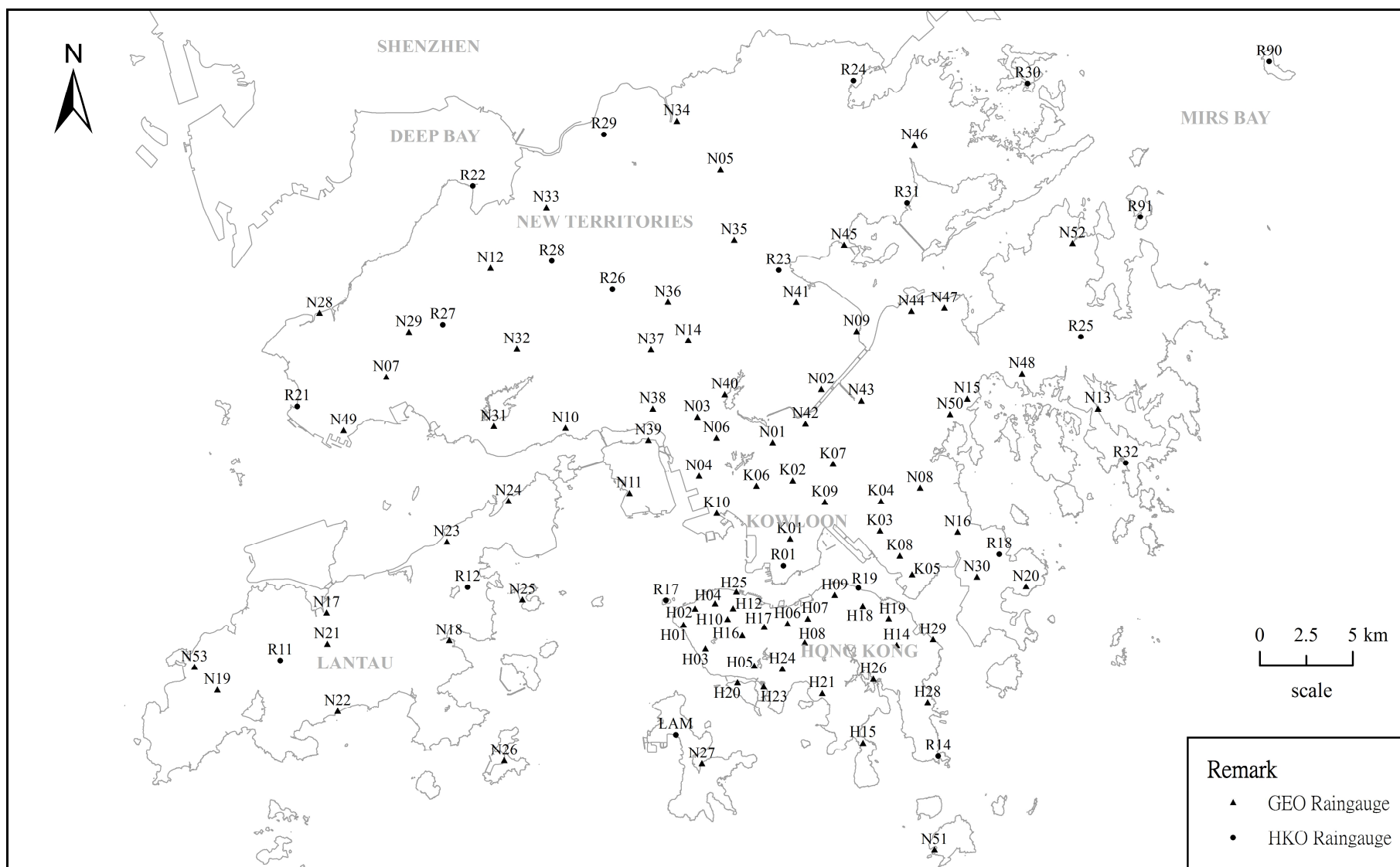
### 2.1 The Raingauge System

The GEO, in collaboration with the HKO, operates an automatic raingauge system that transmits rainfall data through both 2G and 3G 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 2015, as well as individual months and individual rainstorms.

The weather in 2015, as described by the HKO (2016), is excerpted as follows:



**Figure 2.1 Locations of GEO and HKO Automatic Raingauges**

"The year 2015 was drier than normal in Hong Kong. The annual total rainfall was 1,874.5 millimetres, a deficit of 22 percent comparing to the 1981-2010 normal of 2,398.5 millimetres (and about 15 percent below the 1961-1990 normal). The number of days with thunderstorms reported in Hong Kong was 37 days in 2015, close to the 1981-2010 normal. Affected by a trough of low pressure, torrential rain and intense thunderstorms in Hong Kong necessitated the issuance of the Black Rainstorm Warning on 26 May."

"A total of 27 tropical cyclones occurred over the western North Pacific and the South China Sea in 2015, less than the long-term (1961-2010) average of around 30. There were 20 tropical cyclones reaching typhoon intensity (Information on the classification of Tropical Cyclones is available at: <http://www.hko.gov.hk/informtc/class.htm>) or above during the year, more than the long-term average of about 15, and 13 of them reached super typhoon intensity (maximum 10-minute wind speed of 185 km/h or above near the centre), the highest since full records began in 1961. In Hong Kong, three tropical cyclones necessitated the issuance of local tropical cyclone warning signals, lower than the long-term average of about six in a year. The No. 8 Gale or Storm Signal was issued during the passage of Typhoon Linfa in July"

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 2015) and in October 2015. Further details on the monthly weather are available on the HKO Website (<http://www.hko.gov.hk/wxinfo/pastwx/mws.htm>).

"With a trough of low pressure lingering over the coastal areas of Guangdong, local weather remained unsettled with occasional heavy showers and squally thunderstorms over the next twelve days. Two 'Red' rainstorm episodes on 20 and 23 May brought more than 150 millimetres of rain to most parts of the territory. Flooding was reported in Sha Tin, Ma On Shan and Tuen Mun on 20 May, and also at the low-lying areas in Sheung Shui and Yuen Long on 23 May. Meanwhile, a fresh to strong easterly airstream also brought windy and cooler conditions to the territory on 21-22 May. Another rapidly developed rainstorm brought more than 70 millimetres of rain to the urban areas and more than 100 millimetres to Sha Tin, Tsuen Wan, Sai Kung and Ma On Shan on 26 May, necessitating the first issuance of Black Rainstorm Warning of the year. Flooding was reported in Ho Man Tin, Sha Tin and Sai Kung."

"As a trough of low pressure reached the south China coast on 12 June, heavy showers and squally thunderstorms affected Hong Kong that morning, with more than 100 millimetres of

rain falling over the urban areas. The southwest monsoon continued to bring hot and showery weather to the territory over the next three days. "

"Meanwhile, Linfa intensified into a typhoon and made landfall over the coast of eastern Guangdong on 9 July. Local winds strengthened gradually in the afternoon with occasional gales on high ground. Tracking generally westwards along the coastal strip of Guangdong, Linfa weakened rapidly during the night. After some morning rain on 10 July, the weather rapidly improved during the day and a spell of very hot weather persisted over the following nine days. The maximum temperature at the Observatory reached 34.4 degrees on 13 July, the highest for the month. However, the weather also became increasingly unsettled with less sunshine and more showers. The showers were thundery at times and heavy in places, particularly over the western part of the territory on 17 July when more than 200 millimetres of rainfall were recorded near Chek Lap Kok in Lantau Island."

"While it remained mostly fine and very hot during the day on 9 August, local weather also became more unsettled that night under the influence of a southwesterly airstream, with squally thunderstorms and showers bringing more than 30 millimetres of rain to many places of the territory, especially over the New Territories. Apart from a generally fine and very hot day on 12 August, showers and thunderstorms continued to affect Hong Kong on 10-16 August. Red rainstorm warning was issued on 15 August with more than 100 millimetres of rain recorded over the New Territories."

"With a trough of low pressure forming over the inland areas of Guangdong and edging towards the coast, outbreaks of heavy rain and squally thunderstorms affected Hong Kong on 21 September. More than 30 millimetres of rainfall were generally recorded over the territory, with rain particularly heavy over parts of the New Territories where rainfall amount exceeded 100 millimetres.

With the weakening of the trough, the weather was a mixture of sunny periods and showers over the next couple of days before fine and hot conditions set in on 24 September. The weather then deteriorated in the afternoon on 26 September as intense thunderstorms and heavy rain associated with a trough of low pressure brought more than 30 millimetres of rainfall to Hong Kong. The rain was particularly heavy over the eastern part of Kowloon with rainfall exceeding 70 millimetres. The weather remained mainly cloudy and showery on 27 September before a dry continental airstream brought fine and hot

conditions towards the end of the month as Super Typhoon Dujuan swept across Taiwan and landed over Fujian."

"With Mujigae making landfall near Zhanjiang of Guangdong and weakening gradually on the afternoon of 4 October, local winds started to subside gradually. Under the influence of the outer rainbands of Mujigae, there were occasional heavy squally showers and thunderstorms in Hong Kong on 4 and 5 October. In particular, more than 40 millimeters of rainfall were recorded over most parts of the territory and rainfall over western part of Lantau Island even exceeded 100 millimeters on 4 October.

Affected by the cloud bands associated with the northeast monsoon, it remained cloudy and showery on 6-7 October. There was also a localized heavy downpour in the eastern part of the New Territories with more than 150 millimetres of rain falling over Sai Kung on the morning of 7 October."

The rainfall recorded at the HKO in the first quarter of 2015 is 102.1 mm (37% below the normal rainfall). The total rainfalls recorded in the second and third quarter are 879.6 mm (6% below normal) and 637.4 mm (44% below normal) respectively. For the last quarter of 2015, the total rainfall is 255.4 mm (53% above normal). The annual rainfall for 2015 is 1,874.5 mm, about 22 percent lower than the annual normal of 2,398.5 mm recorded between 1981 and 2010. The cumulative rainfall for 2015 is compared with the highest, lowest and mean rainfall in Figure 2.2.

Figure 2.3 shows the monthly rainfall distribution in 2015. Figure 2.4 shows the annual rainfall distribution in 2015, together with the locations of the reported landslides.

## 2.3 Rainstorms in 2015

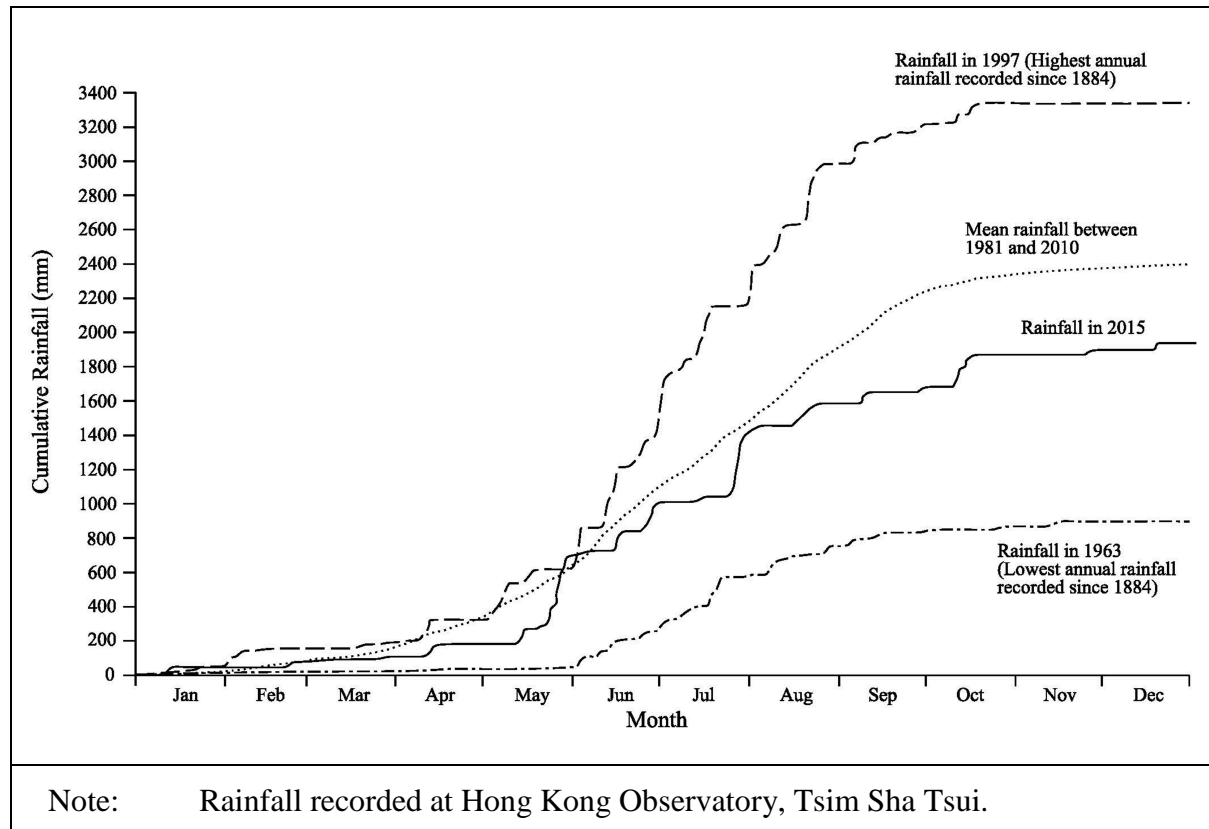
Table 2.1 tabulates the rainfall parameters for 13 rainstorms in 2015, during which the daily rainfall exceeded 100 mm at any of the HKO and the GEO raingauges. The parameters include the maximum 24-hour, 4-hour and 1-hour rolling rainfalls (based on 5-minute rainfall data). Table 2.1 also includes the 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 13 rainstorms are also shown in Table A1 of Appendix A.

Figures A1 to A13 of Appendix A show the isohyets of the maximum rolling 24-hour rainfall during the above 13 rainstorms, together with the locations of reported landslides with incident date or incident reported date 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 rainstorm of 14-16 August 2015 had caused 19 reported landslides. Each of the other rainstorms in 2015 resulted in less than ten reported landslides.

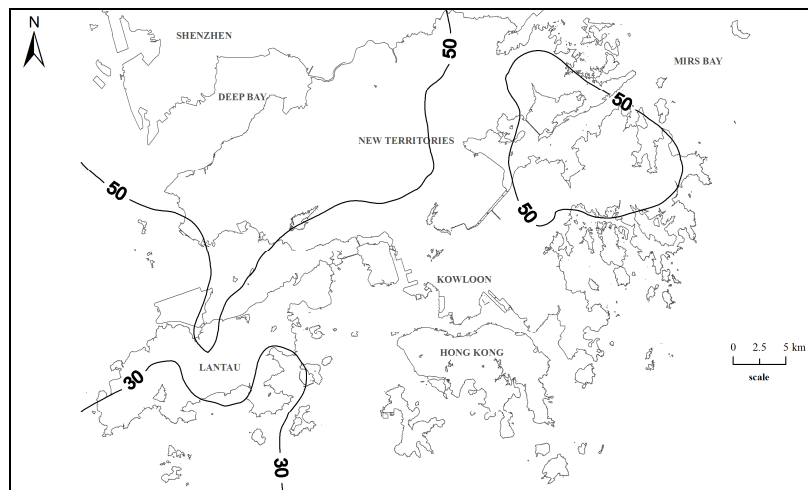
## 2.4 Warnings Issued by the Hong Kong Observatory

Table 2.2 summarises the details of the Thunderstorm, Flooding, Landslip, Tropical Cyclone and Rainstorm Warnings issued by the HKO in 2015. One Black Rainstorm Warning was issued on 26 May 2015. Four Red Rainstorm Warnings and 21 Amber Rainstorm Warnings were issued between 20 May and 15 August 2015, and between 11 May and 4 October 2015 respectively. Two Landslip Warnings were issued on 20 May 2015 and 22 July 2015.

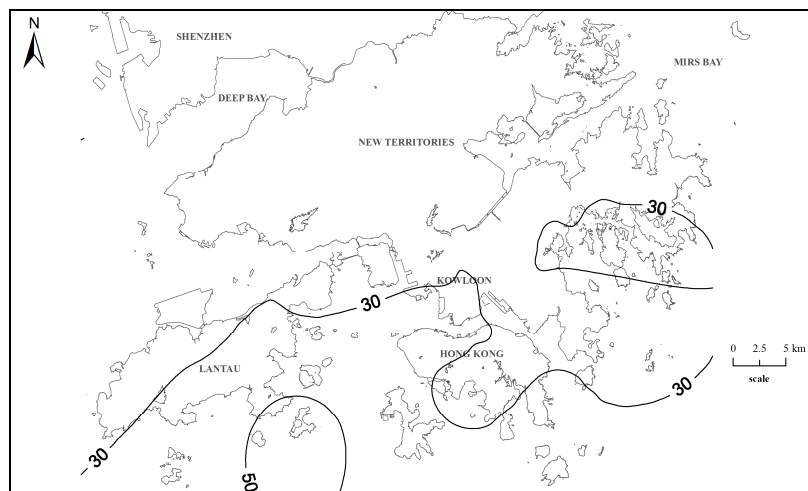


**Figure 2.2 Cumulative Rainfall for 2015 at the Hong Kong Observatory and its Recorded Highest, Mean and Lowest Cumulative Rainfalls**

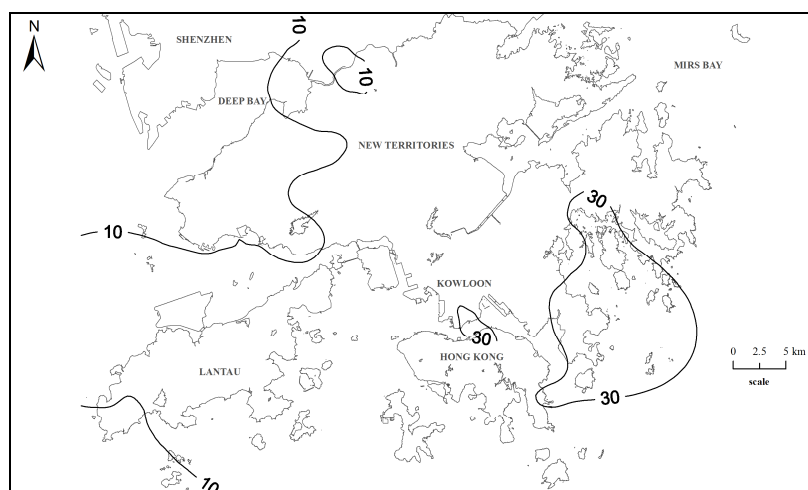




January 2015



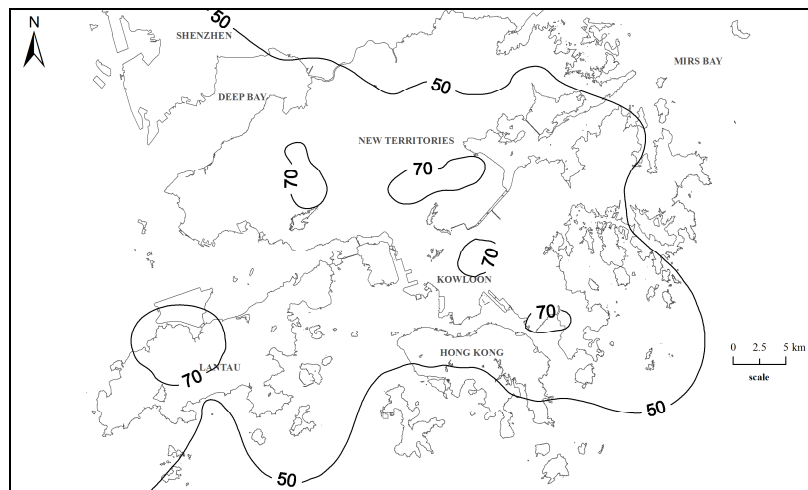
February 2015



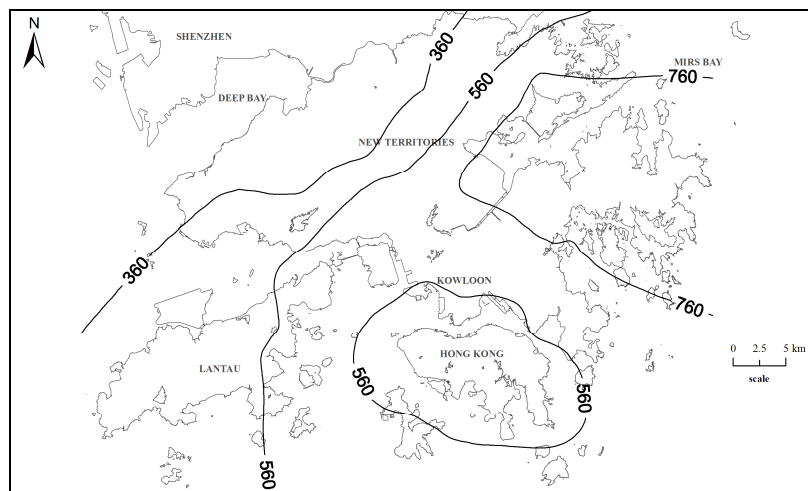
March 2015

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

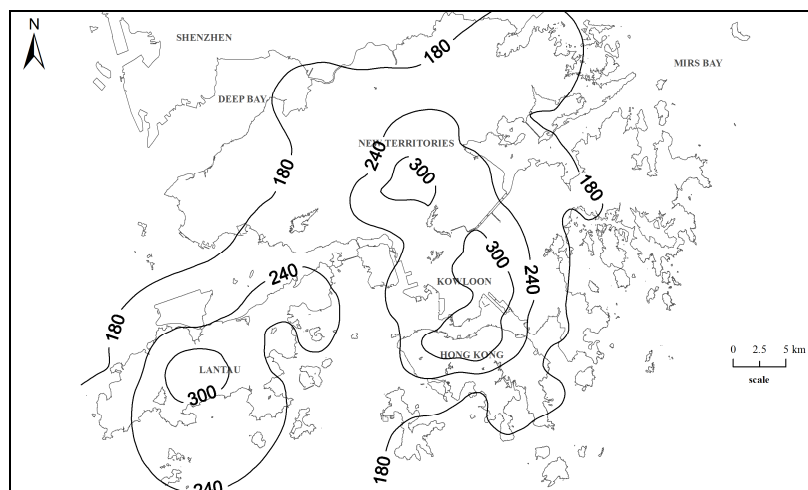
**Figure 2.3 Monthly Rainfall Distribution in 2015 (Sheet 1 of 4)**



