

Department of Conservation, Forests & Lands

LAND CAPABILITY STUDY IN THE SHIRE OF MANSFIELD

EROSION RISK ASSESSMENT
OTHER LAND USE CONSTRAINTS
LAND MANAGEMENT GUIDELINES

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TABLE OF CONTENTS

PREFACE.....	ii
DEPARTMENTAL RE-ORGANISATION:	ii
THE SCOPE AND LIMITATIONS OF THE REPORT.....	iii
PART 1 – SUMMARY AND CONCLUSIONS	1
Outline of the Study	1
Conclusions.....	1
PART 2 – TECHNICAL ASPECTS OF THE STUDY	4
Outline of the Methods	4
Assessment of Erosion Risk.....	4
Management Guidelines	6
Areas of Special Conservation Interest.....	9
REFERENCES	10

APPENDICES

Appendix A - Land Unit Descriptions	11
Appendix B – Soil Conservation and Land Utilisation Acts.	29
Appendix C	30

PREFACE

Three requirements for sound land use planning area:-

- * An understanding of the extent to which the use will be limited by the natural characteristic of the land,
- * The effect the use will have on the land and the water derived from it,
- * The need for special land management or structural design to overcome limitations or to restrict the impacts to acceptable levels.

Land capability assessment is a rational and systematic means of obtaining this information.

The Soil Conservation Authority is able to provide land capability information for a range of uses and at different scales to meet the various needs of planning. The information provides a relatively stable base on which to superimpose other planning considerations.

DEPARTMENTAL RE-ORGANISATION:

This report has been prepared as a function of the Soil Conservation Authority as expressed under the terms of the *Soil Conservation and Land Utilization Act*. The report refers, therefore, to the Soil Conservation Authority (SCA) throughout.

With an amalgamation of various government agencies into the Department of Conservation, Forests & Lands currently proceeding it is likely that an arm of that Department will assume the responsibility for administering this function.

THE SCOPE AND LIMITATIONS OF THE REPORT

- * This report is based on an assessment of the physical characteristics of the land, social, economic and other factors which may influence planning have not been considered. Such factors may be the subject of further input by the Soil Conservation Authority.
- * The scale of the assessment has necessitated some generalization, site-specific data will be required for detailed planning.
- * The precision with which boundaries are mapped is affected by the scale of the map. Subsequent enlargement of the map does not improve the precision and may be misleading.
- * The boundaries on the maps usually represent readily seen changes in the land. However, where an important land characteristic changes gradually, the boundary indicates approximately where there is a significant change in the effect on land use.
- * No material may be extracted from the report for publication without the written permission of the Soil Conservation Authority.

PART 1 – SUMMARY AND CONCLUSIONS

Outline of the Study

The study was undertaken at the request of the Department of Planning for use as an aid to planning and development in the Shire of Mansfield. The report describes erosion risk and other characteristics of the land which may impose constraints on land development in the Shire.

Mansfield Shire (see locality plan) has an area of approximately 3 915 km² and varies from undulating plains at about 320 metres elevation up to steep mountainous country at 1 866 metres elevation, with annual rainfall ranging from 630 millimetres to more than 1 500 millimetres in the Alps.

Approximately 35% of the Shire is freehold land, the remainder being largely forested public land. The study concentrates on the freehold land and is less detailed on the public land.

Areas of Special Interest to the Soil Conservation Authority are the Upper Goulburn (Eildon) Water Supply Catchment and the Upper Delatite Water Supply Catchment and the Lake Nillahcootie Water Supply Catchment. These are detailed in Part 2.

Conclusions

The erosion risk classes in the Shire are shown on the enclosed maps. General management guidelines are presented in Table 2. The main conclusions and recommendations are summarised below.

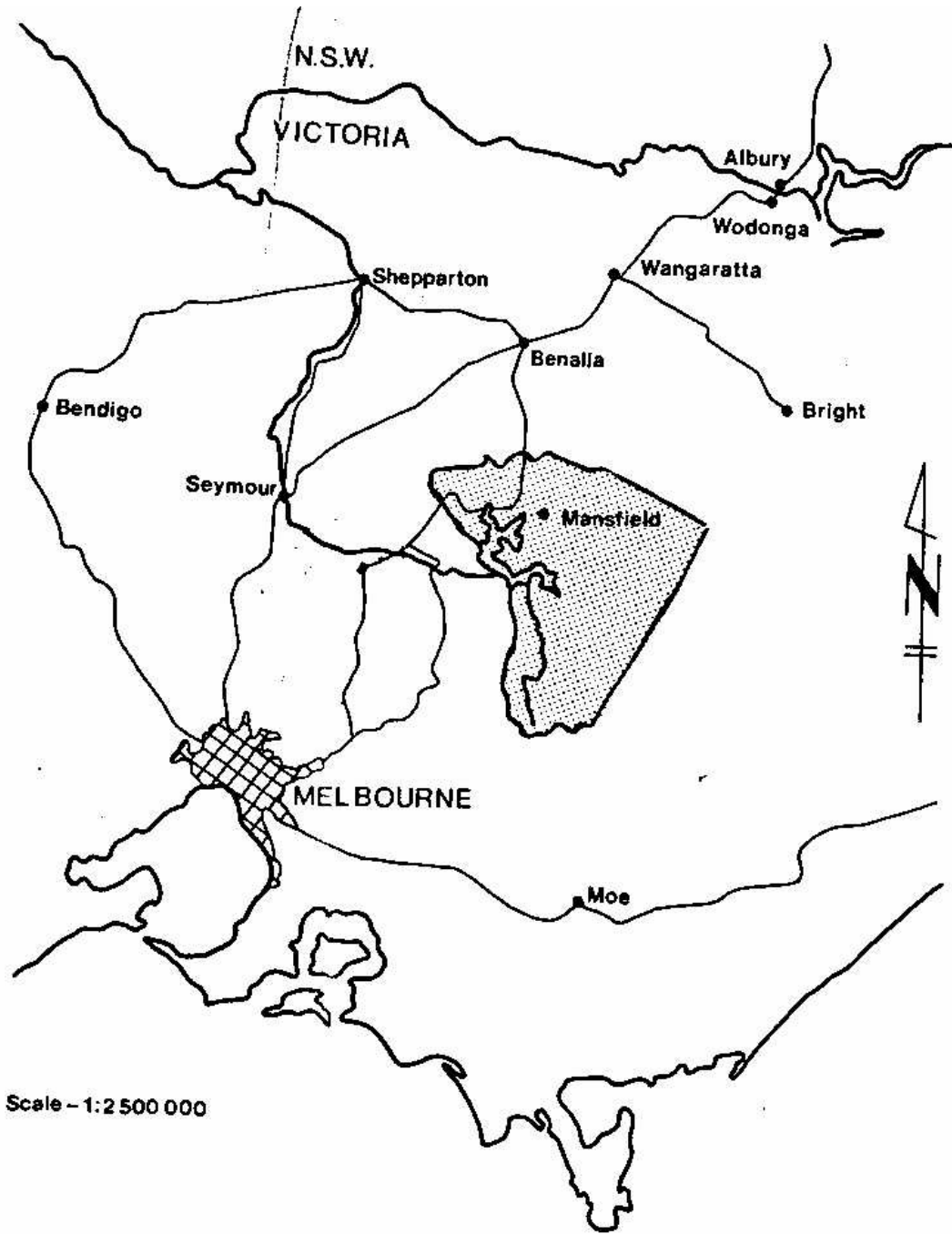
- (i) Land with severe risk (Class 5). This land is considered highly hazardous and should have strong limitations placed upon its development.
 - * It is recommended that subdivision of land in Erosion Risk Class 5 should not be permitted unless the developer can demonstrate to the satisfaction of the Soil Conservation Authority that the development will not result in increased soil erosion from the area.
 - * Permanent clearing of Class 5 land should be prohibited and reforestation should be actively encouraged. In general, such land should be considered as best used for forestry and passive recreation.
- (ii) Land with a high erosion risk (Class 4).
 - * Intensive small-lot subdivision and clearing should be discouraged.
 - * It is recommended that all proposals for development of land in Erosion Risk Class 4 be referred to the Soil Conservation Authority for specific advice on soil conservation requirements at the earliest possible stage.
- (iii) Land with a moderate erosion risk (Class 3). Development of most of the moderate risk land should be possible without causing increased erosion provided specialised techniques and careful management, which take account of the natural characteristics of the land, are adopted.

