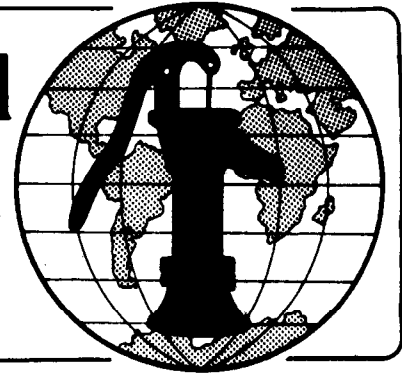


Water for the World



Constructing, Operating, and Maintaining Cesspools

Technical Note No. SAN. 2.C.2

A cesspool is a covered pit with open-joint walls that receives piped sewage. The solids settle to the bottom and the effluent passes through the walls into the surrounding soil. Constructing a cesspool involves excavating a pit at the correct location; laying up sidewalls with stones, bricks, or concrete blocks; and connecting the cesspool to a dwelling with sewer pipe. The system is self-operating and requires little or no maintenance. It must be periodically inspected for system failure.

A properly constructed cesspool can last from five to 15 years. This technical note describes how to construct a cesspool. Read the entire technical note before beginning construction.

Useful Definitions

CONTAMINATE - To make unclean by introducing an infectious (disease-causing) impurity such as bacteria from sewage and effluent.

EFFLUENT - Settled sewage.

SEWAGE - All washwater, excreta, and water used to flush excreta that flows from a building or buildings through a sewer pipe and into a septic tank, cesspool, or stabilization pond.

Materials Needed

The project designer must provide three papers before construction can begin:

1. Location map similar to Figure 1 showing the cesspool in relation to water supplies, dwellings, streams, trees, and property lines,

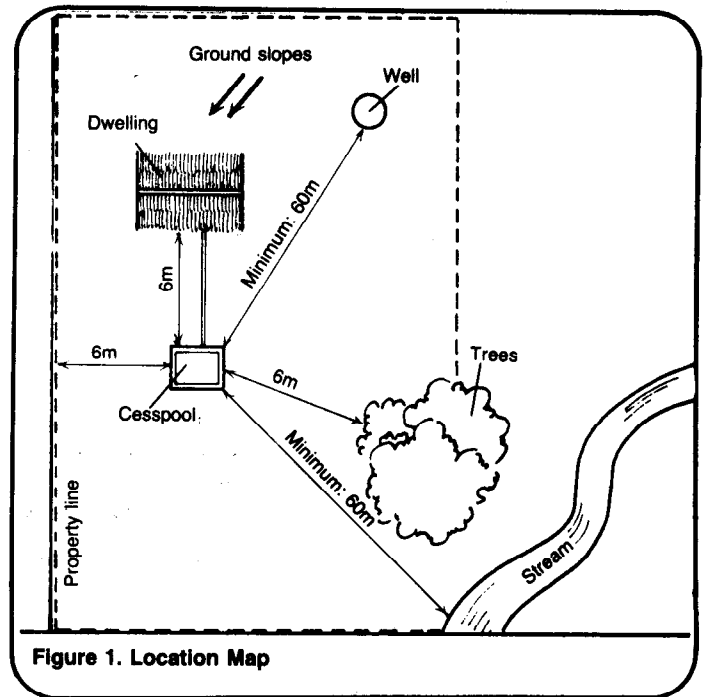


Figure 1. Location Map

2. Plan views similar to Figure 2 showing length, width, depth, and other design criteria,

3. Materials list similar to Table 1 showing all labor, materials, and tools needed to construct the cesspool.

Constructing a Cesspool

Depending on local conditions, availability of materials, and skills of workers, some construction steps will require only a few hours while others may take a day or more. Read the construction steps and make a rough estimate of the time required for each step. You will then have an idea of when specific laborers, materials, and tools must be available during the construction process. Draw up a work plan similar to Table 2 showing construction steps.

