FACTUAL REPORT ON HONG KONG RAINFALL AND LANDSLIDES IN 2001

GEO REPORT No. 146

T.T.M. Lam

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 2001

GEO REPORT No. 146

T.T.M. Lam

This report was originally produced in May 2002
as GEO Special Project Report No. SPR 2/2002

First published, July 2004

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. These include guidance documents and results of comprehensive reviews. 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 last page of this report.

R.K.S. Chan
Head, Geotechnical Engineering Office
July 2004

FOREWORD

This report presents the factual information on rainfall and landslides in Hong Kong in 2001. Most of the landslide data were obtained from the records of incidents reported to the Geotechnical Engineering Office (GEO). Supplementary information was collected by the GEO's 2001 landslide investigation consultants. The Hong Kong Observatory provided weather and rainfall information. The Special Projects Division carried out a review of the rainfall records and rainfall analysis and prepared Section 2 of this report. All contributions are gratefully acknowledged.

(K.K.S. Ho)
Chief Geotechnical Engineer/Landslip Investigation

ABSTRACT

This report presents the factual information on rainfall and landslides in Hong Kong in 2001. Rainfall information was obtained from the Geotechnical Engineering Office (GEO) automatic raingauge system and from the Hong Kong Observatory (HKO). Most of the landslide data were obtained from the records of incidents reported to the GEO. Supplementary information was collected by the GEO's 2001 landslide investigation consultants.

Rainfall at the HKO's Principal Raingauge at Tsim Sha Tsui in 2001 amounted to 3091.8 mm, which ranked the fourth highest in terms of annual rainfall since records began in 1884. One Black Rainstorm Warning was issued on 1 September 2001 and Red Rainstorm Warnings were issued on nine occasions between 8 June 2001 and 7 September 2001.

Eight Landslip Warnings were issued between 6 June 2001 and 8 September 2001. A total of 227 incidents that occurred in 2001 were reported to the GEO. Of these, 214 were classified as genuine landslides, 16 of which were major failures (i.e. with a failure volume of 50 m^3 or more, or where a fatality has occurred). No fatalities were reported but a rockfall incident resulted in two injuries. The consequences resulting from the landslides included the permanent evacuation of 15 squatters and the temporary evacuation of 33 squatters and six houses. Twenty-three landslides resulted in closure of sections of roads and thirteen landslides resulted in closure of sections of pedestrian pavements, footpaths and other forms of minor foot and vehicular access.

CONTENTS

1. INTRODUCTION

This report presents a summary of the factual information on rainfall and landslides that occurred in 2001. Rainfall information was obtained from the Geotechnical Engineering Office (GEO) and the Hong Kong Observatory (HKO). Most of the landslide data were obtained from the records of incidents reported to the GEO. Supplementary information was collected by the GEO's 2001 landslide investigation consultants.

In this report, a landslide is defined as the detachment or excessive displacement of soil or rock mass, and includes failure of fill slopes, cut slopes, retaining walls, natural hillsides and disturbed terrain, rockfalls and boulder falls. A 'major' landslide is defined as a failure in which the estimated or recorded volume of the detached or displaced mass is 50 m^3 or more, or where a fatality has occurred. This report presents rainfall and landslide information throughout the year rather than emphasising any one specific rainstorm or landslide.

Diagnosis of landslides occurred in 2001 and recommendations for improving the performance of the slope safety system will be presented separately in a report on review of landslides in 2001.

2. RAINFALL

2.1 The Raingauge System

The GEO, in cooperation with the Hong Kong Observatory (HKO), operates an automatic raingauge system that transmits real-time rainfall data via telephone lines to the GEO and HKO at five-minute intervals. During 2001, this system comprised 86 GEO raingauges and 24 HKO raingauges. The locations of all the raingauges are shown on Figure 1.

2.2 Rainfall Records

The data from the raingauge system are checked, verified and stored by the GEO in a computer database, from which they can be extracted and analysed. A selection of rainfall depths with respect to different durations for the year, for individual months, and for individual storms is presented below.

The weather in 2001 was described by the HKO, in the Monthly Weather Summary for December 2001 (HKO, 2002), as follows:

> "The year 2001 was warmer and wetter than usual. The mean temperature of 23.6 degrees was 0.6 degrees above normal, ranking the fourth highest on record. The mean minimum temperature of 21.8 degrees was the second highest on record. The annual total rainfall of 3091.8 millimetres [as recorded at the HKO's Principal Raingauge at Tsim Sha Tsui] also ranked the fourth highest. In June 2001, the total rainfall of 1083.6 millimetres [at the HKO] set a new record for the month.

Six tropical cyclones necessitated the hoisting of Tropical Cyclone Warning Signals. The No. 8 signal was hoisted during the passage of Typhoon Utor and Typhoon Yutu. The only Black Rainstorm Signal of the year was issued on September 1 while the Red Rainstorm Signal was issued on nine occasions."

"January was warmer and wetter than usual. February was again warmer but drier than usual. Warmer and drier weather continued into March. The rainstorm on 25 March necessitated the issuance of the Amber Rainstorm Warning, the earliest rainstorm warning in a year since the revised rainstorm warning system came into effect in 1998."

"April was again warmer and drier than usual. Hail fell on 9 April during the passage of thunderstorms. May was the fourth consecutive month with warmer and drier weather. The accumulated rainfall since 1 January amounted to only 410 millimetres, 33 per cent below the normal figure."

"With an active trough of low pressure lingering over the vicinity of the south China coast for about two thirds of the month, the weather of June was marked by persistent heavy rain and thunderstorms. The monthly rainfall amounted to 1083.6 millimetres, about three times the normal figure. This is also a new rainfall record for June, the previous record being 962.9 millimetres [at the HKO] in June 1966."

"In June, Typhoon Chebi led to the hoisting of the Standby Signal No. 1 in Hong Kong for the first time this year. Tropical Storm Durian, which developed into a full-fledged typhoon in early July, affected Hong Kong by the end of June and necessitated the hoisting of the Strong Wind Signal No. 3."

"July was wetter and cooler than usual. A waterspout formed over the Tathong Channel during the passage of Durian. Typhoon Utor and Typhoon Yutu both necessitated the hoisting of the No. 8 signal in Hong Kong. The last time the No. 8 signal was hoisted twice in July was in 1966."

"It was warmer and drier than usual in August. Standby Signal No. 1 was hoisted for Tropical Storm Fitow. September was warmer and wetter than usual. Typhoon Nari, characterised by its erratic movement and unusual long life-span of 15 days, necessitated the hoisting of the No. 3 signal in Hong Kong."

"It was warmer and drier than usual in October. Dry weather continued into November with only 4.3 millimetres of rainfall

recorded against a normal of 35.1 millimetres. December was warmer and wetter than usual."

The cumulative rainfall for 2001 recorded at the HKO's Principal Raingauge at Tsim Sha Tsui is shown in Figure 2, and is compared with the highest and lowest recorded and mean cumulative figures.

Figures 3a, 3b, 3c and 3d show the total monthly rainfall distributions in 2001.

Figure 4 shows the total annual rainfall distribution during 2001, together with the locations of reported landslides.

2.3 Rainstorms in 2001

The maximum 24-hour, five-hour and one-hour rolling rainfall (five-minute basic units) for the eleven storms during 2001 in which maximum 24-hour rolling rainfall exceeded 50 mm at the HKO are given in Table 1, together with the maximum amounts at any of the GEO raingauges. Also included are the 4-day and 15-day antecedent rainfall at the HKO, and the number of reported landslides. Similar data from selected previous major rainstorms are included for comparison.

Figures 5 to 15 show isohyets of maximum rolling 24-hour rainfall during these eleven storms, together with landslide locations and the locations and values of maximum rainfall for durations from five minutes to 48 hours.

Three storms triggered significant numbers of landslides. The storms of 5 to 13 June 2001, 24 to 28 June 2001 and 29 August 2001 to 8 September 2001 triggered 76, 17 and 42 reported landslides respectively. No other storms triggered more than six reported landslides.

If all the GEO raingauges are considered, rather than just the Principal Raingauge at the HKO, there were 22 storms that exceeded 50 mm of rainfall in 24 hours (including the eleven storms shown in Table 1). Maximum rolling rainfall amounts with respect to different durations for all of these 22 storms are shown in Table A1 of Appendix A.

2.4 Warnings Issued by the Hong Kong Observatory

Relevant warnings issued by the HKO and Landslip Warnings jointly issued by the GEO and the HKO in 2001 are summarised in Table 2. In total, eight Landslip Warnings were issued between 6 June 2001 and 8 September 2001. One Black Rainstorm Warning was issued on 1 September 2001 and Red Rainstorm Warnings were issued on nine occasions between 8 June 2001 and 7 September 2001.

3. LANDSLIDES

3.1 Landslide Occurrence in 2001

A total of 227 landslide incidents, which occurred in 2001 was reported to the GEO. In total, 214 landslides were classified as genuine landslides (summarised in Appendix B), 16 (7.5%) of which were major (see Table B2 in Appendix B). The remaining reported incidents were either not landslides or incidents that were of no geotechnical concern, such as fallen trees and very minor washouts, and were therefore not considered in the analysis described below. The locations of all the reported landslides are shown in Figure 4.

Selected notable landslides are presented in Section 4 and illustrated in Plates 1 to 10. Information on the landslides collected when the incidents were attended to by the GEO are recorded on GEO Incident Reports and Landslip Cards (for major landslides). These information together with the scanned images of all GEO Incident Reports and Landslip Cards have been uploaded onto the Slope Information System which is accessible by the general public. Further details of these failures can be found in the incident files of the District Divisions of the GEO and in landslide studies or reviews conducted by GEO's landslide investigation consultants.

Wherever possible, the dates and times of the landslides were assessed by geotechnical engineers. Some incidents were not reported to the GEO until several days or weeks after they had occurred. For these, it was difficult to determine the exact times of occurrence. Of the 214 reported landslides, the timing of occurrence was determined to within one day for 108 incidents.

It should be noted that there were almost certainly other landslides which were not reported to the GEO, many of which would have occurred in remote areas with no immediate consequences.

3.2 Consequence of Landslides

3.2.1 General

The consequence of landslides in terms of number of landslides (including number of major landslides) affecting various types of facility (e.g. buildings, roads, squatters, etc.) in Hong Kong, Kowloon and the New Territories are shown in Table 3. It should be noted that a failure may affect more than one type of facility. Significant consequences of landslides (e.g. casualties, evacuation of squatters and buildings, closure of roads, etc.) classified according to type of slope failure, are listed in Table 4. Table 5 shows the distribution of the different facility group affected by major landslides. Further descriptions of selected notable landslides are presented in Section 4.

3.2.2 Buildings

Six landslides affected buildings, and none of these was major. These landslides resulted in the temporary evacuation of six houses.

3.2.3 Roads and Transport Facilities

Forty-eight landslides affected sections of roads and transport facilities (e.g. railways, tramways, LRT, etc.). Four of these were major. Twenty-three landslides resulted in the closure of sections of roads. Landslide incidents Nos. HK2001/06/002, HK2001/06/008, MW2001/06/007 and 2001/09/0057 are described in Section 4.

3.2.4 Squatters

A total of 32 landslides affected squatter areas and five of these landslides were major. These landslides led to the permanent evacuation of 15 squatters and the temporary evacuation of 33 squatters. Landslide incidents Nos. MW2001/06/010, MW2001/06/016a, 2001/09/0057 and 2001/09/0066 are described in Section 4.

3.2.5 Construction Sites

Five landslides affected active construction sites. Two of these were major. Landslide incident No. 2001/09/0057 is described in Section 4.

3.2.6 Other Areas

Other areas affected by landslides include pedestrian pavements, footways, minor footpaths, minor access facilities, carparks, parks, playgrounds, gardens, backyard, open areas, etc.. Fifty landslides affected pedestrian pavements, footways, minor footpaths and access facilities, four of which were major. Eighty-five landslides affected carparks, parks, playgrounds, gardens, backyard, open areas, etc. and five of these were major. Thirteen landslides resulted in closure of sections of pedestrian pavements, footpath and other forms of foot and vehicular access. Landslide incidents Nos. ME2001/06/030, ME2001/06/059, MW2001/06/009 and MW2001/06/021 are described in Section 4.

3.3 Types of Slope Failures

3.3.1 General

Landslides reported to the GEO have been classified into six types of slope failures, i.e. fill slopes, cut slopes, retaining walls, natural hillside and disturbed terrain. The number of different types of slope failures are shown in Table 6.

3.3.2 Fill Slopes

There were eleven fill slope failures, comprising 5.1% of all landslides reported. Two of these failures were major. Landslide incident No. 2001/09/0066 is described in Section 4.

3.3.3 Cut Slopes

There were 118 cut slope failures, comprising 55.2% of all landslides reported. These were classified further according to types of material involved, i.e. soil, soil/rock and rock.

There were 84 landslides for soil cut slopes, two of which were major. There were 25 soil/rock cut slope failures, none of which were major. Landslide incidents Nos. HK2001/06/002 and MW2001/06/007 are described in Section 4.

There were nine incidents on rock cut slopes, none of which were major. Landslide incident No. HK2001/06/008 is described in Section 4.

3.3.4 Retaining Walls

There were 18 failures of retaining walls, comprising 8.4% of all landslides. Three of these incidents were major. Landslide incident No. MW2001/06/010 is described in Section 4.

3.3.5 Natural Hillside

There were 62 natural hillside failures reported, comprising 29% of all landslides. Eight of these failures were major. Landslide incidents Nos. ME2001/06/030, ME2001/06/059, MW2001/06/016a, MW2001/06/021 and 2001/09/0057 are described in Section 4.

3.3.6 Disturbed Terrain

There were five disturbed terrain failures reported, comprising 2.3% of all landslides. One of these failures was major. Landslide incident No. MW2001/06/009 is described in Section 4.

3.4 Landslide Volume Distribution

Tables 7 and 8 show the distribution of landslide volumes for all landslides which were reported to the GEO. One hundred and six landslides (about 49.5%) involved less than 5 m^3 of material. A total of 16 of the reported landslides (about 7.5%) involved a failure volume of 50 m^3 or more. Of these 16 major failures, two were fill slopes, two were soil cut slopes, three were retaining walls, eight were on natural hillsides and one was on disturbed terrain. There were no rock slopes or soil/rock slopes in this group.

4. NOTABLE LANDSLIDES

4.1 General

Out of the 214 genuine landslides reported to GEO in 2001, eleven are described in more detail here. These eleven landslides have been selected mainly on the basis of their failure volume, consequence or technical interest.

4.2 The 1 September 2001 Channelised Debris Flow on the Natural Hillside above Lei Pui Street, Kwai Chung (GEO Incident No. 2001/09/0057)

(A major natural hillside failure that developed into a channelised debris flow, destroying two squatter units (i.e. one squatter hut and a canopy) and depositing debris within an active construction site as well as on Lei Pui Street and Shek Pai Street below. The incident resulted in temporary closure of the sole vehicular access to a residential area and two schools for three days, Plate 1)

During heavy rainfall and after Landslip Warning and Black Rainstorm Warning were hoisted on 1 September 2001, a major landslide (GEO Incident No. 2001/09/0057) occurred at about 10:50 p.m. on the natural hillside approximately 130 m above Lei Pui Street, Kwai Chung. The source area, located at about 230 mPD above a locally steep (60°) exposed rock face, was approximately 26 m long and 18 m wide, with a maximum depth of about 1.5 m. The detached material comprised mostly moderately decomposed granite in the form of slabs separated by persistent, dilated and infilled sheeting joints, with some overlying colluvium. The landslide involved a failure volume of approximately 250 m^3.

The sliding mass subsequently entrained a further volume of about 500 m^3 of material from the natural drainage line and rapidly developed into a debris flow after mixing with concentrated surface runoff along the drainage line. The fast-moving debris demolished two squatter units located further downhill at about 100 mPD and adjacent to the natural drainage line. The debris came to rest within an active construction site above Lei Pui Street, except for about 50 m^3 of outwash material which was washed on to Lei Pui Street and Shek Pai Street below by surface water flow. As a result, Lei Pui Street, which is the sole vehicular access to a residential area and two schools, was temporarily closed from 1 September 2001 to 4 September 2001 for three days.

4.3 The 9 June 2001 Rockfall from Slope No. 11NW-A/C58 at Castle Peak Road, Kwai Chung (GEO Incident No. MW2001/06/007)

(A rockfall from the rock cut portion of a soil/rock cut slope onto Castle Peak Road, which resulted in injury to the driver and a passenger in a passing vehicle, Plate 2)

At about 6:00 p.m. on 9 June 2001, some 3 hours after a rainstorm, a rockfall (GEO Incident No. MW2001/06/007), with an estimated failure volume of about 0.05 m^3, occurred on cut slope No. 11NW-A/C58 adjacent to Castle Peak Road below Wah Yuen Chuen, Kwai Chung. A fragment of rock hit a Post Office van, which was travelling on the inside lane of Castle Peak Road, and smashed through its windscreen. The van lost control and crashed into the toe of the slope. As a result, the driver and the only other passenger, who was also

in the front seat, were injured.

The rockfall incident occurred on the northeast side of the section of Castle Peak Road below Wah Yuen Chuen. The slope is a soil and rock cut slope and is approximately 210 m long and up to about 35 m high. The slope comprises four batters formed at about 60° to the horizontal with three berms of 1.0 m to 1.3 m in width. The slope is mostly covered with shotcrete except for the exposed rock portion located approximately in the middle portion of the slope (which is about 100 m in length for the lowest two batters and about 40 m in length for the upper batter). The exposed rock face is heavily jointed and susceptible to detachment of small rock blocks. The rock face was locally covered with much unplanned vegetation, including grass and shrubs that are growing into the rock joints. The source of the rockfall was probably within the exposed rock face of the cut slope.

4.4 The 25 June 2001 Rockfall from Slope No. 11SE-A/C561 at King's Road, Tin Hau (GEO Incident No. HK2001/06/008)

(A rockfall which resulted in the temporary closure of the westbound lane of King's Road and the adjacent footway at the slope toe, Plate 3)

Following heavy rainfall and after Amber Rainstorm Warning was hoisted on 25 June 2001, a rockfall (GEO Incident No. HK2001/06/008) occurred at around 8:00 p.m. on a 15 m high rock cut slope No. 11SE-A/C561 located above King's Road, Tin Hau. The incident involved the detachment of a rock block (about 1.1 m by 0.4 m by 0.4 m) from a location about 10 m above the slope toe, which landed on the pedestrian footway along King's Road at the slope toe. The incident resulted in the temporary closure of the footway and the inside lane of King's Road.

The rock slope face exposes adverse joint orientations which resulted in the formation of rock wedges. Persistent seepage from the slope face has promoted the growth of unplanned vegetation. Progressive tree root growth has penetrated into joint apertures, thereby wedging the joints open.

4.5 The 8 June 2001 Boulder Fall from above Slope No. 11SE-C/C54 at Tai Hang Road, Jardine's Lookout (GEO Incident No. HK2001/06/002)

(A boulder fall which resulted in the temporary closure of the southbound lane of Tai Hang Road, Plate 4)

On 8 June 2001, a boulder fall (GEO Incident No. HK2001/06/002) occurred at approximately 8:30 a.m. during heavy rainfall and after Landslip Warning and Red Rainstorm Warning were hoisted. The 0.1 m^3 boulder originated from sloping ground at about 11 m above the carriageway. The source location of the boulder is within an area where slope upgrading works were completed in April 2001. The slope upgrading works on slope No. 11SE-C/C54 extended beyond the original crest line of the cut feature to cover a portion of the hillside above, including the source area of the boulder fall. The boulder came to rest on the inside lane of Tai Hang Road, which was temporarily closed as a result of the incident.

4.6 The 12 June 2001 Boulder Fall from the Hillside above Slope No. 7SW-C/C72 at Kwai Shing Circuit, Kwai Chung (GEO Incident No. MW2001/06/021)

(A boulder fall from the hillside above the crest of a 22 m high cut slope onto a bus shelter below, which resulted in temporary closure of the bus shelter, Plate 5).

On 12 June 2001 during relatively light rainfall and after Amber Rainstorm Warning was hoisted, a boulder (about 0.5 m by 0.5 m by 0.5 m) fell from the hillside above the crest of slope No. 7SW-C/C72 at about 1:00 p.m.. The failure (GEO Incident No. MW2001/06/021) resulted in temporary closure of the bus shelter. Although the exact origin of the boulder is uncertain, an area of flattened vegetation and a trail of freshly deposited rock fragments indicated that the source area was likely to be on the hillside about 6 m above the crest of slope No. 11NW-C/C72.

4.7 The 12 June 2001 Boulder Fall and the 27 June 2001 Landslide on Natural Hillside above Hong Ning Road Park, Kwun Tong (GEO Incidents Nos. ME2001/06/030 and ME2001/06/059)

(A boulder fall and a landslide from the natural hillside above Hong Ning Road Park respectively, which resulted in damage to the park's amenities and temporary closure of a portion of the park, Plate 6)

During moderate rainfall and after Amber Rainstorm Warning was hoisted on the morning of 12 June 2001, a boulder fall (GEO Incident No. ME2001/06/030) occurred on the natural hillside at about 2 m above an approximately 18 m high slope (registered as No. 11NE-D/DT32) within Hong Ning Road Park. The spheroidal boulder (about 1.5 m in size) from the natural hillside bounced several times on the shotcrete cover of the slope below and damaged some of the facilities in the park. The boulder came to rest in a fishpond which was about 20 m from the toe of slope No. 11NE-D/DT32.

During rainfall and after Landslip Warning and Amber Rainstorm Warning were hoisted on 27 June 2001, another landslide (GEO Incident No. ME2001/06/059) occurred at about 10:00 p.m. on the natural hillside at a height of approximately 12 m above the park and to the west of the source area of the 12 June 2001 boulder fall. The failure volume was about 5 m^3 comprising completely decomposed granite. One boulder (approximately 1 m in size) was released by the failure and travelled down the hillside, broke the drainage gully grating at the base and came to rest about 1 m from the public toilet block at the toe of the hillside.

Both incidents occurred during heavy rainfall and resulted in temporary closure of a portion of Hong Ning Road Park.

4.8 The 10 June 2001 Landslide at Wo Hop Shek Cemetery, Fanling (GEO Incident No. MW2001/06/009)

(A major slope failure within a cemetery area which resulted in temporary closure of part of the cemetery, Plate 7)

During heavy rainfall and after Amber Rainstorm Warning was hoisted on 10 June 2001, a major landslide (GEO Incident No. MW2001/06/009), involving a failure volume of approximately 250 m³ occurred at Wo Hop Shek Cemetery, Fanling. The failure site is located within a cemetery area, consisting of cut and fill burial platforms that range from about 1.5 m to 2 m in height. The landslide scar was about 15 m wide by 30 m long, with a maximum depth of about 1.3 m. The landslide debris was deposited on an access road and some open area at the toe of the cemetery. As a consequence of the landslide, some of the graves were damaged and the affected area was temporarily closed.