In particular, areas where water naturally concentrates should not be disturbed, and disposal of water which would be concentrated by development should be carefully planned.

 - * Advice on the need for specialised design and construction techniques and follow-up management should be sought from the Soil Conservation Authority prior to approval of any development.

- (iv) Although land in Erosion Risk Classes 2 and 1 is not generally regarded as presenting significant erosion problems there may be small areas of higher risk which would require special management within the areas shown in those Classes on the map. Where such areas become apparent, the Soil Conservation Authority should be consulted for advice on appropriate management.

Locality plan – Shire of Mansfield



PART 2 – TECHNICAL ASPECTS OF THE STUDY

Outline of the Methods

In order to identify and map areas of land with differing land capability, a systematic study of the natural characteristics of the land has been made. Areas of land which have consistent slope, soils and native vegetation on similar rock types and with a limited range of climate are identified. Such areas are referred to as land units.

Within the Shire, eighty land units have been identified, which are shown on the enclosed maps.

The land unit information has been used together with local knowledge of the erosion risk of the various land types to categorise each of these units into erosion risk classes.

The land unit descriptions (Appendix A) provide a range of information which can be adapted for use by planners for purposes other than erosion control. In particular, areas subject to prolonged wetness or having poor effluent disposal or water holding characteristics can be identified. Where these constraints may exist they are referred to in the Constraints section of the tables in Appendix A.

Warning:

The information provided in the Constraints section of Appendix A has been compiled by field observation only and needs to be confirmed by appropriate field and/or laboratory tests.

Assessment of Erosion Risk

Erosion risk is best defined as a means of rating the potential of land to erode is subjected to poor management or soil disturbance. Factors considered in this rating for each land unit are: Steepness of the land, erodibility of the soil, soil depth, permeability and structured and soil/water balance.

The erosion risk is assessed in five classes – Class 5 being highest. Definitions of the classes are presented in Table 1.

It should be realized that because of the broad scale of mapping (1:25,000 and 1:50,000) the map units can only represent a general level of erosion risk over relatively large areas. Obviously at a more detailed level, local variations will be found. It is important therefore, that where areas of land are nominated for intensive development, the need for further detailed mapping at a much larger scale be recognised.

Table 1 – Erosion Risk Classes

Class	Erosion Risk	General Limitations on Development
1	None to very slight	Erosion risk does not occur or is very slight. Standard designs and installation techniques and normal site preparation and management should be possible without risk of erosion.
2	Slight	Slight erosion risk exists. Careful planning, and use of standard specifications for site preparation, construction and follow up management should be satisfactory to minimise erosion.
3	Moderate	Moderate erosion risk exists which may lead to difficulties during and after construction but which can be overcome. Specialised design, construction techniques and follow up management are necessary to minimise erosion.
4	High	High erosion risk. Avoidance of erosion during and after construction is difficult and long term problems may occur. Adverse effects may be inflicted upon adjoining land. Extensively modified design and installation techniques, exceptionally careful site preparation and management would be necessary.
5	Severe	Severe erosion risk and/or danger of large landslides is prevalent. Any development will cause instability which cannot be practically overcome.

Management Guidelines

There are considerable variations in standards of land management which can substantially effect stability, particularly in areas with high erosion risk. Similarly, techniques of earthworks construction and follow-up treatment can vary considerably with possible significant or drastic effect upon stability where these are inadequate or inappropriate.

The guidelines in Table 2 outline the type and levels of management considered necessary to guard against unacceptable land deterioration within each erosion risk map unit.

