ESTIMATION OF A SEPTIC TANK

1. **Definition of Septic Tank.**

A **septic tank** is a watertight chamber made of concrete, fiberglass, PVC or plastic, through which domestic wastewater (sewage) flows for primary treatment.[1] Settling and anaerobic processes reduce solids and organics, but the treatment is only moderate.[1] Septic tank systems are a type of onsite sewage facility (OSSF). They can be used in areas that are not connected to a sewerage system, such as rural areas. The treated liquid effluent is commonly disposed in a septic drain field which provides further treatment.

2. **Components of Septic Tank.**

a. **Inspection Pit**. A hole in the ground, lined with site built or manufactured sides that receive wastewater from house or building. The wastewater then flows from inspection pit to septic tank.

b. **Septic Tank**. The septic tank is buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out, forming sludge, and oil and grease to float to the surface as scum. It also allows partial decompositions of the solid materials. Compartments and a T-shaped outlet in the septic tank prevent the sludge and scum from leaving the tank and traveling into the soak pit.

c. **Soak Pit**. A soak pit, also known as a soak away or leach pit, is a covered, porous-walled chamber that allows water to slowly soak into the ground. Pre-settled effluent from a collection and storage/treatment or (semi-) centralized treatment technology is discharged to the underground chamber from which it infiltrates into the surrounding soil.

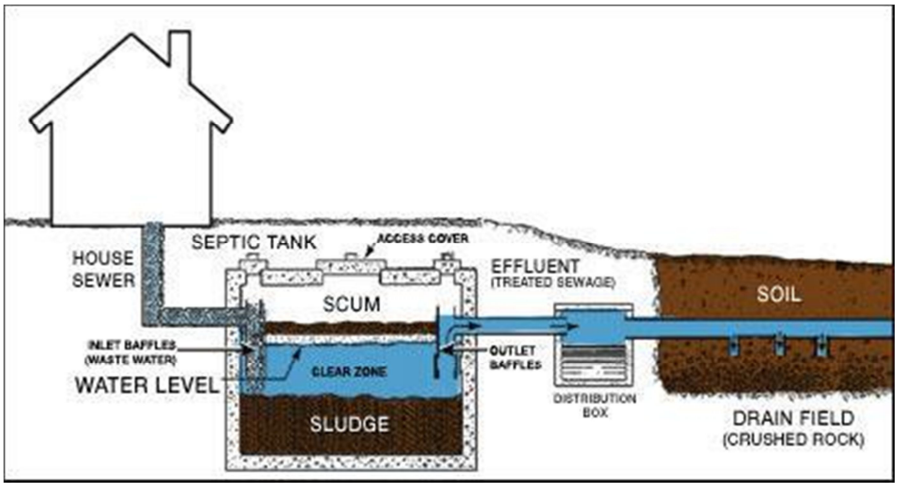
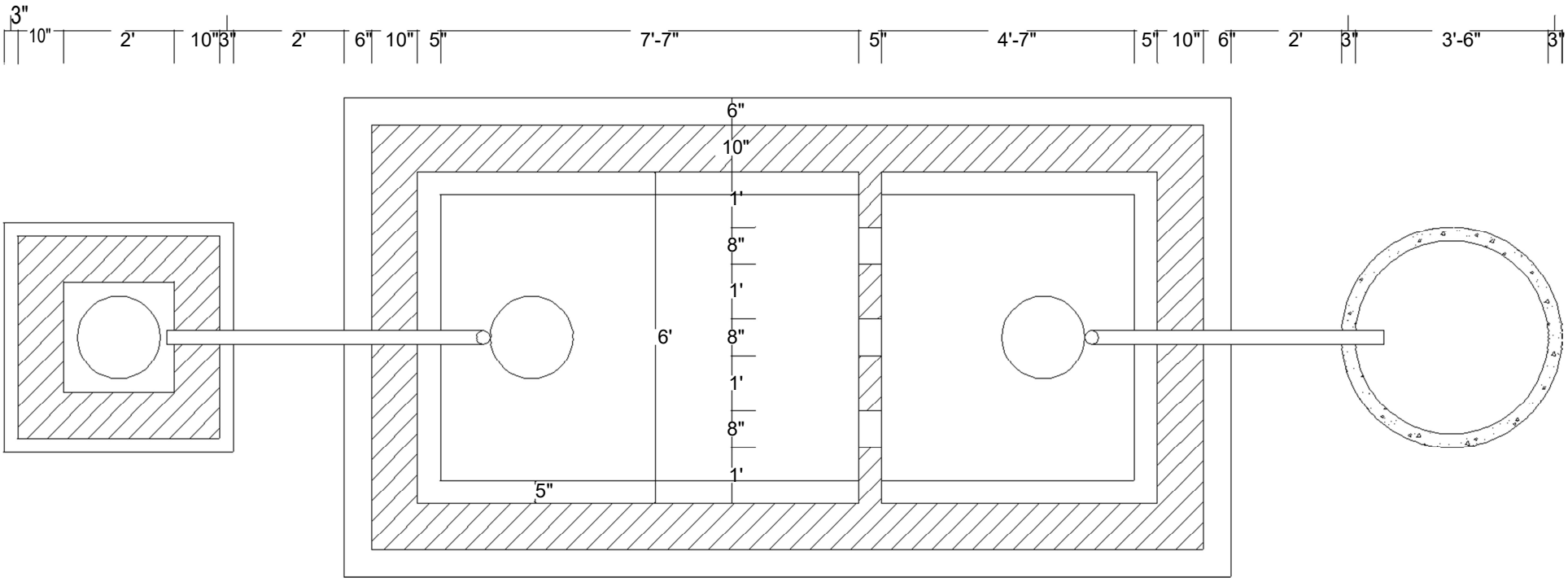


