## Rainwater Harvesting

## **Types of Water Harvesting**

- Drinking water
- Irrigation
- Sanitation (toilet flushing, shower, etc.)

## Why Harvest Rainwater?

- Redundancy Two is One, One is None.
- Soft water
  - Soft water makes soap last longer
- Low Cost
- Much easier than using a hand pump

## **Project Example**

- Every project is going to be a bit different
- This project will have 2 separate systems:
  - Drinking water from a metal shed roof
  - Sanitation water from an asphalt shingle roof
- We will only be discussing the Drinking Water part.

#### The 12x24 Shed



## About this project

- Metal roof
  - More efficient collection than a rougher surface
  - Much cleaner
  - Little or no leeching of toxins into the water
- Single collection point for the entire roof
- North side of shed to reduce sun exposure

## Storage

- Six 55-gallon drums 330 gallons total
- HDPE (High Density Polyethylene) material
- BPA free, FDA Compliant Resins
- Black to block sunlight
- Note: "Not recommended for long term of drinking water."
- Open Top Allows access to install fittings near the bottom.

# Delivery



## Base to support drums



#### **Drums Installed**



# The Key Steps for Rainwater Harvesting

- Limit Sources of Contamination
- Plan for Volume
- Filter Leaves and Debris
- Divert the First Flush
- Secure The System
- Manage Standing Water
- Monitor and Maintain

## Limit Sources of Contamination

- Clear away overhanging branches
- Keep the gutters clean

- Roof Size: 12x24 ft.
- 288 sq. ft.
- 144x288 inches
- 41,472 sq. inches

- One US Gallon is defined as 231 cubic inches
- Multiply cubic inches for one inch of rain on your roof size x 0.004329018 to get gallons
- 41,472 cubic inches (or 1 inch of rainfall) = 179.533 gallons for this project

- So, 1" of rainfall will deliver 179.533 gallons of water from a 12x24 roof.
- Six 55-gallon drums = 330 gallons = 1.8" of rainfall

	Total Prcp Sum	_	5 year Average	Gallons Collectable				
OCT	2.59	5.79	7.18	2.45	1.06	23.84		
NOV	2.02	3.25	0.13	1.31	5.83	8.88	1.78	318.85
DEC	6.6	0.96	1.21	0.88	2.17	14.28	2.86	512.75
JAN	3.77	4.82	3.91	6.72	4.63	21.69	4.34	778.81
FEB	1.28	0.72	2.07	2.81	2.47	8.83	1.77	317.06
MAR	0.48	2.47	1.27	1.66	1.95	9.6	1.92	344.70
APR	3.3	4.88	2.43	3.03	3.72	16.11	3.22	578.46
MAY	4.48	13.41	1.87	3.6	2.47	27.15	5.43	974.86
JUN	8.77	6.87	10.71	6.01	3.79	42.03	8.41	1,509.15
JUL	7.24	8.85	5.58	6.11	9.67	42.41	8.48	1,522.80
AUG	7.95	8.22	8.81	4.63	14.63	37.17	7.43	1,334.65
SEP	5.3	1.14	18.27	6.63	7.56	31.34	6.27	1,125.31
	53.78"	61.38"	63.44"	45.84"	59.95"		I	10,173.42

- The 30-year rainfall average for this location is 54.46 inches.
- Even the lowest average rainfall month (February) still yields 317 gallons.

#### Filter Leaves and Debris

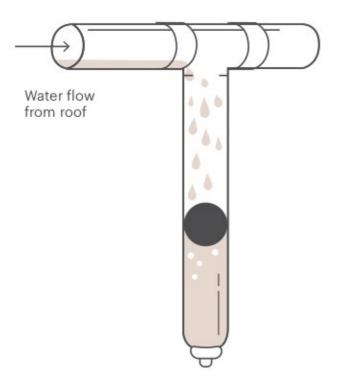
 Use a "Leaf Eater" directly beneath the gutter outlet.

#### Filter Leaves and Debris

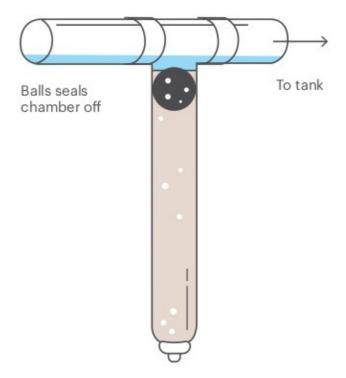


#### Divert the First Flush

First flush of contaminated water is diverted into chamber



Once chamber is full, fresh water flows to tank



## **Secure The System**

- Make sure all openings to the stored water are screened and mosquito-proof.
- Make sure that squirrels, rats, and other pests can't damage the system.

## Manage Standing Water

- The only standing water should be the water inside the storage tanks.
- Make sure that angles are steep enough that water flows freely.
- Remember to account for freezing temperatures.

#### Monitor and Maintain

 Set up a routine to check the system regularly.

#### Resources

- Leaf Eater Amazon ASIN B004VM9CW0
- First Flush Amazon ASIN B0010WG6BU
- Plastic Drum ULINE.COM
  - Shipping charge was \$136, including Lift Gate service (required!)
- Misc. fittings & hardware
- Rain-Harvesting-Handbook-AU-Issue-2-2021web.pdf

