

DISCLAIMER OF LIABILITY AND WARRANTY

This publication describes the author's opinions regarding the subject matter herein. The author and publisher are not rendering advice or services pertaining to specific individuals or situations. For specific advice, or if expert assistance is required, the services of a qualified professional should be obtained.

The author and publisher assume no responsibility whatsoever for the use of the information in this publication or for decisions made or actions taken based, in whole or in part, on the information in this publication. The author and publisher make no warranties, express or implied, regarding the information. Without limiting the foregoing, the author and publisher specifically disclaim and will not be responsible for any liability, loss, or risk incurred directly, indirectly or incidentally as a consequence of the use or misuse of any advice or information presented herein. Use this publication and information with good judgment and do the best you can in your particular situation.

You agree to indemnify and hold the author and publisher, and their respective officers, directors, agents, employees, contractors and suppliers, harmless from any claim or demand, including reasonable attorneys' fees, related to your use or misuse of this publication or the information contained therein. You further agree that you will cooperate fully in the defense of any such claims.

Notice: As the purchaser of this electronic document you are permitted to store it and print it for your own personal use only.

Otherwise, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of the copyright owner and publisher. It is illegal to make a copy of all or part of this publication for someone else, even if you do not

charge for the copy. If you have purchased this book from anywhere other than **nomadpowersystem.com**, including eBay, please report it to **hank@nomadpowersystem.com** immediately.

COPYRIGHT

Those who have received or purchased the guide are neither authorized nor permitted to transmit copies of this guide to anyone without written permission. Giving away copies to people who haven't paid for them is illegal under international copyright laws and will submit you to possible legal action. Therefore, the utilization of this file is limited to personal use only.

TERMS AND DISCLAIMER

By using, viewing, and interacting with this guide or the **nomadpowersystem** website, you agree to all terms of engagement, thus assuming complete responsibility for your own actions.

The authors and publishers will not be held liable or claim accountability for any loss or injuries. Use, view, and interact with these resources at your own risk.

All products from **nomadpowersystem.com** and its related companies are strictly for informational purposes only. While all attempts have been made to verify the accuracy of information provided on our website and within the publications, neither the authors nor the publishers are responsible for assuming liability for possible inaccuracies.

The authors and publishers disclaim any responsibility for the inaccuracy of the content, including but not limited to errors or omissions. Loss of property, injury to self or others, and even death could occur as a direct or indirect consequence of the use and application of any content found herein.

DIY Grey Water System

INTRO

I have always hated flushing clean water down the toilet and wasting the water that goes down the plug hole.

So I decided to make my own grey water recycling system.

It is fairly easy to put together if you are technically minded. And doesn't cost too much compared to other systems.



Image Notes

- 1. Collection pipes**
- 2. Waste from bathroom**
- 3. Collection tubes**

Step 1: Basic Principle

The basic principle is when water goes down the plug hole from the bath shower or bathroom sink. It is collected in 2 soil pipes fixed to the side of the house, and then pumped up in to the loft to be stored in a storage tank ready to be used to flush the toilet.