Table 2 – land Management Guidelines

Class	Erosion Risk	General Limitations on Development
1	None to very slight	<p>Generally no specific conservation management practices are required in this map unit, except along drainage lines where erosion may occur.</p> <p>To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover.</p> <p>Roads which cross drainage lines where high flows are likely should be designed with adequate culvert capacity or alternatively low profile floodway fords, at right angles to the flow to minimise cost and erosion potential.</p> <p>To avoid problems with spillways when siting farm dams in drainage lines which carry large flows, off-stream storages are recommended.</p>
2	Slight	<p>Generally only limited special management inputs are required in this map unit to prevent soil erosion, except along drainage lines where erosion is likely to occur.</p> <p>To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover.</p> <p>Roads which cross drainage lines where high flows are likely, should be designed as for Unit 1 above. In addition, roads should be aligned close to contour and have adequate surface and/or subsurface cross drainage or be aligned directly up and down the slope with drainage water dispersed laterally.</p> <p>Disturbed areas caused during construction works should be revegetated by topsoiling and sowing.</p> <p>To avoid problems with spillways when siting farm dams in drainage lines which carry large flows, off-stream storages are recommended.</p> <p>Planning for fence locations should take account of significant topographical features so that it is possible to conform to the criteria above.</p>

Class	Erosion Risk	General Limitations on Development
3	Moderate	<p>Specialised land management techniques are required to minimise soil erosion. Moreover, localised areas of higher risk occur in which intensive development of any kind should be avoided.</p> <p>To minimise the danger of erosion in drainage lines, avoid disturbance and maintain a protective vegetative cover.</p> <p>Employ contour cultivation or minimum tillage techniques for cropping and pasture establishment.</p> <p>Locate roads and fences on contour, along ridges or directly up and down slope. Disperse water from roads at frequent intervals by surface or subsurface drainage. Design roads as recommended under Unit 1 above.</p> <p>Take care to minimise disturbed areas during construction and undertake adequate soil conservation measures. Conserve topsoil for respreading after construction. Revegetation of these areas may require special treatment as well as sowing and adequate maintenance.</p> <p>All dams constructed in this unit will require careful siting, design and construction techniques.</p> <p>Generally a vigorous vegetative ground cover should be maintained throughout this unit.</p> <p>Subdivision into areas of small lots could cause increased erosion unless due consideration is given to topographical features. Planning of fence locations should also take into account these features so that it is possible to conform to the above criteria.</p>
<p><u>It is recommended that:</u></p> <p>Advice on the need for specialised design and construction techniques and follow up management should be sought from the SCA prior to approval of any development.</p>		
4	High	<p>High inputs of specialised land management techniques are required to minimise soil erosion and/or landslides. Localised areas of higher risk occur in which any development should be avoided.</p> <p>Employ contour cultivation or aerial seeding for pasture establishment. Specialised management techniques for grazing are required. Cropping is not advisable. SCA advice should be sought.</p> <p>A vigorous vegetative ground cover should be maintained throughout this unit. Further forest clearing is undesirable and tree planting should be encouraged.</p>

Class	Erosion Risk	General Limitations on Development
		<p>All clearing or earthworks, including dam construction, roading and other construction works, should employ conservation specifications suitable for each site and include topsoil saving, revegetation, and other soil stabilisation measures and maintenance.</p> <p>Limited subdivision may be possible with due consideration to topographical features. SCA advice should be sought at the earliest planning stage.</p> <p>Planning of fence locations should take into account topographical features to avoid stock concentration in hazardous areas. SCA advice should be sought.</p>
<p><u>It is recommended that:</u></p> <p>All proposals for development of land in Unit 4 be referred to the SCA for specific advice on soil conservation requirements at the earliest possible stage.</p> <p>Intensive small-lot subdivision and clearing should be discouraged, and tree planting should be encouraged.</p>		
5	Severe	<p>Any land disturbance will require extremely high levels of specialised management input to minimise soil erosion and/or landslides. Intensive development of any kind is undesirable and should be avoided.</p> <p>Cultivation is not recommended. Pastures should be sown by aerial seeding only and maintained as a vigorous ground cover.</p> <p>Grazing should be strictly controlled and consultation with the SCA on grazing management is highly recommended.</p> <p>Clearing of timber should not be prohibited unless for timber harvesting and then should be strictly controlled and the area reforested immediately after. Reforestation of existing cleared areas should be actively encouraged. Some areas in this unit should not be disturbed under any circumstances.</p> <p>Earthworks of any kind should be discouraged except for emergency or fire protection purposes. In these instances strict attention to design specifications according to SCA requirements should be mandatory.</p> <p>Subdivision should be discouraged. However, isolated areas may be suitable for limited development. Such areas would require detailed terrain evaluation due to the severe risk involved.</p>

Class	Erosion Risk	General Limitations on Development
		Planning of fence locations should take into account topographical features to minimise erosion by stock trafficking. SCA advice should be sought.
<p><u>It is recommended that:</u></p> <p>Subdivision of land in this map unit should not be permitted unless the developer can demonstrate to the satisfaction of the SCA that the development will not cause increased soil erosion or land deterioration.</p> <p>Permanent clearing of land should be prohibited and reforestation actively encouraged.</p> <p>In general the area should be regarded as being best used for forestry, passive recreation and strictly controlled grazing.</p>		

Areas of Special Conservation Interest

1. Upper Goulburn (Eildon) Water Supply Catchment

The whole of the catchment area above Eildon weir is a proclaimed WSC under the provisions of the SC & LU Act 1958. (A copy of this Proclamation appears as Appendix B of this report).

Two areas within this catchment have increased significance:

- (a) LAKE EILDON ENVIRONS LAND USE DETERMINATION. (A copy of the LUD appears as Appendix C of this report).
- (b) PROPOSED UPPER DELATITE LAND USE DETERMINATION – the water supply catchment area for Mansfield township. Determination of this catchment will be gazetted in the near future.

2. Lake Nillahcootie Water Supply Catchment

The whole of the Broken River catchment area above Nillahcootie Weir is a proclaimed WSC under the provisions of the SC & LU Act, 1958. (A copy of this proclamation appears as Appendix D of this report).

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Proclaimed catchments are vital sources of water to the community. Any activity within such catchments should be compatible with water supply interests.

The land use determined areas should be recognised primarily for their water supply function. All proposals for development or change of land use must comply with the provision of the determinations which in some instances may override the recommendations in this report.

REFERENCES

- A Study of the Land in the Catchment of Lake Eildon
Allen S. Rundle (1977) Soil Conservation Authority, Victoria.
- A Study of the Land in the Catchment of the Broken River
Allen S Rundle & R K Rowe (1974, Soil Conservation Authority, Victoria.