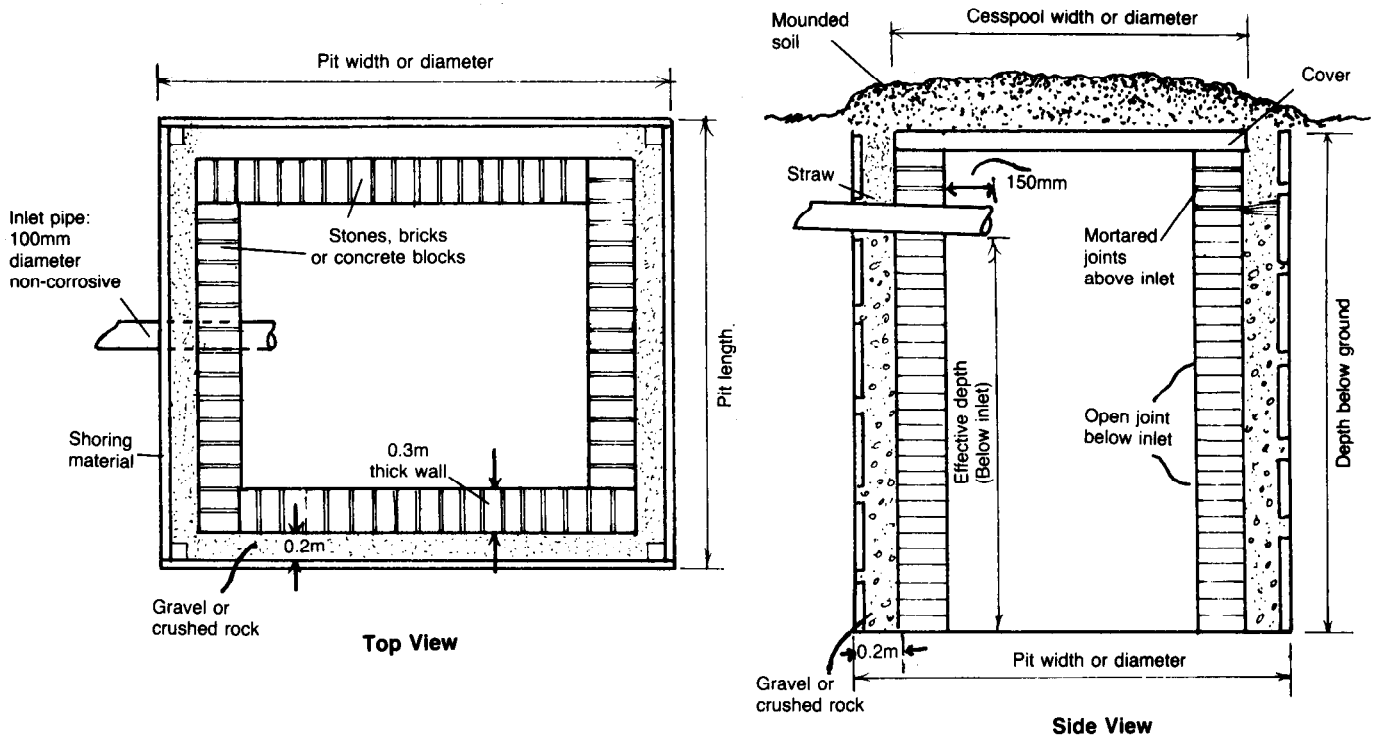


Figure 2. Cesspool

Table 1. Sample Materials List

Item	Description	Quantity	Estimated Cost
Labor	Foreman	1	_____
	Laborers	3	_____
Supplies	Bricks for sidewalls	_____	_____
	Gravel for filler	_____	_____
	Concrete for cover	_____	_____
	Mortar or tar for water-proofing	_____	_____
	Inlet pipe (100mm, non-corrosive)	_____	_____
	Straw	_____	_____
	Shoring material	_____	_____
	Nails	_____	_____
Other	_____	_____	
Tools	Measuring tape	1	_____
	Shovels	4	_____
	Picks	1	_____
	Wheelbarrow	1	_____
	Containers for mixing concrete	2	_____
	Hammer	1	_____
	Saw	1	_____
	Other	_____	_____