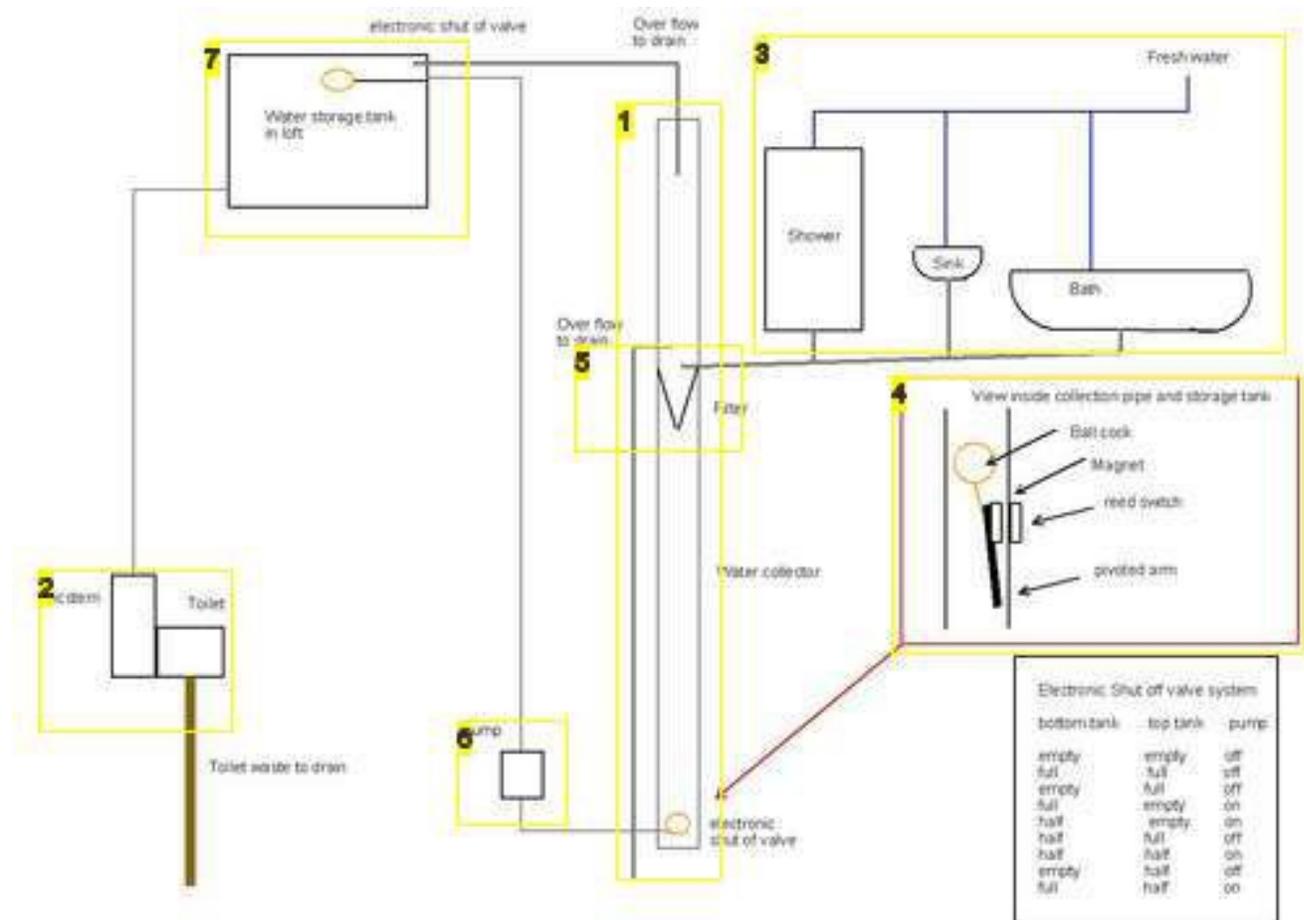


Image notes

1. Collector tubes

2. Toilet

3. Bathroom

4. Switch mechanism

5. Filter

6. Pump

7. Loft tank

Step 2: Parts Needed

- 2 x 110mm soil waste pipes.
- 1 x 40mm waste pipe.
- 3 x 40mm fitting for 110mm soil pipe
- 2 x end caps screw on type
- 1 pump
- 1 one way valve
- 1 foam filter
- 1 storage tank with lid
- 2 ball cocks
- Some 15mm copper or speed fix pipe.
- 2 magnets
- 2 reed proximity switches.
- 2 relays
- Some cable

Originally I was going to use a 12 volt pump running from a solar panel. But the pump I had wasn't powerful enough to pump the water up to my loft so I had to use an old central heating pump I have from my old central heating.