April 2015



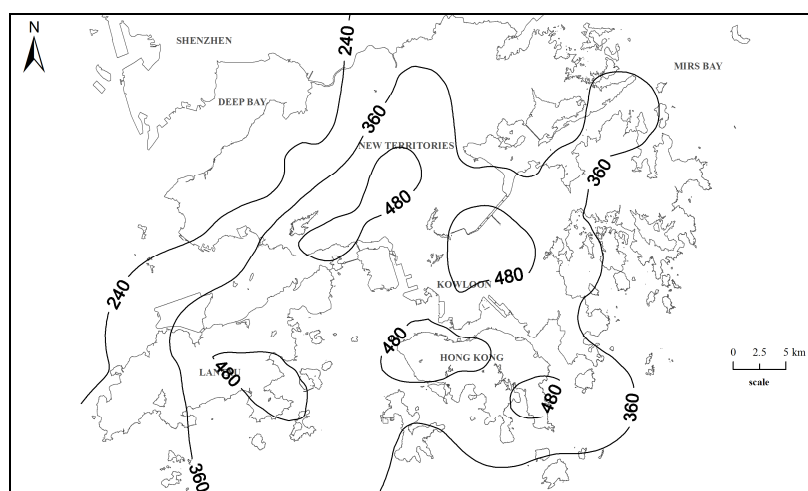
May 2015



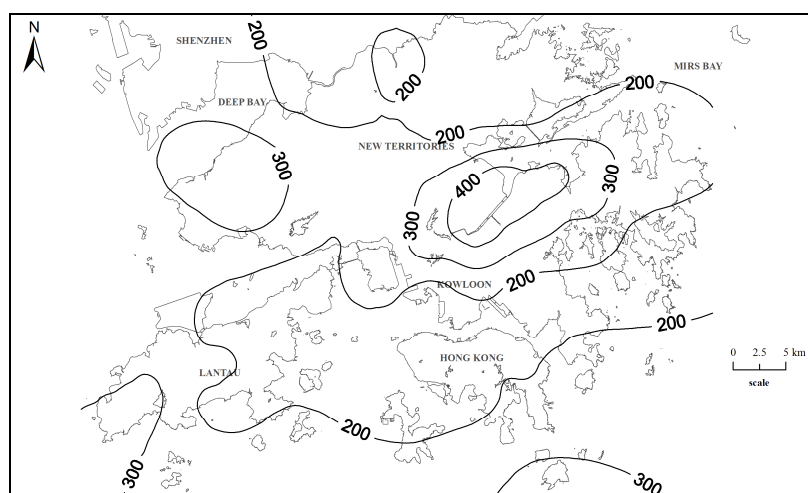
June 2015

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

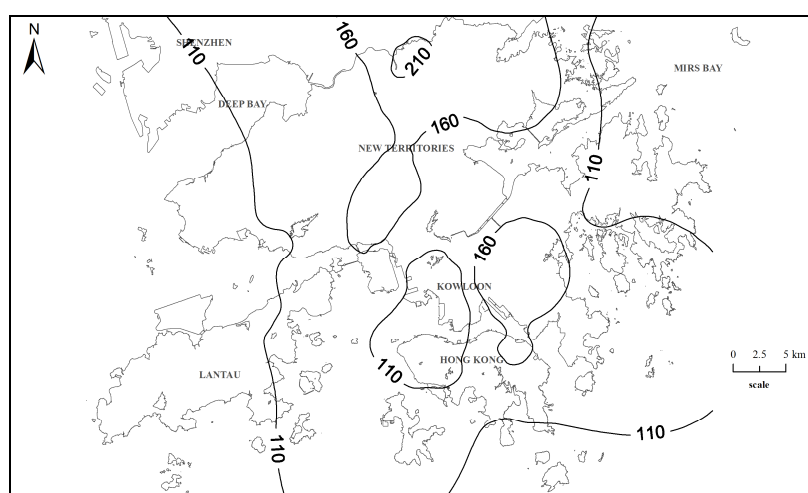
**Figure 2.3 Monthly Rainfall Distribution in 2015 (Sheet 2 of 4)**



July 2015



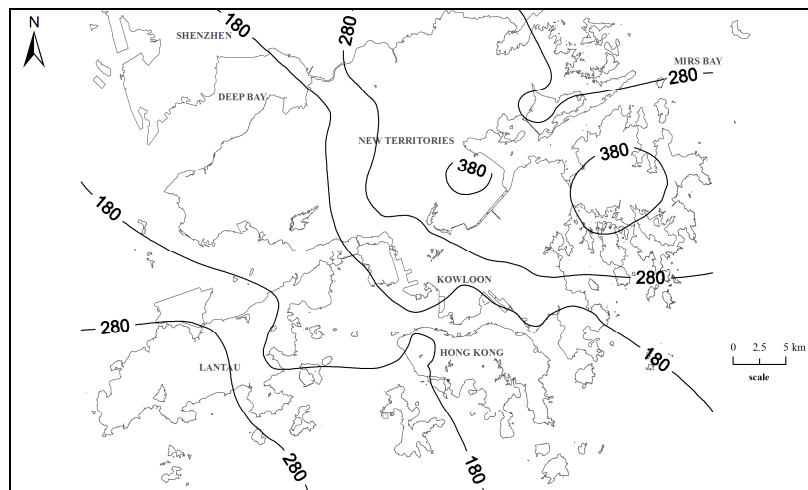
August 2015



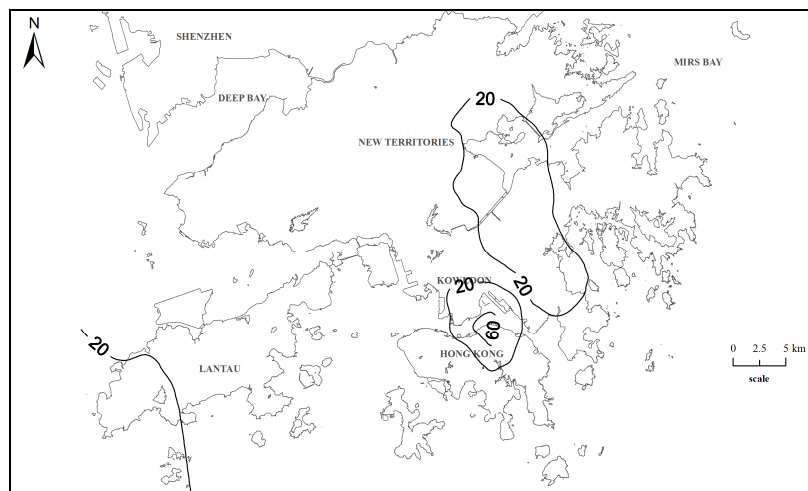
September 2015

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

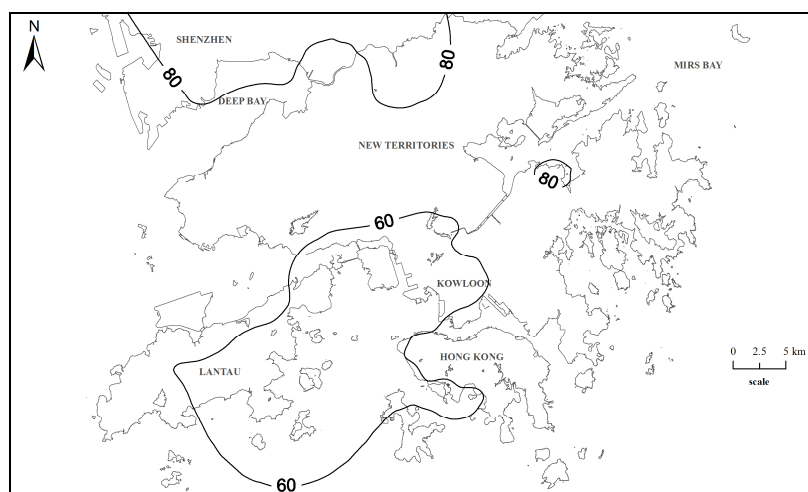
**Figure 2.3 Monthly Rainfall Distribution in 2015 (Sheet 3 of 4)**



October 2015



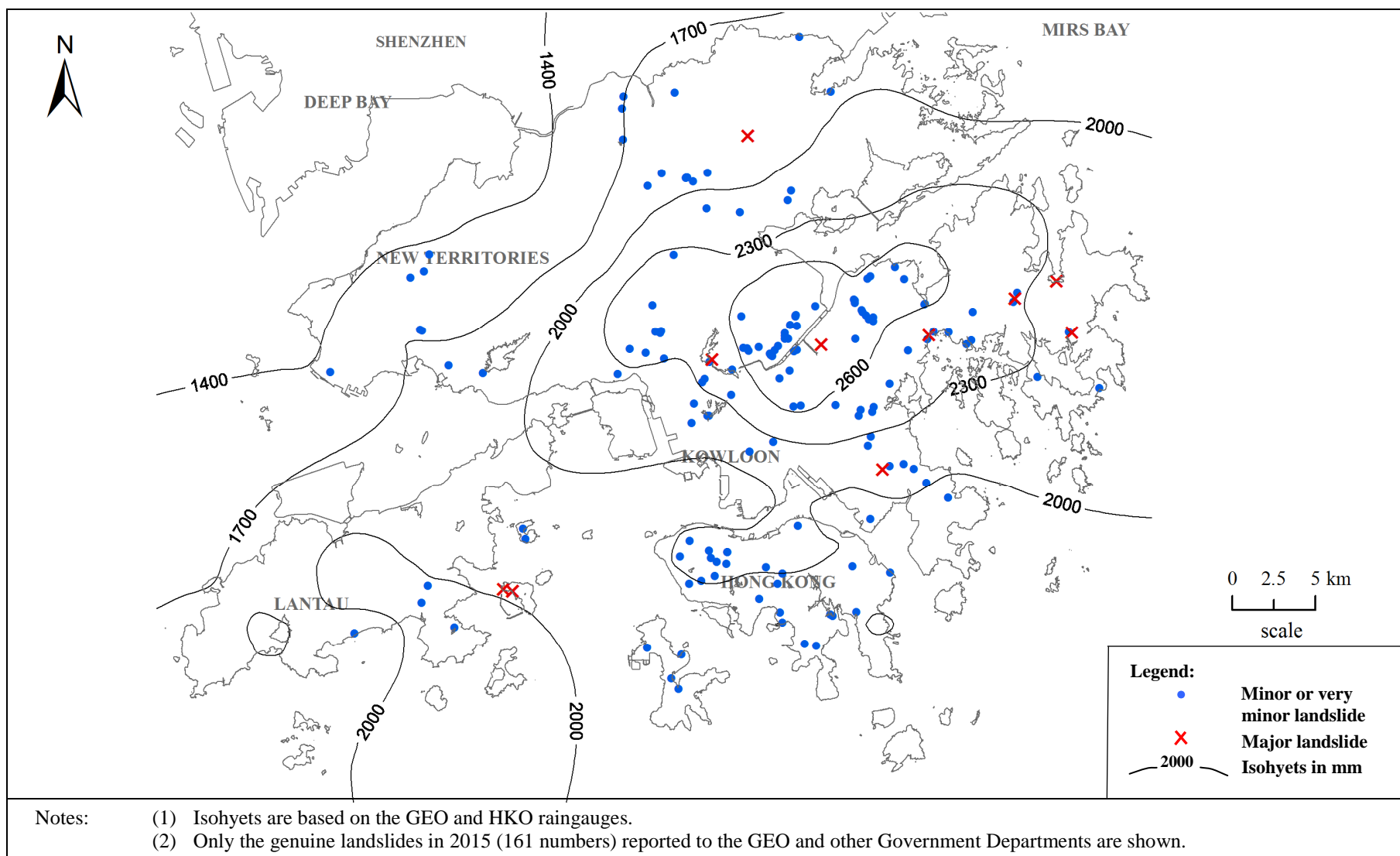
November 2015



December 2015

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

**Figure 2.3 Monthly Rainfall Distribution in 2015 (Sheet 4 of 4)**



**Figure 2.4 Annual Rainfall Distribution and Locations of Reported Landslides in 2015**

**Table 2.1 Rainfall and Landslides in 2015 and Selected Previous Major Rainstorms (Sheet 1 of 2)**

| Date of<br>Rainstorm Event <sup>(1)</sup> | Maximum Rainfall (mm) <sup>(2)</sup> |      |      |            |        |                               |             |             | Number of Landslides<br>Reported <sup>(4)</sup> |
|---|--------------------------------------|------|------|------------|--------|-------------------------------|-------------|-------------|---|
|   | Hong Kong Observatory (HKO)          |      |      |            |        | GEO Raingauges <sup>(3)</sup> |             |             |   |
|   | 24-hr                                | 4-hr | 1-hr | Antecedent |        | 24-hr                         | 4-hr        | 1-hr        |   |
|   |                                      |      |      | 4-day      | 15-day |                               |             |             |   |
| 20-25 July 2015                           | 181.5                                | 83   | 23.5 | 1.5        | 29.5   | 330 (H10)                     | 227 (H03)   | 102 (N42)   | 9   |
| 23-24 May 2015                            | 169                                  | 83   | 37.5 | 118        | 180.5  | 280 (N51)                     | 125.5 (H26) | 74.5 (N25)  | 5   |
| 19-21 May 2015                            | 115.5                                | 54   | 41   | 25.5       | 67     | 386.5 (N47)                   | 285 (N47)   | 105.5 (N13) | 3   |
| 12-13 June 2015                           | 98                                   | 90.5 | 42.5 | 27.5       | 56     | 127.5 (H07)                   | 123.5 (H07) | 91.5 (H07)  | 0   |
| 3-8 October 2015                          | 83                                   | 37   | 20.5 | 7          | 44.5   | 308.5 (N19)                   | 246 (N48)   | 125.5 (N48) | 7   |
| 14-16 August 2015                         | 43.5                                 | 14   | 6.5  | 70.5       | 83     | 289 (N47)                     | 263 (N47)   | 150.5 (N47) | 19  |
| 26-27 May 2015                            | 39.5                                 | 20.5 | 4.5  | 205        | 355.5  | 188 (N06)                     | 148 (N06)   | 92.5 (N50)  | 6   |
| 10-11 May 2015                            | 28                                   | 20.5 | 13   | 8.5        | 13     | 146 (N13)                     | 92.5 (N46)  | 77 (N46)    | 0   |
| 21-22 September 2015                      | 20.5                                 | 18   | 8.5  | 0          | 9      | 117 (N34)                     | 108.5 (N34) | 69.5 (N34)  | 1   |
| 26-27 September 2015                      | 16.5                                 | 8.5  | 6.5  | 3          | 22.5   | 104 (K03, K07)                | 104 (K07)   | 103 (K07)   | 0   |
| 13-14 November 2015                       | 12                                   | 6.5  | 3.5  | 3.5        | 4.5    | 111.5 (H09)                   | 101.5 (H09) | 56.5 (H09)  | 0   |
| 17-18 July 2015                           | 1.5                                  | 1.5  | 1.0  | 0          | 28     | 236 (N17)                     | 220 (N17)   | 93 (N21)    | 1   |
| 26-27 August 2015                         | 0                                    | 0    | 0    | 3.5        | 92.5   | 141.5 (N19)                   | 133 (N19)   | 108 (N19)   | 0   |

- 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 refer to those genuine landslides that can be attributed to the rainstorm events.

**Table 2.1 Rainfall and Landslides in 2015 and Selected Previous Major Rainstorms (Sheet 2 of 2)**

| Date of<br>Rainstorm Event | Maximum Rainfall (mm) <sup>(1)</sup> |      |      |            |        |                               |      | Number of Landslides<br>Reported <sup>(2)</sup> |      |
|----------------------------|--------------------------------------|------|------|------------|--------|-------------------------------|------|---|------|
|                            | Hong Kong Observatory (HKO)          |      |      |            |        | GEO Raingauges <sup>(3)</sup> |      |   |      |
|                            | 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 (N14)   | 194.5 (N14) | 61.5 (N14)  | 378 |
| 7-9 May 1992      | 324.7 | 195   | 109.9 | 4.2   | 9.1   | 386.5 (H10) | 243 (H10)   | 144.5 (H19) | 314 |
| 15-16 June 1993   | 155.1 | 122.3 | 54.1  | 155.8 | 296.1 | 285 (N13)   | 191.5 (N13) | 111 (H13)   | 123 |
| 4-5 November 1993 | 106.6 | 27.8  | 9.4   | 0     | 0     | 745 (N17)   | 285 (N17)   | 114 (N17)   | 394 |
| 21-25 July 1994   | 310.2 | 141.9 | 70.4  | 18.7  | 310.1 | 956 (N14)   | 365 (N14)   | 211.5 (N14) | 208 |
| 3-11 August 1994  | 74.1  | 44.9  | 27.1  | 8.1   | 759.1 | 381 (N14)   | 187.5 (N14) | 103.5 (N14) | 46  |
| 11-15 August 1995 | 325.7 | 109.1 | 43.8  | 5.1   | 436.9 | 468 (H08)   | 223.5 (H14) | 106 (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 (N09)   | 249.5 (N09) | 125 (N01)   | 150 |
| 8-9 June 1998     | 428.4 | 152.4 | 71.7  | 86.6  | 246.8 | 562 (N15)   | 218.5 (N15) | 98 (N09)    | 96  |
| 22-26 August 1999 | 313.1 | 127.4 | 50.7  | 6.8   | 170.3 | 565 (N14)   | 230.5 (N10) | 120.5 (N10) | 269 |
| 16-21 August 2005 | 416.4 | 122.9 | 39.1  | 110.7 | 214.1 | 570 (N01)   | 173.5 (N18) | 82 (N25)    | 229 |
| 6-9 June 2008     | 417.6 | 246.3 | 145.5 | 99.9  | 242.5 | 622.5 (N19) | 384 (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 refer 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 2015**

| Month     | Monthly Total Rainfall (mm) | Dates on which Warnings <sup>(1)</sup> were in Effect      |            |                         |                                 |   |
|-----------|-----------------------------|--|------------|-------------------------|---------------------------------|---|
|           |                             | Thunderstorm <sup>(2)</sup>                                | Flooding   | Landslip <sup>(3)</sup> | Tropical Cyclone <sup>(4)</sup> | Rainstorm   |
| January   | 41.7                        | -  | -          | -                       | -                               | -   |
| February  | 32                          | -  | -          | -                       | -                               | -   |
| March     | 28.4                        | -  | -          | -                       | -                               | -   |
| April     | 64.5                        | 8, 20  | -          | -                       | -                               | -   |
| May       | 513                         | 9, 10, 11, 16, 17, 19, 20, 22, 24, 25, 26, 27, 28, 30, 31  | 23         | 20-21                   | -                               | 11 (Amber), 20 (2 x Amber), 20 (Red) , 23 (4 x Amber), 23 (Red), 24 (Amber), 26 (2 x Amber), 26 (Red), 26 (Black) |
| June      | 291                         | 1, 2, 3, 5, 6, 10, 11, 12, 14, 15, 21, 22, 23, 24, 25, 26  | -          | -                       | 21-23 (1, KUJIRA)               | 12 (Amber)  |
| July      | 406.2                       | 10, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 | 17, 24     | 22                      | 8-10 (1-8, LINFA)               | 21 (Amber), 22 (Amber)  |
| August    | 143.3                       | 9, 10, 11, 12, 13, 14, 15, 16, 20, 21, 26, 27, 29, 30, 31  | 9, 15      | -                       | -                               | 9 (Amber), 15 (2 x Amber), 15 (Red)   |
| September | 92.5                        | 1, 2, 4, 7, 16, 21, 26, 30                                 | 21         | -                       | -                               | 2 (Amber), 21 (Amber), 26 (Amber)   |
| October   | 168.3                       | 1, 2, 3, 5, 6, 7   | -          | -                       | 2-5 (1-3, MUJIGAE)              | 3 (Amber), 4 (Amber)  |
| November  | 22.8                        | -  | -          | -                       | -                               | -   |
| December  | 64.3                        | -  | -          | -                       | -                               | -   |
| Total     | 1868                        | 128 Warnings   | 6 Warnings | 2 Warnings              | 3 Warnings                      | 26 Warnings (21 x Amber, 4 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 2015

Landslide incidents occurring in 2015 and reported to the GEO and other government departments are summarised in Table 3.1.

**Table 3.1 Breakdown of Landslides in 2015 Reported to Government Departments**

| Department   | Reported Number of Landslides | Genuine Landslides      |
|--|-------------------------------|-------------------------|
| Agriculture, Fisheries and Conservation Department                               | 6 (0)                         | 6 (0)                   |
| Architectural Services Department  | 8 (0)                         | 8 (0)                   |
| Drainage Services Department   | 0                             | 0                       |
| Geotechnical Engineering Office,<br>Civil Engineering and Development Department | 136 <sup>(1)</sup>            | 127 <sup>(1)</sup>      |
| Highways Department  | 32 (31)                       | 32 (31)                 |
| Housing Department   | 0                             | 0                       |
| Lands Department   | 3 (0)                         | 3 (0)                   |
| Water Supplies Department  | 29 (1)                        | 17 (1)                  |
| Total  | 214 (32) <sup>(2)</sup>       | 193 (32) <sup>(2)</sup> |

Legend:

32 (31) Thirty-two incidents were reported to the government department concerned, 31 of which were also reported to the GEO separately by other parties (i.e. duplicate cases)

Notes: (1) A total of 136 landslide incidents that occurred in 2015 (discounting duplicate cases) were reported to the GEO, of which 127 were classified as genuine landslides.  
(2) The number of reported landslide incidents that occurred in 2015 (discounting duplicate cases) is **182** [214 - 32]. The number of genuine landslides is **161** [193 - 32].

A total of 182 landslide incidents that occurred in 2015 were reported to various government departments. These include 136 incidents (discounting duplicate cases) reported to the GEO. Another 46 incidents were reported to other government departments (i.e. AFCD, ArchSD, HyD, LandsD and WSD). Of these 182 reported incidents, 161 were genuine landslides (see details in Appendix B). The other reported incidents were non-landslide events such as tree falls and flooding.