Estimated Cost = _____

Table 2. Sample Work Plan

Time Estimate	Day	Task	Personnel	Materials and Tools
1 hour	1	Mark trench and pit site	Foreman; 1 laborer	Drawings, measuring tape, stakes
3 hours	1	Excavate trench	Foreman; 3 laborers	3 shovels, 1 pick
4 hours	1	Lay sewer pipe	Foreman; 3 laborers	100mm diameter clay pipe, mortar
1 hour	2	Place barricades around pit site	Foreman; 3 laborers	Machetes, bamboo poles, vine
6 hours	2	Begin excavating pit	Foreman; 3 laborers	3 shovels; 1 pick; 1 wheelbarrow
6 hours	3	Complete excavation	Foreman; 3 laborers	3 shovels; 1 pick; 1 wheelbarrow
2 hours	3	Shore sides of pit	Foreman; 3 laborers	Machetes; bamboo, vine
4-6 hours	4	Begin laying up sidewalls and placing gravel filler	Foreman; 3 laborers	Concrete blocks, gravel
1 hour	4	Extend inlet pipe beyond interior of sidewall	Foreman; 3 laborers	100mm diameter clay pipe, mortar
2 hours	5	Complete sidewalls	Foreman; 3 laborers	Concrete blocks, mortar
1 hour	5	Complete filler	Foreman; 3 laborers	Gravel, straw, soil
2 hours	5	Build cover	Foreman; 1 laborer	Hammer, saw, nails, tin sheets
2 hours	5	Place cover, waterproof, and mound with soil; remove barricades	Foreman; 1 laborer	Tar, 2 shovels

Caution!

1. When excavating a pit deeper than 1.5m, shore up the sides to prevent a cave-in which could be fatal to a worker in the pit.

2. During excavation, erect barricades to keep away unauthorized persons who might fall in the pit and suffer serious injury.

3. To avoid contaminating water supplies, construct the cesspool to the exact specifications and at the precise location specified by the project designer.

1. Assemble all laborers, materials, tools, and drawings needed to begin construction. Study all drawings carefully.

2. Determine the correct location of the cesspool using the location map and a measuring tape. Clear the area of any vegetation that may hinder construction. Lay out the dimensions of the cesspool on the ground and mark its location with stakes or pointed sticks. Mark the trench line for the pipe from the dwelling to the site for the cesspool as shown in Figure 3.

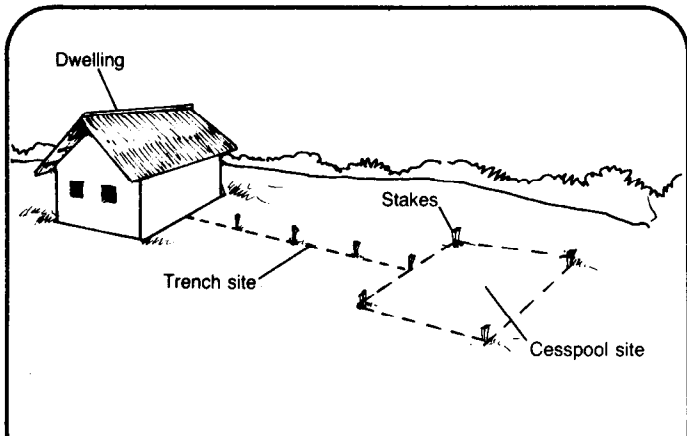


Figure 3. Locating Cesspool Site

through to the end, check for leaks or an improper slope. Make the necessary correction, then cover the pipe with soil and mound. Erect barricades around the pit site.

6. Excavate the pit to the width, length, and depth specified by the project designer. The depth is measured downward from the end of the inlet pipe, not from the surface of the ground. The walls should be vertical and fairly smooth but not compacted. As the pit is being excavated, lightly rake the sides and check to make sure they are vertical using a plumb line or a rock and string as shown in Figure 5. Shore up the walls with bamboo, boards, or poles, leaving 100-150mm space between each pole or board. See Figure 6.

