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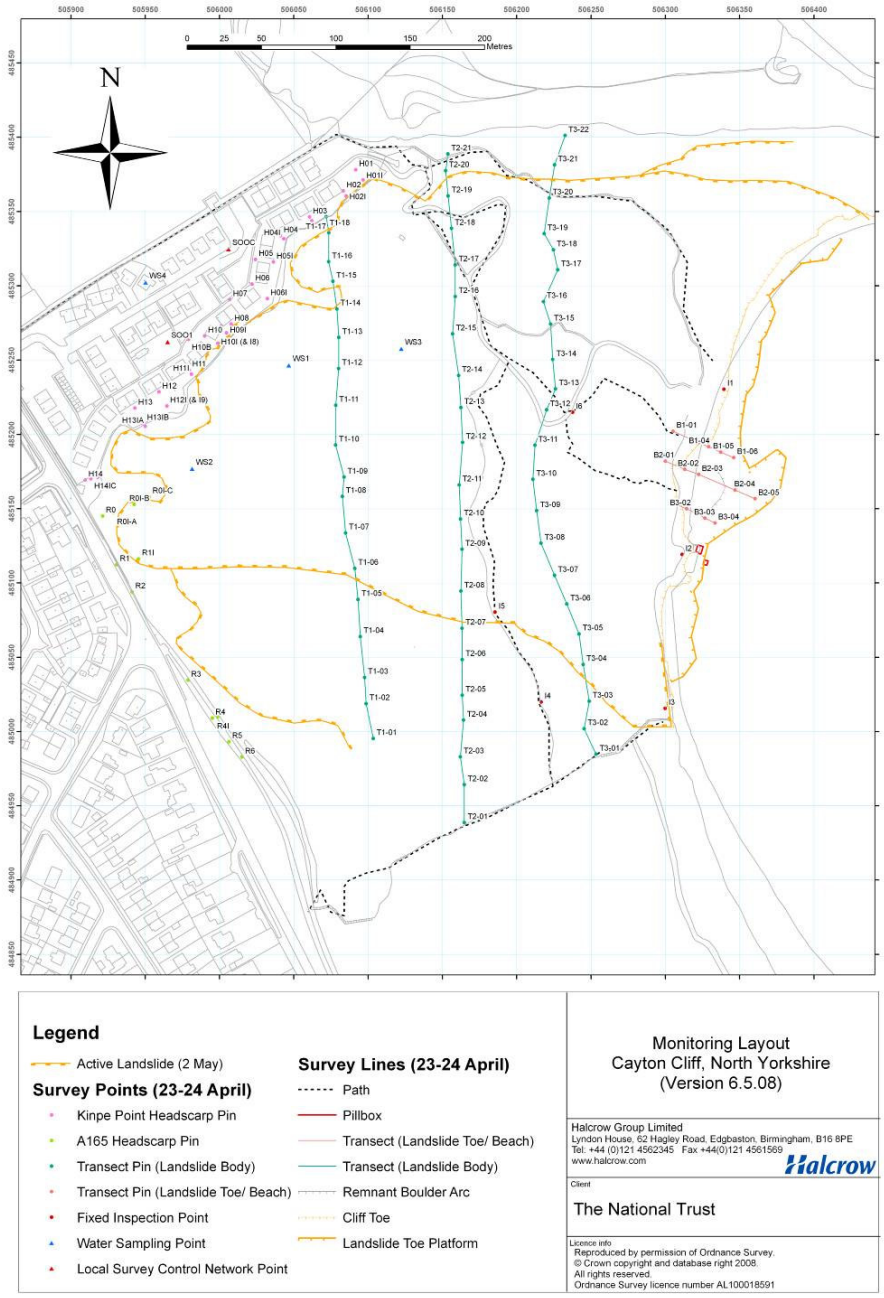
Cayton Cliff, Cayton Bay, North Yorkshire
Monitoring Report

Report No.: 004 **Issue Date:** 1.10.08

Monitoring data and analysis for the period:

July: 1.7.08- 29.7.08
August: 29.7.08- 26.8.08
September: 26.8.08- 23.9.08



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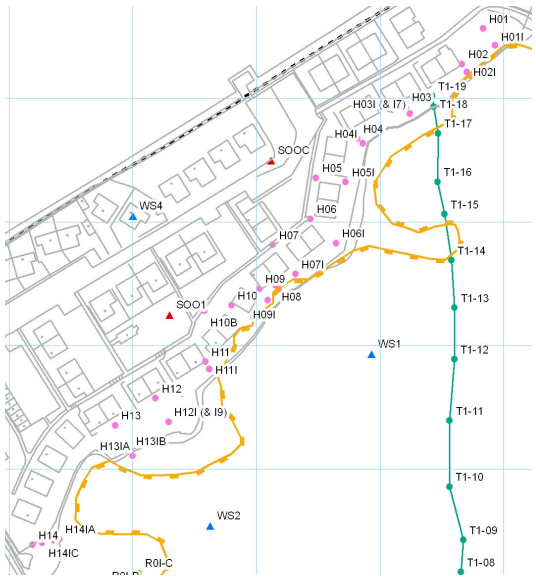
Knipe Point Headscarp Recession

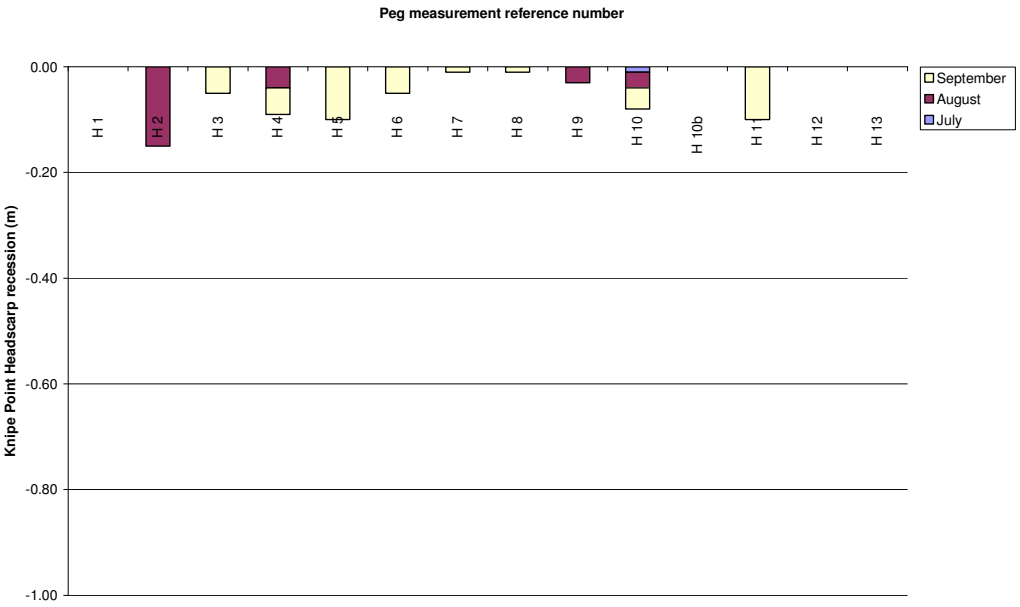


KEY RESULTS

- Negligible recession during July
- Slight activity measured during August & September (typically less than 0.1m monthly)
- Significant new tension cracks observed between H7 and H11 (inspected 22.8.08, & 2.9.08). These have widened and lengthened during this period (Photo 1)
- Widening of existing tension crack between H11 and H12, 0.1m width

RECOMMENDATIONS

- Continue twice weekly (**Tue** & Fri.) observations and monitoring
- Monitor the developing tension cracks at H7- H11, & H11- H12 for observable change
- Check pins at H2 for possible signs of disturbance



Note: coloured bars in the graph show total monthly recession measured since 1.7.08. Refer to user notes at the end of this report. <u>Average monthly error of ± 0.05 m</u>.

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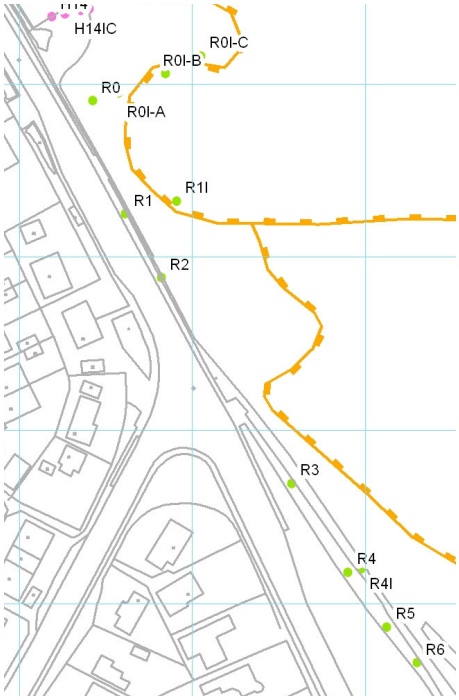
A165 Filey Road Headscarp Recession