Of the 161 genuine landslides, ten (6.2%) were major landslides (see Table B1 in Appendix B), 103 (64.0%) were minor landslides and 48 (29.8%) 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 4.3. 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 161 landslides, the timing of occurrence was determined to within one day for 32 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, injuries, 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 landslides are presented in Table 3.4. Further descriptions of some selected notable landslides of 2015 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)                                | 2 (0)            | 0       | 10 (0)                               | 12 (0)   |
| Registered Squatter Dwellings                                       | 0                | 0       | 18 (0)                               | 18 (0)   |
| Roads   | 8 (0)            | 2 (0)   | 15 (2)                               | 25 (2)   |
| Transportation Facilities (e.g. railways, tramways, etc.)           | 0                | 0       | 0                                    | 0        |
| Pedestrian Pavements/Footways                                       | 2 (0)            | 1 (0)   | 1 (0)                                | 4 (0)    |
| Minor Footpaths/Access Paths/Access Roads                           | 8 (0)            | 0       | 43 (3)                               | 51 (3)   |
| Construction Sites  | 0                | 0       | 1 (0)                                | 1 (0)    |
| Open Areas  | 1 (0)            | 1 (0)   | 23 (3)                               | 25 (3)   |
| Catchwaters   | 2 (0)            | 0       | 5 (1)                                | 7 (1)    |
| Others (e.g. carpark, parks, playgrounds, gardens, backyards, etc.) | 3 (0)            | 0       | 11 (0)                               | 14 (0)   |
| Nil   | 1 (0)            | 3 (0)   | 9 (1)                                | 13 (1)   |
| Total   | 27 (0)           | 7 (0)   | 136 (10)                             | 170 (10) |

Legend:

44 (3)      Forty-four landslides of which three were major failures

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.

**Table 3.3 Breakdown of Landslide Consequences by Types of Slope Failures**

| Types of Slope Failures      |           | Number of Squatter Dwellings <sup>(1)</sup> 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   | 1                                     | 0                    | 0  | 0      | 0                        |
| Cut Slopes                   | Soil      | 0   | 0         | 0   | 1                                     | 0                    | 2  | 0      | 0                        |
|                              | Soil/Rock | 0   | 0         | 0   | 3                                     | 0                    | 0  | 0      | 0                        |
|                              | Rock      | 0   | 0         | 0   | 3                                     | 1                    | 0  | 0      | 4 <sup>(3)</sup>         |
| Retaining Walls              |           | 0   | 0         | 0   | 0                                     | 0                    | 2  | 0      | 0                        |
| Natural Hillside             |           | 0   | 0         | 0   | 2                                     | 0                    | 1  | 0      | 0                        |
| Registered Disturbed Terrain |           | 1 (1)   | 0         | 0   | 0                                     | 0                    | 0  | 0      | 0                        |
| Total                        |           | 1 (1)   | 0         | 0   | 10                                    | 1                    | 5  | 0      | 4                        |

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) Four injuries were resulted from a single rockfall incident No. 2015/02/1659 (see Section 4.2 for details).

**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   | 0  | 0  | 0  | 1 | 6 | 3 |
| Major Landslides on Man-made Slopes              | 0   | 0  | 0  | 0  | 1 | 4 | 1 |
| Major Landslides on Registered Disturbed Terrain | 0   | 0  | 0  | 0  | 0 | 0 | 0 |
| Major Landslides on Natural Hillside             | 0   | 0  | 0  | 0  | 0 | 2 | 2 |

Notes: (1) Facility groups are classified in accordance with the GEO Technical Note No. 15 (GEO, 2007).  
 (2) A given landslide may affect more than one type of facility.

**Table 3.5 Breakdown of Landslides by Types of Slope Failures**

| Types of Slope Failures      |           | Number   | Percentage (%) |
|------------------------------|-----------|----------|----------------|
| Fill Slopes                  |           | 11 (2)   | 6.8            |
| Cut Slopes                   | Soil      | 78 (2)   | 48.5           |
|                              | Soil/Rock | 14 (0)   | 8.7            |
|                              | Rock      | 14 (2)   | 8.7            |
| Retaining Walls              |           | 8 (0)    | 5              |
| Natural Hillside             |           | 30 (4)   | 18.6           |
| Registered Disturbed Terrain |           | 6 (0)    | 3.7            |
| Total                        |           | 161 (10) | 100            |

Legend:

30 (4) Thirty landslides, four of which were major failures

Note: Where a landslide involved more than one type of failure, the predominant type of failure has been considered in the above classification.

### 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 109 landslides (67.7%) involved less than 5 m<sup>3</sup> of material. There were ten major landslides (with a failure volume of 50 m<sup>3</sup> or more), four of which occurred on natural hillsides and the other six occurred on man-made features. The largest two incidents occurred on a fill slope at Hok Tau Road, Fanling and a cut slope adjoining the dam of Shing Mun Reservoir, which involved a failure volume of 340 m<sup>3</sup> and 350 m<sup>3</sup> respectively. The former landslide resulted in temporary closure of Hok Tau Road (refer to Section 4.3) whilst the latter solely affected the catchwater at slope toe without any notable consequence.

**Table 3.6 Landslide Volume Distribution with Respect to Geographical Locations**

| Volume of Failure<br>(m <sup>3</sup> ) | Hong Kong<br>Island | Kowloon | New Territories<br>and Outlying<br>Islands | All         |
|--|---------------------|---------|--|-------------|
| < 5                                    | 25                  | 6       | 78   | 109 (67.7%) |
| ≥ 5 to < 10                            | 1                   | 0       | 21   | 22 (13.7%)  |
| ≥ 10 to < 20                           | 0                   | 0       | 11   | 11 (6.8%)   |
| ≥ 20 to < 50                           | 0                   | 1       | 8  | 9 (5.6%)    |
| ≥ 50 to < 200                          | 0                   | 0       | 8  | 8 (5%)      |
| ≥ 200 to < 500                         | 0                   | 0       | 2  | 2 (1.2%)    |
| ≥ 500 to < 1000                        | 0                   | 0       | 0  | 0 (0%)      |
| ≥ 1000                                 | 0                   | 0       | 0  | 0 (0%)      |
| Total                                  | 26                  | 7       | 128  | 161 (100%)  |

Legend:

22 (13.7%) Twenty-two landslides, which amount to 13.7% of the total 161 genuine landslides reported to the Government

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

| Volume of Failure<br>(m <sup>3</sup> ) | Fill Slopes | Cut Slopes |           |      | Retaining<br>Walls | Natural<br>Hillside | Registered<br>Disturbed<br>Terrain | Total       |
|--|-------------|------------|-----------|------|--------------------|---------------------|------------------------------------|-------------|
|  |             | Soil       | Soil/Rock | Rock |                    |                     |                                    |             |
| < 5                                    | 6           | 58         | 10        | 10   | 4                  | 19                  | 2                                  | 109 (67.7%) |
| ≥ 5 to < 10                            | 1           | 8          | 1         | 1    | 4                  | 4                   | 3                                  | 22 (13.7%)  |
| ≥ 10 to < 20                           | 1           | 7          | 2         | 0    | 0                  | 0                   | 1                                  | 11 (6.8%)   |
| ≥ 20 to < 50                           | 1           | 3          | 1         | 1    | 0                  | 3                   | 0                                  | 9 (5.6%)    |
| ≥ 50 to < 200                          | 1           | 2          | 0         | 1    | 0                  | 4                   | 0                                  | 8 (5%)      |
| ≥ 200 to < 500                         | 1           | 0          | 0         | 1    | 0                  | 0                   | 0                                  | 2 (1.2%)    |
| ≥ 500 to < 1000                        | 0           | 0          | 0         | 0    | 0                  | 0                   | 0                                  | 0 (0%)      |
| ≥ 1000                                 | 0           | 0          | 0         | 0    | 0                  | 0                   | 0                                  | 0 (0%)      |
| Total                                  | 11          | 78         | 14        | 14   | 8                  | 30                  | 6                                  | 161 (100%)  |

Legend:

22 (13.7%) Twenty-two landslides, which amount to 13.7% of the total 161 genuine landslides reported to the Government

Note: Where a landslide involved more than one type of failure, the predominant type of failure has been considered in the above classification.

## 4 Notable Landslides

### 4.1 General

Of the 161 genuine landslides reported to the Government that occurred in 2015, three incidents are described in more detail below. These three incidents have been selected on the basis of their consequences.

### 4.2 The 19 February 2015 Rockfall from Slope No. 15NE-A/C425 at Stanley Gap Road near Chung Hom Kok Road, Stanley (Incident No. 2015/02/1659)

At about 5:00 p.m. on 19 February 2015, a rockfall incident occurred on a bare rock cut slope (Feature No. 15NE-A/C425) along Stanley Gap Road near Chung Hom Kok Road under dry weather (Figure 4.1). The rockfall, with an estimated failure volume of about  $0.05 \text{ m}^3$ , involved the detachment of several rock blocks, one of them punching through the window of a tour bus travelling along the road. As a result, four passengers on board were injured by the broken glass fragments. The incident was widely reported by the mass media.



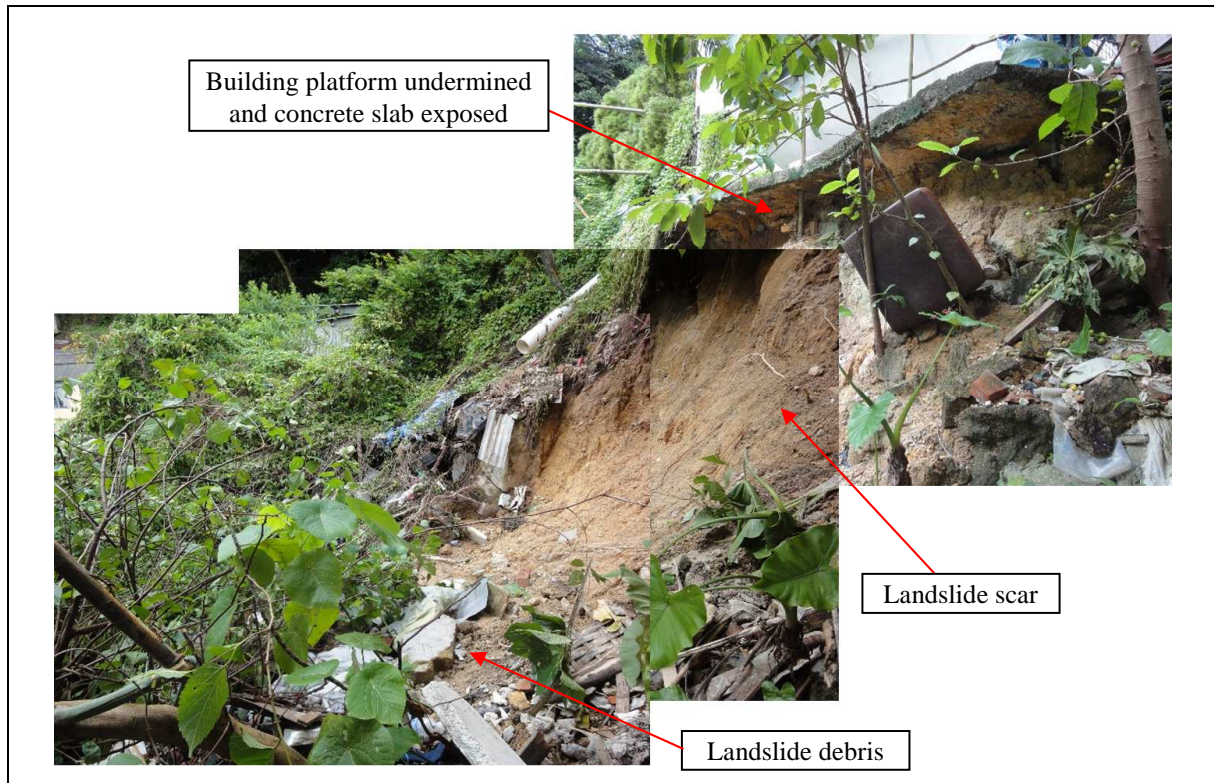
**Figure 4.1 Views of the 19 February 2015 Rockfall from Slope No. 15NE-A/C425 at Stanley Gap Road near Chung Hom Kok Road (Incident No. 2015/02/1659) (Photographs extracted from Apple Daily Website)**

### 4.3 The 15 August 2015 Landslide at an Unregistered Cut Slope below a Squatter Structure at Pai Tau Village, Shatin (Incident No. 2015/08/1733)

On 15 August 2015, a  $6 \text{ m}^3$  landslide was reported to have occurred on an unregistered soil cut slope below a squatter dwelling at No. 350 Pai Tau Village, Shatin (Figure 4.2). The exact date and time of failure were however not known. The landslide scar is about 3 m long, 5.3 m wide and 0.7 m deep. The building platform of the squatter dwelling was undermined and the concrete slab was exposed. No injury or casualty was reported.



According to available records, a Category 2 Non-development Clearance<sup>1</sup> (NDC) to the squatter dwelling at the slope crest was recommended by GEO in 1993. Subsequently, the squatter dwelling was permanently evacuated under a Category 1 NDC<sup>2</sup> recommended by GEO following the 2015 landslide.



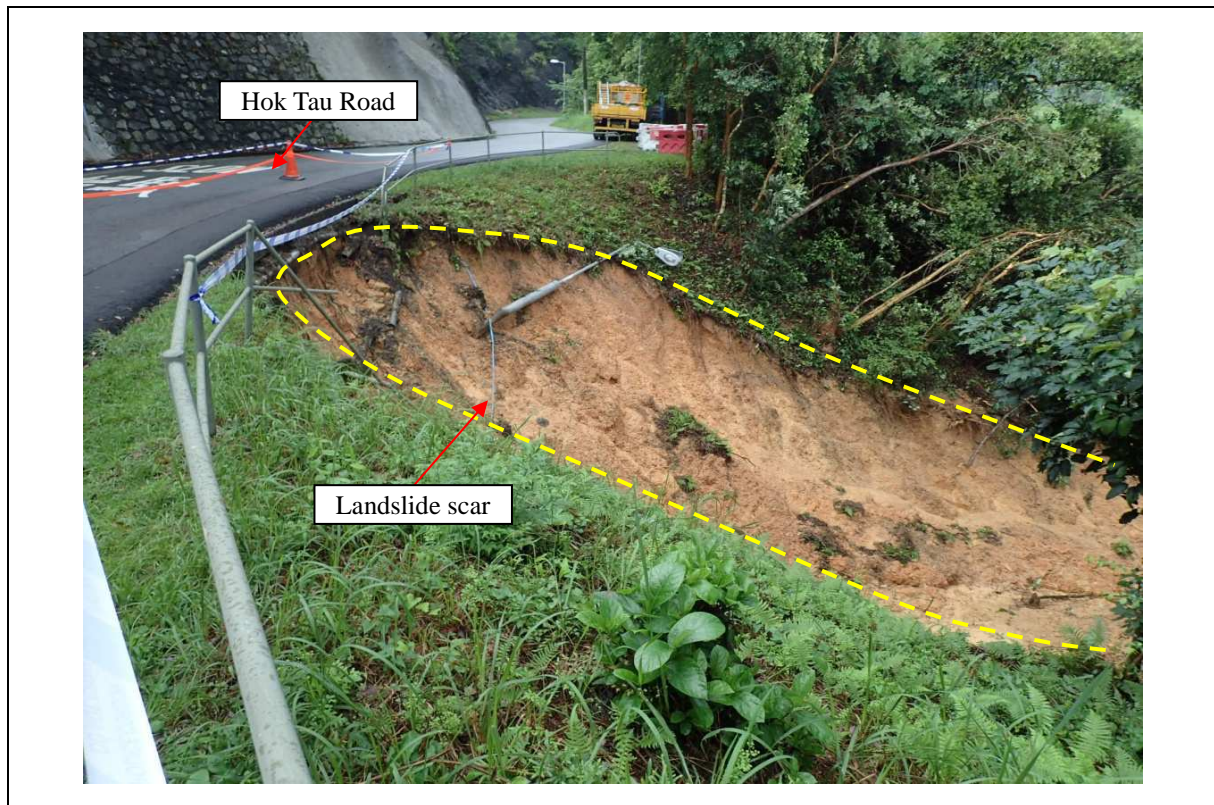
**Figure 4.2 General View of the 15 August 2015 Landslide at an Unregistered Cut Slope below a Squatter Structure at Pai Tau Village (Incident No. 2015/08/1733)**

#### **4.4 The 24 July 2015 Landslide on Slope No. 3SW-B/F59 at Hok Tau Road, Fanling (Incident No. 2015/07/1715)**

At about 10:00 a.m. on 24 July 2015, a major landslide occurred on a fill slope (Feature No. 3SW-B/F59) at Hok Tau Road, Fanling (Figure 4.3). The landslide scar measured about 17.5 m long, 15 m wide and 2.5 m deep, with an estimated failure volume of about 340 m<sup>3</sup>. The landslide primarily involved failure of fill materials with in-situ soils being exposed on the lower part of the scar. The generally intact failed soil mass travelled downhill for a distance of about 40 m and came to rest on an undeveloped green belt. The incident resulted in temporary closure of the southbound lane of Hok Tau Road for eight days. No injury or casualty was reported.

<sup>1</sup> Category 2 Non-development Clearance (NDC) recommendations are issued to squatter structures that are considered especially vulnerable to landslides due to their close proximity to potentially unstable slopes; the clearance is through advice and persuasion.

<sup>2</sup> Category 1 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.



**Figure 4.3 General View of the 24 July 2015 Landslide on Slope No. 3SW-B/F59 at Hok Tau Road (Incident No. 2015/07/1715)**

## 5 Conclusion

Rainfall recorded at the HKO's Principal Rain gauge at Tsim Sha Tsui amounted to 1,874.5 mm in 2015, a deficit of 22 percent comparing to the 1981-2010 normal of 2,398.5 mm. In 2015, two Landslip Warnings and one Black Rainstorm Warning were issued between 20 May and 22 July 2015. Of the 161 genuine landslides, ten were major failures, 103 were minor failures and 48 were very minor failures with negligible consequences.

There were 12 landslides in 2015 with notable consequences. Of these landslides, one led to minor injuries of four persons due to a fallen rock block punching through the window of a tour bus and one led to permanent evacuation of a squatter dwelling. The remaining ten landslides resulted in temporary closure of roads. Other landslides in 2015 affected open areas, footpaths or minor access roads, construction site and catchwaters without any significant direct or indirect consequence. No fatality was reported as a result of the 2015 landslides.

## 6 References

- GEO (2007). *GEO Technical Guidance Note No. 15 (TGN 15) – Guidelines for Classification of Consequence-to-Life Category for Slope Features*. Geotechnical Engineering Office, Hong Kong, 14 p.
- GEO (2010). *GEO Circular No. 3 – Non Development Clearance (Slope Safety) of Squatters*. Geotechnical Engineering Office, Hong Kong, 20 p.
- HKO (2016). *The Year's Weather - 2015*. Hong Kong Observatory, Hong Kong, 7 p.

## Appendix A

Some Selected Rainfall Parameters for the 13 Rainstorms  
with Daily Rainfall Exceeding 100 mm in 2015

**List of Tables**

| Table<br>No. |  | Page<br>No. |
|--------------|--|-------------|
| A1           | Some Selected Rainfall Parameters for the 13<br>Rainstorms with Daily Rainfall Exceeding 100 mm in<br>2015 | 39          |

## List of Figures

| Figure<br>No. |   | Page<br>No. |
|---------------|---|-------------|
| A1            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 10 May (00:00) and 11 May 2015 (24:00) and<br>Locations of Landslides             | 42          |
| A2            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 19 May (00:00) and 21 May 2015 (24:00) and<br>Locations of Landslides             | 43          |
| A3            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 23 May (00:00) and 24 May 2015 (24:00) and<br>Locations of Landslides             | 44          |
| A4            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 26 May (00:00) and 27 May 2015 (24:00) and<br>Locations of Landslides             | 45          |
| A5            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 12 June (00:00) and 13 June 2015 (24:00) and<br>Locations of Landslides           | 46          |
| A6            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 17 July (00:00) and 18 July 2015 (24:00) and<br>Locations of Landslides           | 47          |
| A7            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 20 July (00:00) and 25 July 2015 (24:00) and<br>Locations of Landslides           | 48          |
| A8            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 14 August (00:00) and 16 August 2015<br>(24:00) and Locations of Landslides       | 49          |
| A9            | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 26 August (00:00) and 27 August 2015<br>(24:00) and Locations of Landslides       | 50          |
| A10           | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 21 September (00:00) and 22 September 2015<br>(24:00) and Locations of Landslides | 51          |
| A11           | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 26 September (00:00) and 27 September 2015<br>(24:00) and Locations of Landslides | 52          |

| Figure<br>No. |   | Page<br>No. |
|---------------|---|-------------|
| A12           | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 3 October (00:00) and 8 October 2015 (24:00)<br>and Locations of Landslides     | 53          |
| A13           | Maximum Rolling 24-hour Rainfall Distribution for the<br>Period between 13 November (00:00) and 14 November 2015<br>(24:00) and Locations of Landslides | 54          |

**Table A1 Some Selected Rainfall Parameters for the 13 Rainstorms with Daily Rainfall Exceeding 100 mm in 2015 (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         | 10-11 May 2015       | 13                 | N34               | 20                 | N46               | 28                 | N45, N46          | 51.5               | N46               |
| 2         | 19-21 May 2015       | 15                 | K05, N13          | 28.5               | K05               | 35                 | K05               | 58.5               | N47               |
| 3         | 23-24 May 2015       | 15.5               | N38               | 23.5               | N51               | 31.5               | N37               | 53.5               | N25               |
| 4         | 26-27 May 2015       | 18.5               | N52               | 32                 | N52               | 42.5               | N42               | 63                 | N52               |
| 5         | 12-13 June 2015      | 15.5               | H07               | 29.5               | H07               | 43                 | H07               | 70.5               | H07               |
| 6         | 17-18 July 2015      | 14                 | N17               | 23                 | N17               | 31.5               | N10               | 52.5               | N10               |
| 7         | 20-25 July 2015      | 15                 | N34, N42          | 27.5               | N34               | 39                 | N34               | 67.5               | N42               |
| 8         | 14-16 August 2015    | 20                 | N47               | 37.5               | N47               | 52.5               | N47               | 100.5              | N47               |
| 9         | 26-27 August 2015    | 15.5               | N21               | 28                 | N19               | 40                 | N19               | 74                 | N21               |
| 10        | 21-22 September 2015 | 11                 | N34               | 21.5               | N34               | 31                 | N34               | 51                 | N34               |
| 11        | 26-27 September 2015 | 20                 | K09               | 37.5               | K09               | 50.5               | K09               | 85.5               | K07               |
| 12        | 3-8 October 2015     | 15                 | N53               | 27                 | N48               | 38                 | N48               | 68.5               | N48               |
| 13        | 13-14 November 2015  | 16.5               | H09               | 26                 | H09               | 28.5               | H09               | 39                 | H09               |