4.9 The 1 September 2001 Landslide on Slope No. 11NE-B/FR249 below No. 56 Denon Terrace, Tseng Lan Shue, Sai Kung (GEO Incident No. 2001/09/0066)

(A major fill slope failure which resulted in severe damage of a squatter located below the fill slope and subsequent permanent evacuation of the squatter, Plate 8)

On 1 September 2001 during heavy rainfall and after Amber Rainstorm Warning was hoisted, a major fill slope failure (GEO Incident No. 2001/09/0066), involving a failure volume of about 50 m^3, occurred at about 10:00 p.m. at slope No. 11NE-B/FR249 below No. 56 Denon Terrace, Tseng Lan Shue, Sai Kung. The landslide scar was about 6 m wide by 5 m long, with a maximum depth of about 1 m. The landslide debris, together with entrained material eroded from the natural hillside below, travelled downhill and came to rest against a squatter. The squatter was severely damaged by the debris and consequently it was permanently evacuated.

4.10 The 11 June 2001 Landslide at No. 1A Tin Sum Village, Fanling (GEO Incident No. MW2001/06/010)

(A major failure of a retaining wall which resulted in the permanent evacuation of one squatter and temporary evacuation of another squatter, Plate 9)

On the morning of 11 June 2001 during heavy rainfall and after Amber Rainstorm Warning was hoisted, a maximum 5.5 m high, 20 m long masonry wall collapsed (GEO Incident No. MW2001/06/010). The collapsed section of the retaining wall together with the landslide debris rested against the squatter (No. 1A Tin Sum Village) at the toe. The estimated failure volume was approximately 90 m³. The squatter was severely damaged. As a result, the squatter was permanently evacuated and another squatter located above the crest of the wall was temporarily evacuated.

4.11 The 9 June 2001 Landslide at Pun Shan Village, Tsuen Wan (GEO Incident No. MW2001/06/016a)

(A natural hillside landslide which resulted in temporary evacuation of a squatter, Plate 10)

During heavy rainfall and after Red Rainstorm Warning was hoisted on 9 June 2001, a landslide (GEO Incident No. MW2001/06/016a), occurred at about 10:30 a.m. on the natural

hillside below Tai Lam Chung Catchwater near Pun Shan Village, Tsuen Wan. The landslide scar was about 4 to 5 m wide and 10 m to 12 m long, with a failure volume of approximately 35 m^3. Part of the landslide debris was deposited on a paved platform of a squatter. The landslide resulted in temporary evacuation of the affected squatter.

5. CONCLUSIONS

Rainfall at the HKO's Principal Raingauge at Tsim Sha Tsui amounted to 3091.8 mm in 2001, which ranked the fourth highest in terms of annual rainfall since records began in 1884. Eight Landslip Warnings were issued between 6 June 2001 and 8 September 2001. One Black Rainstorm Warning was issued on 1 September 2001 and Red Rainstorm Warnings were issued on nine occasions between 8 June 2001 and 7 September 2001. A total of 227 incidents were reported to the GEO, of which 214 were classified as genuine landslides. Sixteen landslides were major failures.

A rockfall incident resulted in two injuries. The consequences of landslides included the permanent evacuation of 15 squatters and the temporary evacuation of 33 squatters and six houses. Twenty-three landslides resulted in closure of sections of roads and thirteen landslides resulted in closure of sections of pedestrian pavements, footpaths and other forms of minor foot and vehicular access.

6. REFERENCES

Hong Kong Observatory (2002). Monthly Weather Summary for December 2001. Hong Kong Observatory, Hong Kong, 33 p.

Wong, C.K.L. (1998). The New Priority Classification Systems for Slopes and Retaining Walls. Geotechnical Engineering Office, Hong Kong, 117 p. (GEO Report No. 68).

LIST OF TABLES

Table 1 - Rainfall and Landslides in 2001, Compared with Selected Previous Major Rainstorms

Date of Rainstorm Event[1]	Maximum Rainfall (mm)[2]								Number of Landslides[4] Reported to GEO[5]
	Hong Kong Observatory (HKO)					GEO Raingauges[3]			
	24-hr	5-hr	1-hr	Antecedent		24-hours	5-hours	1-hour	
				4 days	15 days				
5-13 Jun 2001[6]	170	110	58	361	623	323 (N36)	251 (N05)	111 (N36)	76
29 Aug – 8 Sep 2001[6]	151	99	53	272	336	280 (N01)	214 (N01)	105 (N40)	42
24-28 Jun 2001[6]	133	73	53	369	453	263 (N41)	147 (N06)	95 (H21)	17
6-7 Jul 2001[6]	132	69	21	153	626	301 (N21)	165 (N17)	70 (N17)	6
15-16 Jul 2001	108	85	37	147	367	246 (N22)	216 (N22)	95 (N21)	5
21-22 Jul 2001	90	67	33	184	458	176 (N27)	97 (K01)	60 (N01, N08)	1
20-21 Sep 2001	76	35	19	76	220	170 (N47)	137 (N50)	67 (N50)	0
18 Jul 2001	69	29	18	190	384	224 (N37)	81 (N41)	35 (N41)	4
5 Apr 2001	57	34	17	62	113	98 (N15, N50)	30 (N15)	14 (N48)	0
1-2 Jul 2001	56	27	27	166	503	172 (N43)	73 (N14)	46 (N43)	2
2-3 Aug 2001	53	33	29	64	233	160 (H05)	141 (H20)	100 (H20)	0
Selected Previous Major Rainstorms (for comparison only)									
28-29 May 82	394	153	44	1	11	430	237	111	238
17 Jun 83[6]	347	274	69	2	77	460	303	101	155
20-21 May 89[6]	388	149	37	28	42	566	224	51	378
7-9 May 92[6]	324	196	110	65	71	385	244	110	314
15-16 Jun 93[6]	155	129	54	18	275	285	195	111	123
4-5 Nov 93[6]	107	31	9	8	8	742	350	94	394
1-4 Jul 97[6]	110	49	18	183	380	799	296	125	150
8-9 Jun 98[6]	429	164	48	58	181	562	223	98	96
22-26 Aug 99[6]	313	143	51	11	175	565	249	121	269

Notes:
(1) Rainstorm events in which rolling 24-hour rainfall at the Hong Kong Observatory, Tsim Sha Tsui, exceeded 50 mm are arranged in order of the intensity of 24-hour rainfall.
(2) The maxima are calculated using 5-minute rainfall as the basic unit, except those recorded at the HKO for the previous major rainstorms. They are the rolling rainfall amounts using one-clock hour rainfall as the basic unit. The 1-hour maximum rainfall at the HKO refers to clock hours.
(3) The maxima are selected from the 86 GEO Raingauges for the rainstorms. The GEO Raingauge reference number is shown in brackets.
(4) Reported totals are for landslides attributed to the events.
(5) GEO = Geotechnical Engineering Office.
(6) Landslip warnings were issued for these events.

Table 2 - Warnings Issued by the Hong Kong Observatory in 2001[1]

Month	Monthly Total Rainfall (mm)	Dates on which Warnings were in Effect				
		Thunderstorm	Flood	Landslip[2]	Tropical Storm	Rainstorm
January	47.6	25, 26	-	-	-	-
February	10.9	-	-	-	-	-
March	56.5	25	-	-	-	25 (Amber)
April	133	4, 9, 11, 18, 21, 22, 24, 30	9	-	-	9 (Amber)
May	162	1, 8, 8-9, 9, 17, 17-18, 19, 21, 22, 30	21	-	-	9 (Amber), 18 (Amber), 21 (Amber), 30 (Amber)
June	1083.6	2, 3-4, 4, 4-5, 5-6, 6, 6-8, 9, 9-10, 11, 12, 13, 15, 16, 17, 20, 23-24, 24, 25, 26, 26-27, 28, 30	7, 9, 10, 12, 23-24, 27	6 (06:00-14:00), 8 (07:45-17:00), 12 (14:15-17:45), 27(15:45) - 28(07:25)	22-23 (Signal 1, Chebi), 30 (Signal 1-3, Durian)	5 (Amber), 7 (Amber), 8 (Amber, Red), 9 (Amber, Red), 10 (Amber), 11 (Amber, Red), 12 (Amber, Red), 13 (Amber), 23-24 (Amber), 25 (Amber), 26 (Amber), 27 (Amber, Red)
July	656.4	1, 3, 5, 6, 12-13, 15, 16, 17-18, 18, 19, 20, 20-21, 21, 24, 26, 27	-	6(18:00) - 7(09:50)	1-2 (Signal 3, Durian), 4-7 (Signal 1-8, Utor), 23-26 (Signal 1-8, Yutu)	6 (Amber), 13 (Amber), 15 (Amber), 17 (Amber), 18 (Amber), 21 (Amber)
August	318.9	1, 2-3, 10, 11, 12, 12-13, 13, 14, 14-15, 15, 16, 18, 19, 27-28, 29, 30, 30-31, 31	2	30 (15:30-23:15)	28-30 (Signal 1, Fitow)	1 (Amber), 2 (Amber, Red), 12 (Amber), 27-28 (Amber), 30 (Amber)
September	563.3	1, 1-2, 2, 2-3, 5, 6, 7-8, 14, 18, 20-21	1-2	1(22:45) - 2(10:00), 8 (03:30-08:45)	19-20 (Signal 3, Nari)	1 (Amber), 1-2 (Amber, Red, Black), 3 (Amber, Red), 5 (Amber), 7 (Amber, Red)
October	10.7	4, 9	-	-	-	-
November	4.3	-	-	-	-	-
December	44.6	-	-	-	-	-
Total	3091.8	88 days	12 days	8 Warnings	6 Warnings	36 days

Notes:
(1) Information in this Table was based on HKO (2002).
(2) Landslip Warnings were issued after consultation between GEO and HKO.

Table 3 - Number of Landslides Affecting Different Facilities

Affected Facility	Hong Kong Island	Kowloon	New Territories and Outlying Islands	All
Squatters	0 (0)	0 (0)	32 (5)	32 (5)
Buildings	0 (0)	0 (0)	6 (0)	6 (0)
Roads	10 (0)	1 (0)	37 (4)	48 (4)
Transportation Facilities (railways, tramways, LRT, etc.)	0 (0)	0 (0)	0 (0)	0 (0)
Pedestrian Pavements/ Footways	6 (1)	2 (0)	5 (0)	13 (1)
Minor Footpaths/Access	3 (0)	1 (0)	33 (3)	37 (3)
Construction Sites	1 (0)	0 (0)	4 (2)	5 (2)
Open Areas	6 (1)	7 (0)	37 (2)	50 (3)
Catchwaters	0 (0)	0 (0)	0 (0)	0 (0)
Others (e.g. carparks, parks, playgrounds, gardens, backyards, etc.)	3 (0)	0 (0)	32 (2)	35 (2)

Legend:

32 (5) Thirty-two landslides of which five were major failures (i.e. failure volume $\geq 50\ m^3$).

Note: A given landslide may affect more than one key type of facility.

Table 4 - Landslide Consequence Related to Type of Slope Failure

Type of Failure		No. of Squatters Evacuated		No. of Blocks, Houses or Flats Evacuated or Partially Closed	No. of Landslides Closure			Deaths	Injuries
		Permanent	Temporary		Roads	Pedestrian Pavements	Footpaths, Back Lanes, Private Access		
Fill Slope		1	2	-	-	2	-	-	-
Cut Slope	Soil	3	10	5	4	-	3	-	-
	Soil/Rock	-	5	1	5	1	1	-	2
	Rock	-	-	-	5	-	-	-	-
Retaining Wall		5	2	-	1	-	2	-	-
Natural Hillside		6	9	-	8	1	2	-	-
Disturbed Terrain		-	5	-	-	-	1	-	-

Note: A failure may give rise to more than one key type of consequence.

Table 5 - Distribution of Facility Groups Affected by Major Landslides

	Facility Group Affected by Major Landslides				
	Group No. 1	Group No. 2	Group No. 3	Group No. 4	Group No. 5
All Major Landslides	5	0	2	4	6
Major Landslides on Man-made Slope	4	0	1	2	1
Major Landslides on Hillside	1	0	1	2	5

Notes: (1) The facility group is classified in accordance with that adopted for the New Priority Classification Systems (Wong, 1998).
(2) A given landslide may affect more than one key type of facility.

Table 6 - Number of Landslides as Classified by Type of Slope Failure

Type of Failure		No.	Percentage (%)
Fill Slope		11 (2)	5.1
Cut Slope	Soil	84 (2)	39.3
	Soil/Rock	25 (0)	11.7
	Rock	9 (0)	4.2
Retaining Wall		18 (3)	8.4
Natural Hillside		62 (8)	29.0
Disturbed Terrain		5 (1)	2.3
Total		214 (16)	100

Legend:

11 (2) Eleven landslides of which two were major failures (i.e. failure volume $\geq 50\ m^3$).

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

Table 7 - Landslide Volume Distribution with Respect to Geographic Locations

Volume of Failure (m^3)	Hong Kong Island	Kowloon	New Territories and Outlying Islands	All
<5	20	6	80	106 (49.5%)
≥5 to <10	3	3	24	30 (14.0%)
≥10 to <20	2	0	26	28 (13.1%)
≥20 to <50	2	1	31	34 (15.9%)
≥50 to <200	2	-	11	13 (6.0%)
≥200 to <500	-	-	1	1 (0.5%)
≥500 to <1000	-	-	1	1 (0.5%)
≥1000	-	-	1	1 (0.5%)
Total	29	10	175	214 (100%)

Legend: 106 (49.5%) denotes 106 landslides, which amount to 49.5% of the 214 genuine landslides reported to the GEO.

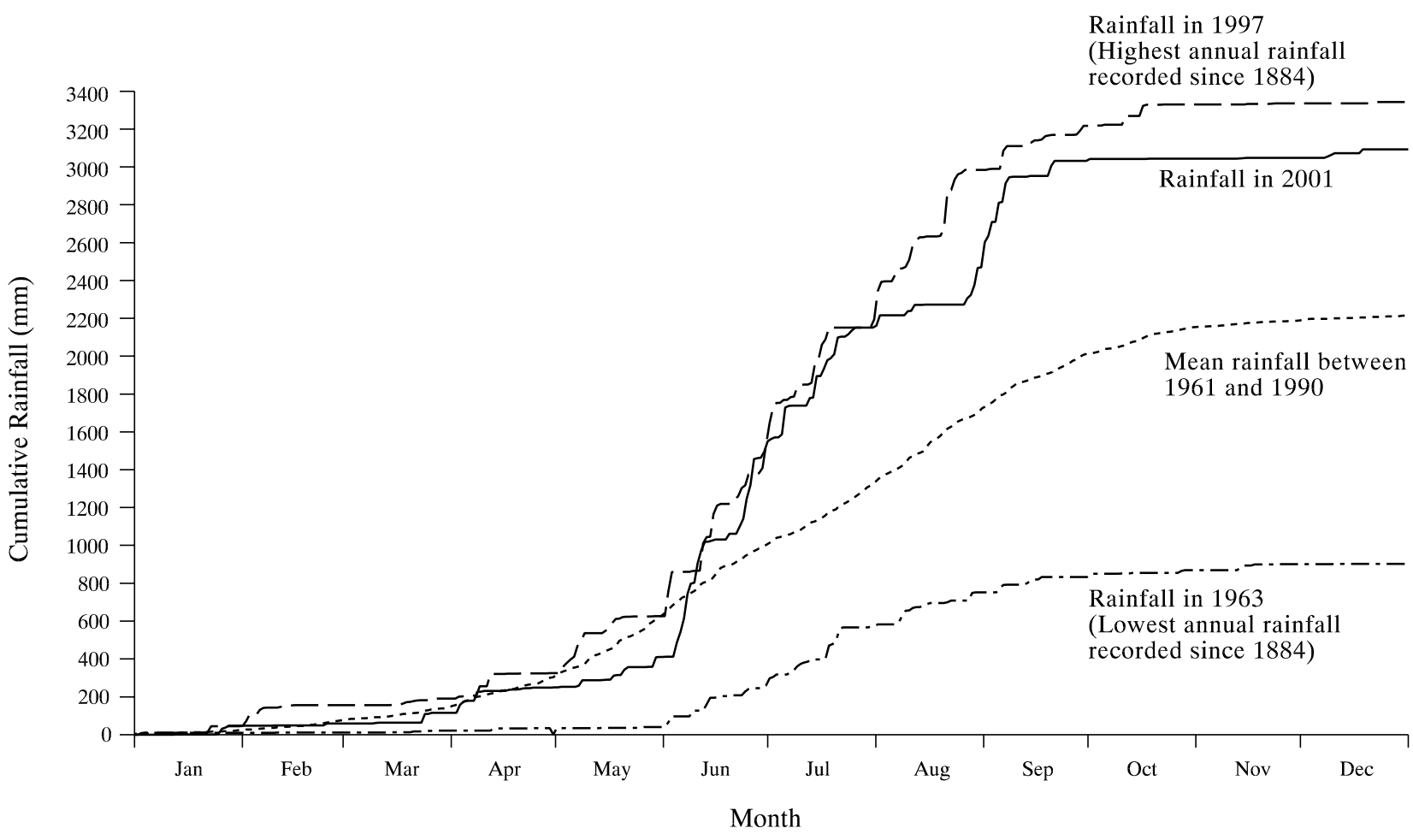
Table 8 - Landslide Volume Distribution with Respect to Type of Slope Failure

Volume of Failure (m^3)	Fill Slope	Cut Slope			Retaining Wall	Natural Hillside	Disturbed Terrain	Total
		Soil Slope	Soil/Rock	Rock				
<5	3	48	18	7	8	20	2	106 (49.5%)
≥5 to <10	3	15	2	0	3	6	1	30 (14.0%)
≥10 to <20	0	12	4	2	2	8	0	28 (13.1%)
≥20 to <50	3	7	1	0	2	20	1	34 (15.9%)
≥50 to <200	2	1	0	0	3	7	0	13 (6.0%)
≥200 to <500	0	0	0	0	0	0	1	1 (0.5%)
≥500 to <1000	0	0	0	0	0	1	0	1 (0.5%)
≥1000	0	1	0	0	0	0	0	1 (0.5%)
Total	11 (5.1%)	84 (39.3%)	25 (11.7%)	9 (4.2%)	18 (8.4%)	62 (29.0%)	5 (2.3%)	214 (100%)

Legend: 106 (49.5%) denotes 106 landslides, which amount to 49.5% of the 214 genuine landslides reported to the GEO.

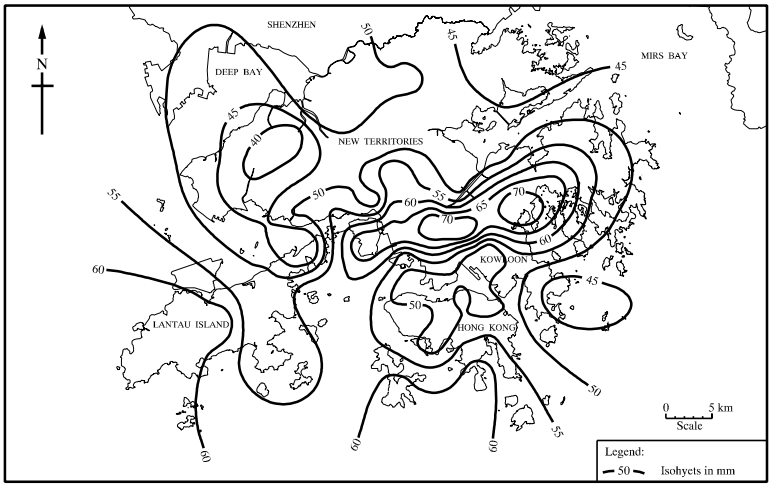
LIST OF FIGURES

Figure 1 - Locations of GEO and HKO Automatic Raingauges

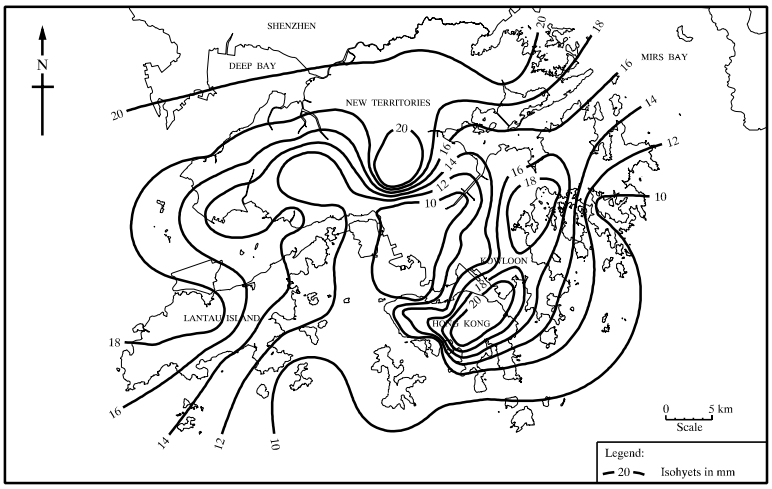


Note: Rainfall recorded at the Hong Kong Observatory, Tsim Sha Tsui.

