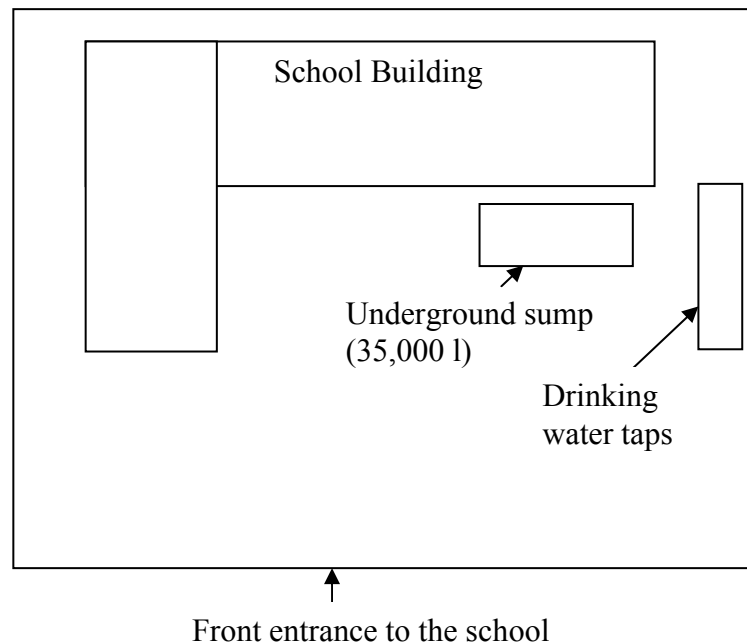


CASE STUDY – NATIONAL PUBLIC SCHOOL – CMR, BANGALORE

Storage and reuse of rainwater

National Public School – CMR, located in Bangalore, has a strength of around 1500 students from Kindergarten to Std. XII. Water consumption in the school is primarily in the toilets. Gardening forms a small percentage and the use for drinking is minimal. However, one set of drinking water fountains is provided for the students. The layout plan is shown in Figure 1.

Figure 1: Line diagram of School



The Catchment details are as follows:

Rooftop area considered for rainwater harvesting – 6300 sq ft. (586 sq. m)

Rooftop type – Flat RCC roof with weather proofing.

There is adequate slope towards the downtake pipe.

The school has an existing underground storage sump of capacity 35,000 litres. Four overhead tanks, each of 1000 l capacity, are located on the rooftop. The overhead tanks are connected to toilets and drinking water taps. The school receives its water from a borewell. Although the school had a large underground sump, it could not be used for storing harvested rainwater, since water from this sump was supplied to all water use points in the school, including the drinking water points and the roof was not cleaned regularly.

Possible options to overcome this limitation were:

Option 1:

To construct a separate sump to collect the rainwater, A separate tank would be required to receive the rainwater and divert it into the toilets. This option would be cost-intensive and would also require extensive plumbing.

Option 2:

Separate the drinking water line by creating a separate tank that receives water directly from the borewell. As a result, the underground sump can be used for storing the harvested rainwater. This water can then be used for every other purpose in the school except for drinking. This was considered the best option as it would reduce the overall cost. Control valves and pipelines could be provided to ensure borewell supply during the non-rainy months.

Calculations

Rainwater yield (lts) = rooftop area (sq mts) * annual rainfall (mms) * runoff coefficient * filter efficiency