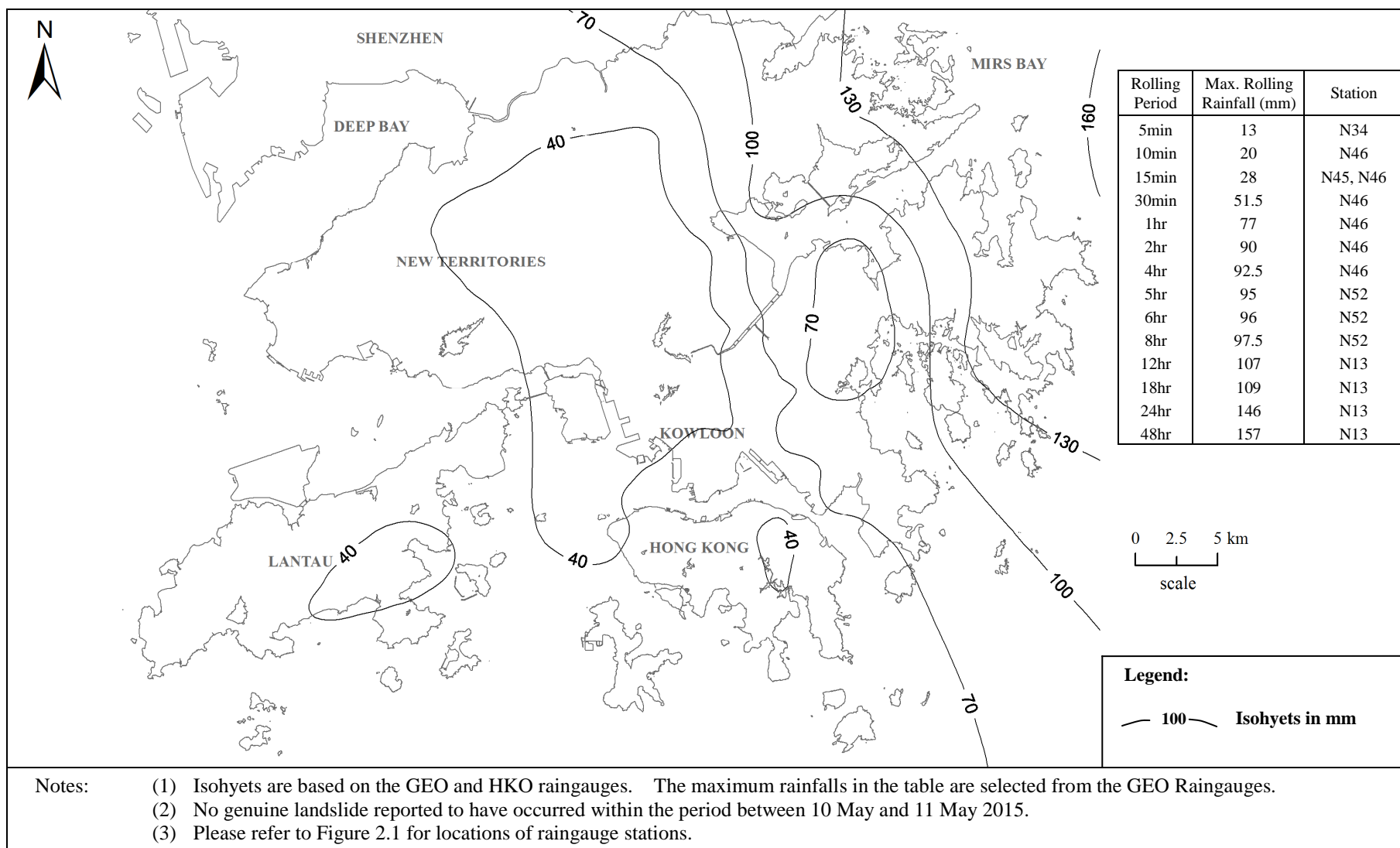


**Table A1 Some Selected Rainfall Parameters for the 13 Rainstorms with Daily Rainfall Exceeding 100 mm in 2015 (Sheet 2 of 3)**

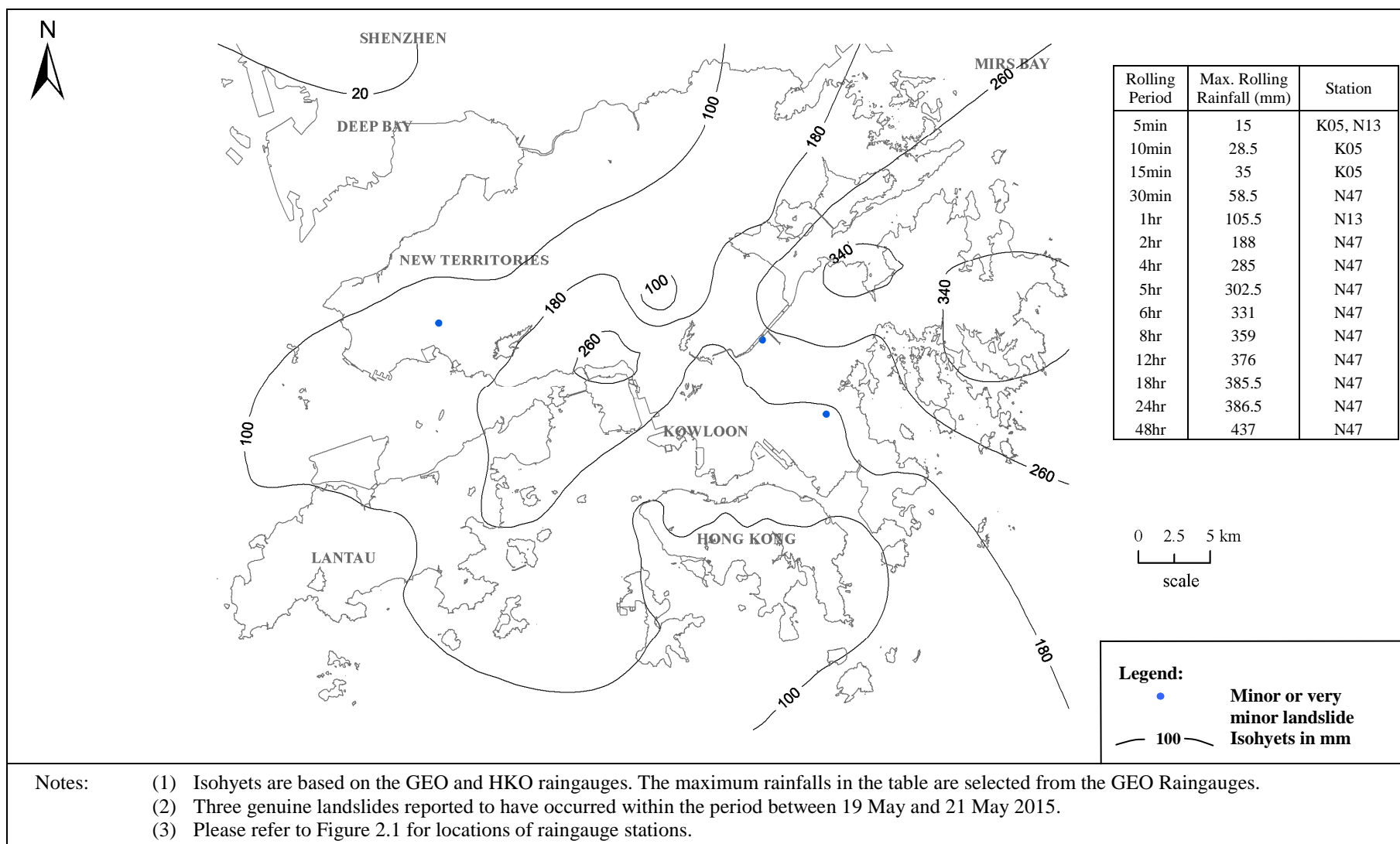
| Rainstorm |                      | 1-hr                     |                      | 2-hr                     |                      | 4-hr                     |                      | 5-hr                     |                      | 6-hr                     |                      |
|-----------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|
|           |                      | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station |
| 1         | 10-11 May 2015       | 77                       | N46                  | 90                       | N46                  | 92.5                     | N46                  | 95                       | N52                  | 96                       | N52                  |
| 2         | 19-21 May 2015       | 105.5                    | N13                  | 188                      | N47                  | 285                      | N47                  | 302.5                    | N47                  | 331                      | N47                  |
| 3         | 23-24 May 2015       | 74.5                     | N25                  | 106.5                    | H26                  | 125.5                    | H26                  | 128.5                    | H26                  | 146.5                    | N51                  |
| 4         | 26-27 May 2015       | 92.5                     | N50                  | 131                      | N06                  | 148                      | N06                  | 149                      | N06                  | 150                      | N06                  |
| 5         | 12-13 June 2015      | 91.5                     | H07                  | 118                      | H07                  | 123.5                    | H07                  | 126.5                    | H07                  | 126.5                    | H07                  |
| 6         | 17-18 July 2015      | 93                       | N21                  | 149.5                    | N17                  | 220                      | N17                  | 227                      | N17                  | 229.5                    | N17                  |
| 7         | 20-25 July 2015      | 102                      | N42                  | 170                      | H28                  | 227                      | H03                  | 260.5                    | H03                  | 283.5                    | H03                  |
| 8         | 14-16 August 2015    | 150.5                    | N47                  | 217                      | N47                  | 263                      | N47                  | 276.5                    | N47                  | 281                      | N47                  |
| 9         | 26-27 August 2015    | 108                      | N19                  | 130                      | N19                  | 133                      | N19                  | 134                      | N19                  | 141                      | N19                  |
| 10        | 21-22 September 2015 | 69.5                     | N34                  | 100                      | N34                  | 108.5                    | N34                  | 115                      | N34                  | 116                      | N34                  |
| 11        | 26-27 September 2015 | 103                      | K07                  | 104                      | K07                  | 104                      | K07                  | 104                      | K07                  | 104                      | K07                  |
| 12        | 3-8 October 2015     | 125.5                    | N48                  | 183                      | N48                  | 246                      | N48                  | 247.5                    | N48                  | 248                      | N48                  |
| 13        | 13-14 November 2015  | 56.5                     | H09                  | 80.5                     | H09                  | 101.5                    | H09                  | 104.5                    | H09                  | 104.5                    | H09                  |

**Table A1 Some Selected Rainfall Parameters for the 13 Rainstorms with Daily Rainfall Exceeding 100 mm in 2015 (Sheet 3 of 3)**

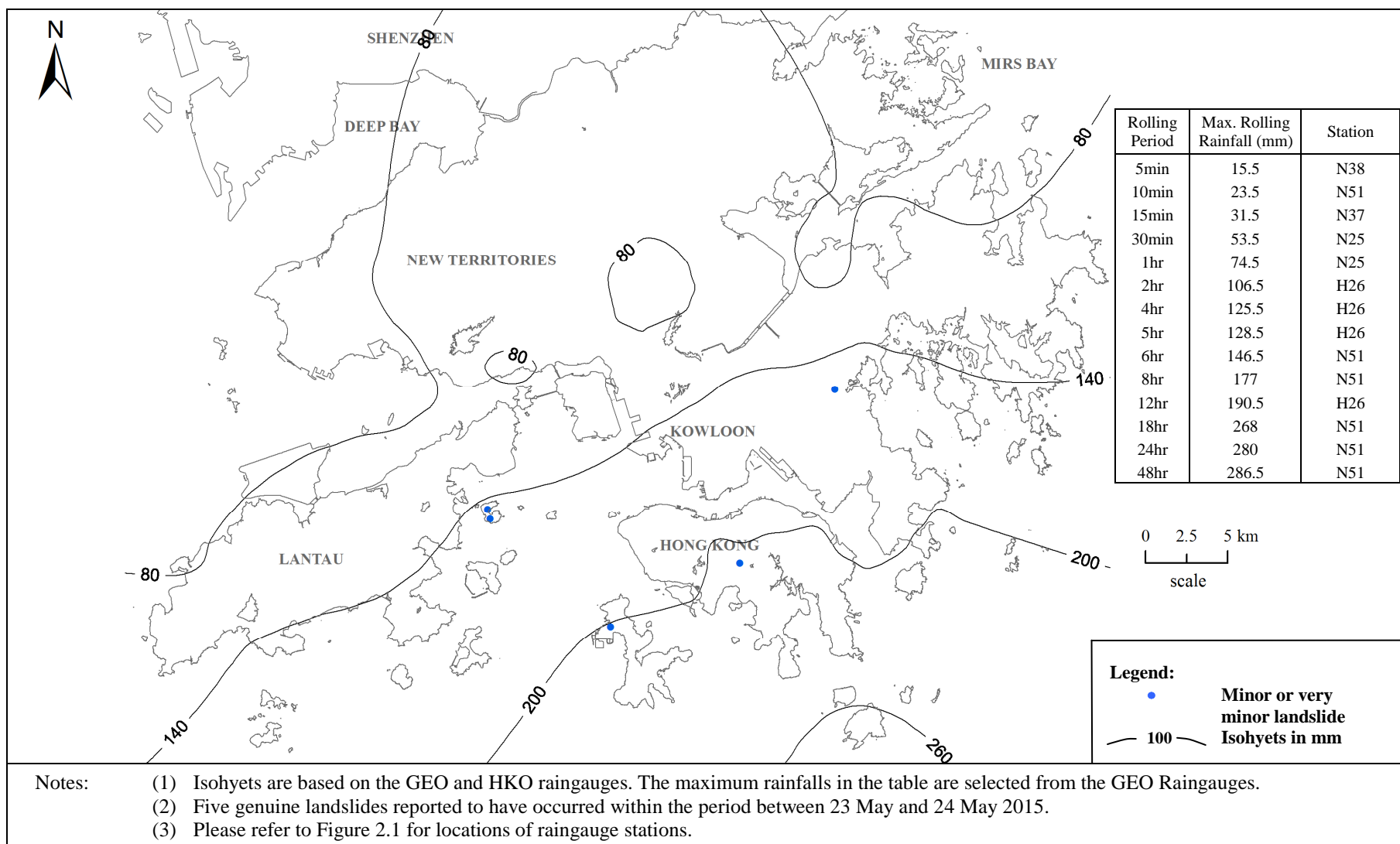
| Rainstorm |                      | 8-hr                     |                      | 12-hr                    |                      | 18-hr                    |                      | 24-hr                    |                      | 48-hr                    |                      |
|-----------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|
|           |                      | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station | Max.<br>rainfall<br>(mm) | Raingauge<br>Station |
| 1         | 10-11 May 2015       | 97.5                     | N52                  | 107                      | N13                  | 109                      | N13                  | 146                      | N13                  | 157                      | N13                  |
| 2         | 19-21 May 2015       | 359                      | N47                  | 376                      | N47                  | 385.5                    | N47                  | 386.5                    | N47                  | 437                      | N47                  |
| 3         | 23-24 May 2015       | 177                      | N51                  | 190.5                    | H26                  | 268                      | N51                  | 280                      | N51                  | 286.5                    | N51                  |
| 4         | 26-27 May 2015       | 150.5                    | N06                  | 157                      | N06                  | 182.5                    | N47                  | 188                      | N06                  | 242.5                    | N47                  |
| 5         | 12-13 June 2015      | 126.5                    | H07                  | 126.5                    | H07                  | 127.5                    | H07                  | 127.5                    | H07                  | 132.5                    | H07                  |
| 6         | 17-18 July 2015      | 236                      | N17                  | 236                      | N17                  | 236                      | N17                  | 236                      | N17                  | 237                      | N17                  |
| 7         | 20-25 July 2015      | 308                      | H10                  | 329                      | H10                  | 329.5                    | H10                  | 330                      | H10                  | 419                      | H10                  |
| 8         | 14-16 August 2015    | 286                      | N47                  | 287                      | N47                  | 288                      | N47                  | 289                      | N47                  | 332                      | N47                  |
| 9         | 26-27 August 2015    | 141.5                    | N19                  | 141.5                    | N19                  | 141.5                    | N19                  | 141.5                    | N19                  | 141.5                    | N19                  |
| 10        | 21-22 September 2015 | 117                      | N34                  | 117                      | N34                  | 117                      | N34                  | 117                      | N34                  | 117                      | N34                  |
| 11        | 26-27 September 2015 | 104                      | K07                  | 104                      | K03, K07             | 104                      | K03, K07             | 104                      | K03, K07             | 104                      | K03, K07             |
| 12        | 3-8 October 2015     | 250.5                    | N48                  | 253.5                    | N48                  | 254.5                    | N19, N48             | 308.5                    | N19                  | 325.5                    | N19                  |
| 13        | 13-14 November 2015  | 105.5                    | H09                  | 106                      | H09                  | 109.5                    | H09                  | 111.5                    | H09                  | 112.5                    | H09                  |



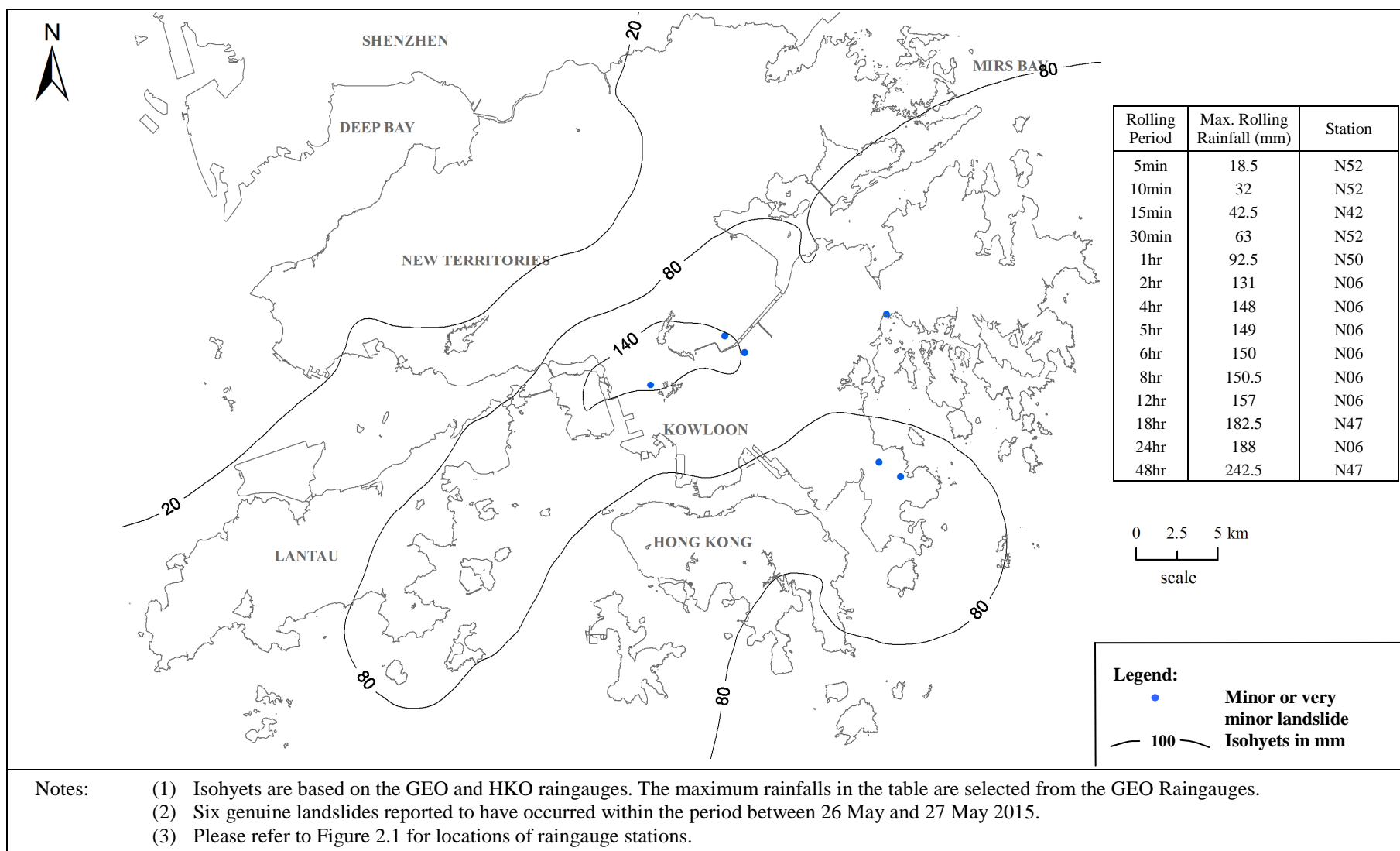
**Figure A1 Maximum Rolling 24-hour Rainfall Distribution for the Period between 10 May (00:00) and 11 May 2015 (24:00) and Locations of Landslides**