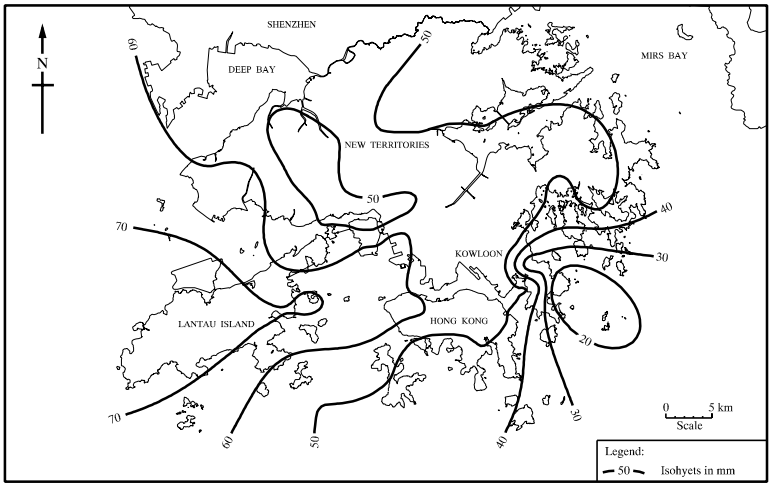
Figure 2 - Cumulative Rainfall for 2001 at the Hong Kong Observatory and its Recorded Highest, Mean and Lowest Cumulative Rainfalls



January 2001



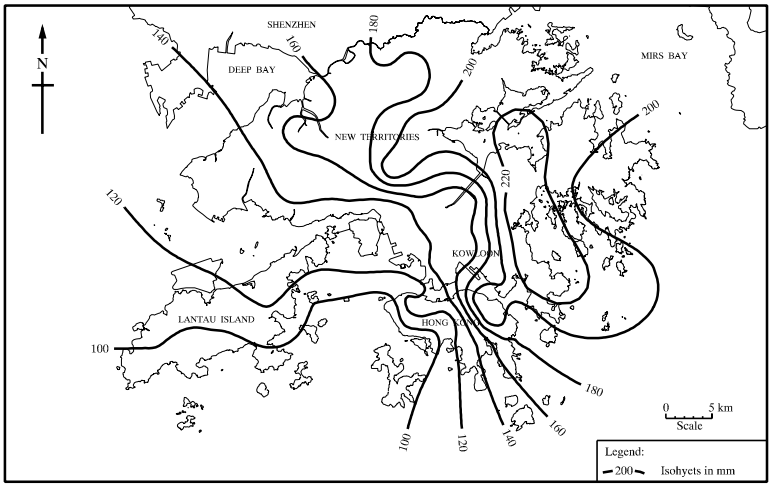
February 2001



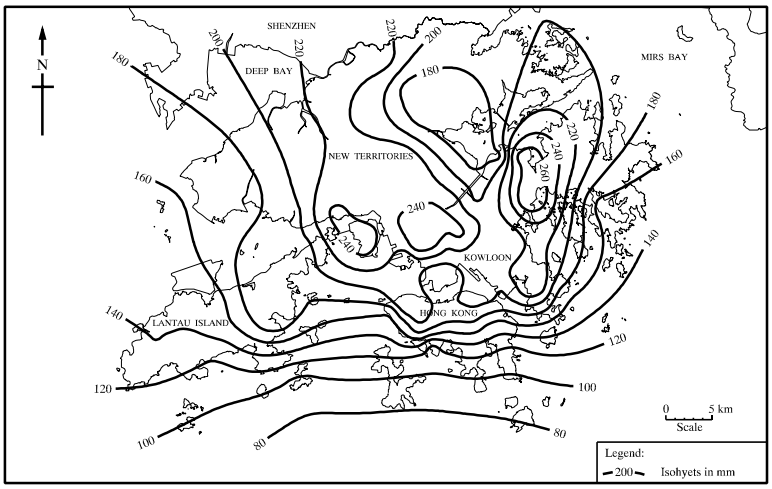
March 2001

Note: Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.

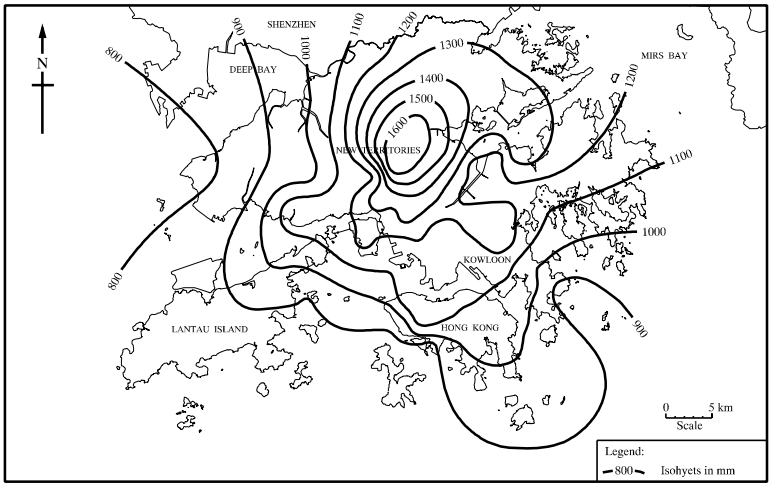
Figure 3a - Total Monthly Rainfall Distribution in 2001



April 2001



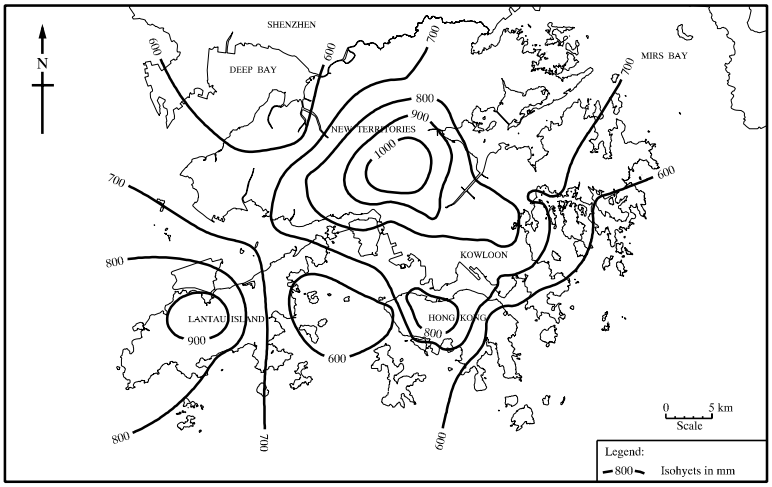
May 2001



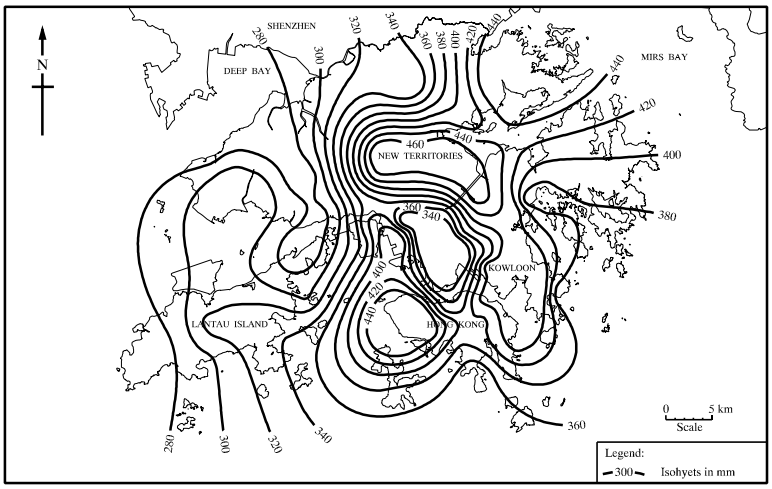
June 2001

Note: Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.

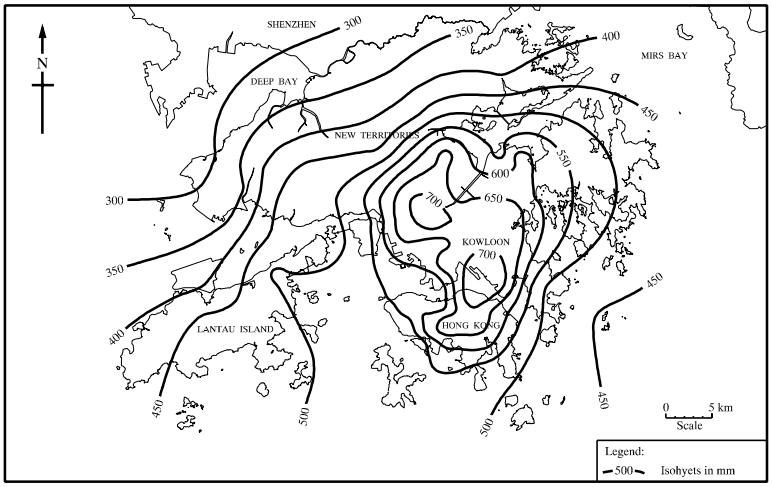
Figure 3b - Total Monthly Rainfall Distribution in 2001



July 2001



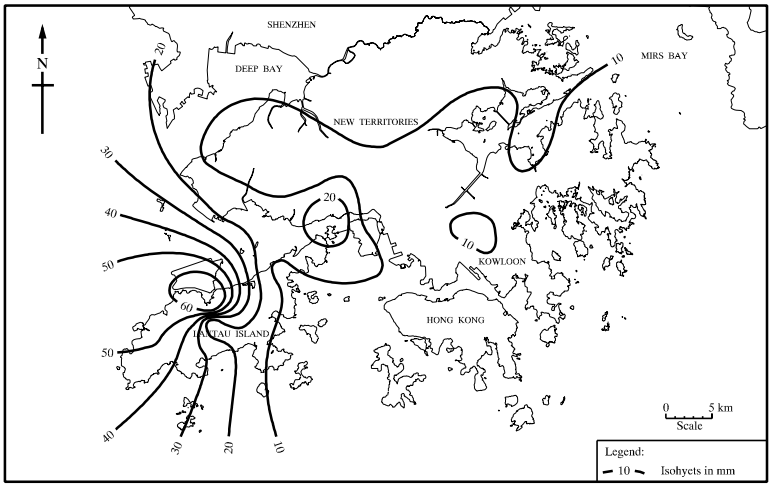
August 2001



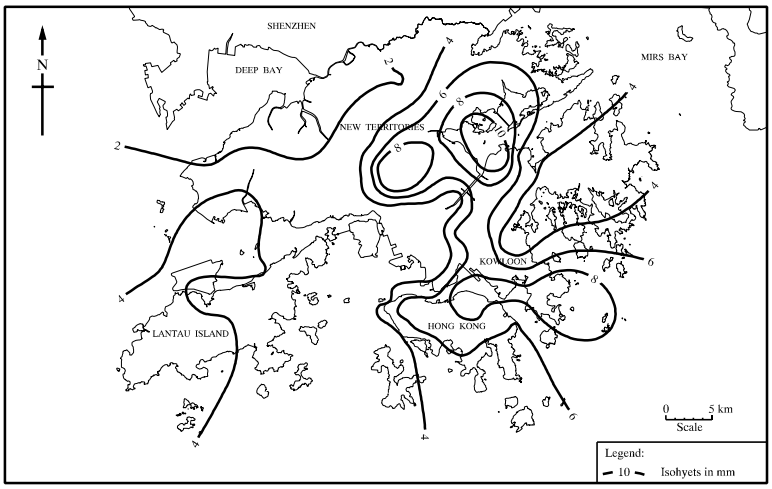
September 2001

Note: Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.

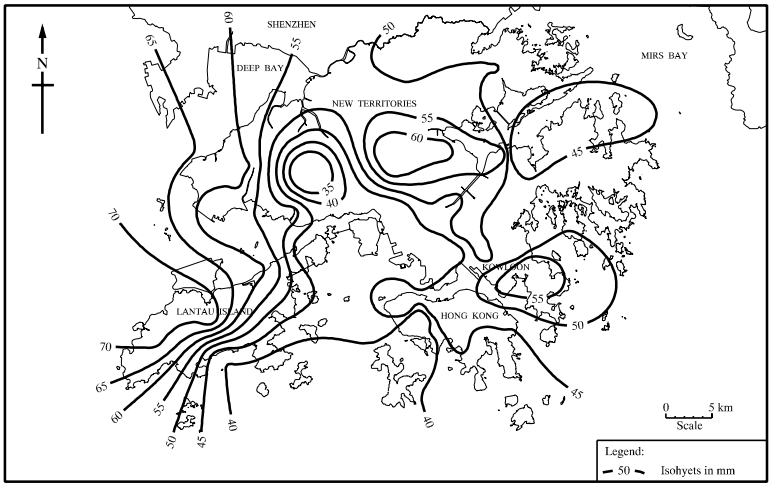
Figure 3c - Total Monthly Rainfall Distribution in 2001



October 2001



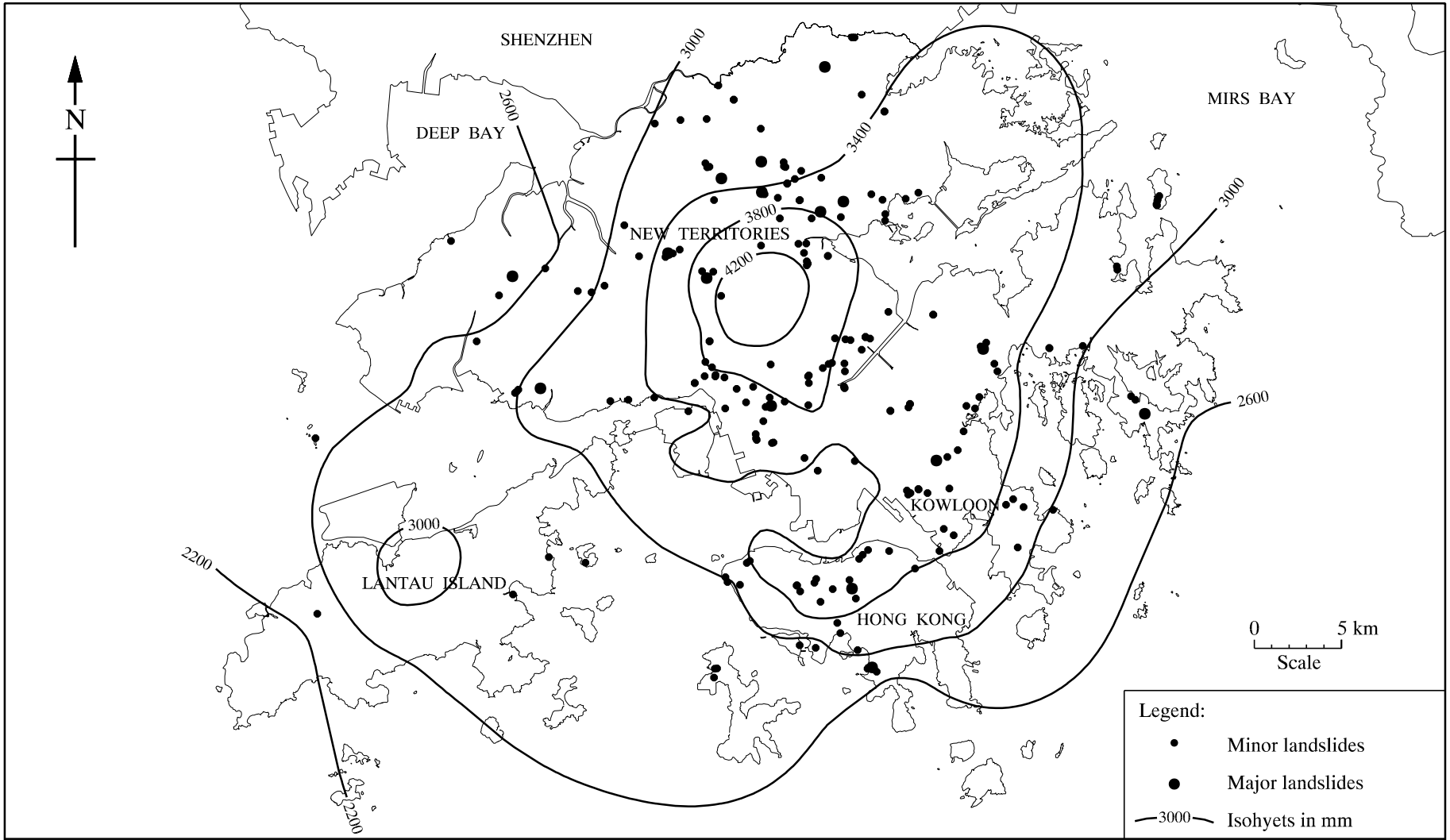
November 2001



December 2001

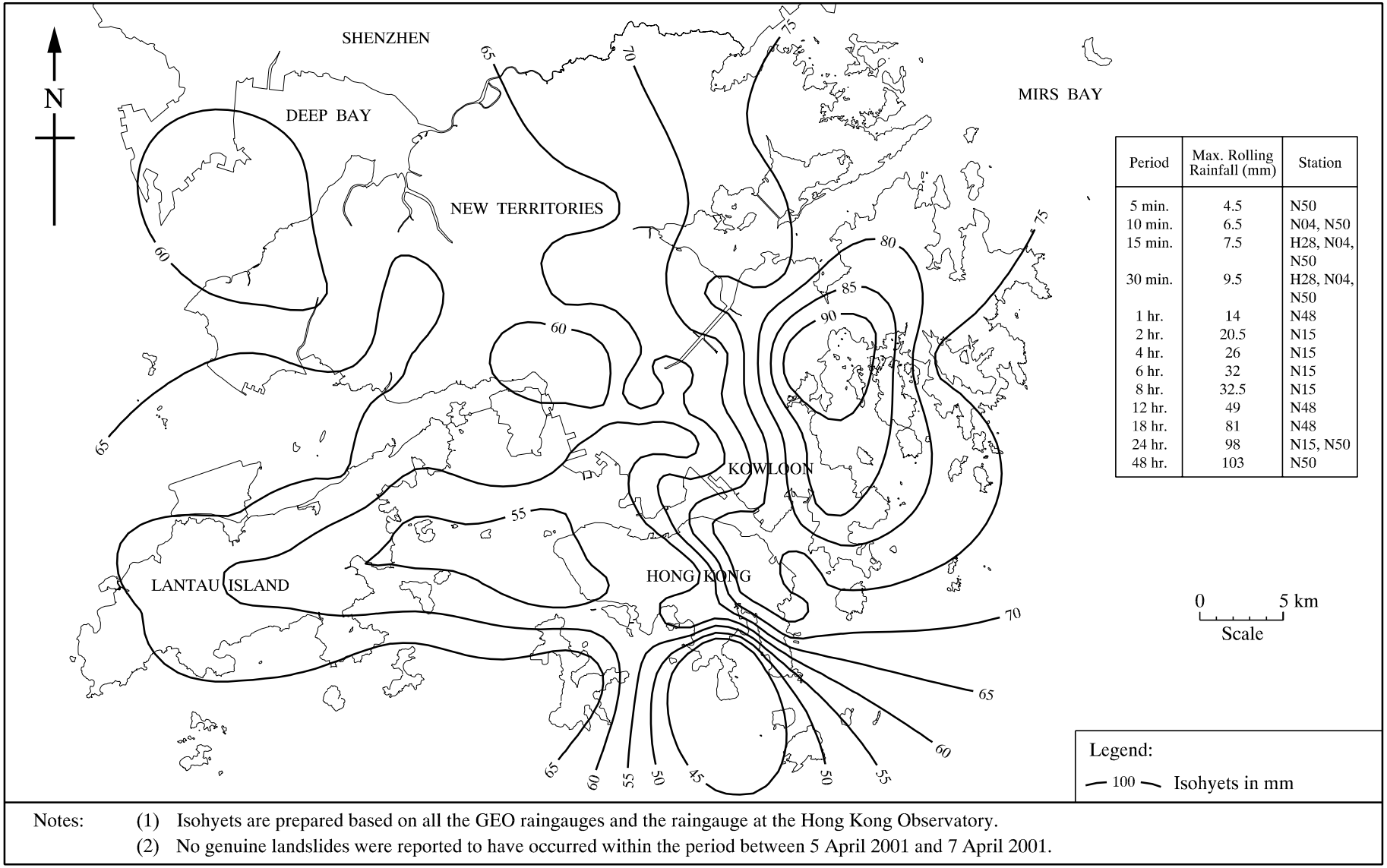
Note: Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.

Figure 3d - Total Monthly Rainfall Distribution in 2001



Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides in 2001 (214 nos.) reported to the GEO are shown.

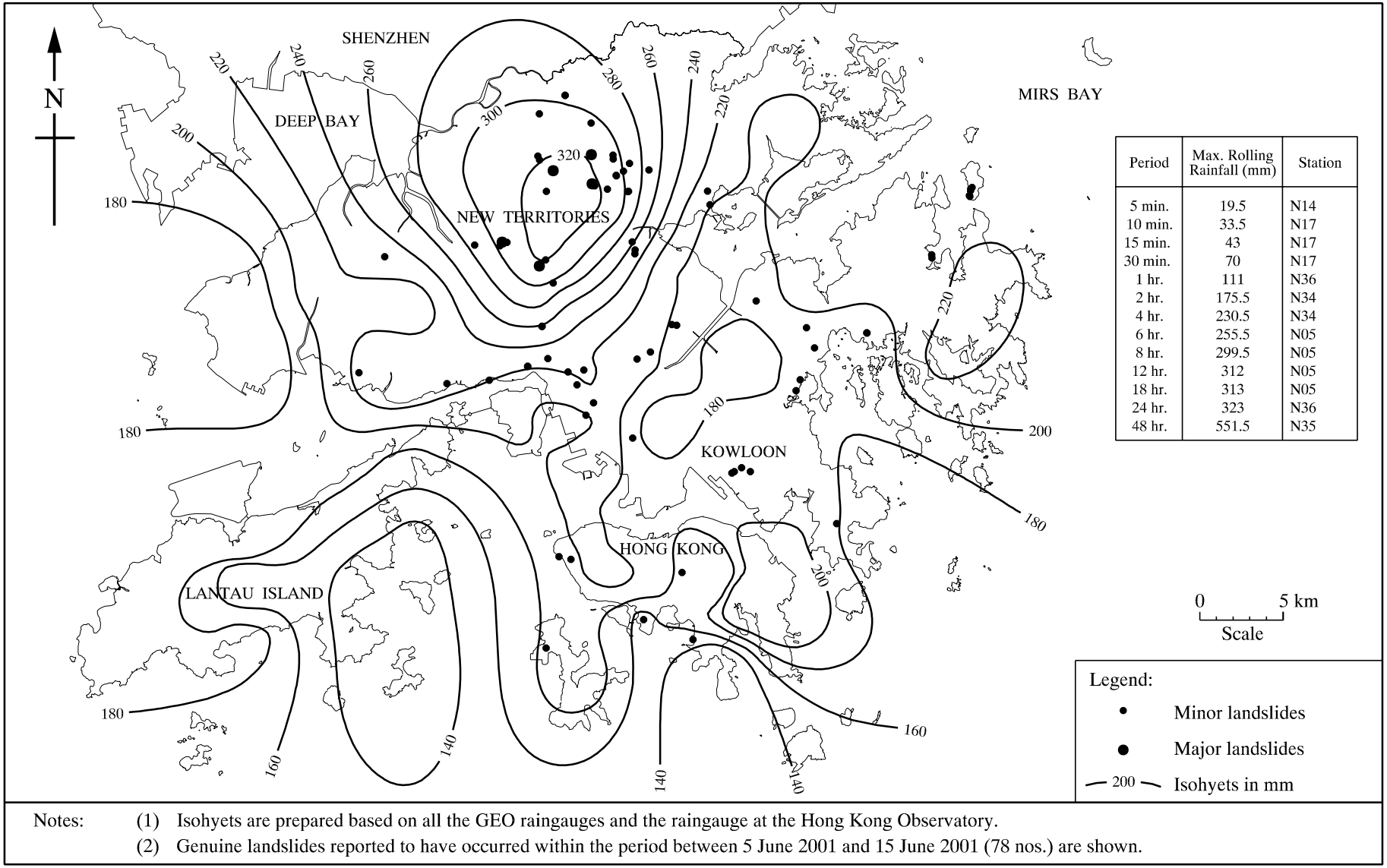
Figure 4 - Total Annual Rainfall Distribution and Locations of Landslides in 2001



Period	Max. Rolling Rainfall (mm)	Station
5 min.	4.5	N50
10 min.	6.5	N04, N50
15 min.	7.5	H28, N04, N50
30 min.	9.5	H28, N04, N50
1 hr.	14	N48
2 hr.	20.5	N15
4 hr.	26	N15
6 hr.	32	N15
8 hr.	32.5	N15
12 hr.	49	N48
18 hr.	81	N48
24 hr.	98	N15, N50
48 hr.	103	N50

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) No genuine landslides were reported to have occurred within the period between 5 April 2001 and 7 April 2001.

