

CASE HISTORY

<p>The Site</p>		<p>Homefarm Orchard is a family home in South Bucks with an acre of garden, four stables and 20 acres of fields for the horses. Lawns and herbaceous borders need copious summer watering. A small swimming pool needs topping up, even if there's a hosepipe ban. During the building of a games room extension in place of a tumbledown wooden hut, rainwater harvesting tanks were installed under the back lawn.</p>
<p>The People</p>	<p>The occupants had been keen to profit from rainwater harvesting. They have a keen understanding of the issues surrounding rainwater harvesting, and of the products, and are keen to make their existing home as sustainable as possible. They were also keen to share their experiences openly with others.</p>	
<p>Objectives</p>	<p>As the rainwater harvesting installation is a retrofit and there was no intention to pipe up all the toilets and the washing machine, it was decided to install a garden system, i.e. tanks without mains water backup. Therefore the water in the tanks can only be rain, and it is legal to use it during the more and more frequent hosepipe bans. Calculations showed that enough water to water the garden and the horses could be collected and stored if the tank(s) were big enough.</p>	
<p>Statistics</p>		<p>The available roof area, including the new extension, is 270 square metres. Even with the poor rainfall in SouthEast England, 64 cms/year, that roof area will provide 138,000 litres a year... that's more than the family of four is presently using in the house. So, across the year, 375 litres will be available per day for the garden. However, that rain falls in an irregular pattern, and, in some years, less in summer when it's needed.</p> <p>So the decision was taken to increase the tank size from that needed for 21 days drought protection to nearly double that... 40 days. 15,000 litres is the required capacity which is two of the biggest mass-produced tanks, the 7,500 litre blue F-Line shallow-dig tank.</p>
<p>Results</p>	<p>The two tanks fitted on one truck from Rainwater Harvesting Ltd (picture, above) and were easy for the ground-worker's JCB to lift into place (picture, right). The hole for the two tanks was dug by the same ground-worker as the extension, in half a day, despite the massive size... the hole for two such tanks was 3.6 by 5 metres and 1.4 metres deep.</p> <p>The excess earth was used to landscape the swimming pool surround, so little was wasted.</p>	<p>Overflow water, if any, and debris from the roof, are filtered off to a 4000 litre soakaway made of specialist plastic crates covered with porous membrane (picture, left).</p> <p>The two tanks were connected at high level because the contractor preferred not to risk a loss of such a huge amount of water through a leak in a low-level joint; so the second tank only starts filling when the first is full. That's fine because each tank has it's own HydroForce</p>

	<p>series 3 pump, each switched independently from inside the house. They are piped underground (1 inch MDPE) to RainBird pipe connection boxes, each of which has a mini-tap and Gardena-style hose fitting (image, right).</p> 
<p>Cost effectiveness</p>	<p>The equipment at list price was £4258 plus VAT @ 20%. Installation manpower was about one man-day, say £200, and landscaping and grassing was another £250. That makes £5600 including VAT. 138,000 litres of mains water would cost this home £352 a year (£176.80 per cubic metre plus £108 fixed charge, see http://www.thameswater.co.uk/).</p> <p>Strictly speaking that would take 16 years to amortise (or shorter because water prices will go up). But our decision was based on the need to keep the garden nice, the horses watered and washed, and the swimming pool topped up. Considering the beauty of the paddocks, stables, garden and lawn to look after, the money spent on the water tanks seems to them like the right decision. When there are prolonged hosepipe bans and they are watering away, then they'll know it's the right decision.</p>
<p>Installation issues</p>	<p>Hole digging was simpler than expected. Tony, the groundworker, was such an ace with his digger though; he got the depth of the hole to within 10mm on the first attempt and completely level at the second. It was so flat and stable that there was no need to put concrete under the tanks, just a layer of pea-shingle.</p> <p>Care was taken a) in back filling with pea-shingle to support the sides and the indents, then top soil over the top and b) in tamping down the soil on several occasions to ensure there would be no subsidence after the grass was laid.</p> <p>Sid the architect worked out the invert levels for the pipes from the gutters with the owners and ensured a good drop into the filter to ensure leaves get washed away. Despite the lawn being a few inches higher than the patio under which these pipes had to go, and the tanks being ten metres from the house, the factory-provided hole in the side of the F-Line tank could be used without needing a turret extension.</p> <p>The equipment in the tank (the entry pipe, filter, downpipe and exit u-tube (no, that's not a video)) are all factory fitted. So it remained only to put the pump on the bottom of the tank, wire it to protected sockets in the house, and fit the one inch MDPE black and green pipe supplied. This was done by the home-owner in this case.</p> <p>A four inch pipe was used as a service pipe to protect the two electric cables from the house to the submerged pumps and one of the one-inch pump output pipes back. As the 16 metres of the service pipe, including two corners and two pipe joins, was laid, a cord was left inside to pull the pump cables through afterwards. However the cord got squeezed between a join and it would not pull through, It was a devil of a job to find where it was stuck and get it freed up. Lesson: check the cord is pulling to-and-fro freely during the service pipe installation.</p>   



There was a well-advised wait of a couple of weeks and some rain to permit the covering to subside and settle before levelling off and turfing over. The turrets and manhole covers of the F-Line tank adjust for height and for level; adjustment continued even after the turf was down.

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