INSTRUCTION SHEET

Building a vegetable raingarden

healthy waterways
Raingardens

What is a vegetable raingarden?

Building a raingarden is a simple way to help the environment and the health of our local waterways while providing a self-watering garden for your backyard. A specially designed raingarden can even be used to grow vegetables.

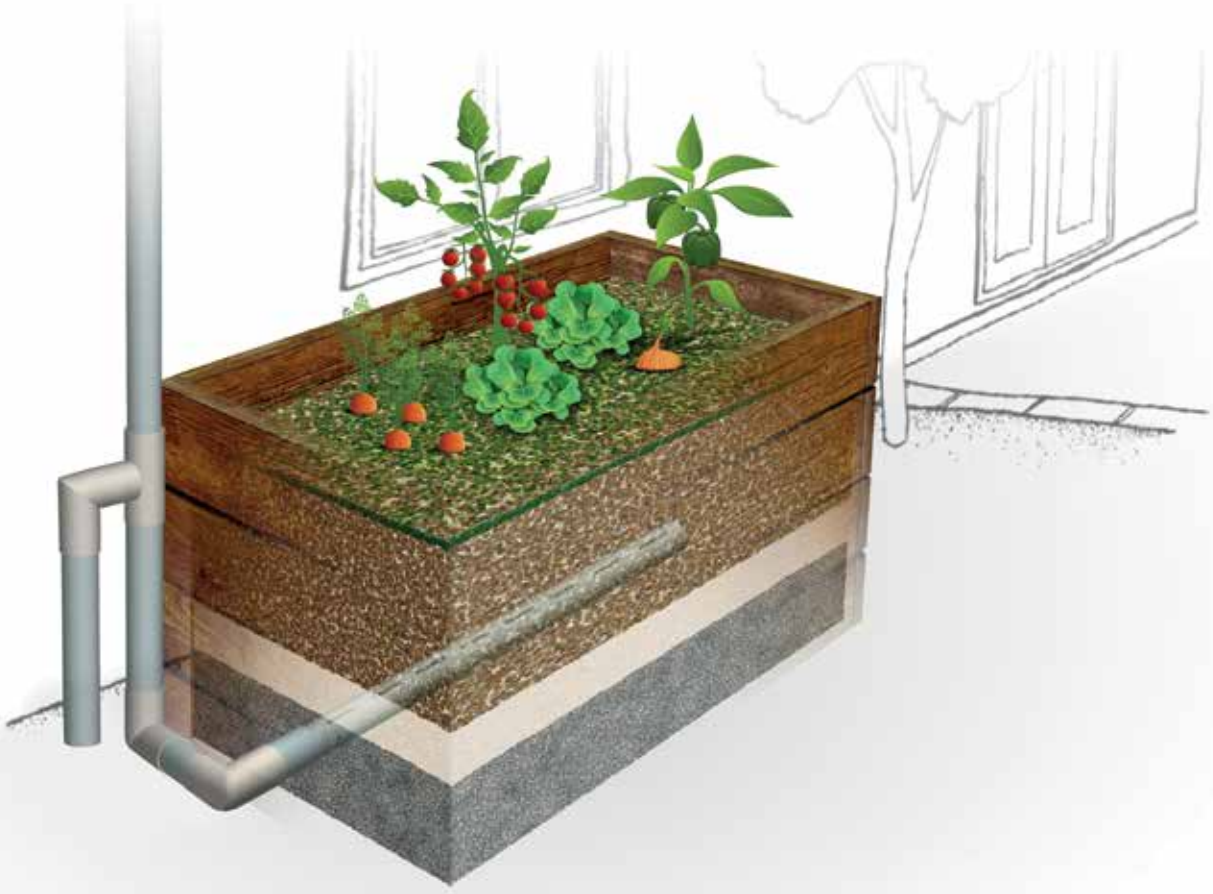
A vegetable raingarden is a specially prepared garden designed to receive and filter stormwater run-off from roofs. When built in a planter box, a vegetable raingarden can be positioned to collect roof water from a diverted downpipe.