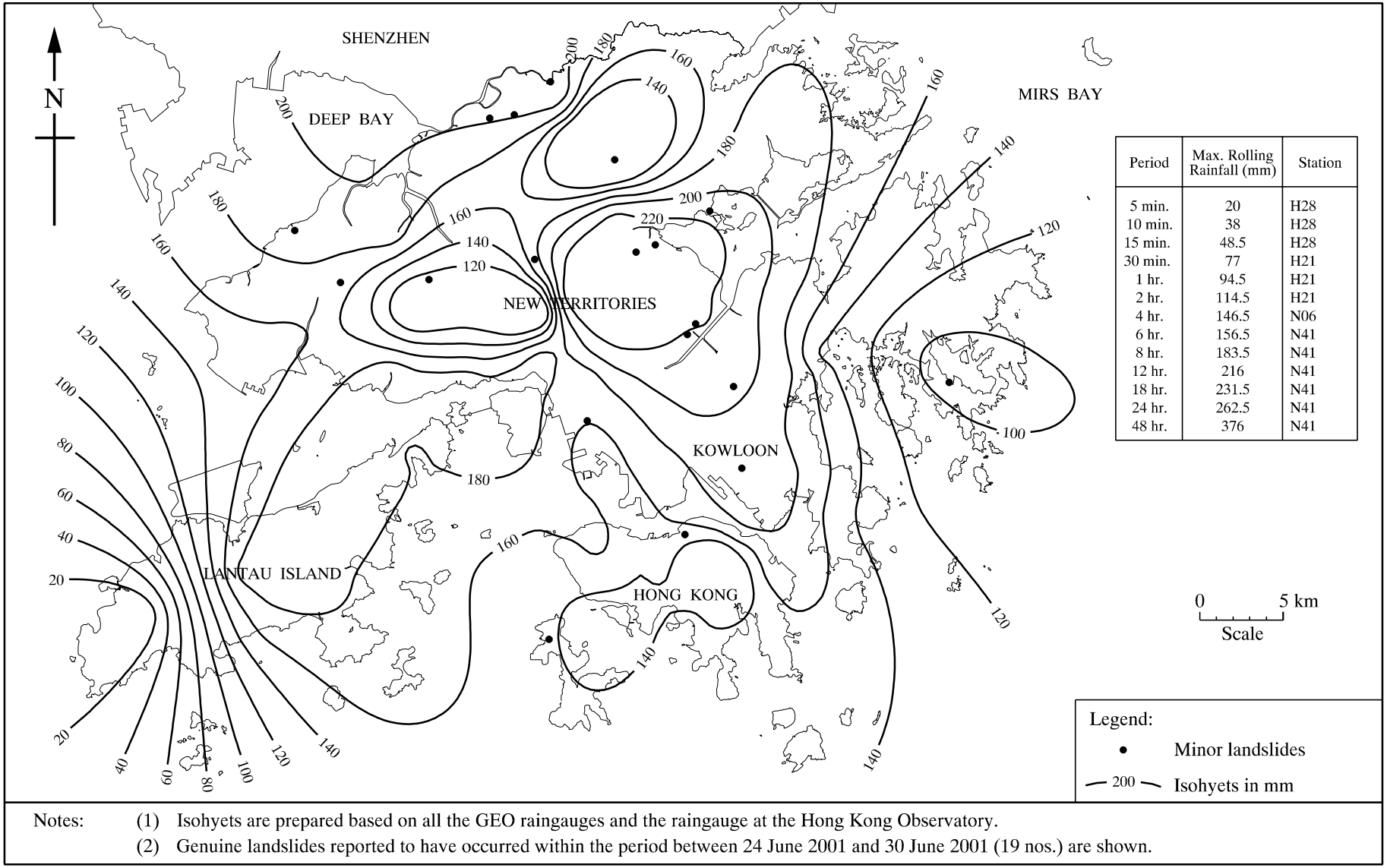
Figure 5 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 5 April 2001 and 23:55 on 5 April 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	19.5	N14
10 min.	33.5	N17
15 min.	43	N17
30 min.	70	N17
1 hr.	111	N36
2 hr.	175.5	N34
4 hr.	230.5	N34
6 hr.	255.5	N05
8 hr.	299.5	N05
12 hr.	312	N05
18 hr.	313	N05
24 hr.	323	N36
48 hr.	551.5	N35

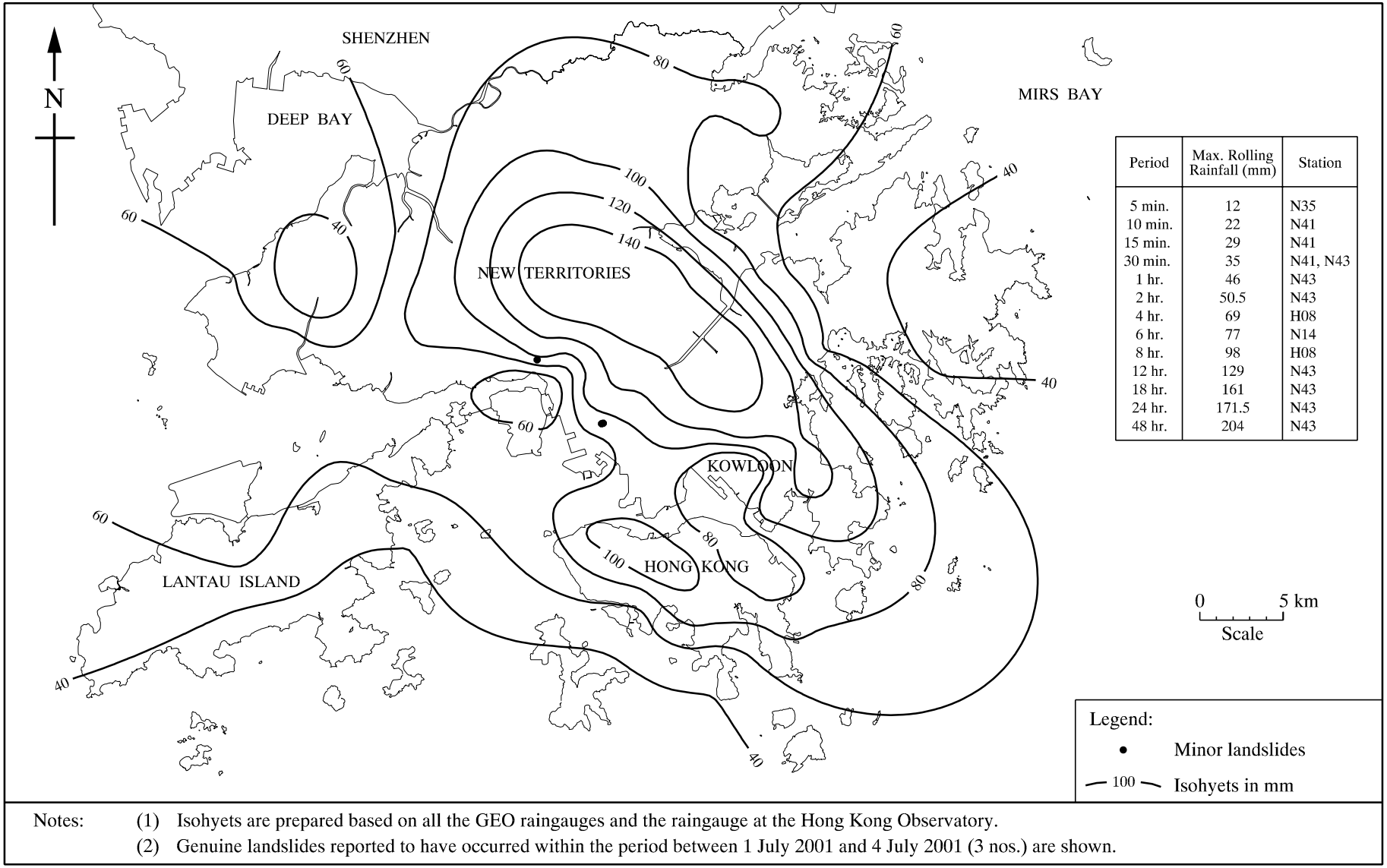
Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 5 June 2001 and 15 June 2001 (78 nos.) are shown.

Figure 6 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 5 June 2001 and 23:55 on 13 June 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	20	H28
10 min.	38	H28
15 min.	48.5	H28
30 min.	77	H21
1 hr.	94.5	H21
2 hr.	114.5	H21
4 hr.	146.5	N06
6 hr.	156.5	N41
8 hr.	183.5	N41
12 hr.	216	N41
18 hr.	231.5	N41
24 hr.	262.5	N41
48 hr.	376	N41

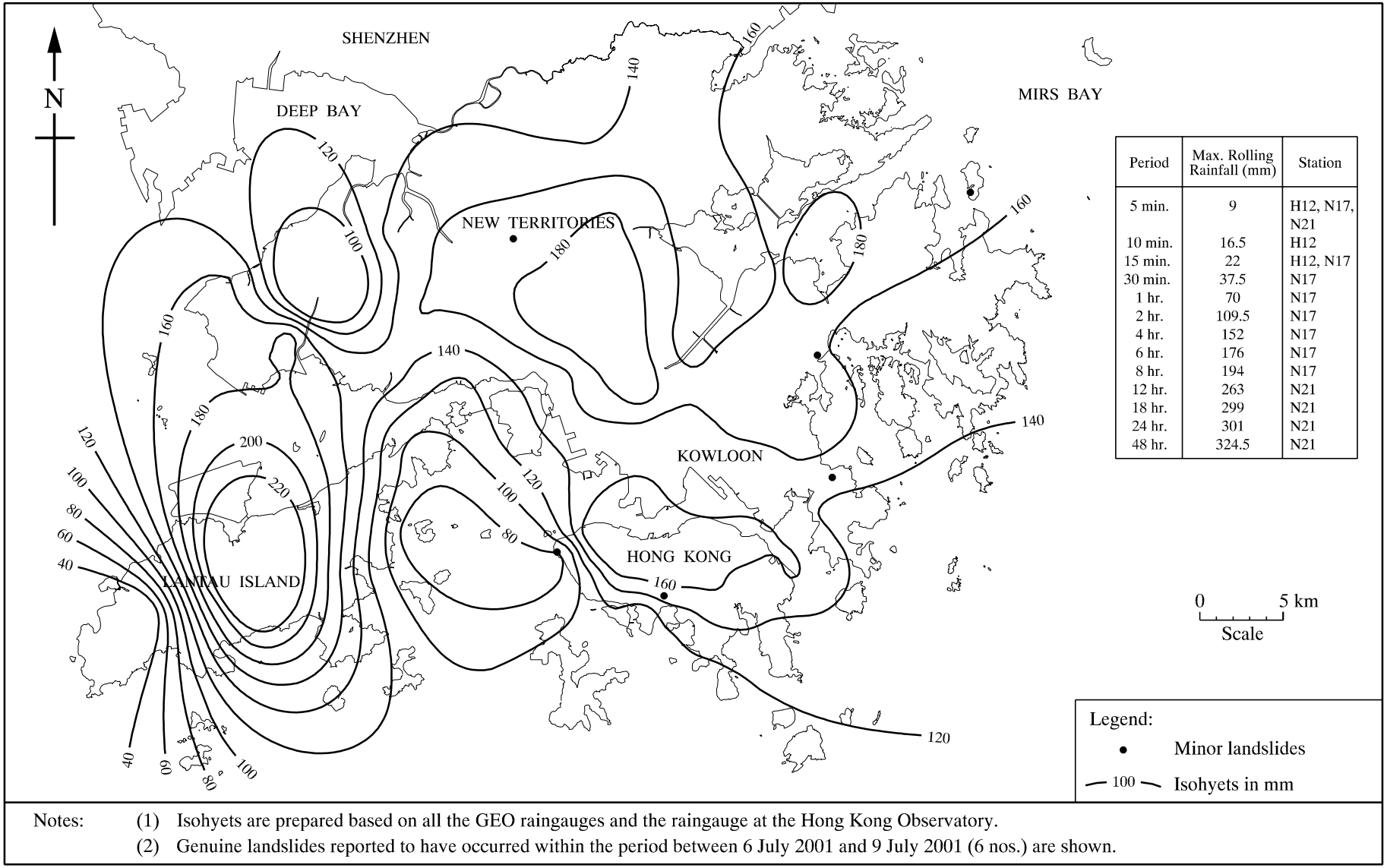
Figure 7 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 24 June 2001 and 23:55 on 28 June 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	12	N35
10 min.	22	N41
15 min.	29	N41
30 min.	35	N41, N43
1 hr.	46	N43
2 hr.	50.5	N43
4 hr.	69	H08
6 hr.	77	N14
8 hr.	98	H08
12 hr.	129	N43
18 hr.	161	N43
24 hr.	171.5	N43
48 hr.	204	N43

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 1 July 2001 and 4 July 2001 (3 nos.) are shown.

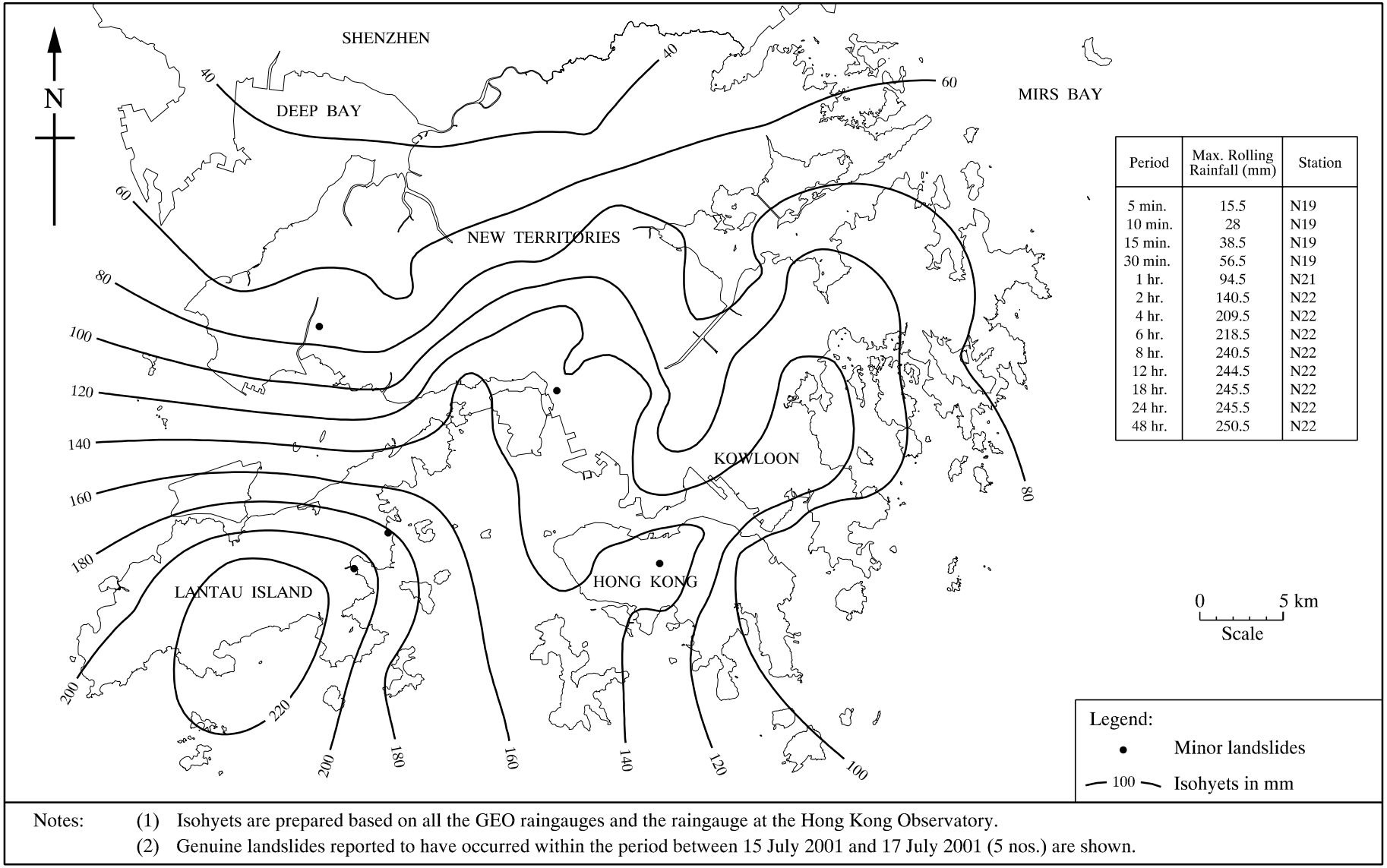
Figure 8 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 1 July 2001 and 23:55 on 2 July 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	9	H12, N17, N21
10 min.	16.5	H12
15 min.	22	H12, N17
30 min.	37.5	N17
1 hr.	70	N17
2 hr.	109.5	N17
4 hr.	152	N17
6 hr.	176	N17
8 hr.	194	N17
12 hr.	263	N21
18 hr.	299	N21
24 hr.	301	N21
48 hr.	324.5	N21

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 6 July 2001 and 9 July 2001 (6 nos.) are shown.

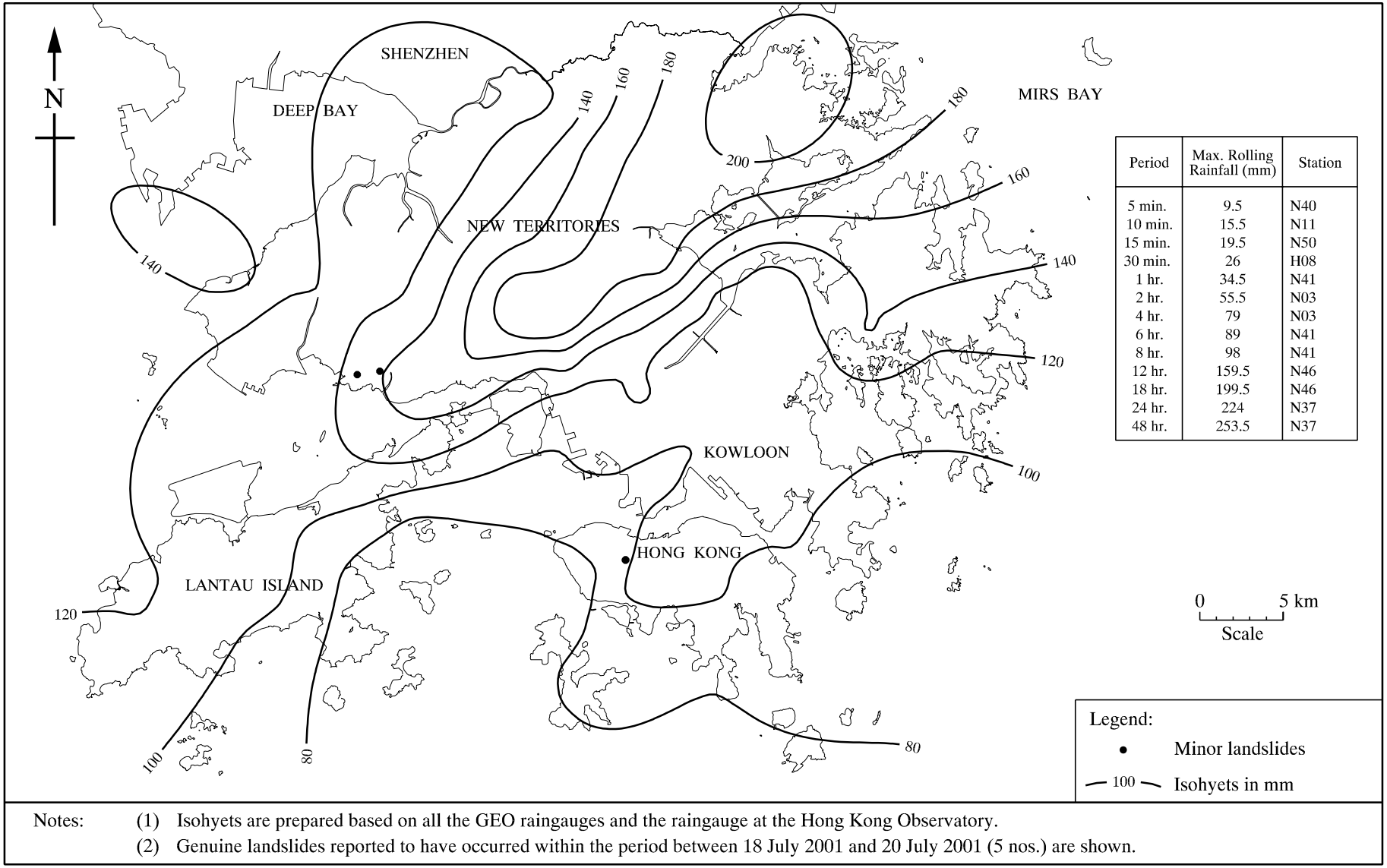
Figure 9 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 6 July 2001 and 23:55 on 7 July 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	15.5	N19
10 min.	28	N19
15 min.	38.5	N19
30 min.	56.5	N19
1 hr.	94.5	N21
2 hr.	140.5	N22
4 hr.	209.5	N22
6 hr.	218.5	N22
8 hr.	240.5	N22
12 hr.	244.5	N22
18 hr.	245.5	N22
24 hr.	245.5	N22
48 hr.	250.5	N22

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 15 July 2001 and 17 July 2001 (5 nos.) are shown.