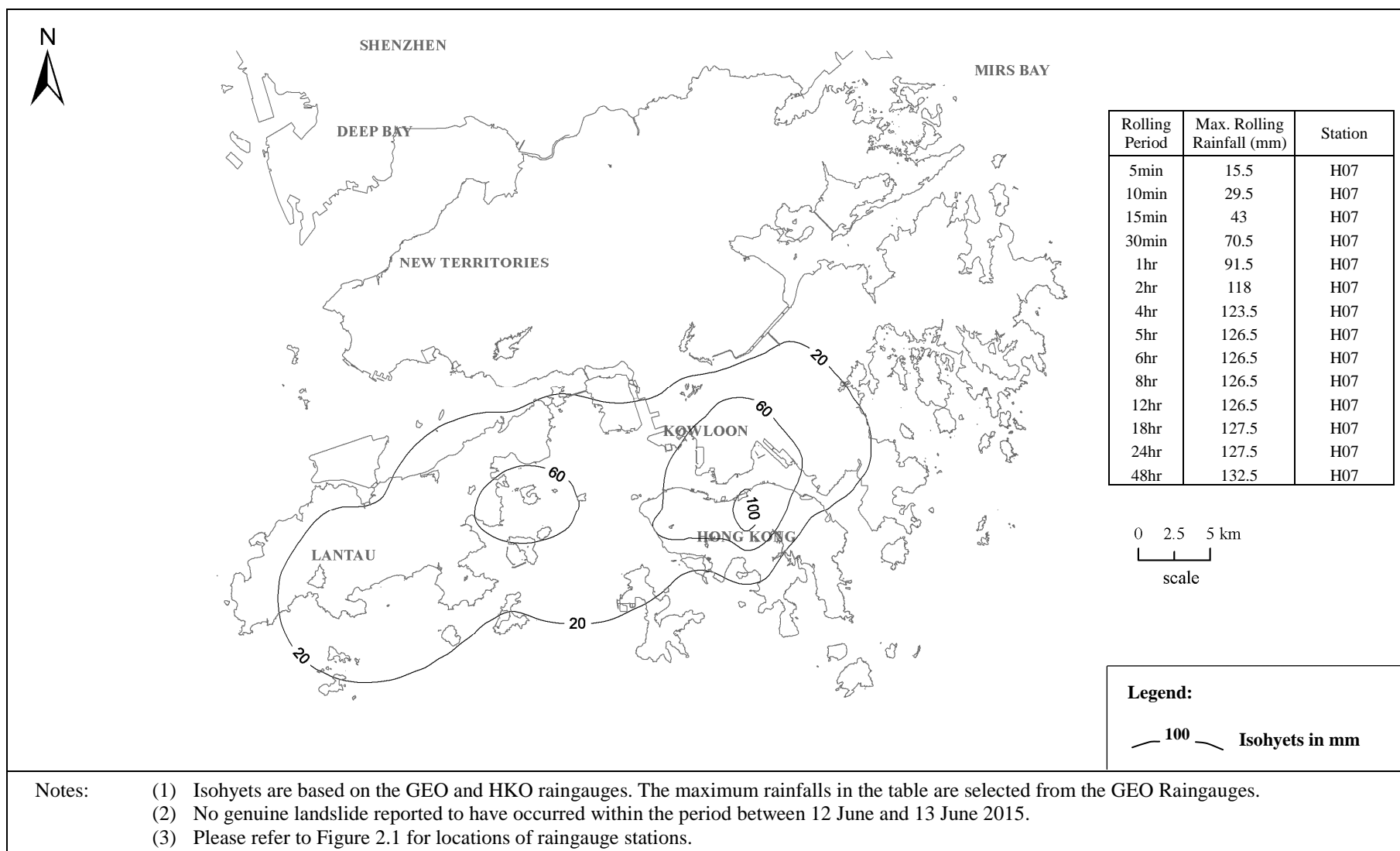
**Figure A2 Maximum Rolling 24-hour Rainfall Distribution for the Period between 19 May (00:00) and 21 May 2015 (24:00) and Locations of Landslides**



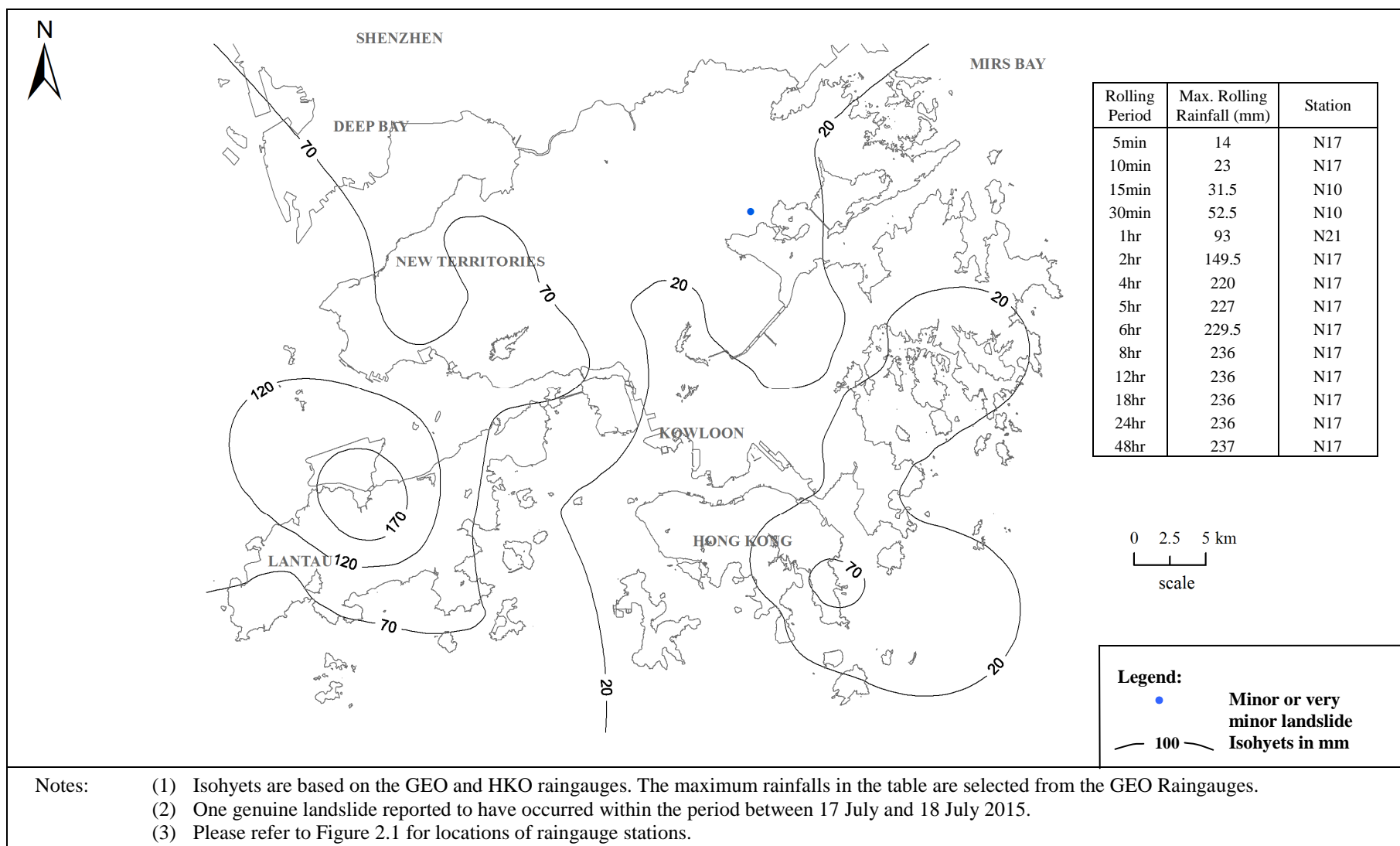
**Figure A3 Maximum Rolling 24-hour Rainfall Distribution for the Period between 23 May (00:00) and 24 May 2015 (24:00) and Locations of Landslides**



**Figure A4 Maximum Rolling 24-hour Rainfall Distribution for the Period between 26 May (00:00) and 27 May 2015 (24:00) and Locations of Landslides**

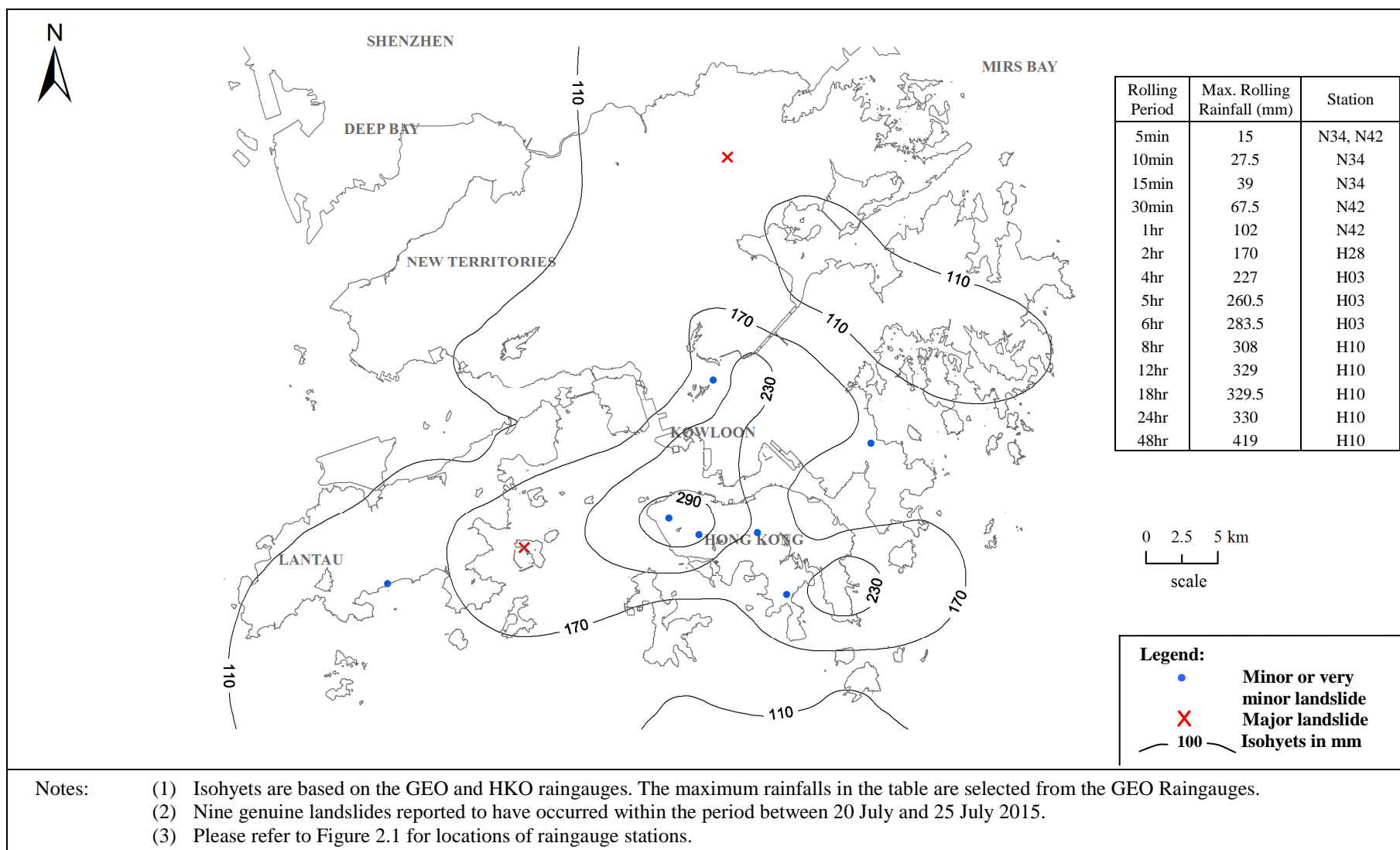


**Figure A5 Maximum Rolling 24-hour Rainfall Distribution for the Period between 12 June (00:00) and 13 June 2015 (24:00) and Locations of Landslides**

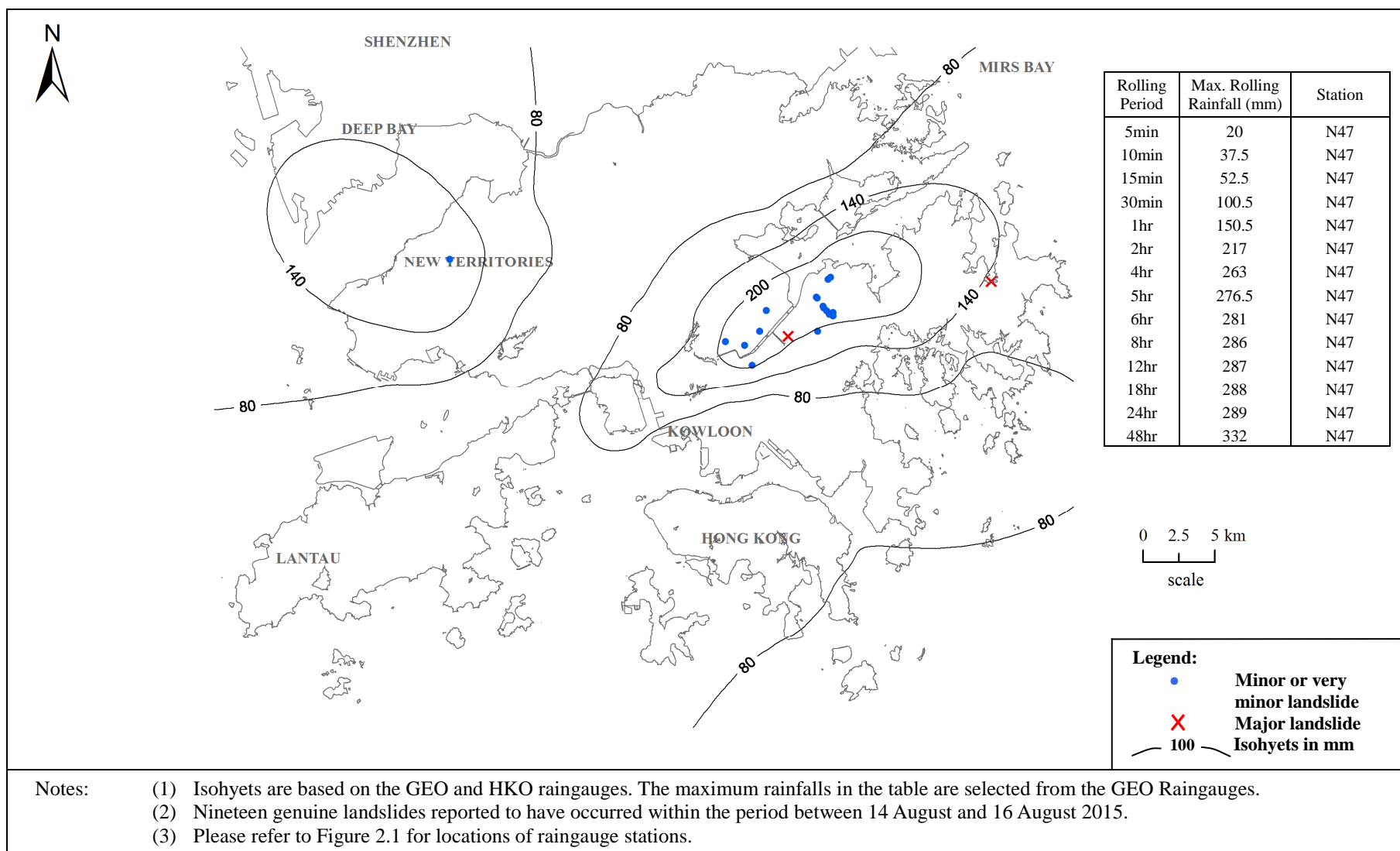


**Figure A6 Maximum Rolling 24-hour Rainfall Distribution for the Period between 17 July (00:00) and 18 July 2015 (24:00) and Locations of Landslides**

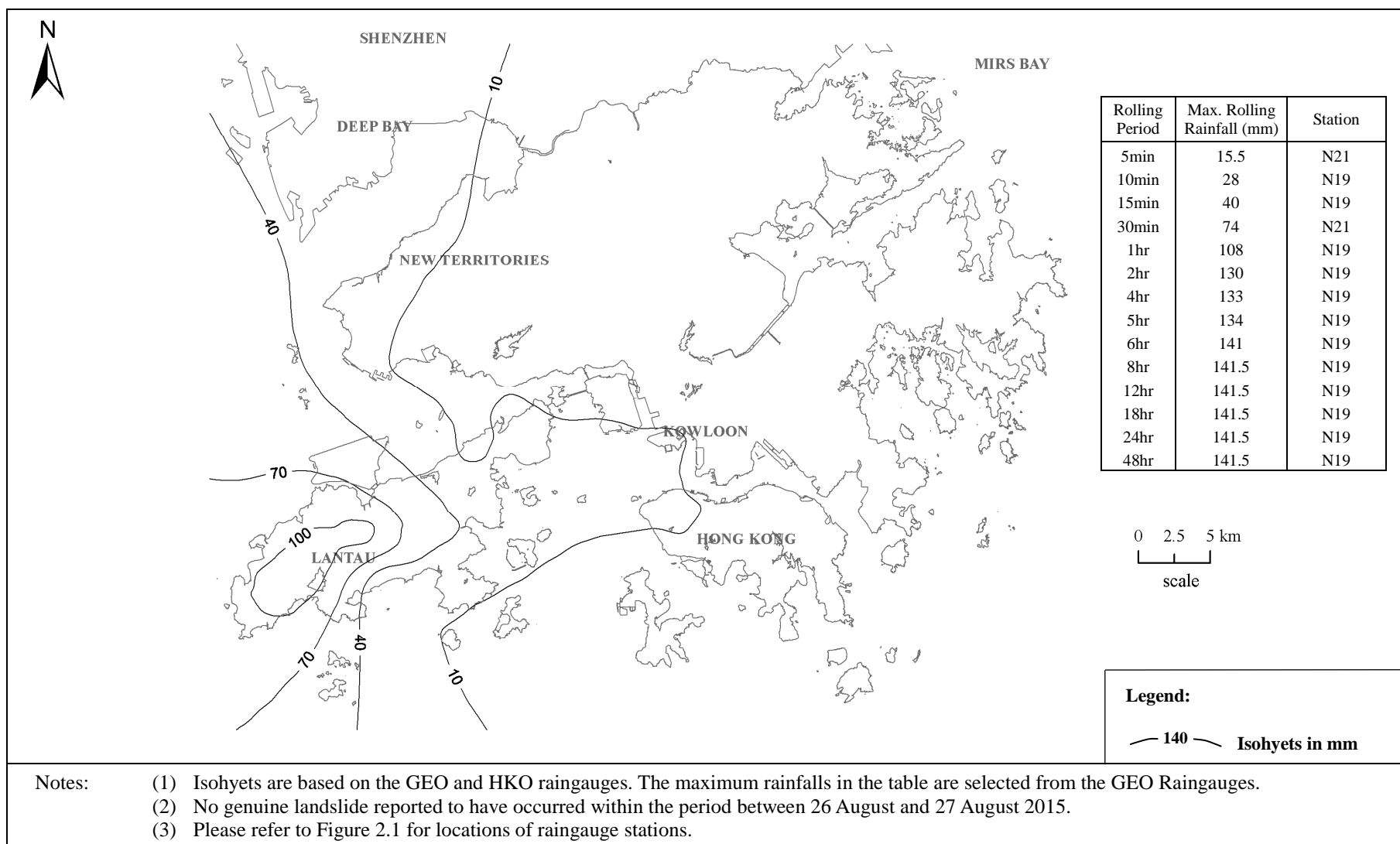




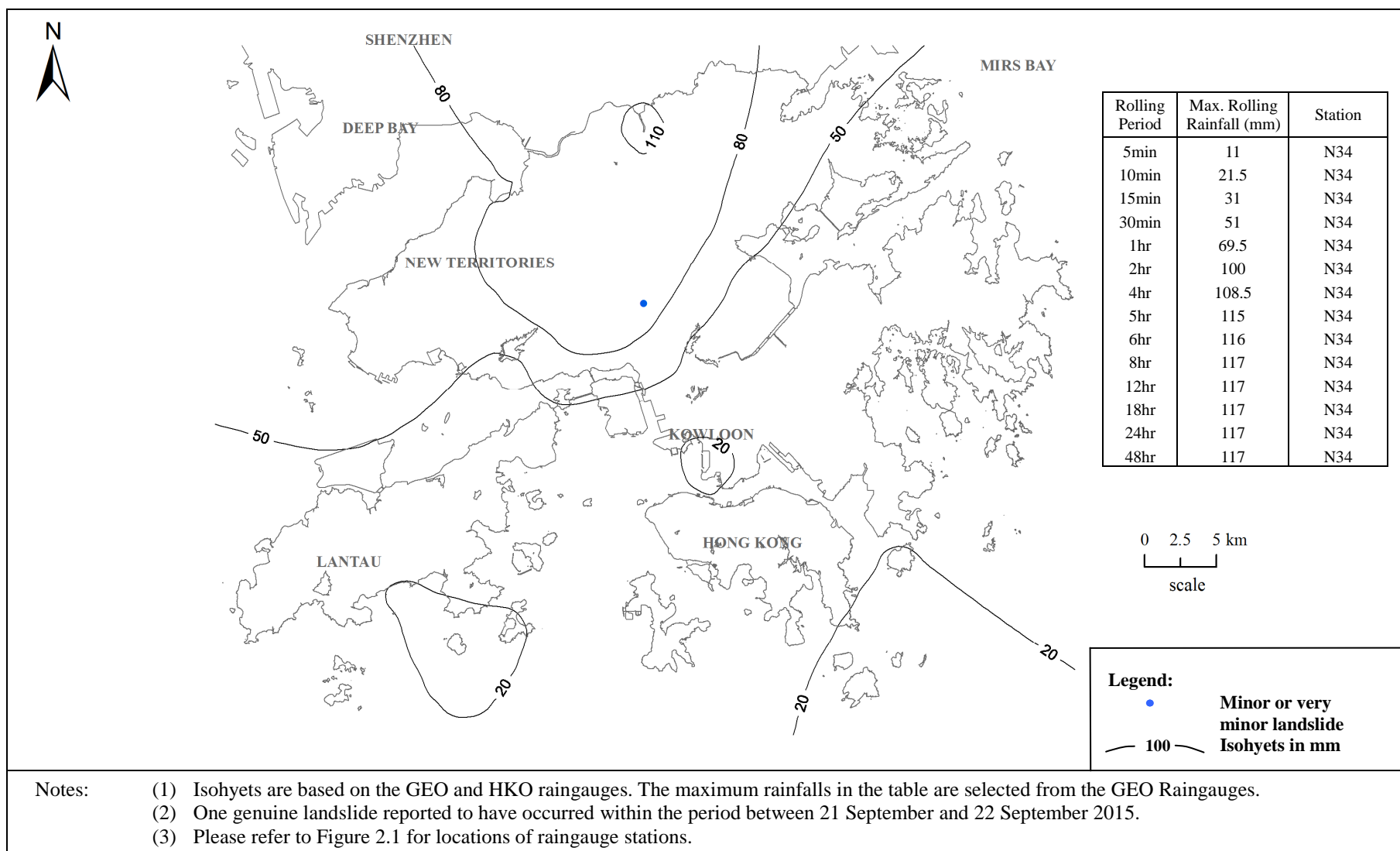
**Figure A7 Maximum Rolling 24-hour Rainfall Distribution for the Period between 20 July (00:00) and 25 July 2015 (24:00) and Locations of Landslides**



