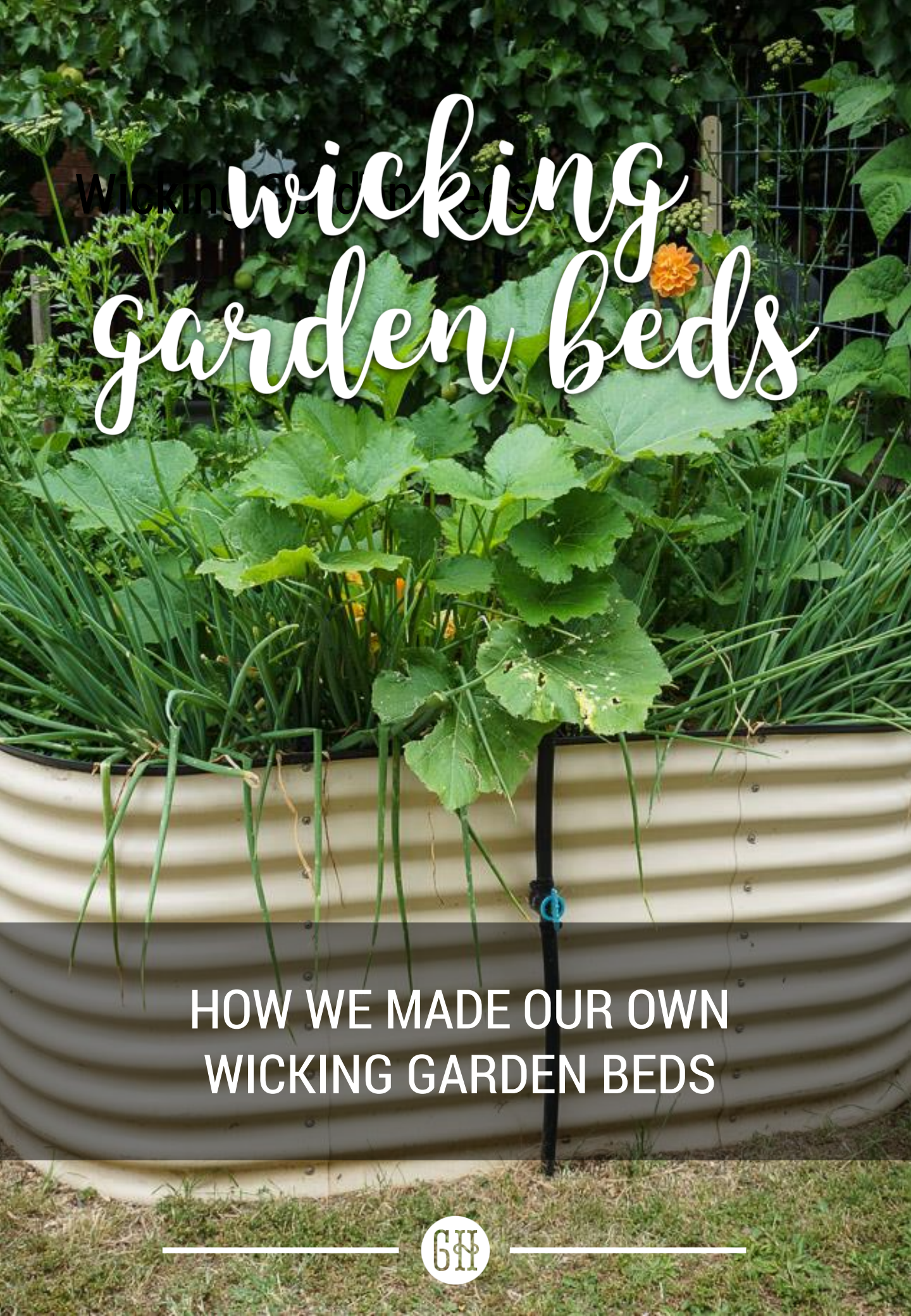
wicking garden beds
HOW WE MADE OUR OWN
WICKING GARDEN BEDS

Hello. I'm Bec

I am the urban hillbilly behind Growing Home. For almost 10 years I have been growing my own food, raising chickens + bees, cooking from the garden, and preserving the harvest.

