PERMCON

OPERATIONS & MAINTENANCE MANUAL

FOR PERMCON PERMEABLE CONCRETE

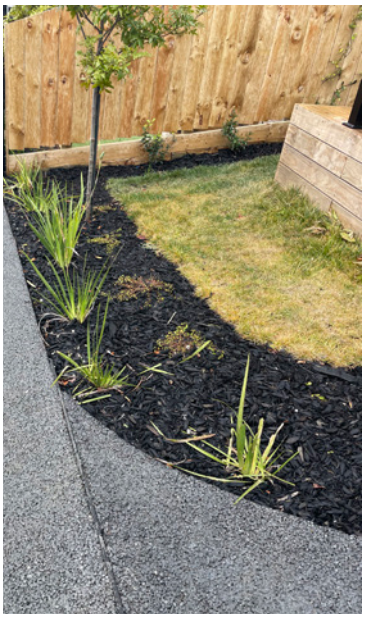
PART 1

INTRODUCTION

Permcon permeable concrete is a concrete wearing course that can be used for light-to-medium traffic loadings and in pedestrian applications without affecting impermeable/permeable ground cover ratios. Permcon permeable concrete also helps mitigate stormwater flows and can also assist with pollutant and debris removal from the stormwater before it enters the stormwater network.

This is possible because Permcon permeable concrete is a pervious concrete with little to no fines in the mix (typically nothing under 5mm). The resulting voids between the stone aggregate allows the stormwater to filtrate through to an open-graded aggregate layer below the Permcon wearing course, which is used for temporary detention volumes. Here, the stormwater can either filtrate into the natural subgrade, evaporate back into the atmosphere, or enter the stormwater network in a controlled manner. The open graded aggregate also filters sediments and pollutants deposited on the pavement surface, mitigating the ingress of these pollutants into the receiving streams and rivers.

The performance of Permcon permeable concrete can be affected over time due to the build up of debris and sediments in the voids of the wearing course, so it requires maintenance to retain its optimum infiltration rates.



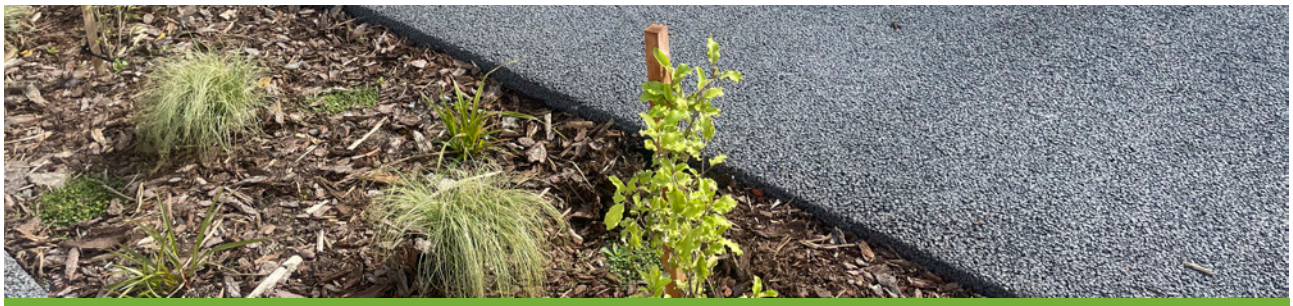
PART 2

RETAINING PERMEABILITY

Permeable pavements in New Zealand are required to have a minimum permeability rate of not less than1200mm/hour at point of install. To remain compliant as a permeable pavement through its design life, the pavement should not drop below 120mm/hour infiltration. If the infiltration rate does drop below the 120mm/hour mark, the pavement is no longer considered to be permeable. The accepted test methodology for permeable pavements in New Zealand is ASTM C 1701 "standard test method for infiltration of in place pervious concrete".

Infiltration rates of Permcon permeable concrete will decrease over time as dusts sediments and organic matter falls or is washed onto the pavement surface. There are some measures that can be adopted to mitigate these events, such as:

- Pavement owners or stakeholders should actively work to minimise the accumulation of rubbish, leaves, sediments and other materials from sitting on the pavement for lengthy periods of time.
- Landscaped areas adjacent to the Permcon pavement should be kept 5-10mm lower than the pavement surface to prevent stormwater washing loose soils or sediments across the surface.
- Soils should be grass seeded or otherwise planted to assist in binding up the soils and breaking stormwater flow velocities.
- Any landscaping undertaken for the maintenance of adjacent garden areas should be undertaken by a professional and there should be clear communication of the properties of the Permcon permeable concrete to ensure that care is taken to avoid ingress of organic materials.
- The Permcon pavement should be suitably protected before tipping materials such as soils, sands or mulches on to the surface.



Landscaped areas adjacent to the Permcon pavement should be kept 5-10mm lower than the pavement

PART 3

MAINTENANCE MATTERS

Once the Percom permeable concrete has been installed and has cured suitably to allow the pavement to be trafficked, a maintenance schedule should be put in place.

A minimum recommended programme would be:

MONTHLY

Visually inspect pavement to ensure:

- It is clear of leaves and debris.
- It drains after rain events.
- There is no visible sediment build up on the pavement.

AS REQUIRED

- Maintain adjacent landscape areas to ensure no soils or sediments are washing onto the pavement.
- Seed or plant bare garden areas upstream of the Permcon pavement.
- Keep the pavement clean by sweeping, using a leaf blower or washing.
- Check overland flow paths have not changed (usually caused by a change in landscaping) as this can bring excessive stormwater onto the pavement. If it has, correct to redirect flows.

ANNUALLY

- Sweep pavement if it was not required through monthly checks during the year.
- Inspect the Permcon pavement for build up of moss or organic material in the voids and remove if present.

