

**305756 Redacted****SHRIMPTON & LIPINSKI LTD****CONSULTING SURVEYORS • ENGINEERS • PLANNERS**

111 Cameron Road, PO Box 231, Tauranga, New Zealand.

Phone 07-577 6069 • Fax 07-577 6065

Email sl.tga@xtra.co.nz

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Our Ref: 13995

Director - City Services  
Tauranga District Council  
Private Bag  
TAURANGA

Attention: s 7(2)(a) - PrivacyDear s 7(2)(a) - PrivacyRe: LANDSLIP AT MOUNT MAUNGANUI MOTOR CAMP

Further to our conversation of yesterday I confirm my opinions following my visit to the landslip site yesterday afternoon.

**Observations:**

- The inundation at the caravan site has been caused by mobilisation of saturated ground further upslope at the site of the slip. The soil moved appears to be a mixture of topsoil and other undifferentiated filling that has flowed over the dense kikuyu grass cover to the bank immediately above the parked caravans.
- Landslip appears to have occurred where filling or past landslip debris has become saturated due to surface water and groundwater infiltration. The slip scarp is below a grassed access track which had been formed across a much larger landslip scarp which extends upslope. Seepage flows were seen from the scarp face with a concentrated flow evident at a natural "pipe" in the soil mass.
- The seepage flow continued to track down through the present slip debris and over the kikuyu grass cover and has been channelled to the existing camp stormwater reticulation by a trench behind the remaining caravan at the lower level. The control of this flow has been successful to date in preventing any further flooding in the caravan park area.
- The line of the instability is part of much older and larger landslip events that extend up to the bushline on the mountain. It is likely that the colluvium from the previous slippage extends into the scarp above the track as is seen from boulders being present near the ground surface and some mixed coloured soils present below the grass cover. Within the present scarp face the soils present also appear to be of a mixed colluvial nature and are overlain by midden material and sidling filling from the track formation.

- A galvanised water pipe is present in a trench somewhere along the track above the slip scarp. This pipe can be seen at the stock watering trough further along the track.
- A visual inspection in the area of inundation showed that some of the terraces on which caravans are parked are supported by various types of restraining structures most of which show signs of distress. The most serious is a wall constructed of waratah standards, half rounds and fencing wire which supports a caravan and awning to the south west of the slip debris pile (site 111). Subsidence has occurred behind this structure and the caravan owners were removing the contents of the caravan during my visit.

### Interim Opinions and Recommendations

I consider that the present slip area is sufficiently remote and stable so that no remedial measures need be undertaken until weather and ground conditions improve to allow a more detailed investigation and the formulation of a repair programme. The present degree of seepage is controlled by the overland flow paths created and the impediments to this flow that may have existed by the accumulation of old slip debris, filling and possibly as a result of the recent landscaping work, have now been taken away.

In the interim I recommend that:

- (a) Councils contractor investigate whether the galvanised pipe above the slip scarp is leaking or has been damaged and also decommission this line if it is not required for stock watering. There is a remote possibility that the present natural "pipe" may be sourced from damage to the water pipe.
- (b) Safety fencing be erected around the head of the slip scarp and at the area of inundation below.
- (c) The degree of recontouring or landscaping work undertaken at the site of the slip be reviewed to see whether this work may have been a contributing factor to the present instability. Information on the nature of the slopes present before the landscaping would also be helpful. *been done*
- (d) The slip scarp be inspected and monitored daily during wet periods and less frequently during dry spells until remedial work can be undertaken.

### Remedial Work

At this stage I consider that the appropriate remedial work would be to stabilise the slip scarp present while at the same time control the seepage that is occurring. This could be undertaken by erecting a timber pile retaining wall with drainage media behind to collect the seepage flow. This flow would then be reticulated to the lower area of the camp. During this work the existing track fill and some of the underlying midden material could be removed by lowering the track.

Included with this work other measures that can be undertaken are:

- The construction of a subsurface drain along the track alignment above the slip to intercept groundwater seeping out of the debris of the older slip scarp above the track.

- The removal of other colluvial material that seems to be present in humps or clumps on the slopes above the caravan site.
- Control of the surface water that runs down the access track above the slip.
- The re-establishment of the planting below the slip scarp with perhaps less topsoil being used.
- A review of and repair and replacement as appropriate of the local retaining walls around caravan sites.
- A risk management survey of other areas above the camping ground and other development along Adams Avenue to determine whether other potential sites of instability exist. Of particular concern could be the mobilisation of some of the boulders on the slope faces if more slippage did occur.

I trust that my initial opinions are of interest. In keeping with your instructions I will continue to inspect the slip site at regular intervals.

Yours faithfully  
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