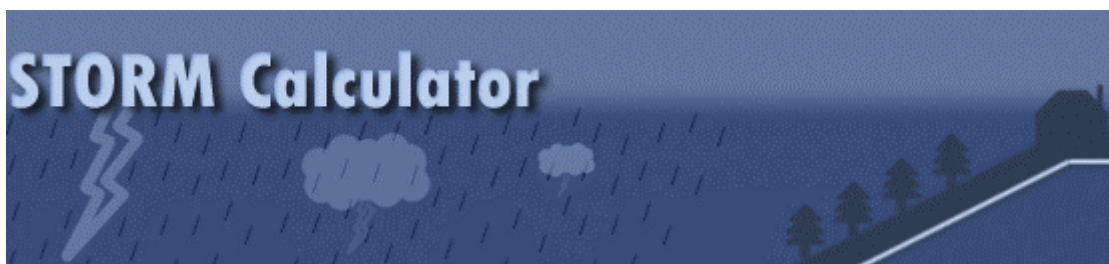




Using the **STORM** Calculator to achieve best practice stormwater treatment

STORM Version 4

October 2006



<http://storm.melbournewater.com.au/>

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Acknowledgements

The STORM Calculator builds upon the Association of Bayside Municipalities (ABM) prototype developed by Ecological Engineering. Programming for the excel STORM Calculator prototype was completed by Dale Browne and William McRobb from Urban Stream with data supplied by Melbourne Water. Conversion of the prototype to a web based program was undertaken by GUI Computing Pty Ltd.

Melbourne Water wishes to thank the six councils: Bayside, Kingston, Melbourne, Moreland, Nillumbik and Port Phillip which assisted in trialling the tool.

Introduction

Melbourne Water has developed the STORM (Stormwater Treatment Objective – Relative Measure) Calculator to simplify the analysis of stormwater treatment methods. The Calculator is designed for the general public to be able to assess simple Water Sensitive Urban Design (WSUD) measures on their property and has been developed specifically for small developments.

The tool is able to rate different developments and compare their performance in treating stormwater against a common measurement system - the best practice standards for urban stormwater. The best practice standards have been set out in the *Urban Stormwater Best Practice Environmental Management Guidelines* (Victoria Stormwater Committee, 1999) for reduction in total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) loads.

The STORM Calculator is able to display the amount of treatment typical WSUD measures will provide in relation to best practice targets. However, it does not include all of the types of treatment measures available. It has instead been restricted to include rainwater tanks, ponds, wetlands, raingarden trenches, infiltration systems, buffers and swales.

The data used for calculating the STORM rating was taken from modelling using the Model for Stormwater Improvement Conceptualisation (MUSIC) Version 3, developed by the Cooperative Research Centre for Catchment Hydrology. (CRCCH, 2005).

The tool was initially developed as an excel prototype and has been converted to a web-based program available at: <http://storm.melbournewater.com.au/>.

Background

The STORM Calculator has been developed from the stormwater assessment tool created by the Association of Bayside Municipalities (ABM) published in the *Delivering Water Sensitive Urban Design: Clean Stormwater – A Planning Framework* (2004). The ABM STORM (Stormwater Treatment Objective – Relative Measure) gives the user a rating based on the percentage of best practice standards achieved by proposed treatment measures. Some alterations to the method behind the ABM tool have been made, resulting in the current STORM Calculator. Details on these changes can be found in section 3.5.

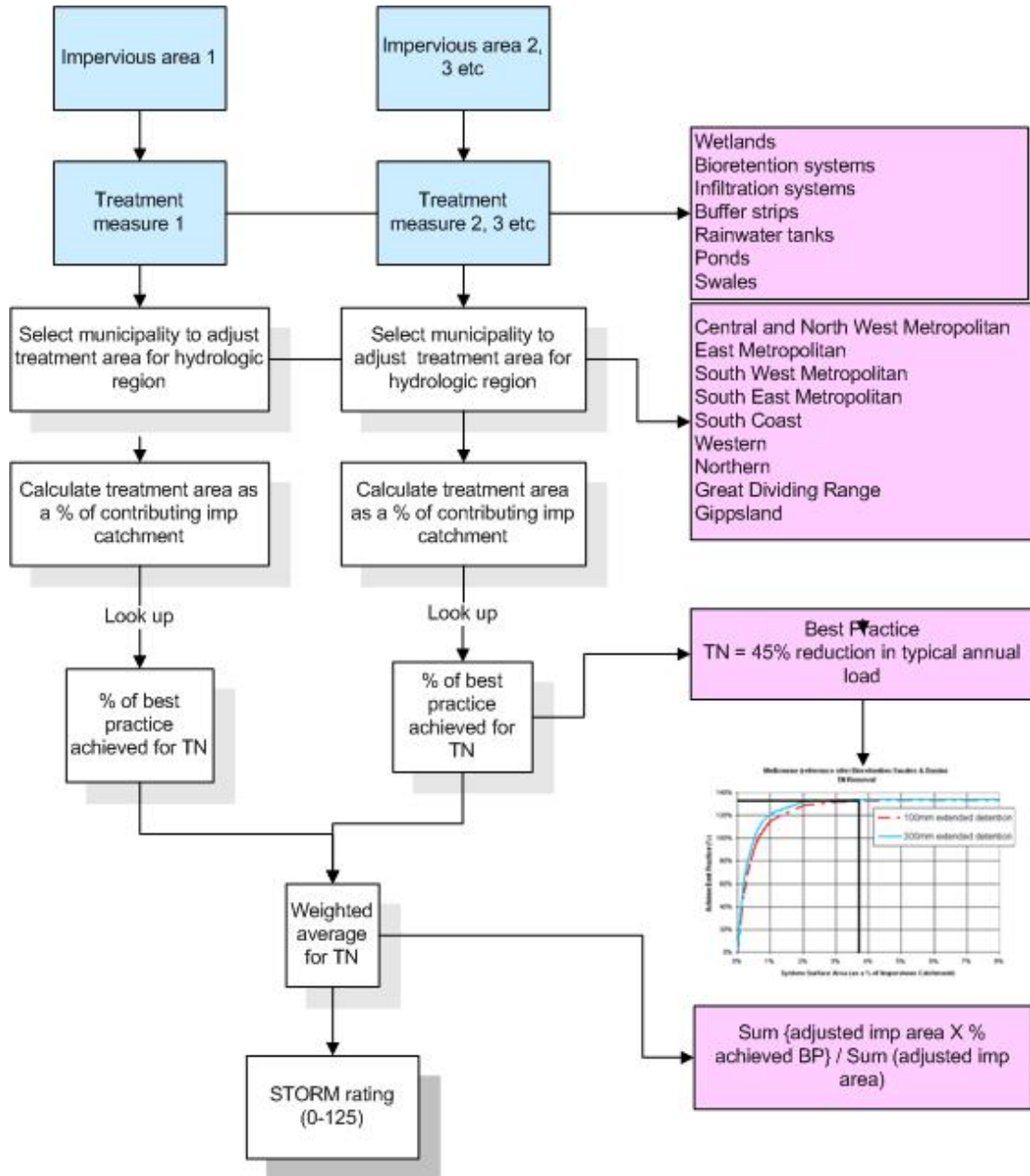
The Best Practice Environmental Guidelines (BPEG), published by the Victorian Stormwater Committee, establish specific stormwater quality objectives to assist in determining the stormwater management necessary to meet State Environment Protection Policy (SEPP) requirements. These guidelines are now a referenced document in the State Planning Policy Framework. The best practice performance objectives from the BPEG, from which the STORM Calculator rates treatment performance are:

- Total Nitrogen (TN): 45% retention of the typical annual load

The reduction in total phosphorus (TP) and total suspended solids (TSS) have not been included in the STORM Calculator as the reduction in TN will mostly be limiting, meaning that the reduction in TP and TSS is not relevant to the STORM rating calculation.

The STORM Calculator rates the performance of treatment measures relative to the percentage of these best practice targets that has been achieved by the treatment measures. Inputs to the model include impervious areas and a selected treatment measure. An adjustment factor adjusts for different hydrologic regions and then a series of look up tables provide treatment performance.



Figure 1 STORM flow diagram








Treatment Types

There are seven different types of treatment measures assessed in STORM including rainwater tanks, ponds, wetlands, raingardens, infiltration systems, buffers and swales. Within these treatment measure types, there are a number of variations available. For example, there is a choice between wetlands with a detention depth of 200mm or 400mm, and infiltration systems using sandy soil or sandy loam as the filter media. The following table (Table 1) outlines more information about these treatment measures as well as tips on designing a system to meet best practice standards.

Table 1: Treatment measures in STORM

Treatment Type	Description	Design Tips	STORM Options
 <p>Rainwater Tank</p>	<p>Rainwater tanks are connected to houses to capture stormwater running off the roof for reuse on the property. Once captured, this water is generally used for watering gardens or for toilet flushing.</p>	<p>The size of the rainwater tank should be based upon the amount of use. For the STORM Calculator, it has been assumed that a water use rate of 20 litres per person per day will be taken from the tank. This assumes that the tank has been connected for toilet flushing.</p>	<p>There is only one option available in STORM for rainwater tanks. This option assumes a tank depth of one metre.</p>
 <p>Pond</p>	<p>Ponds are often used as storage areas for water as well as a first step in multiple stormwater treatment measures. Pollutants are removed from the water through natural processes and the settling of solids over a period of time.</p>	<p>It is important that ponds are designed so that water does not stagnate and cause problems such as algal blooms. A water detention time of 72 hours is generally suitable.</p>	<p>STORM assumes a permanent pool volume equal to 0.6 times the surface area of the pond (a pond depth of 0.6 metres)</p>

Treatment Type	Description	Design Tips	STORM Options
<p data-bbox="236 271 363 300">Wetlands</p> 	<p data-bbox="515 271 780 568">Wetlands consist of a number of different zones that filter and treat pollutants in stormwater using vegetation and natural processes, as well as the settling of suspended solids.</p>	<p data-bbox="802 271 1083 667">Wetland systems can be sensitive to large amounts of nutrients that can cause algal blooms, or stagnant water that may encourage mosquitoes. A detention time of 72 hours should be designed to help prevent these problems from occurring.</p>	<p data-bbox="1109 271 1348 869">STORM contains two options for wetlands, an extended detention depth of 200mm or 400mm. The extended detention depth is the depth between the permanent pool volume surface level and the overflow level. A larger extended detention depth will result in a higher reduction in pollutants.</p>
<p data-bbox="236 875 389 904">Raingarden</p> 	<p data-bbox="515 875 762 1205">Raingardens consist of a filter area that drains into a porous pipe. Raingardens work by treating pollutants and filtering out solids before draining into the stormwater system.</p>	<p data-bbox="802 875 1083 1406">A larger extended detention depth will result in more pollutant treatment. However, it is important that the detention depth is designed to suit the expected flows into the system. Raingardens can be incorporated into properties to treat roof and paving runoff prior to it being discharged into waterways.</p>	<p data-bbox="1109 875 1348 1308">There are two types of raingardens to choose from in STORM, an extended detention depth of 100mm or 300mm. The extended detention depth is the depth between the surface level of the system and the top of the overflow weir.</p>
<p data-bbox="236 1420 379 1449">Infiltration</p> 	<p data-bbox="515 1420 780 1711">Infiltration measures are designed to encourage stormwater to infiltrate into surrounding soils and are highly dependant on local soil characteristics.</p>	<p data-bbox="802 1420 1054 1749">It is important that catchment characteristics and pollutant types and loads are taken into consideration in the design of the infiltration system to ensure it is appropriate.</p>	<p data-bbox="1109 1420 1348 1912">There are two types of infiltration systems available in STORM, sand and sandy loam. These refer to the soil type used in the system, with sand giving a faster seepage rate (180 to 360 mm/hour) then sandy loam (36 to 180 mm/hour), resulting in higher pollutant reductions.</p>

Treatment Type	Description	Design Tips	STORM Options
<p data-bbox="236 309 389 338">Buffer strip</p> 	<p data-bbox="579 309 833 674">Buffer strips are vegetated strips that convey runoff from a hard surface to a downstream drainage system. Buffers are effective in removing coarse and medium sized sediment from stormwater.</p>	<p data-bbox="855 309 1114 506">Ensure vegetation heights are correct so that runoff can enter the buffer strip. Buffer strips are typically grassed.</p>	<p data-bbox="1142 309 1350 775">The one option in STORM assumes (like other systems) that 100 per cent of the impervious area is connected to the treatment. STORM also assumes that the seepage loss through buffer strips is zero.</p>
<p data-bbox="236 784 320 813">Swale</p> 	<p data-bbox="579 784 823 1111">Swales are linear depressions that provide for stormwater collection and conveyance. Swales may simply be grass-lined or more densely vegetated and/or landscaped.</p>	<p data-bbox="855 784 1118 1346">Swales with greater vegetation depth will provide a greater level of treatment and can be aesthetically pleasing. Swales can be combined with rain gardens to improve the performance via appropriate filter media. Check dams may be required for steep areas, i.e. slopes greater than 4 per cent.</p>	<p data-bbox="1142 784 1350 1010">STORM assumes an average slope of 3 per cent and provides two options for vegetation depth.</p>

More information on all of these treatment measures can be found at <http://wsud.melbournewater.com.au> or from the *WSUD Engineering Procedures: Stormwater Manual* (Melbourne Water, 2005). The City of Melbourne has published *Water Sensitive Urban Design Guidelines* (available at www.melbourne.vic.gov.au), which provide valuable advice on WSUD principles as well as fact sheets on various treatment measures. Information on treatment measure properties is also available from the *MUSIC User Guide* (CRCCH, 2005), which is available for downloading from www.toolkit.net.au.

Development of the STORM Calculator

To assist in assessing the performance of stormwater treatment measures, a series of look-up curves (imperious catchment area and treatment measure surface area) has been developed. Different treatment measures have been modelled using a set of average parameters and a range of treatment sizes and catchment areas. The performance of stormwater treatment measures has been summarised into a STORM rating, which is a measure against best practice performance standards.

Calculating the STORM Rating

The following section details the calculation that is performed to evaluate the STORM rating for a site.

The STORM rating for a site is calculated by using area adjustment factors based upon the municipality the property is located in. These adjustment factors have been calculated using the hydrologic regions developed for the *WSUD Engineering Procedures: Stormwater Technical Manual* (Melbourne Water, 2005).

The treatment area (A_t) for each treatment measure is divided by the relevant adjustment factor (F) for the selected municipality and treatment type, giving a regionalised treatment area (A_r) (equation 1).

$$\frac{A_t}{F} = A_r \quad \text{Equation 1}$$

Using the regionalised treatment area and the area of impervious surface (A_i), the treatment area as a percentage of contributing impervious area (P) is calculated (equation 2).

$$\frac{A_r}{A_i} = P \quad \text{Equation 2}$$

From this value, the percentage of best practice achieved for the treatment measure is obtained from a series of data tables containing values for each treatment type. These

data tables have been created from values generated using MUSIC to model the treatment performance of various WSUD treatment measures.

If more than one treatment measure has been used, the STORM rating for each individual treatment measure is calculated and an overall STORM rating for the site is based on a weighted average of the ratings for each treatment measure.

The weighted average is determined by multiplying the individual contributing impervious areas for each treatment measure (as entered by the user) by the individual STORM ratings for each treatment measure. The sum of these values for all of the treatment measures is then divided by the sum of the impervious areas.

Example:

A property in the City of Bayside with:

- Total area of 250m²
- 1000L rainwater tank capturing water from 100m² of roof area, with 3 occupants living in the house
- 2m² raingarden (100mm extended detention) treating the runoff from a 50m² paved area

Figure 2 below shows a diagram of the property.

