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Corangamite Catchment Management Authority and the City of Greater Geelong

A.S. Miner Geotechnical

Case Study for Erosion and Landslides.

Melba Parade, Anglesea

Report No: 356.3/22/06

INCOMPLETE

Prepared for Troy Clarkson

Department of Primary Industries

PO Box 103

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and

Leigh Dennis

Corangamite Catchment Management
Authority

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1. Site Description

1.1 Site I.D.

356.3/22

1.2 Site address

Melba Parade Anglesea

1.3 Brief site description

1.4 Map datum/ Map projection/ Zone

MGA Zone 54 (GDA94)

1.5 Easting

E 777550

1.6 Northing

N 5742690

1.7 Municipality

Surfcoast

1.8 CCMA landscape zone

Thompson

1.9 Previous ID

WF3644

1.10 Previous Data Source

Warren Feltham (2005) CCMA landslide and Erosion Database. Version 2 The University of Ballarat. Geology Department July 2005. Contained in an MapInfo Table entitled "SW_erosion_landslides"

2. Hazard Description

2.1 Soil degradation type

Landslide

2.2 Soil degradation sub-class

Earth slide

2.3 Description of hazard present on site or threatening site from above or below

The landslide is curvilinear in plan with a subvertical profile and varying in height from 10 to 15 m. The landscape north of the headscarp of the slide rises at 1 in 12. To the east a series of isolated stacks show the path of cliff retreat. Beneath the face the area is quiet hummocky with a zone of "flowage" reaching towards the sea where material is being actively eroded away.

Regional dips on the Demons Bluff Formation is about 9 degrees

2.4 Dimensions of Hazard (width, length and depth if appropriate)

100 m (W) x 150 to 250 m (L) x 10 m (D)

2.5 Extent of Hazard (spatial area and volume if appropriate)

Approx 6 ha total area effected below the Great Ocean Rd but the actual slide body may be considerably less. The slide area could be approximately 2 ha in area with a volume of the order of 200,000 m³.

2.6 Magnitude of hazard (travel distance or rate of occurrence)

Not stated but estimated to be of the order of 30-50 m

2.7 List previous reports or studies relevant to this site

J.L. Neilson (1074) Observations on the Melba Parade Land Slip, Anglesea. Unpublished Report UR 1974/27. Victorian Mines Department.

GC Black and Associates Pty Ltd. Coastal Stability Study including melba Parade Landslip. Report No 97012R2 . 31st May 1997

2.8 Custodian of previous reports and studies

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DSE Anglesea

3. The Event Has Already Occurred

3.1 Date of first occurrence

Known to have occurred prior to Dec 1973

3.2 Date of most recent re-activation or acceleration

Unknown.

3.3 Actual or postulated trigger event including magnitude and duration

Movement has occurred predominantly after heavy rainfall. High moisture contents in the failed materials indicate high groundwater pressures are a key factor. (A potential triggering event of 102 mm occurred on 06/02/1973)

3.4 Frequency of Trigger Event if known

Unknown (The potential trigger rainfall event of 102.0 mm on the 06/02/1973 ranks 5th out of 27,236 daily rainfall records. This event has an Antecedent Rainfall Probability Exceedance Threshold (or ARPET) value = 0.02%)

3.5 What damage or impact occurred?

Unknown but Melba Parade was cut at the Great Ocean Road ([Need more info from Shire](#))

3.6 Was there a risk of injury or loss of life?

The slide occurred to within 20 m of the road and houses so there was a possibility of retrogressive movement although warning would have been available to the residents.

There would also have been some danger due to toppling and sliding for beachcombers and sunbathers situated directly under the fretting face

3.7 How important was it?

Very important due to the close proximity to houses and Melba Parade. It is unclear if the Great Ocean Road was at any risk.

3.8 What asset classes were impacted?

Infrastructure

3.9 What asset sub classes were impacted?

Built environment/houses and both major and minor roads

3.10 What are the asset values?

Building= 8, major road (Gt Ocean Rd)=8, minor roads=5

3.11 How severely were assets impacted?

The Road was cut so it is unclear if this was preventative or due to actual damage.