Appendix A - Land Unit Descriptions

SHIRE OF MANSFIELD

Land unit name: Alpine

Geology	Tertiary basalt, Devonian granite & Granodiorite, and some metamorphosed Hornfels and spotted sediments					Rainfall: 1,500 mm
Map Symbol	AR	M	AH	AS	AV	
Erosion Risk Rating	5	5	5	5	5	
Land Form	Gentle to moderate slopes	Moderate sloping broad ridges	Moderate to steep long slopes	Moderate to steep slopes	Rugged upper slopes and sharp crests	
Slope %	5 – 10	8 – 15	20 – 25	20 – 30	30 - 550	
Soils	Organic loams, Sandy loams	Alpine organic loams	Shallow organic loams & deeper gradational or duplex	Organic loams	Shallow stony organic loams	
Native Vegetation	Alpine Ash, Mountain Gum, Snow Gum, with Alpine herbs and grasses					
Constraints	Shallow soils	Shallow soils & rock		Stones & gravel	Shallow soil, stones & gravel	
	Alpine herb vegetation is very sensitive to trafficking. It is very difficult to re-establish vegetation on disturbed sites due to climatic extremes, short growing season, frost heave, high activity, low natural fertility, shallow soils and on-going trafficking pressures.					

SHIRE OF MANSFIELD

Land unit name: Buttercup

Geology	Lower carboniferous sandstone, siltstone					Rainfall: 800-1,200 mm
Map Symbol	BR	BM	BH	BS	BV	
Erosion Risk Rating	3	3	3	4	5	
Land Form	Rolling plateau & crests	Moderate slopes	Hilly & generally dissected	Steep slope	Very steep slopes & escarpments	
Slope %	3 – 10	8 – 15	10 – 25	20 – 30	30+	
Soils	Friable red & brown gradational	Variable, brown gradational to yellow duplex	Stony gradational, some duplex	Stony loams & red gradational	Stony loams & occasional brown gradational	
Native Vegetation	Narrow leaf Peppermint, Long leaf Box, Yellow Box, Stringybark with some Messmate, Blue Gum, Candlebark and Red Gum					
Constraints	Occasional rock outcrops	Contains areas of poor drainage and springs	Shallow soils	Shallow soils & rock outcrops	Shallow soil & rock outcrops common	
	Cold wet winters are a restriction on management and makes revegetation difficult following disturbance. Construction activities should be restricted to the dryer months Springs and wet areas should be avoided.					

SHIRE OF MANSFIELD

Land unit name: Currajong

Geology	Quaternary Alluvium					Rainfall: 1,250-1,500 mm
Map Symbol	CM	CH	CHA	CS	CV	CVR
Erosion Risk Rating	2	3	4	5	5	5
Land Form	Moderate slopes	Moderate to steep valley sides & lower slope	Dissected lower slopes	Steep sides of incised drainage lines	Very steep long slopes	Very steep slopes on shallow rock
Slope %	8 – 12	12 – 17	15 – 25	25 – 35	30 – 50	40 - 60
Soils	Yellow duplex	Red duplex & uniform sands	Variable but mainly yellow duplex	Uniform dark sandy loam	Uniform sandy loam	Friable stony gradational
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Candlebark, Blue Gum and Alpine Ash					
Constraints	Access to this unit usually difficult	Many small steep sections not mapped	Shallow soils & moderate risk of land slips. Highly dissected	Steepness, erodibility and high probability of siltation of streams restricts development.		Steepness & shallow soils
	Specific comments on any developmental proposal by qualified authorities would be essential in these units. Springs and soaks may also pose problems throughout.					

SHIRE OF MANSFIELD

Land unit name: Delatite

Geology	Quaternary alluvium			Rainfall: 800-1,400
Map Symbol	DF	DG	DUW	
Erosion Risk Rating	1	2	2	
Land Form	Higher terrace flats	Flood zone	Lower terraces & Flood Zone	
Slope %	1 – 2	2 – 5	0 – 3	
Soils	Red gradational	Yellow gradational sands & clays	Variable sands & clays	
Native Vegetation	Red Gum, Yellow Box, Candlebark & other Gums			
Constraints		Waterlogging and infrequent flooding. Should be preserved as a buffer zone to protect water quality		

SHIRE OF MANSFIELD

Land unit name: Eildon

Geology	Devonian sedimentary sandstone, Siltstone, Claystone					Rainfall: 760-1,150 mm
Map Symbol	EU	EG	ER	EM	EH	ES
Erosion Risk Rating	1	2	2	3	4	5
Land Form	Undulating slopes of valley floor	Gentle slopes of valley floor	Rolling slope	Moderate slopes	Hilly	Steep slope
Slope %	1 – 3	2 – 5	4 – 10	8 – 15	10 – 25	20 – 35
Soils	Dark uniform yellow gradational yellow duplex	Dark gradational yellow duplex	Weakly bleached gradational, yellow duplex	Friable brown gradational	Friable red gradational	Stony loams & red gradational
Native Vegetation	Red Box, Red Stringybark, Narrow leaf Peppermint, Broad leaf Peppermint, Long leaf Box, Blue Gum, Candlebark					
Constraints	Subject to flooding					Slope and shallow soils
	Gravel seams and rockiness limit the availability of dam sites					
						High runoff poses a hazard to land immediately down slope. Susceptible to severe sheet erosion if the land is devoid of reasonable vegetative ground cover.

SHIRE OF MANSFIELD

Land unit name: Eildon (continuation)

Geology	Devonian, Sandstone, Siltstone, Claystone	Rainfall: 760-1,150 00
Map Symbol	EV	
Erosion Risk Rating	5	
Land Form	Very steep slopes	
Slope %	30+	
Soils	Stony loams, weakly bleached gradational	
Native Vegetation		
Constraints	Slope & shallow soils	
	Gravel seams, rockiness and steepness limit the availability of dam sites. High runoff poses a hazard to land immediate downslope. Susceptible to severe sheet erosion if the land is devoid of reasonable vegetative ground cover.	

SHIRE OF MANSFIELD

Land unit name: Hollands

Geology	Lower Carboniferous rocks and material derived from them					Rainfall: 900-1,250 mm
Map Symbol	HG	HR	HM	HH	HS	HV
Erosion Risk Rating	1	2	2	3	4	5
Land Form	Gentle slopes	Rolling slopes	Moderate slopes	Hilly	Steep slopes	Very steep slopes
Slope %	2 – 5	4 – 10	8 – 15	10 – 25	20 - 35	30+
Soils	Stony loams & weakly bleached gradational	Red & yellow duplex			Red duplex & weakly bleached gradational	Stony loam & rock
Native Vegetation	Broad leaf Peppermint, Narrow leaf Peppermint, Candlebark, Blackwood, Swamp Gum (in wetter areas)					
Constraints						Shallow soils & rock & steepness
	These units are susceptible to rapid erosion if the soil is disturbed or mismanaged. Septic effluent disposal may be a problem because of the low permeability of some of the clay subsoils.					