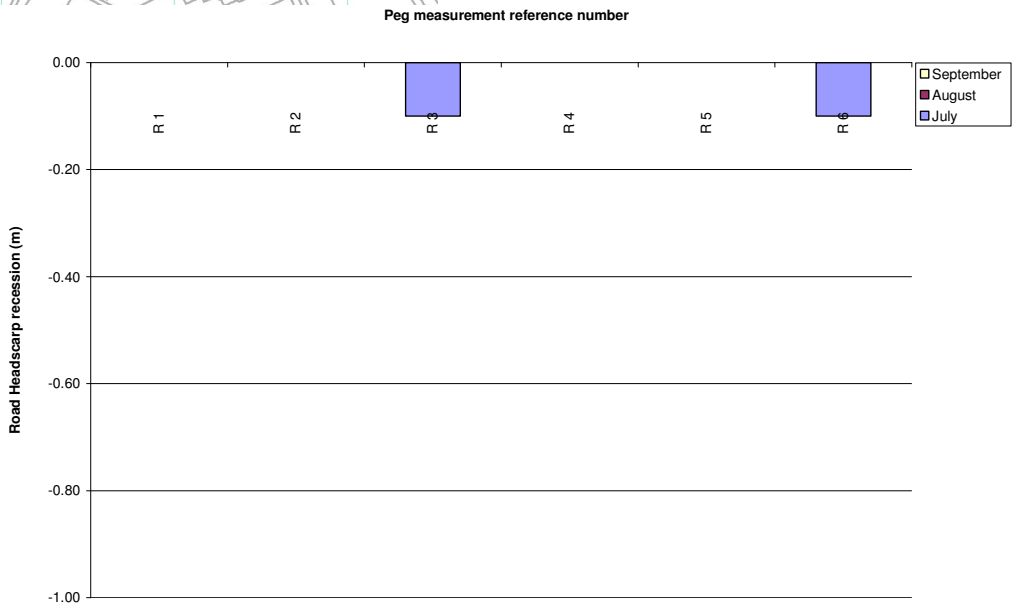


KEY RESULTS

- No significant recession of the headscarp
- A surface crack and shallow depression along the road between R0 and R1 was reported on 1.8.08 (Photo 2). This was inspected 4.8.08, and is continuing to be monitored by SBC.

RECOMMENDATIONS

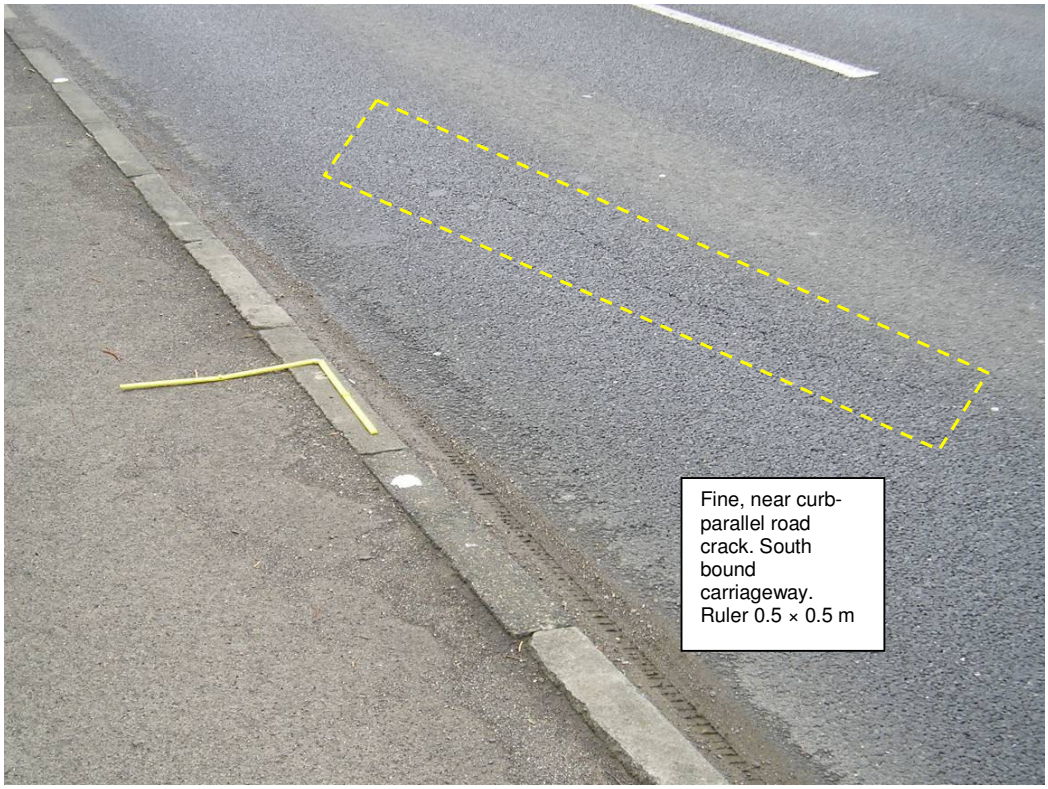
- Continue twice weekly (**Tue** & Fri.) observations and monitoring
- Pay close attention to the road surface between R0 to R2, and make a note of any observable change