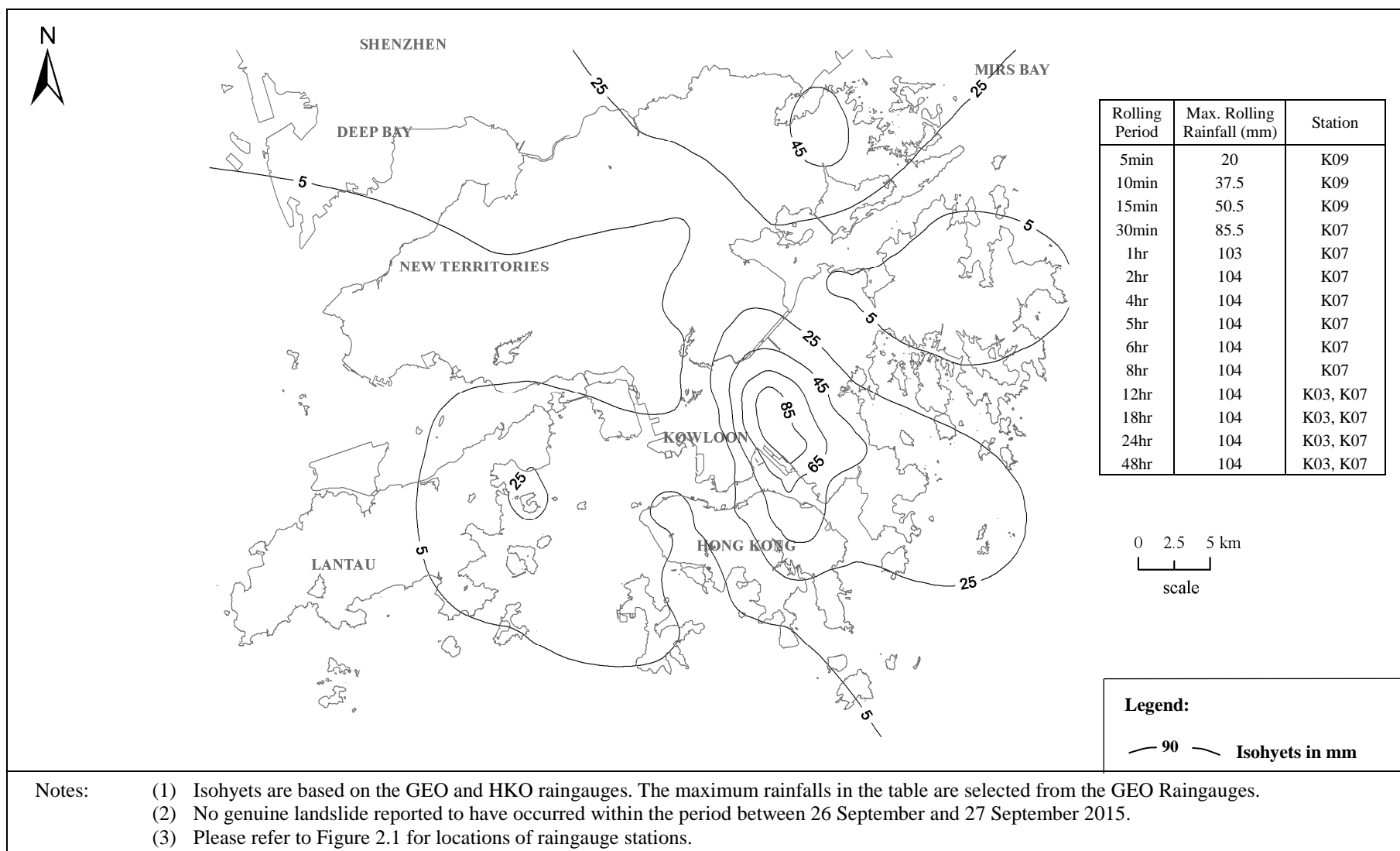
**Figure A8 Maximum Rolling 24-hour Rainfall Distribution for the Period between 14 August (00:00) and 16 August 2015 (24:00) and Locations of Landslides**



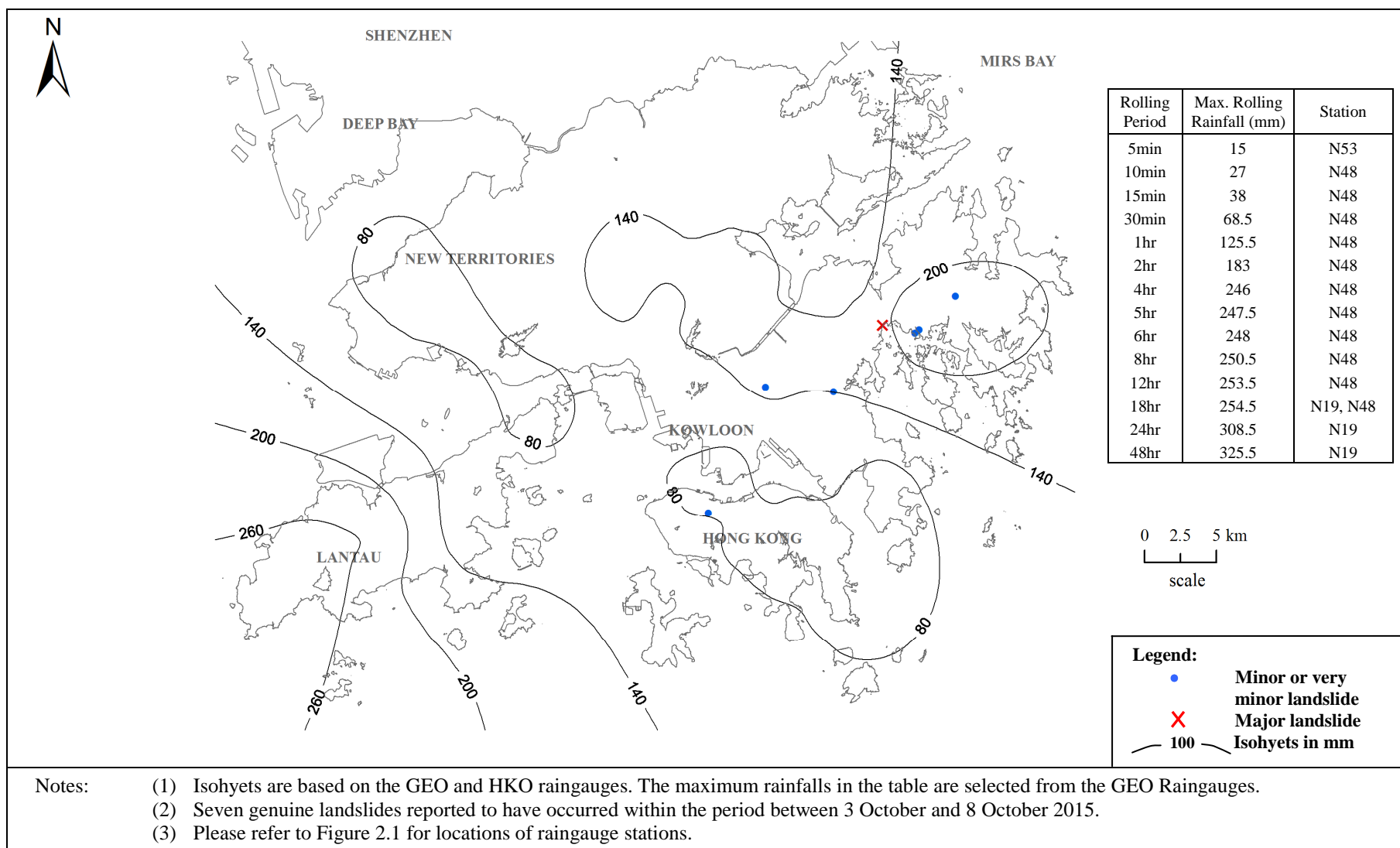
**Figure A9 Maximum Rolling 24-hour Rainfall Distribution for the Period between 26 August (00:00) and 27 August 2015 (24:00) and Locations of Landslides**



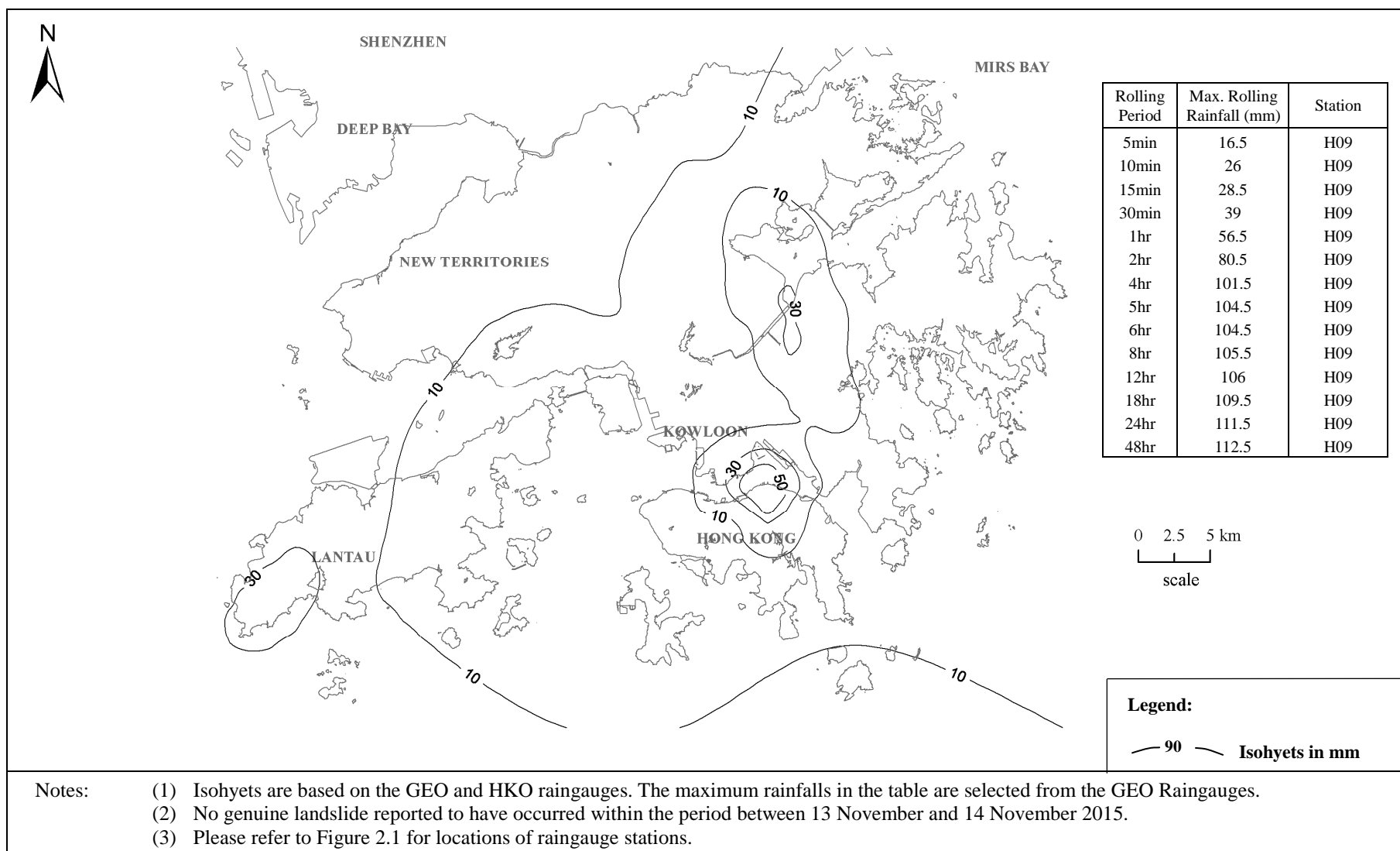
**Figure A10 Maximum Rolling 24-hour Rainfall Distribution for the Period between 21 September (00:00) and 22 September 2015 (24:00) and Locations of Landslides**



**Figure A11 Maximum Rolling 24-hour Rainfall Distribution for the Period between 26 September (00:00) and 27 September 2015 (24:00) and Locations of Landslides**



**Figure A12 Maximum Rolling 24-hour Rainfall Distribution for the Period between 3 October (00:00) and 8 October 2015 (24:00) and Locations of Landslides**



**Figure A13 Maximum Rolling 24-hour Rainfall Distribution for the Period between 13 November (00:00) and 14 November 2015 (24:00) and Locations of Landslides**

## Appendix B

### List of Landslide Incidents Reported to the Government



**List of Tables**

| Table<br>No. |  | Page<br>No. |
|--------------|--|-------------|
| B1           | List of Major Landslide Incidents                  | 57          |
| B2           | List of Landslide Incidents on Hong Kong Island    | 59          |
| B3           | List of Landslide Incidents in Kowloon             | 62          |
| B4           | List of Landslide Incidents in the New Territories | 63          |
| B5           | List of Landslide Incidents on Outlying Islands    | 76          |

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

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Failure      |                  |            | Facility Affected | Consequence   |
|-----------------------------|--|-----------------------------------|--------------|------------------|------------|-------------------|---|
|                             |  |                                   | Date (Time)  | Feature Type     | Scale (m³) |                   |   |
| 2015/05/1674                | Footpath leading from Sai Wan Road to Sai Wan Village, Sai Kung                  | 8SE-A/C103                        | Unknown      | Soil cut         | 55         | Minor footpath    | -   |
| 2015/07/1708                | Hiking trail at West of Hong Sing Garden, Po Lam Road North, Tseung Kwan O       | 11NE-D/F369                       | 30/6         | Fill             | 58         | Nil               | -   |
| 2015/07/1715                | 65 m northeast of Lau Shui Heung Road, Hok Tau Road Junction, Fanling            | 3SW-B/F59                         | 24/7 (10:00) | Fill             | 340        | Road              | One lane of Hok Tau Road temporarily closed               |
| 2015/07/1719                | Natural hillside to the west of Feature No. 10SW-D/C57, Hei Ling Chau            | Natural hillside                  | 24/7 (10:00) | Natural hillside | 100        | Open area         | District open space (paved) at crest partially undermined |
| 2015/07/1722                | Southwest of Bungalow E, Hei Ling Chau Addiction Treatment Centre, Hei Ling Chau | Natural hillside                  | Unknown      | Natural hillside | 80         | Open area         | -   |
| 2015/08/1731                | MacLehose Trail Section 2, Chek Keng, Sai Kung                                   | Natural hillside                  | 15/8         | Natural hillside | 100        | Minor footpath    | -   |
| 2015/08/1744                | Adjacent to quarry, North of Tai Shek Kwu, Shatin                                | 7SE-A/C506                        | 15/8         | Rock cut         | 150        | Open area         | -   |

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

| Incident No. <sup>(1)</sup>          | Location  | Feature Registration No.<br>(if any) | Failure         |                  |               | Facility Affected | Consequence                                   |
|--------------------------------------|---|--------------------------------------|-----------------|------------------|---------------|-------------------|---|
|                                      |   |                                      | Date<br>(Time)  | Feature Type     | Scale<br>(m³) |                   |   |
| 2015/10/1770                         | Hopes Villa, Tai Mong Tsai Road, Sai Kung                           | 8SW-A/C217                           | 7/10<br>(11:00) | Soil cut         | 66            | Access road       | Access road to Hopes Villa temporarily closed |
| 2015/10/1772                         | Natural hillside above Feature No. 8NW-D/C7, Pak Tam Road, Sai Kung | Natural hillside                     | Unknown         | Natural hillside | 52            | Road              | -   |
| 2015/01/1002WS<br>(WSD/2015/1/1/NTE) | Adjoining the dam of Shing Mun Reservoir                            | 7SW-C/C959                           | Unknown         | Rock cut         | 350           | Catchwater        | -   |

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

**Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 1 of 3)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Reported |        | Failure      |                  |                      | Facility Affected         | Consequence   |
|-----------------------------|--|-----------------------------------|----------|--------|--------------|------------------|----------------------|---------------------------|---|
|                             |  |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m³)           |                           |   |
| 2015/02/1657                | South of Craigmount, No. 34 Stubbs Road  | Natural hillside                  | 30/1     | ICC    | 28/1 (10:00) | Natural hillside | 6.8                  | Other (other remote area) | -   |
| 2015/02/1659                | Stanley Gap Road near Chung Hom Kok Road   | 15NE-A/C425                       | 19/2     | HyD    | 19/2 (17:00) | Rock cut         | 0.05 (Rockfall)      | Road                      | Four passengers on board of a tour bus injured      |
| 2015/03/1660                | Natural hillside above Feature No. 11SW-B/C101 (behind Nos. 56 to 58A MacDonnell Road) | Natural hillside                  | 6/3      | Public | 6/3 (08:00)  | Natural hillside | 0.01 (Boulder fall)  | Building                  | -   |
| 2015/04/1661                | Old Peak Road  | < 3 m high cut slope              | 1/4      | Public | Unknown      | Soil/rock cut    | 3.35                 | Minor footpath            | -   |
| 2015/04/1663                | Pokfulam Gardens, Pokfulam Road  | 11SW-C/C124                       | 14/4     | HyD    | 12/4 (09:00) | Rock cut         | 0.4 (Rockfall)       | Pedestrian pavement       | A section of pedestrian pavement temporarily closed |
| 2015/05/1678                | Black's Link   | 11SW-D/C1570                      | 26/5     | HyD    | 24/5 (14:20) | Soil/rock cut    | 1                    | Road                      | -   |
| 2015/06/1697                | Near No. 7 Pollock's Path, The Peak  | 11SW-D/C513                       | 29/5     | ICC    | Unknown      | Rock cut         | 0.05 (Rockfall)      | Road                      | -   |
| 2015/06/1698                | East of Feature No. 11SW-A/C699, Lugard Road   | Natural hillside                  | 10/6     | HyD    | Unknown      | Natural hillside | 0.01 (Boulder fall)  | Road                      | -   |
| 2015/06/1704                | Cape Collinson Path  | 2 m high cut slope                | 25/6     | HAD    | 23/6         | Soil/rock cut    | 0.001 (Boulder fall) | Minor footpath            | -   |

**Table B2 List of Landslide Incidents on Hong Kong Island (Sheet 2 of 3)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Reported |        | Failure      |                  |                         | Facility Affected | Consequence  |
|-----------------------------|--|-----------------------------------|----------|--------|--------------|------------------|-------------------------|-------------------|--|
|                             |  |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m <sup>3</sup> ) |                   |  |
| 2015/06/1705                | Near No. 99 Repulse Bay Road   | 15NE-A/CR45                       | 25/6     | Police | 25/6 (15:00) | Soil/rock cut    | 0.5 (Rockfall)          | Access road       | -  |
| 2015/06/1706                | Natural hillside above Feature No. 11SW-B/CR102, Bayview Mansion, 54 MacDonnell Road       | Natural hillside                  | 24/6     | Public | Unknown      | Natural hillside | 0.01 (Rockfall)         | Building          | -  |
| 2015/07/1707                | Along Tai Tam Road, 100 m North of Hing Man Estate, Chai Wan                               | Natural hillside                  | 10/7     | Police | 10/7 (22:00) | Natural hillside | 0.02 (Boulder fall)     | Road              | One lane of Tai Tam Road temporarily closed          |
| 2015/07/1711                | Stanley Gap Road   | 15NE-A/C241                       | 22/7     | HyD    | 22/7 (14:20) | Soil/rock cut    | 2.8                     | Road              | All two lanes of Stanley Gap Road temporarily closed |
| 2015/07/1712                | Tai Hang Road  | 11SE-C/C54                        | 23/7     | HyD    | 23/7 (09:00) | Soil cut         | 0.02 (Boulder fall)     | Road              | -  |
| 2015/07/1713                | Peel Rise  | Natural hillside                  | 23/7     | HyD    | 23/7 (16:00) | Natural hillside | 3                       | Access road       | Restricted access road temporarily closed            |
| 2015/07/1716                | Kam Ping Street, North Point   | Natural hillside                  | 26/7     | Police | Unknown      | Natural hillside | 0.8 (Rockfall)          | Nil               | -  |
| 2015/07/1717                | Findlay Road, The Peak   | Natural hillside                  | 27/7     | HyD    | Unknown      | Natural hillside | 3                       | Minor footpath    | -  |
| 2015/07/2001LI              | Natural hillside near Queen Mary Hospital above the Southern End of Feature No. 11SW-C/C79 | Natural hillside                  | 22/7     | LI     | 22/7 (09:00) | Natural hillside | 0.5                     | Road              | One lane of Pokfulam Road temporarily closed         |

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

| Incident No. <sup>(1)</sup>        | Location   | Feature Registration No. (if any) | Reported |        | Failure      |                  |                         | Facility Affected             | Consequence |
|------------------------------------|--|-----------------------------------|----------|--------|--------------|------------------|-------------------------|-------------------------------|-------------|
|                                    |  |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m <sup>3</sup> ) |                               |             |
| 2015/08/1725                       | Near House No. 249, Wong Chuk Hang San Wai   | < 3 m high fill slope             | 3/8      | Public | Unknown      | Fill             | 3                       | Open area                     | -           |
| 2015/08/1747                       | 50m east of Feature No. 15NE-A/R342, Tai Tam Tuk Reservoir                             | 3.5 m high cut slope              | 17/8     | WSD    | 12/8 (16:00) | Soil cut         | 1                       | Other (verge)                 | -           |
| 2015/10/1773                       | Natural hillside above Feature No. 11SW-B/C101 (behind Nos. 56 to 58A MacDonnell Road) | Natural hillside                  | 8/10     | Public | 5/10 (20:00) | Natural hillside | 0.01 (Boulder fall)     | Other (building lot)          | -           |
| 2015/11/1785                       | Natural hillside above Feature No. 15NE-A/C25, Repulse Bay Road                        | Natural hillside                  | 12/11    | Public | 11/10        | Natural hillside | 0.1 (Boulder fall)      | Access road                   | -           |
| 2015/10/1028WS (WSD/2015/10/1/HKI) | Along WSD Access Road HK 29 off Pokfulam Road  | 11SW-A/C1134                      | 7/10     | WSD    | Unknown      | Soil cut         | 0.5                     | Pedestrian pavement           | -           |
| 2015/12/1043WS (WSD/2015/12/5/HKI) | Aberdeen Valley Scheme, West Catchwater (2nd Section, CH4170 - CH4510)                 | 11SW-C/C405                       | 9/12     | WSD    | Unknown      | Soil/rock cut    | 0.01 (Rockfall)         | Catchwater                    | -           |
| 2015/12/1044WS (WSD/2015/12/6/HKI) | Tai Tam East Catchwater (CH4110 - CH4290)  | 15NE-B/CR128                      | 15/12    | WSD    | Unknown      | Soil/rock cut    | 0.05                    | Catchwater and minor footpath | -           |
| 2015/12/1045WS (WSD/2015/12/7/HKI) | Tai Tam Reservoir Road, Tai Tam  | 15NE-A/C203                       | 23/12    | WSD    | Unknown      | Soil cut         | 0.2 (Rockfall)          | 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 1)**

| Incident No. <sup>(1)</sup>               | Location  | Feature Registration No. (if any) | Reported |        | Failure      |               |                         | Facility Affected   | Consequence   |
|---|---|-----------------------------------|----------|--------|--------------|---------------|-------------------------|---------------------|---|
|   |   |                                   | Date     | By     | Date (Time)  | Feature Type  | Scale (m <sup>3</sup> ) |                     |   |
| 2015/05/1675                              | Shatin Pass Road, Wong Tai Shin                                     | 11NE-A/C284                       | 23/5     | HyD    | Unknown      | Rock cut      | 1                       | Road                | Shatin Pass Road (one lane road) temporarily closed |
| 2015/06/1701                              | No. 15 Magnolia Road, Shek Kip Mei                                  | 11NW-B/FR191                      | 12/6     | BD     | Unknown      | Fill          | 0.1                     | Pedestrian pavement | -   |
| 2015/10/1765                              | Shatin Pass Road, Wong Tai Shin                                     | 11NE-A/C497                       | 5/10     | Police | 4/10 (03:10) | Rock cut      | 22 (Rockfall)           | Road                | Shatin Pass Road (one lane road) temporarily closed |
| 2015/07/1017AD (ArchSD/KC(N)/2015/07/001) | Lok Fu Park   | 11NW-B/C413                       | 24/7     | ArchSD | Unknown      | Soil/Rock cut | 3                       | Open area           | -   |
| 2015/11/1033WS (WSD/2015/11/2/NTE)        | Access road to Water Treatment Works near Kowloon Byewash Reservoir | 11NW-A/C255                       | 17/11    | WSD    | Unknown      | Soil cut      | 2                       | Nil                 | -   |
| 2015/11/1034WS (WSD/2015/11/3/NTE)        | Access road to Water Treatment Works near Kowloon Byewash Reservoir | 11NW-A/C253                       | 17/11    | WSD    | Unknown      | Soil cut      | 0.5                     | Nil                 | -   |
| 2015/11/1035WS (WSD/2015/11/4/NTE)        | Access road to Water Treatment Works near Kowloon Byewash Reservoir | 11NW-A/C252                       | 17/11    | WSD    | Unknown      | Soil cut      | 1                       | Nil                 | -   |

