



Municipal Flood Emergency Plan - Swan Hill Rural City

A Sub-Plan of the Municipal Emergency
Management Plan

And

VICSES Unit(s) Swan Hill and Robinvale

Version 2.1, April 2018



Table of Contents

DISTRIBUTION LIST	IV
DOCUMENT TRANSMITTAL FORM / AMENDMENT CERTIFICATE	VI
LIST OF ABBREVIATIONS & ACRONYMS.....	VII
PART 1. INTRODUCTION.....	8
1.1 MUNICIPAL ENDORSEMENT	8
1.2 THE MUNICIPALITY.....	9
1.6 PURPOSE AND SCOPE OF THIS FLOOD EMERGENCY PLAN.....	16
1.7 MUNICIPAL FLOOD PLANNING COMMITTEE (MFPC)	17
1.8 RESPONSIBILITY FOR PLANNING, REVIEW & MAINTENANCE OF THIS PLAN.....	17
1.9 ENDORSEMENT OF THE PLAN	17
PART 2. PREVENTION / PREPAREDNESS ARRANGEMENTS	19
2.1 COMMUNITY AWARENESS FOR ALL TYPES OF FLOODING	19
2.2 NON-STRUCTURAL FLOOD MITIGATION MEASURES	20
2.2.1 <i>Exercising the Plan</i>	20
2.2.2 <i>Flood Warning</i>	20
2.2.3 <i>Local Knowledge</i>	20
PART 3. RESPONSE ARRANGEMENTS	21
3.1 INTRODUCTION	21
3.1.1 <i>Activation of Response</i>	21
3.1.2 <i>Responsibilities</i>	21
3.1.3 <i>Municipal Emergency Coordination Centre (MECC)</i>	Error! Bookmark not defined.
3.1.4 <i>Escalation</i>	21
3.2 STRATEGIC CONTROL PRIORITIES	21
3.3 COMMAND, CONTROL & COORDINATION.....	22
3.3.1 <i>Control</i>	22
3.3.2 <i>Incident Controller (IC)</i>	22
3.3.3 <i>Incident Control Centre (ICC)</i>	22
<i>Divisions and Sectors</i>	23
3.3.4 <i>Incident Management Team (IMT)</i>	23
3.3.5 <i>Emergency Management Team (EMT)</i>	23

3.3.6	<i>On Receipt of a Flood Watch / Severe Weather Warning</i>	24
3.3.7	<i>On Receipt of the First and Subsequent Flood Warnings</i>	24
3.4	COMMUNITY INFORMATION AND WARNINGS	25
3.5	MEDIA COMMUNICATION	26
3.6	IMPACT ASSESSMENT	26
3.7	PRELIMINARY DEPLOYMENTS	26
3.8	RESPONSE TO FLASH FLOODING	26
3.9	EVACUATION	27
3.10	FLOOD RESCUE	27
3.11	AIRCRAFT MANAGEMENT	27
3.12	RESUPPLY	27
3.13	ESSENTIAL COMMUNITY INFRASTRUCTURE AND PROPERTY PROTECTION	28
3.14	DISRUPTION TO SERVICES	28
3.15	ROAD CLOSURES	28
3.16	DAM FAILURE	29
3.17	WASTE WATER RELATED PUBLIC HEALTH ISSUES AND CRITICAL SEWERAGE ASSETS	30
3.18	AFTER ACTION REVIEW.....	30
PART 4.	EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS	31
4.1	GENERAL	31
4.2	EMERGENCY RELIEF	31
4.3	ANIMAL WELFARE	31
4.4	TRANSITION FROM RESPONSE TO RECOVERY	31
APPENDIX A -	FLOOD THREATS FOR SWAN HILL MUNICIPALITY	32
APPENDIX B -	TYPICAL FLOOD PEAK TRAVEL TIMES.....	37
APPENDIX C –	ROBINVALE FLOOD EMERGENCY PLAN.....	39
APPENDIX D -	FLOOD EVACUATION ARRANGEMENTS	42
APPENDIX E -	FLOOD WARNING SYSTEMS	47
APPENDIX F -	MAPS	50
APPENDIX G -	SANDBAG GUIDELINES	61
APPENDIX H –	MFEP COMMITTEE CONTACT LIST.....	618

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Document Transmittal Form / Amendment Certificate

This Municipal Flood Emergency Plan (MFEP) will be amended, maintained and distributed as required by VICSES in consultation with the Swan Hill Rural City. Suggestions for amendments to this Plan should be forwarded to VICSES North West Region, Swan Hill Office PO. Box 1700, Swan Hill Vic, or via email to northwest.office@ses.vic.gov.au.

Amendments listed below have been included in this Plan and promulgated to all registered copyholders.

Amendment Number	Date of Amendment	Amendment Entered By	Summary of Amendment
1		P Patterson	Issue of initial document
2	April 2018	P Patterson	Total reissue due to a number of amendments V 2.1.

This Plan will be maintained on the following websites:

www.ses.vic.gov.au

www.swanhill.vic.gov.au

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan:

AEP	Annual Exceedance Probability
AHD	Australian Height Datum (the height of a location above mean sea level in metres)
AIIMS	Australasian Inter-service Incident Management System
AoCC	Area of Operations Control Centre / Command Centre
ARI	Average Recurrence Interval
ARMCANZ	Agricultural & Resource Management Council of Australia & New Zealand
AV	Ambulance Victoria
BoM	Bureau of Meteorology
CEO	Chief Executive Officer
CERM	Community Emergency Risk Management
CFA	Country Fire Authority
CMA	Catchment Management Authority
RERC	Regional Emergency Response Coordinator
RERCC	Regional Emergency Response Coordination Centre
DHS	Department of Human Services
DH	Department of Health
Dol	Department of Infrastructure
DELWP	Department of Environment Land Water & Planning
EMMV	Emergency Management Manual Victoria
EMT	Emergency Management Team
EO	Executive Officer
FO	Floodway Overlay
FWS	Flood Warning System
FZ	Floodway Zone
IC	Incident Controller
ICC	Incident Control Centre
IMT	Incident Management Team
IMS	Incident Management System
EMLO	Emergency Management Liaison Officer
LSIO	Land Subject to Inundation Overlay
/MOC	/Municipal Operations Centre
MEMP	Municipal Emergency Management Plan
MEMPC	Municipal Emergency Management Planning Committee
MERC	Municipal Emergency Response Coordinator
MERO	Municipal Emergency Resource Officer
MFB	Metropolitan Fire and Emergency Services Board
MRM	Municipal Recovery Manager
PMF	Probable Maximum Flood
RCC	Regional Control Centre
RDO	Regional Duty Officer
SBO	Special Building Overlay
SCC	State Control Centre
SEWS	Standard Emergency Warning System
SHERP	State Health Emergency Response Plan
SOP	Standard Operating Procedure
VicPol	Victoria Police
VICSES	Victoria State Emergency Service

Part 1. INTRODUCTION

1.1 Municipal Endorsement

This Municipal Flood Emergency Plan (MFEP) has been prepared by the Swan Hill Rural City Municipal Flood Emergency Planning Committee and with the authority of the Swan Hill Rural City Council pursuant to Section 20 of the Emergency Management Act 1986 (as amended).

The Swan Hill Rural City Municipal Flood Emergency Planning Committee has undertaken consultations with the Swan Hill and Robinvale communities about the arrangements contained within this plan.

Local specific Flood Emergency Plans are to be developed for the Robinvale community and may also be developed for Pental Island and Tyntynder Flats areas.

This MFEP is a sub plan to the Swan Hill Rural City Council Municipal Emergency Management Plan and is consistent with the Emergency Management Manual Victoria (EMMV) and the Victoria Flood Management Strategy (DNRE, 1998a), and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Municipal Emergency Management Planning Committee (MEMPC).

The Municipal Flood Emergency Plan is consistent with the Regional Flood Emergency Plan and the State Flood Emergency Plan.

This Municipal Flood Emergency Plan is a result of the cooperative efforts of the Swan Hill Rural City Flood Emergency Planning Committee (MFPC) and its member agencies.

This Plan is to be endorsed by the Swan Hill Rural City Emergency Management Planning Committee, as a sub-plan to the MEMP.

Provisional Endorsement, Subject to formal acceptance by Swan Hill MEMP Committee.

Signed:..... Date.....

Cr Les Mc Phee

Chair

Swan Hill Rural City Municipal Flood Emergency Planning Committee

Approved by Victoria State Emergency Service North West Region

Signed: Date.....

Mr Mark Cattell

Regional Manager

North West Region

Victoria State Emergency Service

1.2 The Municipality

1.2.1 GENERAL

The Swan Hill Rural City municipality has the Murray River as its northern and eastern boundary, it is located in the North-West of the State; and the municipality occupies an area of 6096 square kilometres. Swan Hill which is the main population centre of the Municipality is located approx 300 km North West of Melbourne on the Murray Valley Highway. Adjacent Victorian Municipalities are the Gannawarra Shire to the Southeast, the Buloke Shire to the South West and the Mildura Rural City to the North West. The Murray River forms the Northern boundary and acts as the border with the Shire of Wakool and the Shire of Balranald both of which are in the State of New South Wales.

1.2.2 Topography

Adjacent to the Murray River the land is basically flat, alluvial floodplain bearing significant stands of river red gums. Away from the river, the Municipality consists of low, undulating country, much of which is lighter soil originating from the typically semi-arid mallee scrub areas that formerly existed in the Region.

Most of the area has been cleared of the native vegetation and is used for primary production. Dry land farming consisting of cereal growing and cattle and sheep grazing, plus irrigation pursuits including pastoral, dairying, horticulture, olives, almonds and vegetable growing, form the majority of the farming activities.

1.2.3 Climate

The average rainfall is 300-350 mm per year with most of the rainfall occurring from Autumn through to Spring. The climate consists mainly of hot summers and mild winters.

1.3 Geographical description of relevant rivers and/or streams:-

1.3.1 Murray River

The Murray River forms part of the 3,750 km long combined Murray-Darling river system which drains most of inland Victoria, New South Wales, and southern Queensland. Overall the catchment area is one seventh of Australia's total land mass. The Murray River carries only a small fraction of the water of comparably-sized rivers in other parts of the world, and with a great annual variability of its flow. In its natural state it has even been known to dry up completely during extreme droughts, although that is extremely rare, with only two or three instances of this occurring since official record keeping began.

The Murray River makes up much of the border between the Australian states of Victoria and New South Wales. Where it does, the border is the top of the bank of the southern side of the river (i.e., none of the river itself is actually in Victoria).

The Murray River itself is Australia's longest river. At 2,508 kilometres in length, the Murray rises in the Australian Alps with its source being in the Kosciusko National Park.

The river drains the western side of Australia's highest mountains and, for most of its length, meanders across Australia's inland plains, forming the border between the states of New South Wales and Victoria as it flows to the northwest, before turning south west for its final 500 kilometres or so into South Australia, reaching the ocean at Lake Alexandrina.

The water of the Murray flows through several lakes that fluctuate in salinity including Lake Alexandrina and The Coorong before emptying through the Murray Mouth into the south-eastern portion of the Indian Ocean, often referenced on Australian maps as the Southern Ocean, near Goolwa.

The Murray River rural/urban environment created since European settlement mitigates the flood threat supporting irrigated agriculture, business and tourism and lifestyle development, this has been accomplished through the use of floodplain levees and significant storage dams along the river and its tributaries.

The area of the Murray between Benjeroop and Beverford is for the most part leveed and is influenced by inflows on the Murray, Loddon and Avoca Rivers, and outflows into the Waddy Creek (NSW).

The area of the Murray between Beverford and Nyah is influenced by Murray, Wakool and Murrumbidgee River flows, some rural levee systems exist in this area.

1.3.2 Little Murray River (Marraboor River)

The Little Murray River is an anabranch of the Murray River leaving the main stream at Benjeroop and returning to the Murray at Swan Hill, this creates an area known as Pental Island, the Loddon River has a direct outfall into the Little Murray, while the Avoca River has flows which eventually enter Lake Boga and then via the outfall into the Little Murray.

Extensive floodplain levee systems exist along the system this provides protection to support irrigation, agriculture, business, tourism and lifestyle development.

1.3.3 Avoca River

The Avoca River rises on the northern slopes above Coonooer Bridge and has a long history of flood events dating back to last century, recorded flood events began in 1870. The flood of record was in 1939 prior to levee banks, after levee banks 1956, 1964, 1973, 1975, 1981, 1983, 1988, 1995. Three significant flood events occurred in September and November of 2010 and January 2011.

During high flows and when the Avoca Marshes are full, the Avoca flows through the 6/7 Channel either directly into the Little Murray River or into Lake Boga. Flows can also be diverted onto the Avoca floodway; this is on the northern side of and runs parallel to, the Murray Valley Highway. The major problems in this area relate to the difficulty of discharging flood waters from the Avoca Marshes and Kangaroo Lake through Lake Boga and the No. 7 Channel into the Little Murray River as its maximum capacity is 600 mega litres per day. If the Little Murray River and Lake Boga have elevated water levels due to flows from the Loddon and Murray rivers the latter becomes impossible.

The northern area of the Avoca River which flows from Mystic Park through Lake Boga to the Avoca floodway is leveed; this supports various economic functions including irrigation, tourism, lifestyle development and agriculture. The lakes of Tutchewop and Long Lake are dedicated for salinity management.

The Bureau of Meteorology provides flood forecasting information this information can be found at: www.bom.gov.au/vic/flood/

1.3.4 Lalbert Creek

The Lalbert Creek is part of the Avoca River floodplain and is used by Grampians, Wimmera Mallee Water as part of their delivery System. The Lalbert Creek will overflow in larger floods and this will have a flow on affect further downstream, impacts will vary depending on stream flows, during the 2010 and 2011 flooding events this creek system impacted area's within the municipality to various degrees, with the main impact of the flooding rural land adjacent to the creek and on the road system, as the creek bisects a number of major and rural roads in the municipality, these include the Loddon Valley Hwy between Kerang and Swan Hill at various locations, Swan Hill – Sea Lake Road and the Swan Hill – Donald Road at Dumosa.

1.3.5 **Loddon River**

This river rises upstream of Laanecoorie Reservoir on the northern slopes of the Great Dividing Range, and joins the Murray River via the Little Murray River at the western end of Pental Island near Swan Hill. In larger flows the water from the Little Murray then flow across the Pental Island (Loddon) Floodway situated on Pental Island and into the Murray River. Around Serpentine, the Loddon floodplain widens and flattens to become a complex leveed and braided system of effluent watercourses. These watercourses include Serpentine Creek, Bannacher Creek, Twelve Mile Creek and Nine Mile Creek on the east side and Kinypanial Creek, Venables / Johnsons Creek and Wandella Creek on the west side. Downstream from Kerang, are the Kerang Lakes and the lower reaches of Barr Creek.

Effluent flows/watercourses are waterways that carry water that break away from the main river. Effluent flows to the western side of the Loddon generally do not return to the river and experience considerable attenuation in the natural lake systems of Boort, Lyndger, Yando, Leaghur and Meran and the adjacent State Forests. In contrast, the eastern effluent flows are into relatively steeper slopes (because they have been modified and deepened to provide drainage to the surrounding land) and enter an extensive and interconnected drainage system made up of Serpentine Creek, Bannacher Creek, Nine Mile Creek and other effluent watercourses that either drain directly back into the Loddon River or into Pyramid Creek.

Wandella Creek is the eventual recipient of all western effluent overflows and flows through to Reedy Lake, Middle Lake and Third Lake, then either overland to Sheepwash Creek and eventually the Loddon River, or via Scotts Creek towards Dry Lake, Lake Charm, Racecourse and Kangaroo Lakes, and eventually to Lake Boga and/or the Little Murray River.

Effluent flows along the Loddon River commence around 10km upstream of Serpentine and result in a peak flow reduction of at least 20%. This reduction increases downstream of Kerang although the effect is substantially reduced if a second flood arrives while the floodplain is still “wet” from the first flood, as occurred in August 1981 and in January 2011.

Note: Flood flows that enter the Kerang Weir pool pass uncontrolled into the Loddon River and the Sheepwash Creek over low fixed crest weirs. Flows into the Washpen Creek can be regulated at the Washpen Regulator although in major floods this will be maintained in the open position.

There are extensive urban and rural levees as well irrigation channel systems. A number of in stream structures also exist. The river supports irrigated agriculture, businesses, and tourism and lifestyle developments.

Note: Further information is currently being sought in relation to when (triggers) for Pental Island floodway operation

1.4 **VULNERABLE AREAS**

1.4.1 **General**

Flood activity in the Municipality is generated almost entirely from rainfall outside the Municipality in the catchment areas of the Murray River and its North Central and North Eastern Victorian tributaries. The effects of floods in the Avoca, Loddon and Wakool Rivers which all flow into the Murray system in or near to the Municipality, compound the situation.

In a flood situation in the Murray River, much of the water passing through the Torrumbarry Weir makes its way into NSW through a myriad of effluent streams, swamps and waterways finally re-

joining the Murray via the Edwards and Wakool River systems river kilometres downstream from Swan Hill.

Coincident flooding of the Murray and Loddon Rivers may increase the vulnerability of levee failure in the area between Benjeroop to Nyah.

The vulnerability of the rural levee system is primarily related to their height or remaining freeboard above a flood event.

The current rural levee system was constructed to the 1975 flood height benchmark (coincident flooding of the Murray and Loddon Rivers)

A number of properties to the north of Swan Hill situated between the Murray River and the Murray Valley Highway may become isolated for >24 hours, mapping is currently be undertaken to provide details of exact locations of the isolated properties, the information below can provide a rough guide as to the general locations:

7 properties in the Piangil/Wood Wood area,
5 properties in the Nyah area,
1 property at Boundary Bend

1.4.2 Benjeroop

Considerable flows continue along the Murray River through Barham to the junction with the Loddon River near Benjeroop which is located just inside the Southern extremity of the Rural City of Swan Hill, and then on to Swan Hill. In a situation where both streams are high, this has the effect of slowing the inflows from the Loddon and placing considerable stress on the levee systems, particularly those in the Benjeroop area.

1.4.3 Pental Island

Pental Island is bounded by the Murray River to the north and its anabranch known as the Little Murray River (otherwise known as the Marraboar River) to the south. The Loddon River forms a junction with the Little Murray River near Benjeroop a short distance downstream of the Murray/Little Murray junction. Loddon waters pass part-way along the Little Murray, then divide, with some flows continuing to where the Little Murray forms a junction with the Murray at Swan Hill, and the balance of the flows cross at the Pental Island Floodway (or Loddon Floodway) directly to the Murray River. On the way these flows can be added to by Avoca River outflows which are steered into the Little Murray via an outfall channel known as the 6/7 Channel or through Lake Boga.

In a simultaneous flood year much of the island can be under threat due to the fact that it lies below the natural flood levels of the rivers and the waters are retained behind a system of approved levees. The Eastern levee **is has undergone significant repairs, with the bank in some area's realigned and rebuilt. in some areas it has been due for completion in 2014**, This work now brings the **once completed the** level of protection **will be up to** 300mm on the 1975 benchmark height 69.64 AHD (at gauge # 409214).

The New South Wales and Pental Island levees, channel flood water to the critical Waddy Creek offtake which is located on the NSW side of the river this is augmented by a NSW water authority operated regulator

The Western ring levee is divided naturally in two by a ridge of high land this creates a central and western section. The Central section up to the Little Murray Weir is protected up to the 1975 benchmark by a modern approved levee; there is a short section above the Little Murray Weir where there is uncertainty as to its capacity. The Western section of the levee between the Little Murray Weir and Swan Hill City is partially protected by modern approved levee system. In the event of downstream flooding the upstream section will become isolated.

There is anecdotal evidence that in flood events, due to the closure of the Murray Downs Creek the water levels at Swan Hill have risen.

Part of the total flows along the Murray River may also enter the Waddy Creek if the regulator is open; this then passes into New South Wales. As this is in NSW the NSW water authorities need to be consulted in arranging for the opening of the regulator.

The Loddon Floodway comes into operation automatically at the fixed spillway, this spillway is approximately 100 metres in length and will commence operation at 70 mAHD (about minor flood level at Swan Hill gauge). This water then flows in a general northerly direction to enter the Murray River. Flow has been augmented by lowering the downstream section of the old levee, this site was considered safe from blow out which could threaten operation of the Little Murray Irrigation Pool.