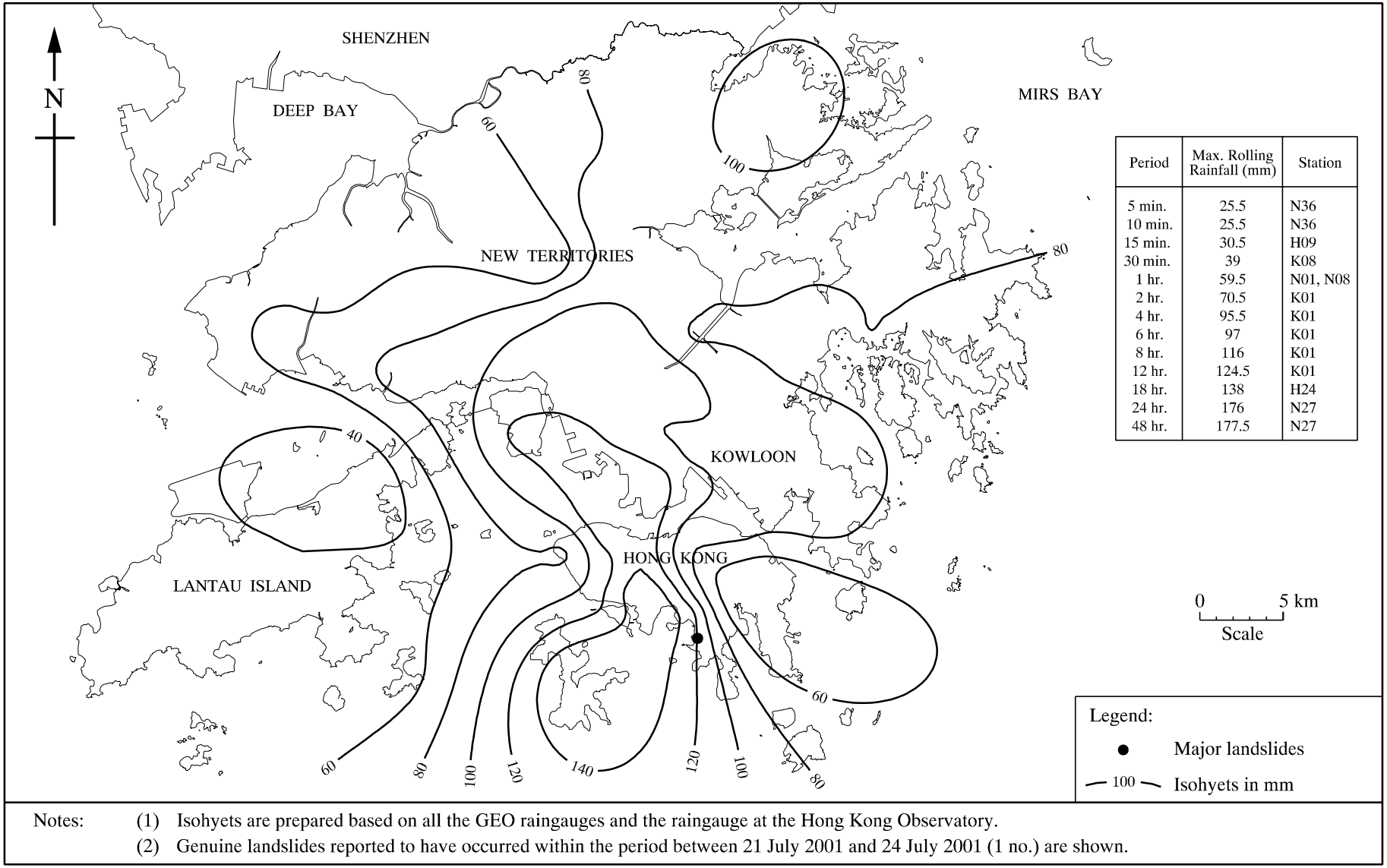
Figure 10 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 15 July 2001 and 23:55 on 16 July 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	9.5	N40
10 min.	15.5	N11
15 min.	19.5	N50
30 min.	26	H08
1 hr.	34.5	N41
2 hr.	55.5	N03
4 hr.	79	N03
6 hr.	89	N41
8 hr.	98	N41
12 hr.	159.5	N46
18 hr.	199.5	N46
24 hr.	224	N37
48 hr.	253.5	N37

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 18 July 2001 and 20 July 2001 (5 nos.) are shown.

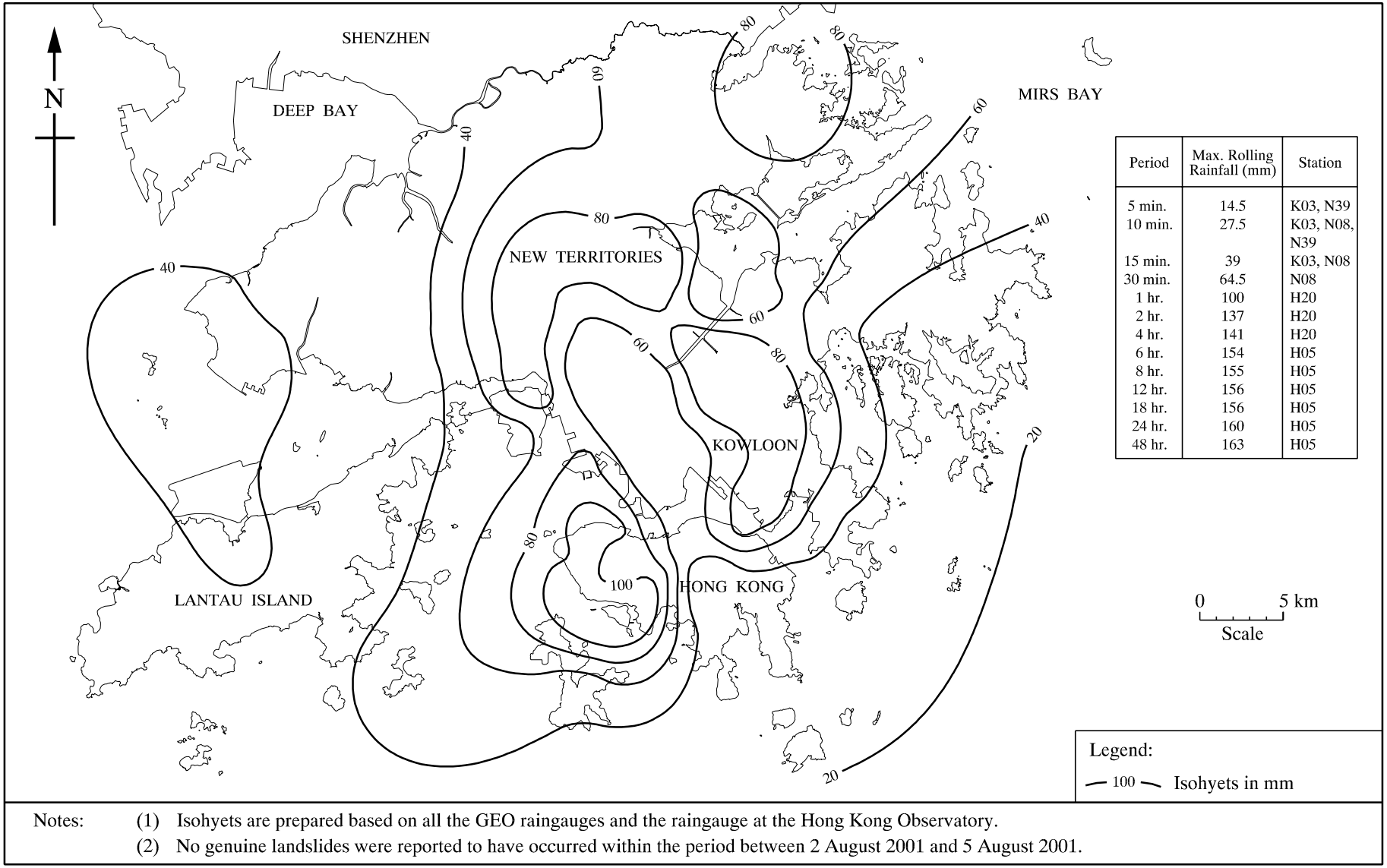
Figure 11 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 18 July 2001 and 23:55 on 18 July 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	25.5	N36
10 min.	25.5	N36
15 min.	30.5	H09
30 min.	39	K08
1 hr.	59.5	N01, N08
2 hr.	70.5	K01
4 hr.	95.5	K01
6 hr.	97	K01
8 hr.	116	K01
12 hr.	124.5	K01
18 hr.	138	H24
24 hr.	176	N27
48 hr.	177.5	N27

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 21 July 2001 and 24 July 2001 (1 no.) are shown.

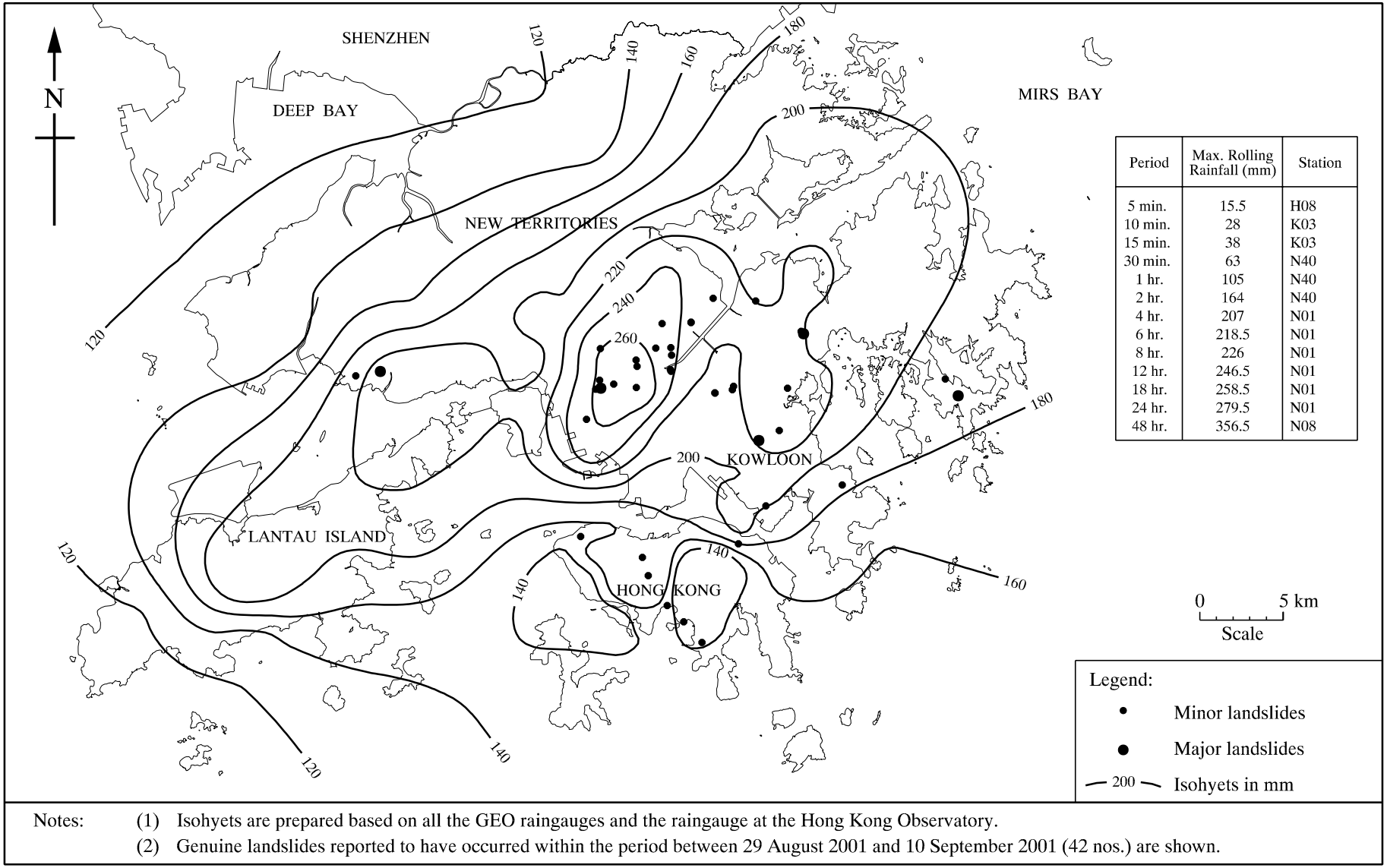
Figure 12 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 21 July 2001 and 23:55 on 22 July 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	14.5	K03, N39
10 min.	27.5	K03, N08, N39
15 min.	39	K03, N08
30 min.	64.5	N08
1 hr.	100	H20
2 hr.	137	H20
4 hr.	141	H20
6 hr.	154	H05
8 hr.	155	H05
12 hr.	156	H05
18 hr.	156	H05
24 hr.	160	H05
48 hr.	163	H05

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) No genuine landslides were reported to have occurred within the period between 2 August 2001 and 5 August 2001.

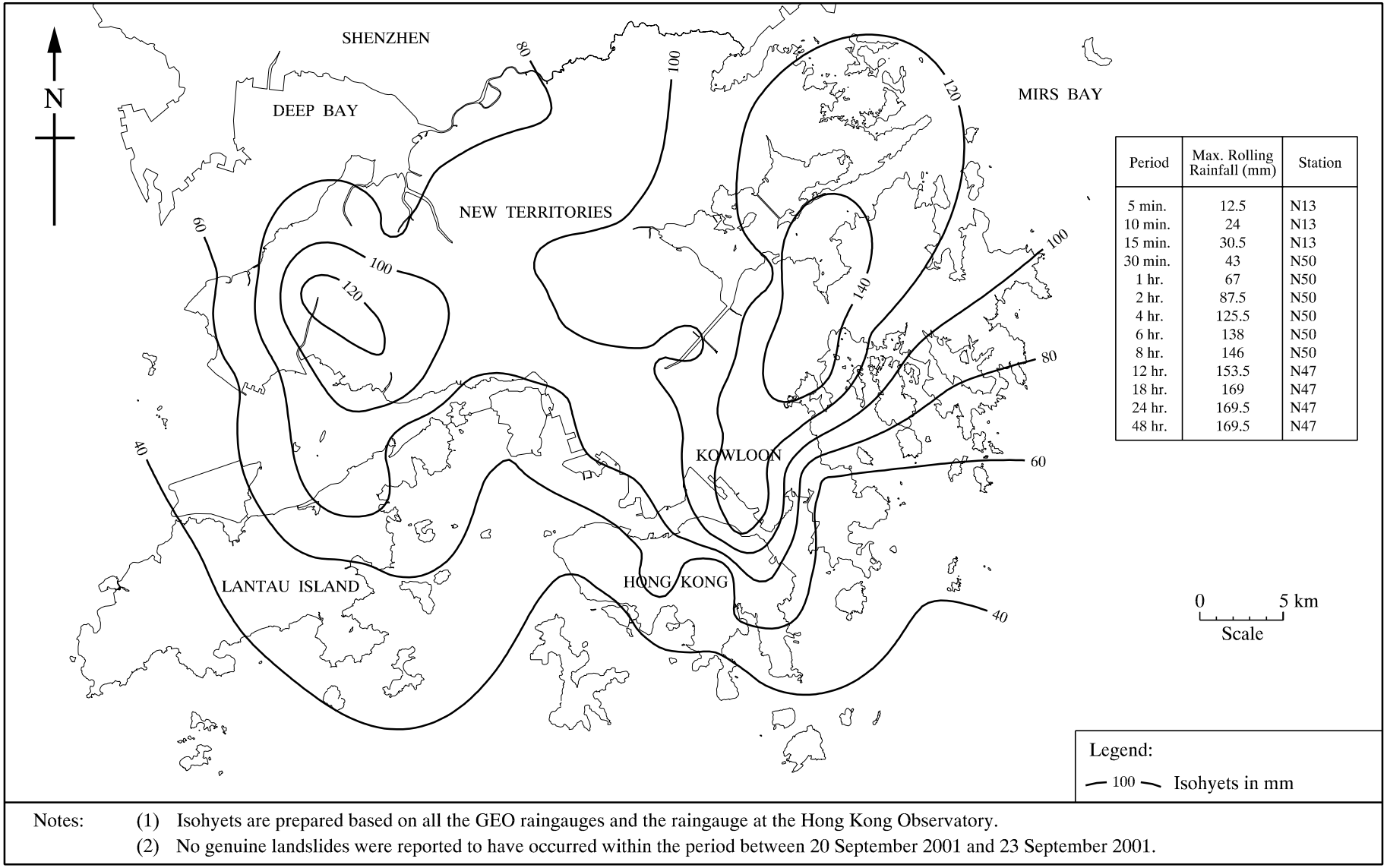
Figure 13 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 2 August 2001 and 23:55 on 3 August 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	15.5	H08
10 min.	28	K03
15 min.	38	K03
30 min.	63	N40
1 hr.	105	N40
2 hr.	164	N40
4 hr.	207	N01
6 hr.	218.5	N01
8 hr.	226	N01
12 hr.	246.5	N01
18 hr.	258.5	N01
24 hr.	279.5	N01
48 hr.	356.5	N08

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) Genuine landslides reported to have occurred within the period between 29 August 2001 and 10 September 2001 (42 nos.) are shown.

Figure 14 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 29 August 2001 and 23:55 on 8 September 2001 and Locations of Landslides



Period	Max. Rolling Rainfall (mm)	Station
5 min.	12.5	N13
10 min.	24	N13
15 min.	30.5	N13
30 min.	43	N50
1 hr.	67	N50
2 hr.	87.5	N50
4 hr.	125.5	N50
6 hr.	138	N50
8 hr.	146	N50
12 hr.	153.5	N47
18 hr.	169	N47
24 hr.	169.5	N47
48 hr.	169.5	N47

Notes: (1) Isohyets are prepared based on all the GEO raingauges and the raingauge at the Hong Kong Observatory.
(2) No genuine landslides were reported to have occurred within the period between 20 September 2001 and 23 September 2001.

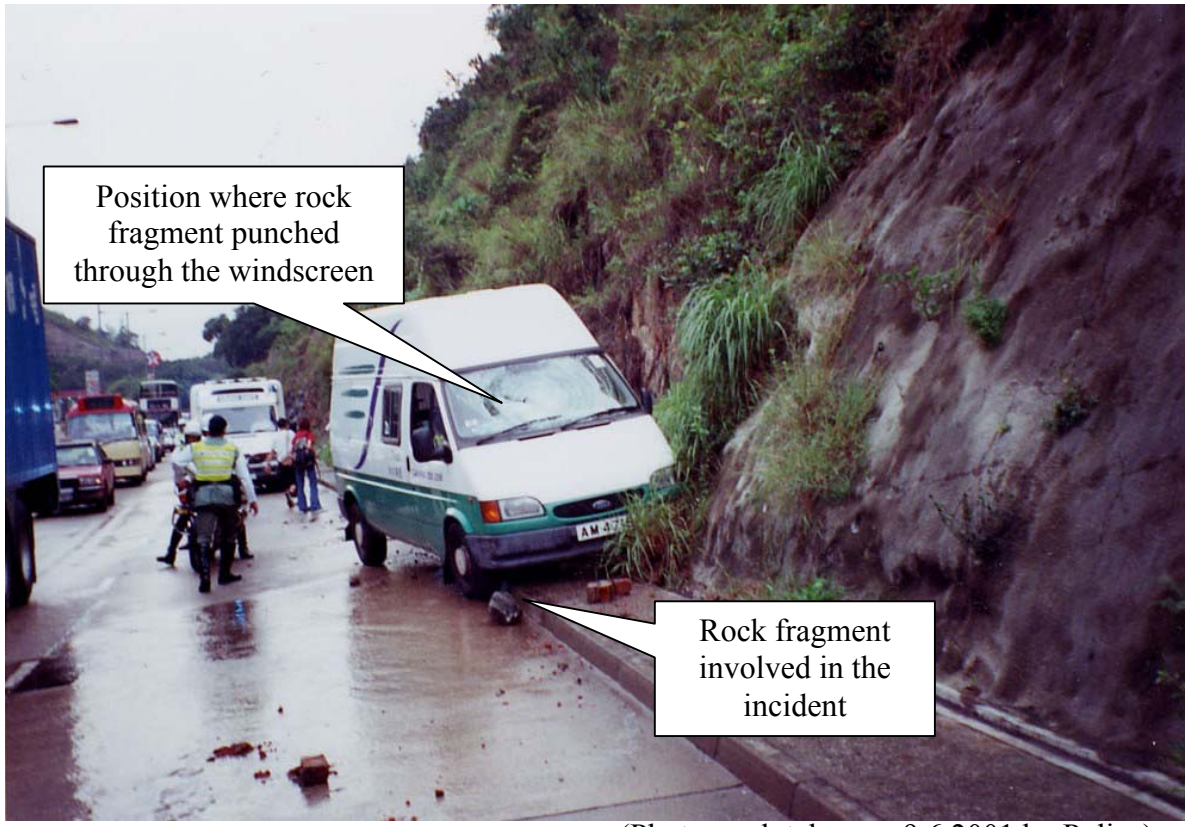
Figure 15 - Maximum Rolling 24-hour Rainfall Distribution for the Period between 00:00 on 20 September 2001 and 23:55 on 21 September 2001 and Locations of Landslides

LIST OF PLATES

(Photograph taken on 7.9.2001)

Description: Channelised debris flow on natural hillside destroyed two squatter units located on the flank of a natural drainage line. The majority of debris came to rest within an active construction site above Lei Pui Street and about 50 m^3 of outwash material was deposited onto Lei Pui Street resulting in temporary closure of Lei Pui Street for three days.

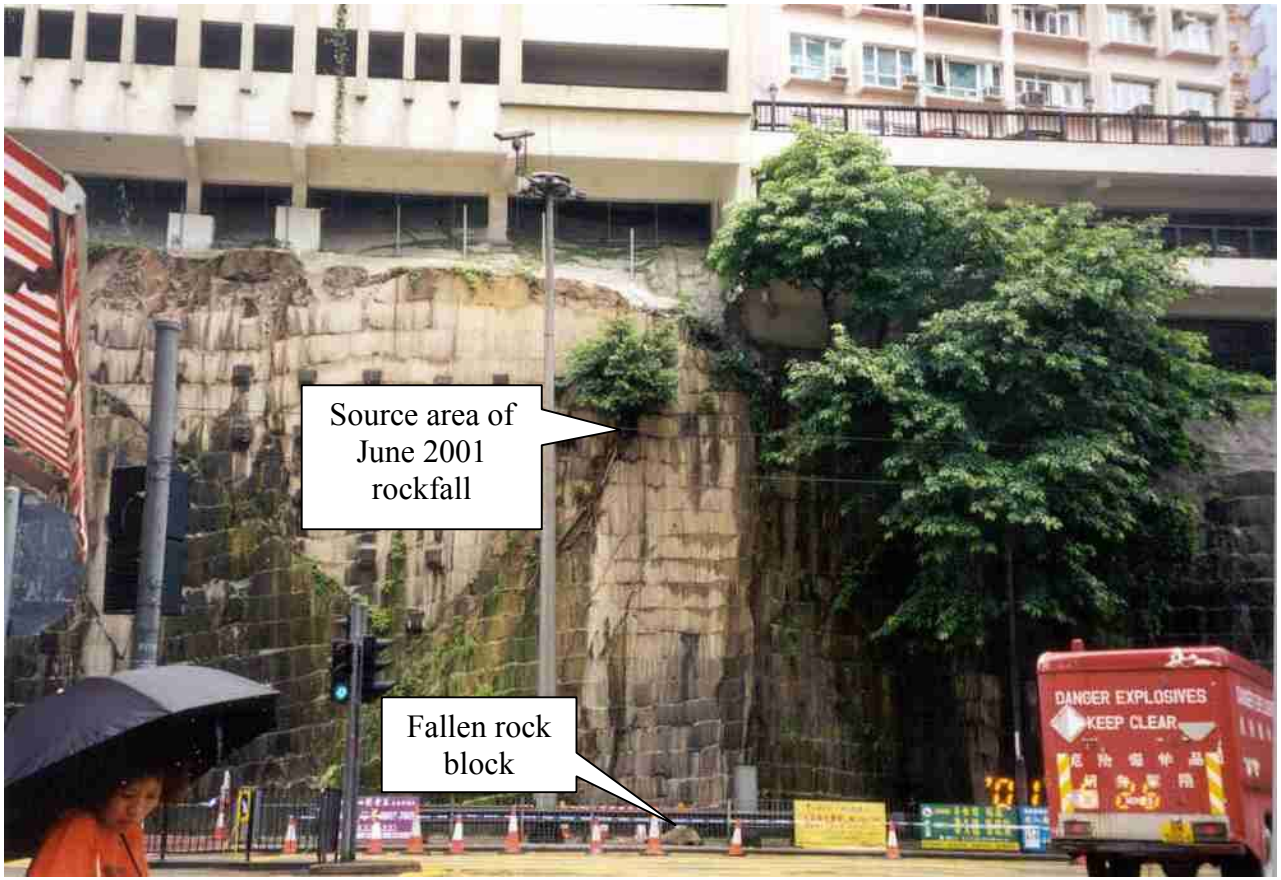
Plate 1 - The 1 September 2001 Channelised Debris Flow on the Natural Hillside above Lei Pui Street, Kwai Chung (GEO Incident No. 2001/09/0057)



(Photograph taken on 9.6.2001 by Police)

Description: A rock fragment fell from the rock portion of a soil/rock cut slope and hit a post office van travelling along the inside lane of Castle Peak Road. The driver lost control and the van crashed into the toe of the slope. The incident resulted in two injuries.