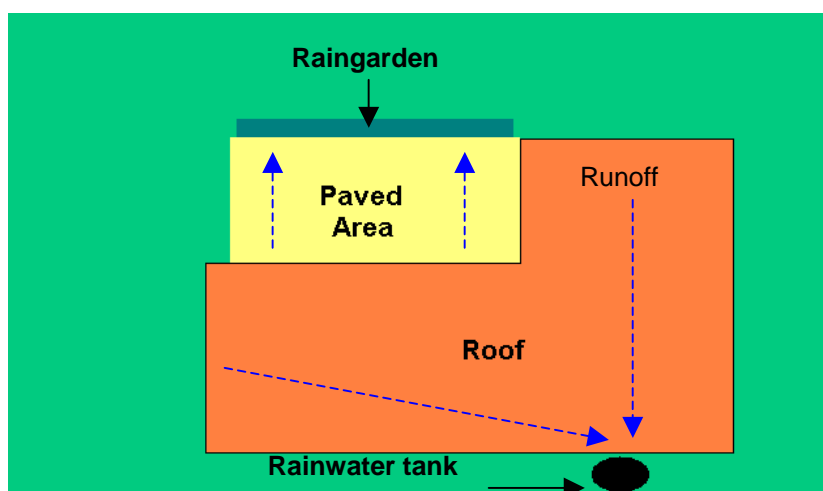


Figure 2 Diagram of site

The calculations performed by the program to calculate the displayed STORM rating are as follows. Values entered by the user can be found in the user input column of the table, with the calculations completed by the tool found in the calculated in STORM column.

Treatment 1: Rainwater tank

Parameter	Description	User Input	Calculated in STORM
Impervious Area 1	Impervious area contributing to treatment measure	100m ²	
Treatment Size	Size/area of the treatment measure	1000L	
Number of Occupants	Number of people to be living in the house	3 people	
Treatment Area 1	Change from litres to square metres		$1000/(1000*1) = 1.00\text{m}^2$
Adjustment Factor	Regional adjustment factor		1.14
Regionalised Treatment Size	Adjustment factor multiplied by treatment size		$1/1.14 = 0.88\text{m}^2$
Treatment Size as % of Impervious Area	Value required for look-up graphs		$(0.88/100) \times 100 = 0.88\%$
Treatment (TN)	Treatment performance		100%

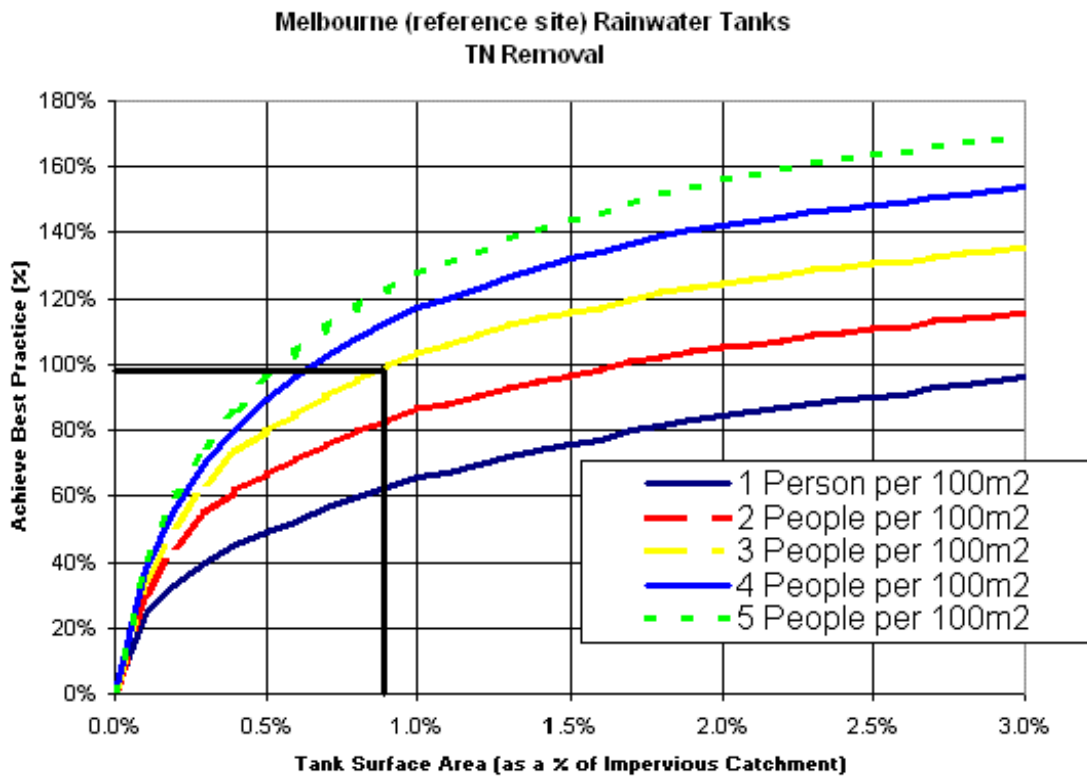


Figure 3 Rainwater tank performance TN

Treatment 2: Raingarden (100mm extended detention)

Parameter	Description	User Input	Calculated in STORM
Impervious Area 2	Impervious area contributing to treatment measure	50m ²	
Treatment Size 2	Size/area of the treatment measure	2m ²	
Adjustment Factor	Regional adjustment factor		1.07
Regionalised Treatment Size	Adjustment factor multiplied by treatment size		$2/1.07 = 1.87\text{m}^2$
Treatment Size as % of Impervious Area	Value required for look up graphs		$(1.87/50) \times 100 = 3.74\%$
Treatment (TN)	Treatment performance		133%

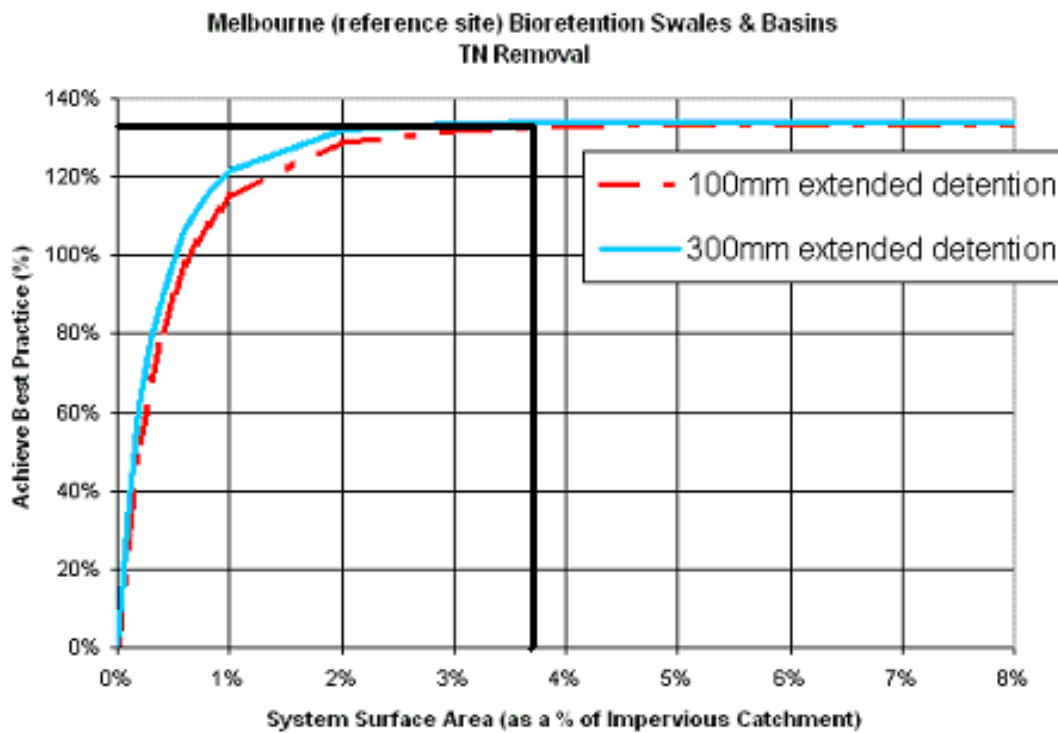


Figure 4 Raingarden performance

Overall STORM rating

Parameter	Description	User Input	Calculated in STORM
STORM rating	Weighted average of TN performance of all treatment measures		$((99\% \times 100) + (133\% \times 50)) / (100 + 50) = 110\%$

Hydrologic Design Regions

The percentage of best practice achieved by treatment measures has been calculated using Melbourne as a reference site. A set of adjustment factors have been calculated for both the greater Melbourne/Geelong area and the entire state of Victoria in order to apply these calculations to regions with different rainfall patterns.

Metropolitan Melbourne as well as the whole of Victoria has been divided into hydrologic regions and the relationship to the reference site of Melbourne calculated, creating the adjustment factors. These factors work by multiplying the size of a treatment measure designed for Melbourne by the relevant adjustment factor for the required hydrologic region. The size of the treatment measure required to obtain the same treatment performance is then found. Full details on how the adjustment factors and hydrologic regions were calculated can be found in the *WSUD Engineering Procedures: Stormwater Technical Manual* (Melbourne Water, 2005).

Victoria has been divided into nine hydrologic design regions determined by rainfall patterns, four within metropolitan Melbourne and five for the rest of the state (Figure 5 and Figure 6). Within Melbourne, these regions have been based upon municipal boundaries, with the exception of the Cities of Casey and Wyndham. These two municipalities contain two hydrologic regions and hence were further separated into North or South of the Monash freeway for Casey and North or South of Skeleton Creek for Wyndham. The Mean Annual Rainfall (MAR) is used to calculate the adjustment factors (Table 2 and Table 3).

Table 3 Hydraulic region adjustment factors for Victoria (source: Melbourne Water, 2005)

Region	Wetland	Raingarden	Swale	Pond
Northern	0.833(MAR)+0.751	0.383(MAR)+0.927	0.352(MAR)+0.956	1.85(MAR)+0.151
Western Plains	0.788(MAR)+0.483	0.059(MAR)+0.919	0.539(MAR)+0.622	1.91(MAR)-0.105
South Coast	0.737(MAR)+0.428	0.143(MAR)+0.719	0.15(MAR)+0.768	1.84(MAR)-0.160
Great Dividing range	0.969(MAR)+0.572	0.316(MAR)+0.766	0.334(MAR)+0.813	2.20(MAR)-0.340
Gippsland	1.78(MAR)+0.273	0.325(MAR)+0.944	0.748(MAR)+0.670	2.28(MAR)-0.227

The adjustment factors for Victoria (outside of the Melbourne/Geelong area) have also been included in the STORM Calculator. However, due to the large size of regional municipalities and the variability of rainfall, a common MAR for each municipality was not determined. A selection of rainfall stations has been used.

Adjustment Factors Assumptions

For use in the STORM Calculator, all municipalities (and individual stations outside Melbourne) have been separated in their hydrologic regions. Adjustment factor values for raingardens, wetlands and ponds are the values shown in Table 2 and Table 3. Values for the other treatment measures available in STORM are:

- Rainwater tanks use pond values
- Infiltration systems (both sand and sandy loam) use raingarden values
- Buffers use swale values.

These values have been included in the STORM Calculator and are automatically selected when the municipality is defined.

Values for the South West Metropolitan, East Metropolitan and South East Metropolitan hydrologic regions remain the same for each municipality. However, for the Central and North West Region values vary with MAR. This is due to differences in the relationships between the regions and reference site. Extensive modelling was completed to define the hydrologic regions, details on the method and results are available in the *WSUD Engineering Procedures: Stormwater Technical Manual* (Melbourne Water, 2005).

The MAR for each municipality in the Melbourne region was calculated using MUSIC, with rainfall data extracted from Melbourne Water's rain gauge database.

Additional rainfall information was sourced from the Bureau of Meteorology website (<http://www.bom.gov.au>). MAR values for each municipality can be found in Appendix A.

Data series from a number of rainfall gauges located in each municipality were extracted and analysed to create a rainfall template containing daily data to be used in MUSIC (Appendix B). Missing data was infilled using data from surrounding rain gauges from the surrounding area. Where there was no suitable rain data available, a zero was inserted in the place of missing data. No more than 10 per cent of the data was replaced with zeros.

In some cases there was not sufficient data available from rain gauges within the municipality, so data from gauges in the surrounding municipalities was used. Rain gauges were selected based on their location within the municipality; with gauges containing the lowest rainfall chosen to ensure MAR values have been underestimated rather than overestimated.

Applying STORM ratings to Victoria

A STORM rating calculated for the reference site can be applied to any region in Victoria by using the adjustment factors calculated for regional Victoria. To apply the STORM calculation to areas outside of Melbourne, the treatment size should be multiplied by the regional adjustment factor to obtain a regionalised treatment area. The adjustment factors can be found in Table 3. The MAR for the area is required to calculate the adjustment factor. Appendix D contains the rainfall stations and data used within each municipality.

Data Tables

In order to expand on the data provided in the ABM STORM Calculator, MUSIC models were used to predict the level of treatment achieved for each of the different treatment measures using different treatment sizes. MUSIC Version 3 was used to model these scenarios.

The MUSIC models were designed to adjust the data in line with the curves generated in the technical manual (Melbourne Water, 2005). Because of this there may be some

variation with the data used in earlier versions of the ABM tool. Table 4 is a summary of the values used for the variables of the treatment nodes in the MUSIC models.

For each model, the size of the treatment area was changed depending on the value of the treatment area as a percentage of the contributing impervious catchment area. Each model used a 100 per cent impervious catchment area of either 10 hectares (infiltration, wetlands, ponds) or 1 hectare (rainwater tanks).

Modelling rainwater tanks needed to include the amount of reuse (calculated from the number of people per 100m² of roof area), as well as the treatment size as a percentage of impervious catchment area value.

In all models the source nodes used the default settings for the generation rates of TN, as well as the rainfall and runoff parameters. The rainfall data used for each model was the 6 minute data for Melbourne from 01/01/1980 12:00AM to 31/12/1989 11:54PM.