Note: coloured bars in the graph show total monthly recession measured since 1.7.08. Refer to user notes at the end of this report. Average monthly error of ± 0.07 m.

Photo 1: Tension crack development at Knipe Point headscarp (2.9.08)

Photo 2: A 165 road crack (4.8.08)



USER GUIDE

1. Background to the report:

A major reactivation of the Cayton Cliff landslide complex occurred on 1st April 2008. The landslip has led to recession of the headscarp and the loss of three bungalows at Knipe Point in April and May 2008. Further cliff top property, major services and the main coastal road (A165) are at risk from landslide activity and headscarp recession in the future.

An observation and slope monitoring strategy has been developed for the site. Regular survey of a fixed ground marker network permits an assessment as to whether the landslide is changing or not. These monitoring reports provide a technical summary of the observation and monitoring results to inform stakeholders of present and future forecast landslide activity and potential consequences at Cayton Cliff.

2. Monitoring methodology:

The observation and slope monitoring strategy comprises a ground marker network installed in specific landslide areas (See Table 1). Observations and taped measurements of the landslide are made from these markers. For example, at the headscarp, regular measurements are made from a fixed marker to features of interest (e.g. the edge of headscarp) (Figure 1). All measurements are recorded on a monitoring record sheet.

Tension cracks are also noted, as these extension fractures are commonly associated with landslide induced ground movement (Figure 2).

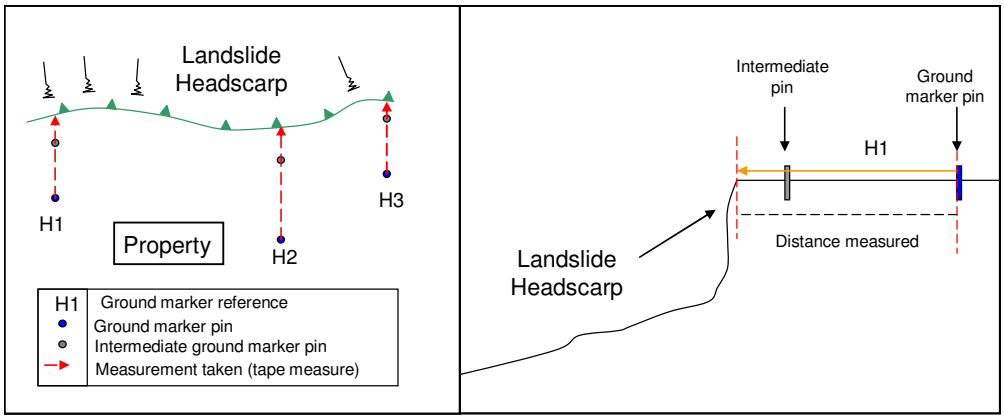


Figure 1. Schematic of ground marker measurement at the Headscarp

Landslide area	Monitoring components	No	Purpose
Knipe Point Headscarp	Measurement pins	15	Measure headscarp recession and evidence of tension cracks
	Field observation points	3	Visual observations of change
A165 Headscarp	Measurement pins	7	Measure headscarp recession and evidence of tension cracks

