

# Water Resources (Amounts of water reasonable for uses guidelines) Determination 2007 (No 1)\*

Disallowable Instrument DI2007—194

made under the

*Water Resources Act 2007*, Section 18 – Amounts of water reasonable for uses

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- 1. Name of instrument**  
This instrument is the *Water Resources (Amounts of water reasonable for uses guidelines) Determination 2007 (No 1)*.
- 2. Commencement**  
This instrument commences on 1 August 2007.
- 3. Determination of water reasonable for uses**  
The amount of water that it is reasonable to use for various purposes is given by Schedule 1.
- 4. Explanatory Notes**  
Schedule 1 is based on what is necessary and sufficient for the relevant purpose. The use of this instrument is intended to ensure the efficient use of ACT water resources and, in particular, to minimise wastage. The Environment Protection Authority is to use this determination in its decisions on licensing and in its recommendations to the Minister on applications for water access entitlements.

Jon Stanhope MLA  
Minister for the Environment  
31 July 2007

\*Name amended under Legislation Act, s 60

## **Schedule 1**

### **Determination of Water Volumes**

Volumes of water for water access entitlements and licences will be determined using the following methods.

In all circumstances, should the applicant request a smaller water volume than is determined using the following methods, then the smaller requested volume will be accepted and issued as the appropriate volume.

#### **1. Volumes of water for irrigation of parkland, irrigated sportsgrounds and residential gardens**

Parkland, sportsgrounds and gardens require sufficient water to meet their evapotranspiration requirements for the prevailing climatic conditions. The water requirements for these areas are based on the volume required to make up the deficit between evapotranspiration and rainfall.

The annual irrigation requirement for parkland and residential gardens in Canberra in addition to rainfall is:

**0.5 ML / 1000 m<sup>2</sup> / year**

In calculating the irrigation requirement for an urban residential property, the total area of the lease is to be used. In all other cases, the area to be irrigated is to be used. Water volumes required by golf courses will be determined using this method.

#### **2. Volumes for rural stock and domestic use**

Water use requirements for all rural stock and domestic water use will be determined as set out in Appendix A.

#### **3. Volumes for water utilities**

Water use requirements for water utilities will be determined on the basis of historical usage, population projections and other relevant factors as determined by the authority.

#### **4. Volumes for metered uses other than those uses specified in categories one to three above**

Water use requirements for uses other than those specified in categories one to three above will be determined by metered use data if sufficient data is available. Data from a minimum of three twelve month periods is deemed to be sufficient data to estimate water use requirements. In meeting this requirement the twelve month periods are not required to be consecutive or correspond to calendar or

financial years. If more than three annual periods of data are available, all periods should be used to estimate average annual use. The volume calculated will be augmented by 10% and rounded to the nearest megalitre to give the water use requirement.

For agricultural or horticultural use the average annual use determined from the metered data will be compared to the volume calculated as set out in Appendix B and the lesser volume will be taken as the water use requirement.

If the licensee can satisfactorily demonstrate to the authority why metered use is not an accurate measure of use, the water use requirements will be derived from literature sources or professional expertise as determined by the authority.

#### **5. Volumes for agricultural and horticultural use where use is unmetered**

The water use requirements for agricultural or horticultural use where insufficient or no metered data has been collected will be calculated as set out in Appendix B. For agricultural and horticultural uses not covered by Appendix B, water use requirements will be derived from literature sources or professional advice as determined by the authority.

#### **6. Volumes for all other unmetered uses**

The water use requirements for all unmetered uses not specified in categories one to five will be derived from literature sources or professional expertise, as determined by the authority.

## Appendix A

### Rural stock and domestic water use requirements

Rural stock and domestic water use requirements for a property for the purposes of issuing a WAE or licence will be determined from stock carrying capacity of a lease and average consumption by different stock, or by the ACT average stock watering requirements as follows;

If in response to the annual stock return requirements three or more years data is present on the register of the ACT Government rural liaison officer for a particular property, then the average stocking rate determined from this data will be taken as the property stocking rate. A reported stock return of zero is accepted as valid for any given year. The property stocking rate will then be multiplied by the daily water requirements of stock listed in Table 1 to determine the stock water requirements for that property. This value will be compared with the ACT average stock watering requirements for that property (6.35 KL/ha/year). The LARGER of the two will be increased by 10% in recognition of the need for some leeway in stock watering and will be the stock and domestic water requirement for the property.

If there are fewer than three years stock return data, or to determine the stock and domestic water use requirements for properties exempt from licensing, the stock and domestic water requirement for the property will be;

The ACT average stock watering requirement (6.35 KL/ha/year) multiplied by the area of property (ha) and augmented by 10% in recognition of the need for some leeway in stock watering.

The domestic component will be determined by multiplying the use rate of **0.5 ML/1000m<sup>2</sup> / year** by the area to be irrigated around the house, up to a maximum area of 2ha, or determined by the authority from literature sources or professional advice as appropriate.