Table 4 Parameter values for Music models

Treatment Measure	Parameter Values	Comments
Wetlands (200mm)	TSS: k=1500, c*=6 TP: k=1000, c*=0.06 TN: k=150, c*=1 Extended Detention = 200mm Inlet Pond Volume = 0.1 x Surface Area Permanent Pool Volume = 0.4 x Surface Area Overflow Weir Width = 200m Notional Detention Time = 72hrs	Models were created for two types of wetlands, 200mm extended detention and 400mm extended detention.
Wetlands (400mm)	TSS: k=1500, c*=6 TP: k=1000, c*=0.06 TN: k=150, c*=1 Extended Detention = 400mm Inlet Pond Volume = 0.1 x Surface Area Permanent Pool Volume = 0.4 x Surface Area Overflow Weir Width = 200m Notional Detention Time = 72hrs	
Swale (0.05m)	TSS: k= 800,C*=20 TP: k=6000,C*=0.130 TN: k=500, C*=1.4 Bed Slope= 3% Vegetation Height = 0.05m Base width = 1m Depth = 0.5m Top width = 3m Surface Area = length (m) * top width(3m) Seepage loss = 0 mm/hr	Two swale models were created for two different vegetation heights – 0.05m mown grass & 0.25m sedge type
Swale (0.25m)	TSS: k= 800,C*=20 TP: k=6000,C*=0.130 TN: k=500, C*=1.4 Bed Slope= 3% Vegetation Height = 0.25m Base width = 1m Depth = 0.5m Top width = 3m Surface Area = length (m) * top width (3m) Seepage loss = 0 mm/hr	

Treatment Measure	Parameter Values	Comments
Raingarden (100mm)	TSS: k=8000, c*=20 TP: k=6000, c*=0.13 TN: k=500, c*=1.4 Filter Depth = 0.6m Filter Area = Surface Area m ³ Overflow weir width = 200m Effective Particle Diameter = 0.45mm Saturated Hydraulic Conductivity = 180mm/hr Extended detention depth = 100mm	Models were created for two types of raingarden trenches, 100mm extended detention depth and 300mm extended detention depth.
Raingarden (300mm)	TSS: k=8000, c*=20 TP: k=6000, c*=0.13 TN: k=500, c*=1.4 Filter Depth = 0.6m Filter Area = Surface Area m ³ Overflow weir width = 200m Effective Particle Diameter = 0.45mm Saturated Hydraulic Conductivity = 180mm/hr Extended detention depth = 300mm	
Infiltration (Sand)	TSS: k=400, C*=12 TP: k=300, C*=0.09 TN: k=40, C*=1.0 Depth to overflow weir = 0.2m Infiltration Rate = 360mm/hr Overflow Weir width = 20m	Infiltration systems were modelled for two filter types (sand and sandy loam) using an infiltration system node.
Infiltration (Sandy Loam)	TSS: k=400, C*=12 TP: k=300, C*=0.09 TN: k=40, C*=1.0 Depth to overflow weir = 0.2m Infiltration Rate = 36mm/hr Overflow Weir width = 20m	
Rainwater Tanks	TSS: k =400, C*=12 TP: k=300, C*=0.13 TN: k=40, C*=1.4 Daily Water Demand = 0.022 kL/day x number of people Extended Detention Depth = 0.01m Volume below overflow pipe = Surface Area x 1 (m ³) Depth above overflow = 0.2m Overflow pipe diameter = 50mm	Rainwater tanks were modelled with the amount of reuse calculated using the number of people in the house and the standard reuse rate of 20 litres per person per day
Buffer	Seepage Loss = 0 mm/hr	A buffer treatment node was used.
Ponds	TSS: k=8000, c*=20 TP: k=6000, c*=0.13 TN: k=500, c*=1.4 Extended Det Depth = 0.1m Permanent Pool Volume = 0.6xSurface Area Overflow weir width= 20m Notional detention time = 72 hours Evaporation Loss=100mm/hr	A sediment pond node was used.

Differences from the ABM Tool

A number of changes have been made to the original STORM tool in order to achieve a more accurate calculation of treatment measure performance. These changes also aim to create a tool that is easier to use. Changes to STORM include:

- The updating and expansion of data tables using MUSIC Version 3
- Exclusion of pervious area from the calculation of performance
- Incorporation of hydrologic regions for Victoria.

A detailed explanation as well as an example calculation showing the differences between the ABM tool and STORM can be found in Appendix C.

In the ABM tool the amount of pervious area on the site was taken into account in the calculation of the rating. This has been excluded from the current STORM Calculator as it gives treatment credit for pervious area left on the block, which can result in a higher STORM rating than will actually be achieved on the site. This method also ensures that the STORM rating calculated is consistent with the method in the technical manual.

Another addition to the tool has been the incorporation of hydrologic regions. All of the data for the tool has been based around Melbourne as a reference site. In order to apply the tool to all areas of Melbourne and the rest of Victoria, the hydrologic regions derived in the WSUD Engineering Procedures (Melbourne Water, 2005) have been incorporated into the STORM calculation.

Limitations of STORM

As the STORM Calculator aims to simplify what would otherwise be a complex modelling process, there are limits to the applications for which it is suitable. These include:

- The ability to model treatment trains
- The properties of treatment measures
- Sites where the impervious fraction is less than 40%

STORM is unable to model the effects of a treatment train – a series of treatment measures that are linked together. STORM is able to model a number of treatment measures, but only when they are separate and not linked.

The data used to calculate the STORM rating is based on a number of assumptions about the properties of treatment measures. If the proposed treatment measures differ from these assumptions, there will be some variation in the actual pollutant reduction from that given by the STORM Calculator.

As STORM does not model runoff from pervious areas, sites that have a low impervious fraction should not be modelled in STORM. In these cases overland flow may need to be directed into treatment systems and the sizing of these will need to take this additional flow into consideration. Other tools like MUSIC should be used for such applications.

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Victoria Stormwater Committee (1999), *Urban Stormwater: Best Practice Environmental Management Guidelines*, CSIRO Publishing, Melbourne.

Appendix A: Municipality mean annual rainfall values

Municipality	Hydrologic Region	MAR (mm/year)
Banyule	Central and North West Metro	645
Bass Coast	South East Metro	660
Baw Baw	South East Metro	931
Bayside	Central and North West Metro	671
Boroondara	Central and North West Metro	642
Brimbank	Central and North West Metro	510
Cardinia	East Metro	851
Casey (North of Monash Freeway)	East Metro	709
Casey (South of Monash Freeway)	South East Metro	709
Darebin	Central and North West Metro	627
Frankston	South East Metro	701
French Island	South East Metro	623
Glen Eira	Central and North West Metro	633
Greater Dandenong	South East Metro	703
Greater Geelong	South West Metro	431
Hobsons Bay	Central and North West Metro	489
Hume	Central and North West Metro	536
Kingston	South East Metro	704
Knox	East Metro	704
Macedon Ranges	Central and North West Metro	546
Manningham	East Metro	748

Municipality	Hydrologic Region	MAR (mm/year)
Maribyrnong	Central and North West Metro	501
Maroondah	East Metro	743
Melbourne	Central and North West Metro	642
Melton Shire	Central and North West Metro	458
Mitchell	Central and North West Metro	537
Monash	East Metro	701
Moonee Valley	Central and North West Metro	512
Moorabool	Central and North West Metro	634
Moreland	Central and North West Metro	646
Mornington Peninsula	South East Metro	666
Murrindindi	East Metro	881
Nillumbik	Central and North West Metro	646
Port Phillip	Central and North West Metro	483
South Gippsland	South East Metro	895
Stonnington	Central and North West Metro	644
Whitehorse	East Metro	730
Whittlesea	Central and North West Metro	610
Wyndham (North/East of Skeleton Creek)	Central and North West Metro	459
Wyndham (South/West of Skeleton Creek)	South West Metro	459
Yarra	Central and North West Metro	564
Yarra Ranges	East Metro	937

Appendix B: Rain gauge data used for calculating MAR

Municipality	Range of Data Used	Rain Gauge Used	% Used	Infill Gauge 1	% Used	Infill Gauge 2	% Used	Infill Gauge 3	% Used
Banyule	1980-2003	229614	90%	229403	0%	229135	1%	0	9%
Bass Coast	1995-2003	228209B ¹	95%	0	5%				
Baw Baw	1995-2003	586198	94%	586178 ²	1%	586201 ¹	5%		
Bayside	1980-2003	586036	53%	229660	4%	0	43%		
Boroondara	1980-2003	229624	57%	586176 ³	2%	229621 ⁴	38%	0	3%
Brimbank	1980-2003	231104	97%	587004	2%	230105	3%	0	2%
Cardinia	1980-2003	228365	90%	586201	9%	0	1%		
Casey	1980-2003	586375	86%	586199	10%	0	4%		
Darebin	1980-2003	229645	96%	586011	2%	0	2%		
Frankston	1980-2003	228378	87%	228371	3%	586375 ⁵	9%	0	1%
French Island	1980-2003	586375 ⁵	86%	228395 ¹	1%	0	13%		
Glen Eira	1987-2003	586115	89%	586194	6%	0	5%		
Greater Dandenong	1980-2003	228362	83%	228381	1%	228368 ⁶	16%		
Greater Geelong	1980-2003	587023	18%	587030 ⁷	29%	231110 ⁷	46%	0	7%
Hobsons Bay	1980-2003	231107 ⁸	92%	1110 ⁷	3%	0	6%		
Hume	1980-2003	230104	94%	230107	2%	586028	1%	0	2%
Kingston	1980-2003	586187	28%	586095	18%	228603	47%	0	6%
Knox	1980-2003	228368	96%	228373	3%	0	1%		
Macedon Ranges	1980-2003	230101	93%	587117	6%	0	1%		
Manningham	1980-2003	586010	52%	586037	3%	229200B ⁹	43%	0	2%
Maribyrnong	1980-2003	230106	93%	0	7%				
Maroondah	1980-2003	230100	92%	0	8%				
Melton Shire	1980-2003	231105	89%	231106	6%	0	5%		
Mitchell	1980-2003	230100	92%	586146	5%	0	3%		
Monash	1980-2003	586185	49%	586023	2%	228603 ¹⁰	43%	0	6%

Municipality	Range of Data Used	Rain Gauge Used	% Used	Infill Gauge 1	% Used	Infill Gauge 2	% Used	Infill Gauge 3	% Used
Moonee Valley	1980-2003	586182	53%	229643	1%	230106 ¹¹	43%	0	3%
Moorabool	1980-2003	230103 ¹²	92%	231106 ¹³	5%	0	3%		
Moreland	1980-2003	229645	96%	229665	1%	0	2%		
Mornington Peninsula	1980-2003	586206	15%	586202	16%	586375 ⁵	56%	0	12%
Murrindindi	1980-2003	586205	19%	588026 ¹⁴	34%	229620 ⁹	45%	0	2%
Nillumbik	1980-2003	229620	96%	229619	1%	0	2%		
Port Phillip	1980-2003	229670	93%	0	7%				
South Gippsland	1980-2003	586192	17%	228365	73%	0	10%		
Stonnington	1980-2003	229624	57%	229621 ¹⁵	39%	229625 ¹⁶	1%	0	2%
Whitehorse	1980-2003	229638	94%	229636	2%	586006	1%	0	2%
Whittlesea	1980-2003	229627	93%	229613	3%	229616	1%	0	3%
Wyndham	1980-2003	231110	88%	231107	6%	587030	1%	0	4%
Yarra	1980-2003	229621	95%	0	5%				
Yarra Ranges	1980-2003	228369	96%	586177	2%	0	2%		

1 Rain gauge from Cardinia Shire used
2 Rain gauge from Yarra Ranges Shire used
3 Rain gauge from Whitehorse City used
4 Rain gauge from Stonnington City used
5 Rain gauge from City of Casey used
6 rain gauge from City of Knox used
7 Rain gauge from Wyndham City used
8 Rain gauge from Brimbank City used

9 Rain gauge from Nillumbik Shire used
10 Rain gauge from Kingston City used
11 Rain gauge from Maribyrnong City used
12 Rain gauge from Macedon Ranges Shire used
13 Rain gauge from Melton Shire used
14 Rain gauge from Mitchell Shire used
15 Rain gauge from Yarra City used
16 Rain gauge from Monash City used

Appendix C: Difference between ABM tool and STORM

As the data produced for the new STORM Calculator has been modelled on the *WSUD Engineering Procedures* manual (Melbourne Water, 2005) curves, it is significantly different than the data set used in the ABM tool.

For ponds, the new data set gives a higher treatment achieved for a smaller treatment area, meaning that applicants using a pond as a treatment device will receive a higher STORM rating in the new tool than with the ABM tool.

The TN data for wetlands (200mm and 400mm extended detention depth) is quite similar.

For infiltration systems using sand as the filter medium, the ABM and STORM data are very similar, However, for the sandy loam infiltration system, the new tool data gives significantly more treatment than the ABM data.

When comparing the percentage achieved best practice values for rainwater tanks, the new STORM values give a higher amount of treatment than the ABM tool.

It is difficult to compare the data set for raingarden systems as the ABM data was modelled using an older version of MUSIC which was found to have an error in the modelling, whereas the data for the new STORM Calculator was modelled using MUSIC Version 3 with the correct algorithm.

Comparisons between the ABM tool, STORM and MUSIC indicate that STORM is more conservative than MUSIC, both of which give less treatment than the ABM tool, as can be seen in Figure 7.

Comparison of WSUD Assessment Tools

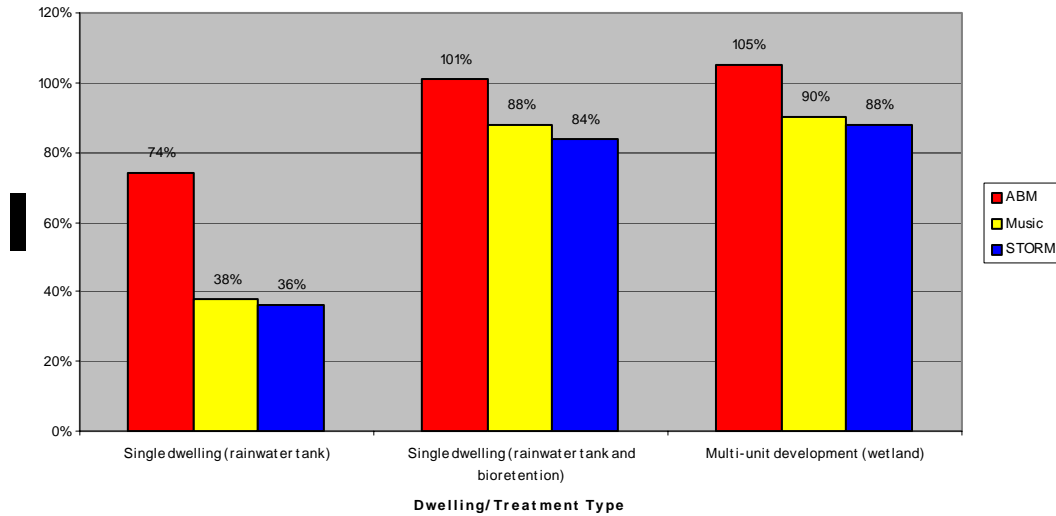


Figure 7 Case study comparison of assessment tools

This graph is based upon the same three case studies being entered into each of the assessment tools. Case study 1 is a single dwelling with a total area of 600m², an impervious area of 250m² treated by a 2400L rainwater tank (3 occupants) and 150m² of impervious area untreated. Case study 2 is based on the same single dwelling, with the addition of a 3m² raingarden (extended detention depth of 100mm) treating the 150m² impervious area.

Case study 3 is a multi-unit development consisting of a total area of 847m², with a 22m² wetland (200mm extended detention depth) treating the runoff from 617m² of impervious area (including roof and other impervious areas). All case studies have been taken from the final report of *Clean Stormwater – a planning framework* (ABM, 2004) and are set in the City of Whitehorse.