While a traditional raingarden receives stormwater run-off on the surface, a vegetable raingarden is sub-irrigated, which means that water enters at the base of the raingarden. This helps to prevent the vegetables being submerged after heavy rain and allows water to be used more efficiently as there is less evaporation from the soil surface.

Featuring layers of soil and sand for filtration and gravel (e.g. scoria) for drainage, a vegetable raingarden helps to protect our rivers and creeks from stormwater pollutants and intense flows that can cause erosion.

Please note: A certified plumber must be used for stormwater connections and modifications.

Did you know that a normal raingarden is only wet during and immediately after rain, leaving it dry most of the time? A vegetable raingarden is designed to use water more efficiently, however it is likely your raingarden will require some watering during dry periods.



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Building your vegetable raingarden

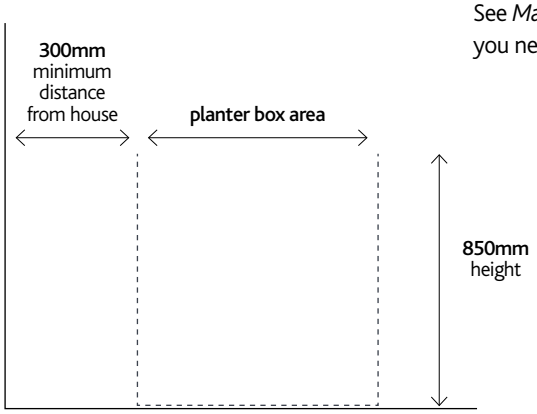
Step 1 – getting started

Location

Build your vegetable raingarden as close as possible to a source of stormwater such as a downpipe. This will help minimise the additional plumbing needed to bring water to the vegetable raingarden. The vegetable raingarden needs to sit at least 300mm away from any permanent structure (eg. a building). Any raingarden built within five metres from a permanent structure should be PVC lined to prevent the infiltration of water into the surrounding soils and building footings.

If the vegetable raingarden is not within five metres of a permanent structure, it should be built with an unlined base, to allow some of the water to infiltrate into the ground.

Remember that a vegetable raingarden should also be positioned to receive as much direct sunlight as possible.



Having decided on a location, it is important to determine the proximity of the existing stormwater, as the raingarden overflow pipe will need to be connected to it. Your local plumber can help with this process as well as diverting the downpipe.

Stormwater reconnection

All connections or modifications to existing stormwater, need to be done by a licensed plumber. Your plumber will ensure that the stormwater is reconnected correctly and not connected to another service such as the sewer.

Underground services

Be aware of any underground services (gas, electricity, water) that run near your house as this may determine where you can build your vegetable raingarden. A raingarden should not be built over or in close proximity to a septic system.

Materials

See *Materials List* for information about what you need to build a vegetable raingarden.