SHIRE OF MANSFIELD

Land unit name: Inverell

Geology	Devonian Granite				Rainfall: 900-1,000 mm
Map Symbol	IM	IH	IS	IV	
Erosion Risk Rating	3	4	5	5	
Land Form	Moderately sloping ridge-tops	Hilly	Steep slopes	Very steep slopes	
Slope %	8 – 15	10 – 25	20 – 35	30+	
Soils	Stony red & brown gradational	Stony red gradational & duplex	Stony loams & stony gradational	Stony loams	
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Candlebark, Blue Gum, Messmate, Red Stringybark with some Red Box, Long leaf Box and Swamp Gum				
Constraints	Steepness, rockiness, shallow soils and the prevalence of land slips preclude most forms of development.				

SHIRE OF MANSFIELD

Land unit name: Kianga

Geology	Lower Carboniferous sediments				Rainfall: 650-950 mm
Map Symbol	KU	KG	KR	KM	
Erosion Risk Rating	1	2	2	3	
Land Form	Undulating slope of valley floor	Gentle slope	Rolling slopes	Moderate slopes	
Slope %	1 – 3	2 – 5	4 – 10	8 – 15	
Soils	Yellow duplex & yellow gradational		Yellow duplex		
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Long leaf Box, Red Gum				
Constraints	These unit are susceptible to rapid gully erosion if the soil is disturbed or mismanaged.				
	Septic effluent disposal can be a problem because of the low permeability of some of the subsoils.				

SHIRE OF MANSFIELD

Land unit name: Loombar

Geology	Devonian rhyodacite					Rainfall: 1,100-1,270 mm
Map Symbol	LR	LM	LH	LS		
Erosion Risk Rating	3	3	4	5		
Land Form	Rolling slopes	Moderate slopes	Hilly	Steep slopes		
Slope %	4 – 10	8 – 15	10 – 25	20 – 35		
Soils	Stony gradational yellow duplex	Stony loams Yellow duplex stony gradational	Red duplex & uniform stony loams	Uniform stony loams & occasional red duplex		
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Red Box, Red Gum, Long leaf Box, Yellow Box, Stringybark, Candlebark and Blue Gum					
Constraints					Land slips	
	<p>Water storage is not assured due to the porous nature of most of the sub-surface material</p> <p>These units are susceptible to rapid erosion if the soil is disturbed or mismanaged</p> <p>Springs may cause large areas of inundation</p> <p>Septic effluent disposal may be hazardous in some of the soils due to shallowness of permeable soil over rock or other impervious materials</p>					

SHIRE OF MANSFIELD

Land unit name: Merrijig

Geology	Lower carboniferous sandstones, siltstones					Rainfall: 630-900 mm
Map Symbol	MU	MUG	MG	MGG	MGP	MR
Erosion Risk Rating	3	1	2	2	2	2
Land Form	Undulating plain	Gilgaid undulating plain	Gentler lower slopes & plains	Gilgaid gentle lower slopes & plains	Gentle crests	Gentle to moderate slopes
Slope %	0-3	0-3	2-5	2-5	2-5	4-10
Soils	Yellow or dark duplex		Yellow or red duplex	Yellow duplex	Gradational & red duplex	Friable brown gradational
Native Vegetation	Red Gum, Yellow Box					
Constraints	Poorly drained, seasonally wet		Moderate to poor drainage and seasonally wet		Shallow soils	
	The steeper units are subject to rapid erosion if the soil is disturbed or mismanaged. Septic effluent disposal can be a problem because of the low permeable nature of some of the sub soils.					

SHIRE OF MANSFIELD

Land unit name: Merrijig (continuation)

Geology	Lower carboniferous sandstone, siltstone					Rainfall: 630-900 mm
Map Symbol	MR _P	MR _w	MM	MM _P	MM _R	MH
Erosion Risk Rating	2	4	3	3	3	3
Land Form	Gentle to moderately sloping crests	Gullies, broad drainage lines & gentle sloping adjoining land	Moderate slopes	Moderately sloping crests	Moderate slopes with shallow underlying rock pavement	Hilly
Slope %	4-10	2-8	8-15	8-15	8-15	10-25
Soils	Friable brown gradational & stony loams	Variable – sandy to cracking clays	Friable reddish gradational & some yellow duplex	Friable reddish gradational & stony loams	Uniform clays & yellow duplex	Stony shallow gradational & some yellow duplex
Native Vegetation	Red Gum, Yellow Box	Red Gum, Swamp Gum, Candlebark, Peppermint	Red Gum, Yellow Box			
Constraints		Seasonal waterlogging, localised flooding, high risk of water pollution	Occasional areas of poor drainage & springs		Effluent disposal restricted	
	Surface water storage restricted due to soil depth					
<p>The steeper units are subject to rapid erosion if the soil is disturbed or mismanaged. Septic effluent disposal can be a problem because of the low permeable nature of some of the sub soils.</p>						

SHIRE OF MANSFIELD

Land unit name: Merrijig (continuation)

Geology	Lower carboniferous sandstone, siltstone	Rainfall: 630-900
Map Symbol	MS	
Erosion Risk Rating	4	
Land Form	Steep slopes	
Slope %	20-30	
Soils	Shallow stony gradational, some yellow duplex	
Native Vegetation	Red Gum, Yellow Box	
Constraints	Rock outcrops, shallow soil	
	The steeper units are subject to rapid erosion if the soil is disturbed or mismanaged. Septic effluent disposal can be a problem because of the low permeability of some of the subsoils.	