Appendix D: Rainfall data used for regional Victoria

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
ALPINE SHIRE	BOGONG	1,819	-36.8056	147.224	Great Dividing Range
ALPINE SHIRE	BRIGHT	1,085	-36.7	147	Great Dividing Range
ALPINE SHIRE	COBUNGRA	632	-37.0333	147.267	Great Dividing Range
ALPINE SHIRE	DEDERANG	903	-36.5	147	Northern
ALPINE SHIRE	ESKDALE	1,029	-36.6833	147.233	Great Dividing Range
ALPINE SHIRE	EUROBIN	1,165	-36.6353	146.863	Northern
ALPINE SHIRE	FALLS CREEK	2,579	-36.8633	147.279	Great Dividing Range
ALPINE SHIRE	GUNDOWRING UPPER	965	-36.5172	147.071	Northern
ALPINE SHIRE	HARRIETVILLE	1,425	-36.8925	147.064	Great Dividing Range
ALPINE SHIRE	HOTHAM HEIGHTS	1,488	-36.9833	147.15	Great Dividing Range
ALPINE SHIRE	KERGUNYAH	926	-36.4472	147.047	Northern
ALPINE SHIRE	LAKE BUFFALO	1,081	-36.7133	146.672	Great Dividing Range
ALPINE SHIRE	MOUNT BEAUTY	1,263	-36.745	147.163	Great Dividing Range
ALPINE SHIRE	MOUNT BUFFALO	1,885	-36.7222	146.819	Great Dividing Range
ALPINE SHIRE	MOUNT ST BERNARD	1,724	-37	147.1	Great Dividing Range
ALPINE SHIRE	MYRTLEFORD	902	-36.5667	146.733	Northern
ALPINE SHIRE	SMOKO	1,170	-36.8	147	Great Dividing Range
ALPINE SHIRE	TAWONGA	1,150	-36.6567	147.128	Great Dividing Range
ARARAT RURAL CITY	ARARAT	600	-37.2775	142.981	Western
ARARAT RURAL CITY	BUANGOR	579	-37.3667	143.183	Western
ARARAT RURAL CITY	EVERSLEY	598	-37.1914	143.173	Western
ARARAT RURAL CITY	JALLUKAR	560	-37.2	142.7	Western
ARARAT RURAL CITY	LAKE BOLAC	540	-37.7111	142.839	South Coast
ARARAT RURAL CITY	LANGI CHIRAM	718	-37.3	143	Western
ARARAT RURAL CITY	MAROONA	562	-37.377	142.811	Western
ARARAT RURAL CITY	MOUNT MOORNAHBOOL	609	-37.3833	142.783	Western
ARARAT RURAL CITY	MOUNT WILLIAM	573	-37.4	142.6	Western
ARARAT RURAL CITY	MOYSTON	573	-37.3011	142.766	Western
ARARAT RURAL CITY	NERRIN NERRIN	573	-37.7667	143.017	South Coast
ARARAT RURAL CITY	POMONAL	720	-37.2	142.6	Western
ARARAT RURAL CITY	STREATHAM	569	-37.6833	143.067	South Coast
ARARAT RURAL CITY	WESTMERE	547	-37.6597	142.996	South Coast
ARARAT RURAL CITY	WICKLIFFE	558	-37.6917	142.724	South Coast
ARARAT RURAL CITY	WILLAURA	545	-37.5481	142.739	Western
BALLARAT CITY	ADDINGTON	704	-37.4158	143.668	Western
BALLARAT CITY	BALLARAT	689	-37.55	143.883	Western
BALLARAT CITY	BUNGAREE	856	-37.5511	143.932	Western
BALLARAT CITY	BURRUMBEET	625	-37.4739	143.656	Western
BALLARAT CITY	LEARMONTH	687	-37.4	143.7	Western
BALLARAT CITY	WHITE SWAN	881	-37.5169	143.927	Western
BALLARAT CITY	WINDERMERE	612	-37.5	143.7	Western
BULOKE SHIRE	BANGERANG	354	-36.105	142.608	Northern
BULOKE SHIRE	BERRIWILLOCK	349	-35.6383	142.994	Northern
BULOKE SHIRE	BIRCHIP	347	-35.9	142.85	Northern
BULOKE SHIRE	BOIGBEAT	329	-35.5519	142.919	Northern
BULOKE SHIRE	CARRON	367	-36.25	142.75	Northern
BULOKE SHIRE	CHARLTON	430	-36.3	143.4	Northern
BULOKE SHIRE	CORACK	354	-36.1	143.1	Northern
BULOKE SHIRE	CULGOA	360	-35.7183	143.104	Northern
BULOKE SHIRE	CURYO SOUTH	399	-35.85	142.8	Northern
BULOKE SHIRE	DONALD	409	-36.4	143	Northern
BULOKE SHIRE	DUMOSA	327	-35.9333	143.217	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
BULOKE SHIRE	GLENLOTH	378	-36.1	143.4	Northern
BULOKE SHIRE	JERUK	362	-36.0167	143.383	Northern
BULOKE SHIRE	KALPIENUNG	326	-35.9	143.25	Northern
BULOKE SHIRE	KINNABULLA	353	-35.9	142.8	Northern
BULOKE SHIRE	LITCHFIELD	361	-36.2833	142.85	Northern
BULOKE SHIRE	MEATIAN	353	-35.7	143.3	Northern
BULOKE SHIRE	MOUNT JEFFCOTT	392	-36.3	143.15	Northern
BULOKE SHIRE	NANDALY	287	-35.3167	142.7	Northern
BULOKE SHIRE	NARRAPORT	353	-35.9978	143.034	Northern
BULOKE SHIRE	NARREWILOCK	368	-36.2	143.4	Northern
BULOKE SHIRE	NULLAWIL	349	-35.85	143.167	Northern
BULOKE SHIRE	SEA LAKE	328	-35.5061	142.848	Northern
BULOKE SHIRE	TYRELL WEST	310	-35.4167	142.667	Northern
BULOKE SHIRE	TYRRELL DOWNS	307	-35.3633	142.985	Northern
BULOKE SHIRE	WARMUR	344	-36.15	142.8	Northern
BULOKE SHIRE	WARNE	357	-35.8167	143.05	Northern
BULOKE SHIRE	WATCHEM	377	-36.1497	142.858	Northern
BULOKE SHIRE	WATCHUPGA	331	-35.75	142.8	Northern
BULOKE SHIRE	WOOROONOOK	373	-36.2497	143.178	Northern
BULOKE SHIRE	WYCHEPROOF	381	-36.0786	143.225	Northern
BULOKE SHIRE	YANGA	340	-35.8167	143.033	Northern
BULOKE SHIRE	YEUNGROON	323	-36.3833	143.417	Northern
CAMPASPE SHIRE	BAMAWM	393	-36.25	144.6	Northern
CAMPASPE SHIRE	CARAG CARAG	428	-36.45	144.9	Northern
CAMPASPE SHIRE	COLBINABBIN	516	-36.5342	144.773	Northern
CAMPASPE SHIRE	CORNELIA CREEK	399	-36.25	144.8	Northern
CAMPASPE SHIRE	COROP	426	-36.45	144.8	Northern
CAMPASPE SHIRE	ECHUCA	429	-36.1661	144.763	Northern
CAMPASPE SHIRE	GUNBOWER	376	-35.9675	144.37	Northern
CAMPASPE SHIRE	KOTTA	427	-36.2244	144.535	Northern
CAMPASPE SHIRE	KOW SWAMP	331	-35.9333	144.3	Northern
CAMPASPE SHIRE	KYABRAM	447	-36.3167	145.05	Northern
CAMPASPE SHIRE	LOCKINGTON	382	-36.35	144.5	Northern
CAMPASPE SHIRE	MOUNT SCOBIE	400	-36.35	144.967	Northern
CAMPASPE SHIRE	PATHO	381	-35.9992	144.423	Northern
CAMPASPE SHIRE	PINE GROVE	383	-36.3	144.35	Northern
CAMPASPE SHIRE	ROCHESTER	445	-36.3628	144.709	Northern
CAMPASPE SHIRE	RUSHWORTH	528	-36.5914	145.016	Northern
CAMPASPE SHIRE	STANHOPE	453	-36.4436	144.984	Northern
CAMPASPE SHIRE	TENNYSON	406	-36.3047	144.411	Northern
CAMPASPE SHIRE	TERRICK	372	-36.15	144.4	Northern
CAMPASPE SHIRE	TIMMERING	413	-36.4	144.85	Northern
CAMPASPE SHIRE	TONGALA	417	-36.15	145	Northern
CAMPASPE SHIRE	TOOLLEEN	491	-36.7167	144.7	Northern
CAMPASPE SHIRE	TORRUMBARRY	379	-36.1	144.5	Northern
CAMPASPE SHIRE	WANALTA	462	-36.6	144.9	Northern
CAMPASPE SHIRE	WARANGA	487	-36.5333	145.083	Northern
CAMPASPE SHIRE	WHARPARILLA	373	-36.1	144.65	Northern
CAMPASPE SHIRE	WHROO	512	-36.6	145.1	Northern
CAMPASPE SHIRE	WYUNA	408	-36.2	145	Northern
CENTRAL GOLDFIELDS	BEALIBA	465	-36.7892	143.544	Northern
CENTRAL GOLDFIELDS	BUNG BONG	500	-37.1	143.6	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
CENTRAL GOLDFIELDS	CARISBROOK	486	-37.0444	143.822	Northern
CENTRAL GOLDFIELDS	DUNOLLY	494	-36.8603	143.728	Northern
CENTRAL GOLDFIELDS	MAJORCA	541	-37.125	143.786	Northern
CENTRAL GOLDFIELDS	MARYBOROUGH	528	-37.0561	143.732	Northern
CENTRAL GOLDFIELDS	TALBOT	544	-37.1728	143.699	Northern
CENTRAL GOLDFIELDS	TULLAROOP	484	-37.0906	143.864	Northern
COLAC OTWAY SHIRE	APOLLO BAY	1,053	-38.7606	143.666	South Coast
COLAC OTWAY SHIRE	BARRAMUNGA	1,375	-38.6	143.7	South Coast
COLAC OTWAY SHIRE	BARWON DOWNS	780	-38.4669	143.748	South Coast
COLAC OTWAY SHIRE	BEEAC	619	-38.1956	143.64	South Coast
COLAC OTWAY SHIRE	BEECH FOREST	1,741	-38.6	143.6	South Coast
COLAC OTWAY SHIRE	BIRREGURRA	668	-38.3369	143.784	South Coast
COLAC OTWAY SHIRE	CAPE OTWAY	896	-38.8556	143.513	South Coast
COLAC OTWAY SHIRE	CARLISLE RIVER	1,081	-38.6	143.4	South Coast
COLAC OTWAY SHIRE	CHAPPLE VALE	1,080	-38.65	143.3	South Coast
COLAC OTWAY SHIRE	COLAC	652	-38.3	143.6	South Coast
COLAC OTWAY SHIRE	COROROOKE	684	-38.3	143.517	South Coast
COLAC OTWAY SHIRE	CRESSY	537	-38.0294	143.633	South Coast
COLAC OTWAY SHIRE	EURACK	589	-38.1783	143.717	South Coast
COLAC OTWAY SHIRE	FORREST	1,042	-38.52	143.715	South Coast
COLAC OTWAY SHIRE	GELLIBRAND RIVER EAST	984	-38.5	143.5	South Coast
COLAC OTWAY SHIRE	HORDERN VALE	1,069	-38.7586	143.508	South Coast
COLAC OTWAY SHIRE	JOHANNA GLEN	1,078	-38.7667	143.383	South Coast
COLAC OTWAY SHIRE	LAVERS HILL	1,807	-38.7	143.4	South Coast
COLAC OTWAY SHIRE	MOUNT SABINE	1,563	-38.6333	143.733	South Coast
COLAC OTWAY SHIRE	PENNYROYAL CREEK	794	-38.4208	143.835	South Coast
COLAC OTWAY SHIRE	TANYBRYN	1,602	-38.6775	143.683	South Coast
COLAC OTWAY SHIRE	TIRRENGOWER	767	-38.4	143.4	South Coast
COLAC OTWAY SHIRE	TOMAHAWK CREEK	706	-38.4	143.45	South Coast
COLAC OTWAY SHIRE	WARRION	589	-38.2031	143.532	South Coast
COLAC OTWAY SHIRE	WEEAPROINAH	1,940	-38.6356	143.512	South Coast
COLAC OTWAY SHIRE	WYELANGTA	1,829	-38.65	143.45	South Coast
CORANGAMITE SHIRE	BERRYBANK	545	-37.9633	143.467	South Coast
CORANGAMITE SHIRE	CAMPERDOWN	778	-38.2331	143.145	South Coast
CORANGAMITE SHIRE	COBDEN	842	-38.3303	143.076	South Coast
CORANGAMITE SHIRE	COORIEMUNGLE	1,044	-38.55	143.1	South Coast
CORANGAMITE SHIRE	CUNDARE	497	-38.1	143.6	South Coast
CORANGAMITE SHIRE	DARLINGTON	608	-37.9969	143.047	South Coast
CORANGAMITE SHIRE	DERRINALLUM	651	-37.9492	143.221	South Coast
CORANGAMITE SHIRE	GELLIBRAND RIVER	1,067	-38.6211	143.275	South Coast
CORANGAMITE SHIRE	LESLIE MANOR	617	-38.1458	143.306	South Coast
CORANGAMITE SHIRE	LISMORE	625	-37.9558	143.342	South Coast
CORANGAMITE SHIRE	POMBORNEIT	696	-38.3	143.3	South Coast
CORANGAMITE SHIRE	PORT CAMPBELL	906	-38.6197	142.994	South Coast
CORANGAMITE SHIRE	PRINCETOWN	892	-38.6956	143.155	South Coast
CORANGAMITE SHIRE	SCOTTS CREEK	927	-38.4	143.1	South Coast
CORANGAMITE SHIRE	SIMPSON	990	-38.5553	143.182	South Coast
CORANGAMITE SHIRE	SKIPTON	621	-37.6853	143.366	Western
CORANGAMITE SHIRE	TERANG	786	-38.2372	142.915	South Coast
CORANGAMITE SHIRE	TIMBOON	954	-38.4881	142.979	South Coast
CORANGAMITE SHIRE	WATTLE HILL	974	-38.75	143.25	South Coast
DELATITE SHIRE	ARCHERTON	1,362	-36.9064	146.239	Great Dividing Range

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
DELATITE SHIRE	BADDAGINNIE	658	-36.595	145.865	Northern
DELATITE SHIRE	BARJARG	802	-37	146	Great Dividing Range
DELATITE SHIRE	BENALLA	671	-36.5483	145.97	Northern
DELATITE SHIRE	BONNIE DOON	704	-37.0272	145.852	Great Dividing Range
DELATITE SHIRE	CHESNEY VALE	578	-36.4556	146.024	Northern
DELATITE SHIRE	GLENROWAN	693	-36.5	146.2	Northern
DELATITE SHIRE	GOORAMBAT	551	-36.415	145.923	Northern
DELATITE SHIRE	HOWQUA	974	-37.2333	146.15	Great Dividing Range
DELATITE SHIRE	JAMIESON	1,169	-37.3014	146.141	Great Dividing Range
DELATITE SHIRE	LAKE MOKOAN	611	-36.4717	146.137	Northern
DELATITE SHIRE	LAKE ROWAN	545	-36.2667	146.05	Northern
DELATITE SHIRE	LIMA	946	-36.8167	145.95	Northern
DELATITE SHIRE	LIMA SOUTH	960	-36.855	146.004	Northern
DELATITE SHIRE	MANSFIELD	711	-37.0525	146.087	Great Dividing Range
DELATITE SHIRE	MATLOCK	1,575	-37.605	146.217	Great Dividing Range
DELATITE SHIRE	MERRIJIG	825	-37.1	146.267	Great Dividing Range
DELATITE SHIRE	MERTON	759	-36.9833	145.717	Great Dividing Range
DELATITE SHIRE	MOLYULLAH	726	-36.6133	146.113	Northern
DELATITE SHIRE	MOUNT BULLER	1,485	-37.1467	146.437	Great Dividing Range
DELATITE SHIRE	SWANPOOL	896	-36.7231	146.017	Northern
DELATITE SHIRE	TATONG	843	-36.7497	146.118	Northern
DELATITE SHIRE	TIMBERTOP	1,031	-37.1167	146.3	Great Dividing Range
DELATITE SHIRE	TOLMIE	836	-37	146.2	Great Dividing Range
DELATITE SHIRE	WARRENBAYNE	744	-36.65	145.883	Northern
DELATITE SHIRE	WOODFIELD	692	-37.0167	145.8	Great Dividing Range
DELATITE SHIRE	WOODS POINT	1,478	-37.5696	146.254	Great Dividing Range
EAST GIPPSLAND SHIRE	BAIRNSDALE	692	-37.8167	147.617	Gippsland
EAST GIPPSLAND SHIRE	BEMM RIVER	946	-37.75	148.967	Gippsland
EAST GIPPSLAND SHIRE	BENAMBRA	641	-36.9469	147.739	Great Dividing Range
EAST GIPPSLAND SHIRE	BENDOC	697	-37.1178	148.965	Gippsland
EAST GIPPSLAND SHIRE	BENGWORDEN	614	-37.9667	147.467	Gippsland
EAST GIPPSLAND SHIRE	BINDI	644	-37.1136	147.812	Great Dividing Range
EAST GIPPSLAND SHIRE	BLACK MOUNTAIN	723	-37.0072	148.267	Great Dividing Range
EAST GIPPSLAND SHIRE	BONANG	914	-37.1711	148.723	Gippsland
EAST GIPPSLAND SHIRE	BOULDER FLAT	922	-37.5	148.9	Gippsland
EAST GIPPSLAND SHIRE	BRODRIBB RIVER	871	-37.7	148.567	Gippsland
EAST GIPPSLAND SHIRE	BROOKVILLE	809	-37.3333	147.617	Great Dividing Range
EAST GIPPSLAND SHIRE	BRUTHEN	760	-37.7089	147.83	Gippsland
EAST GIPPSLAND SHIRE	BUCHAN	903	-37.3	148.2	Great Dividing Range
EAST GIPPSLAND SHIRE	BULLUMWAAL	994	-37.65	147.533	Gippsland
EAST GIPPSLAND SHIRE	BUTCHERS RIDGE	970	-37.4	148.3	Great Dividing Range
EAST GIPPSLAND SHIRE	CABANANDRA	725	-37.1333	148.666	Gippsland
EAST GIPPSLAND SHIRE	CABBAGE TREE CREEK	1,082	-37.71	148.708	Gippsland
EAST GIPPSLAND SHIRE	CANN RIVER	996	-37.5333	149.15	Gippsland
EAST GIPPSLAND SHIRE	CLUB TERRACE	1,053	-37.5414	148.939	Gippsland
EAST GIPPSLAND SHIRE	COMBIENBAR	1,138	-37.4	149.017	Gippsland
EAST GIPPSLAND SHIRE	DEDDICK	617	-37.1014	148.431	Great Dividing Range
EAST GIPPSLAND SHIRE	DELEGATE	780	-37.0667	148.8	Gippsland
EAST GIPPSLAND SHIRE	DELLICKNORA	722	-37.1072	148.685	Gippsland
EAST GIPPSLAND SHIRE	EAGLE POINT	660	-37.9517	147.662	Gippsland
EAST GIPPSLAND SHIRE	ENSAY	705	-37.3756	147.837	Great Dividing Range
EAST GIPPSLAND SHIRE	ERRINUNDRA PLATEAU	1,726	-37.3339	148.874	Gippsland