Table 1. Summary of the ground marker network

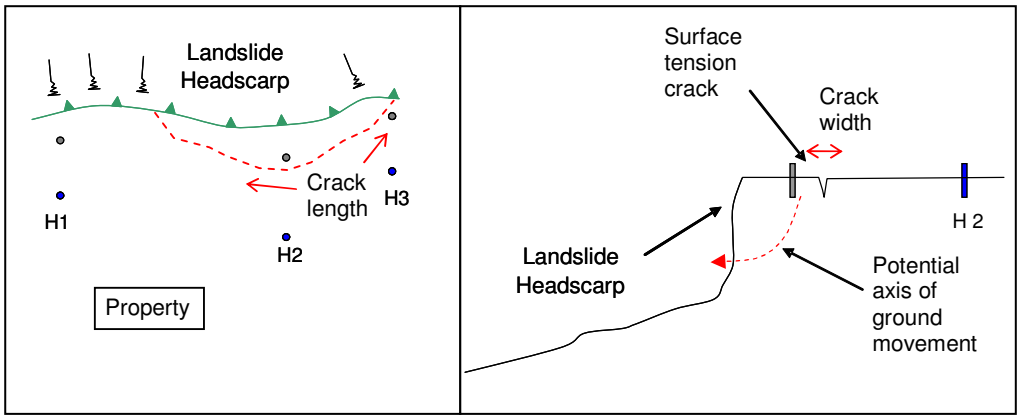


Figure 2. Schematic of tension cracking at the Headscarp, and their measurement axes

3. Analysis of monitoring results (Headscarp):
Field measurements are entered into a master database, and measurement errors are calculated (average standard deviation).The data are plotted on a graph to show the amount of recession recorded by month, since 1st July 2008 (Figure 3). The graphs reveal that headscarp recession is sporadic over time with some locations and time points recording no recession (i.e. no change is shown on the graph). Other locations show a variable amount of recession from one time to another confirming the unpredictable nature of headscarp recession due to variable weather and ground conditions.

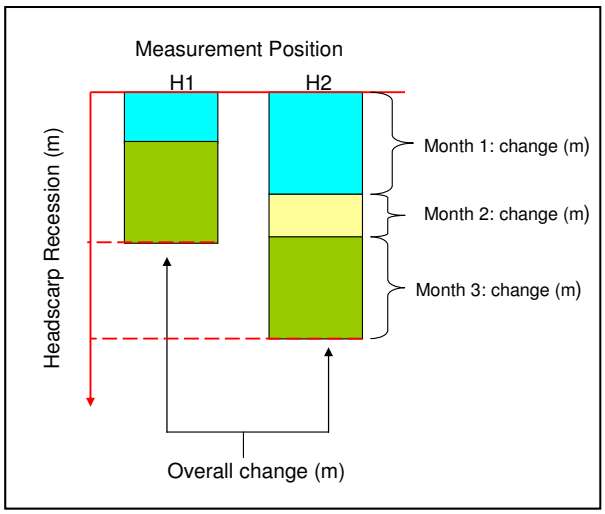


Figure 3. Explanation of cumulative change

4. Where is your property at Knipe Point?
Figure 4 provides a plan of the properties at Knipe Point. This will help locate a property relative to the preceding maps of the observation and slope monitoring network.

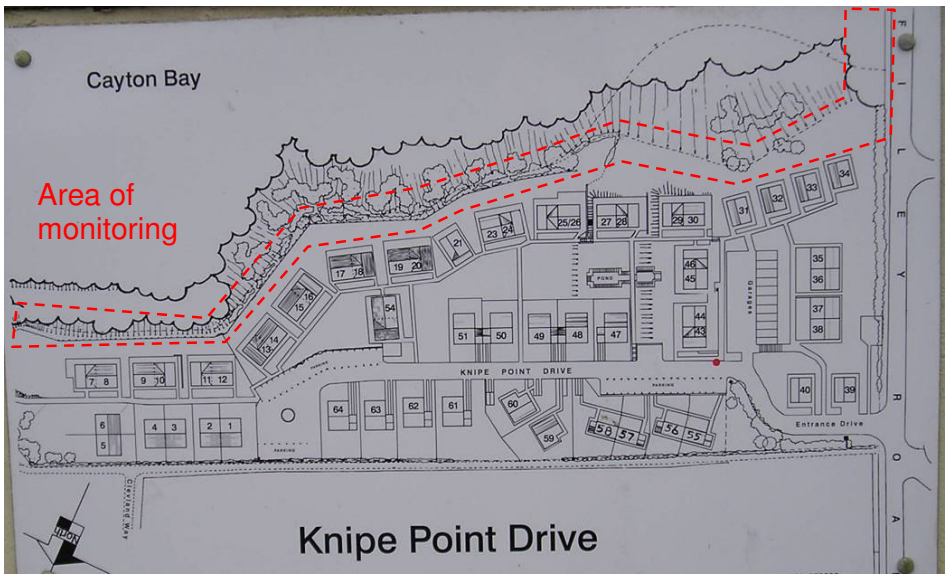


Figure 4. Map of the Knipe Point Development