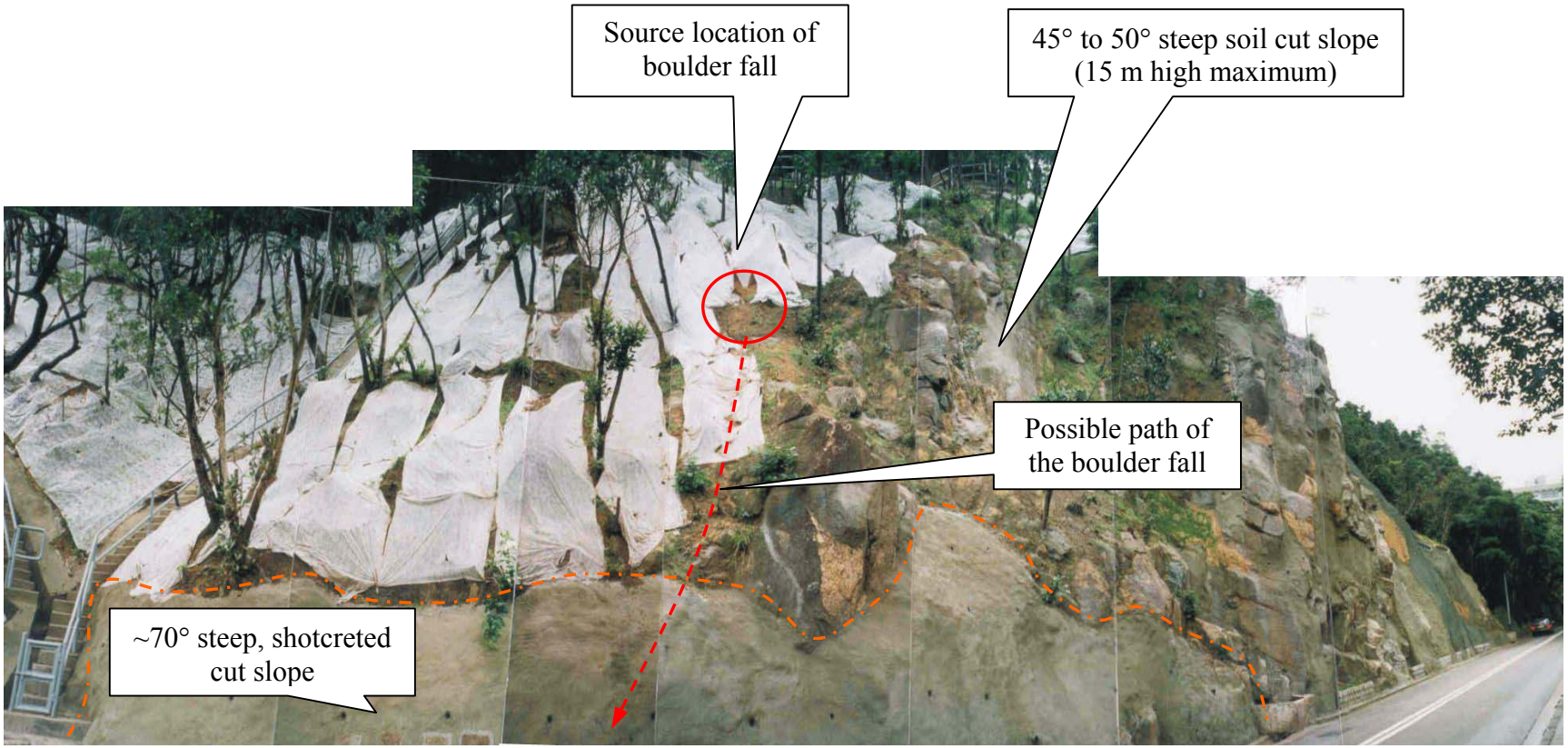
Plate 2 - The 9 June 2001 Rockfall from Slope No. 11NW-A/C58 at Castle Peak Road, Kwai Chung (GEO Incident No. MW2001/06/007)



(Photograph taken on 26.6.2001)

Description: A rockfall from a rock cut slope resulted in temporary closure of the inside lane of King's Road and the adjacent footway at the slope toe.

Plate 3 - The 25 June 2001 Rockfall from Slope No. 11SE-A/C561 at King's Road, Tin Hau (GEO Incident No. HK2001/06/008)



(Photograph taken on 8.6.2001)

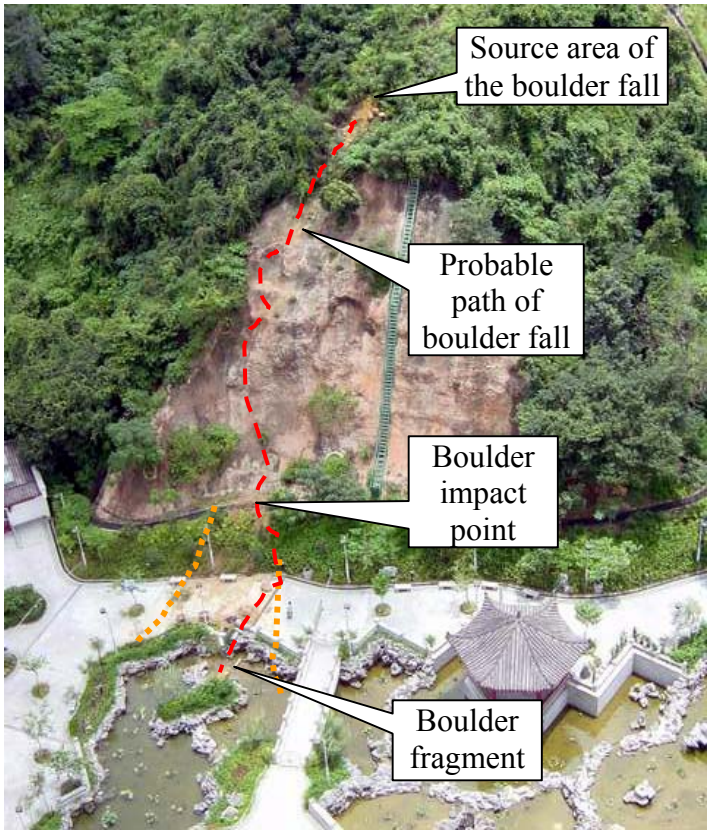
Description: A boulder fell from the ground above a soil/rock cut slope. The incident resulted in temporary closure of one lane of Tai Hang Road.

Plate 4 - The 8 June 2001 Boulder Fall from above Slope No. 11SE-C/C54 at Tai Hang Road, Jardine's Lookout (GEO Incident No. HK2001/06/002)

(Photograph taken on 12.6.2001 by Highways Department)

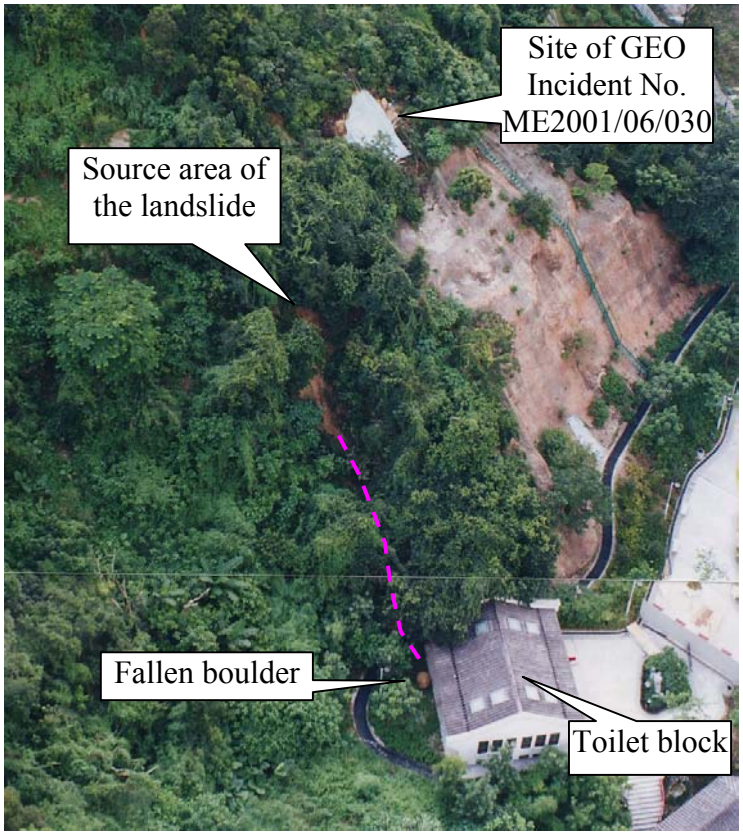
Description: A boulder fall from the hillside above a cut slope which affected a bus shelter.

Plate 5 - The 12 June 2001 Boulder Fall from the Hillside above Slope No. 7SW-C/C72 at Kwai Shing Circuit, Kwai Chung (GEO Incident No. MW2001/06/021)



(Photograph taken on 13.6.2001)

Description: (a) A boulder fell from the hillside above Hong Ning Road Park which resulted in temporary closure of a portion of the Park. (GEO Incident No. ME2001/06/030)



(Photograph taken on 28.6.2001)

Description: (b) A landslide occurred on the hillside resulting in release of debris and a boulder that came to rest against a toilet block. The incident resulted in temporary closure of a portion of Hong Ning Road Park. (GEO Incident No. ME2001/06/059)

Plate 6 - The 12 June 2001 Boulder Fall and the 27 June 2001 Landslide on Natural Hillside above Hong Ning Road Park, Kwun Tong (GEO Incidents Nos. ME2001/06/030 and ME2001/06/059)

(Photograph taken on 10.6.2001 by Apple Daily)

Description: A major failure on a cemetery area (consisted of cut and fill burial platforms of 1.5 to 2 m high) resulted in damage of some of the graves and temporary closure of a part of the cemetery.

Plate 7 - The 10 June 2001 Landslide at Wo Hop Shek Cemetery, Fanling (GEO Incident No. MW2001/06/009)

(Photograph taken on 3.9.2001)

Description: A major failure on a fill slope which resulted in permanent evacuation of a squatter.

Plate 8 - The 1 September 2001 Landslide on Slope No. 11NE-B/FR249 below No. 56 Denon Terrace, Tseng Lan Shue, Sai Kung (GEO Incident No. 2001/09/0066)

(Photograph taken on 11.6.2001)

Description: A masonry wall failure which resulted in permanent evacuation of a squatter located in front of the failed wall and temporary evacuation of another squatter above it.

Plate 9 - The 11 June 2001 Landslide at No. 1A Tin Sum Village, Fanling (GEO Incident No. MW2001/06/010)

(Photograph taken on 13.6.2001)

Description: A landslide on natural hillside resulted in temporary evacuation of a squatter located below the failed hillside.

Plate 10 - The 9 June 2001 Landslide at Pun Shan Village, Tsuen Wan (GEO Incident No. MW2001/06/016a)

APPENDIX A

RAINFALL OF SELECTED RAINSTORMS RECORDED AT GEO RAINGAUGES

LIST OF TABLES

Table A1 - Rainstorms in which Rolling 24-hour Rainfall Exceeded 50 mm at any GEO Raingauge (Sheet 1 of 3)

Rainstorm (2001)		5 min		10 min		15 min		30 min	
		Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station
1	26-27 Jan 2001	9	K07, N11	16.5	N11	22.5	K07, N11	30	N50
2	25-26 Mar 2001	13	N25	20.5	N25	28	N17	44	H01
3	4-5 Apr 2001	7	N17	10.5	N19	12.5	N19	19	N11
4	9-10 Apr 2001	19.5	N10	33.5	N10	40.5	N37	50	K02
5	9-10 May 2001	14	K06	25.5	K06	34	N01	54.5	K06
6	17-19 May 2001	14	N16	23.5	N16	29	N16	37.5	N16
7	21-22 May 2001	11	N34	19	N34	23.5	N21	39	N21
8	30-31 May 2001	9.5	N01	17.5	N16	25	K06	45	N01
9	5-14 Jun 2001	19.5	N14	33.5	N17	43	N17	70	N17
10	20-21 Jun 2001	12	N39	18.5	N39	22	N39	23.5	N38, N39
11	23-28 Jun 2001	22.5	N10	39	N06	57.5	N06	91	N06
12	1-4 Jul 2001	12	N35	22	N41	29	N41	35	N41, N43
13	6-8 Jul 2001	9	H12, N17, N21	16.5	H12	22	H12, N17	37.5	N17
14	13-22 Jul 2001	25.5	N36	28	N19	38.5	N19	57	N17
15	24-26 Jul 2001	16	N10	27	N10, N24	38.5	N24	55	N26
16	1-3 Aug 2001	14.5	K03, N39	27.5	K03, N08, N39	39	K03, N08	64.5	N08
17	12-13 Aug 2001	19	H01	32.5	H12	42	H01	59	H01
18	15-19 Aug 2001	13	N28, N49	23.5	N28	32.5	N28	52.5	N28
19	27 Aug - 9 Sep 2001	15.5	H08	28.5	H24	38	K03, H24	64.5	H24
20	14-15 Sep 2001	14	N32	22.5	N32	25	N32	38	N33
21	20-22 Sep 2001	12.5	N13	24	N13	30.5	N13	43	N50
22	4-5 Oct 2001	11	N17	19	N17	26.5	N17	47.5	N17

Table A1 - Rainstorms in which Rolling 24-hour Rainfall Exceeded 50 mm at any GEO Raingauge (Sheet 2 of 3)

Rainstorm (2001)		1 hr		2 hrs		4 hrs		6 hrs	
		Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station
1	26-27 Jan 2001	36	N50	45.5	K07, N50	52	K07, N50	54	N50
2	25-26 Mar 2001	54.5	N19, H01	64.5	N19	64.5	N19	65	N19
3	4-5 Apr 2001	25.5	N11	34	K01	48	N48	55	N50
4	9-10 Apr 2001	55.5	N45	89	N47	92	N47	92	N47
5	9-10 May 2001	57.5	K06	61	K06	61	K06	61	K06
6	17-19 May 2001	39.5	N15	53	N15	75	N15	84.5	N15
7	21-22 May 2001	51.5	N34	52	N34	63	N34	63.5	N34
8	30-31 May 2001	75	N01	86	H04	101	N01	111	N11
9	5-14 Jun 2001	111	N36	175.5	N34	230.5	N34	255.5	N05
10	20-21 Jun 2001	24.5	H05	24.5	H05	32.5	K07	38	K07
11	23-28 Jun 2001	132	N06	146.5	N06	146.5	N06	156.5	N41
12	1-4 Jul 2001	46	N43	50.5	N43	69	H08	77	N14
13	6-8 Jul 2001	70	N17	109.5	N17	152	N17	176	N17
14	13-22 Jul 2001	100	N17	140.5	N22	209.5	N22	218.5	N22
15	24-26 Jul 2001	65	N26	67.5	N26	67.5	N26	69.5	N26
16	1-3 Aug 2001	100	H20	137	H20	141	H20	154	H05
17	12-13 Aug 2001	62	N04	62	N04	62.5	N04	63	N04
18	15-19 Aug 2001	55	N45	56	N45	56.5	N45	56.5	N45
19	27 Aug - 9 Sep 2001	105	N40	164	N40	207	N01	218.5	N01
20	14-15 Sep 2001	59.5	N33	60	N33	60	N33	60	N33
21	20-22 Sep 2001	67	N50	87.5	N50	125.5	N50	138	N50
22	4-5 Oct 2001	65	N17	81	N17	83.5	N17	83.5	N17

Table A1 - Rainstorms in which Rolling 24-hour Rainfall Exceeded 50 mm at any GEO Raingauge (Sheet 3 of 3)

Rainstorm (2001)		8 hrs		12 hrs		18 hrs		24 hrs		48 hrs	
		Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station	Max. rainfall	Station
1	26-27 Jan 2001	58	N50	58	N50	58	N50	62	N50	64	N50
2	25-26 Mar 2001	65	N19	65	N19	65	N19	65	N19	65	N19
3	4-5 Apr 2001	59	N50	74.5	H14	81	N48	98	N50, N15	103	N50
4	9-10 Apr 2001	92	N47	92.5	N47	92.5	N47	93.5	N47	94	N47
5	9-10 May 2001	61	K06	61.5	K06	70	K07	71.5	K07	72	K07
6	17-19 May 2001	85.5	N15	143.5	N15	156	N15	160	N15	164	N15
7	21-22 May 2001	63.5	N34	64	N34	65.5	N34	69.5	N34	70.5	N34
8	30-31 May 2001	119.5	K06	119.5	K06	119.5	K06	119.5	K06	124	K06
9	5-14 Jun 2001	299.5	N05	312	N05	313	N05	323	N36	551.5	N35
10	20-21 Jun 2001	49	N43	57.5	N43	57.5	N43	58.5	N43	58.5	N43
11	23-28 Jun 2001	183.5	N41	216	N41	231.5	N41	262.5	N41	376	N41
12	1-4 Jul 2001	98	H08	129	N43	161	N43	171.5	N43	221.5	N36
13	6-8 Jul 2001	194	N17	263	N21	299	N21	301	N21	324.5	N21
14	13-22 Jul 2001	240.5	N22	244.5	N22	245.5	N22	245.5	N22	282	N37
15	24-26 Jul 2001	69.5	N26	69.5	N26	73	N26	104	N37	120	N37
16	1-3 Aug 2001	155	H05	156	H05	156	H05	160	H05	163	H05
17	12-13 Aug 2001	63	N04	63	N04	63	N04	63	N04	63.5	N04
18	15-19 Aug 2001	56.5	N45	56.5	N45	68.5	N07	79	H03	86	H01
19	27 Aug - 9 Sep 2001	226	N01	246.5	N01	258.5	N01	279.5	N01	356.5	N08
20	14-15 Sep 2001	60	N33	60	N33	60	N33	60	N33	60	N33
21	20-22 Sep 2001	146	N50	153.5	N47	169	N47	169.5	N47	169.5	N47
22	4-5 Oct 2001	83.5	N17	83.5	N17	83.5	N17	83.5	N17	83.5	N17

APPENDIX B

LIST OF LANDSLIDE INCIDENTS REPORTED TO THE GEO

LIST OF TABLES

Table B1 - List of Major Landslide Incidents Reported to GEO (Sheet 1 of 2)

Incident No.	Location	Slope No.	Failure			Facility Affected	Consequence
			Date (Time)	Type	Scale (m^3)		
ME2001/06/017	Hillside above Hong Chi Pinehill School, Tai Po	Natural hillside	Unknown	Natural hillside	80*	Drains	Surface Drainage blocked
ME2001/06/018	Access Road to Sha Lo Tung, Tai Po	Natural hillside and 3SW-D/C155	Unknown	Natural hillside	60	Access road	Access road closed
MW2001/04/001	Po Kok Branch School, No. 380, Tan Kwai Tsuen Road, Hung Shui Kiu, Yuen Long	Unregistered	9/4 (19:00)	RC retaining wall	50*	Garden of school, open area of factory	Portion of school garden and factory open area closed
MW2001/06/005	Ling Wan San Tsuen near Ling Wan Temple, Pat Heung, Yuen Long	Unregistered	10/6 (08:00)	Cement plastered brick wall	60	Squatters	3 squatters permanently evacuated
MW2001/06/008	Fanling Tai Lung Farm near North District Hospital, South-East of Fanling Golf Course, Fanling	Natural hillside	9/6	Natural hillside	100*	Access road	Access road closed
MW2001/06/009	Wo Hop Shek Cemetery, Fanling	Series of 1.5 to 2 m high soil cut and fill terrace	10/6	Disturbed terrain(1)*	250*	Cemetery	Closure of affected area of cemetery
MW2001/06/010	No. 1A Tin Sum Village, Yung Hang Road, Fanling	Unregistered	11/6 (10:00)	Masonry wall	90*	Squatters	1 squatter permanently evacuated and 1 squatter temporarily evacuated
MW2001/06/033	DSD's construction site (Contract No. DD/98/04), near Kam Ying Yuen, Kam Tin Road, Yuen Long	Slope within construction site	10/6 – 11/6	Temporary soil cut	80	Squatters, construction site	3 squatters temporarily evacuated
2001/07/0020	Broadwood Road	11SE-C/F103	Few months before 7/2001	Fill slope	50 (sign of distress)	Open area	

Table B1 - List of Major Landslide Incidents Reported to GEO (Sheet 2 of 2)

Incident No.	Location	Slope No.	Failure			Facility Affected	Consequence
			Date (Time)	Type	Scale (m^3)		
2001/07/0036	Below and opposite 59 South Bay Road	Natural hillside	21/7 (03:30)	Natural hillside	60	Pedestrian pavement, natural stream course	
2001/07/0042	Waste Reception Area, North East NT Landfill (NENT), Sha Tau Kok	3NW-D/C254	10/7	Soil cut (majority) and natural hillside above	8000*	Landfill site of internal access road	Access road closed
2001/09/0057	Natural hillside above Lei Pui Street, Kwai Chung	Natural hillside	1/9 (22:00)	Natural hillside	~780	Squatters, active construction site, roads	2 squatters destroyed, 1 squatter temporarily evacuated, 2 roads closed
2001/09/0060	Downhill in front of huts Nos. 4-5 Kak Hang Tun Village, Sai Kung	Natural hillside	2/9 (12:30)	Natural hillside	175*	Open area	
2001/09/0066	Below 56 Denon Terrace, Tseng Lan Shue, Clear Water Bay Road, Sai Kung.	11NE-B/FR249*	1/9 (22:30)	Fill slope*	50*	Squatter	1 squatter permanently evacuated
2001/09/0088	Village Access leading to Pak A Village, Sai Kung	Natural hillside (majority) and 1.2 m high cut slope	1/9 (22:00)	Natural hillside and soil cut slope	100	Minor footpath	Minor footpath closed
2001/09/0098	Near No. 4 Siu Lam Village, Tuen Mun	Natural hillside	5/9 (11:00)	Natural hillside	75	Minor private access	

Legend:

* Information from GEO's landslide investigation consultants and agreed by GEO's District Divisions.