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
EAST GIPPSLAND SHIR	FERNBANK	682	-37.9	147.3	Gippsland
EAST GIPPSLAND SHIR	GABO ISLAND	948	-37.5678	149.916	Gippsland
EAST GIPPSLAND SHIR	GELANTIPY	945	-37.25	148.3	Great Dividing Range
EAST GIPPSLAND SHIR	GENOA	948	-37.4833	149.567	Gippsland
EAST GIPPSLAND SHIR	GIPSY POINT	1,054	-37.4667	149.667	Gippsland
EAST GIPPSLAND SHIR	GLEN VALLEY	1,069	-36.9	147.5	Great Dividing Range
EAST GIPPSLAND SHIR	GLEN WILLS	1,331	-36.8667	147.467	Great Dividing Range
EAST GIPPSLAND SHIR	GLENARTE	1,342	-37.55	148.8	Gippsland
EAST GIPPSLAND SHIR	GOONA	642	-37.95	147.6	Gippsland
EAST GIPPSLAND SHIR	GOONGERAH	1,022	-37.3667	148.683	Gippsland
EAST GIPPSLAND SHIR	HINNOMUNJIE	622	-37.0167	147.667	Great Dividing Range
EAST GIPPSLAND SHIR	KALIMNA	632	-37.9	147.9	Gippsland
EAST GIPPSLAND SHIR	KARLO CREEK	1,288	-37.5333	149.467	Gippsland
EAST GIPPSLAND SHIR	LAKE TYERS	821	-37.8525	148.064	Gippsland
EAST GIPPSLAND SHIR	LAKES ENTRANCE	732	-37.8833	148	Gippsland
EAST GIPPSLAND SHIR	LINDENOW	673	-37.8011	147.458	Gippsland
EAST GIPPSLAND SHIR	MALLACOOTA	849	-37.55	149.683	Gippsland
EAST GIPPSLAND SHIR	MARLO	770	-37.7833	148.533	Gippsland
EAST GIPPSLAND SHIR	MELWOOD	875	-37.7283	147.517	Gippsland
EAST GIPPSLAND SHIR	METUNG	648	-37.8833	147.85	Gippsland
EAST GIPPSLAND SHIR	MOORMURANG	657	-37.9	147.5	Gippsland
EAST GIPPSLAND SHIR	MURRUNGOWAR	1,001	-37.6333	148.683	Gippsland
EAST GIPPSLAND SHIR	NICHOLSON	664	-37.8506	147.766	Gippsland
EAST GIPPSLAND SHIR	NOORINBEE	952	-37.5667	149.15	Gippsland
EAST GIPPSLAND SHIR	NOWA NOWA	850	-37.7167	148.1	Gippsland
EAST GIPPSLAND SHIR	OMEO	679	-37.1011	147.598	Great Dividing Range
EAST GIPPSLAND SHIR	ORBOST	849	-37.6917	148.459	Gippsland
EAST GIPPSLAND SHIR	PAYNESVILLE	671	-37.95	147.7	Gippsland
EAST GIPPSLAND SHIR	POINT HICKS	960	-37.8017	149.275	Gippsland
EAST GIPPSLAND SHIR	REEDY FLAT	787	-37.4	147.9	Great Dividing Range
EAST GIPPSLAND SHIR	ROTAMAH ISLAND	677	-37.9833	147.733	Gippsland
EAST GIPPSLAND SHIR	SARDINE CREEK	963	-37.5	148.533	Gippsland
EAST GIPPSLAND SHIR	SARSFIELD	710	-37.75	147.7	Gippsland
EAST GIPPSLAND SHIR	SUGGAN BUGGAN	611	-36.95	148.333	Great Dividing Range
EAST GIPPSLAND SHIR	SWAN REACH	681	-37.8167	147.883	Gippsland
EAST GIPPSLAND SHIR	SWIFTS CREEK	614	-37.2617	147.723	Great Dividing Range
EAST GIPPSLAND SHIR	TABBERABBERA	834	-37.5833	147.367	Great Dividing Range
EAST GIPPSLAND SHIR	TAMBO CROSSING	789	-37.5058	147.848	Great Dividing Range
EAST GIPPSLAND SHIR	THE BROTHERS	692	-36.9	147.8	Great Dividing Range
EAST GIPPSLAND SHIR	TONGHI CREEK	1,022	-37.5697	149.063	Gippsland
EAST GIPPSLAND SHIR	TONGIO	651	-37.1794	147.707	Great Dividing Range
EAST GIPPSLAND SHIR	TUBBUT	665	-37.0719	148.59	Gippsland
EAST GIPPSLAND SHIR	UPLANDS	1,112	-36.7706	147.694	Great Dividing Range
EAST GIPPSLAND SHIR	WANGARABELL	902	-37.3892	149.498	Gippsland
EAST GIPPSLAND SHIR	WINGAN INLET	1,028	-37.6333	149.333	Gippsland
EAST GIPPSLAND SHIR	WROXHAM	906	-37.3	149.4	Gippsland
EAST GIPPSLAND SHIR	WULGULMERANG	650	-37.1	148.3	Great Dividing Range
GANNAWARRA SHIRE	BAEL BAEL	315	-35.7	143.7	Northern
GANNAWARRA SHIRE	BEAUCHAMP	321	-35.6	143.6	Northern
GANNAWARRA SHIRE	BENJEROOP	354	-35.51	143.825	Northern
GANNAWARRA SHIRE	BUDGERUM	338	-35.7833	143.667	Northern
GANNAWARRA SHIRE	COHUNA	375	-35.8	144.208	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
GANNAWARRA SHIRE	FAIRLEY	320	-35.7	143.9	Northern
GANNAWARRA SHIRE	GOULBURN-MURRAY WAT	367	-35.7358	143.93	Northern
GANNAWARRA SHIRE	KERANG	374	-35.7236	143.92	Northern
GANNAWARRA SHIRE	KOONDROOK	365	-35.65	144.15	Northern
GANNAWARRA SHIRE	LAKE CHARM	318	-35.6	143.8	Northern
GANNAWARRA SHIRE	LALBERT	374	-35.6725	143.375	Northern
GANNAWARRA SHIRE	LALBERT EAST	307	-35.7	143.5	Northern
GANNAWARRA SHIRE	LEITCHVILLE	372	-35.9	144.3	Northern
GANNAWARRA SHIRE	MACORNA	417	-35.8667	143.85	Northern
GANNAWARRA SHIRE	MEAD	340	-35.8333	144.117	Northern
GANNAWARRA SHIRE	MURRABIT	354	-35.5333	143.917	Northern
GANNAWARRA SHIRE	NINYEUNOOK	341	-36	143.4	Northern
GANNAWARRA SHIRE	ROWLANDS	322	-35.8667	144.083	Northern
GANNAWARRA SHIRE	TITTYBONG	369	-35.8	143.4	Northern
GANNAWARRA SHIRE	TOWANINNIE	333	-35.9	143.4	Northern
GANNAWARRA SHIRE	TRAGOWEL	329	-35.85	144	Northern
GLENELG SHIRE	CAPE BRIDGEWATER	831	-38.3214	141.407	South Coast
GLENELG SHIRE	CAPE NELSON	784	-38.4319	141.542	South Coast
GLENELG SHIRE	CARAPOOK	636	-37.6	141.5	South Coast
GLENELG SHIRE	CONDAH	703	-38	141.7	South Coast
GLENELG SHIRE	DARTMOOR	781	-37.9	141.3	South Coast
GLENELG SHIRE	DRIK DRIK	839	-37.9694	141.308	South Coast
GLENELG SHIRE	GORAE	962	-38.3	141.6	South Coast
GLENELG SHIRE	GRASSDALE	734	-37.8031	141.678	South Coast
GLENELG SHIRE	HEYWOOD	839	-38.1	141.633	South Coast
GLENELG SHIRE	KENTBRUCK	957	-38.1967	141.358	South Coast
GLENELG SHIRE	MERINO	708	-37.7	141.55	South Coast
GLENELG SHIRE	NARRAWONG	756	-38.2	141.7	South Coast
GLENELG SHIRE	NELSON	767	-38.0347	141.017	South Coast
GLENELG SHIRE	PORTLAND	834	-38.3856	141.606	South Coast
GLENELG SHIRE	PURALKA	724	-37.8	141.1	South Coast
GLENELG SHIRE	RENNICK	799	-37.8408	140.972	South Coast
GLENELG SHIRE	STRATHDOWNIE	690	-37.7	141.2	South Coast
GLENELG SHIRE	TAHARA	667	-37.7158	141.699	South Coast
GLENELG SHIRE	TYRENDARRA	774	-38.1614	141.776	South Coast
GOLDEN PLAINS SHIRE	BANNOCKBURN	515	-38.0447	144.169	South Coast
GOLDEN PLAINS SHIRE	BARUNAH PLAINS	533	-38.0683	143.867	South Coast
GOLDEN PLAINS SHIRE	CAPE CLEAR	594	-37.7833	143.617	Western
GOLDEN PLAINS SHIRE	DEREEL	749	-37.8167	143.75	Western
GOLDEN PLAINS SHIRE	DURDIDWARRAH	688	-37.8233	144.208	Western
GOLDEN PLAINS SHIRE	ENFIELD	684	-37.8	143.8	Western
GOLDEN PLAINS SHIRE	INVERLEIGH	534	-38.1167	144.05	South Coast
GOLDEN PLAINS SHIRE	LETHBRIDGE	554	-37.9833	144.233	South Coast
GOLDEN PLAINS SHIRE	LINTON	731	-37.6833	143.567	Western
GOLDEN PLAINS SHIRE	MEREDITH	691	-37.8447	144.072	Western
GOLDEN PLAINS SHIRE	MOUNT BUTE	626	-37.7333	143.483	Western
GOLDEN PLAINS SHIRE	MOUNT MERCER	709	-37.8333	143.833	Western
GOLDEN PLAINS SHIRE	NEWTOWN	569	-37.7	143.6	Western
GOLDEN PLAINS SHIRE	ROKEWOOD	566	-37.9	143.7	South Coast
GOLDEN PLAINS SHIRE	SCARSDALE	695	-37.7	143.65	Western
GOLDEN PLAINS SHIRE	SHELFORD	580	-37.9842	143.853	South Coast
GOLDEN PLAINS SHIRE	SHEOAKS	504	-37.9075	144.13	South Coast