If the pit is to be deeper than 2.5m, shore the walls in two sections: upper and lower. When the depth below the surface of the ground reaches about

3. Excavate the trench from the dwelling to the cesspool site with a downward grade of about 1 in 100. This means that the trench bottom drops one unit in elevation for every 100 units in length. The trench should slope evenly and be as straight as possible. It need be no more than 0.3m wide and 0.3m deep.

4. Lay 100mm diameter vitrified clay, concrete, or plastic sewer pipe in the trench from the dwelling to the cesspool site as shown in Figure 4. Seal all pipe joints with mortar or similar material.

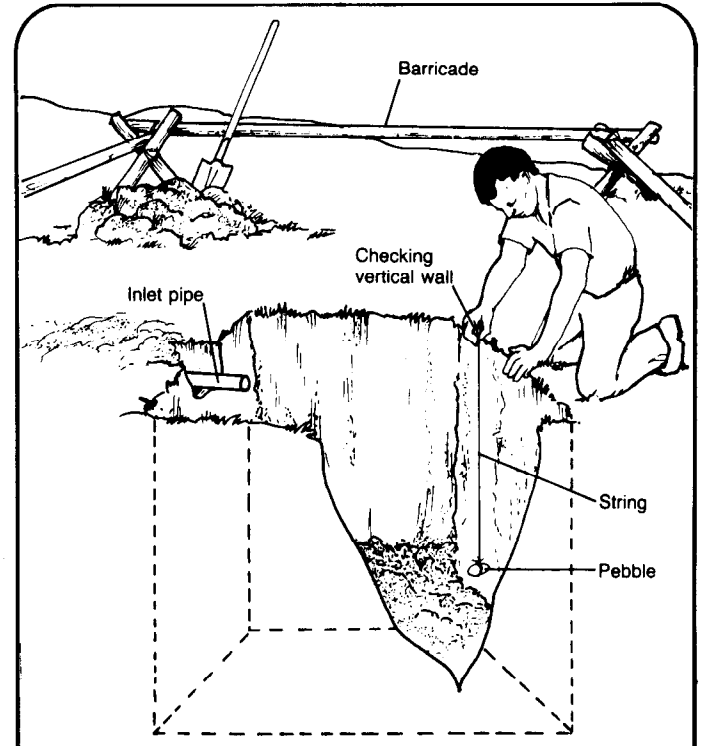


Figure 5. Excavating the Cesspool Pit

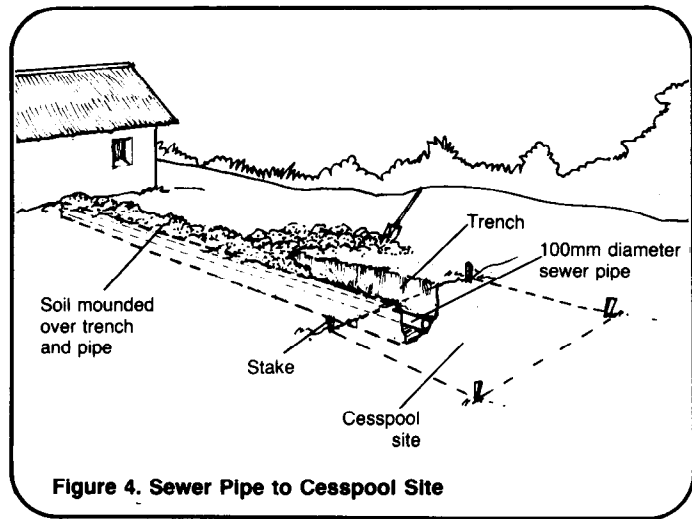


Figure 4. Sewer Pipe to Cesspool Site

5. Check the slope of the sewer pipe by pouring water into the pour-flush bowl or other receptacle in the dwelling. If water does not flow