See Appendix F3 and F4 for maps of the Pental Island Levee system and location of Loddon Floodway.

1.4.4 Little Murray River – Winlaton, Fish Point, Lake Boga, Castle Donnington and Swan Hill South.

The area from the Loddon and Little Murray River junction to Swan Hill is protected by a levee and levee channel system which dates back to the 1930's and has been upgraded and maintained since this time.

The **Winlaton Depression** takes in an area from Loddon Junction to Fish Point this area is agricultural land and is subject to overland flooding, there are levees in the area but most are defined as uncontrolled rural levees with no formal maintenance program in place and have a high risk of failure or overtopping in moderate to major flood events.

To the south of the Little Murray River, a levee system is in place above the Little Murray Weir this together with the 6/7 channel and the adjoining Avoca floodway from Lake Boga is critical in maintaining irrigated agriculture during flooding events, this is due to drainage constraints to the Little Murray Weir Irrigation pool.

Due to the closure of the Murray Downs Creek (NSW) the area between the Little Murray Weir, Castle Donnington and Swan Hill south is anecdotally more vulnerable to flooding. This is due to a flow restriction, which may in turn increase flood levels upstream of Swan Hill; this in turn may lead to a higher degree of failure or overtopping of the structural mitigation measures in this area.

1.4.5 Swan Hill City

Swan Hill itself consists of some low lying areas which are protected from Murray River flood waters by significant levees. These levees are designed and constructed to code and provide up to 600 mm free board from the 1% AEP event. **See Appendix F 1.**

History suggests that a Murray River flood on its own, will only be a minor flood problem at Swan Hill itself, irrespective of the amount of rainfall and the number of creeks and rivers flooding upstream of Barham.

Significant inflows of water from both the Goulburn and Campaspe systems may have a flow on affect within the Swan Hill City as this will increase the volume of water within the Murray River.

The danger for Swan Hill arises from simultaneous flooding of the Murray, Loddon and Avoca Rivers, and the consequential effects that arise in the Little Murray.

NB - Simultaneous floods have a history of occurring.

1.4.6 **Tyntynder Flats / Beverford**

Tyntynder Flats is a low lying area situated close to the Murray River and immediately downstream from Swan Hill. It comprises dairy cattle and other irrigation farming land, and consists of in the main relatively small holdings. It is protected from Murray River floodwaters by a significant system of unregistered and unregulated rural levees. Some of these date back to the 1930's and have had limited maintenance or upgrading since this time. Since the 1960's there has been increased development on the New South Wales side of the river, and this may increase the area's vulnerability to levee failure. Like each of the other vulnerable areas, this area is most vulnerable when those levees are placed under stress due to the simultaneous flooding events as detailed above.

In the 1990's the Swan Hill/Tyntynder floodplain Management Study provided modelling of the 1975 (benchmark) flood event, this highlighted this vulnerability. There may also be some automatic containment of flood waters should this occur, this is assisted by the irrigation channel system which directs the flows downstream through what is referred to as flow tubes.

See Appendix F 5

The Flow tubes are:

Western; this will channel the waters from the vicinity of Arnoldt St and flows in a northerly direction to discharge back into the Murray River below Beveridge Island, this water may impact the Murray Valley Hwy.

Central; this channels water from the vicinity of Douglas Rd and flows to the north where it merges with the Eastern Flow tube, midway between Runciman and Butler Roads (see eastern flow for outlet). This flow may impact the Swan Hill Abattoir which is located at the North end of River Rd.

Eastern: this channels the water from an approximate area of River Rd to Runciman Rd and flows in a northerly direction where it combines with the flow from the Central flow tube and continues in a northerly direction where it discharges back into the Murray River below Beveridge Island.

The vulnerability of these rural levees is high and there is a strong likelihood that in major flood events these banks could fail.

There are numerous drains and channels that run through the area some of these run back into the Swan Hill Township, these drains may need to be blocked in a major flooding event. This information once compiled will be inserted,

In the interim contact should be made with council to access this information.

Note: As at April 2018 a study is being undertaken on the levee systems along the Murray River within the Swan Hill Municipality, this is being led by DELWP, and will include the areas of Pental Island, Swan Hill , Tyntynder up to and including Nyah, any relevant information from this study will be incorporated as required and relevant.

1.4.7 **Vinifera**

Vinifera is located on the Murray Valley Highway just south of Nyah, there is evidence that during the 2011 flood event the waters from the Murray River flowed overland and spread out around the east of the highway. This water coming quite close to the Highway, although at no stage was the highway closed. Some action was taken to sandbag and block off drains and culverts that ran under the highway at this location.

An uncontrolled levee runs from adjacent to the Speewa Rd / River Rd intersection east back to the start of the Vinifera forest, it is understood that during the 2011 flood event sandbagging of

this levee was undertaken this has not been confirmed. There are 5 properties located in the area behind this uncontrolled levee, it is not known to what extent these properties would have been affected should the levee have failed

1.4.8 Nyah Forest to the Wakool Junction

The Wakool River connects with the Murray River on the New South Wales side midway between Swan Hill and Robinvale. The area from Nyah to the junction is alternating high loamy land and outbreaks of low lying land. Properties in this area are generally large and sparsely populated. Some of this agricultural land is vulnerable, but in the main the individual levee banks and significant areas of available floodplain provide reasonable protection from floodwaters, it should be noted in flooding events a number of properties will become isolated for a time.

During the 2011 flood event works were undertaken on the levee that runs from the Nyah Pumps and around the back of the recreation reserve, it is uncertain who authorised this work and to what standard and level it was constructed for, although it did protect this area during this event.

1.4.9 Robinvale

Areas South of Robinvale are prone to significant outflows from the Murray, however there is no risk to homes or roads. West of Robinvale is generally high land which does not come under threat and only pumping sites need protection. The Eastern section of the Robinvale Township is protected by a significant but uncontrolled levee bank.

Swan Hill Rural City Council is currently examining the issues concerning the ongoing maintenance of this particular levee. An audit and engineering analysis was undertaken of this levee with the final report issued in January 2002

It should be noted Murray River flows in the Robinvale area are significantly affected by flows entering the river from the Murrumbidgee/Wakool/Edwards system upstream of Robinvale. However, significant areas of floodplain are available on both sides of the Murray in the Robinvale area and this negates any significant threat that might otherwise exist.

1.4.10 Lalbert Creek

Lalbert Creek carries the overflow from the Avoca River into the terminal Lake Timboram. An uncontrolled levee exists along its entire length which passes through large acreage farmland. Flows are also impacted upon by extensive lignum growth which flourishes on the creek bed; this may have the effect of holding back the natural flow of the floodwaters and is not subject to any maintenance.

In larger floods concern often arises about the Ultima - Culgoa Road and also the Sea Lake Swan Hill Road where water will impact on the roads and these may become impassable this is due to constrictions at the culverts where the creeks bisect the roads.

1.4.11 Lake Boga

In larger floods areas adjacent to Lake Boga may be inundated. Lakeside Drive in particular, which is on the Northern side of the lake, may become affected. High water levels may threaten the lake embankments in several locations on the North and West side of the lake the affects may be increased if there is a significant amount of wave or water action impacting on the banks of the lake.

The Lake Boga floodway runs to the north of Lake Boga discharging into the Little Murray River. During the event of 2011 the north eastern bank began leaking in several places due to flows from the Little Murray River flowing back towards Lake Boga. At the time, this

caused concerns regarding the integrity of the remaining structure. Since the 2011 flood event the eastern side has been reconstituted.

The road between the Lake and the floodway is classified as a causeway, with the water flowing over the road into the floodway in major event, this will occur at around 70 mAHd.

In larger events flood waters will flow towards Lake Boga from the south. There are a number of lakes in this area including Golf Course, Round and Long Lakes. During the 2011 flood event water entered all these lakes but did not impact on Lake Boga Township and no residential properties were affected.

1.4.12 East and West Tresco

This area is primarily irrigated agricultural land with both small and large landholdings; this area is vulnerable to flooding should there be a failure of the Mystic Park Forest Levee, at the time of preparing this plan the design or protection height of the levee is unknown.

1.5 History of Flood Events

Recent "Major" flood events have occurred within the Municipality in the following years:- 1956, 1973, 1974, 1975, 1981, 1983, 1989, 1993, 2011 and 2016

1.5.1 Extent of Damage

The impact of those events has resulted mainly in property damage including stock and crop losses but not loss of life.

1.5.2 Conclusions to be Drawn (This should be used as a guide only as all floods will be different).

Historically the 1975 flood was the highest recorded at Swan Hill. Best estimates suggest that in the case of a 1% flood in the Loddon River coincident with similar flows in the Murray at Barham to those occurring in 1975, and coincident with similar high flows in the Avoca, there is a potential input of flood waters into the Swan Hill area of between 68,000 and 73,000 M/L per day. Based on the effects of the 1975 flood event which resulted in inputs of between 41,000 and 46,000, there is a potential of approximately 27,000 M/L per day which is incapable of containment within the current protective systems which are in place at Benjeroop, Pental Island and Tyntynder Flats.

1.5.3 Locations and Data

Statistical data and information on previous flood events can be obtained from the North Central and Mallee Catchment Management Authorities.

1.6 Purpose and Scope of this Flood Emergency Plan

The purpose of this MFEP is to detail arrangements agreed for the planning, preparedness/prevention, response and recovery from flood incidents within the Swan Hill municipality

As such, the scope of the Plan is to:

- Identify the Flood Risk to the Swan Hill municipality.
- Support the implementation of measures to minimise the causes and impacts of flood incidents within the Swan Hill Municipality.

-
- Detail Response and Recovery arrangements including preparedness, Incident Management, Command and Control;
 - Identify linkages with Local, Regional and State emergency and wider planning arrangements with specific emphasis on those relevant to flood.

1.7 Municipal Flood Planning Committee (MFPC)

Membership of the Swan Hill Municipality Flood Planning Committee (MFPC) will comprise of the following representatives from the following agencies and organisations:

- VICSES Regional Officer – Emergency Management. **(Chair)**,
- Councillor Swan Hill Rural City,
- MERO/Deputy MERO Swan Hill Rural City
- VICSES Unit Controller Swan Hill and Robinvale.
- Victoria Police (Municipal Emergency Response Co-ordinator) (MERC),
- North Central Catchment Management Authority,
- Mallee Catchment Management Authority
- Department of Health (DH) as required,
- Department of Human Services (DHS) as required,
- Department of Environment and Primary Industries (DELWP) as required,
- Water Authorities as required,
- Bureau of Meteorology as required,
- Local community representatives and
- Other agencies as required

1.8 Responsibility for Planning, Review & Maintenance of this Plan

This Municipal Flood Emergency Plan must be maintained in order to remain effective.

VICSES through the Flood Emergency Planning Committee has responsibility for preparing, reviewing, maintaining and distributing this plan.

The MFEPC will meet on at least once per year.

The plans should be reviewed:

- Following any new flood study;
- Change in non-structural and/or structural flood mitigation measures;
- After the occurrence of a significant flood event within the Municipality to review and where necessary amend arrangements and information contained in this Plan.

1.9 Endorsement of the Plan

The MFEP will be circulated to MFEPC members.

Upon acceptance by the MFEPC , the plan will be presented to the MEMPC for endorsement with the recommendation to include the MFEP as a sub-plan of the MEMPlan.

Part 2. PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Flooding

2.1.1 MFEP and Local Flood Guide Communications.

Details of this MFEP and Local Flood Guides will be released to the community through local media, websites (VICSES and the Municipality) upon formal adoption by the Swan Hill Rural City and other Community lead opportunities as identified through the FloodSafe program.

VICSES with the support of Swan Hill Rural City Council, North Central and Mallee CMA will coordinate community education programs for flooding within the council area.

A FloodSafe program for Robinvale is currently underway. The program will focus on building key relationships within the Community and other Emergency Service Providers in the area a Local Flood Guide has been produced in several languages.

A FloodSafe program for Swan Hill City (CBD) is currently being scoped and will have a focus on Business preparedness and response to flooding once initiated.

Benjeroop FloodSafe program has been initiated with the Local Flood Guide currently in development with Community and key stakeholders.

Copies of LFGs and project plans will be added in as an Appendix to this plan as they become available.

2.1.2 Structural Flood Mitigation Measures

The following summary of structural flood mitigation measures exist within the Council area:

2.1.2.1 Swan Hill Town-ship.

The Swan Hill strategic levee protection system (designed to 600mm above 1% AEP) was completed in December 2003; this system runs from the rail crossing on the Murray Valley Highway South of Swan Hill to Arnoldt Street in the north. This system protects the town of Swan Hill. It should be noted that the No 9 Channel operated by Goulburn Murray Water bisects the levee approximately 250 meters south of Maher Rd Swan Hill. In extreme rural flooding events this channel may need to be filled in. **See Appendix F 1**

2.1.2.2 Pental Island.

Pental Island is bounded by the Marraboor and Murray Rivers the area consists primarily of agricultural concerns with mainly relatively small holdings, a formal levee system is in place across most of and on both sides of the Island in general this provides protection up to the benchmark 1975 flood level (69.64 AHD at the Pental Island pump gauge #409214). **See Appendix F3 & F4.**

2.1.2.3 Tyntynder Flats.

The Tyntynder floodplain comprises primarily flat agricultural land with some small areas of rises towards the northern and western edges. These rises are not considered to be subject to flood damage. The southern part (that area closest to Swan Hill Township) can be classified as hobby farms carrying various numbers of domestic stock (sheep, cattle, horses etc.)

Property sizes generally increase as you move to the north, in these areas commercial farming enterprises are conducted this includes dairy farms, cattle and sheep, some of these areas are also used for cropping and some vegetable crops.

Most of the levees in this area are uncontrolled and have no formal maintenance or inspection program.

Overland flows through the Tyntynder Flats area follow three main flow paths or non-defined channels; these are known as the Western, Central and Eastern Tubes. **See Flow Tube Map Appendix F5.**

The maps contained in **Appendix F2** provide information in relation to these levees and locations where there integrity is questionable.

2.1.2.4 Robinvale.

The Robinvale Levee extends approximately 5 kilometres along the west bank (Victorian side) of the Murray River in the township of Robinvale and runs from Ninth Road to the south to the Murray River Bridge at Robinvale. The levee was constructed over 50 years ago with no formal maintenance program in place but some ad hoc maintenance has occurred anecdotally this has been undertaken by local land owners due to the condition of the levee it is unsure to the actual level of protection that it will offer. **See Appendix F7 for map of the levee.**

Note: Ownership and responsibility of these levees is still under review . The exception to this is the strategic levee at Swan Hill which falls under the responsibility of local government.

2.2 Non-structural Flood Mitigation Measures

2.2.1 Exercising the Plan

Arrangements for exercising this Plan will be at the discretion of the MEMPC. This Plan should be regularly exercised, preferably on an annual basis. Refer to section 4.7 of the EMMV for guidance.

2.2.2 Flood Warning

Arrangements for flood warning are contained within the State Flood Emergency Plan and the EMMV (Part 3.7) and on the BoM website.

Specific details of local flood warning system arrangements are provided in **Appendix E.**

2.2.3 Local Knowledge

Local knowledge is information obtained from local identified individuals, communities and organisations and provides a means of gathering information in real time on flood behaviour along a stream system, and a network for the distribution of community information and warnings to the community along the stream system.

The following arrangements for accessing local knowledge have been established:

- An informal network of individuals has been established at Pental Island, Tyntynder Flats, Lake Boga and Fish Point this system involves local landholders and farmers who have a good understanding of river flows and behaviour around their properties. At this stage there is no agreed formal structure/process on how this intelligence is passed on and this needs to be further developed.
- In the interim the following process is to be utilised.

On the issue of a moderate to major flood warning the nominated Divisional Commander / RDO or IC should contact the community representatives on the Swan Hill Flood Emergency Planning Committee (contact details are located in Appendix H) they have agreed to act as the conduit for information flow and provide intelligence within their area of expertise.

Information flow diagram is shown in **Appendix E, Figure 1, and (page 48)**

Part 3. RESPONSE ARRANGEMENTS

3.1 Introduction

3.1.1 Activation of Response

Flood response arrangements may be activated by the Regional Duty Officer (RDO) VICSES North West Region or Incident Controller.

The Incident Controller/RDO VICSES will activate agencies as required and documented in the State and Regional Flood Emergency Plan.

3.1.2 Responsibilities

There are a number of agencies with specific roles that will act in support of VICSES and provide support to the community in the event of a serious flood within the Swan Hill Municipality. These agencies will be engaged through the EMT.

The general roles and responsibilities of supporting agencies are as agreed within the Swan Hill Rural City MEMP, EMMV (Part 7 'Emergency Management Agency Roles'), State Flood Emergency Plan and Regional Flood Emergency Plan.

Any agreed roles of supporting agencies **may** be listed/are in a separate appendix to this plan.

3.1.3 Escalation

Most flood incidents are of local concern and an appropriate response can usually be coordinated using local resources. However, when these resources are exhausted, the State's arrangements provide for further resources to be made available, firstly from neighbouring Municipalities (on a regional basis) and then on a State-wide basis.

Resourcing and event escalation arrangements are described in the EMMV ('State Emergency Response Plan' – section 3.5).

3.2 Strategic Control Priorities

To provide guidance to the Incident Management Team (IMT), the following strategic control priorities shall form the basis of incident action planning processes:

- Protection and preservation of life is paramount - this includes:
 - . Safety of emergency services personnel, and;
 - . Safety of community members including vulnerable community members and visitors/tourist located within the incident area.
- Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.;
- Protection of critical infrastructure and community assets that supports community resilience;
- Protection of residential property as a place of primary residence;
- Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability;
- Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment;

Circumstances may arise where the Incident Controller is required to vary these priorities, with the exception being that the protection of life should remain the highest. This shall be done in consultation with the State Controller and relevant stakeholders based on sound incident predictions and risk assessments.

3.3 Command, Control & Coordination

The Command, Control and Coordination arrangements in this Municipal Flood Emergency Plan must be consistent with those detailed in State and Regional Flood Emergency Plans. For further information, refer to sections 3.4, 3.5 & 3.6 of the EMMV.

The specific details of the Command, Control and Coordination arrangements for this plan are to be provided in Appendix C.

3.3.1 Control

Functions 5(a) and 5(c) at Part 2 of the *Victoria State Emergency Service Act 1986 (as amended)* detail the authority for VICSES to plan for and respond to flood.

Part 7.1 of the EMMV prepared under the *Emergency Management Act 1986 (as amended)*, identifies VICSES as the Control Agency for flood. It identifies DELWP as the Control Agency responsible for “*dam safety, water and sewerage asset related incidents*” and other emergencies

All flood response activities within the Swan Hill Rural City including those arising from a dam failure or retarding basin / levee bank failure incident will therefore be under the control of the appointed Incident Controller, or his / her delegated representative.

3.3.2 Incident Controller (IC)

An Incident Controller (IC) will be appointed by the VICSES (as the Control Agency) to command and control available resources in response to a flood event on the advice of the Bureau of Meteorology (or other reliable source) that a flood event will occur or is occurring. The Incident Controller responsibilities are as defined in Part 3.5 of the EMMV

3.3.3 Incident Control Centre (ICC)

As required, the Incident Controller will establish an Incident Control Centre (ICC) from which to initiate incident response command and control functions. The decision to activate an ICC rests with the Control Agency (i.e. VICSES).

Pre-determined Incident Control Centre locations are:

Level 3

- Mildura Cnr 11th Street and Koorlong Avenue (DELWP Complex)
- Bendigo Cnr Midland Highway and Taylor Street Epsom (DELWP Complex)

Level 2

- Swan Hill 17 Rutherford Street (North West SES Regional Office)
- Kerang 58 Fitzroy Street (CFA District 20 HQ)
- Bendigo 7 Rohs Road (North West SES HQ)

Divisions and Sectors

To ensure that effective Control and Command structures are in place, the Incident Controller may establish Divisions and Sectors depending upon the complexity of the event and resource capacities.

The following Divisions and Sectors may be established to assist with the management of flooding within the Municipality:

Division	Sector
Swan Hill	Swan Hill (including Pental Island)
	Beverford (including Tyntynder Flats)
	Nyah (including Nyah West)
	Lake Boga
	Lalbert
	Robinvale
	Benjeroop*
	Murrabit*
	Lake Charm*
Kerang *.	