Our most productive and user friendly growing areas have been our raised wicking garden beds. I want to inspire you to create your own wicking garden beds!

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ABOUT WICKING GARDEN BEDS

Wicking Garden Beds are raised garden beds that have a reservoir built in to the bottom of them, so that water is held below the growing medium. The roots of your edible plants have access to a more consistent water supply, which helps them grow healthier and happier.

Wicking garden beds work through a process known as Capillary Action. This is essentially a phenomenon where liquids defy gravity and are drawn up into fine 'tubes' or porous materials.

The movement is a result of the surface tension of the liquid (caused by cohesion within the liquid) interacting with the adhesion between the liquid and the medium.

If you like maths, there is an equation that can be used to determine the distance a liquid will travel in an upward direction based on the diameter of the tube (or capillary) the liquid is moving through.

Essentially, the smaller the spaces between particles the higher water will rise through capillary action.

CONSIDERATIONS

When designing your own wicking garden beds, consider the level of wicking that can be achieved by the reservoir medium and growing medium you are using.

The maximum wicking action possible with the type of reservoir medium that we used (7mm river pebble/ gravel) is about 30cm. Having a reservoir of greater depth than 30cm means the water may be limited in getting to the soil line (to be drawn up further by the soil) especially when the reservoir water level is low.

Using sand for the reservoir instead, means that water will rise higher through sand than it will through the river pebble due to the sand having finer practicals, which will result in less space between particles creating finer capillaries and more tension.

You may also want to avoid using containers or garden beds that have seams that are assembled with wingnuts/ bolts, which are sharp and may pierce the lining (we covered ours with black plastic irrigation piping that we split).

Instead of installing with the reservoir and growing medium above ground, dig the reservoir into the ground to make filling with sand or gravel much easier (this negates the benefits of 'raised' beds though).

Think about the required size of the overflow pipe in the event a downpipe is feeding the reservoir with roof diverted stormwater.

ABOUT WICKING GARDEN BEDS

BENEFITS

Wicking garden beds can be an investment in time and money to build, but there are reasons why it is worth it.

Wicking beds are water efficient, as they store rainwater for future use, and there is less evaporation compared to 'top down' watering.

Being raised, they are easy to garden in, with less bending or kneeling compared to ground level beds.

They can be easy to 'top up' with water as needed from your rainwater tank or town water.

Less watering from the 'top down' reduces foliar issues (like powdery mildew) from watering on the leaves.

Raised beds are great if you have poor soil, or only concrete or paved backyard.

Use the water from overflow drains to create water gardens for bees and pollinators to enhance your gardens eco-system.

The roots of your plants have access to consistent water supply, which helps them grow healthier and happier.

Reduce soil compaction that can come from 'top down' watering.

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CHALLENGES

There may be challenges to consider when planning and building your wicking garden beds...

These were our most expensive garden beds to set up, with the cost to buy the Colourbond beds + other materials. It is an investment (that has paid off since 2010 for us!)

If you are planning large wicking garden beds, it can take a reasonable amount of time to build them, esp if you have garden beds with panels, or a kit, that first must be put together!

If you plan to build wicking garden beds as big as ours, they do take up a lot of space. If you lack space, consider making wicking pots instead or find smaller garden beds to convert!

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When you plant seeds and seedlings, you may need to water from the top down (around the base of the plants) until they grow and establish root systems.

If pond liner leaks after you've filled the beds with pebble/ sand and soil etc, it isn't easy to work out where and fix it. Consider testing the seal of your pond liner by filling with water (& draining) before adding the rest.

There is the potential for growing medium to get saturated in heavy rains if the overflow pipe isn't big enough to allow drainage fast enough.