Figure 1: Components of a Septic Tank (http://www.natureclean.com)

3. **Worked Out Problem.**

The following figure is related to workout problem. The septic tank has a total height of 9 ft (including 6″ floor slab and 6″ cover slab). Soak pit has a total height of 30 ft (including 4″ cover slab).



INSPECTION PIT **SEPTIC TANK** **SOAK PIT**

Figure 2: Plan of Septic Tank

Table 1-1: Estimation of a Septic Tank

Item No.	Item Description	No.	Length (ft)	Width(ft)	Height/ Depth(ft)	Quantity	Remarks
1.	**Earthwork Excavation**						
	Septic Tank	1	16.0833	8.67	9.0	1254.54 cft	
	Soak Pit	1	12.57	---	30.0	376.99 cft	
2.	**Cement Concrete (1 :3:6) Floor of Septic Tank**	1	16.0833	8.67	0.5	69.72 cft	
3.	**Precast RC Work**						
	Roof Cover Slab of Septic Tank	1	15.0833	7.67	0.5	57.84 cft	
	Roof Cover Slab of Soak Pit	1	12.57	---	0.33	4.19 cft	
	Side Wall of Soak Pit	---	2.94	---	29.67	87.22 eft	
4.	**1st Class Brickwork with 1 :4 Cement Mortar in septic tank**						
	(a) Long Wall						
	: 1st step	2	15.0833.	1.25	3.0	113.12 cft	
	: 2nd step	2	15.0833	0.833	5.0	125.69 cft	
	(b) Short Wall						
	: 1st step	2	5.167	1.25	3.0	38.75cft	
	: 2nd step	2	6.0	0.833	5.0	49.98 cft	
	(c) Partition Wall						
	: 1st step	1	5.167	0.417	3.0	6.46 cft	
	: 2nd step	1	6.0	0.417	5.0	12.51 cft	
5.	**1/2 inch Cement Plaster 1:3 with Standard Water Proofing Compound in Septic Tank**						
	(a) Long Wall						
	: 1st step	2	12.583	---	3.0	75.498 sft	
	: 2nd step	2	13.417	---	5.0	134.17 sft	
	(b) Short Wall						
	: 1st step	2	5.167	---	3.0	31.002 sft	
	: 2nd step	2	6.0	---	5.0	60.00 sft	
	(c) Partition Wall						
	: 1st step	---	5.167	---	3.0	31.002 sft	
	: 2nd step	---	6.0	---	5.0	60.00 sft	
6.	**3/4 inch Cement Plaster 1:3 with standard water proofing compound in floor of septic tank**	1	12.583	5.167	---	65.02 sft	

Item No.	Item Description	No.	Length (ft)	Width(ft)	Height/ Depth(ft)	Quantity	Remarks
7.	**2 inch size Brick Aggregate at Bottom of Soak Pit**	---	$\pi\times(3.5)^2/4$	---	1.0	9.62 sft	
8.	**Coarse Sand at Bottom of Soak Pit**	---	$\pi\times(3.5)^2/4$	---	1.5	14.43 sft	

Table 5-2: Cost Estimation of Septic Tank

Item No.	Item Description	Quantity times price per quantity	Total Price (Taka)
1.	Earthwork Excavation	1631.53 cft @ 1475.00 per cft	2406.50
2.	Cement Concrete (1 :3:6)	69.72 cft @ 8991.00 per cft	6268.52
3.	Precast RC Work	149.25 cft @ 15073.53 per cft	22497.24
4.	1st Class Brickwork with 1:4 Cement Mortar in septic tank	346.51 cft @ 5629.40 per cft	19506.43
5.	1/2 inch Cement Plaster 1 :3 with Standard Water Proofing Compound in Septic Tank	391.67 sft @ 882.00 per sft	3454.53
6.	3/4 inch Cement Plaster 1:3 with Standard Water Proofing Compound Floor of in Septic Tank	65.02 sft @ 1323.00 per sft	860.21
7.	Aggregate at Bottom of Soak Pit	9.62 cft @ 33.50 per cft	322.27
8.	Coarse Sand at Bottom of Soak Pit	14.43 cft @ 33.50 per cft	483.40
9.	2 inch dis Ventilating Pipe fitted position	1 No. @ Tk 15.00 each	15
10.	6 inch diameter Pipe	5.25 ft @ Tk 30 per ft	157.50
11.	C. I. (cast iron) Manhole Cover 18 inch diameter over Septic Tank	2 No. @Tk. 300.00 each	600
12.	RCC Tees	2 No. @Tk. 150.00 each	300