PERMEABLE PAVEMENT
Operation & Maintenance Guide
STORMWATER DEVICE INFORMATION SERIES

Auckland Council
Te Kaunihera o Tāmaki Makaurau
What are permeable pavements?

Permeable pavements are hard surface paving systems that reduce stormwater runoff flows and improve runoff water quality. The porous surface of permeable pavement allows stormwater to soak through to an underlying coarse gravel layer, before slowly draining away. They are used in low traffic areas such as carparks, driveways and footpaths.
Nine key components of permeable pavements

1. **Sub-grade material**
   Strong and durable material to withstand wetting and drying over time.

2. **Impermeable liner (if required)**
   Prevents water draining through to subgrade material. May be specified on sites with poor draining soils, in high groundwater areas or in structurally sensitive soils. On some sites, clay soils create a natural impermeable layer.

3. **Underdrain (if present)**
   Directs flow draining through pavers. Perforated pipes connecting to local stormwater system.

4. **Geotextile (if required)**
   Placed between layers to provide additional tensile strength.

5. **Base course**
   Strong, durable high volume draining material (up to 30% voids). Provides temporary storage for runoff.

6. **Bedding material**
   Porous material. May be coarse sand or fine gravel (2-5mm), depending on paver type. Filters pollutants from runoff.

7. **Pavers**
   Three main types: open cell grid of concrete or plastic with sand or grass cover; solid interlocking blocks with drainage gaps; porous interlocking blocks.

8. **Edge beams**
   300 x 300mm concrete to fix pavers in place.

9. **Overflow**
   To take excess flows. Includes catchpits.

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**Diagram Notes**

- **Water Flow**
  - Porous Block Pavers (permeable)
  - Modular Block Pavers (impermeable)

- **Connections**
  - Connection to stormwater system
  - Perforated under drain
  - Sub-grade (impermeable or permeable)

- **Materials**
  - Bedding material: Porous material. May be coarse sand or fine gravel (2-5mm), depending on paver type.
  - Geotextile: Placed between layers to provide additional tensile strength.
  - Base course: Strong, durable high volume draining material (up to 30% voids).
  - Sub-grade: Strong and durable material to withstand wetting and drying over time.
Other types of permeable / porous surfaces

Porous Paving

Porous Concrete

Open Grade Porous Asphalt

(Photo: Leighton Contractors)
MAINTENANCE SCHEDULE

How and when should maintenance be carried out? There are two main maintenance concerns for permeable pavements. First, the settling of paving after construction, and second, ongoing care to avoid clogging of the pavement by weeds and sediment. The schedule below outlines timing for checking these concerns.

<table>
<thead>
<tr>
<th>TIMING</th>
<th>COMPONENT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>After storms</td>
<td>Gravel basecourse</td>
<td>• Inspect paving area to check water drains away after heavy rain. Ponding may be due to clogging in drainage system.</td>
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<tr>
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<td>Inspection chambers (if included)</td>
<td>• Place in permeable paving to monitor water levels in basecourse.</td>
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<tr>
<td>Ongoing</td>
<td>Permeable paving</td>
<td>• Where areas of paving settle, lift blocks, re-level bedding material and lay blocks at new level.</td>
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<tr>
<td>Monthly</td>
<td>Permeable paving</td>
<td>• If present, mow grass and resow as required.</td>
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<tr>
<td>Annually</td>
<td>Permeable paving</td>
<td>• Sweep solid block or porous pavers with wet vacuum sweeper to prevent clogging with sediment.</td>
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<tr>
<td></td>
<td>Joint and bedding material</td>
<td>• After cleaning solid block or porous pavers with wet vacuum sweeper, check joint material and top up as necessary.</td>
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## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE PROBLEMS</th>
<th>SOLUTION</th>
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<tr>
<td>Water ponding or flowing off pavers.</td>
<td>Pavers clogged with sediment or other organic matter.</td>
<td>• Wet vacuum surface to clean off build up.</td>
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<td>Slope of pavers too steep.</td>
<td>• Lift and relay basecourse and sand to flatten slope.</td>
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<tr>
<td>Pavers lifting and rutting.</td>
<td>Settling causing pavers to settle unevenly.</td>
<td>• Lift pavers and re-grade sub-layers (subgrade, gravel and sand), adding material if required.</td>
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<td>Vehicle loads on pavers exceed design load.</td>
<td>• Stop heavy vehicle access to area.</td>
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<tr>
<td>Water samples downstream show pollutants flowing through pavers without filtering.</td>
<td>Rip or hole in impermeable layer or damaged underdrain.</td>
<td>• Lift pavers and basecourse to check underdrain and permeable layer, and repair if required.</td>
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<tr>
<td></td>
<td>Pollutants entering area too high to be filtered by permeable pavement system.</td>
<td>• Install a primary stormwater treatment device (for instance, a grass swale or rain garden) to filter runoff before reaching permeable pavers.</td>
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</tbody>
</table>
Quick maintenance checks

✔ Inspect permeable pavement area frequently for sediment build up and to check drainage

✔ Block or divert new or existing inlets and outlets.

Avoid

✖ Do not use high pressure water blaster to clean pavers – this will remove bedding material.

✖ Do not use herbicides on pavers – this will enter downstream stormwater system.

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