3.12 Estimated cost of impact (including qualitative and quantitative costs for loss of asset, investigations, remedial works, cultural, business and environment)

Remedial works may have involved the construction of retaining wall and drainage works.
(To be confirmed with the Shire)

Investigations including drilling probably of the order of \$25,000

Relocation of the Melba Parade and closures would have had significant costs (to be confirmed from the shire)

4. Remediation Has Already Been Undertaken

4.1 What remediation option was used?

There now appears to have been some erosion/scour protection to the toe of the sliding materials. Obviously the improvements to drainage and sewerage in the township would also have significantly contributed to the overall stabilisation of this site.

4.2 How was the site initially assessed?

John Neilson from Vic Mines department as requested by Shire

4.3 How was the remediation designed and by Who?

Unknown

4.4 Did it require specialist equipment or subcontractors?

Unknown but unlikely

4.5 How effective has the remediation been?

Indications from the more recent GC Black report indicate the site has been relatively stable

4.6 How was the effectiveness judged?

From observations by geotechnical engineers familiar with the area.

4.7 Would other treatments worked here?

Yes. Other treatments including sub horizontal drainage or drainage adits would have been very effective in reducing internal groundwater pressures. Re contouring of the headscarp may also have been effective but there is little room to apply any form of toe buttressing.

The failure planes seems to have been along a highly plastic pyroclastic or tuffaceous layer and some form of in situ reinforcement across this weaker zone may also have proved to be effective if it was applied prior to the failure.

4.8 Was it early intervention or reactive?

Reactive

4.9 What was the cost of remediation (including design, construction and implementation)?

Unknown

4.10 How was the remediation funded?

Unknown but probably by asset manager (DSE or the equivalent at the time)

5. Ongoing Review and Monitoring Requirements

5.1 What is the likely ongoing monitoring and review strategy?

Part of a regular coastal stability monitoring program set up by DSE

5.2 What is the nature of future monitoring and maintenance?

Visual inspections with the ability to do further API. Given the inactivity at the site no significant ongoing maintenance is known but the seawall is known to have degraded over time and may need replacing

5.3 What are the likely costs of monitoring and maintenance?

Unknown but monitoring report could be of the order of \$5000 every three years

Photos



Photos



Sketches and Drawings

Landslide at Point Roadknight, Anglesea

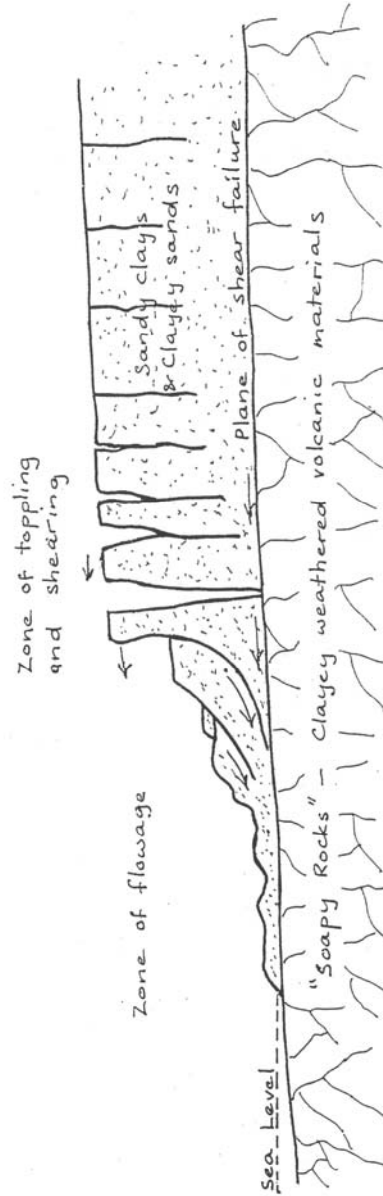


FIG. 14