Be aware that any nearby trees may end up growing roots into your garden beds, as the smaller roots seek water. These can possibly cause issues with the pond liner and geotextile.

wicking garden bed
REQUIREMENTS

The size and style of the wicking beds you are going to build will determine your exact requirements, but here are the basic considerations when designing and planning. You may decide to make smaller and simpler wicking pots or boxes, but if you are planning larger wicking gardens you may require:

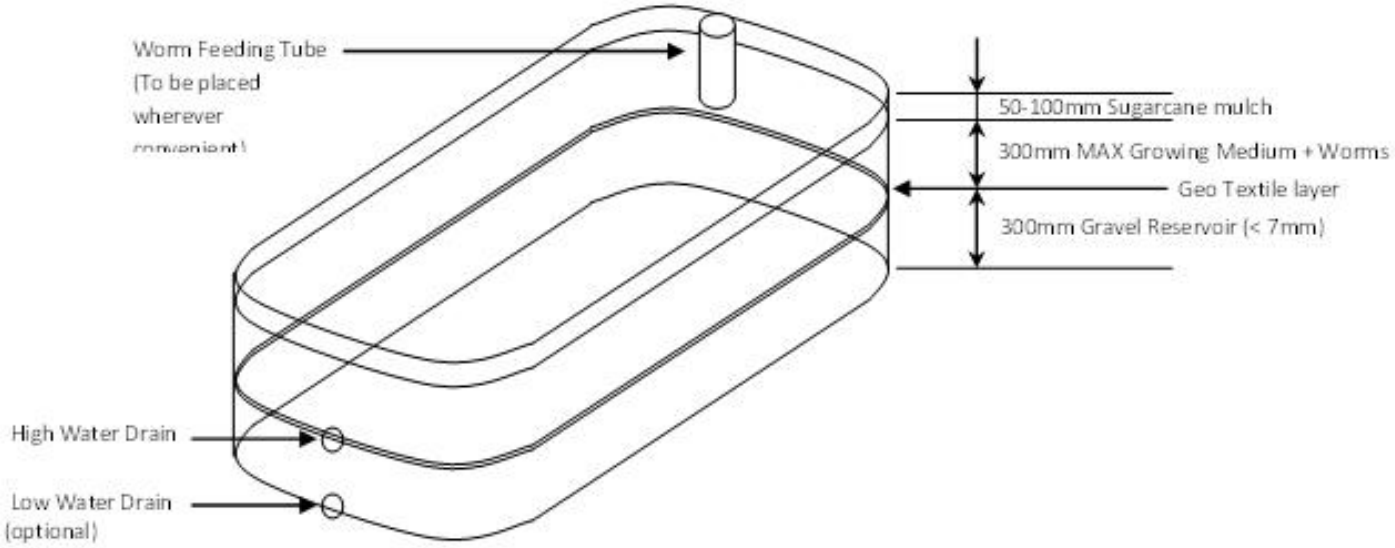
CONTAINERS	We used Colourbond garden beds from Birdies Garden products. You could use just about any container/ garden bed, in any size, or retrofit/ convert existing garden beds.
OVERFLOW PIPE + SILICON	Such as a Threaded Tank Inlet (Bulkhead fitting) to prevent the water level rising above the reservoir level and flooding the growing medium. Our overflow drains into mini water gardens we set up for our bees to drink from.
LINING	Use pond liner (or builders plastic), which comes in one large piece, as you cannot have seams in the liner as water will leak out (it can be gathered to fit, and tape in place).
WATER PIPING	Slotted ag pipe (cover length and end in geotextile to prevent pebble entering) along the bottom of the bed, which allows filling by hose or irrigation system.

