

Designing a raingarden - Water Sensitive Design Section - Great Lakes Development Control Plan



Raingardens (also known as bioretention systems) are garden beds which use native plants and free draining soils to capture, filter and treat pollutants such as nutrients, heavy metals and sediments typically found in stormwater.

Raingardens are one of the treatment options that can be used to meet the water quality targets outlined in the Water Sensitive Design section of the Great Lakes Development Control Plan (DCP).

A raingarden is designed to receive stormwater directly from the rainwater tank overflow, downpipes and hard surfaces such as driveways or paved areas.

HOW DO I WORK OUT WHAT SIZE RAINGARDEN I NEED

For individual houses, there are two ways to work out what size raingarden will be needed to comply with the DCP:

1. Use the Deemed to Comply sizing table (below) or
2. Run the Small Scale Stormwater Quality Model (S3QM).

The Deemed to Comply sizing table can only be used when:

- A minimum of 75% of the roof area is directed to the rainwater tank.

- Water from the tank is being used outdoors, in the toilet and laundry.
- The rainwater tank is the same size as specified in the Deemed to Comply table.
- Roof runoff that does not flow to the tank and any other impervious area such as the driveway (minimum of 50% of other impervious surfaces) is directed to flow into the raingarden.

If these requirements cannot be met, you wish to increase the size of your rainwater tank or you would prefer to only collect your roof water in a planter box style raingarden (raised garden bed) you will need to use the Small Scale Stormwater Model to work out what size the raingarden needs to be. A certificate from the tool must be included with your Development Application.



Planter box style raingarden

If you are preparing a plan for a dual occupancy, multiple dwellings, industrial or commercial development you will be required to use the Small Scale Stormwater Model to demonstrate compliance with the DCP.

WHERE SHOULD I LOCATE MY RAINGARDEN

The location of your raingarden needs to be carefully considered during the design of your home; this will ensure that there is enough space for you to fit the garden in. Raingardens can be any size or shape and therefore can be incorporated into the landscaping of any garden.

Your raingarden should be located to maximise the amount of water that can be collected from your property. Hard surfaces such as driveways, roof and rainwater tank overflow need to be directed to the raingarden therefore the lowest point on your block will usually be the best position. If your block is on steep land it is best to position your raingarden along the contours so that the risk of erosion is minimised and excavation requirements are reduced.

In clay soils (clay loams, medium clays, heavy clays) raingardens should be set back by 5m from existing and future houses and garages. In sandy areas (sands, loamy sands, loams) there should be a 2m minimum set back. If space is limited on your property, the walls and base of your raingarden can be completely lined with an impermeable hard plastic liner and smaller separation distances can be applied. If you choose to reduce the separation distances you will require certification from an engineer or geotechnical consultant to indicate that there is no risk to future or existing infrastructure (this can be done in conjunction with the design of the footings and slab).

The plants that grow in raingardens are important for removing nutrients from stormwater. To make sure plants will thrive; locate your raingarden where it will receive adequate sunlight (e.g. the Northern side of your block).

WHAT DO I DO IF MY BUILDING SITE IS CONSTRAINED

There are some situations where you may find it difficult to make a raingarden work effectively on your property. As each property is unique, the specific solution to meeting the requirements of the DCP will need to be tailored for each development. Situations where it could be difficult to build a raingarden include flat clay sites where there is not enough fall for the water to flow through the filter layers before exiting to the stormwater system, rocky sites where raingardens cannot be excavated and sites where there is a high groundwater table. In these situations, alternative ways to achieve the objectives of the DCP can be considered, for example the Small Scale Stormwater Tool can be used to trial other treatments such as swales, increased rainwater tank size and raised garden bed raingardens. Applicants are encouraged to employ the services of a stormwater/environmental engineer or hydrologist to assist them with developing an appropriate strategy.

Handy Hint: Avoid building your raingarden underneath large trees as the root system will interfere with excavations. As a general rule the root system will extend out to the edge of the tree canopy.

WHAT ARE REQUIREMENTS FOR A RAINGARDEN DESIGN

Detailed example plans are available on Council's website.

When submitting your development application you will need to include the following details on your plan:

- Location of the raingarden in plan view.
- Area of roof connected to the rain water tank and raingarden.
- Rainwater tank, stormwater downpipes and other connections (such as the driveway) to the raingarden.
- Cross section of the raingarden including depths of filter material and levels at the inlet and outlet drains.
- If the deemed to comply table was used, a summary of the roof size v's block size.
- S3QM Certificate if applicable.

An example of how this can be summarised on your plans is provided below:

Stormwater treatment summary	
Sizing Methodology used	Eg. S3QM or Deemed to comply
Lot area (m ²)	567.15
Roof area (m ²)	255.55
Tank size (kL)	3
Roof area to tank (%)	80
Other hard stand to treatment (eg. driveway, outdoor areas) (m ²)	80.99
Treatment type (eg. raingarden, infiltration system)	Raingarden
Treatment size (m ²)	6

Handy Hint: Two species of plants are to be selected from Great Lakes Council's Fact Sheet 15 'Local Plant Selection For Raingardens' at the densities outlined in the fact sheet. You can also choose to have 50% of the area planted with other native species of your choice that are tolerant of predominantly dry and wet conditions.

LOOKING AFTER YOUR RAINGARDEN

Once established, raingardens are low maintenance. To help your raingarden function properly it is important to:

- Water daily for the first few weeks.
- Weed as necessary (if you have mulched the garden there will be less need for weeding).
- Remove sediment build up in the overflow pipe by flushing it with a hose periodically.
- Prevent soils from being compacted by vehicles or other traffic.
- Replace plants if they do not survive.

