Executive Summary

Task B of this assignment has prepared a record of large landslides present in the natural terrain of Hong Kong. The locations, classifications and geometric details of these landslides have been derived from the following source material: the large and cross-tagged landslides recorded in the NTLI, landslides and general areas of instability shown on the HKGS and GASP maps, and the high resolution, black and white, low-level aerial photography flown in 1963/4. Post-1963/4 aerial photographs were also examined to review the later NTLLI large and cross-tagged features.

The interpretation of 1963/4 low-level aerial photographs was central to Task B; the process of identifying, recording and describing large landslides was assisted by the high quality photographs used. More recent aerial photography proved less valuable, both in terms of quality, coverage and landslide information. Field validation exercises formed a useful forum for discussing interpretation issues.

The existing NTLLI data set contains reference to large landslides and multiple-source (cross-tagged) landslides recorded from high-level aerial photographs taken between 1945 and 1994. The Task B aerial photograph interpretation allowed much greater resolution than that undertaken with the high-level photography used to compile the NTLLI. Many of the large NTLLI features were verified but were found to occur within yet larger landslides. A significant proportion of NTLLI features originally classified as large landslides, were reinterpreted, either as erosion features, mostly gullies, or as small landslides (less than 20m in scarp width).

A classification based on morphology was developed, which contains the main modes of fall, slide, flow and compound movement. The classification is based to a large extent on that of Soeters and van Westen (1996), though the term 'debris avalanche' has required further definition. Most of the large landslides recorded were comparatively small (20-50m in scarp width) and considered to be shallow (mostly less than 10m, and predominantly less than 5m in depth). Debris slides and debris flows were among the most common types of landslide described, accounting for over 75% between them, while the remainder are more or less equally divided between debris avalanches, rock slides, non circular rotational slides and earth flows. Landslides that have developed into debris flows downslope are also frequent. Material has often been deposited in debris basins or as levees alongside stream channels, but some colluvial deposits remain on relatively steep slopes and have the potential to fail again. A number of landslides were recorded that have apparently short displacement distances, the failed mass remaining largely intact, though displaced. Although some debris avalanches were recorded, most of those identified were classified as small and were therefore not included in the data set.
Some hillsides display large failure morphologies (100m scarp width or more), including arcuate scarps formed in rock with extensive deposits of colluvium below. Colluvium comprises either 'en masse' landslide material, single or multiple-event debris flow deposits, or undifferentiated deposits. The majority of the very large landslides are considered to be very old (early Holocene?), and many have controlled the subsequent drainage pattern that has evolved on them. Some of the smaller landslides (20-50m scarp width) appear to have taken place within the time frame of the photographic record.

Clusters of large landslides were identified in the following locations:

- in the coarse ash tuffs and undifferentiated colluvium around Sai Kung;
- on the sedimentary/pyroclastic rock escarpment north of Plover Cove Reservoir;
- on the mountain range between Shek Long and Plover Cove Reservoir;
- in the western half of Lantau Island and on the Chi Ma Wan Peninsula;
- in the sedimentary and stratified volcanic rocks west of Tuen Mun.

The relationships between slope geomorphology and landsliding is clearly evident from the 1963/4 photographs, and there remains much more interpretative value in this extremely valuable data source. This leads to the following suggestions:

- further develop and apply the terrain classification developed as an aid to this study;
- examine the pattern of landslide clustering and the significance of landslide 'nesting', whereby small landslides and slope movements form part of a larger picture;
- prepare geomorphological maps for selected areas of Hong Kong through further interpretation of the 1963/64 aerial photography and the use of pilot studies, to enhance the interpretation of the large landslide record in terms of landscape development, past and present, and the explanation of landslide locations;
- field mapping of some of the very large, complex landslides to provide better understanding of these features, and their potential for reactivation;
- relative age dating of large landslides and the development of a 'State of the Art Review' of Hong Kong landslides.