* Note: - reporting lines for these locations may vary as water moves down the system and access from either north or south becomes restricted.

Pre-determined Division Command locations are:

- Swan Hill
- Kerang

Pre-determined Sector Command locations are:

- Swan Hill
- Beverford
- Nyah
- Lake Boga
- Lalbert
- Benjeroop
- Murrabit
- Lake Charm
- Robinvale

3.3.4 Incident Management Team (IMT)

The Incident Controller will form an Incident Management Team (IMT).

Refer to 3.5 of the EMMV for guidance on IMTs and Incident Management Systems (IMSS).

3.3.5 Emergency Management Team (EMT)

The Incident Controller will establish a multi-agency Emergency Management Team (EMT) to assist the flood response. The EMT will consist of key personnel (with appropriate authority) from stakeholder agencies and relevant organisations who need to be informed of strategic issues related to incident control and who are able to provide high level strategic guidance and policy advice to the Incident Controller for consideration in developing incident management strategies.

Organisations, including Swan Hill Rural City, required within the EMT will provide an Emergency Management Liaison Officer (EMLO) to the ICC if and as required as well as

other staff and / or resources identified as being necessary, within the capacity of the organisation.

Refer to 3.5 of the EMMV for guidance on EMTs.

3.3.6 On Receipt of a Flood Watch / Severe Weather Warning

Incident Controller or VICSES RDO (until an incident controller is appointed) will undertake actions as follows:

- Review flood intelligence to assess likely flood consequences
- Monitor weather and flood information – www.bom.gov.au
- Assess Command and Control requirements.
- Review local resources and consider needs for further resources regarding personnel, property protection, flood rescue and air support
- Notify and brief appropriate officers. This includes Regional Control Centre (RCC) (if established), State Control Centre (SCC) (if established), Council, other emergency services through the EMT.
- Assess ICC readiness (including staffing of IMT and EMT) and open if required
- Ensure flood bulletins and community information are prepared and issued to the community
- Monitor watercourses and undertake reconnaissance of low-lying areas
- Develop media and community information management strategy
- Ensure flood mitigation works are being checked by owners
- Develop and issue incident action plan, if required
- Develop and issue situation report, if required

3.3.7 On Receipt of the First and Subsequent Flood Warnings

Incident Controller/VICSES RDO (until an incident controller is appointed) will undertake actions as follows:

- Develop an appreciation of current flood levels and predicted levels. Are floodwaters, rising, peaking or falling?
- Review flood intelligence to assess likely flood consequences. Consider:
 - What areas may be at risk of inundation
 - What areas may be at risk of isolation
 - What areas may be at risk of indirect affects as a consequence of power, gas, water, telephone, sewerage, health, transport or emergency service infrastructure interruption
 - The characteristics of the populations at risk
- Determine what the at-risk community need to know and do as the flood develops.
- Warn the at-risk community including ensuring that an appropriate warning and community information strategy is implemented including details of:
 - The current flood situation
 - Flood predictions

-
- What the consequences of predicted levels may be
 - Public safety advice
 - Who to contact for further information
 - Who to contact for emergency assistance
 - Liaise with relevant asset owners as appropriate (i.e. water and power utilities)
 - Implement response strategies as required based upon flood consequence assessment.
 - Continue to monitor the flood situation – www.bom.gov.au/vic/flood/
 - Continue to conduct reconnaissance of low-lying areas

3.4 Community Information and Warnings

Guidelines for the distribution of community information and warnings are contained in the State Flood Emergency Plan.

Community information and warnings communication methods available include:

- Emergency Alert
- Phone messages (including SMS)
- Radio, including local community radio and Television
- Two-way radio
- Mobile and fixed public address systems
- Sirens
- Verbal Messages (i.e. Doorknocking)
- Agency Websites
- VICSES Flood Storm Information Line
- Variable Message Signs (i.e. road signs)
- Community meetings
- Newspapers
- Email
- Telephone trees
- Community Flood Wardens
- Fax Stream
- Newsletters
- Letter drops
- Social media and/or social networking sites (i.e. twitter and/or facebook)

Refer to **Appendix E** for the specific details of how community information and warnings are to be provided.

The release of flood bulletins and information with regard to response activities at the time of a flood event is the responsibility of VICSES, as the Control Agency.

Council has the responsibility to assist VICSES to warn individuals within the community including activation of flood warning systems, where they exist.

Responsibility for public information, including media briefings, rest with VICSES as the Control Agency.

Other agencies such as CFA, DELWP and VICPOL may be requested to assist VICSES with the communication of community flood warnings.

In cases where severe flash flooding is predicted, dam failure is likely or flooding necessitating evacuation of communities is predicted, the Incident Controller may consider the use of the Emergency Alert System and Standard Emergency Warning System (SEWS).

The Dept of Health and Human Services will coordinate information regarding public health and safety precautions.

3.5 Media Communication

The Incident Controller through the Information Unit established at the ICC will manage Media communication. If the ICC is not established the RDO will manage all media communication.

3.6 Impact assessment

Impact assessments will be conducted in accordance with part 3 of the EMMV to assess and record the extent and nature of damage caused by flooding. This information may then be used to provide the basis for further needs assessment and recovery planning by DHHS and recovery agencies.

3.7 Preliminary Deployments

When flooding is expected to be severe enough to cut access to towns, suburbs and/or communities the Incident Controller will consult with relevant agencies to ensure that resources are in place if required to provide emergency response. These resources might include emergency service personnel, food items and non-food items such as medical supplies, shelter, assembly areas, relief centres etc.

3.8 Response to Flash Flooding

Emergency management response to flash flooding should be consistent with the guideline for the emergency management of flash flooding contained within the State Flood Emergency Plan.

When conducting pre-event planning for flash floods the following steps should be followed, and in the order as given:

1. Determine if there are barriers to evacuation by considering warning time, safe routes, and resources available and etc.
2. If evacuation is possible, then evacuation should be the adopted strategy and it must be supported by a public information capability and a rescue contingency plan;
3. Where its likely people will become trapped by floodwaters due to limited evacuation options safety advice needs to be provided to people at risk advising them not to attempt to flee by entering floodwater if they become trapped, and that it may be safer to seek the highest point within the building and to telephone 000 if they require rescue. This advice needs to be provided even when evacuation may be possible, due the likelihood that not all community members will evacuate.
4. For buildings known to be structurally un-suitable an earlier evacuation trigger will need to be established (return to step 1 of this cycle).
5. If an earlier evacuation is not possible then specific preparations must be made to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as those people call for help.

During a flash flood it will often be difficult, due the rapid development of flooding, to establish evacuation (relief) centres ahead of actually triggering the evacuation as is normal practice but this is insufficient justification for not adopting evacuation.

3.9 Evacuation

The decision to recommend or warn people to prepare to evacuate or to evacuate immediately rests with the Incident Controller.

Once the decision is made VicPol are responsible for the management of the evacuation process where possible. VICSES and other agencies will assist where practical. VICSES is responsible for the development and communication of evacuation warnings.

VicPol and/or Australian Red Cross may take on the responsibility of registering people affected by a flood emergency including those who have been evacuated.

Refer to section 3.8 of the EMMV and the Evacuation Guidelines for guidance of evacuations for flood emergencies.

Refer to **Appendix F** of this Plan for general information regarding evacuation arrangements for identified locations within the Swan Hill Municipality.

3.10 Flood Rescue

Victoria Police are the responsible agency for rescue from land or water within Victoria.

VICSES may conduct flood rescues. Appropriately trained and equipped VICSES units or other agencies that have appropriate training, equipment and support may carry out rescues.

Rescue operations may be undertaken where voluntary evacuation is not possible, has failed or is considered too dangerous for an at-risk person or community. An assessment of available flood rescue resources (if not already done prior to the event) should be undertaken prior to the commencement of Rescue operations.

Rescue is considered a high-risk strategy to both rescuers and persons requiring rescue and should not be regarded as a preferred emergency management strategy. Rescuers should always undertake a dynamic risk assessment before attempting to undertake a flood rescue.

NOTE: There are no specialised Swift Water Rescue resources within the Swan Hill Rural City Municipal area. Should these resources be required they will need to be accessed through the ICC/VICSES Regional Duty Officer

3.11 Aircraft Management

Aircraft can be used for a variety of purposes during flood operations including evacuation, resupply, reconnaissance, intelligence gathering and emergency travel.

Air support operations will be conducted under the control of the Incident Controller.

The Incident Controller may request aircraft support through the State Air Desk located at the State Control Centre will establish priorities.

Suitable airbase facilities are located at:

- Swan Hill Aerodrome
- Robinvale Aerodrome

A number of other facilities exist that can support rotary winged aircraft this includes numerous sporting grounds and ovals across the shire.

3.12 Resupply

Communities, neighbourhoods or households can become isolated during floods as a consequence of road closures or damage to roads, bridges and causeways. Under such circumstances, the need may arise to resupply isolated communities/properties with essential items.

When predictions/intelligence indicates that communities, neighbourhoods and/or households may become isolated, VICSES will advise businesses and/or households that they should stock up on essential items.

After the impact, VICSES can support isolated communities through assisting with the transport of essential items to isolated communities and assisting with logistics functions.

Resupply operations are to be included as part of the emergency relief arrangements with VICSES working with the relief agencies to service communities that are isolated.

3.13 Essential Community Infrastructure and Property Protection

Essential Community Infrastructure and Property (e.g. residences, businesses, roads, power supply etc.) may be affected in the event of a flood.

The Swan Hill Rural City maintains a small stock of sandbags at its Karinie Street Depot; these are for councils use in protecting its critical infrastructure. Back-up supplies are available through the VICSES Regional Headquarters. The Incident Controller will determine the priorities related the use of sandbags, which will be consistent with the strategic priorities.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of Essential Community Infrastructure. Other high priorities may include for example the protection of historical buildings.

Property may be protected by:

- Sandbagging to minimise entry of water into buildings
- Encouraging businesses and households to lift or move contents
- Construction of temporary levees in consultation with the CMA, LGA and VICPOL and within appropriate approval frameworks.

The Incident Controller will ensure that owners of Essential Community Infrastructure are kept advised of the flood situation. Essential Community Infrastructure providers must keep the Incident Controller informed of their status and ongoing ability to provide services.

3.14 Disruption to Services

Disruption to services other than essential community infrastructure and property can occur in flood events. Refer to appendix C for specific details of likely disruption to services and proposed arrangements to respond to service disruptions in Swan Hill Rural City.

3.15 Road Closures

Swan Hill Rural City and VicRoads will carry out their formal functions of road closures including observation and placement of warning signs, road blocks etc. to its designated local and regional roads, bridges, walking and bike trails. Swan Hill Rural City staff may also liaise with and advise VicRoads as to the need or advisability of erecting warning signs and / or of closing roads and bridges under its jurisdiction. VicRoads are responsible for designated main roads and highways and Councils are responsible for the designated local and regional road network.

VICROADS and Swan Hill Rural City will communicate community information regarding road closures. The table below provides some basic details of Council and VicRoads roads that were affected during the 2011 flooding? At the time of completing this document there was no information to indicate, either a flood height or what depth of water was across the roads, this information should be used for indicative purposes only.

Rural City of Swan Hill

Greater Swan Hill Area.

Road	Where	Responsible Authority
Back Boga Road	– Closed between Donald Swan Hill Road and Palframan Lane	Council
Bailey Road	– Closed between Murray Valley Highway and Tresco – Mystic Park Roads	Council
Burns Road	– Closed at Lalbert Creek	Council
Ceveri Road	– Closed between Dalrymple Road and Lake Boga – Ultima Road.	Council
Chillingollah Road	- Closed between Nowie Road and Pira Road.	Council
Connor Road	– Closed at Lalbert Creek.	Council
Date Road	– Closed at Lalbert Creek.	Council
Dunstan Road	– Closed at Lalbert Creek.	Council
Good Lane	– Closed at Lalbert Creek	Council
Meatian West Road	– Closed at Lalbert Creek	Council
Murnungin Road	– Closed at Lalbert Creek.	Council
Oliver Road	– Closed at Lalbert Creek	Council
Pental Island Road	– Closed between Caelli Lane and Fish Point Road	Council
Power Road	– Closed at Lalbert Creek	Council
Rob Roy Road	– Closed between Fish Point Road and McCabe Road	Council
Stewart Road	- Closed at Lalbert Creek	Council
Tomamichel Road	– Closed at Lalbert Creek	Council
Yarraby Road	– Closed between Prescott Lane and Pearse Lake Road	Council
North South Road	- Closed between Byrnes Road and Lake Road at Woorinen	Council
Culgoa-Ultima Road	– Closed between Ultima and Culgoa	Council
Threadgold Road	– Closed between Chillingollah Road and Bulga Road	Council
Meatian-Mystic Park Road	– Closed between Swan Hill - Donald Road and Quambatook Road	Council

Robinvale Area

Road	Where	Responsible Authority
Buckley Rd	- Closed between Lake Carpul Rd & Lake Powell Rd	Council
Curran Rd	- Closed between Robinvale-Sealake Rd and Lake Powell Rd	Council
Lake Carpul Rd	- Closed between Murray Valley Hwy and Lake Powell Rd	Council
Lake Powell Rd	– Closed Robinvale – Sea Lake Rd and Hattah - Robinvale Rd.	Council
El-Alamein Road	Closed between Robinvale Sea Lake Road and Jezzine Road	Council
Cloverdale Village	– Closed between Sanananda Road, Salamaua Road and Bogadjim Roads	Council
Damascus Road	- Closed between Swan Hill Sea Lake Road and El Alamein Road	Council
Jezzine Road	– Closed between El Alamein Road and Walsh Road	Council

3.16 Dam Failure

DELWP is the Control Agency for dam safety incidents (e.g. breach, failure or potential breach / failure of a dam), however VICSES is the Control Agency for any flooding that may result.

There are no major dams located within the municipality, with a potential to cause structural and community damage although there is a small structure situated on the Little Murray River located at the end of the Little Murray Weir Road, this structure is known as the Little Murray Weir and is what is called an in stream structure. Should this structure fail for some reason it is not expected to have a significant flood impact on Swan Hill. This structure is expected to be removed in the near future.

There are a number of extremely large dams, these are all located many kilometres up-stream of Swan Hill on the, Murray, Loddon, Goulburn and Campaspe river systems.

These dams are;

- Lake Hume near Albury (Murray River)
- Lake Mulwala near Yarrawonga, (Murray River)
- Lake Dartmouth (Murray River)

-
- Torrumbarry Weir (Murray River)
 - Cairn Curran (Loddon River)
 - Lake Eildon (Goulburn River)
 - Lake Eppalock (Campaspe River)

Any of these, if compromised could impact on the municipality, the degree of impact is uncertain, due to the location and distance from Swan Hill of these facilities. The warning time to impact in Swan Hill is expected to be >24 hours.

3.17 Waste Water related Public Health Issues and Critical Sewerage Assets

Inundation of critical sewerage assets including septic tanks and sewerage pump stations may result in water quality problems within the Municipality. Where this is likely to occur or has occurred the responsibility agency for the critical sewerage asset should undertake the following:

- Advise VICSES of the security of critical sewerage assets to assist preparedness and response activities in the event of flood;
- Maintain or improve the security of critical sewerage assets;
- Check and correct where possible the operation of critical sewerage assets in times of flood;
- Advise the ICC in the event of inundation of critical sewerage assets.
- Consultation also needs to occur with Goulburn Murray Water regarding the rural drain and channel system.

It is the responsibility of the Swan Hill Rural City, Environmental Health Officer to inspect and report to the MERO and the ICC on any water quality issues relating to flooding this should also be done in consultation with Lower Murray Water.

3.18 After Action Review

VICSES will coordinate the after action review arrangements of flood operations as soon as practical following an event.

All agencies involved in the flood incident should be represented at the after action review.

Part 4. EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

Arrangements for the recovery from a flood incident within the Swan Hill Rural City are detailed in the Swan Hill Rural City MEMP and/or the Recovery Sub-plan.

4.2 Emergency Relief

The decision to recommend the opening of an emergency relief centre rests with the Incident Controller. Incident Controllers are responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Relief and Recovery Plan (Part 4 of the EMMV).

The range and type of emergency relief services to be provided in response to a flood event will be dependent upon the size, impact, and scale of the flood. Refer to 4.4 of the EMMV for details of the range of emergency relief services that may be provided.

Suitable relief facilities identified for use during floods are detailed in the MEMP.

Details of the relief arrangements and activation of services are available in the Swan Hill Rural City Council MEMPlan.

4.3 Animal Welfare

Matters relating to the welfare of livestock, companion animals and wildlife (including feeding and rescue) are to be referred to DEDJTR.

Requests for emergency supply and/or delivery of fodder to stranded livestock or for livestock rescue are to be passed to DEDJTR.

Matters relating to the welfare of wildlife are to be referred to DEDJTR.

The following facilities are available should they be required:

- Swan Hill pound Sea Lake Rd Swan Hill (limited capacity domestic animals only)
- Swan Hill sale yards Karinie Street Swan Hill. .
- Robinvale

4.4 Transition from Response to Recovery

VICSES as the Control Agency is responsible for ensuring effective transition from response to recovery. This transition will be conducted in accordance with existing arrangements as detailed in Part 3 Section 3.10 of the EMMV.

APPENDIX A - FLOOD THREATS FOR SWAN HILL MUNICIPALITY

1. General

Swan Hill is located in the north west of Victoria, approximately 300 km from Melbourne. It is situated on the Murray River downstream of its confluence with the Loddon River. Swan Hill is also located just downstream of the confluence of the Murray and Little Murray Rivers.

Floods in Swan Hill were severe at the end of the last century, but have reduced due to the construction of levees along most of the Murray River.

Flooding in Swan Hill will eventuate from two water courses: the Murray River and the Loddon River. It is possible in a severe flood that the Avoca River, which discharges into terminal lakes, will overflow through Swan Hill, but this is unlikely and will probably result in minor increases to flooding (GHD et al, 1986).

2. Historic Floods

There have been several historical floods that have had an effect to Swan Hill. These include:

- The 1870 flood along the length of the Murray River, which ranks the highest at most gauging stations along the Murray River. This flood resulted in large scale flooding, and efforts have been made since to reduce rural and urban impacts through the construction of levees in both Victoria and New South Wales (GHD et al, 1986).
- The 1916 major floods in the Goulburn, Campaspe, Loddon and Murray (GHD et al, 1986)
- The 1956 flood was classified as the first major flood in recent history. At Swan Hill, the 1956 flood was 0.25m lower than the 1870 flood (GHD et al, 1986), and reached a level of 67.6 mAHD at the Swan Hill gauge (409204) (MDBC, 1992).
- The 1975 flood reached a height of 67.7 mAHD at the Swan Hill gauge (409204) (MDBC, 1992) – this was reported as 67.5 mAHD by SKM (1998, Appendix A). During this flood, sandbagging was required to prevent flooding from occurring (Binnie et al, 1992)
- The 2011 flood reached 67.487 mAHD at the Swan Hill gauge this is just above the Minor flood level (67.421 mAHD as provided by BOM flood class levels) at Swan Hill. Some sandbagging occurred at several identified low spots on River Road, this action was taken in anticipation of a Moderate to Major flood occurring.

Since the levee construction in the 1920s, all floods have been contained with-in the levees which are raised when necessary during particular floods (GHD et al, 1986).

Due to the complex nature of the waterways (further description in the section below), comparison between different flood events can be difficult. The flooding effects along the Murray of a Loddon flood depends on whether or not the Murray is in flood upstream of the confluence with the Murray.

Flooding at Swan Hill is typically influenced by Loddon River, flood frequency analyses of historic flows within the Loddon River are provided below.

NOTE: During the 2011 event a number of calls were received concerned that the water had broken out of the river system and Swan Hill Township was going to be flooded from the west, it was ascertained that this water was actually heavy rainfall runoff coming from the Mallee through or over the sand hills and running down Felton Drive.

APPENDIX A FLOOD THREATS SWAN HILL MUNICIPALITY

The figures below show the hydrograph of several historical floods along the Loddon River. They provide an indication of the rate of rise and fall along with the total peak flow.