PART 3

MAINTENANCE MATTERS (CONT.)

ROUTINE MAINTENANCE

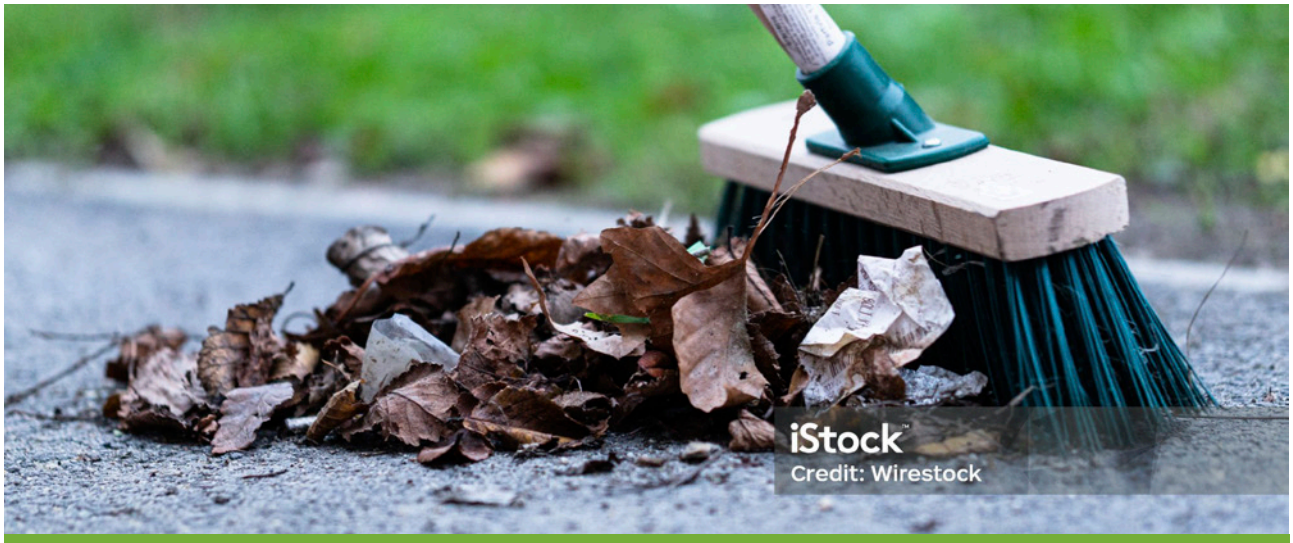
Monthly routine maintenance should start with a visual inspection of the Permcon permeable concrete pavement to ensure it is clear of debris. If there are leaves, grasses or other solid debris on the pavement, these can be removed by sweeping, using a leaf blower or similar. On larger areas, using a sweep or dry vacuum truck is recommended.

This will help prevent materials on the surface breaking down over time into smaller elements that can drop into the voids of the Permcon pavement and should be done as required.

The timing cycle will be affected by the environment of the pavement. In large, open, airy sites, the need to sweep will be less frequent, whereas if the pavement is under a tree canopy or a smaller, closed-in area with less sun and wind, then more frequent sweeps will be required.

If the Permcon pavement is on the dark side of the house, or is in a sheltered, covered area, there may be a build up of moss or other organic growth in the voids of the pavement. In these instances, it may be difficult to remove with just sweeping or a dry vacuum; a chemical wash might be required.

If so, it is important to check for environmental impacts. Residue will wash through the permeable basecourse into the sub grade, which could harm the bacteria that assists with removing pollutants from the stormwater and filter into the water table itself, harming local plant life or impacting on receiving streams and rivers.



If there are leaves, grasses or other solid debris on the Permcon permeable pavement, these can be removed by sweeping, using a leaf blower or similar

PART 3

MAINTENANCE MATTERS (CONT.)

EXCEPTIONAL MAINTENANCE

If the Permcon permeable concrete infiltration rates drop below the 120mm/hour mark – either by an outside event or because routine maintenance has been missed and there is a build-up of debris in the voids of the pavement – the above methods may not be enough to reestablish permeability rates. In this case, a deep clean might be necessary.

Typically a deep clean will involve a truck fitted with specifically designed equipment. There are several companies in New Zealand that are equipped to do this work. Using a professional company that understands the process is critical for a successful outcome.

The best method for this is to simultaneously power wash and vacuum. Once the pavement is saturated, the water will come up through the concrete, bringing the lodged debris with it. It can then be vacuumed out, leaving the voids clean and open again.

CLIMATE CONSIDERATIONS

In areas of New Zealand where there is a risk of freezing, it is important to maintain the free-draining properties of the Permcon permeable concrete. If the pavement infiltration rates are allowed to degrade to the point where stormwater is held in the voids of the pavement – either in an organic matter or trapped due to debris – there is a risk that, in a freeze event, the water will expand and damage the structure of the concrete pavement. It is important to assess the infiltration rates of the Permcon pavement in autumn and, if there is any standing water or very slow to drain puddles, then a deep clean should be undertaken.

If the Permcon pavement is free-draining into the open-graded aggregate beneath, and suitable underdrains are in place to manage excess stormwater, then a Permcon permeable pavement offers significant advantages in snow or ice conditions.

If there is a snow event, the Permcon pavement can be cleared using shovels. However, if de-icing agents are being considered, check their chemical make-up carefully, as some agents are harmful to concrete products and others harmful to the environment.

CONTACT DETAILS

NEW ZEALAND

Phone: +64 27 224 1361

Email: **info@permconnz.co.nz**

Website: **www.permconnz.co.nz**

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