



PERMEABLE PAVEMENT Construction Guide

STORMWATER DEVICE INFORMATION SERIES

**Auckland
Council**
Te Kaunihera o Tāmaki Makaurau





Permeable pavement at Olympic Park, Waitakere



Final Construction result

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

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.

6. Bedding material

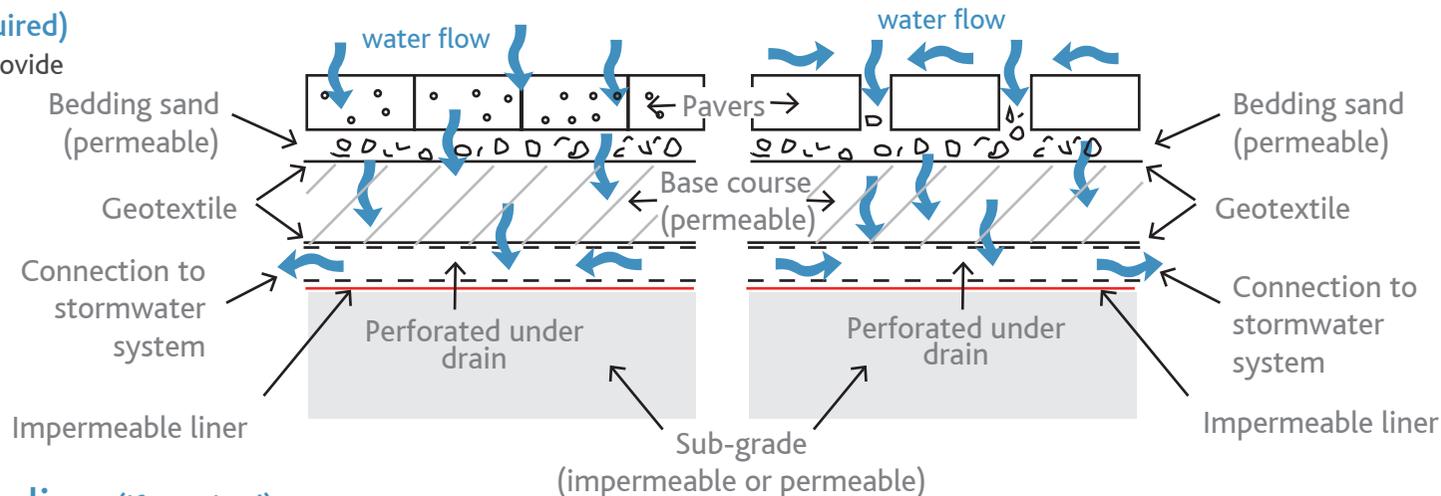
Porous material. May be coarse sand or fine gravel (2-5mm), depending on paver type. Filters pollutants from runoff.

4. Geotextile (if required)

Placed between layers to provide additional tensile strength.

Porous Block Pavers (permeable)

Modular Block Pavers (impermeable)



5. Basecourse

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

9. Overflow

To take excess flows. Includes catchpits.

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.

1. Sub-grade material

Strong and durable material to withstand wetting and drying over time.

3. Underdrain (if present)

Directs flow draining through pavers. Perforated pipes connecting to local stormwater system.

Other types of permeable / porous surfaces

Porous Paving



Porous Concrete



Open Grade Porous Asphalt



(Photo: Leighton Contractors)

Construction Sequence

The following is a general guide for permeable pavement construction. Refer to detailed plans and specifications for each site in consent plans.

1. Prepare site ground

Mark or peg out paving area. Put erosion and sediment control measures in place (catchpit protection, filter socks, silt fencing). Remove topsoil and, if specified, compact subgrade. Grade to specified level. Place edge beams around perimeter.



Fig.1 Excavation to design level.
Finished soil level marked as white 'T'

2. Lay impermeable liner and underdrain, if included.

If specified, lay impermeable liner over entire area, checking seams are sealed and there are no stress points or tears.

If included, lay underdrain (with filter sock, if specified), on 300mm minimum depth gravel with 0.5% slope (50mm drop over 1m length). Connect to stormwater outlet with watertight fit. Backfill carefully over underdrain with 50mm basecourse.

3. Fit geotextile, if included.

Place geotextile over subgrade material, or over impermeable layer and underdrain to prevent clogging by fine sediment in runoff.

4. Place basecourse

Place gravel basecourse material to level and depth specified. Basecourse gravel to be washed crushed rock (not scoria) with 30% minimum voids. Place layer of geotextile over basecourse.



Fig.2

Construction Sequence Cont...

5. Lay bedding material

Lay clean, bedding material over basecourse. Level with rake or straight edge. Do not compact. Lay to 25mm minimum depth, or deeper if specified by paver manufacturer.

6. Lay pavers

Follow manufacturer's specifications for paver type, making paving even and flat with joint material filling edges. If area is on a slope, start laying pavers from lowest point. Fill paver joints and gaps with bedding material to top. For open cell grid pavers, sow grass seed and place pea gravel, as specified by manufacturer. Water to establish grass.

7. Restore site

Remove construction materials and reinstate surrounding area, regrassing disturbed areas. Remove sediment and erosion controls. Check underdrain connections to stormwater systems are clear of blockages.



Fig.3 Permeable paving



Fig.4 Jointing material between pavers

Quick checks

- ✓ Allow pavers to settle before vehicles have access to site.
- ✓ Keep sediment and soil clear of permeable paving area during construction.
- ✓ Inspect area after one year to check functioning as designed.
- ✓ Block new and existing inlets and outlets from area during construction.

Avoid

- ✗ Do not expose soils in surrounding area before erosion and sediment controls are in place.
- ✗ Do not puncture, tear or not install impermeable layer if specified, and ensure geotextile layer is placed between impermeable layer and basecourse.
- ✗ Do not use fertilizers or herbicides around permeable pavements, to prevent draining to waterways.
- ✗ Do not use scoria material for bedding or joint material or basecourse.
- ✗ Do not compact paving materials – this reduces drainage capacity.

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