Table 1 Estimated frequency of historical Loddon River floods (Source: SKM, 1999)

Year	Peak Flow at Benjeroop (ML/d)	Annual Exceedance Probability (AEP)
1909	31,100	1%
1933	26,100	2%
1916	21,770	3.5%
1975	17,280	6.5%
1956	16,400	7.5%
1973	15,900	8%
1981	15,550	8.5%
1974	10,800	20%
1993	9,490	25%

If required detailed hydrographs for all these events can be accessed from VICSES North West Region or via the North Central Catchment Management Authority.

The flood levels for the Murray River at Swan Hill are as follows:

Minor	4.5 meters
Moderate	4.6 meters
Major	4.7 meters

These reading are taken from the Gauging Station (# 409204C) on the Murray River at Swan Hill.



Figure 2.1 Swan Hill Murray River gauging station. (Number 409204C)

APPENDIX A FLOOD THREATS SWAN HILL MUNICIPALITY

Gauge Location: Murray River downstream Swan Hill

Table 2 Murray River Gauge downstream Swan Hill (No 409204C.)

Event/Category	Gauge Height at this site		Flow	Probability frequency years
	Meters	AHD Height		
		67.99	40,000 (guide only)	
1% ARI event			36,200	100 year
2% ARI event			35,800	50 year
1975 event		67.70	35,300	
Major	4.70	67.621		
5% ARI event			34,800	20 years
Moderate	4.60	67.521		
10% ARI event			33,600	10 years
Minor	4.50	67.421		
20% ARI event			31,500	5 years
		67.38	30,000 (guide only)	
50% ARI event			25,900	2 years

(Binnie & Partners, 1992)

Data is still being sought to complete this table. (It should also be noted that there is a significant restriction on flows at Swan Hill this is due to the constricting under the Swan Hill Bridge (26,000 ML per day)

Within the VFD, considering a distance of approximately 4 km upstream and downstream of Swan Hill, the following information exists:

- Heights from historical flood events available (including the number of heights available for that flood):
 - 1906 (7)
 - 1909 (1)
 - 1956 (6)
 - 1975 (5)
 - 1981 (1)
 - 1983 (1)
 - 1993 (5)
- Extent of the 100 year ARI event
- Extent of the floodway
- Extents of the following historical events
- December 1975 (note that this extent seems to be inaccurate because it crosses directly through the 'Hill' in Swan Hill).
- Extent of the January 2011

3. Description of Major Waterways and Drains

Note that any intelligence in these tables MUST have regard for changes within catchments that modify likely flood behaviour.

Waterway or Drain	Description
Murray River	At Barham, maximum flows are limited to 35000 ML/d for all major floods due to channel capacity (MDBC, 1992) Both private and town levees line both sides of the river and provide protection to different levels. The discharge in the river at Gonn Crossing cannot exceed its threshold of approximately 26000 ML/d.
Natural effluents along the Murray River	Between Barham and Swan Hill, there are only 2 of the 6 natural effluents that remain open (Little Merran and Waddy Creeks). The remainder have been blocked by levees (MDBC, 1992)
Loddon River	The Loddon River is the major driver for floods in Swan Hill. The Loddon flows into the Little Murray, but is influenced by water levels in the Murray river adjoining Pental Island and for a short distance upstream. Flooding of the Loddon River also creates issues where the Loddon enters the Little Murray River, a backwater effect is created at this location which causes raised river levels at the Murray / Little Murray junction and forces more flow along the Big Murray (SKM, 1999)
Avoca River	Unlikely to have an impact on floods in Swan Hill, there is a significant flow and time lag as the Avoca flows into a series of terminal lakes the last of these being Lake Boga where an outfall flows from the lake and into the Little Murray River. Issues are likely to occur if there is simultaneous flooding of the Little Murray, Murray, Loddon and Avoca Rivers
Swan Hill and Robinvale	Various locations where the urban storm water enters the river, If the river is high there may be issues of flash flooding due to urban storm water retention and its inability to exit the storm water system.

4. Details of relevant gauges

Station No	River / Creek	Station	Flood Class Levels (m)			Comments
			Minor	Moderate	Major	
408200	Avoca	Yawong Weir	3.0 145.7 mAHD	5.0 147.7	5.30 1478.0	Zero gauge 142.719 mAHD
408900		Charlton (town) James Paterson Bridge	4.0 125.6 mAHD	5.9 127.5 mAHD	7.5 129.1 mAHD	Also visual height gauge on west side of bridge. Zero gauge 121.64 mAHD
408212		Charlton D/S	3.50 123.1 mAHD	5.00 125.3 mAHD	7.00 126.87 mAHD	*Zero gauge 119.57 mAHD
408203		Quambatook	2.00 93.408 mAHD	2.20 93.608 mAHD	2.40 93.808 mAHD	Zero gauge 91.408 mAHD
407240	Loddon	Laanecoorie Res	1.50 2,000 ML/d	3.00 8,500 ML/d	5.50 43,000 ML/d	Zero gauge 149.518 mAHD
407320		Loddon Weir D/S	3.30 2,030 ML/d	6.00 7,120 ML/d	7.00 10,380 ML/d	Zero gauge 100.635 mAHD
407205		Appin South	2.80 82.916 mAHD	3.10 83.216 mAHD	3.30 83.416 mAHD	
407202		Kerang (MVH Bridge)	77.00 mAHD	77.50 mAHD	77.80 mAHD	
	Edwards	Deniliquin	4.60 87.774 mAHD	7.20 90.374 mAHD	9.40 92.574 mAHD	
409215	Murray	Barmah	6.00 95.287 mAHD	6.50 95.787 mAHD	7.00 96.287 mAHD	
409200		Echuca (Vic)	93.50 mAHD	93.90 mAHD	94.40 mAHD	
409207		Torrumbarry D/S	7.30 39,000 ML/d	7.60 48,300 ML/d	7.80 56,800 ML/d	Zero gauge 78.545 mAHD
409005		Barham	4.50 75.934 mAHD	5.80 77.234 mAHD	6.10 76.534 mAHD	
409204		Swan Hill	4.50 67.421 mAHD	4.60 67.521 mAHD	4.70 67.621 mAHD	
414203		Euston	9.10	9.80	10.30	

5. Critical Infrastructure

5.1 Lower Murray Water Infrastructure.

5.1.1 Swan Hill

Water Supply: The main raw water pumping station near the Swan Hill Bridge was sandbagged during the 2011 flood event, this was done as a precaution and on reflection was not required. Water would need to have risen by at least another 300mm before there was any concern on it entering the building. Should this facility be impacted it may be necessary to have water restrictions put into place to conserve available drinking water. The Key Assets are the Water Treatment Plant in Monash Drive, western tanks and the relift at Woorinen Road.

Sewerage: All the main sewerage pump stations are protected by the town levee, If the integrity of the levee became affected consideration would need to be given to protecting the main pump stations at Chapman Street and Woorinen Road.

5.1.2 Woorinen.

Water supply: The Key asset is the relift station and tank on Woorinen Road.

Sewerage: No issues as local septic systems in place.

5.1.3 Nyah/Nyah West

Water supply: Water is supplied from the Swan Hill via the Woorinen Nyah pipeline to the Two Bays Storage Tank and from there distributed to the Nyah West Elevated Storage, the only issue is if the main Swan Hill facilities are affected.

Sewerage: The main sewer pump station is located in Yarrby Road near the entrance to the recreation reserve, only issue that may arise is if the integrity of the levee became affected..

5.1.4 Lake Boga

Water supply: Water is supplied from Swan Hill via a pipeline a short section of this runs outside the town levee system with the only issue being if the pipe ruptured in this area and the ability to access and fix the problem. If with pipeline was shut down potable water would need to be trucked into Lake Boga until the damage could be repaired.

Sewerage: If the lake flooded would need to consider the isolating of any sewer pump stations in the network next to the lake.

5.2 Other Infrastructure

5.2.1 Communications network.

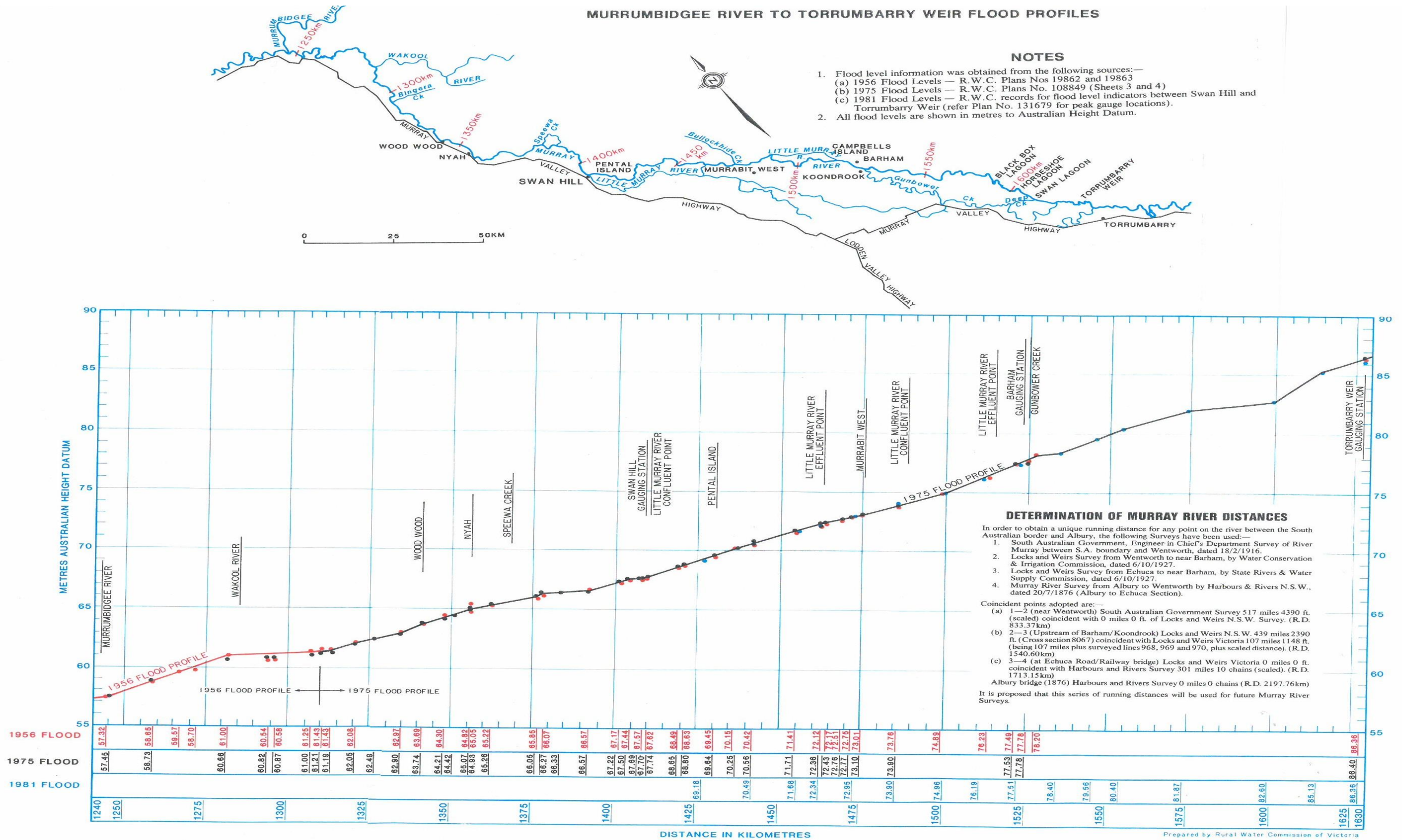
During the 2011 flood event, there was no disruption to the service caused by any local inundation of facilities, some disruption occurred due to infrastructure being impacted at other locations, these are identified within the local flood plans.

5.2.2 Electrical power kiosks/zone sub stations.

During the 2011 flood event no electrical infrastructure was impacted within the municipality. At this time there was significant concern regarding the Kerang power distribution sub-station. Had this facility be impacted it would have had a significant effect on the power supplies within the municipality and the greater north west area. This sub-station is now protected by a properly constructed bund which provides protection to 300mm above the 1% AEP.

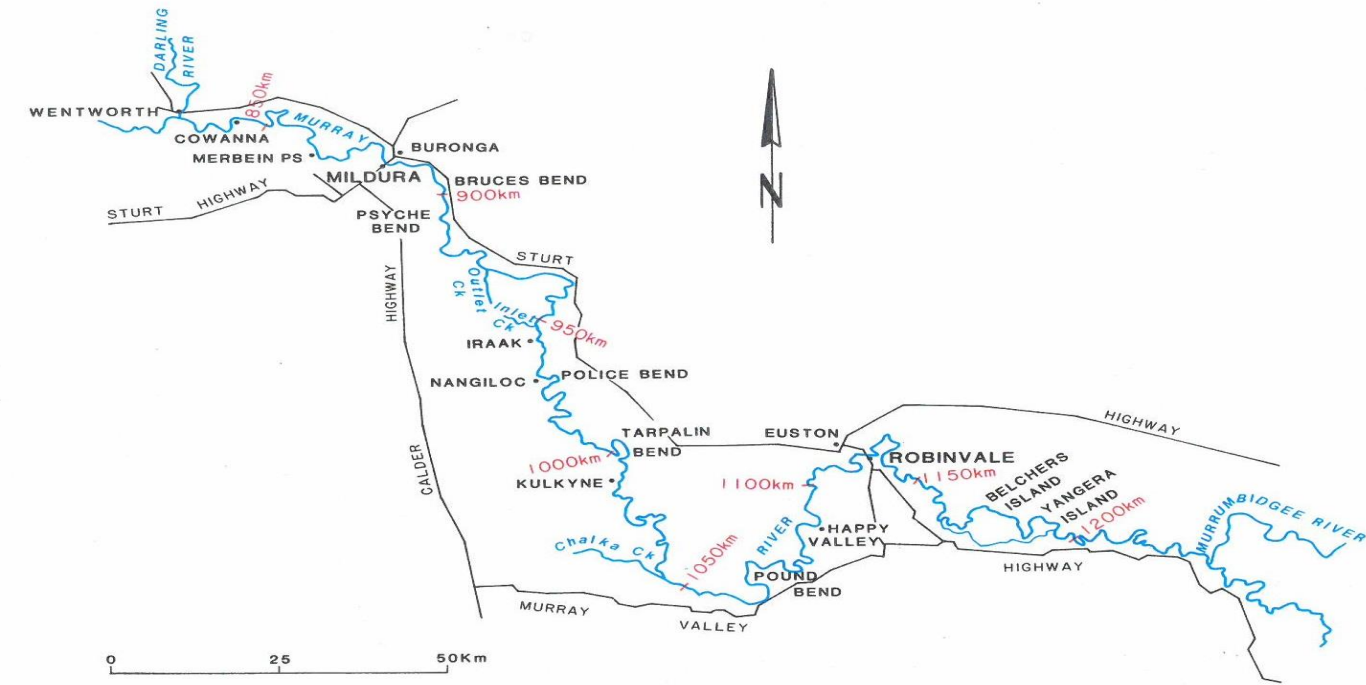
APPENDIX B – TYPICAL FLOOD PEAK TRAVEL TIMES

B MURRUMBIDGEE RIVER TO TORRUMBARRY WEIR



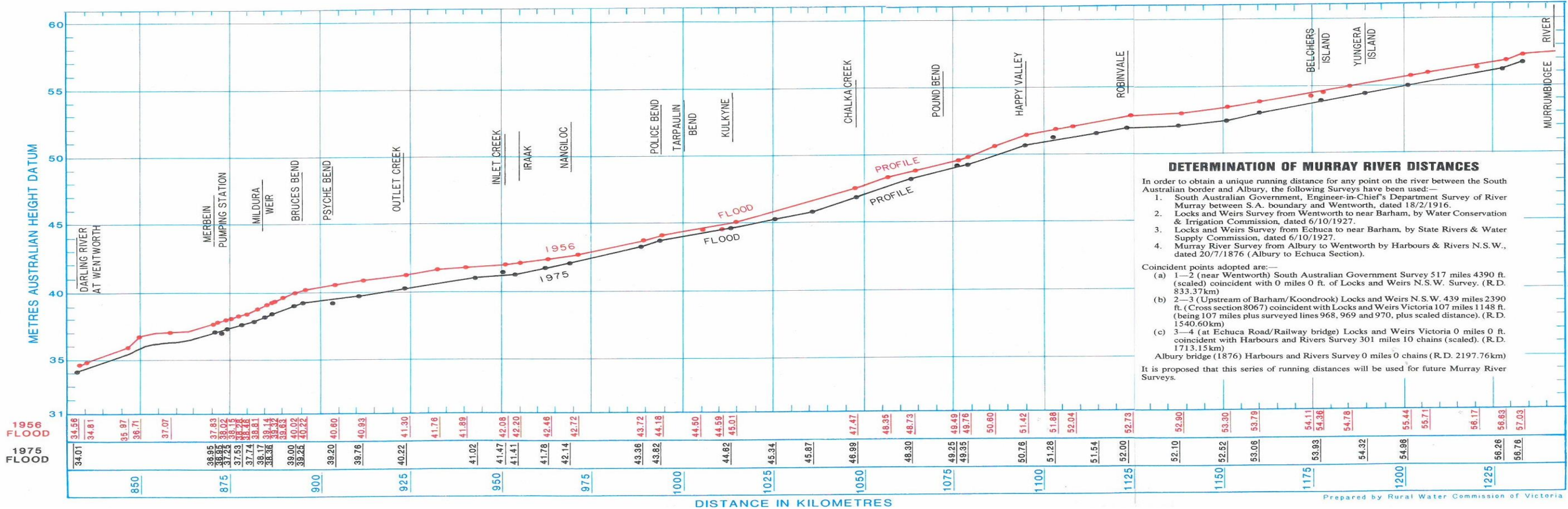
B WENTWORTH TO MURRUMBIDGEE RIVER

WENTWORTH TO MURRUMBIDGEE RIVER FLOOD PROFILES



NOTES

- Flood level information was obtained from the following sources:—
 (a) 1975 Flood Levels — R.W.C. Plan No. 108849 (Sheets 4-6) and R.W.C. Plan No. 136092.
 (b) 1956 Flood Levels — R.W.C. Plan No. 19862 and Plan No. 141286.
 - 1956 and 1975 Flood levels were also obtained at Locks 6, 7, 8 and 9 along the Murray River between Wentworth and just beyond the South Australian border. These levels are not shown on this longitudinal section but are as follows:—
- | Location | River R.D. (Km) | 1956 Flood Level (m A.H.D.) | 1975 Flood Level (m A.H.D.) |
|------------------|-----------------|-----------------------------|-----------------------------|
| Lock No. 6 | 635.3 | 22.03 | 20.92 |
| S.A./Vic. border | 652.9 | — | — |
| Lock No. 7 | 702.9 | 26.33 | 25.72 |
| Lock No. 8 | 732.0 | 28.00 | 27.39 |
| Lock No. 9 | 771.4 | 30.76 | 29.98 |
- All floods levels are shown in metres to Australian Height Datum.



DETERMINATION OF MURRAY RIVER DISTANCES

In order to obtain a unique running distance for any point on the river between the South Australian border and Albury, the following Surveys have been used:—

- South Australian Government, Engineer-in-Chief's Department Survey of River Murray between S.A. boundary and Wentworth, dated 18/2/1916.
- Locks and Weirs Survey from Wentworth to near Barham, by Water Conservation & Irrigation Commission, dated 6/10/1927.
- Locks and Weirs Survey from Echuca to near Barham, by State Rivers & Water Supply Commission, dated 6/10/1927.
- Murray River Survey from Albury to Wentworth by Harbours & Rivers N.S.W., dated 20/7/1876 (Albury to Echuca Section).

Coincident points adopted are:—

- 1—2 (near Wentworth) South Australian Government Survey 517 miles 4390 ft. (scaled) coincident with 0 miles 0 ft. of Locks and Weirs N.S.W. Survey. (R.D. 833.37km)
- 2—3 (Upstream of Barham/Koonooka) Locks and Weirs N.S.W. 439 miles 2390 ft. (Cross section 8067) coincident with Locks and Weirs Victoria 107 miles 1148 ft. (being 107 miles plus surveyed lines 968, 969 and 970, plus scaled distance). (R.D. 1540.60km)
- 3—4 (at Echuca Road/Railway bridge) Locks and Weirs Victoria 0 miles 0 ft. coincident with Harbours and Rivers Survey 301 miles 10 chains (scaled). (R.D. 1713.15km)

Albury bridge (1876) Harbours and Rivers Survey 0 miles 0 chains (R.D. 2197.76km)

It is proposed that this series of running distances will be used for future Murray River Surveys.