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
GOLDEN PLAINS SHIRE	SMYTHESDALE	736	-37.65	143.683	Western
GOLDEN PLAINS SHIRE	TEESDALE	533	-38	144	South Coast
GOLDEN PLAINS SHIRE	WARRAMBIN	617	-37.8794	143.901	South Coast
GREATER BENDIGO SH	AXEDAILE	523	-36.8	144.5	Northern
GREATER BENDIGO SH	BENDIGO	551	-36.7533	144.283	Northern
GREATER BENDIGO SH	BIG HILL	563	-36.8333	144.233	Northern
GREATER BENDIGO SH	DRUMMARTIN	434	-36.45	144.45	Northern
GREATER BENDIGO SH	EAGLEHAWK	544	-36.7333	144.233	Northern
GREATER BENDIGO SH	ELMORE	465	-36.4997	144.609	Northern
GREATER BENDIGO SH	EPPALOCK	525	-36.8464	144.529	Northern
GREATER BENDIGO SH	GOORNONG	467	-36.6	144.5	Northern
GREATER BENDIGO SH	HEATHCOTE	576	-36.9578	144.693	Northern
GREATER BENDIGO SH	KNOWSLEY	529	-36.8333	144.583	Northern
GREATER BENDIGO SH	LEICHARDT	445	-36.7	144.1	Northern
GREATER BENDIGO SH	LONGLEA	512	-36.8	144.4	Northern
GREATER BENDIGO SH	MALDON	594	-36.9	144.083	Northern
GREATER BENDIGO SH	MARONG	467	-36.7	144.1	Northern
GREATER BENDIGO SH	MIA MIA	595	-37	144.6	Northern
GREATER BENDIGO SH	RAVENSWOOD	553	-36.9	144.2	Northern
GREATER BENDIGO SH	RAYWOOD	435	-36.5339	144.208	Northern
GREATER BENDIGO SH	REDESDALE	582	-37.0194	144.52	Northern
GREATER BENDIGO SH	RUNNYMEDE	442	-36.5	144.6	Northern
GREATER BENDIGO SH	SANDHURST	574	-36.8444	144.244	Northern
GREATER BENDIGO SH	SEDGWICK	569	-36.9167	144.317	Northern
GREATER SHEPPARTO	ARCADIA	523	-36.55	145.3	Northern
GREATER SHEPPARTO	CANIAMBO	521	-36.4564	145.657	Northern
GREATER SHEPPARTO	COOMA	438	-36.4	145.1	Northern
GREATER SHEPPARTO	DOOKIE	553	-36.3717	145.704	Northern
GREATER SHEPPARTO	GIRGARRE	442	-36.4333	145.133	Northern
GREATER SHEPPARTO	HARSTON	488	-36.4833	145.167	Northern
GREATER SHEPPARTO	KATANDRA	460	-36.25	145.6	Northern
GREATER SHEPPARTO	KIALLA	497	-36.5	145.5	Northern
GREATER SHEPPARTO	LEMNOS	564	-36.3608	145.459	Northern
GREATER SHEPPARTO	MERRIGUM	467	-36.3667	145.133	Northern
GREATER SHEPPARTO	MOORoopNA	495	-36.4	145.343	Northern
GREATER SHEPPARTO	MURCHISON	547	-36.6144	145.214	Northern
GREATER SHEPPARTO	SHEPPARTON	501	-36.3783	145.419	Northern
GREATER SHEPPARTO	ST GERMAINS	443	-36.25	145.15	Northern
GREATER SHEPPARTO	TALLYGAROPNA	436	-36.3	145.4	Northern
GREATER SHEPPARTO	TATURA	484	-36.4431	145.23	Northern
GREATER SHEPPARTO	TOOLAMBA	440	-36.5	145.3	Northern
HEPBURN SHIRE	ALLENDALE	660	-37.4	143.9	Western
HEPBURN SHIRE	CAMPBELLTOWN	586	-37.225	143.96	Northern
HEPBURN SHIRE	CLUNES	585	-37.3047	143.778	Northern
HEPBURN SHIRE	CRESWICK	713	-37.4	143.9	Western
HEPBURN SHIRE	DAYLESFORD	878	-37.3461	144.155	Northern
HEPBURN SHIRE	GLENLYON	924	-37.3	144.25	Northern
HEPBURN SHIRE	KINGSTON	769	-37.35	144	Northern
HEPBURN SHIRE	LYONVILLE	1,105	-37.4	144.25	Great Dividing Range
HEPBURN SHIRE	MUSK	1,020	-37.3667	144.183	Northern
HEPBURN SHIRE	NEWLYN	731	-37.4	144	Northern
HEPBURN SHIRE	SHEPHERDS FLAT	739	-37.2831	144.108	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
HEPBURN SHIRE	SMEATON	617	-37.4	143.9	Western
HEPBURN SHIRE	TRENTHAM	1,076	-37.3908	144.322	Great Dividing Range
HEPBURN SHIRE	YANDOIT	629	-37.2	144.1	Northern
HINDMARSH SHIRE	ANTWERP	381	-36.2967	142.025	Northern
HINDMARSH SHIRE	BAKER	325	-36.1	141.6	Western
HINDMARSH SHIRE	BOXDALE	414	-36.35	141.5	Western
HINDMARSH SHIRE	BROUGHTON	428	-36.15	141.35	Western
HINDMARSH SHIRE	DIAPUR	431	-36.3	141.45	Western
HINDMARSH SHIRE	DIMBOOLA	407	-36.4642	142.033	Western
HINDMARSH SHIRE	GERANG GERUNG	406	-36.3986	141.879	Western
HINDMARSH SHIRE	GLENLEE	398	-36.2575	141.857	Western
HINDMARSH SHIRE	JEPARIT	385	-36.14	141.988	Northern
HINDMARSH SHIRE	JUNGKUM	472	-36.5333	141.633	Western
HINDMARSH SHIRE	KATYIL	408	-36.3	142.1	Western
HINDMARSH SHIRE	KENMARE	355	-35.9167	142.167	Northern
HINDMARSH SHIRE	KINMAKATKA	475	-36.4333	141.567	Western
HINDMARSH SHIRE	LAKE HINDMARSH	344	-36.1	141.95	Northern
HINDMARSH SHIRE	LOCKHART	477	-36.3667	141.983	Western
HINDMARSH SHIRE	LORQUON	383	-36.1542	141.757	Western
HINDMARSH SHIRE	NHILL	415	-36.3347	141.637	Western
HINDMARSH SHIRE	NI NI WELL	366	-36.25	141.8	Western
HINDMARSH SHIRE	RAINBOW	367	-35.9	142	Northern
HINDMARSH SHIRE	TARRANGINNIE	402	-36.3	141.5	Western
HINDMARSH SHIRE	WINIAM	439	-36.4	141.7	Western
HINDMARSH SHIRE	YANAC	403	-36.1128	141.417	Western
HORSHAM RURAL CITY	CLEAR LAKE	504	-36.9389	141.871	Western
HORSHAM RURAL CITY	DADSWELLS BRIDGE	565	-36.9183	142.507	Western
HORSHAM RURAL CITY	DRUNG DRUNG	446	-36.7767	142.394	Western
HORSHAM RURAL CITY	HORSHAM	449	-36.6522	142.105	Western
HORSHAM RURAL CITY	JUNG	418	-36.6064	142.361	Western
HORSHAM RURAL CITY	LONGERENONG	418	-36.6722	142.299	Western
HORSHAM RURAL CITY	NATIMUK	440	-36.7436	141.941	Western
HORSHAM RURAL CITY	TELANGATUK	568	-37.1	142	Western
HORSHAM RURAL CITY	TELANGATUK EAST	506	-37.0619	141.987	Western
HORSHAM RURAL CITY	TOOLONDO	427	-37	142	Western
HORSHAM RURAL CITY	WAIL	420	-36.5167	142.167	Western
HORSHAM RURAL CITY	WALMER	456	-36.7	142.15	Western
HORSHAM RURAL CITY	WONWONDAH	523	-36.9	142.3	Western
INDIGO SHIRE	BARNAWARTHA	535	-36.1139	146.684	Northern
INDIGO SHIRE	BEECHWORTH	954	-36.3703	146.713	Northern
INDIGO SHIRE	BRUARONG	901	-36.4167	146.867	Northern
INDIGO SHIRE	CHILTERN	693	-36.1492	146.611	Northern
INDIGO SHIRE	GOORAMADDA	541	-36	146.5	Northern
INDIGO SHIRE	INDIGO	610	-36.0964	146.601	Northern
INDIGO SHIRE	MOUNT BARANDUDA	1,091	-36.2619	146.856	Northern
INDIGO SHIRE	OSBORNES FLAT	855	-36.3	146.9	Northern
INDIGO SHIRE	RUTHERGLEN	590	-36.055	146.478	Northern
INDIGO SHIRE	STANLEY	1,251	-36.4167	146.767	Northern
INDIGO SHIRE	TANGAMBALANGA	768	-36.2506	147.026	Northern
INDIGO SHIRE	WAHGUNYAH	487	-36	146.4	Northern
INDIGO SHIRE	WOORAGEE	812	-36.3025	146.73	Northern
INDIGO SHIRE	YACKANDANDAH	952	-36.3114	146.838	Northern

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LA TROBE SHIRE	ALDIVALOCH	1,042	-38.4	146.3	South Coast
LA TROBE SHIRE	BUDGEREE EAST	1,142	-38.4322	146.381	South Coast
LA TROBE SHIRE	GUNYAH GUNYAH	1,349	-38.5	146.35	South Coast
LA TROBE SHIRE	HAZELWOOD	804	-38.2883	146.49	South Coast
LA TROBE SHIRE	JUMBUK	962	-38.4	146.4	South Coast
LA TROBE SHIRE	KOORNALLA	885	-38.3231	146.532	South Coast
LA TROBE SHIRE	MARYVALE	911	-38.2333	146.417	South Coast
LA TROBE SHIRE	MOE	969	-38.2022	146.259	South Coast
LA TROBE SHIRE	MORWELL	784	-38.2347	146.431	South Coast
LA TROBE SHIRE	OLSENS BRIDGE	1,403	-38.4861	146.323	South Coast
LA TROBE SHIRE	TRARALGON	755	-38.2	146.5	South Coast
LA TROBE SHIRE	YALLOURN	902	-38.2	146.4	South Coast
LA TROBE SHIRE	YINNAR	825	-38.3167	146.333	South Coast
LODDON SHIRE	BOORT	376	-35.9756	143.609	Northern
LODDON SHIRE	BRIDGEWATER	418	-36.65	143.933	Northern
LODDON SHIRE	BUCKRABANYULE	421	-36.3	143.5	Northern
LODDON SHIRE	BURKES FLAT	453	-36.6722	143.552	Northern
LODDON SHIRE	CALIVIL	375	-36.2667	144.083	Northern
LODDON SHIRE	CAMPBELLS FOREST	422	-36.5692	144.074	Northern
LODDON SHIRE	CANARY ISLAND	361	-35.9825	143.852	Northern
LODDON SHIRE	DINGEE	398	-36.3667	144.233	Northern
LODDON SHIRE	DURHAM OX	387	-36.1361	143.917	Northern
LODDON SHIRE	EASTVILLE	491	-36.8658	143.977	Northern
LODDON SHIRE	EDDINGTON	493	-36.8883	143.861	Northern
LODDON SHIRE	FERNIHURST	399	-36.2833	143.883	Northern
LODDON SHIRE	GLADFIELD	345	-36.0422	143.939	Northern
LODDON SHIRE	GLENALBYN	475	-36.6	143.8	Northern
LODDON SHIRE	GREGWIN	402	-36	143.55	Northern
LODDON SHIRE	INGLEWOOD	464	-36.5767	143.868	Northern
LODDON SHIRE	KORONG VALE	441	-36.3567	143.705	Northern
LODDON SHIRE	LAANECOORIE	456	-36.8339	143.892	Northern
LODDON SHIRE	LAKE MARMAL	375	-36.1522	143.517	Northern
LODDON SHIRE	LAKE MERAN	401	-35.9167	143.75	Northern
LODDON SHIRE	LEAGHUR	361	-35.9667	143.779	Northern
LODDON SHIRE	LEAGHUR DAM	312	-35.9833	143.8	Northern
LODDON SHIRE	MIEPOLL	600	-36.6856	143.511	Northern
LODDON SHIRE	MINCHA	367	-35.9992	144.093	Northern
LODDON SHIRE	MITIAMO	399	-36.2167	144.233	Northern
LODDON SHIRE	MOLIAGUL	536	-36.7458	143.678	Northern
LODDON SHIRE	MOLOGA	392	-36.15	144.2	Northern
LODDON SHIRE	MOLOGA WEST	332	-36.1333	144.05	Northern
LODDON SHIRE	MYSIA	399	-36.2333	143.767	Northern
LODDON SHIRE	PRAIRIE	420	-36.2989	144.14	Northern
LODDON SHIRE	PYRAMID HILL	353	-36.05	144.1	Northern
LODDON SHIRE	QUAMBATOOK	383	-35.9825	143.647	Northern
LODDON SHIRE	RHEOLA	491	-36.65	143.7	Northern
LODDON SHIRE	SERPENTINE	419	-36.3681	143.951	Northern
LODDON SHIRE	SERPENTINE CREEK	428	-36.3167	143.983	Northern
LODDON SHIRE	TANDARRA	412	-36.4311	144.248	Northern
LODDON SHIRE	TARNAGULLA	476	-36.7756	143.834	Northern
LODDON SHIRE	WEDDERBURN	473	-36.4197	143.611	Northern
LODDON SHIRE	WOODSTOCK	466	-36.8	144	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
LODDON SHIRE	WOODSTOCK-ON-LODDON	452	-36.7647	144	Northern
LODDON SHIRE	WOOSANG	441	-36.3	143.5	Northern
LODDON SHIRE	WYCHITELLA	416	-36.25	143.6	Northern
LODDON SHIRE	YALLOOK	418	-36.4333	144.167	Northern
LODDON SHIRE	YARRAWALLA	371	-36.1878	144.055	Northern
MILDURA RURAL CITY	BARING	349	-35.3833	142.067	Northern
MILDURA RURAL CITY	BENETOOK	200	-34.4	142	Northern
MILDURA RURAL CITY	BENETOOK NORTH	228	-34.1	141.8	Northern
MILDURA RURAL CITY	BERROOK	280	-34.9458	141.005	Northern
MILDURA RURAL CITY	BOINKA	297	-35.2	141.6	Northern
MILDURA RURAL CITY	BRONZEWING	315	-35.1906	142.371	Northern
MILDURA RURAL CITY	CARWARP	283	-34.4667	142.2	Northern
MILDURA RURAL CITY	COLIGNAN	254	-34.5	142.4	Northern
MILDURA RURAL CITY	COWANGIE	319	-35.2339	141.383	Northern
MILDURA RURAL CITY	CRAMENTON	315	-34.8	142.467	Northern
MILDURA RURAL CITY	DANYO	331	-35.3	141.3	Northern
MILDURA RURAL CITY	GALAH	320	-35.0833	142.183	Northern
MILDURA RURAL CITY	HATTAH	355	-34.7667	142.333	Northern
MILDURA RURAL CITY	IRYMPLE	275	-34.2261	142.151	Northern
MILDURA RURAL CITY	KADOON	301	-35.2	141.4	Northern
MILDURA RURAL CITY	KARAWINNA	250	-34.4	141.7	Northern
MILDURA RURAL CITY	KARWEEN	292	-34.4667	141.267	Northern
MILDURA RURAL CITY	KOLEYA	287	-34.5	141.7	Northern
MILDURA RURAL CITY	KULWIN	290	-35.1	142.65	Northern
MILDURA RURAL CITY	KURNWILL	286	-34.4611	141.392	Northern
MILDURA RURAL CITY	LAKE CULLULLERAINE	257	-34.2744	141.588	Northern
MILDURA RURAL CITY	LINDSAY POINT	292	-34.105	141.016	Northern
MILDURA RURAL CITY	LINGA	347	-35.1681	141.692	Northern
MILDURA RURAL CITY	MERBEIN	284	-34.2133	142.04	Northern
MILDURA RURAL CITY	MERINGUR	278	-34.3894	141.335	Northern
MILDURA RURAL CITY	MERRINEE	283	-34.3844	141.758	Northern
MILDURA RURAL CITY	MILDURA	289	-34.2306	142.084	Northern
MILDURA RURAL CITY	MITTYACK	318	-35.15	142.667	Northern
MILDURA RURAL CITY	MORKALLA	275	-34.2942	141.173	Northern
MILDURA RURAL CITY	MULCRA	317	-35.1667	141.1	Northern
MILDURA RURAL CITY	MURRAY LOCK NUMBER 9	284	-34.1928	141.599	Northern
MILDURA RURAL CITY	MURRAYVILLE	328	-35.2625	141.178	Northern
MILDURA RURAL CITY	NEDS CORNER	245	-34.3167	141.333	Northern
MILDURA RURAL CITY	NOWINGI	282	-34.6	142.2	Northern
MILDURA RURAL CITY	NULKWYNE	310	-34.9272	142.176	Northern
MILDURA RURAL CITY	OUYEN	331	-35.0694	142.316	Northern
MILDURA RURAL CITY	PANITYA	245	-35.25	141.1	Northern
MILDURA RURAL CITY	PIRLTA	276	-34.3619	141.904	Northern
MILDURA RURAL CITY	RED CLIFFS	287	-34.3072	142.188	Northern
MILDURA RURAL CITY	TIEGA	304	-35.1	142.2	Northern
MILDURA RURAL CITY	TORRITA	295	-35.5	141.9	Northern
MILDURA RURAL CITY	TULILLAH	246	-34.2	141.867	Northern
MILDURA RURAL CITY	TUNART	281	-34.5	141.3	Northern
MILDURA RURAL CITY	TUTYE	301	-35.2	141.5	Northern
MILDURA RURAL CITY	UNDERBOOL	305	-35.1667	141.817	Northern
MILDURA RURAL CITY	WAGANT	303	-35.1	142.5	Northern
MILDURA RURAL CITY	WALPA	307	-35.0922	141.261	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
MILDURA RURAL CITY	WALPEUP	337	-35.12	142.004	Northern
MILDURA RURAL CITY	WERRIMULL	274	-34.3892	141.594	Northern
MILDURA RURAL CITY	WILLAH	291	-34.5	141.9	Northern
MILDURA RURAL CITY	WOORNACK	334	-35.15	142.483	Northern
MILDURA RURAL CITY	YARRARA	292	-34.4	141.417	Northern
MOIRA SHIRE	BARMAH	387	-36.0167	145	Northern
MOIRA SHIRE	BOWEYA	522	-36.2	146.083	Northern
MOIRA SHIRE	BOXWOOD	520	-36.3	145.8	Northern
MOIRA SHIRE	BURRAMINE	448	-36	145.9	Northern
MOIRA SHIRE	COBRAM	471	-35.9164	145.65	Northern
MOIRA SHIRE	DEVENISH	557	-36.3	145.9	Northern
MOIRA SHIRE	INVERGORDON	448	-36.15	145.6	Northern
MOIRA SHIRE	KAARIMBA	488	-36.1	145.3	Northern
MOIRA SHIRE	KANYAPPELLA	389	-36.1	144.95	Northern
MOIRA SHIRE	KATAMATITE	437	-36.0833	145.683	Northern
MOIRA SHIRE	KOTUPNA	469	-36.1333	145.1	Northern
MOIRA SHIRE	MADOWLA PARK	393	-36.1	145	Northern
MOIRA SHIRE	MOIRA	425	-36.0167	145.017	Northern
MOIRA SHIRE	NATHALIA	428	-36.0606	145.202	Northern
MOIRA SHIRE	NUMURKAH	447	-36.1	145.45	Northern
MOIRA SHIRE	PICOLA	375	-36	145.1	Northern
MOIRA SHIRE	PIREE	417	-35.95	145.3	Northern
MOIRA SHIRE	STRATHMERTON	445	-35.9167	145.4	Northern
MOIRA SHIRE	TUNGAMAH	512	-36.1636	145.884	Northern
MOIRA SHIRE	ULUPNA	428	-35.8892	145.387	Northern
MOIRA SHIRE	UPPER MOIRA	449	-36.0167	145.117	Northern
MOIRA SHIRE	WAAIA	447	-36.05	145.333	Northern
MOIRA SHIRE	WILBY	505	-36.1569	146.012	Northern
MOIRA SHIRE	YABBA	455	-36.2	145.7	Northern
MOIRA SHIRE	YALCA	408	-36	145.3	Northern
MOIRA SHIRE	YARRAWONGA	517	-36.0281	146.004	Northern
MOIRA SHIRE	YARROWEYAH	458	-35.8764	145.546	Northern
MOIRA SHIRE	YIELIMA	407	-35.9	145.2	Northern
MOIRA SHIRE	YOUANMITE	430	-36.15	145.7	Northern
MOIRA SHIRE	YUNDOOL	481	-36.3	145.85	Northern
MOUNT ALEXANDER SHIRE	BARINGHUP	526	-36.9367	144.01	Northern
MOUNT ALEXANDER SHIRE	BARKERS CREEK	622	-36.9667	144.267	Northern
MOUNT ALEXANDER SHIRE	CAIRN CURRAN	505	-36.9886	143.975	Northern
MOUNT ALEXANDER SHIRE	CAMPBELLS CREEK	591	-37.1	144.217	Northern
MOUNT ALEXANDER SHIRE	CASTLEMAINE	553	-37.1	144.2	Northern
MOUNT ALEXANDER SHIRE	EBERYS	580	-37.2019	144.013	Northern
MOUNT ALEXANDER SHIRE	EXPEDITION PASS	611	-37.05	144.3	Northern
MOUNT ALEXANDER SHIRE	FRYERSTOWN	596	-37.1	144.25	Northern
MOUNT ALEXANDER SHIRE	HARCOURT	703	-37.0008	144.26	Northern
MOUNT ALEXANDER SHIRE	JOYCES CREEK	503	-37.0853	143.998	Northern
MOUNT ALEXANDER SHIRE	LANGLEY	708	-37.15	144.5	Northern
MOUNT ALEXANDER SHIRE	METCALFE	634	-37.1	144.4	Northern
MOUNT ALEXANDER SHIRE	NEEREMAN	494	-36.9	144	Northern
MOUNT ALEXANDER SHIRE	NEWSTEAD	540	-37.1064	144.062	Northern
MOUNT ALEXANDER SHIRE	TARADALE	722	-37.0167	144.067	Northern
MOUNT ALEXANDER SHIRE	TARRANGOWER	558	-37	144	Northern
MOUNT ALEXANDER SHIRE	TOOLERN VALE	594	-37	144	Northern