SHIRE OF MANSFIELD

Land unit name: Nillahcootie

Geology	Devonian granite and Granite alluvium					Rainfall: 800-950 mm
Map Symbol	NG	NR	NM	NH	NS	
Erosion Risk Rating	2	2	3	4	4	
Land Form	Gentle lower slopes	Rolling slopes	Moderate slopes	Hilly upper slopes	Steep upper slopes	
Slope %	2-5	4-10	8-15	10-25	20-35	
Soils	Uniform coarse sands with some yellow duplex and pale gradational					
Native Vegetation	Red Stringybark, Red Box, Broad leaf Peppermint with Apple Box, Candlebark and Swamp Gum in wetter areas.					
Constraints	<p>Surface springs occur throughout these units and may cause large areas of inundation over prolonged periods.</p> <p>The ability of soils to hold water is variable and unpredictable because of the prevalence of uniform sands.</p> <p>Septic effluent disposal may be hazardous in some of the soils due to the shallowness of permeable soil over rock or other impermeable material.</p> <p>Susceptible to rapid erosion of the soil is disturbed or mismanaged.</p>					

SHIRE OF MANSFIELD

Land unit name: Strathbogie

Geology	Devonian granite and material derived from it				Rainfall: 900-1,000 mm
Map Symbol	SR	SM	SH	SS	
Erosion Risk Rating	3	3	3	4	
Land Form	Rolling slopes	Moderate slopes	Hilly side slopes	Steep slopes	
Slope %	4-10	8-15	10-25	20-35	
Soils	Red duplex & some yellow duplex	Red duplex & some yellow duplex	Red duplex & some yellow duplex	Massive gradational	
Native Vegetation	Broad leaf Peppermint, Narrow leaf Peppermint, Candlebark, with occasional Blue Gum and Blackwood, and Swamp Gum in wetter areas.				
Constraints	Prone to landslips	Rock outcrops		Rocky tors & scattered surface rock	
	Surface water storage is not assured due to the porous nature of the sub surface material. Particularly prone to sheet and gully erosion if disturbed or mismanaged.				

SHIRE OF MANSFIELD

Land unit name: Timbertop

Geology	Non-identified mixture of Cambrian and Ordovician rocks, Ignimbritic rhyolite and materials derived from them					Rainfall: 800-1,200 mm
Map Symbol	TU	TG	TR	TM	TH _F	TH
Erosion Risk Rating	1	2	2	3	3	4
Land Form	Undulating slopes of valley floor	Gentle slopes of valley floor	Rolling slopes	Moderate slopes	Moderate to steep slopes, fine soils	Moderate to steep slopes
Slope %	1-3	2-5	4-10	8-15	10-20	10-25
Soils	Dark uniform yellow gradational yellow duplex	Dark gradational & yellow duplex	Stony & weakly bleached gradational & yellow duplex	Friable brown gradational, stony loams & yellow duplex	Red & brown gradational	Uniform coarse sands & friable red gradational
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Candlebark, Brittle Gum, Mountain Gum, with Alpine species in the higher country					
Constraints	Subject to flooding			Susceptible to rapid erosion if the soil is disturbed or mismanaged		
	The ability of soils in these units to hold water is variable and unpredictable unless tested.					

SHIRE OF MANSFIELD

Land unit name: Timbertop (continuation)

Geology	Non identified mixture of Cambrian and Ordovician Rocks, Ignimbritic rhyolite and materials derived from them			Rainfall: 1.000+ mm
Map Symbol	TS _F	TS	TV	
Erosion Risk Rating	5	5	5	
Land Form	Steep slopes, fine soils	Steep slopes	Very steep slopes	
Slope %	25-40	20-35	35+	
Soils	Red & brown gradational	Uniform coarse sands & shallow stony gradational	Shallow stony gradational & sands	
Native Vegetation	Narrow leaf Peppermint, Broad leaf Peppermint, Candlebark, Brittle Gum, Mountain Gum, with Alpine species in the higher country			
Constraints	Shallow soils	Shallow soil, rockiness	Steepiness, rockiness, shallow soils	
	Susceptible to rapid erosion if the soil is disturbed or mismanaged The ability of soils in these units to hold water is variable and unpredictable unless tested.			

SHIRE OF MANSFIELD

Land unit name: Wombat

Geology	Tertiary Basalt					Rainfall: 1,000-1,250 mm
Map Symbol	WG	WR	WM	WH	WS	
Erosion Risk Rating	1	2	2	3	3	
Land Form	Gentle slopes	Gentle to moderate slopes	Moderate slopes	Moderate to steep slopes	Steep slopes	
Slope %	2-5	4-10	8-15	10-25	20-35	
Soils	Friable red gradational (sometimes light clays) with well structured sub soils.					
Native Vegetation	Messmate, Narrow leaf Peppermint, Candlebark, Manna Gum, Blue Gum & Blackwood					
Constraints	Surface springs may cause large areas of inundation over prolonged periods. These units are susceptible to rapid erosion if disturbed or mismanaged The storage of surface water may be impractical because of the non-dispersive nature of the soils.					

Appendix B – Soil Conservation and Land Utilisation Acts.

Upper Goulburn Catchment

Proclamation

By His Excellency the Governor of the State of Victoria and its Dependencies in the Commonwealth of Australia., Etc., Etc., Etc.

I, the Governor of the State of Victoria in the Commonwealth of Australia by and with the advice of the Executive Council of the said state and in pursuance of the provisions contained in section 22 of the Soil Conservation and Land Utilization Act, 1947 do by this my Proclamation define the water supply catchment to be known as the Upper Goulburn Catchment as follows:

Commencing at the eastern end of the wall of the Eildon dam on the Goulburn River, thence southerly along the watershed between Snobs Creek and Jerusalem Creek to Mt Torbreck; thence continuing southerly along the watershed between the head waters of Snobs Creek, Royston and Taggerty Rivers on the west and the Big River on the east to Mt Arnold; Great Dividing Range over Mt Matlock and Mt Singleton to Mt Selma; then generally in a north easterly, north westerly and northerly direction along the Great Dividing Range to Mt Macdonald; thence continuing along the Great Dividing Range generally in an easterly and north easterly direction over Mt Magdala to Mt Howitt; thence generally in a north westerly direction along the watershed between the head waters of the King River to the north east and Howqua and Delatite Rivers to the south west; thence continuing generally westerly and north westerly along the watershed between the Broken River on the north and Ford and Benkeet Creeks on the south; thence in a generally south westerly direction along the water shed between the Seven Creeks on the north west and the Gerar and Meeton Creeks on the south east to a point on the water shed west of the township of Meeton; thence generally in a south easterly direction along the water shed between the headwaters of the Home, Colonial and U.T. Creeks on the south west and the immediate catchment of the western or Delatite Arm of the Eildon Reservoir to the western end of the wall of Eildon Dam; thence across the crest of the Dam to the commencing point.

The area described is more particularly defined on a plan lodged at the Head Office of the Soil Conservation Authority, 378 Cotham Road, Kew.