APPENDIX C – ROBINVALE FLOOD EMERGENCY PLAN

APPENDIX C1 – ROBINVALE FLOOD EMERGENCY PLAN

1. Overview of Flooding Consequences

Areas South of Robinvale are prone to significant outflows from the Murray, however there is no risk to homes or roads. North of Robinvale is generally high land which does not come under threat and only pumping sites need protection.

It should be noted Murray River flows in the Robinvale area are significantly affected by flows entering the river from the Murrumbidgee/Wakool/Edwards system upstream of Robinvale. However, significant areas of floodplain are available on both sides of the Murray in the Robinvale area and this negates any significant threat that might otherwise exist.

2. Flood Mitigation

The Eastern section of the Robinvale town-ship is protected by a significant but uncontrolled levee bank. This levee extends approximately 5 km along the west bank (Victorian side) of the Murray River in the township of Robinvale. This levee was constructed over 50 years ago, and it has no formal maintenance regime and currently receives occasional maintenance by local landowners. The levee primarily protects the township of Robinvale from Ninth Road in the south to the Murray River Bridge (Murray Valley Highway).

The Swan Hill Rural City Council is examining the issues concerning the ongoing maintenance of this particular levee. A full engineering analysis of the Robinvale Levee was finalised in January 2002

A significant flash flooding problem can arise at Robinvale; this occurs when the river is in flood and rainfall collects behind the levee system and due to the nature of the drainage system the water is not able to drain into the river.



Figure C.1 Robinvale Township during 1956 Flood (source Price Merrett Consulting P/L)

3. Flood Impacts and Required Actions

- The last significant flood events which affected Robinvale occurred in the years 1974 and 75 these were considered very large events but no information is available as to comparisons between these events and flood levels.

APPENDIX C – ROBINVALE FLOOD EMERGENCY PLAN

- During the January/February 2011 event the major cause of the damage in Robinvale was due to flash flooding. This being due to several reasons including, the drainage system not being able to cope and water collecting behind the levee system and then not being able to drain away.
- According to the last Robinvale Levee audit conducted in 2002 the levee is in very poor condition. **See Table C2.1 below** for details of High risk sites for potential overtopping or failure. Flood peak travel times are contained in Appendix **B1 and B2**
- The probability of the Robinvale town-ship being flooded by a riverine event is low but consequence of the impact of this type of event in Robinvale would be high.
- The Robinvale Caravan Park is very vulnerable as it is situated between River Road and the Murray River, just to the east of the Murray Valley Highway – Murray River Bridge.
- Anecdotal evidence suggests that some houses in Kennedy St are vulnerable to flooding events this is said to have occurred in the 1974 flood event.
- 10-15 houses in the vicinity of Bogadjim Rd in the location of 'Cloverdale' which is a low-lying area to the south east of Robinvale township experienced a flash flood event in 2011 this was due to significant rainfall in the area.
- There are also identified risks to sewerage pumping station and the domestic town water pumping station in Ryans Rd. The domestic pumping station is located above the 1956 flood level but there are some concerns relating to earth movement and the possibility of distribution pipes being damaged.

Table C2. 1

Reference Number	Chainage	Land	Adjacent Land	Remarks
1	468.6	C.L	Lot 72	Weak spot from traffic crossing (Ninth Road)
2	568	P.L	Lot 73	Rabbit holes causing major damage
3	655	P.L	Lot 70	Rabbit holes causing major damage
4	732	C.L	Lot 70	Rabbit holes causing major damage
5	896	C.L	Lot 69	Rabbit holes causing major damage
6	1054	C.L	Lot 68	Weak spot from traffic crossing (Seventh Road)
7	1137.9	C.L	Lot 33	Local drop in crest level
8	1270.8	C.L	Lot 32	Weakness due to tree, traffic crossing (Sixth Road) and local drop in crest level
9	1665.9	C.L	Lot 19	Weak spot from traffic crossing (Fifth Road)
10	1953.4	C.L	Lot 13	Weak spot from traffic crossing (Fourth Road) and local drop in crest level (100 m).
11	2137.6	C.L	Lot 8	Weak spot from traffic crossing (Third Road)
12	2193.7	C.L	Lot 7	Weak spot from traffic crossing
13	2414.3	C.L	Lot 3C	Weak spot from traffic crossing (Second Road)
14	2510	C.L	Lot 3B	Right Bank eroding
15	2808	C.L	LPT 139579 (1)	Weak spot from traffic crossing
16	1332.5 – 2970.9	C.L	LP 75611 (1)) Local low point in levee around NRE depot (now DELWP)

(Price Merrett Consulting Pty Ltd. (2002). *Robinvale Levee Audit Engineering Analysis Final Report.*)

Legend: C.L = Crown Land

P.L = Public Land

Notes:

1. The remarks are listed from the observations made by surveyors during the course of the levee survey.
2. These observations reflect only obvious faults and do not purport to cover all likely faults.

APPENDIX C – ROBINVALE FLOOD EMERGENCY PLAN

3. Items have not been ranked in order of priority since they are all spot locations requiring attention and the nature of their problems indicate difficulty in determining what extent of the levee and penetration into the structure the defects exist. It is indicative that each location has an increased but unknown probability of failure.

4. Command, Control and Coordination

To ensure that effective Command and Control are in place, the Incident Controller may establish Divisions and Sectors depending upon the complexity of the event and resource capacities.

Under this structure Robinvale will become a sector of the Swan Hill Divisional Command as per the table below. Control of the event will be established via this structure.

Division	Sector
Swan Hill	Lake Boga
	Lalbert
	Swan Hill (including Pental Island)
	Beverford (including Tyntynder Flats)
	Nyah (including Nyah West)
	Robinvale

5. Relevant Gauge Information.

Gauge Location: Murray River at Euston

Murray River Gauge a Euston (No. 414203)

Event/Category	Gauge Height at this site		Flow	Probability frequency years
	Meters	AHD Height		
1% ARI event			339,000	100 year
August 1956	10.59	52.43	302,000	
2% ARI event	10.43	52.27	275,000	50 year
Major	10.30	52.14	270,000	
July 1931	10.25	52.09	248,000	
4% ARI event	10.03	51.87	218,000	25 years
Nov 1975	9.91	51.75	205,000	
Oct 1974	9.84	51.68	198,000	
Moderate	9.80	51.64	195,000	
October 1955	9.59	51.43	173,000	
November 1993	9.56	51.40	171,000	
10% ARI event	9.32	51.16	152,000	10 years
Minor	9.10	50.94	145,000	
20% ARI event	8.50	50.34	108,000	5 years

Note – In Flash Flood areas without gauges, it will only be possible to provide a general description of likely flood impacts.

Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS.

APPENDIX D - FLOOD EVACUATION ARRANGEMENTS

Phase 1 - Decision to Evacuate

The Incident Controller may make the decision to evacuate an at-risk community under the following circumstances:

- Properties are likely to become inundated;
- Properties are likely to become isolated and occupants are not suitable for isolated conditions;
- Public health is at threat as a consequence of flooding and evacuation is considered the most effective risk treatment. This is the role of the Health Commander of the incident to assess and manage. Refer to the State Health Emergency Response Plan (SHERP) for details);
- Essential services have been damaged and are not available to a community and evacuation is considered the most effective risk treatment.

The following should be considered when planning for evacuation:

- Anticipated flood consequences and their timing and reliability of predictions;
- Size and location of the community to be evacuated;
- Likely duration of evacuation;
- Forecast weather;
- Flood Models;
- Predicted timing of flood consequences;
- Time required to conduct the evacuation;
- Time available to conduct the evacuation;
- Evacuation priorities and evacuation planning arrangements;
- Access and egress routes available and their potential flood liability;
- Current and likely future status of essential infrastructure;
- Resources required to conduct the evacuation;
- Resources available to conduct the evacuation;
- Shelter including Emergency Relief Centres, Assembly Areas etc.;
- Vulnerable people and facilities;
- Transportation;
- Registration
- People of CALD background and transient populations;
- Safety of emergency service personnel;
- Different stages of an evacuation process.

The decision to evacuate is to be made in consultation with the MERO, MERC, DHS, Health Commander and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS.

The table below details triggers for evacuation, if these heights are predicted or are likely to occur evacuation should be considered

Sector	Gauge	Trigger
Lake Boga	No specific gauges at this location	GMWater will monitoring inflow to the Lake if this is expected to or does exceed outflow through 6/7 channel (Avoca outfall) GMWater will advise the ICC as residential properties around the lake may be impacted.
Pental Island	No specific gauges at this location	
Tyntynder Flats	No specific gauges at this location	

The table below details time required to evacuate established areas.

Sector	Likely time required for evacuation (including resource assumptions)

Phase 2 – Warning

Warnings may include a warning to prepare to evacuate and a warning to evacuate immediately. Once the decision to evacuate has been made, the at-risk community will be warned to evacuate. Evacuation warnings can be disseminated via methods listed in part 3 of this plan.

Evacuation warning messages will be developed and issued by VICSES in consultation with the MERO, MERC, DHS and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

Phase 3 – Withdrawal

Withdrawal will be controlled by VICPOL. VICSES will provide advice regarding most appropriate evacuation routes and locations for at-risk communities to evacuate to, etc.

VICSES, CFA, AV and Local Government will provide resources where available to support VICPOL/VICROADS with route control and may assist VICPOL in arranging evacuation transportation.

VICPOL will control security of evacuated areas.

Evacuees will be encouraged to move using their own transport where possible. Transport for those without vehicles or other means will be arranged via the MERC and or Police Evacuation Commander and the MERO

Possible Evacuation Routes to be used:

Sector	Evacuation Route	Evacuation route closure point and gauge height of closure
Lake Boga	Via the Murray Valley Hwy, head north west to Swan Hill	This route is expected to remain open even during major flood events
Pental Island	In a major flood event the Loddon floodway will be operating this means that the Island will be split into two, from the eastern end of the island the	It is expected that the Fish Point Bridge would be closed during a major flood event this would isolate the community to the Eastern side of the Loddon floodway.

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS.

	egress is via the Fish Point Bridge, then via the Murray Valley Highway to either Lake Boga or Swan Hill. From the Western end of the Island egress is via the Pental Island Road into Swan Hill	

Landing zones for helicopters are located at:

- Swan Hill Aerodrome.
- Swan Hill Showgrounds and football ovals
- Ken Harrison Reserve.
- There are numerous other locations within the municipality that are suitable landing sites for rotary winged aircraft.

Special needs groups will be/are identified in Council's 'residents at risk' register. This can be done through community network organisations. Further information on Council's 'residents at risk' register can be obtained from Municipal Recovery Manager, DHS or Police.

Phase 4 – Shelter

Relief Centres and/or assembly areas which cater for people's basic needs for floods may be established to meet the immediate needs of people affected by flooding.

These facilities will be established on an as needed basis, at locations that are safe from the effects of the flood event. A number of sites are already identified in the municipality, details of which are contained in the Swan Hill Rural City Municipal Emergency Management Plan

VICPOL in consultation with VICSES will liaise with Local Government and DHS (where regional coordination is required) via the relevant control centre to plan for the opening and operation of relief centres. This can best be achieved through the Emergency Management Team (EMT).

Animal Shelter

Animal shelter compounds will be established for domestic pets and companion animals of evacuees. These facilities are located at the following locations below arrangements for the use of these facilities will be coordinated by Swan Hill Rural City Council

Sector	Animal Shelter (include address)	Comments
Robinvale	Moore Street	6 pens for dogs and cats only.
Swan Hill, Lake Boga, Beverford	Sea Lake Rd	16 pens for dogs and cats only.

NOTE: The Swan Hill Sale Yards are located on the Cnr of Karinie Street and Saleyards Rd, depending on internal operational requirements the facility can be used for holding of stock, the approximate capacity is listed below:

30,000 head of sheep,
3,000 head of cattle,
50 horses.

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS.

Caravans

Caravans maybe evacuated to the following locations:

Sector	Caravan evacuation location (include address)	Comments
Pental Island	Swan Hill Show Grounds McCallum Street Swan Hill.	The use of this facility should be arranged in consultation with the council
Swan Hill	Swan Hill Show Grounds McCallum Street Swan Hill.	The use of this facility should be arranged in consultation with the council
Lake Boga	Swan Hill Show Grounds McCallum Street Swan Hill.	The use of this facility should be arranged in consultation with the council

Phase 5 – Return

Return will be consistent with the Strategic Plan for the Return of Community

The Incident Controller in consultation with VICPOL will determine when it is safe for evacuees to return to their properties and will arrange for the notification of the community.

VicPol will manage the return of evacuated people with the assistance of other agencies as required.

Considerations for deciding whether to evacuate include:

- Current flood situation;
- Status of flood mitigation systems;
- Size and location of the community;
- Access and egress routes available and their status;
- Resources required to coordinate the return;
- Special needs groups;
- Forecast weather;
- Transportation particularly for people without access to transport

Disruption to Services

Disruption to a range of services can occur in the event of a flood. This may include road closures affecting school bus routes, water treatment plant affecting potable water supplies etc.

[List facilities, trigger point for action and strategy to be employed this is still under development]

Service	Impact	Trigger Point for action	Strategy/Temporary Measures

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS.

Essential Community Infrastructure and Property Protection

Essential Community Infrastructure and properties (e.g. residences, businesses, roads, power supply etc.) that require protection are:

There is no identified community infrastructure that requires sandbag protection work to be undertaken during a flood event, all have been constructed to be flood resistant up to the identified benchmark of the 1975 flood event

Facility	Impact	Trigger Point for action	Strategy/Temporary Measures

Sandbag collection and distribution points within the Swan Hill Municipality are identified in Appendix G of this plan

Rescue

The following resources are available within Swan Hill Rural City Council area to assist with rescue operations:

VICSES has a number of boating resources within the area including:

- 3 x Rescue boats at Swan Hill
- 1 x Rescue boats at Robinvale
- 2 x Rescue boats at Kerang

Known high-risk areas/communities (i.e. low-lying islands) where rescues might be required include:

- Pental Island
- Tyntynder Flats
- Robinvale
- Various outlying rural areas of the municipality

APPENDIX E - FLOOD WARNING SYSTEMS

1 Flood Warning Products

Flood Warning products and Flood Class Levels can be found on the BoM website. Flood Warning products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings.

2 Severe Thunderstorm and Severe Weather Warnings

The BoM can forecast the environment in which severe thunderstorms or small scale weather systems that are locally intense and slow moving may occur and provides a generalised service to that effect. However, it is not yet scientifically possible to predict individual flash flooding events except on time scales of tens of minutes at the very best.

The BoM issues warnings of flash flooding when it becomes apparent that an event has commenced which may lead to flash flooding or when flash flooding has commenced.

3 Flood Watches

Flood watches are issued by the BoM to notify communities and other stakeholders within broad areas (rather than specific catchments) of the potential flood threat from a developing weather situation. They provide a 'heads up' of likely flooding.

Flood watches are based on an assessment of the developing weather situation and indicators of current catchment wetness. They provide generalised statements about expected forecast rainfall totals, the current state of the catchments within the target area and the streams at risk from flooding. Instructions for obtaining rain and stream level observations and access to updated Watches and Warnings are also included.

Normally, the BoM would issue a Flood Watch 24 to 36 hours in advance of any likely flooding and issue updates as required. If at any time during that period there was an imminent threat of floods occurring, the Flood Watch would be upgraded to a Flood Warning.

4 Flood Warnings

4.1 Overview

Flood Warnings are firm predictions of flooding based on actual rainfall and river height information as well as the results of stream flow based models of catchment behaviour that take account of antecedent conditions (i.e. the 'wetness' of the catchment, storage levels within dams, etc.) and likely future rainfall. Releases from dams are an essential input to such models.

Flood warnings are categorised as 'minor', 'moderate' or 'major' (see BoM website for an explanation of these terms and current flood class levels) and indicate the expected severity of the flood for agreed key locations along the river. More specifically, flood warnings usually include:

- ◆ Rainfall amounts for selected locations within and adjacent to the catchment;
- ◆ River heights and trends (rising, steady, falling) at key locations within the catchment;
- ◆ Outflows (in ML/d) from any major dams within the catchment;
- ◆ Forecasts of the height and time of flood peaks at key locations;
- ◆ Weather forecast and the likely impact of expected rainfall on flooding; and
- ◆ A warning re-issue date and time.

Note 1: The term "local flooding" may be used for localised flooding resulting from intense rainfall over a small area.

APPENDIX E - FLOOD WARNING SYSTEMS

Note 2: The term “significant rises” may be used in the early stages of an event when it is clear that river levels will rise but it is too early to say whether they will reach flood level.

Additional information (e.g. weather radar and satellite images as well as updated rain and river level information) can also be obtained from the Bureau’s website (www.bom.gov.au/hydro/flood/vic) or for the cost of a local call on ☎ 1300 659 217.

On receipt on an Initial or Urgent Flood Warning, the VICSES Regional Office at Swan Hill (or the after-hours Regional Duty Officer) will send out the warning via email, in most cases nominated representatives of affected organisations will also receive an SMS message, advising of the warning being issued. In the case of all subsequent warnings, copies of the information will be forwarded via email. Organisations to which flood watches and warnings will be distributed for the Murray and Loddon Rivers are included at Attachment 1 to this Appendix.

All flood watches and warnings are available on the BoM website (www.bom.gov.au).

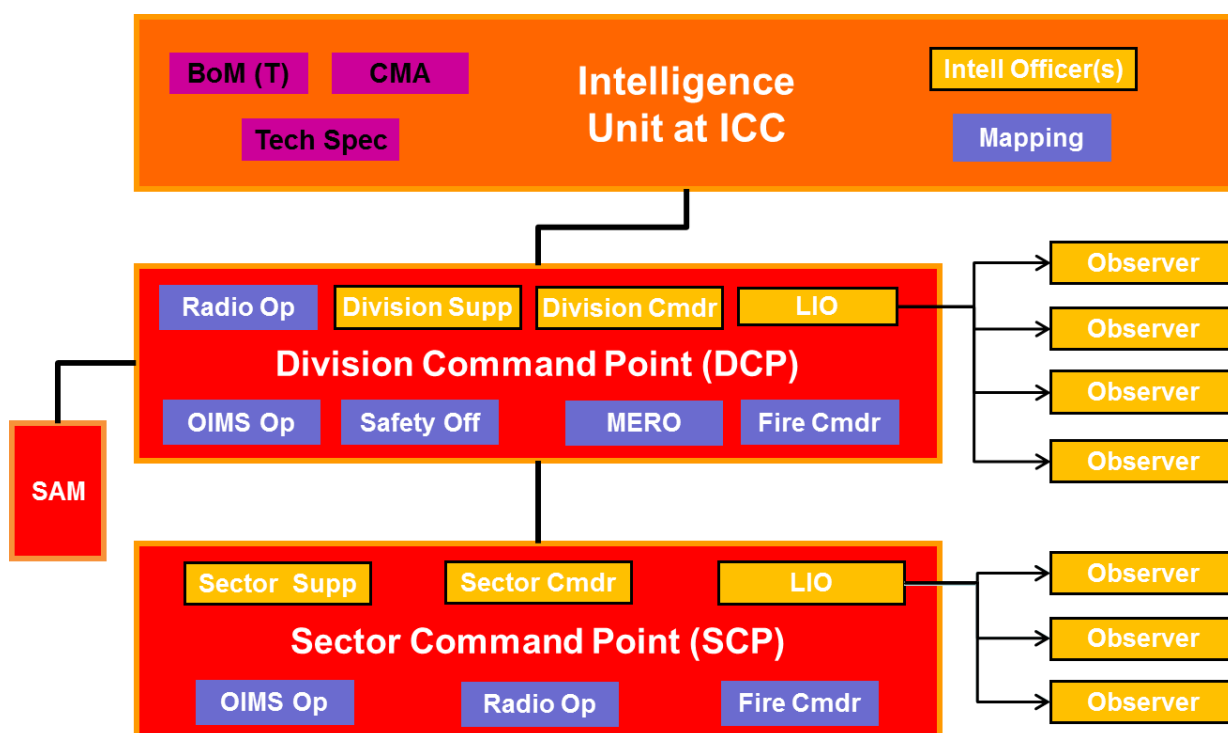


Figure 1: Intelligence Unit Information Flow

4.2 Flood Bulletins

VICSES distributes flood emergency information to the media through “Flood Bulletins”. Flood Bulletins provide BoM Flood Warning information as well as information regarding possible flood consequences and safety advice, not contained in BoM Flood Warning products. VICSES uses the title Flood Bulletin to ensure emphasis is placed on BoM Flood Warning product titles.