(1) The man-made feature does not comply with the slope registration criteria given in GEO Circular No. 15.

Table B2 - List of Landslide Incidents in Hong Kong Island Reported to GEO (Sheet 1 of 3)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
HK2001/03/002	Natural hillside at South of 54 - 56 Kennedy Road and above slope No. 11SW-B/C216	Natural hillside	28/3	HyD/HK	Unknown	Natural hillside	< 10	Open area	
HK2001/04/001	Above Petrol Station at IL 8630 King's Road, Hong Kong (near MTR Quarry Bay Station)	Natural hillside	25/4	Public	19/4 (06:00)	Natural hillside	0.01	Petrol station	
HK2001/06/002	500 m East of Marymount Secondary School, Tai Hang Road, Hong Kong	11SE-C/C54	8/6	Police	8/6 (08:00)	Soil/rock cut	0.1*	Open area	
HK2001/06/004	South Bay Road	15NE-A/C100	8/6	Police	8/6 (13:00)	Rock cut	15	Road	2 lanes of road closed
HK2001/06/005	Within private lot of 10-12 Consort Rise	11SW-C/F132	8/6	BD	8/6	Fill slope	3	Road	
HK2001/06/006	Nam Long Shan Road, Ocean Park Entrance	15NW-B/C44	9/6	Police	9/6 (20:40)	Rock cut	2	Road	1 lane of road closed
HK2001/06/007	Slope below 200 Victoria Road (near House 1B and Happy Lodge)	1.5 m high soil cut slope(1)	14/6	Public	Unknown	Soil cut	2	Open area	
HK2001/06/008	King's Road Westbound near Lau Li Street (below Serene Court, 41 Tin Hau Temple Road)	11SE-A/C561	25/6	HyD/HK	25/6 (20:00)	Rock cut	0.1	Road, footpath	1 lane of road closed, footpath closed
2001/07/0008	10A-D Shouson Hill Road West, Hong Kong	11SW-D/C676	9/7	LPM consultants	Possible on 7/7	Soil/rock cut	2	Minor footpath	
2001/07/0009	Mount Davis Path, Hong Kong	1.2 m high fill slope and masonry wall(1)	10/7	HyD/HK	7/7	Fill slope and masonry wall	2	Roadside lay by	
2001/07/0019	Bowen Road near Culvert B38/lamp post No. 26728	Natural hillside	16/7	Police	16/7 (11:00)	Natural hillside	1	Pedestrian pavement	

Table B2 - List of Landslide Incidents in Hong Kong Island Reported to GEO (Sheet 2 of 3)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/07/0020	Broadwood Road	11SE-C/F103	13/7	Public	Few months before 7/2001	Fill slope	50	Open area	
2001/07/0033a	Hospital Path off Barker Road near lamp post No. 19155	1 m high soil/rock cut slope(1)	19/7	HyD/HK	Possible 18/7	Soil/rock cut	0.1	Minor footpath	
2001/07/0033b	Hospital Path off Barker Road near lamp post No. 19155	1.5 m high soil/rock cut slope(1)	19/7	HyD/HK	Possible 18/7	Soil/rock cut	0.5	Minor footpath	
2001/07/0033c	Hospital Path off Barker Road near lamp post No. 19155	2.5 m high soil/rock cut slope(1)	19/7	HyD/HK	Possible 18/7	Soil/rock cut	<0.1	Minor footpath	
2001/07/0036	Below and opposite 59 South Bay Road	Natural hillside	21/7	Police	21/7 (03:30)	Natural hillside	60	Pedestrian pavement and natural stream course	
2001/08/0053	Within a construction site at APIL 129, Praya Road, Ap Lei Chau	Natural hillside	28/8	GEO	Possible in early 7/2001	Natural hillside	40	Construction site	
2001/09/0059	Island Road between Shouson Hill Road and Deep Water Bay Road	15NW-B/C114	2/9	HyD/HK	1/9 (11:45)	Soil/rock cut	3	Road	1 lane of road closed
2001/09/0069	Opposite 22 Sun Shing Street, Chai Wan, Hong Kong	11SE-A/C5	3/9	Police	2/9	Rock cut	0.07	Road	1 lane of road closed
2001/09/0072	Headland Road, Repulse Bay	15NE-A/C265	3/9	Police	3/9	Soil/rock cut	~5	Minor footpath	Minor footpath closed
2001/09/0089	Right of way to No. 30 Peak Road	11SW-D/R1116	5/9	Police	5/9 (morning)	Concrete wall	15	Building access	
2001/09/0095	Middle Gap Road near lamp post No. 36873	11SW-D/C554	5/9	HyD/HK	5/9 (20:25)	Rock cut	0.5	Road	½ lane of road closed

Table B2 - List of Landslide Incidents in Hong Kong Island Reported to GEO (Sheet 3 of 3)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0097	Roadside near 99 Repulse Bay Road	15NE-A/C47	5/9	Police	5/9 (16:45)	Soil/rock cut	2	Road	1 lane of road closed
2001/09/0106	Backyard of 16 Ching Lin Terrace Western District	Natural hillside	10/9	Public	8/9 (06:00)	Soil/rock cut	2	Backyard	
2001/09/0109	Tin Hau Temple Road	11SE-A/FR61	14/9	HyD	14/9	Fill slope	6	Open area	
2001/10/0114	Behind 26 Ching Wah Street, North Point, Hong Kong	1.5 m high soil cut slope(1)	28/9	HyD/HK	Unknown	Soil cut	Sign of distress	Backyard	
2001/10/0116	Natural hillside above 60 Peak Road	Natural hillside	8/10	Public	Possible 9/2001	Natural hillside	1.5	Stream course	
2001/12/0123	Below Pokfield Road, Hong Kong	Unregistered	14/12	Police	14/12 (07:15)	Fill slope*	30*	Pedestrian pavement	Pedestrian pavement closed
2002/02/0008	To the south of the Sports House of the Hong Kong Stadium	11SW-D/DT17	20/2 /2002	LCSD	17/9	Disturbed terrain	0.4	Road	

Legend:

* Information from GEO's landslide investigation consultants and agreed by GEO's District Divisions.

(1) The man-made feature does not comply with the slope registration criteria given in GEO Circular No. 15.

Table B3 - List of Landslide Incidents in Kowloon Reported to GEO (Sheet 1 of 2)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
ME2001/06/001	Opposite Wellcome supermarket at Hiu Kwong Court, Hiu Kwong Street, Kwun Tong	11NE-D/C20	6/6	Public	6/6	Soil/rock cut	0.1	Open area	
ME2001/06/003	88 Kung Lok Road - Home for the Aged, Kwun Tong	11NE-C/C68	8/6	Public	8/6 (09:00)	Soil/rock cut	0.2	Pedestrian pavement	
ME2001/06/004	Kung Lok Road, below St. Catharine's School for Girls, Kwun Tong	11NE-C/C71	9/6	FSD	Unknown	Soil/rock cut	1	Pedestrian pavement	Pedestrian pavement closed
ME2001/06/029	Southern corner of King Hing Court, Kung Lok Road, Kwun Tong	11NE-C/C219	12/6	Public	12/6 (05:00)	Soil/rock cut	4.5	Open area	
ME2001/06/030	Natural hillside above slope No. 11NE-D/DT32, at Park off Hip Wo Street	Natural hillside	12/6	Police	12/6	Natural hillside	5	Road, open area	Pedestrian pavement closed
ME2001/06/059	Natural hillside above Hong Ning Road Park, Phase II, Kwun Tong	Natural hillside	28/6	Arch SD	27/6 (22:00)	Natural hillside	7	Toilet block	
2001/07/0040	Adjacent to slope No. 11NE-A/FR38, Morse Park, Kowloon	Natural hillside	23/7	GEO	Unknown	Natural hillside	2	Open area	
2001/09/0058	Along Kwun Ping Road near lamp posts Nos. EB2957 and EB2958.	7SE-C/C352	2/9	Police	2/9 (09:00)	Soil cut	8	Road	
2001/09/0071	Natural hillside below slope No. 11SE-B/C205, Ko Chiu Road, Ko Chiu Path	Natural hillside*	3/9	Public	2/9	Natural hillside*	40*	Open area	

Table B3 - List of Landslide Incidents in Kowloon Reported to GEO (Sheet 2 of 2)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0112	Playground near Ma San Tsuen, Lei Yue Mun, Kwun Tong	11SE-B/C114	21/9	Food and Enviromental Hygiene Dept.	Unknown	Soil cut	3	Open area	

Legend:

* Information from GEO's landslide investigation consultants and agreed by GEO's District Divisions.

(1) The man-made feature does not comply with the slope registration criteria given in GEO Circular No. 15.

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 1 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/02/003	Lot 957, DD118 Tai Shu Ha Road West, Nam Hang Tsuen	Unregistered	22/2	Police	Around January	Fill slope	~20	Open area	
ME2001/03/001	Along access road near Luk Keng Road, Nam Chung	3SE-A/C6	23/3	HyD/NT	Unknown	Soil cut	Sign of distress	Open area	
MW2001/03/001	No. 38 Yau Oi Tsuen, Tao Fung Shan Road	7SW-B/CR260	26/2	Public	Unknown	Concrete wall	1	Open area	
ME2001/03/002	Along access road near Luk Keng Road, Nam Chung	3SE-A/C6	23/3	HyD/NT	Unknown	Soil cut	Sign of distress	Open area	
LI2001/001M	Tam Kon Shan Road, Tsing Yi	Unregistered	9/4	HyD	9/4 (12:00)	Retaining fill wall under construction	35	Roads, construction site	1 lane of road closed
ME2001/04/001	Lung Ha Wan Road, Clear Water Bay, Sai Kung	12NW-D/C4	16/4	HyD/NT	Unknown	Soil/rock cut	9	Road	1 lane of road closed
MW2001/04/001	Po Kok Branch School, No. 380, Tan Kwai Tsuen Road, Hung Shui Kiu, Yuen Long	Unregistered	10/4	Public	9/4 (19:00)	RC retaining wall	50*	Garden of school, open area of factory	Portion of school garden and factory open area closed
MW2001/04/002	Slope below Route Twisk near Tso Kung Tam Recreation Centre, Tsuen Wan	Natural hillside	10/4	HyD/NT	8/4	Natural hillside	10-15	Minor footpath	
ME2001/04/004	Footpath adjacent to Chinese Permanent Cemetery, Tseung Kwan O	Natural hillside	23/4	DO/SK	Unknown	Natural hillside	<1	Minor footpath	
ME2001/05/001	O Pui Village, Mang Kung Uk, Sai Kung	1 m high retaining wall(1)	14/5	DLO	Unknown	RC retaining wall	3	Road	
MW2001/05/002	No. 5, Yung Shue Long Village, Lamma Island	Unregistered	5/5	Public	Few Months before May	Masonry wall	1	Open area	
MW2001/05/003	Sham Wat Road near Tai Fung Au, Lantau Island	Natural hillside*	24/5	Police	23/5	Natural hillside*	0.3	Pedestrian pavement	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 2 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
LI2001/145Ma	Route Twisk	6SE-B/C4	13/6	HyD	11/6	Soil cut	3	Road	
LI2001/145Mb	Route Twisk	6SE-B/C4	13/6	HyD	11/6	Soil cut	2	Road	
LI2001/146M	Route Twisk	6SE-D/C52	13/6	HyD	11/6	Soil cut	2	Road	
LI2001/158M	Route Twisk	6NE-D/C6	4/7	HyD	11/6	Soil cut	3	Road	
ME2001/06/002	No. 2A1, Kau Lung Hang, Tai Po	3SW-D/C85	8/6	Police	8/6 (10:00)	Soil/rock cut	10	Squatters	5 squatters temporarily evacuated
MW2001/06/002	So Kwun Wat, near the southern end of a CED's project (Contract No. CV/98/04), Tuen Mun	6SW-C/C509*	7/6	CED	7/6	Soil cut	7	Squatter (brick structure)	
MW2001/06/003	WSD's access Road, Pak Tin No. 5 District slope No. 7SW-D/C751	Natural hillside*	8/6	WSD	7/6	Natural hillside*	<1	WSD's access road, squatter	1 squatter temporarily evacuated, access road closed
MW2001/06/004	No. 98 Cheung Hang Village, (near Wonderland Villa), Kwai Chung	7SW-C/DT98	9/6	Police	9/6 (17:15)	Disturbed terrain	30	Squatters, minor footpath	5 squatters temporarily evacuated, minor footpath closed
ME2001/06/005	Wong Shek Pier Jockey Club Water Sports Centre, Sai Kung	Natural hillside	9/6	LCSD	9/6 (09:30)	Natural hillside	12	Backyard	
MW2001/06/005	Ling Wan San Tsuen near Ling Wan Temple, Pat Heung, Yuen Long	Unregistered	10/6	Police	10/6 (08:00)	Cement plastered brick wall	60	Squatters	3 squatters permanently evacuated
ME2001/06/006	Pak Tam Road near Wong Shek Pier, Sai Kung	8NE-C/C10	9/6	HyD/NT	9/6 (09:00)	Soil/rock cut	4	Road	1 lane of road closed