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 New Territories (Sheet 1 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No. (if any) | Reported |        | Failure      |                  |                         | Facility Affected             | Consequence                                |
|-----------------------------|---|-----------------------------------|----------|--------|--------------|------------------|-------------------------|-------------------------------|--|
|                             |   |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m <sup>3</sup> ) |                               |  |
| 2015/01/1653                | Behind House No. 18 Cho Ma Wu, Nam Hang, Tai Po               | 4 m high cut slope                | 9/1      | Public | Unknown      | Soil cut         | 0.26                    | Registered squatter dwelling  | -  |
| 2015/01/1656                | Village access road near No. 40 Ng Tung Chai, Tai Po          | 2 m high retaining wall           | 16/1     | ICC    | Unknown      | Retaining wall   | 1                       | Access road                   | -  |
| 2015/02/1658                | Opposite of Serenity Place, To Lok Road, Tsueng Kwan O        | 11NE-D/C141                       | 12/2     | Police | 12/2 (09:00) | Rock cut         | 0.3 (Rockfall)          | Road                          | One lane of To Lok Road temporarily closed |
| 2015/04/1662                | Behind Chung Shan Terrace No. 23 Castle Peak Road, Kwai Chung | 11NW-A/C120                       | 14/4     | Police | 14/4 (00:01) | Rock cut         | 1 (Rockfall)            | Building                      | Part of the corrugated roof cover damaged  |
| 2015/04/1664                | In front of House Nos. 50-51 Kei Ling Ha Lo Wai, Tai Po       | 1.2 m high retaining wall         | 13/4     | ICC    | Unknown      | Retaining wall   | 0.76                    | Open area                     | -  |
| 2015/05/1666                | Lin Ma Hang Road, Sha Tau Kok                                 | 3NE-A/C60                         | 13/5     | HyD    | Unknown      | Soil cut         | 4.5                     | Road                          | -  |
| 2015/05/1667                | No. 335 Pai Tau Village, Shatin                               | 2.5 m high cut slope              | 15/5     | Public | Unknown      | Soil cut         | 0.1                     | Open area                     | -  |
| 2015/05/1668                | Behind No. 80A Tseng Tau Tsuen Sheung Tsuen, Tuen Mun         | < 3 m high cut slope              | 21/5     | Police | 20/5 (18:00) | Soil cut         | 0.9                     | Registered squatter dwelling  | -  |
| 2015/05/1669                | Treasure Spot Palace, A Shan, Tung Tsz Road, Tai Po           | Natural hillside                  | 20/5     | Police | Unknown      | Natural hillside | 6                       | Other (abandoned small house) | -  |



**Table B4 List of Landslide Incidents in New Territories (Sheet 2 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No. (if any) | Reported |        | Failure      |                   |                         | Facility Affected            | Consequence                              |
|-----------------------------|---|-----------------------------------|----------|--------|--------------|-------------------|-------------------------|------------------------------|--|
|                             |   |                                   | Date     | By     | Date (Time)  | Feature Type      | Scale (m <sup>3</sup> ) |                              |  |
| 2015/05/1670                | Near Pak Shek Wo, Sai Kung  | 11NE-B/C378                       | 20/5     | Police | 20/5         | Soil cut          | 2                       | Access road                  | -  |
| 2015/05/1671                | No. 119A Pak Tin Village, Section 2, Shatin   | 7SW-B/DT57                        | 21/5     | Public | Unknown      | Disturbed terrain | 1.6                     | Registered squatter dwelling | The roof of the squatter dwelling dented |
| 2015/05/1672                | 10 m southeast to Feature No. 7SW-C/C597, San Tsuen, Tsuen Wan                        | < 3 m high cut slope              | 20/5     | Public | Unknown      | Soil cut          | 0.3                     | Minor footpath               | -  |
| 2015/05/1673                | Near House 4A, Block C, Ma Tso Lung, Shun Yee San Tsuen, Sheung Shui                  | < 3 m high cut slope              | 22/5     | Public | Unknown      | Soil cut          | 0.2                     | Open area                    | -  |
| 2015/05/1674                | Footpath leading from Sai Wan Road to Sai Wan Village, Sai Kung                       | 8SE-A/C103                        | 22/5     | Police | Unknown      | Soil cut          | 55                      | Minor footpath               | -  |
| 2015/05/1676                | No.11 Shui Hau Village, Sai Kung  | < 3 m high cut slope              | 23/5     | Police | 23/5         | Soil cut          | 1.5                     | Registered squatter dwelling | -  |
| 2015/05/1679                | Access road leading to Yu Uk Village near Lamp Post No. V2165, Mang Kung Uk, Sai Kung | < 3 m high cut slope              | 26/5     | DLO    | 26/5 (12:10) | Soil cut          | 5.1                     | Access road                  | -  |
| 2015/05/1680                | Pat Tsz Wo Village, Fo Tan  | 10 m high cut slope               | 22/5     | DO     | Unknown      | Soil cut          | 3                       | Open area                    | -  |
| 2015/05/1681                | To Fung Shan Road, Shatin   | 7SW-B/C409                        | 26/5     | HyD    | 26/5         | Soil cut          | 0.1                     | Nil                          | -  |

**Table B4 List of Landslide Incidents in New Territories (Sheet 3 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No. (if any) | Reported |        | Failure      |                   |                    | Facility Affected                                  | Consequence |
|-----------------------------|---|-----------------------------------|----------|--------|--------------|-------------------|--------------------|--|-------------|
|                             |   |                                   | Date     | By     | Date (Time)  | Feature Type      | Scale (m³)         |  |             |
| 2015/05/1682                | 25 m northwest of Feature No. 6SW-C/C143, So Kwun Wat, Tuen Mun                                 | 4 m high fill slope               | 21/5     | Public | Unknown      | Fill              | 10                 | Registered squatter dwelling                       | -           |
| 2015/05/1683                | East of Wah King Hill Road, Kwai Chung  | 7SW-C/C1173                       | 26/5     | Police | 26/5 (20:00) | Soil cut          | 6                  | Registered squatter dwelling                       | -           |
| 2015/05/1685                | Heung Shek Cemetery, Chuen Lung, Tsuen Wan  | 7SW-A/DT38                        | 26/5     | DO     | Unknown      | Disturbed terrain | 15                 | Access road  | -           |
| 2015/05/1689                | Tai Mong Tsai Road, Sai Kung  | 8SW-A/F66                         | 26/5     | HyD    | 26/5 (10:00) | Fill              | 4                  | Road   | -           |
| 2015/05/1690                | East of D.D. 225 Lot 621 S.B, access road linking Ha Yeung Village and Sheung Sze Wan, Sai Kung | 4 m high cut slope                | 28/5     | DO     | 27/5         | Soil cut          | 23.6               | Access road  | -           |
| 2015/05/1691                | Mang Kung Wo Road near Lamp Post No. VE6592, Sai Kung   | 2.5 m high cut slope              | 29/5     | DLO    | Unknown      | Soil cut          | 3                  | Road   | -           |
| 2015/06/1692                | Natural hillside above Feature No. 7SE-C/C3, Shui Chuen Au Street, Shatin                       | Natural hillside                  | 28/5     | HyD    | 27/5 (10:00) | Natural hillside  | 1.8 (Boulder fall) | Other (maintenance access of Feature No. 7SE-C/C3) | -           |
| 2015/06/1693                | No. 114A Pak Tin Village, Section 2, Shatin   | 7SW-B/DT46                        | 26/5     | Public | Unknown      | Disturbed terrain | 1.5                | Open area  | -           |
| 2015/06/1694                | Behind Belair Garden, Shatin  | 7SE-A/C450                        | 4/6      | LandsD | 20/5 (18:00) | Soil cut          | 21                 | Open area  | -           |

**Table B4 List of Landslide Incidents in New Territories (Sheet 4 of 13)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Reported |        | Failure      |                  |                         | Facility Affected          | Consequence                                 |
|-----------------------------|--|-----------------------------------|----------|--------|--------------|------------------|-------------------------|----------------------------|---|
|                             |  |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m <sup>3</sup> ) |                            |   |
| 2015/06/1695                | Northwest of No. 38 Pai Tau Village, Shatin  | 7SW-B/C653                        | 2/6      | DLO    | Unknown      | Soil cut         | 0.2                     | Village house              | -   |
| 2015/06/1696                | 40 m northeast of Feature No. 11SE-B/F136, Devil's Peak, Wilson Trail Section 3, Tseung Kwan O | < 3 m high cut slope              | 5/6      | DLO    | 4/6          | Soil cut         | 0.2 (Boulder fall)      | Minor footpath             | -   |
| 2015/06/1699                | Behind House No. 10, Nai Chung Old Village, Tai Po   | Natural hillside                  | 3/6      | HyD    | Unknown      | Natural hillside | 0.47                    | Village house              | -   |
| 2015/06/1702                | Ngau Pui Wo Village, Sai Kung  | 2 m high cut slope                | 21/6     | Public | Unknown      | Soil cut         | 0.6                     | Access road                | -   |
| 2015/06/1703                | Tai Po Road (Ma Liu Shui Section), Shatin  | 7SE-A/C212                        | 23/6     | Public | Unknown      | Rock cut         | 2 (Rockfall)            | Open area                  | -   |
| 2015/07/1708                | Hiking trail at West of Hong Sing Garden, Po Lam Road North, Tseung Kwan O                     | 11NE-D/F369                       | 13/7     | LandsD | 30/6         | Fill             | 58                      | Nil                        | -   |
| 2015/07/1715                | 65 m northeast of Lau Shui Heung Road, Hok Tau Road Junction, Fanling                          | 3SW-B/F59                         | 24/7     | FSD    | 24/7 (10:00) | Fill             | 340                     | Road                       | One lane of Hok Tau Road temporarily closed |
| 2015/07/1718                | 10 m north of Feature No. 7SW-D/C7, Shatin   | Natural hillside                  | 27/7     | DLO    | 23/7         | Natural hillside | 5                       | Other (DLO's storage area) | -   |
| 2015/07/1720                | 90 m southeast of No. 4 Siu lam Village, Siu Lam   | 6SW-D/C581                        | 28/7     | Public | Unknown      | Soil cut         | 0.03                    | Access road                | -   |

**Table B4 List of Landslide Incidents in New Territories (Sheet 5 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No. (if any) | Reported |        | Failure     |                   |                         | Facility Affected                               | Consequence   |
|-----------------------------|---|-----------------------------------|----------|--------|-------------|-------------------|-------------------------|---|---|
|                             |   |                                   | Date     | By     | Date (Time) | Feature Type      | Scale (m <sup>3</sup> ) |   |   |
| 2015/07/1721                | Below Feature No. 3SE-C/C159 Behind Forest Hill, Lo Fai Road, Tai Po                      | Natural hillside                  | 29/7     | Public | 19/7        | Natural hillside  | 26.18                   | Nil   | -   |
| 2015/07/1723                | Adjacent to Lamp Post No. EA5443, To Fung Shan Road, Shatin                               | Natural hillside                  | 29/7     | DLO    | Unknown     | Natural hillside  | 0.5 (Boulder fall)      | Nil   | -   |
| 2015/08/1724                | Nature hillside between Lamp Post Nos. VE0097 and VE4353, Shui Bin Village, Tseung Kwan O | Natural hillside                  | 28/7     | DLO    | 22/7        | Natural hillside  | 0.1 (Boulder fall)      | Minor footpath                                  | -   |
| 2015/08/1726                | House No. 72 Tsiu Keng Yin Pun Tsuen, Sheung Shui   | 2 m high retaining wall           | 5/8      | Police | 5/8 (18:00) | Retaining wall    | 8                       | Registered squatter dwelling                    | -   |
| 2015/08/1727                | Along access road to Kwu Tung Fresh Water Service Reservoir, Sheung Shui                  | 2SE-B/C258                        | 7/8      | LandsD | Unknown     | Soil Cut          | 2.6                     | Access road                                     | -   |
| 2015/08/1729                | Belair Garden, Tai Chung Kiu Road, Shatin   | 7SE-A/FR186                       | 8/8      | Public | Unknown     | Fill              | 2.25                    | Open area                                       | -   |
| 2015/08/1730                | Near Lamp Post No. VA4275, Tin Liu Village, Sai Kung                                      | Natural hillside                  | 15/8     | FSD    | Unknown     | Natural hillside  | 20                      | Access road                                     | -   |
| 2015/08/1731                | MacLehose Trail Section 2, Chek Keng, Sai Kung  | Natural hillside                  | 15/8     | FSD    | 15/8        | Natural hillside  | 100                     | Minor footpath                                  | -   |
| 2015/08/1733                | Below 350 Pai Tau Village next to Feature No. 7SW-D/CR157, Shatin                         | 9 m high disturbed terrain        | 15/8     | Police | Unknown     | Disturbed terrain | 6                       | Registered squatter dwelling and minor footpath | Category 1 NDC(2) recommendation on a squatter structure made to LandsD |

**Table B4 List of Landslide Incidents in New Territories (Sheet 6 of 13)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No.<br>(if any) | Reported |        | Failure      |                   |                         | Facility Affected                          | Consequence                       |
|-----------------------------|--|--------------------------------------|----------|--------|--------------|-------------------|-------------------------|--|-----------------------------------|
|                             |  |                                      | Date     | By     | Date (Time)  | Feature Type      | Scale (m <sup>3</sup> ) |  |                                   |
| 2015/08/1734                | 20 m east of Hing On Estate, Sui Wo Court, Sui Wo Road, Fo Tan                                       | 7SE-A/DT25                           | 15/8     | Police | 15/8 (08:00) | Disturbed terrain | 7                       | Registered squatter dwelling               | -                                 |
| 2015/08/1735                | Near No 1 Wo Liu Hang Road , Wo Liu Hang , Fo Tan  | 1.5 m high retaining wall            | 15/8     | Police | Unknown      | Retaining wall    | 5                       | Minor footpath and other (drainage system) | Minor footpath temporarily closed |
| 2015/08/1736                | No. 50 Kei Ling Ha Lo Wa, Sai Sha Road, Sai Kung   | 8NW-C/C54                            | 15/8     | Police | Unknown      | Soil cut          | 2                       | Village house                              | -                                 |
| 2015/08/1737                | Below Feature No. 7SE-A/C566 Near Lamp Post No. M6654, Opposite to Phase 2 Sui Wo Court, Sui Wo Road | < 3 m high cut slope                 | 15/8     | Police | Unknown      | Soil cut          | 10                      | Minor footpath                             | Minor footpath temporarily closed |
| 2015/08/1738                | Below No. 398 Ha Wo Che Tsuen, Shatin  | 2 m high cut slope                   | 15/8     | Police | Unknown      | Soil cut          | 2                       | Open area                                  | -                                 |
| 2015/08/1739                | Lot No. 1518 in D.D.124, Hung Shui Kiu, Yuen Long  | 3 m high fill slope                  | 17/8     | Public | 15/8 (11:00) | Fill              | 1                       | Minor footpath                             | -                                 |
| 2015/08/1741                | Feature No. 7SE-C/C296, Shatin Tau New Village, Shatin   | 7SE-C/C296                           | 15/8     | Public | 15/8 (08:00) | Soil cut          | 0.7                     | Open area                                  | -                                 |
| 2015/08/1742                | House No. 3A & 3B, Mui Tsz Lam Village, Shatin   | < 3 m high cut slope                 | 18/8     | Public | 17/8         | Soil cut          | 4.7                     | Village house                              | -                                 |
| 2015/08/1744                | Adjacent to quarry, North of Tai Shek Kwu, Shatin  | 7SE-A/C506                           | 17/8     | LandsD | 15/8         | Rock cut          | 150                     | Open area                                  | -                                 |

**Table B4 List of Landslide Incidents in New Territories (Sheet 7 of 13)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Reported |        | Failure     |                  |                | Facility Affected               | Consequence                       |
|-----------------------------|--|-----------------------------------|----------|--------|-------------|------------------|----------------|---------------------------------|-----------------------------------|
|                             |  |                                   | Date     | By     | Date (Time) | Feature Type     | Scale (m³)     |                                 |                                   |
| 2015/08/1745                | Lung Mun Road, Tuen Mun  | 5SE-C/C18                         | 17/8     | HyD    | Unknown     | Rock cut         | 8 (Rockfall)   | Road                            | -                                 |
| 2015/08/1746                | Near House Nos. 19 and 20, Ma On Shan Tsuen, Ma On Shan                            | < 3 m high retaining wall         | 22/7     | DLO    | Unknown     | Retaining wall   | 5.2            | Registered squatter dwelling    | -                                 |
| 2015/08/1748                | North of House No. 142, Lok Lo Ha, Shatin  | 7SE-A/C150                        | 20/8     | Public | 15/8        | Soil cut         | 0.1            | Registered squatter dwelling    | -                                 |
| 2015/08/1749                | Near Lamp Post Nos. VE2021 and VA9445, Pak Tin Village, Section 2, Tai Wai, Shatin | < 3 m high cut slope              | 18/8     | Public | 15/8        | Soil cut         | 2              | Minor footpath                  | -                                 |
| 2015/08/1750                | House No. 390, West of Tin Lin, Shatin   | 7SW-D/C138                        | 19/8     | Public | 15/8        | Soil cut         | 3.8            | Village house                   | -                                 |
| 2015/08/1752                | Adjacent to No. 134 Lok Lo Ha, Fo Tan  | Natural hillside                  | 21/8     | DO     | Unknown     | Natural hillside | 5              | Minor footpath                  | -                                 |
| 2015/08/1753                | Natural hillside to the East of Feature No. 7SE-B/C215, Shatin                     | Natural hillside                  | 21/8     | Public | 15/8        | Natural hillside | 45             | Other (water supply facilities) | -                                 |
| 2015/08/1754                | Near footpath of House No. 42, Ma On Shan Tsuen, Ma On Shan                        | < 3 m high retaining wall         | 20/8     | Public | 15/8        | Retaining wall   | 2.6            | Minor footpath                  | Minor footpath temporarily closed |
| 2015/09/1755                | Nos. 21-29 Sui Wo Road, Sha Tin Sui Wo Road, Shatin                                | 7SE-A/C107                        | 2/9      | HyD    | Unknown     | Rock cut         | 0.1 (Rockfall) | Road                            | -                                 |

**Table B4 List of Landslide Incidents in New Territories (Sheet 8 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No.<br>(if any) | Reported |        | Failure      |                |                         | Facility Affected                          | Consequence                                |
|-----------------------------|---|--------------------------------------|----------|--------|--------------|----------------|-------------------------|--|--|
|                             |   |                                      | Date     | By     | Date (Time)  | Feature Type   | Scale (m <sup>3</sup> ) |  |  |
| 2015/09/1756                | Ma On Shan Country Park Management Centre, Ma On Shan   | 7SE-B/C175                           | 21/8     | Public | 16/8         | Soil cut       | 4.2                     | Open area                                  | -  |
| 2015/09/1757                | 85 m northeast of No. 32 Ma On Shan Tsuen, Ma On Shan   | 7NE-D/C203                           | 21/8     | Public | 16/8         | Soil cut       | 2.4                     | Open area                                  | -  |
| 2015/09/1758                | 100 m east of No. 32 Ma On Shan Tsuen, Ma On Shan   | 7NE-D/C236                           | 21/8     | Public | 16/8         | Soil cut       | 0.6                     | Road                                       | -  |
| 2015/09/1759                | 180 m southeast of Ma On Shan Ha Tsuen, Ma On Shan  | 7SE-B/C74                            | 21/8     | Public | 16/8         | Soil cut       | 4.2                     | Road                                       | -  |
| 2015/09/1760                | Access road to Ma On Shan Village, Ma On Shan   | 7SE-B/C173                           | 21/8     | Public | 16/8         | Soil cut       | 1                       | Road                                       | -  |
| 2015/09/1761                | Behind Licensed Land STT917, Tsing Chuen Wai, Tuen Mun  | 1.9 m high retaining wall            | 9/9      | LandsD | Unknown      | Retaining wall | 5.4                     | Registered squatter dwelling and open area | Structures along the toe partially damaged |
| 2015/09/1762                | Tai Mo Shan Road, Tsuen Wan   | 6SE-B/C67                            | 22/9     | HyD    | 21/9 (16:45) | Soil cut       | 5                       | Pedestrian pavement                        | -  |
| 2015/09/1763                | North of Feature No. 6NW-C/R22, San Hing Tsuen, Tuen Mun  | > 3 m high cut slope                 | 24/9     | LandsD | Unknown      | Soil cut       | 1.4                     | Open area and other (storage house)        | -  |
| 2015/09/1764                | Next to the Culvert to the North of Feature No. 7NE-D/C138, below footpath underneath Ma On Shan Bypass, Ma On Shan | 2.2 m high fill slope                | 21/8     | Public | 15/8         | Fill           | 33                      | Minor footpath and other (drainage system) | -  |