FREQUENTLY ASKED QUESTIONS

Q: Do raingardens create a pond?

A: No. Water will only pond for a few hours after rain. By using the correct soils and plants and making sure that your underflow drains are not blocked your raingarden will drain quickly.

Q: Do raingardens become a breeding ground for mosquitos?

A: No. Because raingardens drain within a few hours, so the mosquito eggs die before they have a chance to hatch.

Q: Is a raingarden expensive to construct?

A: Raingardens can be as simple or extravagant as you like. The main cost is the materials. You can easily construct a raingarden yourself providing you are able to demonstrate that it has been constructed according to the approved plans.

Q: Can the raingarden area required be included as part of the landscaping ratio for the property?

A: Yes.

Q: Can the raingarden be included in the property set back?

A: Yes, providing it is constructed on your land.

Q: Can the raingarden be built over Council's drainage easement or MidCoast Water's Sewer easement?

A: No.

CONSTRUCTING A RAINGARDEN STEP BY STEP

Your raingarden should be constructed according to the plans approved with your development application, exact details may vary from the description below.

Example detailed drawings that correspond to these steps are available on Council's website.

Step 1:

- Excavate a trench or construct a planter box / raised garden bed to the specified size and depth. Ensure that there will be a minimum 800mm fall from the raingarden inlet to the kerb / stormwater system.
- Seal the sides and base of the raingarden with impermeable plastic (unless recommended distances from infrastructure are observed or certification from an engineer has been provided).
- Place the slotted drainage pipe along the bottom at a 1 in 100mm grade so that water falls towards the kerb / stormwater system. The pipe should not be covered in any kind of filter fabric or 'sock' as this tends to clog.

- Connect the slotted drainage pipe along the bottom to the vertical overflow pipe; the top is to be set at 100mm above the top layer of filter material.
- Connect the drainage pipe to the stormwater outlet kerb and gutter (via a rigid kerb adaptor) or street pit ensuring that the connections are well sealed. If your design has an inlet pit for flow dissipation have a plumber install the pit at this stage.

Handy Hint: Seek advice about underground services and the location of footings on your building prior to excavation.

- If your raingarden is greater than 4m wide, you will need to install two longitudinal slotted drainage pipes and two overflow pipes. These need to be evenly spaced across the raingarden base to provide adequate drainage.

Step 2:

- Lay a washed drainage layer of 5mm fine aggregate so that it covers the pipe, this layer should be 100-150mm.

Step 3:

- Lay the transition layer of coarse sand on top of the drainage layer, this layer should be 100mm.
- Lightly compact the sand, smooth it out and make it level.
- Lay the filter material (sandy loam) on top of the sand to 400mm deep (see Fact sheet 16).
- Lightly compact the filter material and make it level.
- Place flat rocks where the rainwater tank and other stormwater pipes enter the raingarden to prevent erosion.
- Connect the stormwater pipes and rainwater tank overflow to the raingarden.

Don't use geofabric between the layers or around the slotted pipe as it is prone to clogging and may result in the raingarden ponding water.

Step 4:

- Plant the plants specified on your plans at the densities described on your plans adding a teaspoon of native slow release fertilizer into the hole of each plant.
- Water the plants for the first few weeks to make sure they survive.

Handy Hint: Avoid weed seeds getting into your raingarden by stockpiling your filter material on a layer of fabric or plastic.

Table 1: Deemed to Comply sizing table

Lot Area (m ²)	Roof Area (m ²)	Tank size (kL)	Raingarden Area (m ²)
400	150	2	4
400	200	2	5
400	150	3	4
400	200	3	4
400	150	5	4
400	200	5	4
400	150	10	3
400	200	10	3
500	150	2	5
500	200	2	5
500	250	2	6
500	150	3	4
500	200	3	5
500	250	3	5
500	150	5	4
500	200	5	4
500	250	5	5
500	150	10	4
500	200	10	4
500	250	10	4
600	150	2	6
600	200	2	6
600	250	2	6
600	300	2	8
600	150	3	5
600	200	3	5
600	250	3	6
600	300	3	6
600	150	5	5
600	200	5	5
600	250	5	5
600	300	5	6
600	150	10	4
600	200	10	4
600	250	10	5
600	300	10	5
800	200	2	8
800	250	2	8
800	300	2	8
800	400	2	10
800	500	2	12
800	200	3	6
800	250	3	8

800	300	3	8
800	400	3	8
800	500	3	10
800	200	5	6
800	250	5	6
800	300	5	8
800	400	5	8
800	500	5	10
800	200	10	6
800	250	10	6
800	300	10	6
800	400	10	8
800	500	10	8
1000	200	2	8
1000	250	2	8
1000	300	2	10
1000	400	2	10
1000	500	2	12
1000	200	3	8
1000	250	3	8
1000	300	3	8
1000	400	3	10
1000	500	3	12
1000	200	5	8
1000	250	5	8
1000	300	5	8
1000	400	5	10
1000	500	5	10
1000	200	10	8
1000	250	10	8
1000	300	10	8
1000	400	10	8
1000	500	10	10

Note:

Where the lot size and/or roof size are not identical to the areas listed, use the next largest lot and/or roof size.

The raingarden size is measured based on the planted area. If you wish to choose a different approach (e.g. tank size and garden size) you will need to use the Small Scale Stormwater Tool to demonstrate how you can meet the water quality targets in the DCP.

These figures are based on sewered premises, where the rainwater tank supplies the toilet and laundry (minimum). Deemed to comply sizing table for unsewered premises can be found on Council's website.