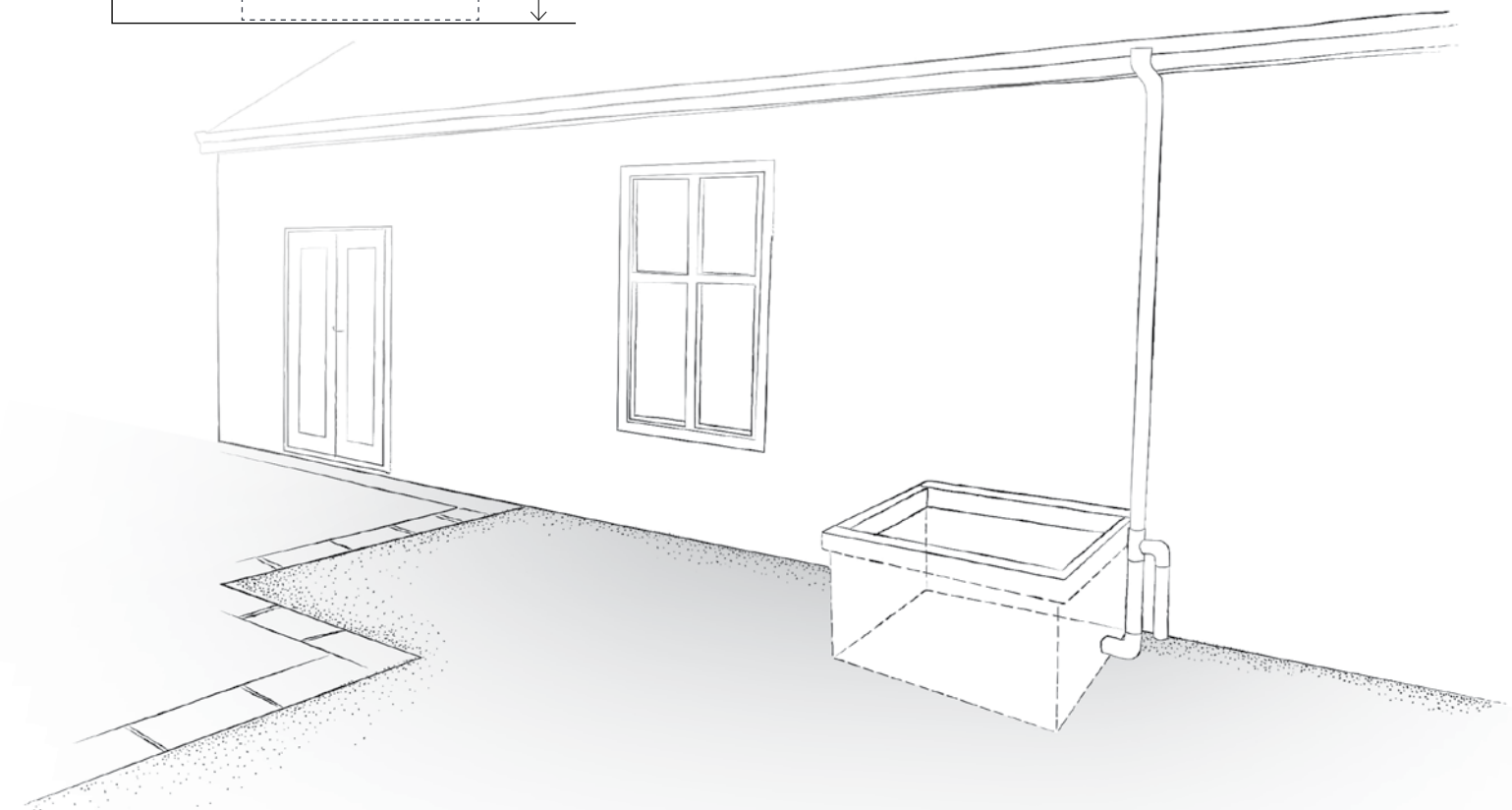
Size

You need to make sure that your raingarden is large enough to manage the amount of stormwater it will receive. If your raingarden is going to capture run-off from the roof via a downpipe, measure the area of roof that drains to that downpipe. Generally, the size of the raingarden should be no less than 2% of the run-off area. But do not make the raingarden too large (>10%), as this may lead to "dry" zones in the vegetable raingarden which are not suitable for growing vegetables. Table 1 will help you work out the correct size.

Table 1 – Raingarden sizing chart*

AREA OF RUN-OFF (m²)	RAINGARDEN SIZE MINIMUM (m²)
50	1
100	2
150	3
200	4
250	5
300	6
350	7
400	8
450	9

* Please note raingarden size minimums. A vegetable raingarden can be built larger than these recommended minimums, however your raingarden should be no larger than 10% of the run-off area.



Step 2 – planter box and pipe infrastructure

Preparing your planter box

You can create a vegetable planter box out of any material as long as it is watertight and strong enough to hold saturated soil. This could be a corrugated iron 'tank' or you could build your own planter box using plantation hardwood or similar. If the raingarden is located within five metres of a permanent structure, the sides and base of the planter box will require a PVC liner. Overlap the sheets by 200mm and seal the joins with PVC tape.