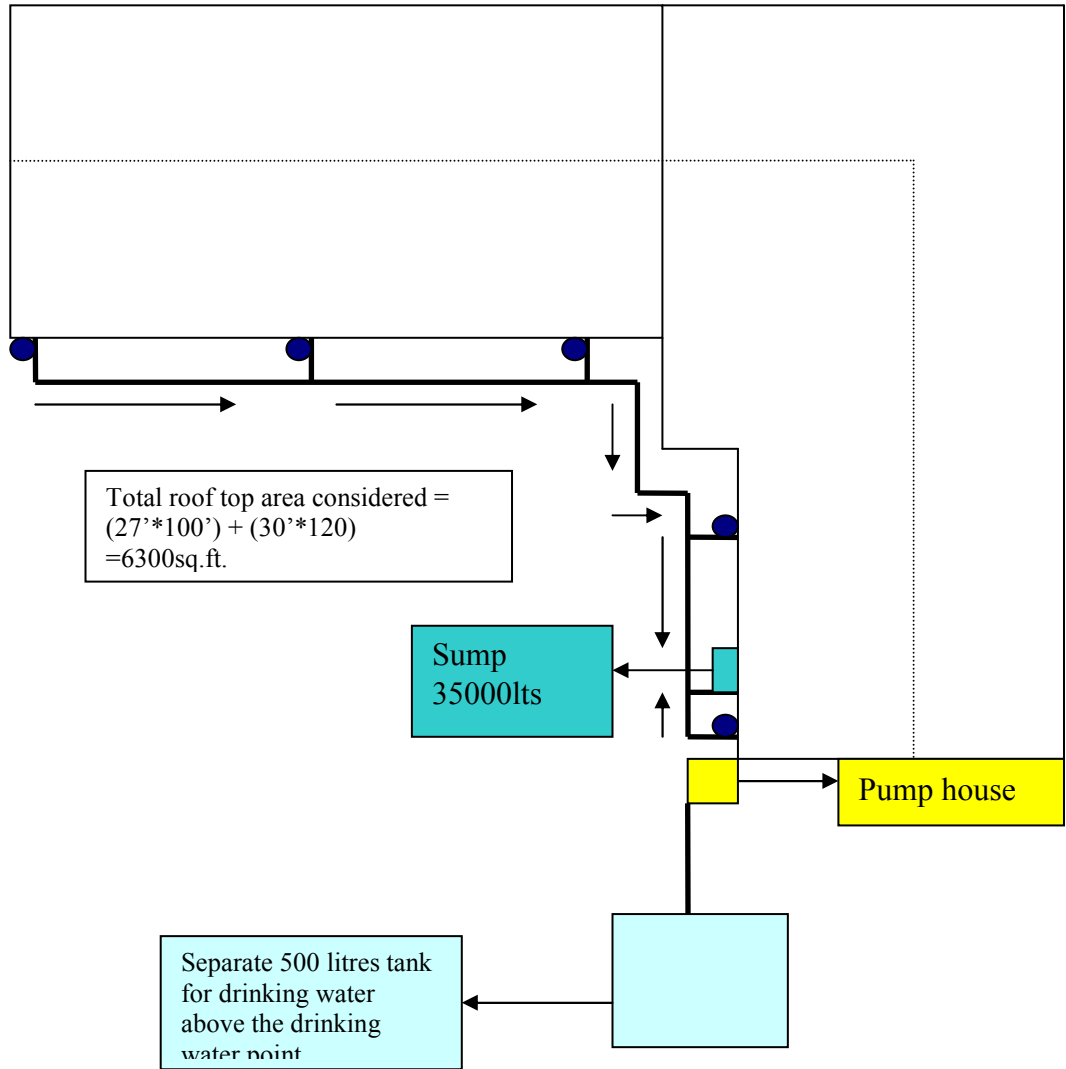
Rainwater yield = $586 * 970 * 0.8 * 0.8 = 3,63,788$ litres

Figure 2 depicts the rainwater harvesting system that was designed for the school. The cost of the entire system amounted to Rs. 70,000/-. The bill of materials is shown in Table 1.

Table 2.1 Bill of materials for the RWH system at School

	Description	Qty
A	<i>RWH PIPES AND SPECIAL FIXTURES:</i>	
1	75mm x 6mts rwh pipe PN4	9
2	110mm x 6mts rwh pipe PN4	12
3	110mm rwh tee	7
4	110mm rwh right angled adapters	10
5	110mm 'L' clamps	10
6	110mm 'C' clamps	40
7	3/8" x 1 1/2" anchor bolts and nuts	18
8	75mm right angled adapters	16
9	110mm x 45deg adapters	4
10	Solvent cement Ltrs	4
11	75mm control valve	2
12	Wooden gatta packets	2
13	Fasteners	1
14	75mm 'c' clamps	42
B	<i>RWH FILTER</i>	2
C	<i>TANK: One 500ltr plastic tank</i>	1
D	<i>MS Structure to hold the tank at a height above the drinking water area</i>	1

Figure 2 Rainwater Harvesting system at School





Water storage sump



Independent drinking water system