IRRIGATION INFORMATION SHEET

If you are proposing to install an irrigation system into your garden, it is essential that it is a ***water-efficient irrigation system connected to your rainwater tank***. We hope that the information below will help you to select the right irrigation system to suit your application and help to reduce the water usage in the garden.

PLANTING

When designing your garden, it is important to consider the water requirements of the plants you wish to grow and to group the plants accordingly.

Water Use	Plant type
High	Exotic lawn, vegetable garden, fruit trees and some exotic shrubs
Medium	Hardy fruit trees, herbs and some exotic shrubs
Low	Native lawn, most local indigenous plants and Australian native species

SOIL

It is important to understand your soil, as water holding capacity will vary depending on the soil type. Improving and adding organic matter to the soil, in areas where you wish to grow food plants, will help retain soil moisture and nutrients. The site soil profile may not need to be modified in areas where you are growing local indigenous plants. The chart below illustrates the water holding capacity for different soil types on varying slopes. Once the soil has reached its water holding capacity, excess water will be lost through seepage and run-off. Therefore it is essential that water is applied at a rate to suit the conditions.

	Percentage of Slope				
	0-4%	5-8%	8-12%	12-16%	Over 16%
Soil Texture, Type	Infiltration Rate (IR)* mm/hr per m2				
Coarse sand	32	25	19	13	8
Medium sand	27	22	16	11	7
Fine sand	24	19	14	10	6
Loamy sand	22	18	13	9	6
Sandy loam	19	15	11	8	5
Fine sandy loam	16	13	10	6	4
Very fine sandy loam	15	12	9	6	4
Loam	14	11	8	6	4
Silt loam	13	10	8	5	3
Silt loam	11	9	7	5	3
Sandy clay	8	6	5	3	2
Clay loam	6	5	4	3	2
Silty clay	5	4	3	2	1
Clay	3	3	2	1	1

Source: Toro Company (1986)
*Assumes ground plane is covered. Figures will decrease with time and percentage of cover.

Table 1. Typical soil infiltration rates

MULCH

Mulch is crucial in helping to reduce the water usage in your garden, as it assists in retaining soil moisture, moderates soil temperature, helps prevent weed germination and over time improves the soil structure. Pea straw mulch is ideal for your vegetable gardens as it adds nutrients to the soil once broken down. Recycled hardwood mulch is a good choice for the indigenous or native garden. However organic timber mulch can become a fire or decay hazard when laid beside vulnerable parts of the building such as timber wall claddings and decks. Rock aggregate mulch may be a better choice in this situation.

Pea straw mulch | Recycled hardwood mulch | Aggregate mulch

BEST TIME TO WATER

It is far more beneficial to water your garden early in the morning rather than during the day, when evaporation will waste some of the applied water. Watering at dusk can be an issue, as water left on the plant foliage overnight can encourage fungal disease. Longer, less frequent watering cycles are recommended over light, frequent watering. A good soaking will encourage deeper plant root growth, greatly increasing the long-term drought resistance of the plant.

GUIDES FOR EFFICIENT IRRIGATION SYSTEMS

There is no single irrigation system that will suit all applications; it will vary depending on your soil type, the plants you wish to grow and the size of area you wish to irrigate. We recommended seeking professional advice to help you design your irrigation system. Your system may be designed to work manually or to function automatically, depending on your preference.

It is advisable to consider the use of a greywater irrigation system in the design and construction of your new home, as household grey water can be filtered and diverted into a below-surface drip irrigation system to irrigate lawns or fruit trees. If choosing to use greywater in your garden, it is important to use detergents, shampoos and conditioners that are low in sodium and phosphorus.

When choosing your irrigation products and services, ensure that they have been accredited with the **Smart Approved WaterMark**. This will guarantee you are selecting products that have been designed and tested to help to save water.

Smart Approved WaterMark

https://www.smartwatermark.org/products/

GARDEN BEDS

A drip irrigation system is a proven method of providing uniform watering at ground level where the plants need it most. A drip system releases a slow trickle of water at a steady rate, directly to the soil and plant root zone, reducing wastage from evaporation and wind drift.

For maximum efficiency, install a reticulated drip system. It is ideal to set up a system that will irrigate selected parts of the garden as efficiently as possible, and have each group of plants irrigated on a separate line. Vegetables, fruit trees, lawns and local indigenous plants all have different water requirements, therefore it's beneficial to be able to water them independently of each other.

If you install drip lines below the mulch layer, you must then be very careful not to puncture the pipes when digging or weeding. In areas that require frequent soil cultivation, such as vegetable gardens, you may choose not to use a drip system.