Place the gravel (ie. scoria) (scoria to be 20mm in size) to a depth of 50mm. This will form a base for the slotted drainage pipe. Make sure the gravel is washed and free of excess dirt as this can create blockages in the inflow pipe (where water feeds the vegetable raingarden).

Pipe infrastructure – to be completed by your plumber

Cut a section of 90mm diameter slotted drainage pipe. The drainage pipe's length needs to be slightly shorter than the length (internal) of the planter box. Lay the section of pipe horizontally along the centre of the planter box base - on top of the 50mm layer of scoria. Place a cap on one end of the pipe (internal). Your plumber will glue all plumbing pieces securely together.

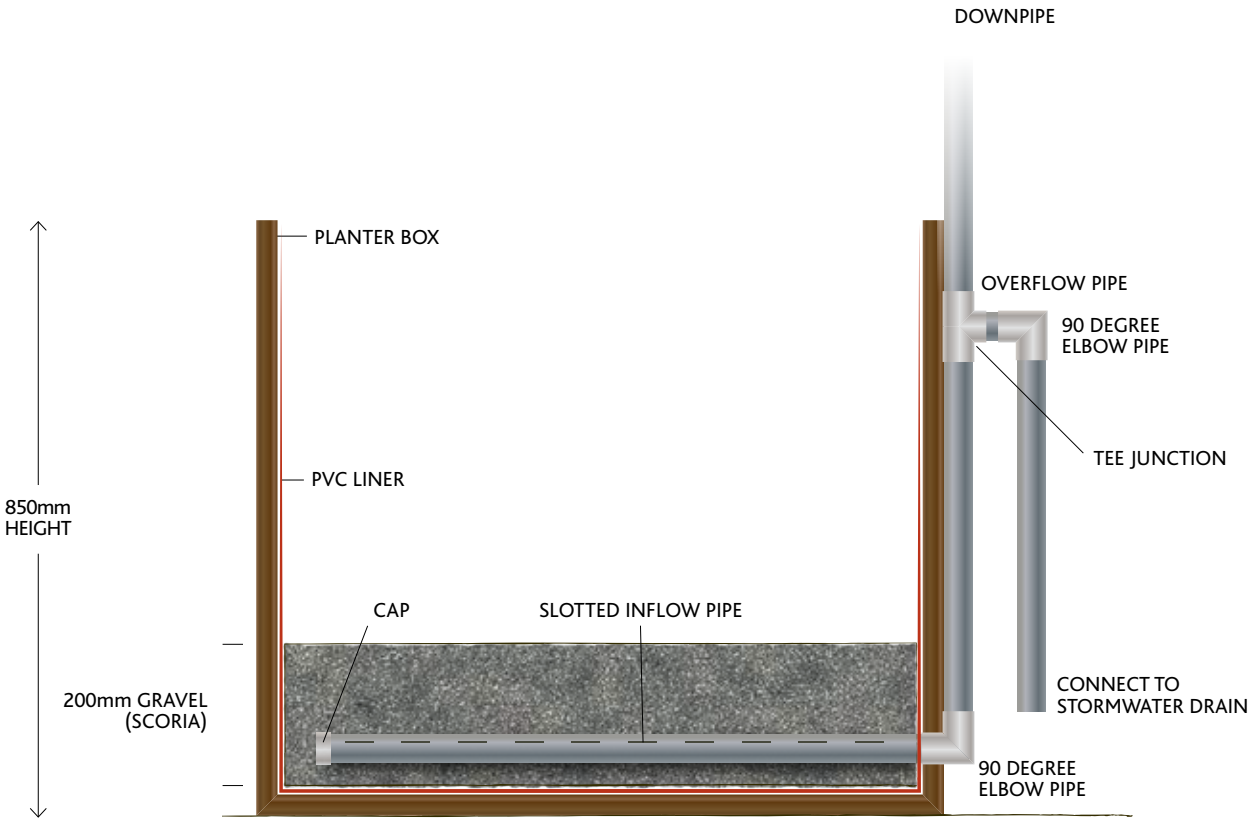
Make a 90mm diameter hole in the middle of one side of the planter box - 50mm from the base. Push the cap-free end of the inflow pipe through the hole, leaving the rest of the pipe lying across the middle of the planter box. You will need to fill gaps between the outside of the drainage pipe and the hole in the planter box with sealant.