Step 3: Assembling The Water Collection Pipes

To start with I laid out the 2 soil pipes and drilled a hole in the side of both of them at one end so I could fit the 40mm fittings and join the 2 pipes together. Then I glued in place the 2 40mm fittings.

You will need to make sure there is lots of adhesive on them and they are well sealed because there is quite a lot of pressure in the bottom of the

pipes. Then I drilled another 40mm hole in the top of one of the pipes so I could fit an overflow pipe.

Next I glued the screw on inspection end cap in the end of one of the tubes. While the adhesive was drying I made up the cut off switch mechanism.

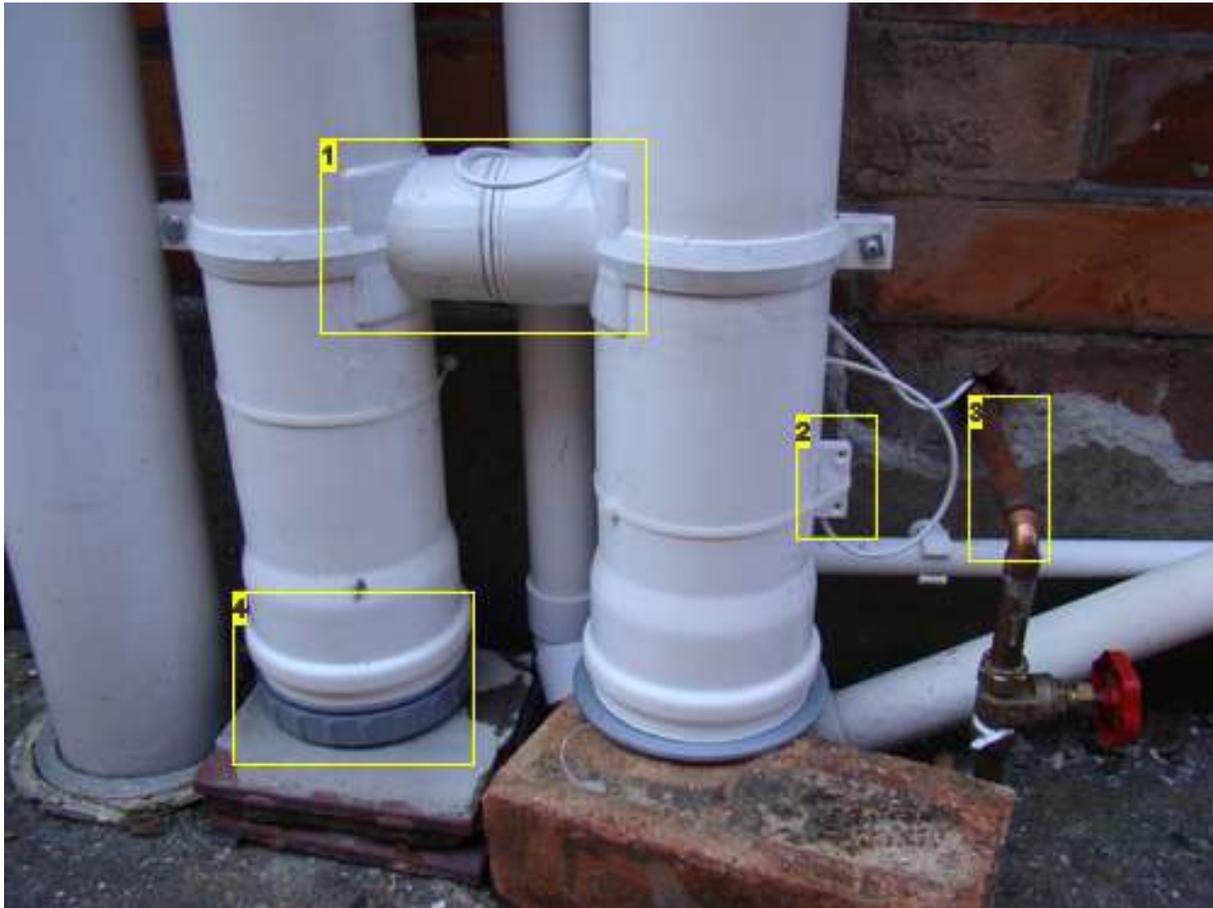


Image notes

1. 40mm link pipe
2. Magnet switch
3. Pipe to the pump
4. End cap

Step 4: Making The Cut Off Switch Mechanism In The Collector Tubes.