**Table B4 List of Landslide Incidents in New Territories (Sheet 9 of 13)**

| Incident No. <sup>(1)</sup> | Location  | Feature Registration No.<br>(if any) | Reported |        | Failure      |                  |                         | Facility Affected                               | Consequence                                      |
|-----------------------------|---|--------------------------------------|----------|--------|--------------|------------------|-------------------------|---|--|
|                             |   |                                      | Date     | By     | Date (Time)  | Feature Type     | Scale (m <sup>3</sup> ) |   |  |
| 2015/10/1766                | Lok Ha Shek, House No. 134, Fo Tan                                  | 7SE-A/C92                            | 25/8     | DO     | Unknown      | Soil cut         | 1.9                     | Registered squatter dwelling and minor footpath | -  |
| 2015/10/1767                | DD7 Lot 1891, Wai Tau Tsuen, Tai Po                                 | 7NW-A/CR281                          | 5/10     | Police | Unknown      | Soil cut         | 10                      | Minor footpath                                  | -  |
| 2015/10/1768                | Tit Hang Tsuen, Ma Tso Lung, Yuen Long                              | 2SE-B/C348                           | 6/10     | LandsD | Unknown      | Soil cut         | 0.5                     | Nil   | -  |
| 2015/10/1769                | Fei Ngo Shan Road, Sai Kung   | 11NE-A/C510                          | 6/10     | HyD    | Unknown      | Soil cut         | 11                      | Road  | One lane of Fei Ngo Shan Road temporarily closed |
| 2015/10/1770                | Hopes Villa, Tai Mong Tsai Road, Sai Kung                           | 8SW-A/C217                           | 7/10     | FSD    | 7/10 (11:00) | Soil cut         | 66                      | Access road                                     | Access road to Hopes Villa temporarily closed    |
| 2015/10/1771                | South of House No. 51 Tai Mong Tsai Village, Sai Kung               | < 3 m high cut slope                 | 7/10     | Police | 7/10 (10:00) | Soil cut         | 3                       | Other (shed)                                    | -  |
| 2015/10/1772                | Natural hillside above Feature No. 8NW-D/C7, Pak Tam Road, Sai Kung | Natural hillside                     | 7/10     | Police | Unknown      | Natural hillside | 52                      | Road  | -  |
| 2015/10/1774                | No. 183 The Peak, Ma On Shan Tsuen, Ma On Shan                      | 7SE-B/C152                           | 8/10     | Public | 18/8         | Soil cut         | 1.5                     | Registered squatter dwelling and minor footpath | -  |
| 2015/10/1775                | Pak Tam Road, Sai Kung  | 8NW-D/C8                             | 8/10     | HyD    | 7/10         | Rock cut         | 0.5 (Rockfall)          | Minor footpath                                  | -  |



**Table B4 List of Landslide Incidents in New Territories (Sheet 10 of 13)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No.<br>(if any) | Reported |        | Failure     |                  |                         | Facility Affected                 | Consequence |
|-----------------------------|--|--------------------------------------|----------|--------|-------------|------------------|-------------------------|-----------------------------------|-------------|
|                             |  |                                      | Date     | By     | Date (Time) | Feature Type     | Scale (m <sup>3</sup> ) |                                   |             |
| 2015/10/1776                | Behind House No. 29, Pei Tau, Sai Kung   | 11NE-B/C834                          | 8/10     | DLO    | 6/10        | Soil cut         | 0.15                    | Other (platform)                  | -           |
| 2015/10/1777                | Po Lam Road North, Sai Kung  | 11NE-D/C520                          | 6/10     | Public | Unknown     | Rock cut         | 0.1<br>(Rockfall)       | Minor footpath                    | -           |
| 2015/10/1778                | Access road to Man Wo Village between Lamp Post Nos. VA3547 and VA3548, Sai Kung         | < 3 m high cut slope                 | 9/10     | LandsD | Unknown     | Soil cut         | 1.5                     | Access road                       | -           |
| 2015/10/1779                | Natural hillside bound by Feature Nos. 3NE-C/C225 and 3NE-C/C167, Kai Kuk Shue Ha, North | Natural hillside                     | 17/8     | Public | Unknown     | Natural hillside | 0.5<br>(Boulder fall)   | Access road and construction site | -           |
| 2015/10/1780                | Tai Lung, Sheung Shui  | 2 m high cut slope                   | 19/10    | Public | Unknown     | Soil cut         | 0.18                    | Road                              | -           |
| 2015/10/1781                | Near Route Twisk, Tsuen Wan  | 6SE-B/C238                           | 27/10    | LandsD | Unknown     | Soil cut         | 1.5<br>(Boulder fall)   | Access road                       | -           |
| 2015/10/1782                | Behind No. 101 Tai Mong Tsai Road, Sai Kung  | 8SW-A/C38                            | 27/10    | Others | Unknown     | Soil cut         | 16                      | Building                          | -           |
| 2015/11/1783                | Near Lot 296 in DD185, Sheung Wo Che Village, Shatin                                     | 1.5 m high cut slope                 | 27/8     | DLO    | Unknown     | Soil cut         | 2.5                     | Minor footpath                    | -           |
| 2015/11/1784                | North of Bay View House of Hong Kong Outward Bound School, Tai Mong Tsai Road, Sai Kung  | 8SW-B/F19                            | 28/10    | Public | 7/10        | Soil cut         | 2                       | Open area                         | -           |

**Table B4 List of Landslide Incidents in New Territories (Sheet 11 of 13)**

| Incident No. <sup>(1)</sup>                | Location  | Feature Registration No.<br>(if any) | Reported |        | Failure     |               |            | Facility Affected | Consequence |
|--|---|--------------------------------------|----------|--------|-------------|---------------|------------|-------------------|-------------|
|  |   |                                      | Date     | By     | Date (Time) | Feature Type  | Scale (m³) |                   |             |
| 2015/12/1786                               | Northwest of Cheng Wai Sang Yu Tsuen, Lo Wu   | 3NW-C/C45                            | 30/11    | Others | Unknown     | Soil cut      | 1.5        | Open area         | -           |
| 2016/01/1788                               | Northwest of Feature No. 6SW-A/CR327, Rural Training College, Alumni Association School, Tuen Mun | 1.8 m high cut slope                 | 17/12    | Public | Unknown     | Soil cut      | 0.3        | Open area         | -           |
| 2015/01/1001AD<br>(ArchSD/SK/2015/01/0001) | Access road to High Island Detention Centre, Sai Kung   | 8SE-C/FR13                           | 10/1     | ArchSD | Unknown     | Fill          | 6          | Nil               | -           |
| 2015/01/1002WS<br>(WSD/2015/1/1/NTE)       | Adjoining the dam of Shing Mun Reservoir, Shatin  | 7SW-C/C959                           | 27/1     | WSD    | Unknown     | Rock cut      | 350        | Catchwater        | -           |
| 2015/05/1005AF<br>(AFCD/2015/05/0001)      | Shing Mun Forest Track-Grass Hill Section, Shatin   | 7SW-B/C603                           | 1/5      | MC     | Unknown     | Soil cut      | 5          | Access road       | -           |
| 2015/05/1006AF<br>(AFCD/2015/05/0002)      | Chuen Lung Forest Track, Tsuen Wan  | 7SW-A/C233                           | 1/5      | MC     | Unknown     | Soil/rock cut | 30         | Minor footpath    | -           |
| 2015/05/1007AF<br>(AFCD/2015/05/0003)      | Shing Mun Reservoir BBQ Site No. 9, Shatin  | 7SW-C/C964                           | 1/5      | MC     | Unknown     | Soil cut      | 3          | Other (BBQ site)  | -           |
| 2015/05/1010WS<br>(WSD/2015/05/3/NTW)      | Tai Lam Chung Catchwater (Section 0, CH9263 - CH9295), Tseun Wan                                  | 6SE-B/CR107                          | 26/5     | WSD    | Unknown     | Soil cut      | 9          | Catchwater        | -           |
| 2015/06/1012LD<br>(LandsD/2015/06/0178)    | South of No. 38 Kap Pin Long New Village, Sai Kung  | 8SW-A/C362                           | 30/6     | LandsD | Unknown     | Soil cut      | 1          | Village house     | -           |

**Table B4 List of Landslide Incidents in New Territories (Sheet 12 of 13)**

| Incident No. <sup>(1)</sup>               | Location  | Feature Registration No.<br>(if any) | Reported |        | Failure     |                   |            | Facility Affected   | Consequence                                     |
|---|---|--------------------------------------|----------|--------|-------------|-------------------|------------|---------------------|---|
|   |   |                                      | Date     | By     | Date (Time) | Feature Type      | Scale (m³) |                     |   |
| 2015/06/1013WS<br>(WSD/2015/06/1/N TE)    | Along Catchwater (CH0000 - CH0210), Golden Hill, Shatin             | 7SW-C/C984                           | 1/6      | WSD    | Unknown     | Soil/rock cut     | 17.4       | Catchwater          | -   |
| 2015/06/1014WS<br>(WSD/2015/06/2/N TE)    | High Island Reservoir, Sai Wan Road, Sai Kung                       | 8SE-A/C60                            | 13/6     | WSD    | Unknown     | Soil/rock cut     | 1.1        | Road                | Sai Wan Road (one lane road) temporarily closed |
| 2015/07/1015AF<br>(AFCD/2015/07/0001)     | Chuen Lung Forest Track, Tsuen Wan                                  | 7SW-A/C236                           | 6/8      | AFCD   | Unknown     | Soil/rock cut     | 10         | Access road         | -   |
| 2015/07/1018LD<br>(LandsD/2015/07/0180)   | Near Lamp Post No. V8076, Sun Tai Village, Tseng Lan Shue, Sai Kung | < 3 m high cut slope                 | 14/7     | LandsD | Unknown     | Soil cut          | 0.5        | Access road         | -   |
| 2015/07/1019WS<br>(WSD/2015/07/1/N TE)    | East Dam of High Island Reservoir, Sai Kung                         | 8SE-D/C2                             | 9/7      | WSD    | Unknown     | Soil/rock cut     | 1.5        | Other (toe channel) | -   |
| 2015/08/1022AF<br>(AFCD/2015/08/0001)     | Beside Feature No. 7SW-C/C1025, Kam Shan Country Park, Shatin       | > 3 m high cut slope                 | 19/8     | AFCD   | Unknown     | Soil cut          | 4          | Access road         | -   |
| 2015/08/1023HY<br>(HyD/NTE/2015/08/0021)  | Ma On Shan Bypass near Lamp Post No. BE1431, Ma On Shan             | 7NE-D/F153                           | 15/8     | HyD    | 15/8        | Soil cut          | 6          | Nil                 | -   |
| 2015/08/1026WS<br>(WSD/2015/08/3/N TW)    | Yau Kom Tau Treatment Works, Tsuen Wan                              | 6SE-D/C606                           | 18/8     | WSD    | Unknown     | Soil cut          | 1.5        | Nil                 | -   |
| 2015/10/1027AD<br>(ArchSD/F/2015/10/0001) | Within GLA-DN81, Wo Hop Shek, North                                 | 3SW-C/DT24                           | 16/10    | ArchSD | Unknown     | Disturbed terrain | 5          | Access road         | -   |

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

| Incident No. <sup>(1)</sup>               | Location  | Feature Registration No.<br>(if any) | Reported |        | Failure     |              |                         | Facility Affected | Consequence |
|---|---|--------------------------------------|----------|--------|-------------|--------------|-------------------------|-------------------|-------------|
|   |   |                                      | Date     | By     | Date (Time) | Feature Type | Scale (m <sup>3</sup> ) |                   |             |
| 2015/10/1029WS<br>(WSD/2015/10/3/NTE)     | Catchwater QA, Tai Mong Tsai, Sai Kung  | 8SW-B/CR197                          | 22/10    | WSD    | Unknown     | Soil cut     | 4.5                     | Catchwater        | -           |
| 2015/11/1030AD<br>(ArchSD/F/2015/11/0001) | Section 60U, 400 m northwest of Sitting Out Area, Wo Hop Shek Cemetery, North | 3SW-C/C110                           | 16/11    | ArchSD | Unknown     | Soil cut     | 12                      | Open area         | -           |
| 2015/11/1031LD<br>(LandsD/2015/11/0194)   | South of Nos. 317 to 320, Tso Wo Hang Sun Tsuen, Sai Kung                     | 8SW-A/FR25                           | 29/10    | LandsD | Unknown     | Fill         | 1                       | Village house     | -           |
| 2015/11/1032WS<br>(WSD/2015/11/1/NTE)     | Catchwater Off Pak Tam Road, Sai Kung Country Park, Sai Kung                  | 8NW-D/CR53                           | 17/11    | WSD    | Unknown     | Soil cut     | 16                      | Catchwater        | -           |
| 2015/12/1036AD<br>(ArchSD/F/2015/12/0001) | 50 m northwest of Gallant Garden, Wo Hop Shek Cemetery, North                 | 3SW-C/C307                           | 18/12    | ArchSD | Unknown     | Soil cut     | 13                      | Access road       | -           |
| 2015/12/1037AD<br>(ArchSD/F/2015/12/0002) | 48 m northwest of Gallant Garden, Wo Hop Shek Cemetery, North                 | 3SW-C/C308                           | 18/12    | ArchSD | Unknown     | Soil cut     | 22.5                    | Access road       | -           |
| 2015/12/1038AD<br>(ArchSD/F/2015/12/0003) | 55 m northwest of Gallant Garden, Wo Hop Shek Cemetery, North                 | 3SW-C/C347                           | 21/12    | ArchSD | Unknown     | Soil cut     | 3                       | Access road       | -           |
| 2015/12/1042WS<br>(WSD/2015/12/4/NTE)     | Adjoining WSD Access Road, North of Lower Shing Mun Reservoir, Sha Tin        | 7SW-D/C685                           | 2/12     | WSD    | Unknown     | Soil cut     | 4                       | Nil               | -           |

Notes:

- (1) The bracket denotes the landslide number adopted by the government 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 2)**

| Incident No. <sup>(1)</sup> | Location   | Feature Registration No. (if any) | Reported |        | Failure      |                  |                    | Facility Affected            | Consequence                                       |
|-----------------------------|--|-----------------------------------|----------|--------|--------------|------------------|--------------------|------------------------------|---|
|                             |  |                                   | Date     | By     | Date (Time)  | Feature Type     | Scale (m³)         |                              |   |
| 2015/01/1655                | DD 5 LM Lot 209, Luk Chau Village, Lamma Island                                  | Natural hillside                  | 12/1     | DO     | Unknown      | Natural hillside | 0.2 (Boulder fall) | Registered squatter dwelling | -   |
| 2015/05/1677                | South of No. 18 Tai Shan East Tsuen, Yung Shue Wan, Lamma Island                 | 14NE-B/CR216                      | 23/5     | FSD    | 23/5 (16:30) | Soil cut         | 5                  | Registered squatter dwelling | -   |
| 2015/05/1684                | No. 18 Chung Mei, Lamma Island   | Natural hillside                  | 26/5     | Public | Unknown      | Natural hillside | 0.8 (Boulder fall) | Minor footpath               | -   |
| 2015/05/1686                | Behind House No. 2 Tai Lung Tsuen, Peng Chau                                     | 10SW-B/CR354                      | 26/5     | ICC    | 24/5         | Soil cut         | 1                  | Registered squatter dwelling | -   |
| 2015/05/1687                | Near House No. 24 Nam Shan Road, Peng Chau                                       | 10SW-B/C351                       | 26/5     | ICC    | 23/5         | Soil cut         | 0.3                | Registered squatter dwelling | -   |
| 2015/05/1688                | Below House No. 27 Pui O Lo Wai Tsuen, Pui O, Lantau                             | 2 m high retaining wall           | 26/5     | Public | Unknown      | Retaining wall   | 0.2                | Village house                | -   |
| 2015/07/1709                | South Lantau Road, Lantau  | 13NE-B/C165                       | 22/7     | HyD    | 22/7 (05:00) | Soil/rock cut    | 8                  | Road                         | One lane of South Lantau Road temporarily closed  |
| 2015/07/1719                | Natural hillside to the west of Feature No. 10SW-D/C57, Hei Ling Chau            | Natural hillside                  | 27/7     | CSD    | 24/7 (10:00) | Natural hillside | 100                | Open area                    | District open space at crest partially undermined |
| 2015/07/1722                | Southwest of Bungalow E, Hei Ling Chau Addiction Treatment Centre, Hei Ling Chau | Natural hillside                  | 30/7     | CSD    | Unknown      | Natural hillside | 80                 | Open area                    | -   |

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

| Incident No. <sup>(1)</sup>                          | Location   | Feature Registration No.<br>(if any) | Reported |        | Failure     |                  |                        | Facility Affected | Consequence |
|--|--|--------------------------------------|----------|--------|-------------|------------------|------------------------|-------------------|-------------|
|  |  |                                      | Date     | By     | Date (Time) | Feature Type     | Scale (m³)             |                   |             |
| 2015/12/1787   | House No. 54 Lo So Shing, Lamma Island                       | Natural hillside                     | 17/12    | DLO    | Unknown     | Natural hillside | 0.18<br>(Boulder fall) | Access road       | -           |
| 2015/06/1011AD<br>(ArchSD/Southern/<br>2015/06/0001) | Adjoining Country Park Management Center, Chi Ma Wan, Lantau | Natural hillside                     | 4/6      | ArchSD | Unknown     | Natural hillside | 0.5                    | Open area         | -           |
| 2015/07/1016AF<br>(AFCD/2015/07/<br>0002)            | Nam Shan Country Park Management Centre, Lantau              | 10SW-C/C168                          | 13/8     | AFCD   | Unknown     | Soil cut         | 8                      | Open area         | -           |

Note: (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.

**Copies of GEO publications (except geological maps and other publications which are free of charge) can be purchased either by:**

Writing to  
Publications Sales Unit,  
Information Services Department,  
Room 626, 6th Floor,  
North Point Government Offices,  
333 Java Road, North Point, Hong Kong.

or

- Calling the Publications Sales Section of Information Services Department (ISD) at (852) 2537 1910
- Visiting the online Government Bookstore at <http://www.bookstore.gov.hk>
- Downloading the order form from the ISD website at <http://www.isd.gov.hk> and submitting the order online or by fax to (852) 2523 7195
- Placing order with ISD by e-mail at [puborder@isd.gov.hk](mailto:puborder@isd.gov.hk)

**1:100 000, 1:20 000 and 1:5 000 geological maps can be purchased from:**

Map Publications Centre/HK,  
Survey & Mapping Office, Lands Department,  
23th Floor, North Point Government Offices,  
333 Java Road, North Point, Hong Kong.  
Tel: (852) 2231 3187  
Fax: (852) 2116 0774

**Requests for copies of Geological Survey Sheet Reports and other publications which are free of charge should be directed to:**

For Geological Survey Sheet Reports which are free of charge:  
Chief Geotechnical Engineer/Planning,  
(Attn: Hong Kong Geological Survey Section)  
Geotechnical Engineering Office,  
Civil Engineering and Development Department,  
Civil Engineering and Development Building,  
101 Princess Margaret Road,  
Homantin, Kowloon, Hong Kong.  
Tel: (852) 2762 5380  
Fax: (852) 2714 0247  
E-mail: [jsewell@cedd.gov.hk](mailto:jsewell@cedd.gov.hk)

For other publications which are free of charge:  
Chief Geotechnical Engineer/Standards and Testing,  
Geotechnical Engineering Office,  
Civil Engineering and Development Department,  
Civil Engineering and Development Building,  
101 Princess Margaret Road,  
Homantin, Kowloon, Hong Kong.  
Tel: (852) 2762 5346  
Fax: (852) 2714 0275  
E-mail: [florenceko@cedd.gov.hk](mailto:florenceko@cedd.gov.hk)

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。

**讀者可採用以下方法購買土力工程處刊物(地質圖及免費刊物除外):**

書面訂購  
香港北角渣華道333號  
北角政府合署6樓626室  
政府新聞處  
刊物銷售組

或

- 致電政府新聞處刊物銷售小組訂購 (電話: (852) 2537 1910)
- 進入網上「政府書店」選購，網址為 <http://www.bookstore.gov.hk>
- 透過政府新聞處的網站 (<http://www.isd.gov.hk>) 於網上遞交訂購表格，或將表格傳真至刊物銷售小組 (傳真: (852) 2523 7195)
- 以電郵方式訂購 (電郵地址: [puborder@isd.gov.hk](mailto:puborder@isd.gov.hk))

**讀者可於下列地點購買1:100 000、1:20 000及1:5 000地質圖：**

香港北角渣華道333號  
北角政府合署23樓  
地政總署測繪處  
電話: (852) 2231 3187  
傳真: (852) 2116 0774

**如欲索取地質調查報告及其他免費刊物，請致函：**

免費地質調查報告:  
香港九龍何文田公主道101號  
土木工程拓展署大樓  
土木工程拓展署  
土力工程處  
規劃部總土力工程師  
(請交:香港地質調查組)  
電話: (852) 2762 5380  
傳真: (852) 2714 0247  
電子郵件: [jsewell@cedd.gov.hk](mailto:jsewell@cedd.gov.hk)

其他免費刊物:  
香港九龍何文田公主道101號  
土木工程拓展署大樓  
土木工程拓展署  
土力工程處  
標準及測試部總土力工程師  
電話: (852) 2762 5346  
傳真: (852) 2714 0275  
電子郵件: [florenceko@cedd.gov.hk](mailto:florenceko@cedd.gov.hk)

## **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      Review of Design Methods for Excavations (1990), 187 p. (Reprinted, 2002).  
No. 1/90

GEO Publication      Review of Granular and Geotextile Filters (1993), 141 p.  
No. 1/93

GEO Publication      Foundation Design and Construction (2006), 376 p.  
No. 1/2006

GEO Publication      Engineering Geological Practice in Hong Kong (2007), 278 p.  
No. 1/2007

GEO Publication      Prescriptive Measures for Man-Made Slopes and Retaining Walls (2009), 76 p.  
No. 1/2009

GEO Publication      Technical Guidelines on Landscape Treatment for Slopes (2011), 217 p.  
No. 1/2011

#### **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