The cap-free end of the drainage pipe then needs to be connected to the downpipe using additional pipe and pipe bends. The pipe infrastructure also needs to incorporate an overflow to pipe excess water back into the stormwater system.

Unlike a traditional planter box raingarden, the overflow for a vegetable raingarden is external to the planter box. This helps to limit contamination of any overflowing water going into stormwater. Excess nutrients from the vegetable mix need to be kept away from stormwater, as excess nutrients found in waterways can lead to algal blooms. To construct the overflow, connect a section of 90mm diameter PVC pipe to the downpipe using a tee joint/ junction. The overflow pipe outside the planter box should be level with the soil surface of the finished planter box (or about 200mm from the top of the planter box).

The overflow pipe then needs to be connected into the stormwater by your plumber.

Handy Hint – Mark the height of the overflow pipe connection (particularly the height of the bottom of the overflow pipe) on the inside of the planter box using a permanent marker. When filling the planter box with its layers this mark can be used as a guide for how much soil to add. The soil surface should be level with this mark.



Building your vegetable raingarden

Step 3 – soil layers

Gravel (scoria) layer

Add scoria to a depth of 150mm over the slotted drainage pipe to bring the total depth of gravel to 200mm. Take care not to dislodge or damage the pipe when adding the additional gravel.

Sand layer and wicks

Place a layer of geotextile fabric on top of the gravel and then place white washed sand to a depth of 100mm. The geotextile will prevent the sand from settling downwards and will also act as a horizontal "wick", to move water to all corners of the vegetable raingarden. The use of vertical wicks is also recommended in order to assist capillary rise (upward movement) of water in the raingarden. This will help the plants to get water that would otherwise stay below the sand layer.

Wicks that are purpose-made for garden beds are commercially available, but you can use any kind of cloth as a wick, including old clothing and any leftover geotextile. The cloth should be rolled into a cylinder, or you can wrap the fabric around a small pipe or broom handle to help create a cylinderical shape. It should be long enough to comfortably span at least half of the height of the vegetable raingarden (i.e. approximately 500-700mm). Place the bottom end of the vertical wick in the gravel layer, as deep as possible. You may need to cut a small hole in the geotextile that separates the sand and gravel layers and pass the wick through it. Infill the sand and then the vegetable garden mix around the wick. Keep the wick reasonably vertical so that the top of the wick is well into the vegetable garden mix layer. Two to three wicks should be sufficient for a $2m^2$ vegetable raingarden.

Vegetable garden mix layer

Add vegetable garden mix to a depth of 350mm or to the height of the downpipe overflow connection. Vegetable garden mix is usually a blend of composted green waste and animal manures, with sand added for drainage. It is available from garden/landscape suppliers. Potting mix can also be used, but you must ensure that it does not contain inorganic fertiliser, as this could harm local waterways if used in your vegetable raingarden.