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MOUNT ALEXANDER SHIRE	VAUGHAN	629	-37.1567	144.208	Northern
MOUNT ALEXANDER SHIRE	WERONA	665	-37.245	144.025	Northern
MOYNE SHIRE	ALLANSFORD	755	-38.3833	142.583	South Coast
MOYNE SHIRE	CARAMUT	646	-38	142.517	South Coast
MOYNE SHIRE	ELLERSLIE	721	-38.15	142.683	South Coast
MOYNE SHIRE	HAWKESDALE	700	-38.1058	142.321	South Coast
MOYNE SHIRE	HAWKSDALE	769	-38.1086	142.322	South Coast
MOYNE SHIRE	HEXHAM	639	-38	142.7	South Coast
MOYNE SHIRE	KOROIT	786	-38.2928	142.373	South Coast
MOYNE SHIRE	MACARTHUR	756	-38.0339	142	South Coast
MOYNE SHIRE	MORTLAKE	684	-38.0853	142.79	South Coast
MOYNE SHIRE	NULLAWARRE	883	-38.4703	142.753	South Coast
MOYNE SHIRE	PANMURE	861	-38.3	142.7	South Coast
MOYNE SHIRE	PETERBOROUGH	825	-38.6086	142.876	South Coast
MOYNE SHIRE	PORT FAIRY	724	-38.4	142.2	South Coast
MOYNE SHIRE	PURA PURA	571	-37.8333	143.083	South Coast
MOYNE SHIRE	WIRWIN	673	-38.0931	142.96	South Coast
MOYNE SHIRE	WOOLSTHORPE	722	-38.1831	142.468	South Coast
MOYNE SHIRE	YAMBUK	760	-38.25	142	South Coast
NORTHERN GRAMPIAN	ARCHDALE	486	-36.8	143.5	Northern
NORTHERN GRAMPIAN	BEAZLEYS BRIDGE	486	-36.6994	143.159	Northern
NORTHERN GRAMPIAN	BELLELLEN	586	-37.15	142.65	Western
NORTHERN GRAMPIAN	COPE COPE	383	-36.45	143.1	Northern
NORTHERN GRAMPIAN	EMU RAIL	516	-36.7	143.4	Northern
NORTHERN GRAMPIAN	FERNANDES	552	-36.7331	143.153	Northern
NORTHERN GRAMPIAN	GLENORCHY	518	-36.8719	142.631	Western
NORTHERN GRAMPIAN	GOWAR	386	-36.5	143.2	Northern
NORTHERN GRAMPIAN	GOWAR EAST	447	-36.6	143.4	Northern
NORTHERN GRAMPIAN	GREAT WESTERN	549	-37.1847	142.855	Western
NORTHERN GRAMPIAN	HALLS GAP	916	-37.2	142.5	Western
NORTHERN GRAMPIAN	KANYA	483	-36.8	143	Northern
NORTHERN GRAMPIAN	LAKE LONSDALE	579	-37.0333	142.583	Western
NORTHERN GRAMPIAN	MARNOO	435	-36.7	142.9	Northern
NORTHERN GRAMPIAN	MORRL MORRL	456	-36.8611	142.933	Western
NORTHERN GRAMPIAN	NAVARRE	532	-36.9	143.114	Northern
NORTHERN GRAMPIAN	PARADISE	565	-36.8303	143.106	Northern
NORTHERN GRAMPIAN	REDBANK	583	-36.9064	143.338	Northern
NORTHERN GRAMPIAN	SLATY CREEK	458	-36.55	143.3	Northern
NORTHERN GRAMPIAN	ST ARNAUD	508	-36.6189	143.263	Northern
NORTHERN GRAMPIAN	STAWELL	530	-37.1	142.8	Western
NORTHERN GRAMPIAN	STUART MILL	602	-36.8	143.3	Northern
NORTHERN GRAMPIAN	TRAINORS LAGOON	436	-36.6	143	Northern
NORTHERN GRAMPIAN	WALLALOO	446	-36.7	142.9	Northern
NORTHERN GRAMPIAN	WARRANOOKE	443	-36.7281	142.73	Western
NORTHERN GRAMPIAN	WARTOOK	883	-37.0936	142.434	Western
NORTHERN GRAMPIAN	WINJALLOK	518	-36.8	143.2	Northern
PYRENEES SHIRE	AMPHITHEATRE	609	-37.2	143.4	Western
PYRENEES SHIRE	AVOCA	542	-37.09	143.473	Northern
PYRENEES SHIRE	BARKLY	548	-36.955	143.188	Western
PYRENEES SHIRE	BEAUFORT	546	-37.6164	143.163	Western
PYRENEES SHIRE	CHEPSTOWE	582	-37.6	143.5	Western
PYRENEES SHIRE	CROWLANDS	520	-37.1	143.1	Western

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
PYRENEES SHIRE	ELMHURST	629	-37.2	143.3	Western
PYRENEES SHIRE	LANDSBOROUGH	512	-37.0061	143.132	Western
PYRENEES SHIRE	LEXTON	601	-37.2758	143.514	Western
PYRENEES SHIRE	MOONAMBEL	600	-36.9864	143.273	Northern
PYRENEES SHIRE	MOUNT LONARCH	730	-37.3	143.4	Western
PYRENEES SHIRE	MOUNT MITCHELL	619	-37.3	143.6	Northern
PYRENEES SHIRE	NATTE YALLOCK	469	-36.9422	143.471	Northern
PYRENEES SHIRE	RAGLAN	755	-37.3506	143.294	Western
PYRENEES SHIRE	TRAWALLA	679	-37.4817	143.462	Western
PYRENEES SHIRE	WAUBRA	665	-37.4203	143.524	Western
QUEENSCLIFFE BOROUGH	QUEENSCLIFF	604	-38.2725	144.659	South Coast
SOUTHERN GRAMPIAN	BALMORAL	617	-37.2472	141.842	Western
SOUTHERN GRAMPIAN	BRANXHOLME	665	-37.8611	141.801	South Coast
SOUTHERN GRAMPIAN	CAVENDISH	636	-37.5281	142.04	South Coast
SOUTHERN GRAMPIAN	COLERAINE	611	-37.6058	141.684	South Coast
SOUTHERN GRAMPIAN	COOJAR	672	-37.3458	141.685	Western
SOUTHERN GRAMPIAN	DUNKELD	699	-37.6467	142.342	South Coast
SOUTHERN GRAMPIAN	GATUM	624	-37.3922	141.918	Western
SOUTHERN GRAMPIAN	GLENISLA	716	-37.2	142.2	Western
SOUTHERN GRAMPIAN	GLENTHOMPSON	671	-37.7	142.5	South Coast
SOUTHERN GRAMPIAN	HAMILTON	691	-37.7333	142.017	South Coast
SOUTHERN GRAMPIAN	HARROW	634	-37.25	141.65	Western
SOUTHERN GRAMPIAN	KANAWALLA	696	-37.65	142	South Coast
SOUTHERN GRAMPIAN	MIRRANATWA	670	-37.4044	142.384	Western
SOUTHERN GRAMPIAN	MOORALLA	667	-37.4	142.1	Western
SOUTHERN GRAMPIAN	MOUTAJUP	645	-37.6486	142.229	South Coast
SOUTHERN GRAMPIAN	NAREEN	687	-37.3658	141.583	South Coast
SOUTHERN GRAMPIAN	PENSHURST	662	-37.8839	142.422	South Coast
SOUTHERN GRAMPIAN	ROCKLANDS	622	-37.2297	141.961	Western
SOUTHERN GRAMPIAN	VICTORIA VALLEY	617	-37.5	142.3	South Coast
SOUTHERN GRAMPIAN	WOOHLPOOER	713	-37.3333	142.15	Western
SOUTHERN GRAMPIAN	YATCHAW	703	-37.8111	142.129	South Coast
STRATHBOGIE SHIRE	AVENEL	604	-36.8928	145.232	Northern
STRATHBOGIE SHIRE	BALMATTUM	589	-36.7	145.6	Northern
STRATHBOGIE SHIRE	CREIGHTONS CREEK	857	-36.9006	145.523	Northern
STRATHBOGIE SHIRE	EUROA	653	-36.7544	145.573	Northern
STRATHBOGIE SHIRE	GOORAM	760	-36.9	145.6	Northern
STRATHBOGIE SHIRE	GOORAM GONG	821	-36.9	145.6	Northern
STRATHBOGIE SHIRE	LONGWOOD	656	-36.8056	145.417	Northern
STRATHBOGIE SHIRE	MANGALORE	571	-36.89	145.183	Northern
STRATHBOGIE SHIRE	MOLKA	524	-36.6436	145.42	Northern
STRATHBOGIE SHIRE	NAGAMBIE	541	-36.7181	145.173	Northern
STRATHBOGIE SHIRE	REDCASTLE	607	-36.8	144.8	Northern
STRATHBOGIE SHIRE	RUFFY	738	-36.9667	145.5	Northern
STRATHBOGIE SHIRE	STRATHBOGIE	977	-36.8472	145.731	Northern
STRATHBOGIE SHIRE	TAHBILK	597	-36.8267	145.084	Northern
STRATHBOGIE SHIRE	VIOLET TOWN	642	-36.6439	145.722	Northern
SURF COAST SHIRE	AIREYS INLET	630	-38.4583	144.088	South Coast
SURF COAST SHIRE	ANGLESEA	660	-38.4056	144.196	South Coast
SURF COAST SHIRE	BENWERRIN	1,132	-38.45	143.9	South Coast
SURF COAST SHIRE	BUCKLEY	619	-38.2506	144.085	South Coast
SURF COAST SHIRE	EASTERN VIEW	736	-38.45	144.1	South Coast