The cut off switch in the bottom pipe is basically a magnet on a pivoting arm. A ball cock. And a reed switch on the outside of the tube.

When the water level rises the ball cock pulls on the arm which moves the magnet against the side of the tube. When the water level drops the arm drops back down and moves the arm away from the side of the pipe.

This I bolted to an end cap to be fitted in the bottom of one of the collection tubes. With a 15mm fitting to supply water to the pump.

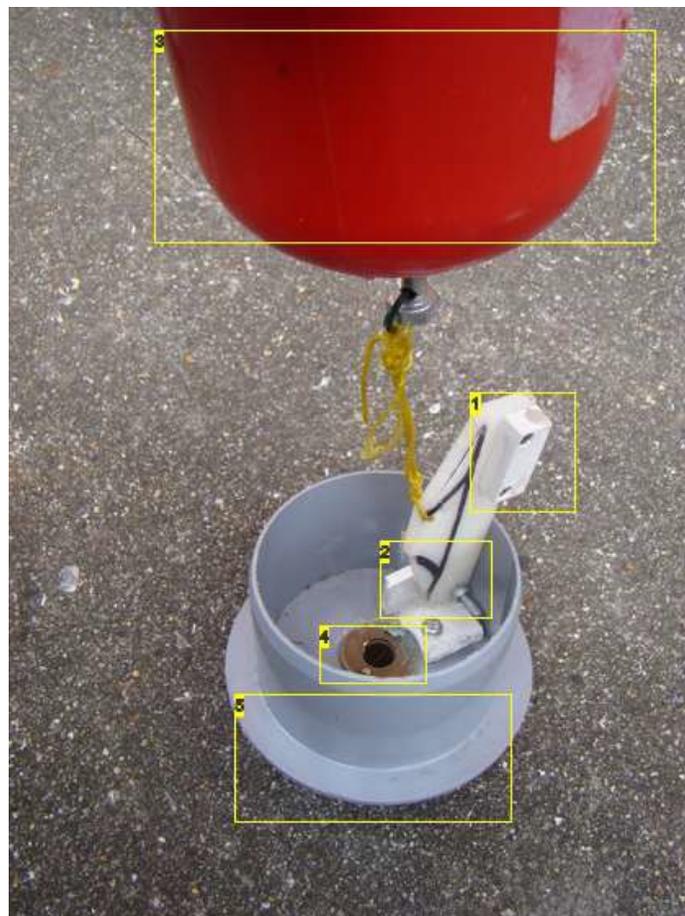


Image notes

1. Magnet
2. Pivot arm
3. Ball cock
4. Pipe fitting
5. End cap

Step 5: Preparing The Storage Tank.

The storage tank will have one 15mm pipe from the pump one 15mm pipe supplying water to the toilet. An over flow pipe. And a bull cock with a magnet attached.

And a reed switch which will cut of the power to the pump when the water level rises.

