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Corangamite Catchment Management Authority and the City of Greater Geelong

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Case Study for Erosion and Landslides.

Lake Elizabeth, Forrest

Report No: 356.3/20/06

Prepared for Troy Clarkson

Department of Primary Industries

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and

Leigh Dennis

Corangamite Catchment Management
Authority

64 Dennis Street

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1. Site Description

1.1 Site I.D.

356.3/20

1.2 Site address

Lake Elizabeth, near Forrest

1.3 Brief site description and general overview

A large area of forest slid into the east branch of the Barwon River in 1952, following heavy rainfall. Approximately 6 million cubic metres of material occurring on bedding planes dipping 12 to 20 degrees slid down slope towards the river forming a natural dam. This dam was later breached in 1953 sending a 7 m wall of mud and debris downstream causing damage to fencing and agricultural land.

1.4 Map datum/ Map projection/ Zone

WGS84 Zone 54

1.5 Easting

739738

1.6 Northing

5728790

1.7 Municipality

Colac Otway Shire

1.8 CCMA landscape zone

Upper Barwon

1.9 Previous ID

WF4741 (Feltham)

11.1 (Rosengren)

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"

ROSENGREN N.J. 1984. Sites of geological and geomorphological significance in the Shire of Otway. *Department of Conservation, Forests and Lands report* ESP No. 399, Department of Conservation, Forests and Lands, 320p.

2. Hazard Description

2.1 Soil degradation type

Landslide

2.2 Soil degradation sub-class

Translational slide along bedding planes

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

A large relatively intact block of sandstone with a spatial extent of approximately 48 ha slid in a north easterly direction into the east branch of the Barwon River. The landslide blocked the river and caused significant disturbance to the river both upstream and downstream of the natural dam which formed.

Significant disruption to slopes within the landslide also occurred which initiated further smaller slides and formed small lakes on back-tilted blocks. The natural dam breached a year after it was formed and this resulted in a significant flood/ surge downstream which destroyed fencing and deposited sediment up to a metre deep on areas of alluvial flats and terraces along the river. A 7 m high wall of water / silt and mud was noted at the Birregurra railway bridge when the flood reached that town

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

1250 m (W) x 360 m (L) x 12.5 m (D) (Note shape is more triangular and dimensions given are approximate only.

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

48 ha and approximately 6 million cubic metres

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

10's of metres

2.7 List previous reports or studies relevant to this site

Department of Conservation, Forests and Lands, 320p

COONEY A.M. 1980. Otway Range landslide susceptibility study - first progress report. *Geological Survey of Victoria Unpublished Report 1980/76*

CURREY D.T. 1952. Landslide on the East Barwon. *Aqua*, 3/11, pp.18-19

DAHLHAUS P.G. & MINER A.S. 2000. Colac Otway Shire Land Capability Assessment: Review of Landslide Risk Management - interim report, Dahlhaus Environmental Geology Pty Ltd; P.J. Yttrup & Associates Pty Ltd, 52p.

ROSENGREN N.J. 1984. Sites of geological and geomorphological significance in the Shire of Otway. *Department of Conservation, Forests and Lands report ESP No. 399*,

2.8 Custodian of previous reports and studies

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Dahlhaus Environmental Geology

3. The Event Has Already Occurred

3.1 Date of first occurrence

Unknown as the slide appears to have occurred in previously failed materials

3.2 Date of most recent re-activation or acceleration

24th June 1952

3.3 Actual or postulated trigger event including magnitude and duration

Heavy rainfall including a three day antecedent rainfall totals of 242 mm at Pennyroyal and 587 mm at Tanybryn which were the closet stations to the slide. (Daily totals at Tanybryn included 227.8 mm on 16/06/1952 and 232.7 mm on 17/06/1952)

3.4 Frequency of Trigger Event if known

The single daily rainfall event of 232.7 mm is ranked 3rd out of 16,598 daily rainfall records whilst the event of 227.8 mm is ranked 4th. These two events have Antecedent Rainfall Probability Exceedance Threshold (or ARPET) values = 0.01%

3.5 What damage or impact occurred?

The Barwon River was effectively dammed until 1953 when the dam breached sending a 7 m high wall of water/mud and debris down the river destroying fencing and degrading agricultural land on the river flats.

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

Unknown

3.7 How important was it?

Very significant given major disturbance to the environment and the possibility fo a natural dam for the State of Victoria

3.8 What asset classes were impacted?

Water Quality, land and biodiversity

3.9 What asset sub classes were impacted?

Other agricultural land, public land non conservation, State and National Parks and reserves, native vegetation conservation significance moderate, waterways, rivers and streams major, proclaimed water supply areas

3.10 What are the asset values?

Variable ranging from 4 for agricultural land to 10 for major waterways

3.11 How severely were assets impacted?

The extent of the impact is not well recorded but could be expected to be severe given the reported 7 m wall of mud that passed under the Birregurra railway bridge. Significant disturbance to the natural forest would have occurred at the time of the slide and with heavy rainfall significant sediment load to the river would have occurred.

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

Cost is unknown but will be explored during a UOB research project during 2007

4. Remediation Has Already Been Undertaken

4.1 What remediation option was used?

None

4.2 How was the site initially assessed?

N/A

4.3 How was the remediation designed and by Who?

N/A

4.4 Did it require specialist equipment or subcontractors?

N/A

4.5 How effective has the remediation been?

N/A

4.6 How was the effectiveness judged?

N/A

4.7 Would other treatments worked here?

N/A

4.8 Was it early intervention or reactive?

N/A

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

N/A

4.10 How was the remediation funded?

N/A

5. Ongoing Review and Monitoring Requirements

5.1 What is the likely ongoing monitoring and review strategy?

Early survey and investigation work was aimed at the possibility of using the natural dam as a water supply within the Otways but the site proved to be not suitable and failed only a year after its formation

5.2 What is the nature of future monitoring and maintenance?

None known

5.3 What are the likely costs of monitoring and maintenance?

N/A

Photos



Sketches and Drawings