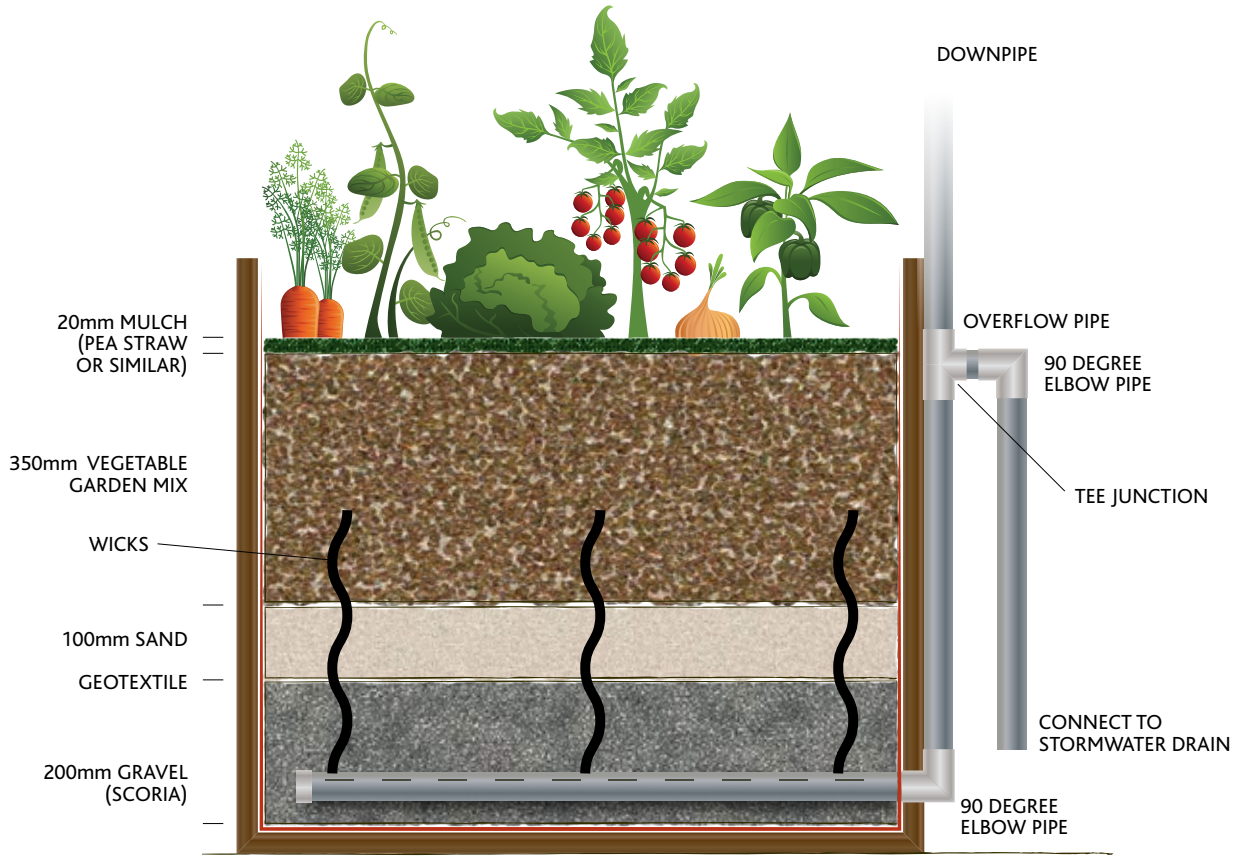
Step 4 - plants and mulch

Plants - vegetables

A wide range of vegetables can be grown in your vegetable raingarden including tomatoes, beans, lettuce, spinach, cucumber, beetroot, onions and leeks. Herbs such as basil and parsley should also grow well. While vegetables can be planted as either seeds or seedlings, seedlings generally need less hand watering to become established.

When selecting which vegetables to plant, remember to consider the time of year that your are planting. For example - it is best to plant tomatoes in Spring and broad beans in Autumn. Also be aware of the sun/shade and space requirements of individual plants. While a traditional raingarden is planted densely to cover the surface, individual vegetable plants generally require more space and will not grow well if crowded.

Note: fertilisers and chemical pesticides should not be used on your raingarden as the nutrients in the fertiliser and the compounds in chemical pesticides can have a detrimental effect on our aquatic flora and fauna.



Looking after your vegetable raingarden

Mulch

Spread mulch to a depth of 20mm around the plants. Pea straw mulch is ideal for a vegetable raingarden, as it provides nutrients for plants when it breaks down, which reduces the need for additional fertiliser. Lucerne and sugar cane mulch provide similar benefits. Avoid using gravel mulch in your vegetable raingarden, as it is likely to burn the vegetable plants during hot weather and does not add any nutrients to the soil.

Water the plants in line with your local water restrictions.

Handy Hint – Ensure you firmly pat down each layer of soil when building your raingarden to help reduce the layers from sinking.