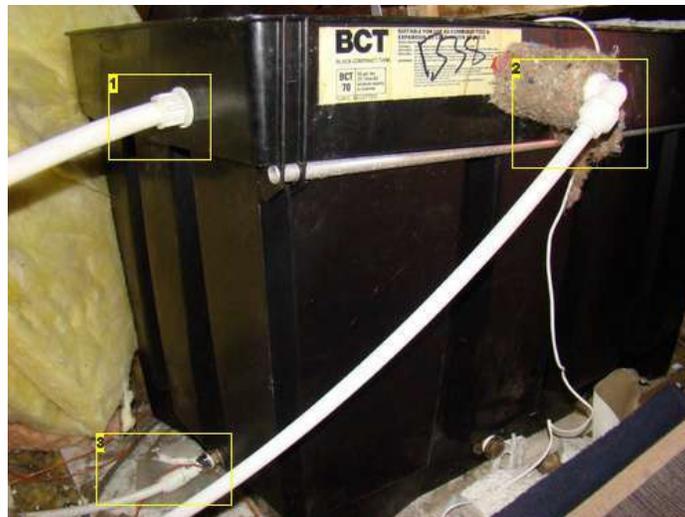


Image notes

1. Over flow pipe
2. Pipe from the pump
3. Pipe to toilet

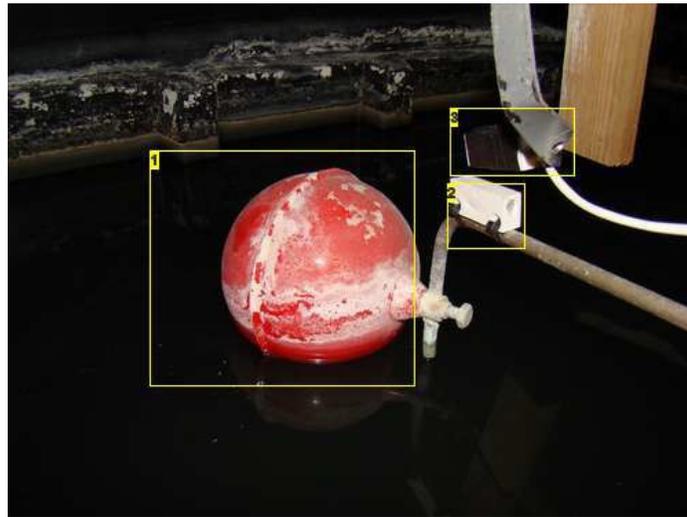


Image notes

1. Ball cock
2. Magnet
3. Switch

Step 6: Fitting The Pipes On The Wall

When all the tubes had dried I fitted the blanking end caps. One of them is the one with the magnet arm and bull cock fitted to it. I bolted the two tubes together on the wall with a small piece of 40mm tube between them.

Then I fitted the over flow and the waste pipe from the bath to the top.

Making sure I had already installed the foam filter in the top of the pipe this is just held in place by chicken wire bent over the top of the pipe.