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
SURF COAST SHIRE	LORNE	927	-38.55	143.983	South Coast
SURF COAST SHIRE	MOUNT MORIAC	555	-38.2	144.2	South Coast
SURF COAST SHIRE	TORQUAY	606	-38.3333	144.317	South Coast
SURF COAST SHIRE	WINCHELSEA	514	-38.2	144	South Coast
SURF COAST SHIRE	WURDIBOLUC	666	-38.2823	144.052	South Coast
SWAN HILL RURAL CIT	ANNUELLO	312	-34.85	142.781	Northern
SWAN HILL RURAL CIT	BANNERTON	316	-34.7233	142.79	Northern
SWAN HILL RURAL CIT	BOUNDARY BEND	350	-34.7164	143.151	Northern
SWAN HILL RURAL CIT	CHILLINGOLLAH	270	-35.2833	143.05	Northern
SWAN HILL RURAL CIT	CHINKAPOOK	355	-35.2	142.95	Northern
SWAN HILL RURAL CIT	GOSHEN	341	-35.5	143.5	Northern
SWAN HILL RURAL CIT	HAYSDALE	325	-34.8833	143.267	Northern
SWAN HILL RURAL CIT	KOOLONONG	310	-34.8833	143.133	Northern
SWAN HILL RURAL CIT	KYNDALYN	292	-34.7122	142.928	Northern
SWAN HILL RURAL CIT	LAKE BOGA	329	-35.4942	143.569	Northern
SWAN HILL RURAL CIT	MANANGATANG	302	-35.2014	142.813	Northern
SWAN HILL RURAL CIT	MOONDAH	311	-35	143	Northern
SWAN HILL RURAL CIT	NYAH	330	-35.1775	143.369	Northern
SWAN HILL RURAL CIT	PENTAL ISLAND	334	-35.4	143.7	Northern
SWAN HILL RURAL CIT	PIANGIL	286	-35.5	143.3	Northern
SWAN HILL RURAL CIT	PIRA	330	-35.2569	143.367	Northern
SWAN HILL RURAL CIT	ROBINVALE	310	-34.59	142.769	Northern
SWAN HILL RURAL CIT	SWAN HILL	349	-35.3406	143.553	Northern
SWAN HILL RURAL CIT	TOWAN	305	-35.1	143.2	Northern
SWAN HILL RURAL CIT	TRESCO	313	-35.5	143.7	Northern
SWAN HILL RURAL CIT	TYNTYNDER	317	-35.2	143.5	Northern
SWAN HILL RURAL CIT	ULTIMA	345	-35.4711	143.266	Northern
SWAN HILL RURAL CIT	ULTIMA EAST	333	-35.4	143.5	Northern
SWAN HILL RURAL CIT	WAITCHIE	322	-35.3667	143.1	Northern
SWAN HILL RURAL CIT	WEMEN	292	-34.7	142.7	Northern
SWAN HILL RURAL CIT	WINNAMBOOL	304	-34.9536	142.739	Northern
SWAN HILL RURAL CIT	WOOD WOOD	332	-35.1	143.35	Northern
SWAN HILL RURAL CIT	WOORINEEN	284	-35.3	143.5	Northern
SWAN HILL RURAL CIT	YOUNGEIRA	297	-34.8	143.1	Northern
SWAN HILL RURAL CIT	YUNGERA	282	-34.8	143.1	Northern
TOWONG SHIRE	BETHANGA	761	-36.1	147.1	Northern
TOWONG SHIRE	BULLIOH	910	-36.1873	147.305	Northern
TOWONG SHIRE	BURROWYE	938	-36	147.55	Northern
TOWONG SHIRE	CALLAGHAN CREEK	1,031	-36.4553	147.432	Northern
TOWONG SHIRE	CORRYONG	776	-36.2003	147.896	Northern
TOWONG SHIRE	CRAVENSVILLE	935	-36.4	147.6	Northern
TOWONG SHIRE	CUDGEWA	796	-36.2	147.8	Northern
TOWONG SHIRE	DARTMOUTH	1,021	-36.5353	147.498	Great Dividing Range
TOWONG SHIRE	KOETONG	1,122	-36.1514	147.494	Northern
TOWONG SHIRE	LUCYVALE	992	-36.2833	147.617	Northern
TOWONG SHIRE	MITTA MITTA	1,019	-36.55	147.4	Great Dividing Range
TOWONG SHIRE	NARIEL CREEK	1,044	-36.3336	147.797	Northern
TOWONG SHIRE	SHELLEY	1,170	-36.1828	147.55	Northern
TOWONG SHIRE	SNOWY CREEK STATION	1,085	-36.6	147.4	Great Dividing Range
TOWONG SHIRE	TALLANDOON	963	-36.4333	147.2	Northern
TOWONG SHIRE	TALLANGATTA	812	-36.2161	147.176	Northern
TOWONG SHIRE	THOWGLA	825	-36.3	148	Northern

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TOWONG SHIRE	TINTALDRA	746	-36.0508	147.939	Northern
TOWONG SHIRE	TOWONG	910	-36.1992	148.024	Northern
TOWONG SHIRE	WALWA	809	-35.9658	147.736	Northern
TOWONG SHIRE	WYEEBOO	944	-36.2833	147.4	Northern
WANGARATTA RURAL	BOBINAWARRAH	789	-36.5531	146.458	Northern
WANGARATTA RURAL	BOORHAMAN	586	-36.2222	146.283	Northern
WANGARATTA RURAL	CARBOOR	924	-36.61	146.536	Northern
WANGARATTA RURAL	CHESHUNT	1,138	-36.8192	146.482	Great Dividing Range
WANGARATTA RURAL	DANDONGADALE	1,216	-36.8064	146.625	Great Dividing Range
WANGARATTA RURAL	EDI UPPER	1,080	-36.7394	146.467	Northern
WANGARATTA RURAL	ELDORADO	668	-36.31	146.521	Northern
WANGARATTA RURAL	EVERTON	681	-36.4	146.55	Northern
WANGARATTA RURAL	HANSONVILLE	705	-36.6	146.3	Northern
WANGARATTA RURAL	KING VALLEY	937	-36.7	146.4	Northern
WANGARATTA RURAL	LAKE WILLIAM HOVELL	1,251	-36.9136	146.386	Great Dividing Range
WANGARATTA RURAL	MILAWA	659	-36.456	146.43	Northern
WANGARATTA RURAL	MOYHU	761	-36.5775	146.378	Northern
WANGARATTA RURAL	MYRRHEE	999	-36.6989	146.284	Northern
WANGARATTA RURAL	OVENS RIVER	636	-36.35	146.342	Northern
WANGARATTA RURAL	PEECHELBA	552	-36.2	146.2	Northern
WANGARATTA RURAL	SPRINGHURST	608	-36.1858	146.469	Northern
WANGARATTA RURAL	WANGARATTA	634	-36.3667	146.3	Northern
WANGARATTA RURAL	WHITFIELD	1,116	-36.7531	146.414	Northern
WANGARATTA RURAL	WHITLANDS	1,404	-36.8492	146.321	Great Dividing Range
WANGARATTA RURAL	WHOROULY	769	-36.5031	146.602	Northern
WARRNAMBOOL CITY	WARRNAMBOOL	701	-38.3725	142.469	South Coast
WELLINGTON SHIRE	ALBERTON	698	-38.6167	146.667	Gippsland
WELLINGTON SHIRE	BALOOK	1,441	-38.4	146.6	South Coast
WELLINGTON SHIRE	BARKLY RIVER	817	-37.5125	146.548	Great Dividing Range
WELLINGTON SHIRE	BLACKWARRY	1,409	-38.4	146.65	Gippsland
WELLINGTON SHIRE	BOISDALE	579	-37.9	147	Gippsland
WELLINGTON SHIRE	BRIAGOLONG	640	-37.8	147.1	Gippsland
WELLINGTON SHIRE	BUSHY PARK	600	-37.8667	147.017	Gippsland
WELLINGTON SHIRE	CALLIGNEE	1,295	-38.3833	146.6	South Coast
WELLINGTON SHIRE	CARRAJUNG	1,132	-38.3667	146.7	Gippsland
WELLINGTON SHIRE	CLYDEBANK	600	-38.0375	147.178	Gippsland
WELLINGTON SHIRE	CROOKED RIVER	673	-37.3811	147.106	Great Dividing Range
WELLINGTON SHIRE	CROOKED RVR	645	-37.3572	146.985	Great Dividing Range
WELLINGTON SHIRE	CULLODEN	932	-37.8	147.083	Gippsland
WELLINGTON SHIRE	DARGO	722	-37.5	147.25	Great Dividing Range
WELLINGTON SHIRE	DARRIMAN	664	-38.4206	146.964	Gippsland
WELLINGTON SHIRE	DENISON	610	-38.0133	146.726	Gippsland
WELLINGTON SHIRE	DUTSON	582	-38.1833	147.2	Gippsland
WELLINGTON SHIRE	EAST SALE	609	-38.1156	147.132	Gippsland
WELLINGTON SHIRE	GIFFARD	565	-38.4242	147.085	Gippsland
WELLINGTON SHIRE	GLENALADALE	755	-37.75	147.25	Gippsland
WELLINGTON SHIRE	GLENMAGGIE	643	-37.9086	146.805	Gippsland
WELLINGTON SHIRE	GORMANDALE	864	-38.3	146.7	Gippsland
WELLINGTON SHIRE	HAWKHURST	725	-37.4194	147.116	Great Dividing Range
WELLINGTON SHIRE	HEDLEY	804	-38.6	146.5	South Coast
WELLINGTON SHIRE	HEYFIELD	618	-38	146.9	Gippsland
WELLINGTON SHIRE	LICOLA	736	-37.6303	146.621	Great Dividing Range

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
WELLINGTON SHIRE	LONGFORD	569	-38.15	147.1	Gippsland
WELLINGTON SHIRE	MACKS CREEK	876	-38.5	146.7	Gippsland
WELLINGTON SHIRE	MADALYA	1,264	-38.5075	146.516	South Coast
WELLINGTON SHIRE	MAFFRA	595	-38	147	Gippsland
WELLINGTON SHIRE	MEERLIEU	570	-38	147.4	Gippsland
WELLINGTON SHIRE	NAMBROK	511	-38.1	146.9	Gippsland
WELLINGTON SHIRE	NEWRY	569	-37.9	146.9	Gippsland
WELLINGTON SHIRE	PORT ALBERT	707	-38.6667	146.683	Gippsland
WELLINGTON SHIRE	ROSDALE	650	-38.1522	146.787	Gippsland
WELLINGTON SHIRE	SALE	606	-38.1	147.05	Gippsland
WELLINGTON SHIRE	SEACOMBE	468	-38.1	147.4	Gippsland
WELLINGTON SHIRE	SEASPRAY	600	-38.32	147.174	Gippsland
WELLINGTON SHIRE	SEATON	693	-37.95	146.7	Gippsland
WELLINGTON SHIRE	STRADBROKE	621	-38.3	147	Gippsland
WELLINGTON SHIRE	STRADBROKE WEST	667	-38.2667	146.917	Gippsland
WELLINGTON SHIRE	STRATFORD	649	-38	147.1	Gippsland
WELLINGTON SHIRE	TALBOTVILLE	675	-37.3	147	Great Dividing Range
WELLINGTON SHIRE	THE HEART	591	-38.1	147.2	Gippsland
WELLINGTON SHIRE	TINAMBA	596	-37.9	146.8	Gippsland
WELLINGTON SHIRE	TOONGABBIE	704	-38.1	146.6	South Coast
WELLINGTON SHIRE	VALENCIA CREEK	708	-37.8167	147	Gippsland
WELLINGTON SHIRE	WON WRON	787	-38.5	146.7	Gippsland
WELLINGTON SHIRE	WOODSIDE	678	-38.5	146.9	Gippsland
WELLINGTON SHIRE	WULLA	614	-38.1167	147.033	Gippsland
WELLINGTON SHIRE	YARRAM	726	-38.56	146.67	Gippsland
WEST WIMMERA SHIRE	APSLEY	596	-37	141.1	Western
WEST WIMMERA SHIRE	BENAYEO	542	-36.8697	141.01	Western
WEST WIMMERA SHIRE	BRINGALBERT	567	-36.85	141.2	Western
WEST WIMMERA SHIRE	CASTERTON	692	-37.2667	141.4	Western
WEST WIMMERA SHIRE	CHARAM	584	-36.9833	141.467	Western
WEST WIMMERA SHIRE	CHETWYND	696	-37.3	141.4	South Coast
WEST WIMMERA SHIRE	DERGHOLM	696	-37.3578	141.209	South Coast
WEST WIMMERA SHIRE	DOUGLAS	488	-37.05	141.717	Western
WEST WIMMERA SHIRE	EDENHOPE	574	-37.0378	141.295	Western
WEST WIMMERA SHIRE	ELDERSLIE	596	-37.1	141	Western
WEST WIMMERA SHIRE	GOROKE	516	-36.7181	141.473	Western
WEST WIMMERA SHIRE	GYMBOWEN	422	-36.7	141.6	Western
WEST WIMMERA SHIRE	KANIVA	455	-36.3739	141.241	Western
WEST WIMMERA SHIRE	KARNAK	529	-36.8639	141.48	Western
WEST WIMMERA SHIRE	LAWLOIT	472	-36.4	141.45	Western
WEST WIMMERA SHIRE	LECOR	498	-36.4	141.1	Western
WEST WIMMERA SHIRE	LILLIMUR	478	-36.3664	141.114	Western
WEST WIMMERA SHIRE	MINIMAY	568	-36.7	141.2	Western
WEST WIMMERA SHIRE	MIRAM	441	-36.4	141.3	Western
WEST WIMMERA SHIRE	NATEYIP	526	-36.55	141.233	Western
WEST WIMMERA SHIRE	NEUARPURR	555	-36.7667	141.067	Western
WEST WIMMERA SHIRE	POOLAIJELO	713	-37.25	141.1	South Coast
WEST WIMMERA SHIRE	SERVICETON	496	-36.3667	140.983	Western
WEST WIMMERA SHIRE	TELOPEA DOWNS	395	-35.9472	141.031	Western
WEST WIMMERA SHIRE	YANIPY	453	-36.425	141.335	Western
WODONGA RURAL CIT	BONEGILLA	809	-36.1333	147	Northern
WODONGA RURAL CIT	MIDDLE CREEK	772	-36.2	146.9	Northern

Municipality	BOM rainfall station name	MAR (mm)	Longitude	Latitude	Hydrologic_Region
WODONGA RURAL CIT	WODONGA	715	-36.1167	146.9	Northern
YARRIAMBIACK SHIRE	AREEGRA	364	-36.3	142.6	Northern
YARRIAMBIACK SHIRE	BANYENA	378	-36.6	142.8	Northern
YARRIAMBIACK SHIRE	BEULAH	341	-35.9	142.4	Northern
YARRIAMBIACK SHIRE	BOOLITE	353	-36.3	142.7	Northern
YARRIAMBIACK SHIRE	BRIM	348	-36.0667	142.417	Northern
YARRIAMBIACK SHIRE	BROOKRET	404	-36.6	142.7	Northern
YARRIAMBIACK SHIRE	BURREREO	407	-36.5167	142.717	Northern
YARRIAMBIACK SHIRE	BURRUM	389	-36.6	142.7	Northern
YARRIAMBIACK SHIRE	GALAQUIL	348	-36.1	142.6	Northern
YARRIAMBIACK SHIRE	GAMA	340	-35.5572	142.543	Northern
YARRIAMBIACK SHIRE	HOPETOUN	342	-35.7344	142.37	Northern
YARRIAMBIACK SHIRE	HOPEVALE	348	-35.9	142.3	Northern
YARRIAMBIACK SHIRE	JUNG JUNG	401	-36.6	142.4	Western
YARRIAMBIACK SHIRE	KEWELL	445	-36.4667	142.4	Western
YARRIAMBIACK SHIRE	LAEN	404	-36.45	142.8	Northern
YARRIAMBIACK SHIRE	LAKE CORRONG	350	-35.7	142.4	Northern
YARRIAMBIACK SHIRE	LASCELLES	334	-35.6069	142.581	Northern
YARRIAMBIACK SHIRE	LUBECK	442	-36.75	142.65	Western
YARRIAMBIACK SHIRE	MINYIP	407	-36.46	142.586	Northern
YARRIAMBIACK SHIRE	MURTOA	421	-36.6214	142.474	Western
YARRIAMBIACK SHIRE	NETHERBY	407	-35.9	142.3	Northern
YARRIAMBIACK SHIRE	NOWIE	302	-35.3	142.3	Northern
YARRIAMBIACK SHIRE	NYPO	319	-35.7	142	Northern
YARRIAMBIACK SHIRE	PATCHEWOLLOCK	337	-35.3833	142.187	Northern
YARRIAMBIACK SHIRE	ROSEBERY	317	-35.8	142.4	Northern
YARRIAMBIACK SHIRE	RUPANYUP	401	-36.55	142.5	Western
YARRIAMBIACK SHIRE	SHEEP HILLS	368	-36.35	142.5	Northern
YARRIAMBIACK SHIRE	SPEED	302	-35.4003	142.439	Northern
YARRIAMBIACK SHIRE	TURRIFF	334	-35.4667	142.467	Northern
YARRIAMBIACK SHIRE	WARRACKNABEAL	377	-36.3575	142.334	Northern
YARRIAMBIACK SHIRE	WILLIMABRINA	345	-36.05	142.2	Northern
YARRIAMBIACK SHIRE	WOOMELANG	349	-35.6803	142.666	Northern
YARRIAMBIACK SHIRE	YALLANGIP	356	-36.1	142.3	Northern
YARRIAMBIACK SHIRE	YARTO	358	-35.4667	142.3	Northern
YARRIAMBIACK SHIRE	YELLANGIP	356	-36.1	142.3	Northern