.....
Given under my Hand and the Seal of the State of Victoria aforesaid at Melbourne, this eighteenth day of December in the year of our Lord One thousand nine hundred and fifty-six, and in the fifth year of the reign of Her Majesty Queen Elizabeth II.

(signed) DALLAS BROOKS

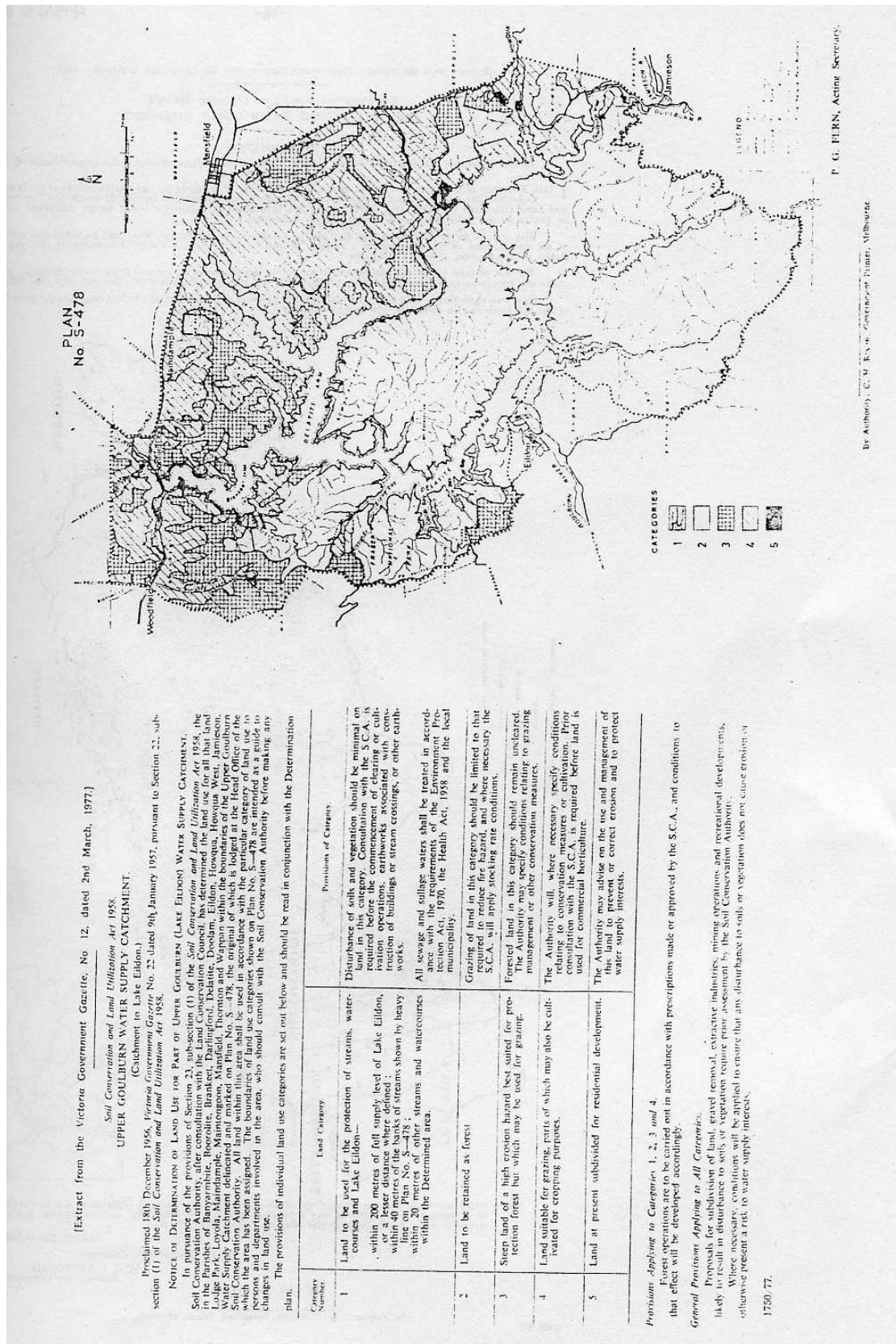
By His Excellency's Command

H E Bolte

Minister for Conservation

GOD SAVE THE QUEEN!

Appendix C



P. G. ELLIOTT, Acting Secretary.

By Authority: C. M. E. V. Government Printer, Melbourne.

[Extract from the Victoria Government Gazette, No. 12, dated 2nd March, 1977.]

Soil Conservation and Land Utilization Act 1958.
UPPER GOULBURN WATER SUPPLY CATCHMENT.
 (Catchment in Lake Eildon.)

Proclaimed 18th December 1966. *Victoria Government Gazette* No. 22, dated 9th January 1957, pursuant to Section 22, sub-section (1) of the *Soil Conservation and Land Utilization Act 1958.*

NOTICE OF DETERMINATION OF LAND USE FOR PART OF UPPER GOULBURN (LAKE EILDON) WATER SUPPLY CATCHMENT.
 In pursuance of the provisions of Section 22, sub-section (1) of the *Soil Conservation and Land Utilization Act 1958*, the Soil Conservation and Land Utilization Council has determined the land use for all that land in the Parishes of Banyamaine, Booroobin, Bantock, Dagald, Thomton and Warman within the Upper Goulburn Water Supply Catchment defined and marked on Plan No. S-478, the original of which is lodged at the Head Office of the Soil Conservation Authority, and within this area shall be used in accordance with the particular category of land use to which the land is assigned. The provisions of the plan No. S-478 are intended as a guide to persons and departments involved in the area, who should consult with the Soil Conservation Authority before making any changes in land use.

The provisions of individual land use categories are set out below and should be read in conjunction with the Determination plan.