The relevant VICSES Region Headquarters or the established ICC will normally be responsible for drafting, authorizing and issuing Flood Bulletins, using the One Source, One Message system.

Flood Bulletins should refer to the warning title within the Bulletin header, for example Flood Bulletin for Major Flood Warning on the Murray River at Swan Hill.

Flood Bulletins should follow the following structure:

- What is the current flood situation;
- What is the predicted flood situation;
- What are the likely flood consequences;
- What should the community do in response to flood warnings;
- Where to seek further information;
- Who to call if emergency assistance is required.

APPENDIX E - FLOOD WARNING SYSTEMS

Note Where possible the following information should be included in all messaging:

The anticipated or current gauge height and whether the river is rising or falling:

- **For Swan Hill how this height compares with 2011 height (i.e. will be same/higher/lower than the 2011 flood event)**
- **For Robinvale how this height compares with 2011 height (i.e. will be same/higher/lower than the 2011 flood event)**

Note: The highest reading at the Swan Hill gauge during the 2011 event was 4.566 meters (67.487 AHD)

4.3 Murray River

The BoM currently provides a flood forecasting service for Swan Hill and Robinvale with forecasts provided for both the Swan Hill and Robinvale gauges. These gauges are located within the town area and provide a very good indication of what is happening within the system at these locations.

4.4 Loddon River

This system has a number of gauges located along its length, including some located near where the river enters the Little Murray, this provides valuable information regarding inflows into the Murray system at this point. A number of influencing factors may affect flows into the Murray system this includes the water levels already within the Murray and Little Murray, and any inflows from the Avoca system.

It is important that the description of the predicted flood situation is consistent with and reflects the relevant BoM Flood Warning.

Flood Bulletins should be focused on specific gauge (or in the absence of gauges, catchment) reference areas, that is the area in which flood consequences specifically relate to the relevant flood gauge.

Flood Bulletins should be prepared and issued after receipt of each Flood Watch and Flood Warning from the BoM, or after Severe Weather or Thunderstorm Warnings indicating potential for severe flash flooding.

Flood Bulletins should also contain relevant local flood information, and may also include information on local trends based on best available information at the time of release.

To ensure Flood Bulletins are released in a timely manner, standardised Flood Bulletins may be drafted based on different scenarios, prior to events occurring. The standardised Flood Bulletins can then be adapted to the specifics of the event occurring or predicted to occur.

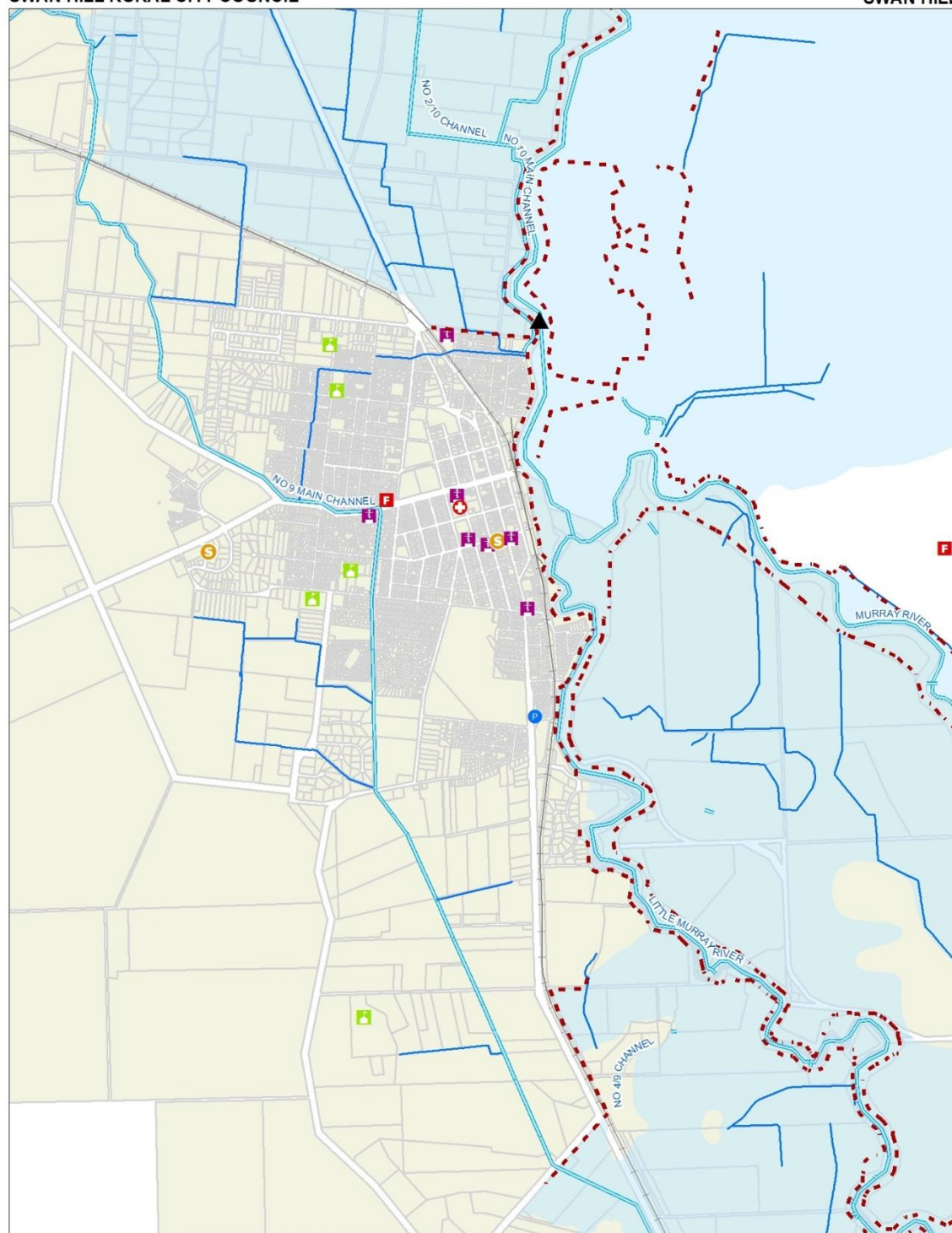
4.5 Local Flood Warning System Arrangements

A system of Observers is in place within the Swan Hill Municipality; (There is no observer network in Robinvale) this local intelligence source can be accessed by contacting local government via the MERO or Council EMLO

APPENDIX F 1– MAPS SWAN HILL LEVEES

SWAN HILL RURAL CITY COUNCIL

SWAN HILL



Scale at A4
Meters
0 130 260 520
1:40,000

- F Fire Station
- H Hospital
- P Police Station
- N Nursing Home
- S School
- C Church
- G Camp Ground
- D Depot
- S SES Unit

- SITE_NAME**
- ▲ MURRAY RIVER @ SWAN HILL
 - Rail Trail
 - Road
 - river/creek
 - creek/stream
 - Extent of Flood Data
 - Levee
 - Cadastre

1% AEP Flood
4.98m Murray River @ Swan Hill



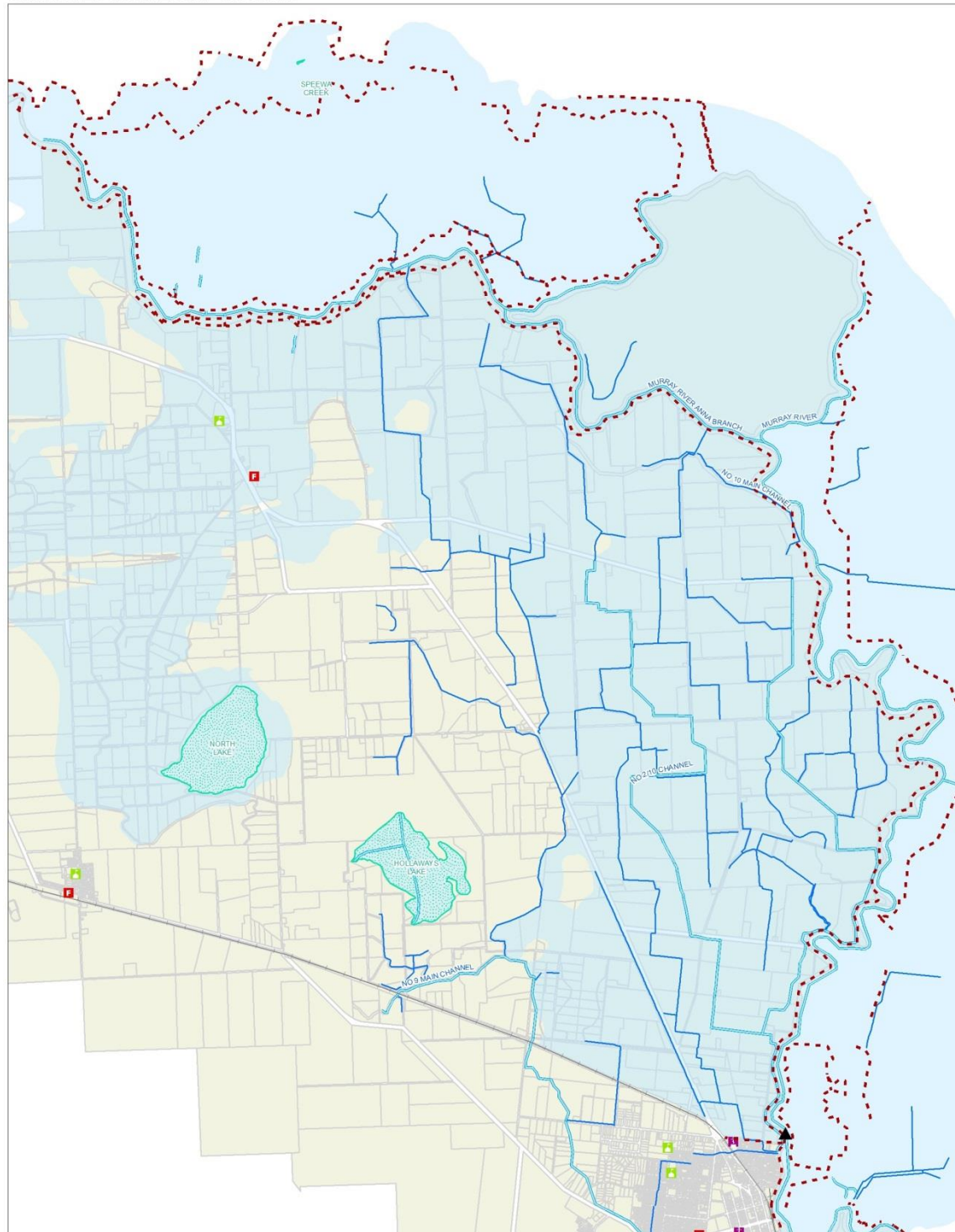
DISCLAIMER
This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The State Emergency Service disclaims any liability (including for negligence) to any person in respect of anything and the consequences of anything, done, or not done of any kind including damages, costs, interest, loss of profits or special loss or damage, arising from any error, inaccuracy, incompleteness or other defect in this information by any such person in whole or partial reliance upon the whole or part of the information in this map publication. Flood information is provided by North Central CMA.

Map Produced: 28 Mar 2014

APPENDIX F 2– MAPS TYNTYNDER FLATS LEVEES

SWAN HILL RURAL CITY COUNCIL

TYNTYNDER FLATS



N
Scale at A4
Meters
0 240 480 960
1:50,000

- Fire Station
- Hospital
- Police Station
- Nursing Home
- School
- Church
- Camp Ground
- Depot
- SES Unit

- SITE_NAME**
- MURRAY RIVER @ SWAN HILL
 - Rail Trail
 - Road
 - river/creek
 - creek/stream
 - Extent of Flood Data
 - Levee
 - Cadastre

1% AEP Flood
1% AEP Flood

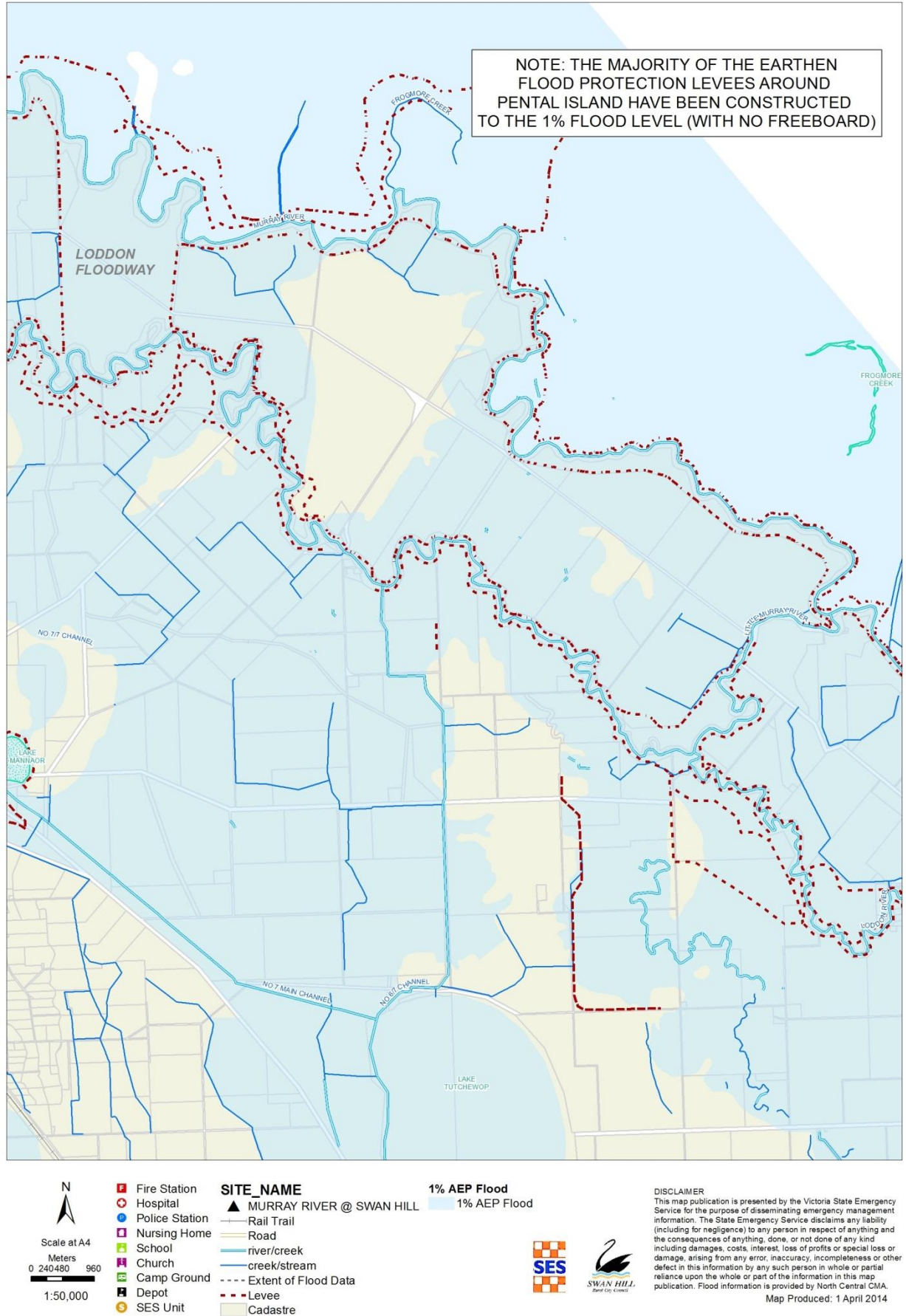


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Map Produced: 1 April 2014

APPENDIX F 3– MAPS PENTAL ISLAND EAST LEVEES

SWAN HILL RURAL CITY COUNCIL

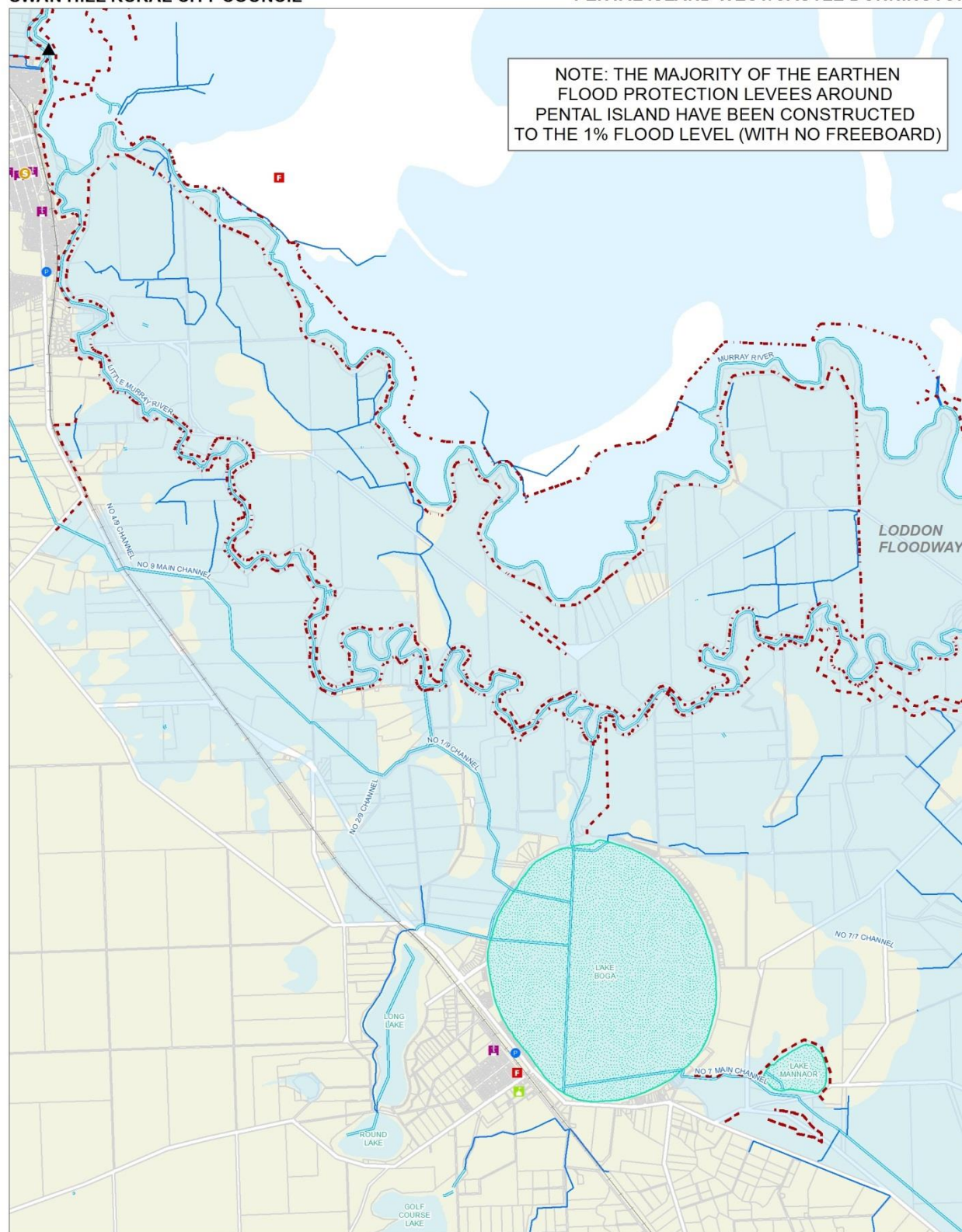
PENTAL ISLAND EAST/FISH POINT



APPENDIX F 4– MAPS PENTAL ISLAND WEST LEVEES

SWAN HILL RURAL CITY COUNCIL

PENTAL ISLAND WEST/CASTLE DONNINGTON



N
Scale at A4
Meters
0 240 480 960
1:50,000

- | | |
|---|---|
| <ul style="list-style-type: none"> ■ Fire Station + Hospital ● Police Station ■ Nursing Home ■ School ■ Church ■ Camp Ground ■ Depot ■ SES Unit | <p>SITE_NAME</p> <ul style="list-style-type: none"> ▲ MURRAY RIVER @ SWAN HILL — Rail Trail — Road — river/creek — creek/stream --- Extent of Flood Data --- Levee ■ Cadastre |
|---|---|