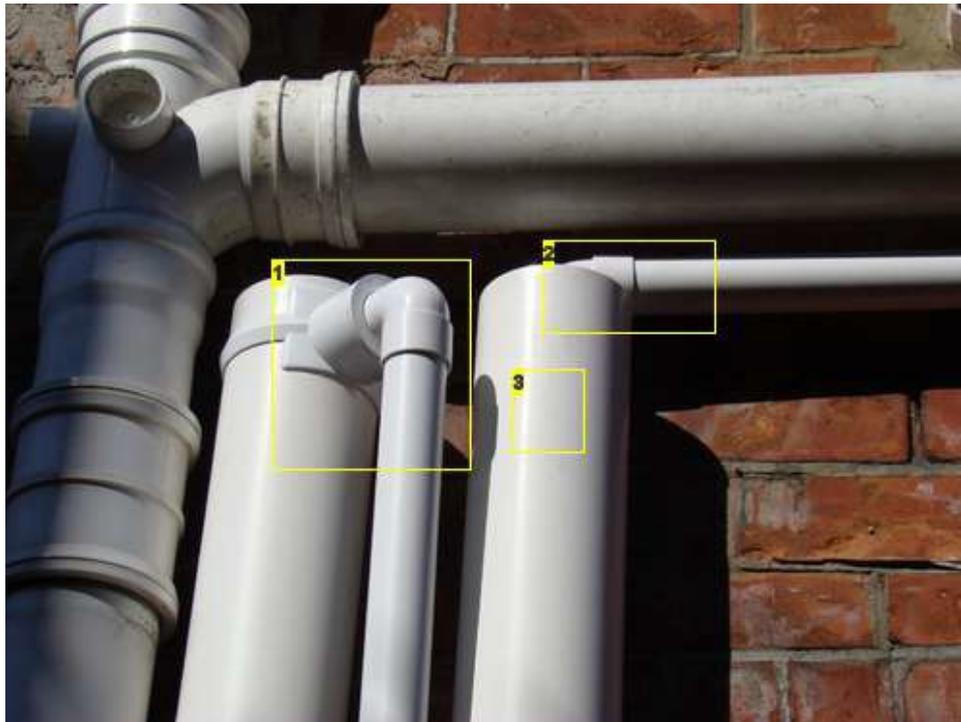


Image notes

- 1. Over flow pipe**
- 2. Waste pipe from bathroom**
- 3. Position of the foam filter**



Image notes

1. Collection pipes
2. Waste from bathroom
3. Collection tubes

Step 7: Plumbing The System

I attached a 15mm copper pipe to the bottom of one of the collection tubes and plumbed it inside to a one way valve to keep the water in the pipe when the pump is off which is connected to the central heating pump.

Then I ran some 15mm pipe up through the house to the top of the tank in

the loft.

Then I attached the overflow pipe to the top of the tank and a 15mm pipe from the bottom of the storage tank to the toilet.



Image notes

1. one way valve

2. Pump

3. Pipe to loft tank

4. control box

Step 8: Making The Control Box

The control box is basically 2 relays. The relay wired to the collection tubes switch is wired as normally open. The relay for the tank in the loft tank switch is wired normally closed.

So when the water level in the collection tubes drops to low the ball cock drop causing the arm to move away from the side of the tube switching of the relay isolating the power to the pump.

The relay in the loft is off until the water level get towards the top of the tank. Then the magnet activates the switch causing the relay to switch on which will turn off the pump.

When the tanks are half full the circuit will switch on the pump and pump the water from the collection tube to the storage tank until ether the collection tubes empty or the storage tank is full.

Step 9: Wiring The Control Circuit And Pump.

I ran some bell wire from the reed switches to the control box which I mounted on the wall next to the pump. Then I wired the pump up to the control box.

As shown below:

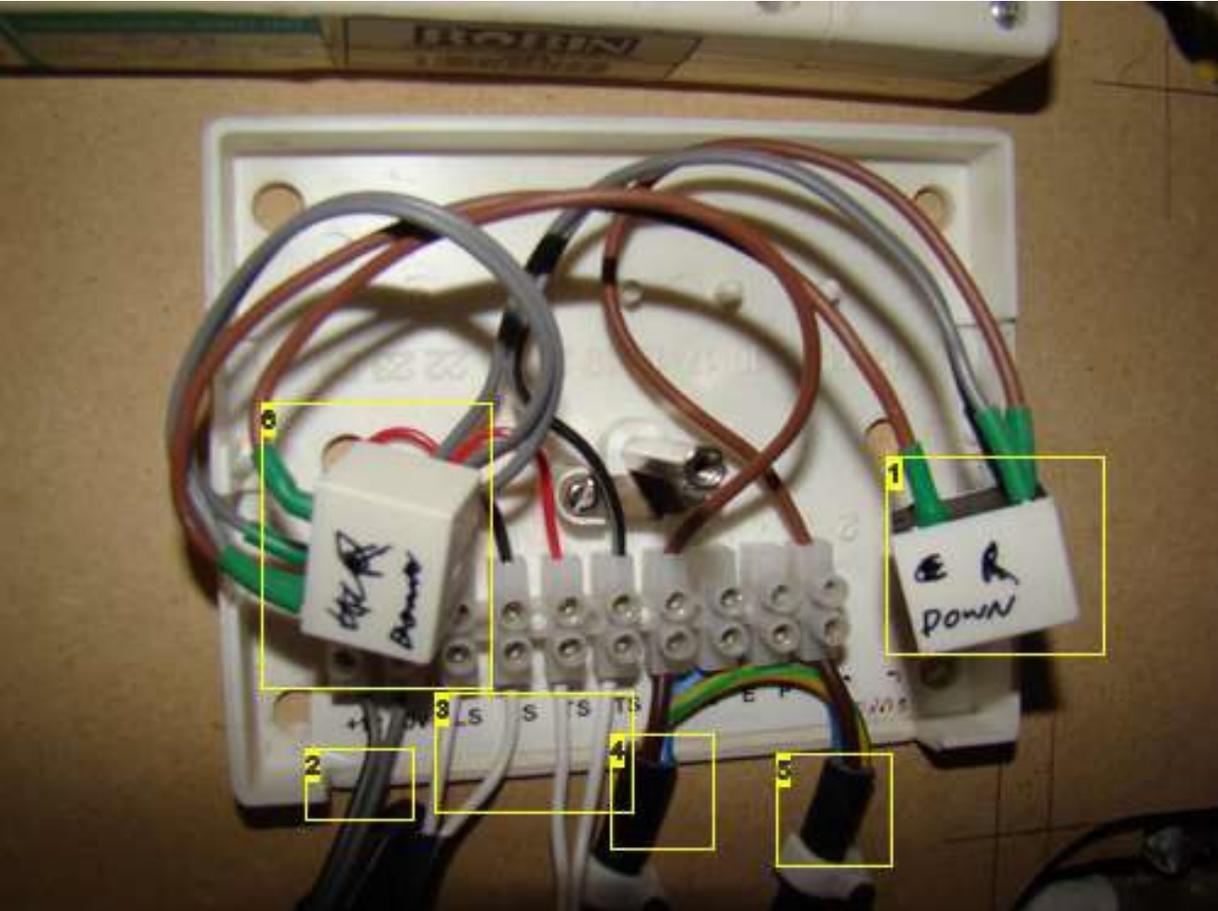


Image notes

1. Collector pipe relay
2. 12 volt supply
3. Switch wires
4. Mains supply for the pump
5. Power to pump
6. Loft tank relay

Step 10: Testing

To test the system I ran the bath and allowed the water to go down the plug hole and to start filling up the collection tubes.

I checked the tube for leaks if I found any I had to empty the water and apply more adhesive to the pipes to try and seal the leaks.

When the adhesive had dried I ran the test again to find any more leaks.

When I was satisfied there were no leaks I was able to test the rest of the system.

I switched on the pump and made sure there was no air in the system and that the pump was powerful enough to pump the water to the tank in the loft and checked that the loft tank was not leaking.

Then it was just a matter of waiting for the pump to pump enough water in to the loft tank so that the water level in the collection tubes dropped enough to activate the switch and turn the pump off. At the same time I manually checked the switch on the storage tank would switch off the power to the pump when the water level rose to high.

When I was happy the switches were switching the pump on and off correctly. And the pipes were not leaking and the overflow pipes were working correctly.

I put the lid on the loft tank.

And went and had a shower and allowed the water to fill the collection pipes, the pump switched on and the loft tank started to fill. Then I just flushed the toilet to make sure it would fill up and there were no leaks.

And that was it!

Step 11: Update Fine Tuning

I have been using this grey water system for about quite some time now.

In this time I have had 1 or 2 small problems that I have had to sort out.

The first one is, I have had 2 switches fail. I have put this down to the switches not being able to cope with the current drawn by the relays so I have made a simple transistor circuit to reduce the current going through the switches this has also enabled me to use just 1 relay.

The second problem has been when the weather gets hot there is a bit of a smell from the grey water stored in the tank in the loft. I have calculated that the tank in the loft is holding too much water for too long.

It is holding enough water for 5 days. So I am replacing the tank in the loft with a smaller tank which will hold enough water for 1-2 days. Then more of the water will be stored in the tubes outside and the water will be recycled faster and won't be sitting around getting smelly.