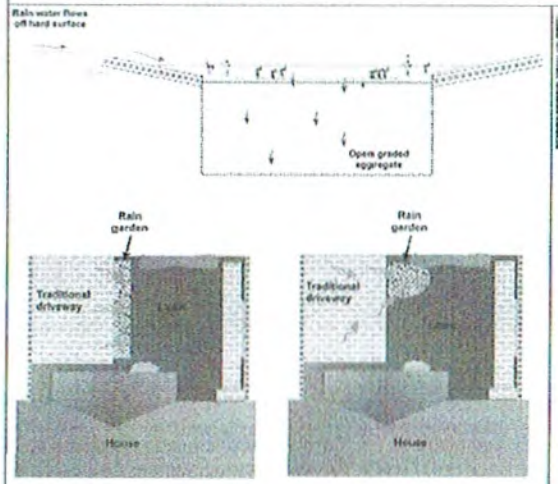
34 Hamilton Road - SuDS info = the existing front driveway will be kept = a rain garden SuDS-design is most apb.

= Planning Condition 3 response.

Rain gardens and soakaways

Water from a conventional paved surface can be directed onto a border, rain garden or into a soakaway. An area of garden can be formed into a depression to collect and store rainwater from conventional impermeable surfaces (asphalt, concrete and block paving), before slowly allowing it to soak into the ground or to flow to the drains. The depressions can be located along the edge of the drive or as a larger area in the garden at a low point. The depression can be planted with suitable plants to help slow runoff or gravel or cobbles can be used as decorative features. There may be a gravel filled trench below it to increase the storage capacity and allow water to soak into the ground more easily. Soakaways are a similar idea except that water is piped into a gravel filled trench or geocellular box (see Glossary) and allowed to soak into the ground. Many houses have the roof downpipes connected to soakaways. They are more suitable for houses with larger front gardens as they require space and need to be located a suitable distance from buildings. Further information on using gardens with block paving can be obtained from Interpave (see link below).



Pros	Cons
Can use conventional impermeable surfaces such as block paving, asphalt or concrete draining to the rain garden	Require deeper excavations
Attractive landscape feature	Require space to construct
	Require knowledgeable contractor to construct correctly
	Require suitable ground conditions (sand or gravel soils)

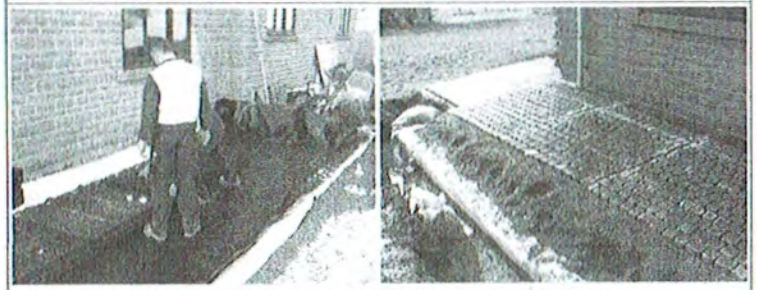
✓ already exists on-site - to be completed prior to occupation.

✓

Rainwater harvesting

Water butts and underground rainwater tanks can be used to complement the drainage methods discussed above to reduce runoff from a property. The simplest systems are water butts where the water is used to water gardens or for washing cars. More complex systems use underground tanks and pumps to provide water to outside taps. The underground tanks can collect rainwater from roofs or from permeable driveways. The water can be used inside the house for toilet flushing, but this is more complex and it is best to consult a specialist rainwater harvesting company (see the UK Rainwater Harvesting Association website).

Rainwater harvesting will not only help reduce rainwater runoff into the drains but will also reduce the amount of mains water used. This can contribute to water efficiency and provide a saving on water bills if using metered water.



Installation of a rainwater harvester system below a permeable concrete block surface

Pros	Cons
Reduces demand for mains water	Installation requires specialist understanding
Water is naturally soft	Can be an expensive option
If water use is metered it can reduce bills	Difficult to retrofit
	Overflow required to drains or soakaway

(for clients information, but likely not feasible for this project due to existance of hardstandings (retained) at front + back..

Section 4

How to design and construct permeable surfaces

NB - currently existing surfaces kept (for 'green' reasons, but if removed, to be followed...)

Depth of construction below permeable driveways

From the surface of proposed drive there will normally be approximately 200mm to 250mm of material forming the driveway construction. If it is hard to drive a 50mm square wooden peg more than 150mm into the ground then the soil is strong enough to support the drive. If it is easy to drive a peg beyond 150mm the ground may be too soft and you will need expert advice.