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 3 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/06/006	Footpath to No. 62, Sung Shan New Village, Yuen Long	2.5 m high soil cut slope(1)	9/6	Police	Unknown	Soil cut*	5	Minor footpath	Minor footpath closed
ME2001/06/007	No. 17 Ma On Shan Village, Ma On Shan, Sha Tin	7NE-D/C211	9/6	Police	9/6 (09:00)	Soil cut	7	Squatter	1 squatter temporarily evacuated
MW2001/06/007	Castle Peak Road Kowloon Bound, near Wah Tai Road at lamp post No. BAA7670-9, below Wah Yuen Chuen	11NW-A/C58	9/6	Police	9/6 (17:30)	Soil/rock cut	0.05	Road	2 persons injured, road closed
ME2001/06/008	Behind houses Nos. 43-45, Tap Mun New Fishermen's Village, Tap Mun	4SE-C/CR36	9/6	Police	9/6 (11:00)	Soil cut	3	Village buildings	3 buildings temporarily evacuated
MW2001/06/008	Fanling Tai Lung Farm near North District Hospital, Southeast of Fanling Golf Course, Fanling	Natural hillside	9/6	Police	9/6	Natural hillside	100*	Road	Road closed
ME2001/06/009	Near house No. 21 Tap Mun New Fishermen's Village, Tap Mun	4SE-C/CR36	9/6	Police	9/6 (09:30)	Soil cut	9	Village building	1 building temporarily evacuated
MW2001/06/009	Wo Hop Shek Cemetery, Fanling	Series of 1.5 to 2 m high cut and fill terrace	11/6	Arch SD	10/6	Disturbed terrain(1)*	250*	Cemetery	Closure of area of affected part of cemetery
ME2001/06/010	Slope near rain shelter at Tap Mum Pier, Sai Kung	4SE-C/C26	9/6	Police	9/6 (12:00)	Soil cut	4	Rain shelter	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 4 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/06/010	No. 1A Tin Sum Village, Yung Hang Road, Fanling	Unregistered	11/6	Police	11/6 (10:00)	Masonry wall	90*	Squatters, access road	1 squatter permanently evacuated, 1 squatter temporarily evacuated
ME2001/06/011	No. 184 Tong Hang Village, Tai Po	3SW-C/CR210	10/6	Public	10/6 (15:00)	Soil cut	20	Squatters	2 squatters temporarily evacuated.
MW2001/06/011	Fan Kam Road, Lin Tong Mei, Tong Kung Leng, Sheung Shui	1 m high brick wall on 1.5 m soil cut slope(1)	9/6	Police	Unknown	Brick wall on soil cut	<5	Access road	
ME2001/06/012	Po Lo Che Road, Sai Kung	8SW-A/C172	9/6	WSD	9/6 (22:00)	Soil cut	45	Road	1 lane of road closed
ME2001/06/013	Wilson Trail near Kau Lung Hang Shan, Tai Po	2.8 m high soil cut slope(1)	11/6	HyD/NTE	11/6 (07:30)	Soil cut	15	Minor footpath	Minor footpath closed
ME2001/06/014	No. 169 Tong Hang Village, Tai Po	3SW-C/C182	11/6	DO/TP	11/6 (10:00)	Soil cut	7	Open area	
MW2001/06/014	No. 2, Pai Min Kok Village, Tsing Lung Tau, Sham Tseng, Tsuen Wan	2 m high soil cut slope(1)	11/6	HyD/NTW	9/6	Soil cut	1.5	Village house	
MW2001/06/015	Access Road to Tin Hoi house, Ting Kau	6SE-C/C478	9/6	Police	9/6 (15:06)	Soil cut	1	Road	1/2 lane of road closed
ME2001/06/016	Hon Ka Road (between lamp posts Nos. VA0079 and V83897), Tai Po	2.8 m high soil cut slope(1)	11/6	DO/TP	Unknown	Soil cut	3	Road	
MW2001/06/016a	Pun Shan Village, hillside below WSD Catchwater, Tsuen Wan	Natural hillside	11/6	WSD	9/6 (10:00)	Natural hillside	35	Squatter	1 squatter temporarily evacuated
MW2001/06/016b	Pun Shan Village, hillside below WSD Catchwater, Tsuen Wan	Natural hillside	11/6	WSD	9/6 (10:00)	Natural hillside	20	Open area	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 5 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
ME2001/06/017	Hillside above Hong Chi Pinehill School, Tai Po	Natural hillside	11/6	Public	Unknown	Natural hillside	80*	Drains	Surface drainage blocked
MW2001/06/017	Access road connecting Route Twisk, near Kwong Pan Ting Village, Tsuen Wan	6SE-B/C315	11/6	DO/TW	Unknown	Soil/rock cut	4	Access road	Access road closed
ME2001/06/018	Access Road to Sha Lo Tung, Tai Po	Natural hillside and 3SW-D/C155	10/6	HyD/NT	Unknown	Natural hillside	60	Road	Access road closed
MW2001/06/018	Huts Nos. 65 and 66 Kiu Tau Tsuen, Tai Kong Po, Shek Kong, Yuen Long	Natural hillside	11/6	Police	11/6 (04:00)	Natural hillside (river bank)	20	Squatters	2 squatters permanently evacuated
ME2001/06/019	Access Road to Sha Lo Tung, Tai Po	7NW-B/C171	10/6	Police	Unknown	Soil cut	4	Access path	Access path closed
MW2001/06/019	Nos. 190A-C, Lam Hau Tsuen, Ping Shan Heung, Yuen Long	2.6 m high soil cut slope[(1)]	11/6	DO/YL	11/6 (12:00)	Soil cut	4-5	Village house	1 village house temporarily evacuated
ME2001/06/020	Slope near house No. 62, Kap Pin Long, Sai Kung	Disturbed terrain[(1)]*	12/6	DO/SK	11/6 (10:00)	Disturbed* terrain	6	Access path	
ME2001/06/021	City Bus depot, Wo Sheung Tun Street, Fo Tan, Sha Tin	7SW-B/C10	9/6	HyD/NT	9/6 (11:00)	Soil/rock cut, fill on crest	10	Backyard	
MW2001/06/021	Natural hillside behind slope No. 7SW-C/C72, Kwai Shing Circuit, Kwai Chung	Natural hillside	12/6	Police	12/6 (13:00)	Natural hillside	0.7	Bus shelter, pedestrian pavement	Bus shelter closed
MW2001/06/022	Landslide at natural hillside of a stream course at Sham Tseng Tung Tsuen, Tsuen Wan	Natural hillside	12/6	Public	Unknown	Natural hillside	1	Open area	
MW2001/06/023	House No. 92, Ta Shek Wu, Pat Heung, Yuen Long	Natural hillside*	11/6	DO/YL	9/6 (09:00)	Natural hillside*	30	Backyard of village house	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 6 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/06/024	No. 99A, Pak Tin Village, Area 2, Tai Wai	2 m high masonry wall[1]	12/6	Police	12/6 (02:00)	Masonry wall	15	Open area, squatter	1 squatter temporarily evacuated
ME2001/06/025	Mang Kung Wo Village, Mang Kung Wo Road, Sai Kung	7SE-D/F33	9/6	HyD/NT	9/6 (11:30)	Fill slope	25	Pedestrian pavement	Pedestrian pavement closed
MW2001/06/025	Wo Hop Shek Cemetery, Fanling	3SW-C/C629	11/6	Arch SD	10/6 (24:00)	Soil cut	25	Cemetery	Affected part of cemetery closed
ME2001/06/026	Behind Tsang Chun Service (dockyard), 24 Pak Sha Village, Sai Kung	Unregistered	12/6	HyD/NT	10/6 (12:00)	Soil cut	2	Open area	
MW2001/06/026	Wo Hop Shek Cemetery, Fanling	3SW-C/C659	11/6	Arch SD	10/6	Soil cut	3	Cemetery	Affected part of cemetery closed
ME2001/06/027	Behind house No. 160, San Tau Kok Village, Tai Po	2 m high soil cut slope[1]	12/6	Public	11/6	Soil cut	25	Access path	
MW2001/06/027	Opposite house No. F43, Chung Kuk Path, Ho Sheung Heung, Sheung Shui	2.8 m high soil cut slope[1]	11/6	DO/N	10/6	Soil cut	5	Access road	1 land of access road closed
ME2001/06/028	Storage shed near house No. 18, Ha Wan, Tap Mun	4SE-C/CR19	12/6	Police	12/6 (10:00)	Soil cut	3	Squatter (storage shed)	
MW2001/06/028	Behind house No. 30E, Man Kam To Road, Sheung Shui	2.8 m high soil cut slope[1]	11/6	DO/N	10/6	Soil cut	10	Backyard	
MW2001/06/029	Near house No. 30E, Man Kam To Road, Sheung Shui	Unregistered	11/6	DO/N	10/6	Soil cut	2	Open area	
MW2001/06/030	Access Road in Tong Kung Leng, Sheung Shui, N. T.	2.5 m high masonry wall [1]	12/6	DO/N	11/6	Masonry wall	7	Access path	1 lane of access path closed
ME2001/06/032	Behind Phase 2 of Classical Garden, Ma Wo, Tai Po	7NW-B/C416	13/6	Public	13/6 (09:30)	Soil cut	8	Open area	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 7 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/06/032	No. 28 Tai Shan Central Village, Lamma Island	14NE-B/C112	8/6	Public	5/6 (02:00)	Soil cut	< 1	Village house	
MW2001/06/033	DSD's construction site (Contract No. DD/98/04), near Kam Ying Yuen, Kam Tin Road, Yuen Long	Slope within construction site	14/6	DSD	10 to 11/6	Temporary soil cut	80	Squatters, construction site	3 squatters temporarily evacuated
MW2001/06/034	Lot 111 DD1517, Wang Toi Shan, Hung Mo Tam, (opposite Pat Heung Police Station), Yuen Long	2.8 m high concrete wall(1)	13/6	Police	12/6	Concrete wall	3	Squatter	1 squatter permanently evacuated
MW2001/06/035	DD114 Wong Chuk Yuen Tsuen, stream below slope No. 6NE-D/FR77, Lam Kam Road, Tai Po	Natural hillside	13/6	HyD/NT	11/6	Natural hillside	2	Stream course	
ME2001/06/036	House No. 7 Ha Wun Yiu, Tai Po	4 m high fill slope(1)	14/6	Public	12/6 (09:30)	Fill slope	6	Minor footpath	
MW2001/06/036	Below hut No. 108F Tong Kung Leng, Fam Kam Road, Sheung Shui	2SE-D/C271	14/6	Public	9/6 (a.m.)	Soil cut	15	Open area in private lot	
ME2001/06/037	Landslide 20 m away from a CLP pylon in Tai Wo Village, Tai Po	Natural hillside	14/6	DO/TP	12/6 (08:45)	Natural hillside	33	Open area	
MW2001/06/037	Da Chuen Ping Village, Kwai Chung	2.8 m high soil cut slope(1)	14/6	DO/TW	13/6	Soil cut	15	Minor footpath	
ME2001/06/038	Lin Ma Hang Road below slope No. 3NW-B/C19	Natural hillside*	14/6	HyD/NT	Unknown	Natural hillside*	24	Stream course	
MW2001/06/038	Ting Kwok Street, Tsuen Wan	Natural hillside	13/6	DO/TW	13/6 (13:30)	Natural hillside	15	Hillside	
ME2001/06/039	Slope near village access leading to house No. 3C Tai Mong Tsai Village, Sai Kung	Natural hillside	12/6	Public	10/6 (10:00)	Natural hillside	1	Access path	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 8 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
ME2001/06/040	55C, Sheung Wun Yiu Village, Tai Po	2 m high rubble wall[(1)]	14/6	Public	12/6	Rubble wall	6	Backyard	
MW2001/06/040	Slope adjacent to a morning hiker's trail near North Kowloon Magistracy, Tai Po Road	Natural hillside	14/6	GEO	11/6 (14:00)	Natural hillside	<2	Minor footpath	
ME2001/06/041	Hillside near house 3C, Tai Mong Tsai Road, Sai Kung	Natural hillside	15/6	Public	10/6 (10:00)	Natural hillside	2	Access path	
ME2001/06/042	Behind No. 22K Kwai Tei Chuen, Fo Tan	7SW-B/CR174	15/6	Public	15/6 (a.m.)	Soil cut	4	Backyard	
MW2001/06/043	Squatter Hut (Crown Land Permit No. Y18328) near Shek Kong Vegetable Wholesale Market, Pat Heung, Yuen Long	2 m high fill slope[(1)]	15/6	DO/YL	9/6 to 10/6	Fill slope	3	Open area	
ME2001/06/044	Natural hillside 70 m from a CLP electricity tower at Tai Wo Village, Tai Po	Natural hillside	14/6	DO/TP	12/6 (08:45)	Natural hillside	30	Open area	
ME2001/06/045	Behind Tse Tong of Lee Uk Village, Shuen Wan, Tai Po	7NE-A/C114	19/6	DO/TP	12/6	Soil cut	1.5	Backyard	
MW2001/06/045	Slope along a footpath at Fu Yung Shan	2 m high soil/rock cut slope[(1)]	27/6	HyD/NTW	Unknown	Natural hillside*	2	Minor footpath	
ME2001/06/046	Below house No. 4D, Tung Tse Village, Tai Po	Natural hillside*	19/6	DO/TP	Unknown	Natural hillside*	3	Stream course	
MW2001/06/046	23 Yung Shue Long New Village, Lamma Island	14NE-B/R13	27/6	Police	27/6 (18:00)	Masonry wall	40	Minor footpath	Minor footpath closed
ME2001/06/047	Access Road to Kau Lung Hang Shan near the peak	3SW-D/C122	20/6	DO/TP	10/6	Soil cut	20	Road	
MW2001/06/047	Natural hillside below house No. 4 of Kau Wah Keng Sun Tsuen, Kwai Chung	Natural hillside	28/6	DO/KT	27/6	Natural hillside	15	Minor footpath	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 9 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
MW2001/06/048	SC No. WCY/862, Wong Chuk Yuen Sheung Tsuen DD114, Pat Heung, Yuen Long	6NE-D/C161	28/6	Police	27/6	Soil cut	4	Backyard	
ME2001/06/049	At catchwater above Tseung Kwan O Landfill Phase 1, Wan Po Road near Chun Yat Street, TKO	12SW-A/C175	12/6	Public	8/6	Rock cut	15	Catchwater	
MW2001/06/049	Lok Ma Chau car park, Yuen Long	2SE-A/C69	28/6	Food and Enviromental Hygiene Dept.	27/6	Soil cut	0.5	Car park	
ME2001/06/050	Access Road South of West Part High Island Reservoir, Sai Kung	8SE-C/C71	26/6	WSD	26/6 (14:00)	Soil cut	6	Open area	
MW2001/06/050	Slope below squatter hut No. TM/NW/1279, No.77A, Choi Yuen Tsuen, Nai Wai, Tuen Mun	Unregistered	28/6	CED	27/6	Soil cut	2	Squatters, backyard	2 squatters permanently evacuated
ME2001/06/051	Above private garden of No. 2, Wo Liu Hang Village, Fo Tan, Sha Tin	7SE-A/C477	27/6	FSD	27/6 (10:00)	Soil cut	6	Open area	
ME2001/06/052	Sui Wo Court, Fo Tan	7SE-A/C3	27/6	Public	27/6 (09:30)	Rock cut	3	Car park entrance	
ME2001/06/053	Hong Chi Pinehill School, Tai Po	Natural hillside	27/6	School	Unknown	Natural hillside	30	Open area of School	
ME2001/06/054	Near Temple, 3 Sheung Wun Yiu, Tai Po	Natural hillside*	27/6	FSD	27/6 (15:00)	Natural hillside*	12	Road	
ME2001/06/056	Slope behind house No. 197, Sha Lan Villa, Tai Po	7NE-A/C85	27/6	DO/TP	27/6	Soil cut	10	Backyard	
ME2001/06/057	No. 80 Nam Wah Po Village, Tai Po	3SW-D/C30	28/6	DO/TP	10/6	Soil cut	1.2	Open area	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 10 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
ME2001/06/058	Behind house No. 71G Kam Shan Village, Tai Po	7NW-B/C558	28/6	DO/TP	Unknown	Soil cut	6	Village building	
ME2001/06/060	Slope behind house No. 81, Nam Wah Po, Tai Po	3SW-D/C29	28/6	DO/TP	10/6	Soil cut	1.5	Backyard	
ME2001/06/061	11A Mau Tso Ngan, Fei Ngo Shan Road, Sha Tin	7SE-C/C529	28/6	DLO/ST	28/6 (05:00)	Soil/rock cut	13	House	1 house temporarily evacuated
ME2001/06/062	Near refuse collection point N64 at Sheung Wo Hang Village, Sha Tau Kok	Natural hillside	28/6	Food and Enviromental Hygiene Dept.	Unknown	Natural hillside (river bank)	20	Refuse collection point	
ME2001/06/063	2 Sheung Wong Yi Au Village, Tai Po	Natural hillside	30/6	DO/TP	30/6 (09:30)	Natural hillside	4	Minor footpath	
2001/07/0001	No.20, North Shek Wu San Tsuen, Sheung Shui	2.3 m high soil cut slope(1)	5/7	DO/N	9/6	Soil cut	4	Open area	
2001/07/0002	Lin Ma Hang Road	3NE-A/R6	4/7	HyD/NT	Unknown	Soil/rock cut	30	Open area	
2001/07/0004	Near No. 34 of Cho Ma Wo Village, Tai Po	7NW-B/C541	4/7	DO/TP	Unknown	Soil cut	17.5	Minor footpath	
2001/07/0007	Slope near house No. 183D and 1A, Po Tung Road, Sai Kung	8SW-C/C29	9/7	HyD/NT	7/6	Soil cut	0.5	Village access	
2001/07/0012	Squatter huts Nos. HC/741 and HC/741B, Wang Toi Shan San Tsuen, Fan Kam Road, Yuen Long	Natural hillside	11/7	DO/YL	6/7 (p.m.)	Natural hillside (river bank)	20	Squatters	2 squatters permanently evacuated
2001/07/0015	Squatters huts Nos. RTP/TM/A/42 and 43 Yung Shue Village, Tap Mun	4SE-C/C23	13/7	Public	7/7 (10:00)	Soil cut	5	Squatter	
2001/07/0016	No. 52A Pak Tin Pa Tsuen, Tsuen Wan	2.8 m high masonry facing wall(1)	13/7	Public	Early July	Masonry facing wall	2	Footbridge	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 11 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/07/0017	East of No. 4 Ma Yau Tong Village, Po Lam Road, Ma Yau Tong, TKO	Natural hillside	14/7	HyD	Unknown	Natural hillside	30	Road	
2001/07/0018	No. 13 Ngan Kwong Wan Road, Mui Wo, Lantau Island	10SW-C/C79	15/7	Police	15/7 (16:00)	Soil cut	0.024	Open area	
2001/07/0022	No. 94, Sheung Pak Nai, Yuen Long	2.5 m high soil cut slope(1)	3/7	DO/YL	28/6	Soil cut	5	Squatters	1 squatter permanently evacuated, 2 squatters temporarily evacuated
2001/07/0023	No. 16 Sung Shan New Village, Yuen Long	2 m high soil cut slope(1)	3/7	DO/YL	29/6	Soil cut	2-3	Stream course	
2001/07/0025	Tsuen Wan Centre	6SE-D/C58	4/7	Arch SD	4/7 (11:00)	Rock cut	0.2	Open area	
2001/07/0028	Tai Hang Village, Tai Po	3SW-C/F213	3/7	DO/TP	10/6	Fill slope	6	Squatters	2 squatters temporarily evacuated
2001/07/0031	Access road to Tit Hang Village near Castle Peak Road, Lok Ma Chau, Yuen Long	2SE-B/C406	28/6	HyD	28/6	Soil cut	10	Road	
2001/07/0030	No. 4 Cheung Sha Kan, Nim Shu Wan, Lantau Island	2.8 m high soil cut slope(1)	17/7	Public	16/7 (15:00)	Soil cut	3	Backyard	
2001/07/0032	No. 42 Siu Sau Village, Tuen Mun	6SW-C/CR700	18/7	HyD	18/7 (a.m.)	Masonry wall and soil cut	2	Squatter	
2001/07/0034	HD's SC No. TM/TTST/476, Tseng Tau Sheung Tsuen, Tuen Mun	2.5 m high soil cut/fill slope(1)	19/7	DLO/TM	15/7	Soil cut and fill protected by masonry facing	0.5	Squatter	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 12 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/07/0038	Access Road to Tai Po Tau "D" pump house near Lamp Post No. EB4167(9)	2 m high soil cut/fill slope(1)	21/7	Police	Unknown	Soil/rock cut	0.5	Road	
2001/07/0039	Nos. 3-4 Siu Lam Tsuen, Siu Lam, Tuen Mun	Natural hillside	20/7	Public	19/7 (a.m.)	Natural hillside	2	Access road	
2001/07/0041	Fung Kat Heung Second Vegetable Station, Yuen Long	2.9 m high soil cut slope(1)	24/7	DO/YL	12/7	Soil cut	0.5	Road	
2001/07/0042	Waste Reception Area, North East NT Landfill (NENT), Sha Tau Kok	3NW-D/C254	24/7	EPD	10/7	Soil cut (majority) and natural hillside above	8000*	Landfill site internal access road	Access road closed
2001/08/0045	No. 26, SC No. RTP/LW/A/126, Lo Wu Tsuen, Sha Ling, Man Kam To	2 m high fill slope(1)	1/8	DO/N	28/6	Fill slope	1	Village building	
2001/08/0046	Sha Chau near Tuen Mun	Natural hillside	1/8	DO/TM	Before 17/7	Natural hillside	30	Minor footpath	
2001/08/0047	Adjacent to house No. 20, Hung Uk Village, Clear Water Bay Road, Sai Kung	12NW-C/C396	8/8	Public	6/7	Soil cut	1	Car park	
2001/08/0048	Chuen Shui Tseng Village, Tai Po	Unregistered*	9/8	DO/TP	Unknown	Soil cut	30	Agriculture terrace	
2001/08/0054	Opposite lamp post No. FC0473 near Tsuen Tsing Interchange, Kwai Tsing	7SW-C/C903	29/8	GEO	Before 15/7 as advised by HyD	Soil/rock cut	0.3	Open area	
2001/09/0057	Natural hillside above Lei Pui Street, Kwai Chung	Natural hillside	21/9	Police	1/9 (22:50*)	Natural hillside	~780	Squatters, active construction site, roads	2 squatters destroyed, 1 squatter temporarily evacuated, roads closed

Table B4 – List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 13 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0060	Downhill in front of huts Nos. 4-5 Kak Hang Tun Village, Sai Kung	Natural hillside	2/9	Police	2/9 (12:30)	Natural hillside	175*	Open area	
2001/09/0062	Access road to Pak Tin Village Area 4 and 5 Heung Fan Liu, Tai Wai	Natural hillside*	2/9	DO/ST	2/9 (02:15)	Natural hillside*	45	Road, squatters	6 squatters temporarily evacuated
2001/09/0063	Tai Po Road at No. 54 Ma Liu Shui, between Yucca Villa and Yung Ping Path	Natural hillside and 1.2 m high fill slope	2/9	Police	2/9	Natural hillside	30	Road, Pedestrian pavement	1 lane of road closed
2001/09/0064	Above Po Lei Street, Kwai Chung (opposite Shek Hing Road)	Natural hillside	2/9	GEO	1/9	Natural hillside	40	Minor footpath	
2001/09/0065	Entrance of Luk Hop Village, Tai Wai	Natural hillside	2/9	Police	2/9 (07:00)	Natural hillside	7	Open area	
2001/09/0066	Below 56 Denon Terrace, Tseng Lan Shue, Clear Water Bay Road, Sai Kung.	11NE-B/FR249*	2/9	Police	1/9 (22:30)	Fill slope*	50*	Squatter	1 squatter permanently evacuated
2001/09/0068	No. 1 Ku Ngam Monastery, Che Kung Mui Road, Sha Tin	Natural hillside	2/9	HyD	2/9 (p.m.)	Natural hillside	15	Open area	
2001/09/0070	Hing Keng Shek Road, Sai Kung	7SE-D/C151	3/9	DO/SK	1/9 (20:00)	Soil cut	2	Road	1 lane of road closed
2001/09/0073	Houses Nos. 294 and 295 Shek Lei Hang Village, Kwai Tsing	7SW-C/C999	3/9	Police	3/9	Soil cut	10	Squatters	2 squatters temporarily evacuated
2001/09/0074	No. 56 Wong Chuk Yeng Village Path, Fo Tan	7SW-B/CR136	3/9	BD	3/9 (08:00)	Soil cut	3	Open area	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 14 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0075	Slope in front of houses Nos. 397-398 Pai Tau Village, Sha Tin	Natural hillside	3/9	DO/ST	2/9	Natural hillside	15	Open area	
2001/09/0077	96 Pai Tau Village, Sha Tin	Natural hillside	3/9	LPM Consultants	3/9 (17:30)	Natural hillside	5	Open area	
2001/09/0078	Area 1 Pak Tin Village, Tai Wai Sha Tin	Natural hillside	3/9	DO/ST	3/9 (a.m.)	Natural hillside	40	WSD access road	Access road closed
2001/09/0079	No. 51 Siu Sau Tsuen, Siu Lam, Tuen Mun	6SW-C/CR673*	3/9	Public	3/9 (a.m.)	Masonry wall	7	Open area	
2001/09/0080	No. 14 Sha Tin Tau San Tsuen, Area 2, Sha Tin	7SW-D/C449	3/9	LPM consultants	2/9 (p.m.)	Soil cut	5	Squatter	
2001/09/0081	Behind slope No. 7SW-D/C449 at Sha Tin Tau Village Area 2, Sha Tin	7SW-D/C450	3/9	LPM consultants	2/9 (p.m.)	Soil cut	7	Open area	
2001/09/0083	Behind No. 25 Lo Tsz Tin Village, Tai Po	3SE-D/C106	4/9	DO/TP	Unknown	Soil cut	1	Vacated 2-storey village house	
2001/09/0084	Slope adjacent to 17 Ma On Sha Tsuen	Natural hillside	4/9	DO/ST	2/9 (09:00)	Natural hillside	10	Minor footpath	
2001/09/0085	68 Wo Liu Hang, Fo Tan	7SE-A/CR125	5/9	Public	3/9 (10:00)	Soil cut	3	Squatter	
2001/09/0086	Near junction of Clear Water Bay and Road Razor Hill Road, Sai Kung	11NE-B/C804	5/9	HyD/NT	2/9	Soil cut	15	Pedestrian pavement	
2001/09/0087	Man Yee Road, Sai Kung	8SE-C/C66	5/9	WSD	1/9 (21:00)	Soil cut	10	Road	
2001/09/0088	Village Access leading to Pak A Village, Sai Kung	Natural hillside (majority) and 1.2 m high cut slope	4/9	DO/SK	1/9 (22:00)	Natural hillside and soil cut	100	Minor footpath	Minor footpath closed

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 15 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0090	Access road to Mau Tso Ngam, Tate's Cairn, Sha Tin	7SE-C/C514	4/9	DO/ST	3/9 (09:00)	Soil cut	2	Road	
2001/09/0091	Natural hillside opposite slope No. 7SE-C/C352, Kwun Ping Road, Kwun Yam Shan, Shatin Pass	Natural hillside	2/9	Police	2/9 (09:00)	Natural hillside	20*	Road	1/4 lane of road closed
2001/09/0093	Shing Mun Park visitor centre, Tsuen Wan	7SW-A/C229	5/9	Arch SD	2/9	Rock cut	3	Open area	
2001/09/0094	Po Lo Che Road, Sai Kung	7SE-B/C7	5/9	WSD	4/9 (14:00)	Soil cut	2	Road	
2001/09/0096	24 Kau Wa Keng San Tsuen, Kwai Tsing	11NW-A/R39	5/9	Public	1/9 (19:00)	Soil cut	0.8	Open area	
2001/09/0098	Near No. 4 Siu Lam Village, Tuen Mun	Natural hillside	6/9	Public	5/9 (11:00)	Natural hillside	75	Minor private access	
2001/09/0100	Golden Hill Road	7SW-C/C666	7/9	HyD/NTE	2/9 (08:00)	Soil cut	2	Road	
2001/09/0101	Access Road in Pak Tin Area 5	7SW-D/C854	6/9	DO/ST	2/9 (15:00)	Soil cut	15	Minor footpath	
2001/09/0102	Ting Kok Road, Ting Kok Village, Tai Po	3SE-C/CR147	7/9	HyD/NT	Unknown	Soil cut	30	Construction site	
2001/09/0103	Behind No. 69, Wo Liu Hang Village, Fo Tan	Natural hillside	6/9	Public	4/9 (09:00)	Natural hillside	2	Squatter	
2001/09/0104	Slope adjacent to access road to house No. 25, Wo Mei, Sai Kung	Natural hillside	7/9	Public	Unknown	Natural hillside	3	Access road	
2001/09/0105	Near 12 Sheung Yeung Village, Clear water Bay Road, Sai Kung	12NW-C/C319	8/9	HyD/NTE	7/9 (Night)	Soil/rock cut	10	Open area	
2001/09/0107	Access road to Mau Tso Ngam, Tate's Cairn	2 m high soil cut slope[1]	4/9	DO/ST	3/9 (09:00)	Soil cut	1.5	Access road	

Table B4 - List of Landslide Incidents in New Territories and Outlying Islands Reported to GEO (Sheet 16 of 16)

Incident No.	Location	Slope No.	Call		Failure			Facility Affected	Consequence
			Date	From	Date (Time)	Type	Scale (m^3)		
2001/09/0110	Footpath at Mission Hill near Tong Yam Street	Natural hillside	11/9	Public	11/9 (10:00)	Natural hillside	5	Minor footpath	
2001/09/0111	Near lamp post No. VA466B, Wong Yee Au Tsuen, Tai Po	Natural hillside	15/9	Police	15/9 (09:00)	Natural hillside	25	Minor footpath	
2001/10/0115	Lot 1278 in DD253, Pak Shek Wo New Village Road, Sai Kung	11NE-B/C404	3/10	BD	Unknown	Soil cut	10	New village road	
2001/10/0117	Village Access leading to Wong Keng Tei Village	2 m high soil cut slope(1)	5/10	DO/SK	2/10 (18:00)	Soil cut	1	Road	
2001/11/0119	Near No.1 Nam Shan Road, Peng Chau	Natural hillside	17/10	DO/Island	1/4	Natural hillside	4	Open area	
2001/12/0121	189A and 190 Tong Hang Tung Tsuen, Tai Po	Disturbed terrain(1)*	24/11	Public	27/6	Disturbed* terrain	Sign of distress	Open area	
2002/03/0009	Licensed house No. PNT629 (SC Nos. ST/413 and 414), Pak Wai Tsuen, Kam Tin, Yuen Long	6NE-A/C9	5/3 /2002	Public	Around August	Soil cut	~1	Backyard	
2002/03/0010	Butterfly Valley - SC No. RTW/9B/264, Kwai Tsing	11NW-A/C432	11/3 /2002	GEO	2/7	Soil/rock cut	2.5	Backyard	
2002/03/0011	Butterfly Valley - SC No. RTW/9B/287, Kwai Tsing	Unregistered	11/3 /2002	GEO	2/7	Soil cut	4.5	Backyard	

Legend:

* Information from GEO's landslide investigation consultants and agreed by GEO's District Divisions.

(1) The man-made feature does not comply with the slope registration criteria given in GEO Circular No. 15.