**Table 1 Animal stock watering requirements**

Animal	Water use to be used to determine daily water requirements (L/day)
Sheep	
-weaners	3
-adult dry on grassland	4
-ewes with lambs	6
Cattle	
-lactating cows on grassland	70
-young stock	40
-dry stock	60
Horses	45

## Appendix B

### Agricultural or horticultural water use requirements

Agricultural and horticultural water use requirements are determined using FAO crop factors and local rainfall and evaporation data.

A worked example is described below using data from Table 2 and using olives as an example.

Irrigation requirement = (Reference evapotranspiration<sup>1</sup> \* Crop factor<sup>2</sup>) – Effective rainfall<sup>1</sup>)

Note 1: See Table 2

Note 2: See Table 3

The irrigation requirement should be calculated for each month and then summed to give an annual requirement.

The irrigation requirement is then augmented by 10% and rounded to the nearest megalitre to give the efficient water use requirement.

**Table 2. Rainfall and evaporation data to be used for the ACT**

Month	Pan evaporation(mm)	Pan factor	Reference evapotranspiration (mm)	Total Rainfall (mm)	Effective Rainfall (mm)
Jan	250	0.85	213	61.5	43.1
Feb	201.2	0.85	171	53.6	37.5
March	170.9	0.85	145	51.9	36.3
April	107.8	0.85	92	49	34.3
May	68.7	0.85	58	48.2	33.7
June	45.2	0.85	38	39.3	27.5
July	51.5	0.85	44	42.1	29.5
Aug	79	0.85	67	46.4	32.5
Sept	110.8	0.85	94	53.4	37.4
Oct	157.2	0.85	134	65.1	45.6
Nov	191.9	0.85	163	64.4	45.1
Dec	251.5	0.85	214	53	37.1

#### Notes on table two

**Pan evaporation.** This provides a measurement of the integrated effect of radiation, wind, temperature and humidity on evaporation from an open water surface. The monthly pan evaporation figures in the table have been calculated from field trials undertaken by the NSW Department of Primary Industries for the ACT climatic region and local soil conditions. These figures should be used for all ACT calculations.

**Pan factor.** Pan evaporation may be affected by a number of factors, including the type and size of the pan and any upwind buffer zone. These effects need to be corrected for. For the Canberra Airport the pan factor has been calculated from field trials undertaken by

the NSW Department of Primary Industries at 0.85. This pan factor should be used for all ACT calculations.

**Reference evapotranspiration.** This is the evapotranspiration losses from a hypothetical reference grass surface. It is calculated by multiplying pan evaporation by the pan factor.

**Total rainfall.** Long term average monthly rainfall data. For calculation of water use requirements the rainfall data given in this Table, taken from the Canberra Airport meteorological office, should be used.

**Effective rainfall.** The effective rainfall is the total rainfall multiplied by a factor of 0.7. Research into rainfall available for crop uptake recommends discounting the first 5mm in winter and the first 10mm in summer. As this is difficult to incorporate into a formula, the factor of 0.7 has been identified as an acceptable rule of thumb for discounting this actual rainfall.

**Megalitres required per hectare.** The crop irrigation requirement per hectare (in ML) is calculated by dividing the total annual irrigation requirement by 100.

**Table 3 Crop factors to be used for the ACT**

<b>Crop</b>	<b>Crop factor</b>
<b>Small Vegetables</b>	<b>1.00</b>
Broccoli	1.00
Brussel Sprouts	1.00
Cabbage	1.00
Carrots	1.00
Cauliflower	1.00
Celery	1.03
Garlic	0.85
Lettuce	1.00
Onions	1.00
Spinach	1.00
Radish	0.88
Egg Plant	0.98
Capsicum	0.98
Tomato	0.98
Rock melon	0.73
Cucumber	0.90

Pumpkin	0.90
Squash, Zucchini	0.85
Sweet Melons	0.90
Watermelon	0.90
<b>Roots and Tubers</b>	<b>1.03</b>
Beetroot	1.00
Parsnip	1.00
Potato	0.95
Sweet Potato	0.65
Turnip and Rutabaga	1.03
<b>Legumes</b>	<b>0.85</b>
Beans, green	0.98
Beans, dry and Pulses	0.75
Chick pea	0.68
Broad bean	1.13
Peas	1.13
Soybeans	0.83
<b>Perennial Vegetables</b>	<b>0.90</b>
Artichokes	0.98
Asparagus	0.63
Strawberries	0.80
<b>Oil Crops</b>	<b>0.75</b>
Canola	0.70
Safflower	0.66
Sesame	0.68
Sunflower	0.71
<b>Cereals</b>	<b>0.78</b>
Barley	0.705
Oats	0.70

Wheat	0.73
<i>Sweet corn</i>	1.1
Millet	0.65
<b>Other</b>	
Lucerne hay	0.93
Clover	0.88
Grazing Pasture	0.75
Berries	0.78
Grapes	0.58
Almonds	0.78
Apples, Cherries, Pears	0.83
Apricots, Peaches, Stone Fruit	0.78
Citrus	0.63
Conifer Trees	1.00
Olives	0.70
Pistachios	0.78
Walnuts	0.88