VEGETABLE GARDEN

If you choose to install an irrigation system in your vegetable garden and would prefer not to work around the pipework of a drip system, there are mini-sprinkler or micro-spray irrigation heads available that have been endorsed by the Smart Approved WaterMark. Mount these on low stake assemblies to irrigate your veggie patch. They deliver water at a slow but adjustable, even and steady rate, allowing the water to soak into the soil, reducing wasteful run off. Purchase only mini-sprinklers or micro-sprays with adjustable flow rates and coverage. Water from mini-sprinklers is discharged in larger droplets than the mist from micro-sprays, and as such is less susceptible to aerial evaporation loss. These mini-sprinklers and micro-sprays can be installed to suit your garden bed design and layout. And although they will need to run longer than other irrigation systems, they will significantly save on water consumption.

You may also wish to consider a wicking garden bed. This is a raised vegie garden that's irrigated predominantly from below rather than above. A wicking garden bed is a sealed system installed with an inlet and outlet pipe. It incorporates both free water reserves and drainage sand immediately below the plant soil, thereby wicking moisture directly to the plants' root zone. The benefit of a wicking bed is that the water reserve needs only occasional topping up, and much less water is lost at the surface to evaporation.

FRUIT TREES

A drip irrigation system can be installed to each tree when first planted, to help establish the tree, however as the trees grows the irrigation system should be modified. A drip ring should be installed to supply an even supply of water to approximately 300mm inside the tree canopy. Alternatively, mini-sprinklers with adjustable spray coverage can be extremely effective and water-wise when operated by night or in the early morning.

LAWN

Ensure you select a turf that requires less water and will not present as a potential weed problem. If you are looking for an instant turf product, then 'Sir Walter Buffalo' is a good option, as it is drought tolerant and grows with surface creeping runners that are easy to control. There is also a native instant lawn option on the market called 'Nara Native Turf' *(Zoysia macrantha)*, which is available in Melbourne. Nara Native Tuft is a summer growing grass and will need a sunny location and, like most grasses, it will go dormant during the cooler months of the year.

We would also strongly recommend installing an indigenous native lawn, and *Microlaena stipoides* (Weeping Grass) is one of the best as it is grows into a soft, compact growing lawn. You will get the best results if you first spread a very fine mulch and then plant the grass seedlings as small plugs and then over-seed to fill in the gaps. It is often a good option to intermix with other indigenous species, such as, *Austrodanthonia racemosa* (Slender Wallaby-grass), *Austrodanthonia geniculata* (Kneed Wallaby-grass) and *Dichondra repens* (Kidney Weed). Good site preparation and establishment are needed to successfully grow an indigenous native lawn. Weed control is important throughout the establishment period and the grass is best mown to a higher height of 25-30mm.

The Lilydale Instant Turf Company is currently running research trials in developing native grasses as instant turf options, and hopefully it will have these new products on the market in the next few years.

If you require an irrigation system for your lawn, a pop-up irrigation system fitted with low flow volume heads or a drip system installed below ground is the best solution.

Intended as a heads-up rather than a sales pitch, ***Antelco*** micro spray and mini-sprinkler irrigation equipment is excellent. It's available through several outlets including ***Complete Irrigation Solutions*** in Dandenong South (03 9799 4444).

http://www.antelco.com/uk/pdfs/2017 Antelco Metric Catalogue.pdf

How much water?

The amount of water you need to apply to your garden will relate to your location and climate, soil type, planting scheme, the impact of wind and shade, whether the garden is mulched, and of course the rainfall.

How often to water?

Stretch the intervals between watering based on observations. Dig a hole to the root zone occasionally to observe the moisture level or only water when plant leaves start wilting. Adjust your watering to the amount of rain that has fallen or is expected and to the temperature.

TIP – buy a rain gauge so you know exactly how much rain has fallen.

How long should I water for?

To apply the right amount of water you will need to know:

- The flow rate from your tap.
- How long it takes to apply the desired quantity using a hand held hose.

or

- The application rate of your irrigation system.

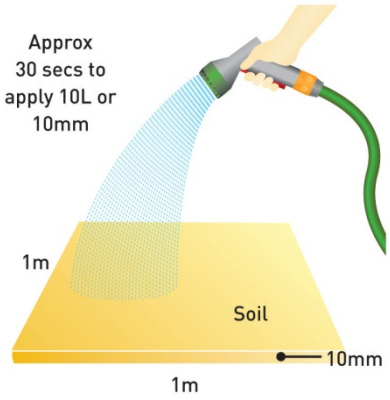
Test your flow rate

A simple way to find out your water flow rate is to measure how long it takes to fill a 9 or 10 litre bucket or watering can with the tap fully open. As an example let us assume it takes 30 seconds to fill a 10 litre bucket or watering can = 20 litres/minute = 1200 litres/hour. Tap pressure varies, so you should test yours for yourself.

