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Barnsley Planning Department

Our Ref: Water/AJM/Barnsley

Dear Sirs

## **Re: App 2012/0189 - Hill Croft Cawthorne Lane – Water Usage & Harvesting Report**

With regard to the above we have been looking at the proposal to store the new rainwater run-off in rainwater harvesting and here present our findings.

Firstly, please note that the existing building and its surrounding surfacing is all to be drained as-existing with no alterations to it. As such, the rainwater falling and storage is being looked at over the new extension roof and car-port only.

### **Section 1 – Rainfall**

We have taken some figures from the MET office to get an estimated annual rainfall over the UK.

These were obtained from here: [http://www.metoffice.gov.uk/hadobs/hadukp/data/seasonal/HadNEEP\\_ssn.dat](http://www.metoffice.gov.uk/hadobs/hadukp/data/seasonal/HadNEEP_ssn.dat) and give an approximation of 800mm depth over a year.

$800/365=2.19$ mm depth rainfall per day.

$2.19 \times 1000 \times 1000 = 2190000$ mm<sup>3</sup> (rainfall per m<sup>3</sup>)

This converted into litres (using online conversion calculator) gives 2.19litres-per day- per m<sup>2</sup> site area.

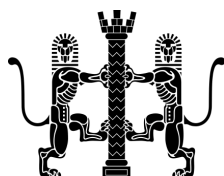
Roof area plus carport = 145m<sup>2</sup>

$145 \times 2.19 = 317.5$  litres per day rainfall average for our new part of the site to be drained.

### **Section 2 – Toilets**

Part of the re-use of the harvested rainfall is toilet flushing.

Looking at the number of bedrooms, taking into account single occupancies (such as Isabella) double rooms and also working people absent during days, we would estimate an average occupancy of 6 people.



A standard toilet cistern has a 6litre capacity.  
We estimate the average person to use 7 flushes per day.  
So 6litres x 6 people x 7 flushes = 252 litres per day

### **Section 3 – Swimming Pool**

Part of the re-use of the harvested water is to be used for swimming pool top-up  
It is not easy to obtain average figures on evaporation from a swimming pool however the following document <http://www.spata.co.uk/wp-content/uploads/2010/01/M7-Water-Conservation-April-2012.pdf> produced by the “Swimming pool and allied trader association” mentions on page 3 an estimate of 3mm per day evaporation rate.

The existing swimming pool is 9.3m x 4.9m  
So  $9300 \times 4900 \times 3\text{mm} = 136710000\text{mm}^3$  (or 137 litres)  
So we have an evaporation of approx 137 litres per day.

### **Section 4 – Garden Watering**

The site is just under half an acre and contains 2 large lawns together with well landscaped borders.  
The harvested water will be used to irrigate these areas. This usage which represents a significant figure has not been included in the calculation at this stage.

### **Section 5 – Car Washing**

The outside taps from the harvested water will be used for vehicle washing which also adds a usage figure to the calculation however this has not been calculated at this stage.

### **Section 6 – Summary**

So we have a rainfall of 317.5 litres per day  
We have a usage of 389 litres per day ( $252 + 137 = 389$ ) just for toilets and pool top-up.  
Hence the usage of reclaimed water is greater than the rainfall.

It is true that this is based on average and estimated amounts and there are times of extremes, but the following also needs to be taken into account:

1. The harvesting tanks themselves are vast (see area on plan) and so have a vast capacity for storage and holding of additional water volume in times of excess.
2. We have not calculated any loss factors within the calculation (such as gutter overflows in heavy rainfall and evaporation in light rainfall, as well as filter efficiency) all of which would reduce the amount of harvested water further.

As a result, we would summarise that the usage of the reclaimed rainwater will exceed the rainfall in most cases and so the storage of the water should actually be at quite a minimum, and yet for times when storage is needed there are large capacity tanks. Overflowing is thus not anticipated as a potential problem under normal circumstances (please note we obviously cannot account for actual flooding conditions where sites would flood anyway and domestic drains be unable to cope with capacities and result in flooding).

Yours sincerely

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