Once established, a vegetable raingarden is low maintenance, however, a few simple tips can help your raingarden function well.

- Inspect your vegetable raingarden regularly - it is likely to need occasional watering in the summer months, during hot and dry periods. If the plants appear to be wilted or if the vegetable garden mix layer is very dry to touch, water the raingarden with a watering can, garden hose, or a spray/ drip irrigation system. Your vegetable raingarden is unlikely to require additional water in the winter months.
- Do not water your vegetable raingarden excessively and avoid watering immediately before or after rainfall. This will allow the system to function more effectively as a vegetable raingarden.
- The use of fertilisers and pesticides should be avoided. If necessary, apply small amounts and ensure that the overflow has been set up accordingly and to avoid polluting stormwater, see pipe infrastructure
- Mulch such as pea straw will help retain moisture in your raingarden and prevent weeds from growing. However, some weeding may be necessary until plants have matured.
- Bird netting can be fitted to your vegetable raingarden to deter pests.
- Harvest and replace plants as necessary.
- The level of the vegetable garden mix needs to remain constant. If the level of the soil surface drops significantly below the height of the overflow, plants might become submerged following heavy rainfall affecting growth. Top up the vegetable garden mix layer as necessary.
- Ensure that the overflow pipe does not become blocked and remove any sediment or build up from the downpipe.

Need help?
If you have any questions about rainwater tank diversions, downpipe diversion or building a raingarden, your landscape gardener or local plumber may be able to help. For more information visit melbourne.water.com.au/raingardens

Materials List – what you need to build your vegetable raingarden

Table 2 – Details the materials required to create a 2m² vegetable raingarden. While item prices may vary depending on the materials you select, building a 2m² raingarden is likely to cost between $400 and $500 (plus the cost of a planter box and plumber).

QUANTITY	MATERIAL
2 l/m	90mm diameter slotted pipe (Ag Pipe)
2 l/m	90mm diameter uPVC pipe*
2 m²	Geotextile fabric
3	Wicks; any cloth, approximately 500-700 mm long
0.4m³	Gravel (20mm scoria)
0.2m³	Sand (white-washed)
0.6m³	Vegetable garden mix
4-15	Plants (as seedlings)
0.1m³	Mulch (e.g. pea-straw)
3	90mm diameter uPVC 90 degree (elbow) bends
1	PVC 90mm tee
1	PVC 90mm cap
10m²	PVC liner (if planter box is lined)
	PVC tape
	Silicone sealant

**Costs per square meter will depend on the length of connections back to the existing stormwater drain.*

l/m = lineal metres m² = square metres m³ = cubic metres mm = millimetres

Handy Hint – You may decide to create your vegetable raingarden using a raised corrugated iron garden bed. Widely available at garden supply stores, the standard heights of these garden beds range from 400mm to 800mm. Once you have selected the garden bed, you will need to adjust the quantity of materials required to create your vegetable raingarden. Remember that the vegetable raingarden needs to be at least 2% of the size of the run-off area. Refer to Table 1 for more information.

Plant List – the best plants for your vegetable raingarden

The following common vegetables and herbs grow well in a vegetable raingarden.

BOTANICAL NAME	COMMON NAME	PLANTING SEASON	MINIMUM SPACE AROUND EACH PLANT (CM^2)
Allium cepa	Onion	Autumn/Winter	10
Allium porrum	Leek	Winter/Spring/Summer	15
Beta vulgaris	Beetroot	Winter/Spring/Summer	10
Capsicum annuum	Capsicum/Chilli	Spring/Summer	50
Cucumis sativus	Cucumber	Spring/Summer	100
Lactuca sativa	Lettuce	All seasons	30
Ocimum basilicum	Basil	Spring/Summer	20
Petroselinum crispum	Parsley	Winter/Spring/Summer	30
Phaseolus vulgaris	Common bean	Spring/Summer	15
Solanum lycopersicum	Tomato	Spring/Summer	60
Spinacia oleracea	Spinach	Autumn	20
Vicia faba	Broad bean	Autumn	20

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