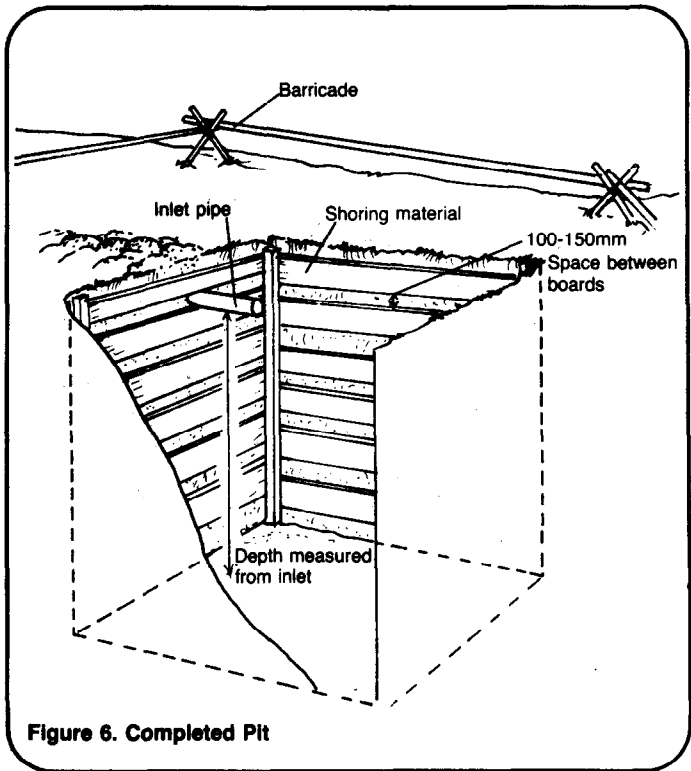


Figure 6. Completed Pit

2.0m, secure shoring materials in place. Continue excavating, leaving a 75-100mm wide ledge or step around the walls to support the upper shoring. When the pit reaches the design depth, measured downward from the inlet pipe, shore up the lower walls. See Figure 7. The bottom of the pit should be fairly level.

7. Begin laying up the sidewalls using bricks, concrete blocks, or select field stones. Make the walls about 0.3m thick. Leave about 0.2m between each sidewall and the earth wall of the pit. Later, this space will be filled with gravel or crushed rock. Do not mortar the laid-up walls below the inlet. See Figure 8.

8. When the walls reach the level of the inlet, extend the inlet pipe 150mm into the pit. This will allow sewage to fall into the pit without running down the wall.