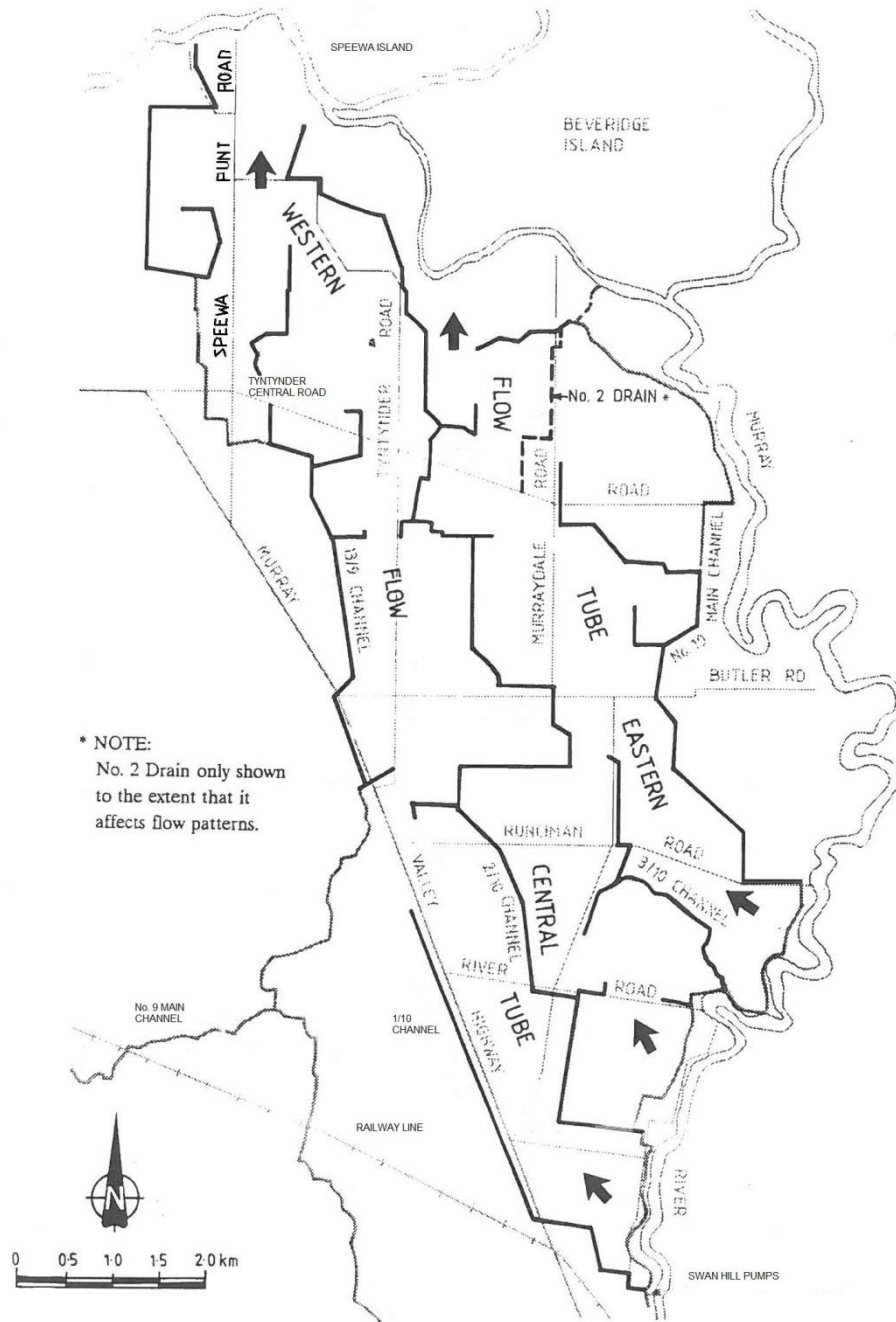
1% AEP Flood
1% AEP Flood



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Map Produced: 1 April 2014

Tyntynder Flats Flood Flow Tubes

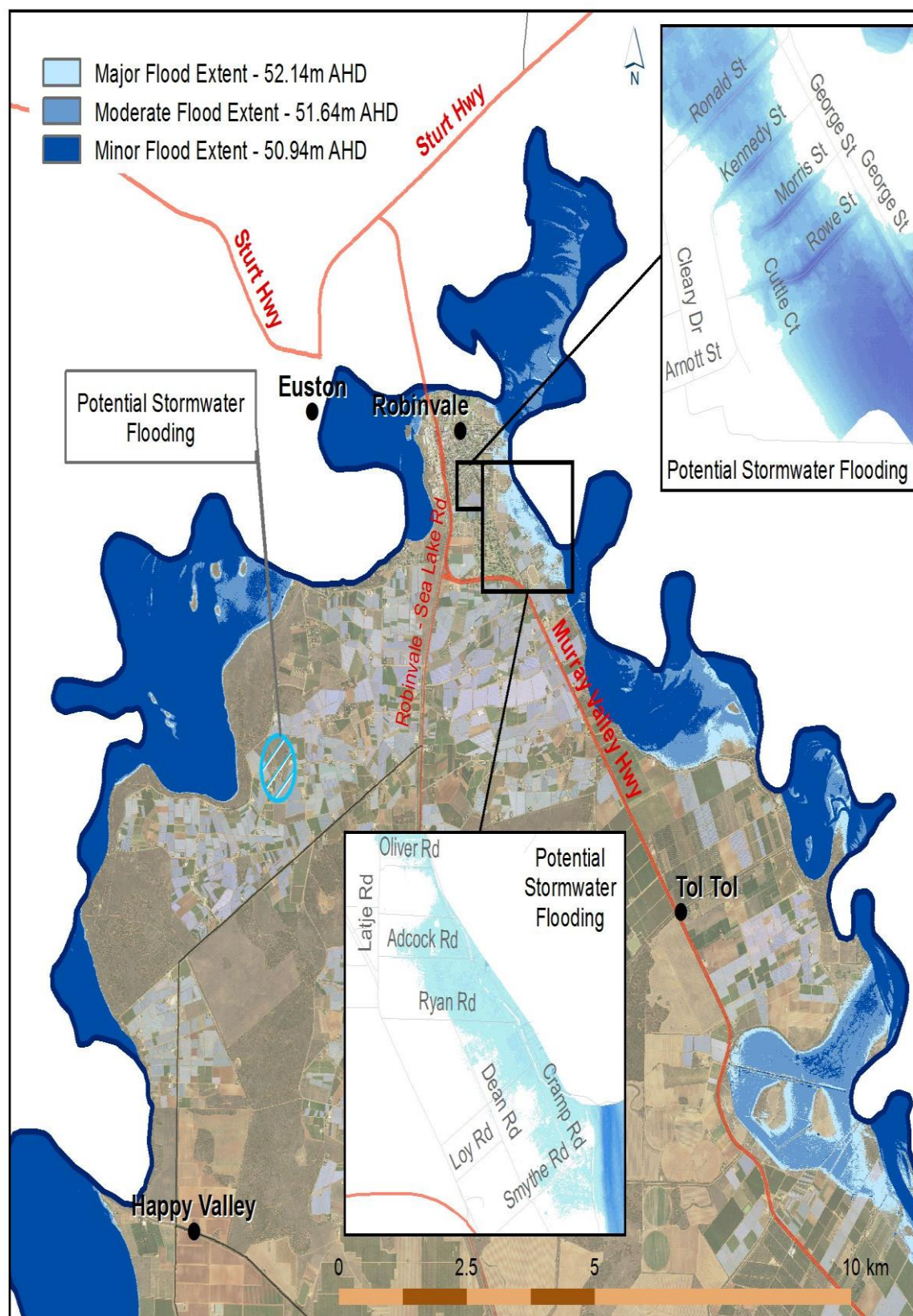
Municipal Flood Emergency Plan - Swan Hill Rural City – A Sub-Plan of the MEMPlan V2.1 April 2018



Binnie & Partners. (1992). *Swan Hill/Tyntynder Flats Flood Plain Management Study Final Report*.

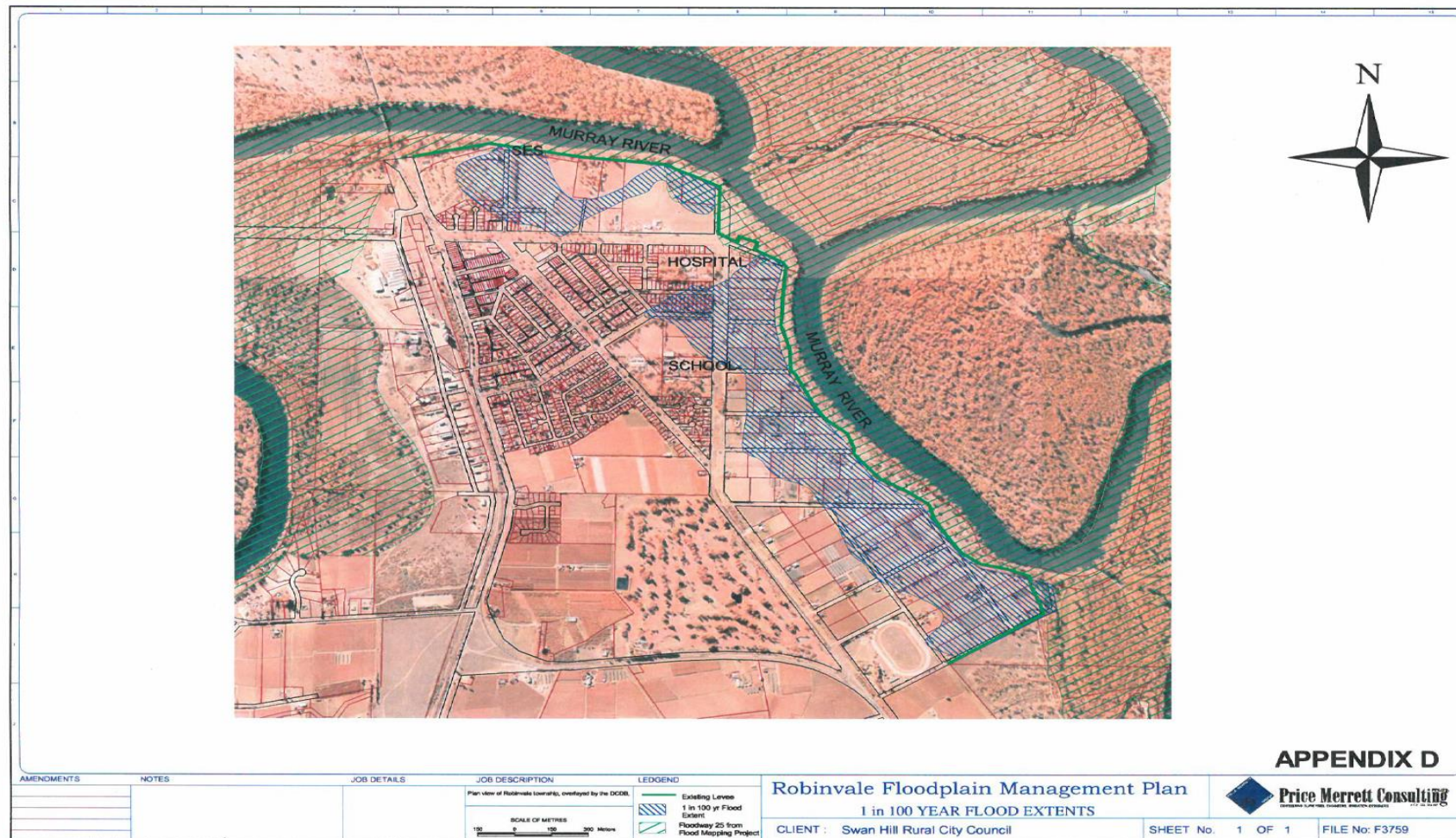
APPENDIX F 6– ROBINVALE FLOOD EXTENT MAP

Flood inundation mapping for Robinvale (including storm water 'flash' flooding)



Mallee Catchment Management Authority. (n.d.).

APPENDIX F 7– ROBINVALE LEVEE MAP



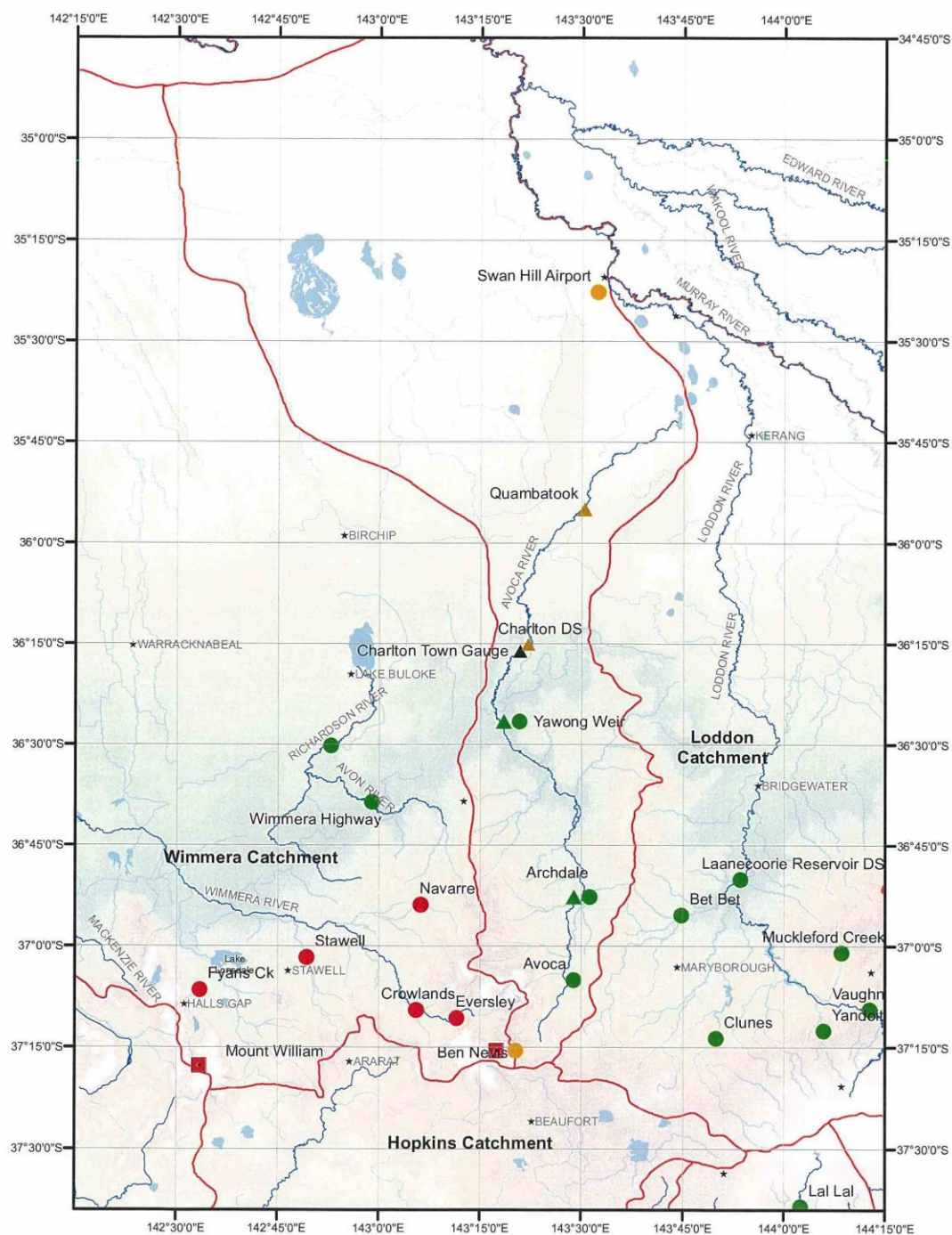
Price Merritt Consulting P/L. (2004). *Robinvale Township Floodplain Management Plan*.

APPENDIX F 8 – AVOCA RIVER BASIN DATA NETWORK

Avoca River Basin Flood Warning Data Collection Network



Australian Government
Bureau of Meteorology



Legend

Water Level Sites

- ▲ ERTS
- ▲ Mindata/Campbell
- ▲ Vocamark/Telemark
- ▲ FTP
- ▲ Staff gauge

Rain Gauge Sites

- ERTS
- Mindata/Campbell/ES
- AWS
- FTP
- Manual Gauge

Repeater Sites

- ERTS

0 5 10 20 30 40

Kilometers

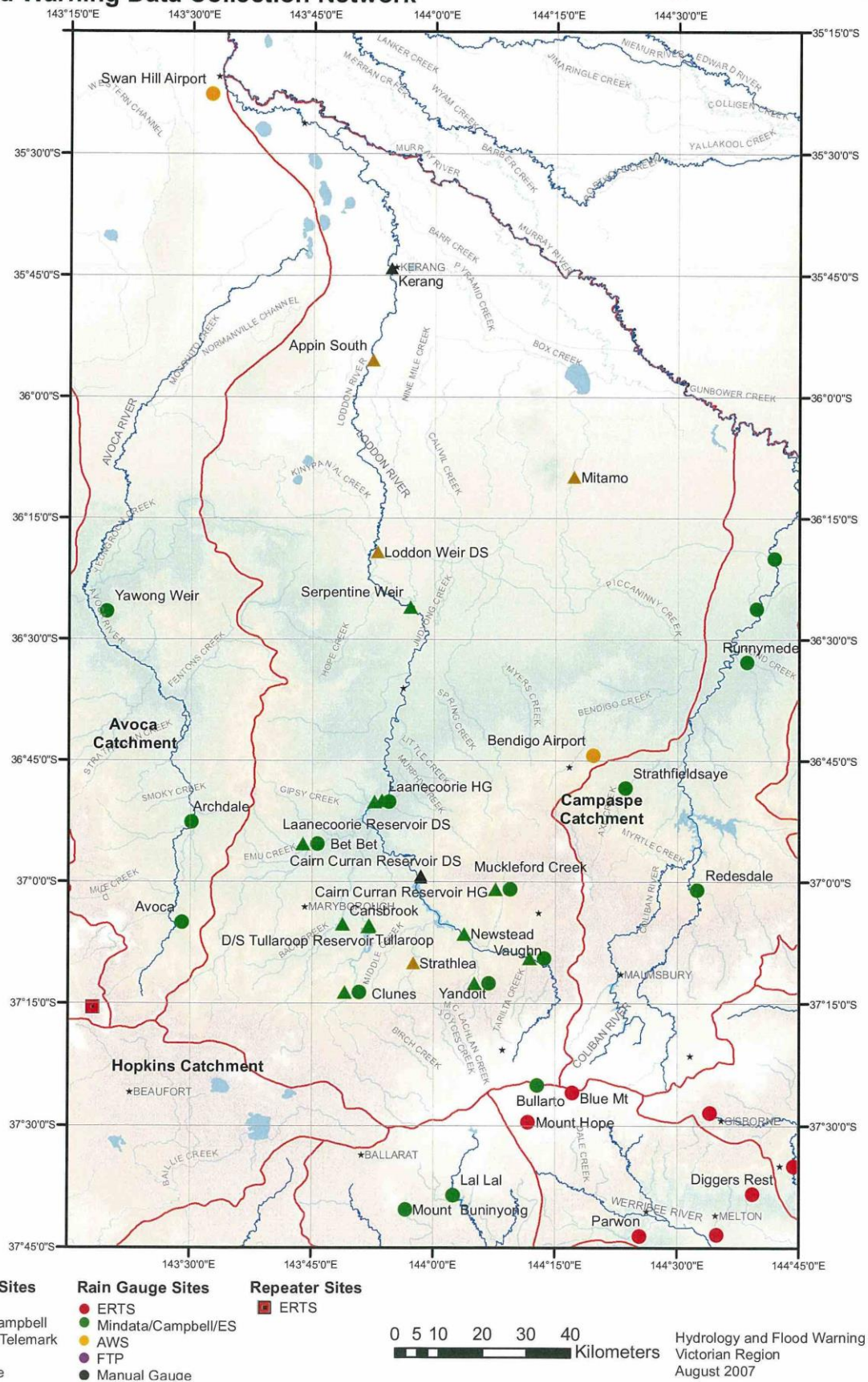
Hydrology and Flood Warning Section
Victorian Region
August 2007

APPENDIX F 9 – LODDON RIVER BASIN DATA NETWORK.