When digging out the drive, if there are any areas which seem softer than the rest, they will need to be dug out and refilled with sub-base. It is important to place a layer of permeable fabric material known as a geotextile at the base of the driveway construction, over the soil. This helps to stop the sub base sinking into the soil and also helps prevents weeds. About 150mm of sub-base is laid over the geotextile and compacted before the final surfacing is placed.

What to consider

Slopes – the driveway should be sloped away from the house wherever possible towards the road. Do not direct water into rain gardens or soakaways close to buildings. If the driveway slopes towards the house use a drainage channel to collect any excess water and connect it to the drains that take the roof water. If the drive is steeply sloping (greater than 1 in 20) it may not be suitable for permeable surfacing. In these cases an impermeable surface could be used and if possible the water directed to a soakaway, rain garden or as a last resort directly to the drains that take roof water. Don't direct water towards a neighbour's property.

Underground services – make sure there are no underground services close to the ground surface where you are paving (eg water pipes, cable TV, electricity cables, etc).

Contaminated sites – if you live on a site that was contaminated by previous uses the shallow soils may have been specifically designed to prevent water soaking into the ground. If this is the case you will have to connect the paved area to the drains. Permeable surfaces may still be used but a more specialist construction will be required that allows water from the sub-base to flow into the drains (See www.paving.org.uk for more details).

Who can construct permeable and porous driveways

It is best to use an experienced landscape or driveway contractor. Organisations like Interlay – The Association of Block Paving Contractors, the British Association of Landscape Industries (BALI) or the Quarry Products Association can provide details of suitable contractors (See Section 6). It is also useful to obtain references from previous clients.

Casual jobbing contractors who knock on your door and offer to lay a driveway should not be used to construct permeable driveways.

Other considerations

Changing existing driveways – Existing drives can also be converted to be permeable or drain to a rain garden. You should ask a builder for advice because the drive may also drain water from the roof.

Legal issues – If you are constructing a new access into the garden across the footpath (officially known as the footway) you will need to obtain permission from the local council to drop the kerbs and the public footpath may need strengthening. This is to protect any services buried in the ground such as water pipes.

What to look out for

- the soil below the driveway or rain garden must be sandy or gravely (not clay) otherwise a connection to the drains may be required. This can be checked by a simple test (See Interpave guide to responsible rainwater management around the home).
- on sites with very clayey soils that cannot soak up a lot of water, it is a wise precaution to include a pipe in the sub-base to drain water to the roof drains. This stops water sitting in the sub-base for a long time. The permeable pavement will still have the desired effect as the water has to soak into the surface, the underground structure will also provide some storage for the water which will slowly find its way to the pipe
- the aggregate used for the sub-base below permeable paving or to build a rain garden must have open voids in it and no fine material. Water should flow freely into it. The sub-base should be compacted as for conventional construction
- when the paving is completed water should soak easily into the surface of the driveway. If a hosepipe is turned onto the surface for 1 or 2 minutes there should be no puddles and the water should soak straight in without flowing over the surface more than 200 to 300mm

- rain gardens should not have mulch on the surface as this will float when water collects on it. The surface around the plants should be covered in a thin layer of gravel to reduce evaporation of water
- as a rule of thumb a pipe will be required if it takes a water filled 300mm by 300mm by 300mm pit more than 11 hours to empty (See Interpave guidance for more information)
- do not build rain gardens or soakaways close to building foundations. For small driveways a minimum distance of 3m should be suitable but it depends on the ground conditions and a greater distance may be required. Ask your local authority Building Control Department if you are unsure

Section 5

Looking after a permeable driveway

Permeable paving, soakaways and rain gardens can provide durable and long lasting drainage systems. They are different to normal driveways and observing a few do's and don'ts will get the best out of them.

Do	Don't
• clean up leaves, mud and litter before they have a chance to clog the surface • brush the surface if any dirt collects on it and this will reduce the risk of it blocking and help stop weeds growing • remove weeds by hand or with a weed burner	• put soil, sand or similar material on the driveway that will block the surface and stop water soaking in • mix concrete on the driveway • pour liquids such as oil on the surface • allow the garden areas to drain onto permeable surfaces as this can allow soil to wash into the surface and block it • use weed killer

If the surface of any of the systems blocks then it can be cleaned. For porous asphalt and porous/permeable concrete blocks the surface can be unclogged using a small vacuum road sweeper or a jet washer.