Category Number	Land Category	Provisions of Category
1	Land to be used for the protection of streams, water-courses and Lake Eildon— within 200 metres of full supply level of Lake Eildon, or a lesser distance where defined; within 40 metres of the banks of streams shown by heavy white lines on Plan No. S-478; within 20 metres of other streams and watercourses within the Determined area.	Disturbance of soils and vegetation should be minimal on land in this category. Consultation with the Soil Conservation Authority is required before the commencement of clearing or plantation operations, earthworks associated with construction of buildings or stream crossings, or other earth-works. All sewage and sullage waters shall be treated in accordance with the requirements of the Environment Protection Act, 1970, the Health Act, 1958 and the local municipality.
2	Land to be retained as forest	Grazing of land in this category should be limited to that necessary to reduce fire hazard, and where necessary the S.C.A. will apply stocking rate conditions.
3	Steep land of a high erosion hazard best suited for protection forest but which may be used for grazing.	Forested land in this category should remain uncleared. The Authority may specify conditions relating to grazing management or other conservation measures.
4	Land suitable for grazing, parts of which may also be cultivated for cropping purposes.	The Authority will, where necessary, specify conditions relating to conservation measures or cultivation. Prior consultation with the S.C.A. is required before land is used for commercial horticulture.
5	Land at present subdivided for residential development.	The Authority may advise on the use and management of land and to prevent or correct erosion and to protect water supply interests.

Provisions Applying to Categories 1, 2, 3 and 4.
 Forest operations are to be carried out in accordance with prescriptions made or approved by the S.C.A., and conditions to their effect will be developed accordingly.

General Provisions Applying to All Categories.
 Proposals for subdivision, removal, gravel removal, extractive industries, mining operations and recreational developments, likely to result in disturbance to soils or vegetation require prior assessment by the Soil Conservation Authority.
 Where necessary, conditions will be applied to ensure that any disturbance to soils or vegetation does not cause erosion or otherwise present a risk to water supply interests.

Soil Conservation and Land Utilization Act 1958.
LAKE NILLAHCOOTIE WATER SUPPLY CATCHMENT

PROCLAMATION

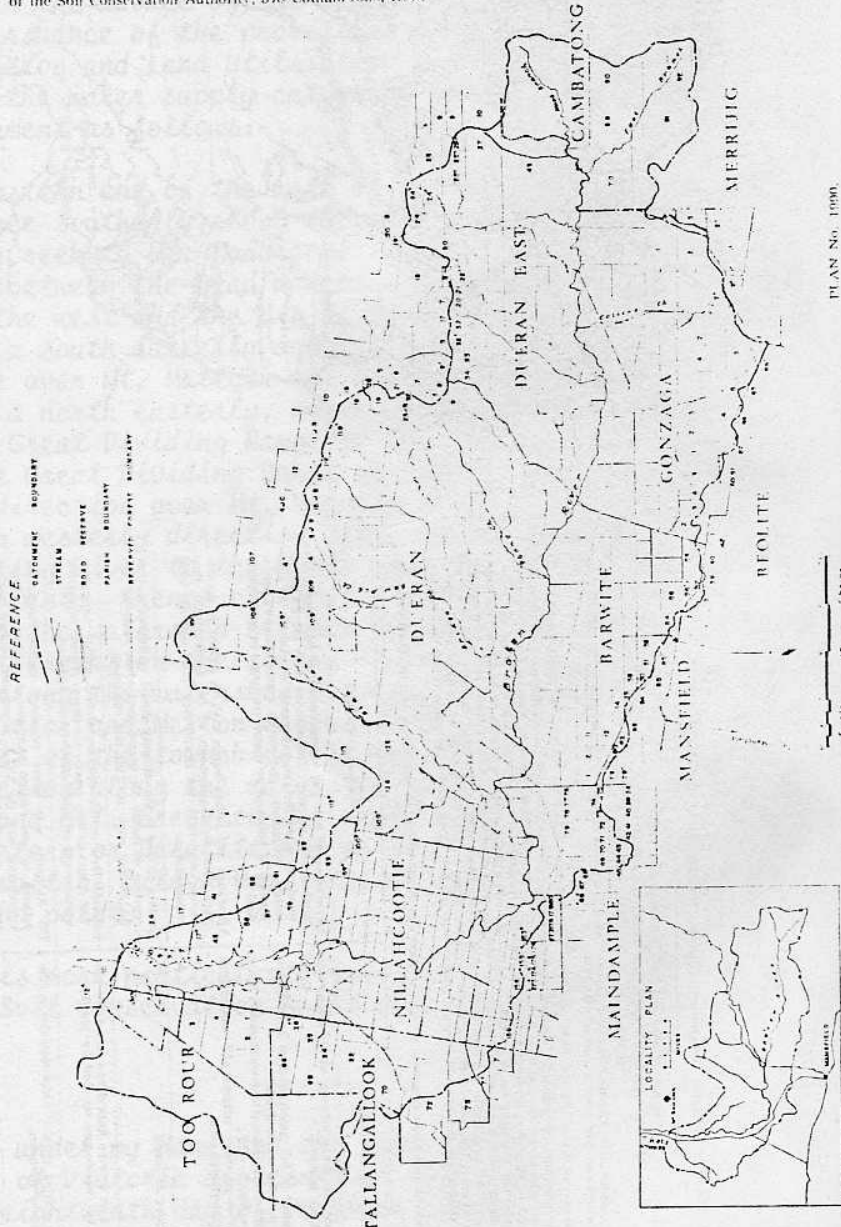
By His Excellency the Governor of the State of Victoria and its Dependencies in the Commonwealth of Australia, &c., &c., &c.

I THE Governor of the State of Victoria in the Commonwealth of Australia, by and with the advice of the Executive Council of the said State and in pursuance of the provisions contained in Section 22 of the Soil Conservation and Land Utilization Act 1958 (No. 6372), do by this Proclamation define the water supply catchment area to be known as the Lake Nillahcootie Water Supply Catchment.

The area to be proclaimed is that part of the catchment of the Broken River and its tributaries upstream of the embankment of the reservoir in a location defined as a line across Crown Allotments 1A, 12A and 12B, Parish of Nillahcootie, County of Delatite.

The use of land within this catchment is subject to determination by the Soil Conservation Authority, acting under the provisions of Section 23 (1) (a) of the Soil Conservation and Land Utilization Act 1958 (No. 6372).

The area described is indicated on Plan No. 1990 hereunder, the original of which is lodged at the Head Office of the Soil Conservation Authority, 378 Cotham road, Kew.



Given under my Hand and the Seal of the State of Victoria aforesaid, at Melbourne, this nineteenth day of September, in the year of our Lord One thousand nine hundred and sixty-seven, and in the sixteenth year of the reign of Her Majesty Queen Elizabeth II.

(L.S.) ROHAN DELACOMBE.
By His Excellency's Command,
W. J. F. McDONALD,
Minister for Conservation.

GOD SAVE THE QUEEN!

By Authority: A. C. BROOKS, Government Printer, Melbourne.