wicking garden bed
REQUIREMENTS

RESERVOIR MEDIUM	We used 7mm river pebble, but landscaping sand may be a better option for increased wicking ability.
GEOTEXTILE	A piece of garden textile, like very strong weed matting, to prevent the soil leaching into the water reservoir, but allows water to transfer through.
GROWING MEDIUM + MULCH	We used a good quality vegetable garden soil from a local landscape supplier, and a good layer of mulch on top. I condition the soil with compost and organic minerals.
WORM TOWERS + WORMS	Pipes with holes drilled in the side to allow access for the worms to come and go into the soil, and a screw on/ off lid on top, to add scraps to feed the worms.
OTHER	Tools, including Power drill with hole cutting drill bit (steel grade) to drill hole for overflow pipe, Wheelbarrow, Shovels, Rake, Scissors.

wicking garden bed

REQUIREMENTS



STEPS TO BUILD

Depending on your wicking bed design and the area you are locating them, your steps and processes may vary.

1. Start with a good foundation, dig footing trench and install garden bed so it is level, then fill the garden bed to the base, line with earth from the footing trench to ensure it is level.
2. Line the garden bed with the pond liner, pleating it to fit and use waterproof tape to secure it around the inner rim of the garden beds (or if it is large, hang it over the top edge for now).
3. Cut a hole in the garden bed and liner for the overflow water pipe. Screw it in to place through the plastic liner, using silicone to seal so the reservoir doesn't leak – allow silicon to dry.
4. Cover the slotted water pipe with geo-textile or flyscreen material (tape or rubber band in place – if using cable ties, don't trim the ends of them as the sharp edges may pierce the lining).
5. Secure the covered water piping on the end of the garden bed (opposite to the overflow drain) using waterproof tape, to the top of the garden bed.
6. Lay the rest of the covered watering pipe along the base of the garden bed.
7. Fill the lined garden bed with river pebble, until level with the drain pipe and level it out (fill just over the required level, which allows for settling).
8. Fill the reservoir with water using the watering pipe to help the river pebble settle, and top-up with more pebble if required.
9. Lay the geo-textile over the river pebble. This can be cut to fit (a double layer to overlap is OK).
10. If using worm towers, place the worm feeding tube in a location convenient and easy to reach.
11. Fill the garden bed up with vegetable garden soil and level it (add extra to allow for settling). Add compost worms if you are using worm towers. Trim the top of the liner (about 10 cm above the soil line to allow for it to recede as the pebble and soil settle), as required.
12. Cover the soil with a good layer of mulch about 5cm deep.

OVERFLOW WATER GARDENS

To make the most of any water which overflows from the wicking beds we created mini water gardens as drinking spots for bees!

These were very simply created using metal ‘drink coolers’ from a hardware store (these do get rust holes eventually but last several years). We added a layer of river pebble (leftover materials from the wicking garden beds) in the bottom about 5 to 8cm deep). Then small pots of water plant varieties were nestled into the pebble.

We have water clover and azolla for the bees to land on to drink, and to keep mosquitos at bay. It floats on top and stays put even when the water garden overflows.

The water in the garden beds gets refreshed when it rains and the wicking beds fill up, or when our irrigation system comes on daily to top them up.

We did have water chestnuts growing in these garden beds too (but they froze in Winter!)

French drains/ trenches dug into the ground at the far end of the wicking beds catch the overflow from these water gardens, allowing it to soak into the surrounding ground and be used by other edible garden beds nearby.

PHOTOS OF OUR WICKING GARDEN BEDS

You can check out photos taken from when we were designing and constructing the wicking garden beds. Please note, we trialled adding a 'low water drain' as a second overflow drainage pipe in the first wicking bed that we built, but decided it wasn't necessary (and is just an extra risk for leakage) and didn't add them in the next three.

There is also an album of photos taken over the years since we built them if you want to see how they have gone with harvests. We added automatic watering system to them after a few years, so extra black piping can be seen on the front of the beds.

- Photos of building the first Raised Wicking Worm Garden Beds (note, this shows two overflow drainage pipes, but we only put one in the other wicking beds)
- Progressive Photos (from November 2010 onwards)

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