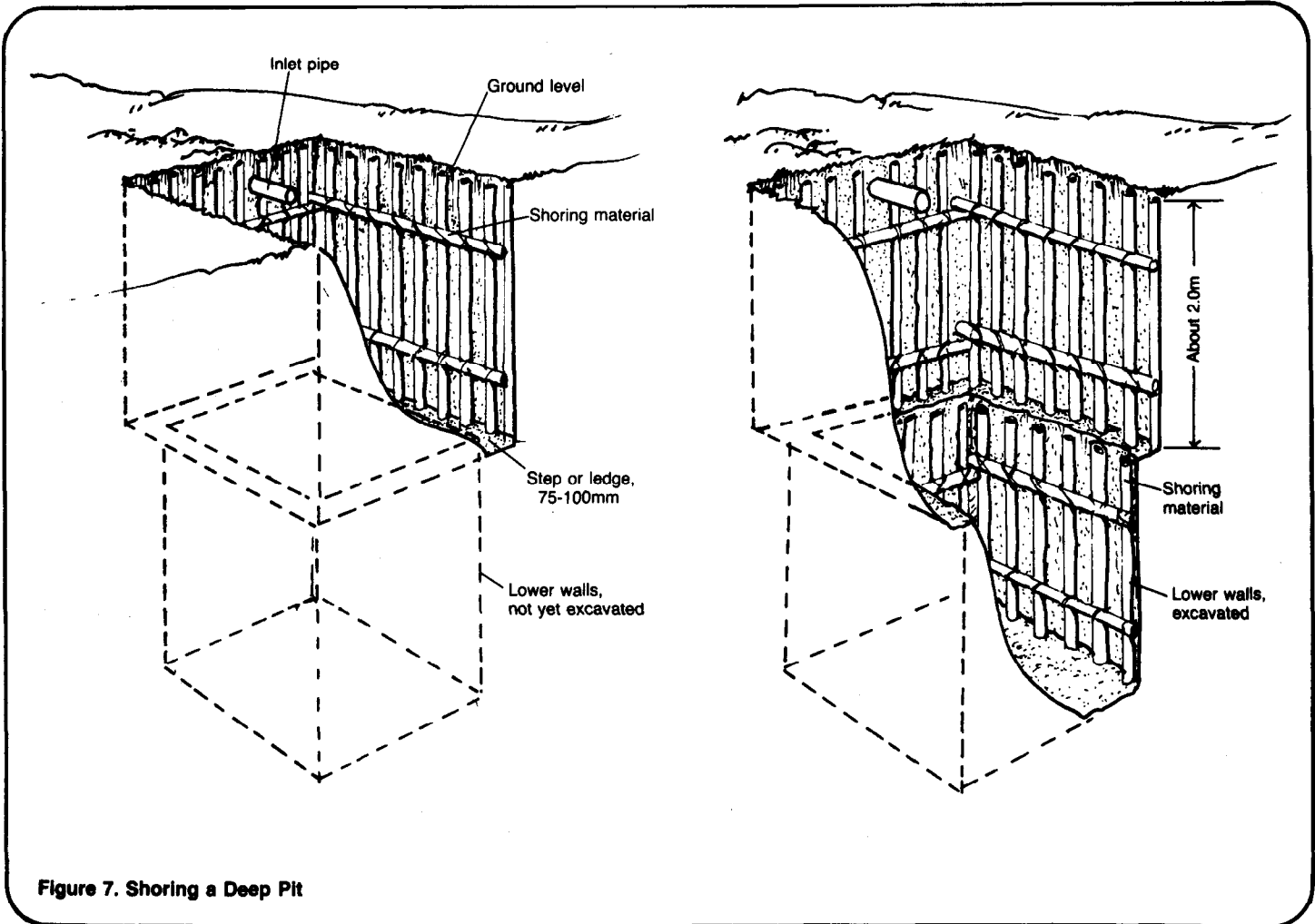


Figure 7. Shoring a Deep Pit

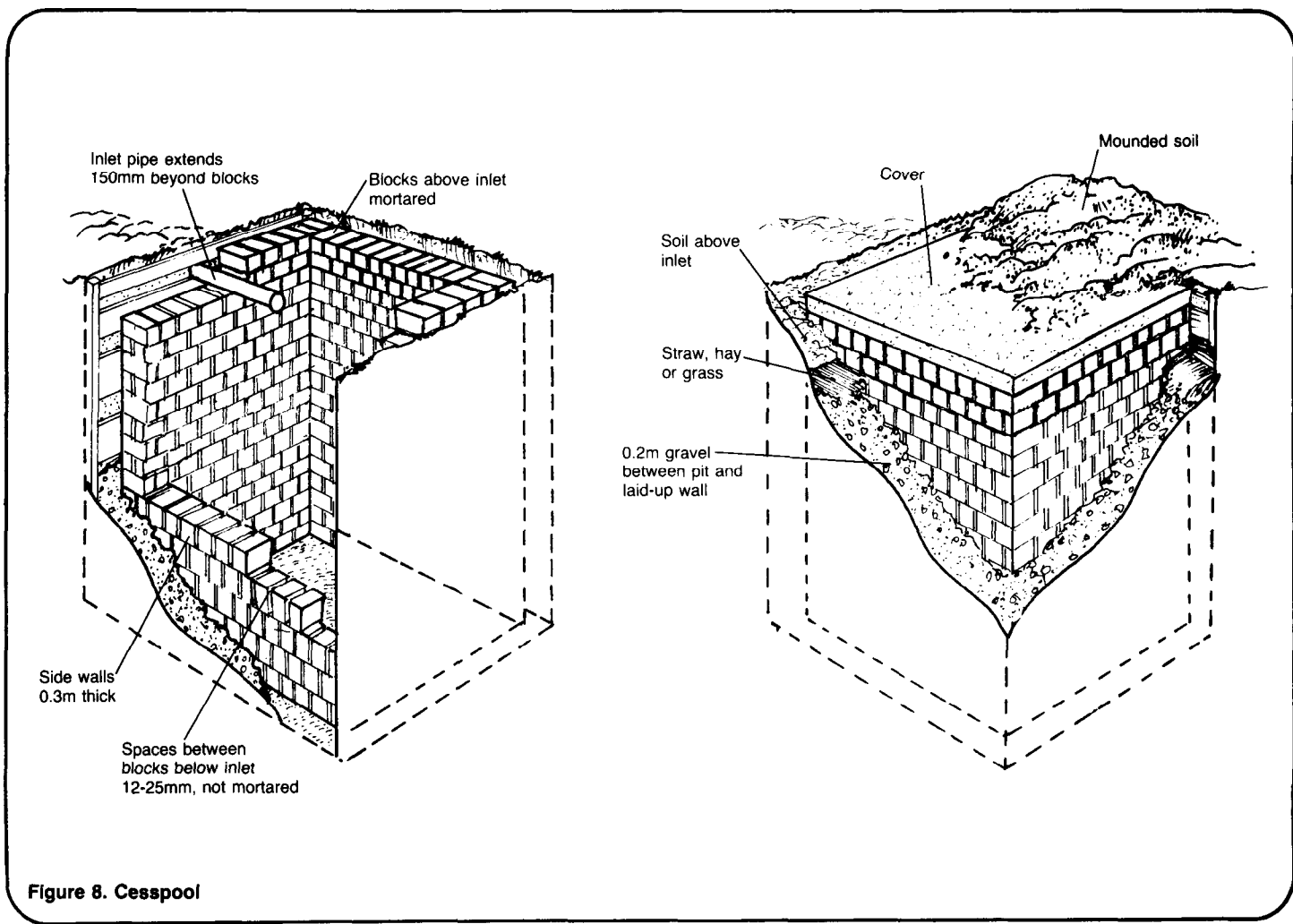


Figure 8. Cesspool

9. Continue laying up the sidewalls to within about 0.3m below the surface of the ground. Mortar the sidewalls above the inlet for strength.

10. Fill in the space between the laid-up walls and the earth walls of the pit with gravel, crushed rock, or pebbles. This material may be added as the walls are laid up. When the gravel reaches the level of the inlet pipe, cover it with straw or hay. Fill in the remainder of the space with soil. See Figure 8.

11. Construct a strong, waterproof cover that fits flush with the outside edges of the laid-up walls. The cover may be wood, metal, or reinforced concrete. It must be strong enough to support the weight of an adult to prevent anyone from falling into the pit.

If the cover is made of wood or metal, waterproof it with mortar, tar, or an equivalent material. If the cover is made of concrete, build it in sections. See "Constructing Septic Tanks," SAN.2.C.3, for details of working with concrete and building a cover in sections.

12. Set the cover in place and waterproof around the edges. Cover and mound with dirt. See Figure 8.

Operating and Maintaining a Cesspool

A cesspool is a self-operating system. Once it is constructed and connected by sewer pipe to the fixture in the dwelling, it is ready for operation. Maintaining a cesspool involves inspecting it for burrowings, erosion, and system failure.

Burrowing. Small holes or excavations on or near the cesspool indicate the presence of burrowing animals. These animals should be kept away by erecting fences, if necessary.

Erosion. If there is erosion on or near the cesspool due to wind, rain, or surface water, fill the holes and mound with soil. Plant grass over the system to help prevent erosion. If surface water is a problem, build small dams or trenches to divert it.

System Failure. If the fixture in the dwelling backs up with sewage, it

may be that the sewer line is clogged. Excavate the pipe, inspect and repair it.

The system may eventually fail. When it does, one or more of the following signs can be observed on or near the site: unusually lush growth, wet areas or puddles, and continual odors. When the system fails, it means that the surrounding soil can no longer absorb effluent. The system cannot be repaired. It must be abandoned and a new cesspool designed and constructed. Consult the project designer.