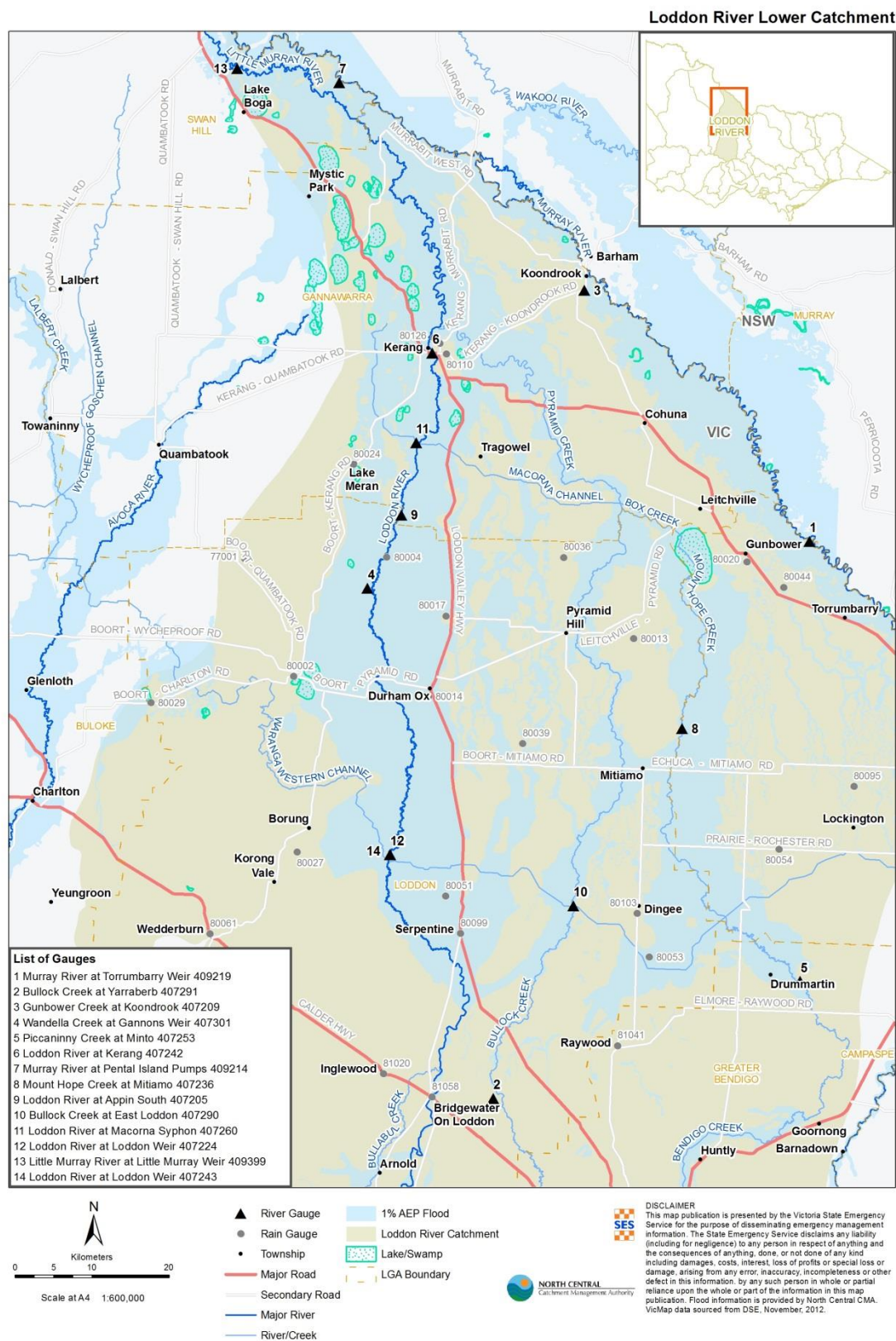
Loddon River Basin Flood Warning Data Collection Network



Australian Government
Bureau of Meteorology

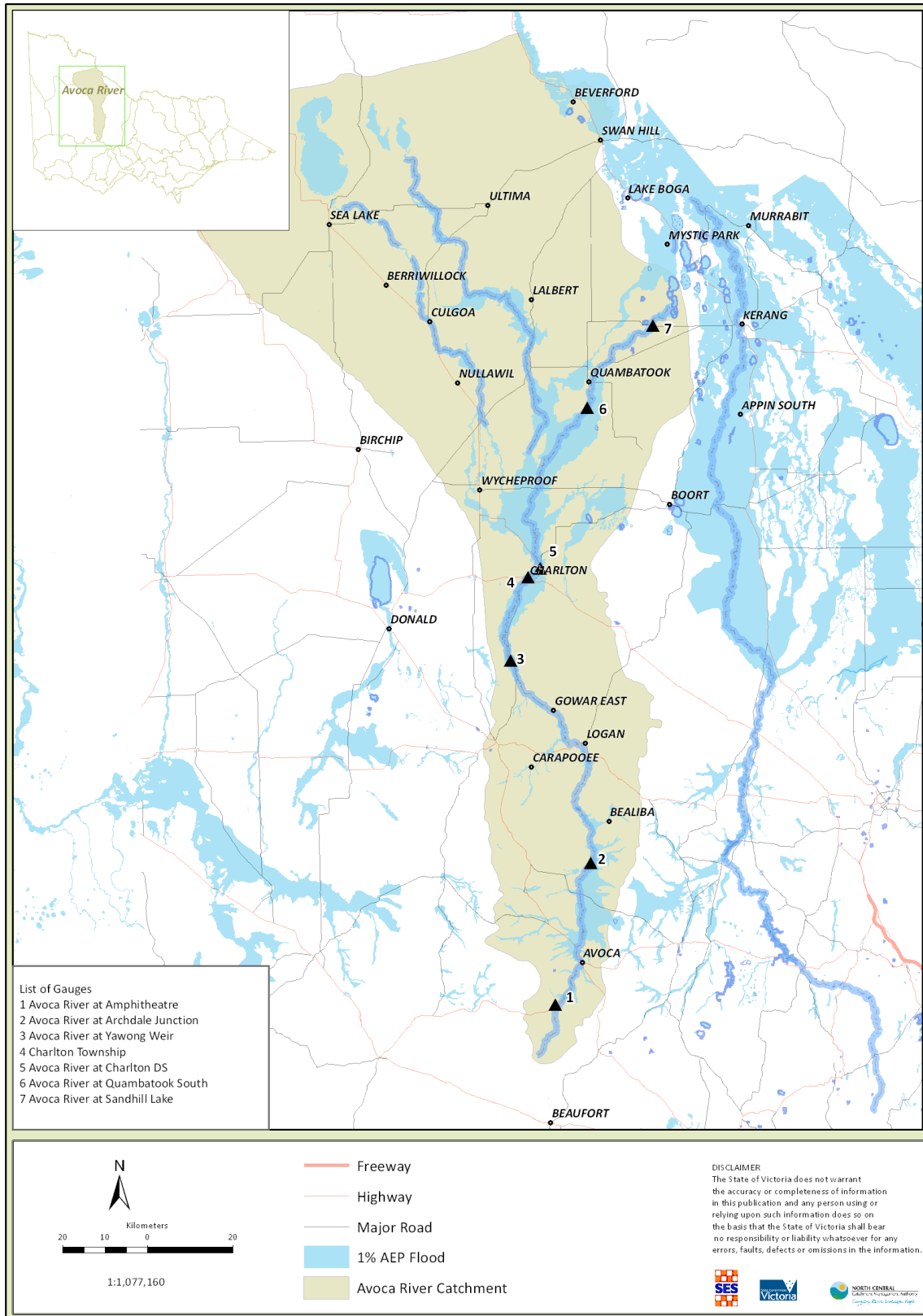


APPENDIX F 10 – LOWER LODDON RIVER CATCHMENT



APPENDIX F 11 – AVOCA RIVER CATCHMENT

Avoca River Catchment



APPENDIX G – SANDBAGS

This applies to the procurement, storage, distribution, use and disposal of sandbags during flood emergencies, primarily Riverine flood events. Flash Flood events, due to their quick nature, will be directed by the local VICSES Unit.

1. Use of sandbags

Sandbags can be used to block doorways, drains and other openings into properties as well as to weigh-down manhole covers, garden furniture and to block sinks, toilets and bath drains to prevent water backing up. They have proven to be successful in keeping water out for short periods of time.

Sandbagging is not always the most effective option and should be considered in the context of this Flood Emergency Plan which includes alternatives for managing flood risk. Other alternatives include moving possessions to higher places, securing objects so they do not float away and placing valuables in water tight containers. During a flood event the Incident Controller and operational staff in the flood affected community will assess the overall risk to communities and allocate sandbag resources based on risk.

2. Responsibilities

VICSES responsibilities include:

- The management of the state-wide procurement and storage of sandbags for flood emergencies
- Providing sandbags to local areas for distribution based on requirements identified in the MFEP
- Identifying distribution arrangements in the MFEP
- Community education and awareness on sandbag management and safe use
- Identifying Critical Infrastructure and Community Critical Facilities in the MFEP
- Providing a support role in flood recovery.

Council responsibilities include:

- Supporting VICSES in developing the MFEP
- Providing a support role during flood response
- Identifying Community Critical Facilities at a municipal level
- Procuring sandbags to protect council owned facilities including Community Critical Facilities managed by council
- Providing locations, plant and equipment, where available and capable, to support sandbagging operations as agreed in the MFEP
- Coordinating the clean-up and community recovery arrangements

Community Critical Facility owners' responsibilities include:

- Working with VICSES to develop an effective flood mitigation plan for their property as part of the MFEP with a priority for permanent structures.

Other ‘Response’ agencies responsibilities include:

- Supporting VICSES in their response role.

Residential and commercial property owners’ responsibilities include:

- Understanding their own flood risk
- Preparing an emergency plan for their home or business
- Procurement and storage of sandbags to protect their own property
- Filling and movement of sandbags to protect their property
- Seek advice from their local council regarding the removal of sandbags from their property, as part of the community recovery

3. Community and business education

VICSES has an established community education program to support community and business in responding to flood emergencies (see www.ses.vic.gov.au/prepare/floodsafe).

VICSES will use the existing community education tools and programs (such as the Local Flood Guides and the FloodSafe program) to promote:

Practical information on:

- The purpose, use and disposal of sandbags (see www.ses.vic.gov.au/prepare/floodsafe/floodsafe-resources/sandbag-reference-guide)
- Obtaining sandbags
- Safety considerations e.g. OHS, manual handling, safe use and disposal
- Alternative flood mitigation strategies to sandbagging
- Where to get information – Phone 1300 842 737 for the VICSES Information Line
- The responsibilities of critical infrastructure owners, businesses and private individuals to understand their flood risk and develop a flood plan

Key messages:

- Emergency response agencies will not always have the capacity to provide sandbags due to other competing priorities
- Businesses and individuals need to understand the flood risk to their property and, where appropriate, develop a Flood Emergency Plan
- Sandbagging is only one way of protecting properties against floodwater and not always the most effective option. Sandbagging should be considered in the context of a Flood Emergency Plan which considers alternatives for managing flood risk.

4. Procurement of sandbags

VICSES

VICSES will maintain a supply of sandbags to support the effective readiness and response to flood emergencies as identified in this MFEP.

The number of sandbags required at a State and regional level will be determined from information provided through the MFEP planning process. There may be occasions where the supply of sandbags is limited and priorities for distribution will need to be determined through local emergency management arrangements.

VICSES will maintain the current cross-border and mutual aid arrangements for flood emergencies. VICSES will also work with local councils to access the resource sharing arrangements established between councils during emergencies.

Council

Council will procure sandbags to protect council owned facilities including Community Critical Facilities managed by council

Residential and commercial property owners'

Sandbags VICSES may pre-emptively distributed sandbags to residential and commercial property owners who may potentially be affected by a flooding event this will be undertaken at the discretion of VICSES and based on available weather information; it will be the owners responsibility to arrange for a supply of sand.

5. Storage of sandbags

VICSES

Sandbags will be stored by VICSES in appropriate locations across the municipality. VICSES will monitor the condition of all its sandbags for deterioration.

VICSES sandbags storage locations and initial quantities are as follows:

- Swan Hill VICSES Local Headquarters (LHQ) 4000 bags (minimum)
- Robinvale VICSES Local Headquarters (LHQ) 2000 bags (minimum)

Additional sandbag supplies are held at the North West (Loddon Mallee) VICSES Regional Offices, located in Bendigo & Swan Hill. These can be accessed for replenishment or additional requirements. Additional sandbags will be supplied to these locations in the lead up to a flood event.

Council

Sandbags will be stored at appropriate Council locations across the municipality. Council will monitor the condition of all its sandbags for deterioration.

Council sandbags storage locations and quantities are as follows:

- Council works depot – 4000 bags

Koraleigh (NSW)

Due to its location and potential access issues, and in consultation and agreement with NSWSES 1 bale (1000) sandbags will be located at the Koraleigh Water Trust Building, Main Street Koraleigh, this supply of sandbags will be managed locally by senior community leaders, and replenished as required by VICSES North West Region.

Discussions are currently underway with NSW Murray Downs Rural Fire Service to preposition 1 bale (1000) sandbags at their facility for this communities use.

6. Distribution of sandbags

Priorities

The Incident Controller may make sandbags and sand available for flood mitigation activities during declared flood emergencies.

APPENDIX G – SANDBAG GUIDELINES.

Sandbags will be issued consistent with the Strategic Control Priorities within the State Flood Emergency Plan, in the following order of priority to protect:

1. Critical Infrastructure and Community Critical facilities identified:
 - (a) in the MFEP or
 - (b) by the Incident Management Team
2. Residential properties identified in the potential flood area
3. Commercial properties identified in the potential flood area
4. Environmental and conservation areas identified in the potential flood area.

Properties identified as being outside the potential flood area, will be referred to an alternative source of sandbags (e.g. local hardware store or sandbag supplier) by VICSES.

Distribution Points

In preparation for a significant flood emergency, VICSES will work with local councils and other agencies to identify appropriate locations for sandbag collection points. Location considerations will include access, safety, human resources and machinery requirements.

- Identified Sand and Sandbag distribution locations are:
 1. Sale Yards Car Park Karinie Street Swan Hill
 2. Car park Ken Harrison Reserve off Yana Street
 3. Other locations may be identified as required

Maps showing location of distribution location and traffic flows is located in Appendix G.

- Traffic management maps are provided as an attachment to this Appendix
- Distribution sites will be managed by VICSES and supported by council/groups/clubs/organisations who will use provided maps and council rate information to track the distribution of these resources to ensure that appropriate affected/potential affected residence will have access to these resources.

The Floodsafe Sandbag Quick Reference Guide (see www.ses.vic.gov.au/prepare/floodsafe/floodsaferesources/sandbag-reference-guide) provides details to community members about the indicative number of sandbags required for residential property protection and guidance on the safe use, for the filling and laying of sandbags.

As part of the response arrangements, the Incident Controller will track the distribution of sandbags through the Incident Management Team (IMT). This information will be provided to the recovery team as part of the transition from response to recovery.

Provision of sand VICSES

VICSES will have plans in place to acquire sand through its own supply arrangements and where necessary through the emergency management arrangements. These arrangements will be identified in the MFEP. Sand suppliers may be identified in the MFEP.

Council

Council will have plans in place to acquire sand through its own supply arrangements

During a localised non declared flood event, sand will be procured by the local responding VICSES Unit. During a declared flood event, sand will be procured via the Incident Control Centre

7. **Disposal and relocation of used sandbags**

Sandbags may be contaminated after use and local councils should ensure that clean up and disposal is considered as part of recovery. Removal and disposal of sandbags used for flood mitigation shall be dealt with under the clean up and community recovery arrangements as outlined in the Emergency Management Manual Victoria. The disposal of sandbags is a shared responsibility between different agencies.

Incident Controllers will provide information on sandbag locations to councils, to assist with clean-up. VICSES will continue to work with relevant agencies to develop protocols for the safe and environmentally responsible disposal of sandbags.

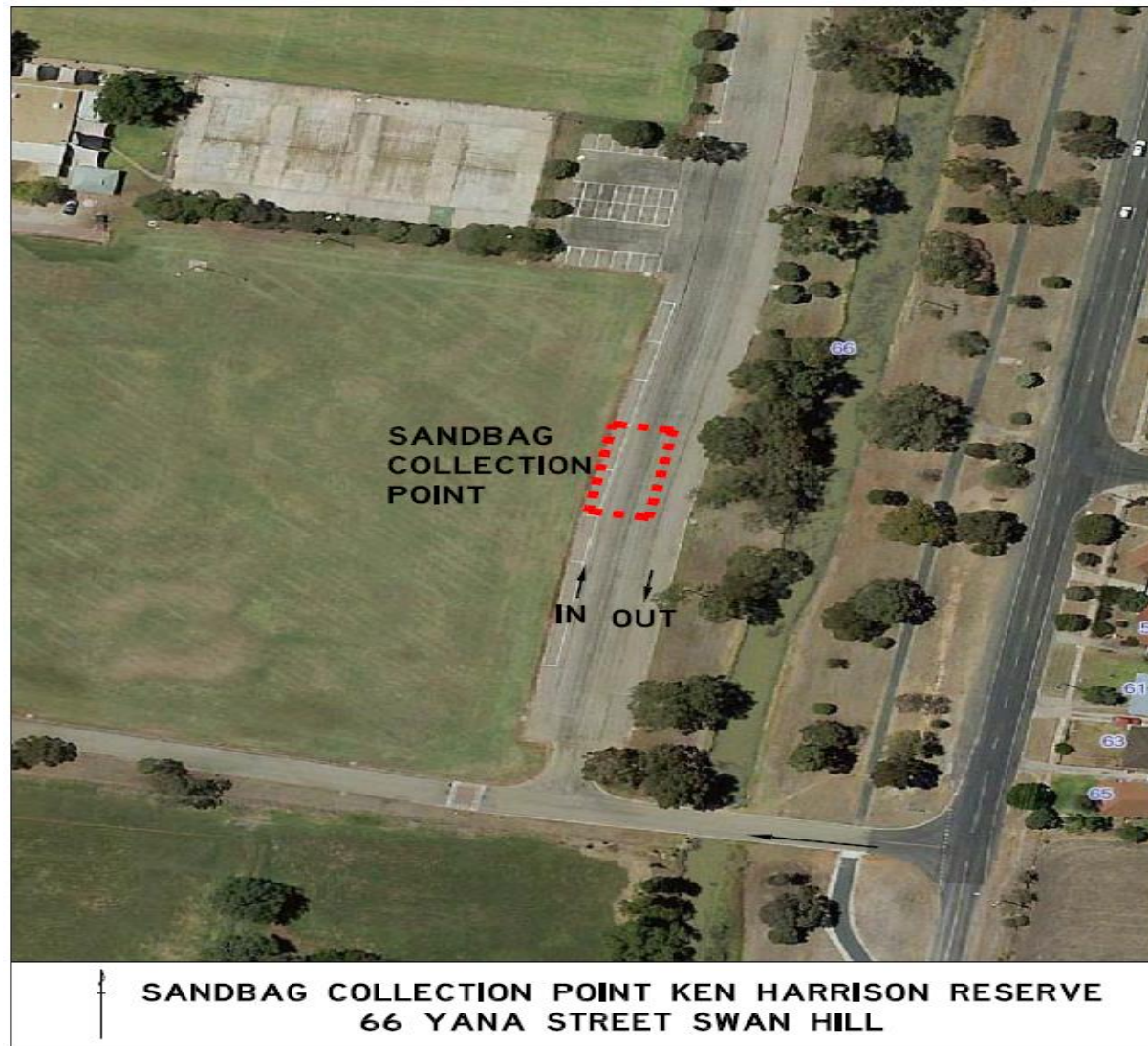
APPENDIX G – SANDBAG GUIDELINES.

Attachment 1:

Maps for sandbag collection points



APPENDIX G – SANDBAG GUIDELINES.



APPENDIX H – MUNICIPAL FLOOD EMERGENCY PLANNING COMMITTEE CONTACT LIST