= 30 seconds to fill
= 20 litres/minute
= 1200 litres/hour

Hand hosing

If you are using a hand held hose measure the flow rate into the bucket using the length of hose and fittings that you normally use (this may vary from different taps).



Let us assume you want to apply 10mm of water to your garden. If you put 10 litres of water over a square metre area you will deliver the equivalent of 10mm. So if you are using a hose that takes 30 seconds to provide 10 litres, you should water each square metre of garden for no more than 30 seconds (50 minutes if you have a 100 square metre garden). This will be sufficient to ensure deep watering to the root zone. Any longer is very likely using more water than necessary. Avoid light sprinklings that barely penetrate the soil and encourage shallow rooting.

Use a trigger nozzle or water wand on your hose. This enables a gentle application that allows water to penetrate to the root zone, whereas a hard stream may just run off surface. It also prevents you wasting water on paths as you move around the garden. Ensure an even distribution of water across similar plant types. Water early mornings to reduce evaporation and fungal problems. Direct water at the root zone, not the leaves.

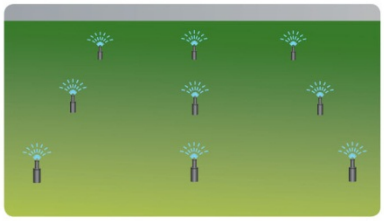
Source: Smart Approved WaterMark and Irrigation Australia

Steps to efficient irrigation

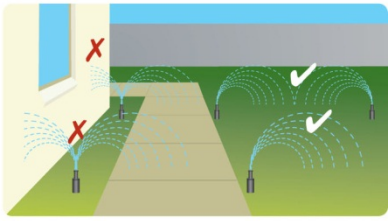
For a fixed irrigation system you should measure the flow rate directly from the tap the irrigation system will be connected to. The flow rate will determine the number of emitters (e.g. drippers, sprinklers, sprayers) you can run at a time. The flow rate from each emitter and the soil type will determine how long the system must run to deliver the required amount of water. Program the system to suit the changing seasons.

DO

Space emitters to apply water evenly



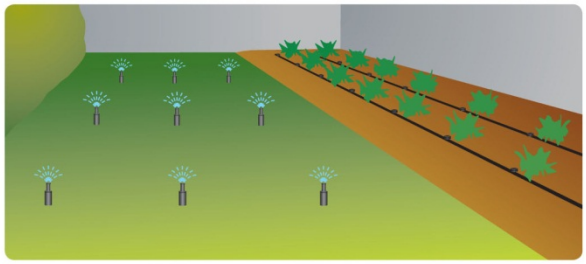
Only place emitters where they are needed. Make sure they only water plants, not buildings or pathways.



Check and maintain your system regularly. Look for leaks, blocked nozzles, plant growth that is blocking spray heads.

Install a rain switch or soil moisture sensors that will override automatic controllers.

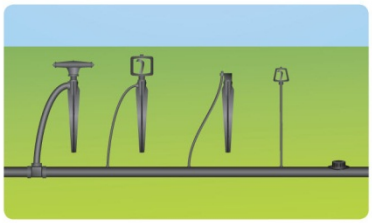
Divide the system into zones as required by garden size, flow rates or planting scheme. E.g. different zones for vegetables and lawn.



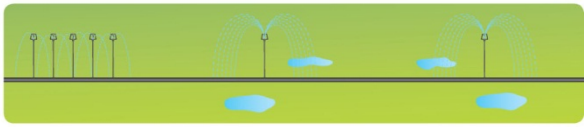
Use a tap timer or electronic controller to control the time and amount of watering. Check local backflow prevention requirements.

DON'T

Don't mix different types of emitters on the one watering zone. E.g. never mix drippers with sprayers or sprinklers.



Don't put too many emitters (insufficient water will come out) or too few (will result in high pressure and wasted water) on one line.



Source: Smart Approved WaterMark and Irrigation Australia

Remember to include a quality disc filter at the upstream end of your irrigation system. This will be particularly important if you are drawing on tank water, as even the smallest sediment or algal build-up can interfere with the flow of mini-sprinklers, micro-sprays and drippers.

Disclaimer

While considerable effort has been made to ensure the accuracy of the information provided in this Irrigation Information Sheet, neither Mullum Creek nor the author accept liability for any consequences arising from reliance on the information published. If you have doubts about acting on any of the information, please seek independent professional advice.