SANITATION IN COMPLEX ENVIRONMENTS

INSTALLATION GUIDELINES

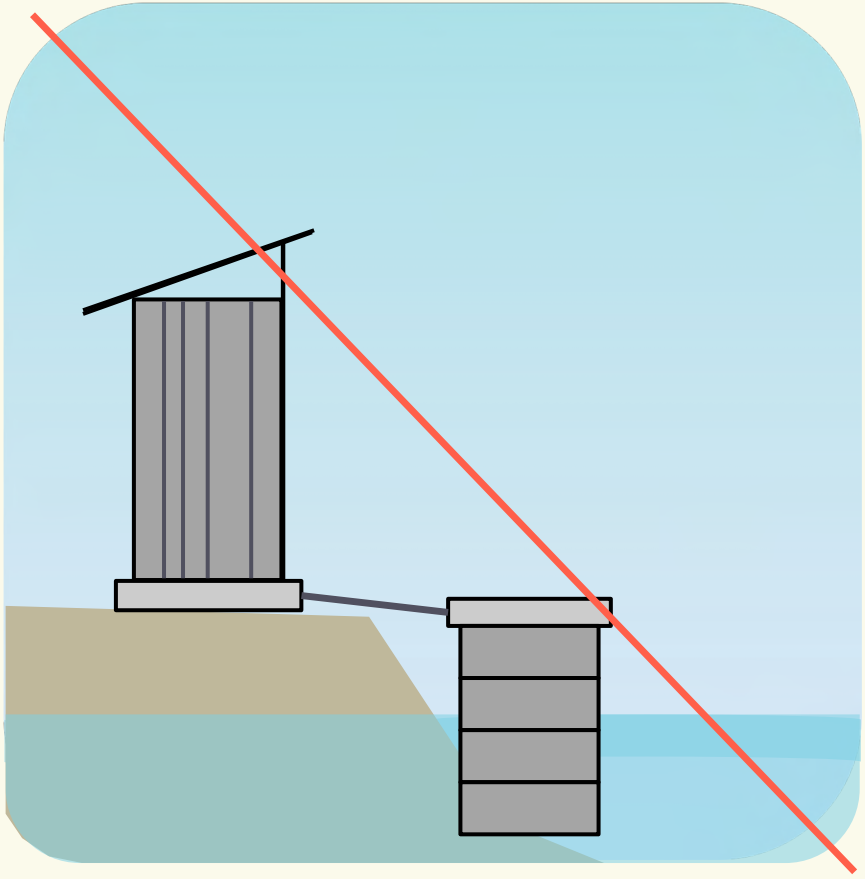
Markets for WASH

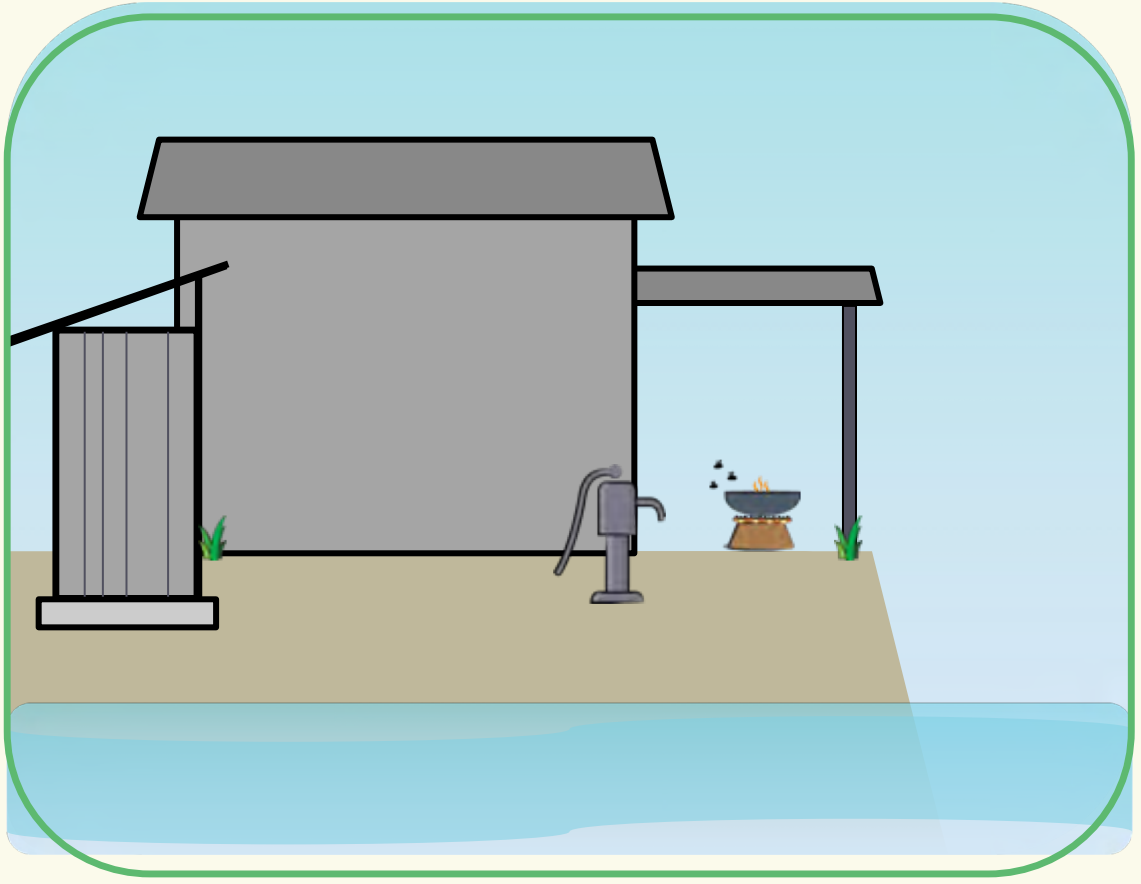
Section 1
Best Practices

Location

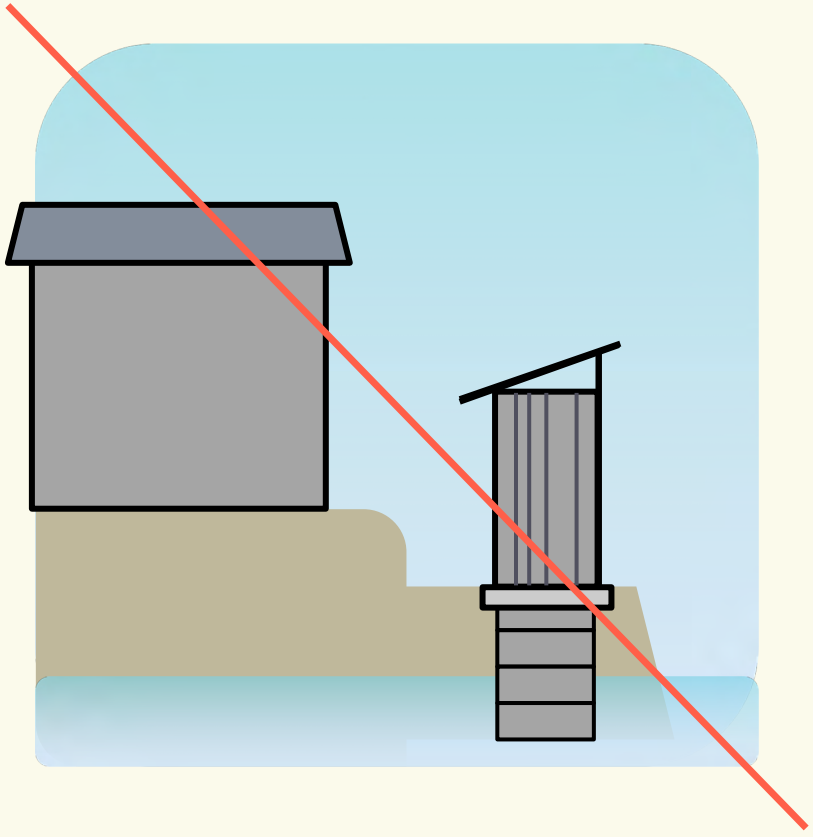
1	Is the latrine separated from the kitchen?	Yes	No
2	Is the latrine separated from the tubewell?	Yes	No
3	Is the latrine 5 ft or more away from the pond/canal/river?	Yes	No
4	Is the latrine within 10 ft or the home?	Yes	No
5	Is the latrine away from the property edge?	Yes	No
6	Is the pathway to the latrine accessible around the year for all members of the household?	Yes	No
7	Is the door to the latrine accessible around the year for all members of the household?	Yes	No
8	Are the entry and steps to the latrine accessible around the year for all members of the household?	Yes	No
9	Is the space inside to the latrine usable around the year for all members of the household?	Yes	No
10	Is the latrine placed in a culturally appropriate direction for the household?	Yes	No

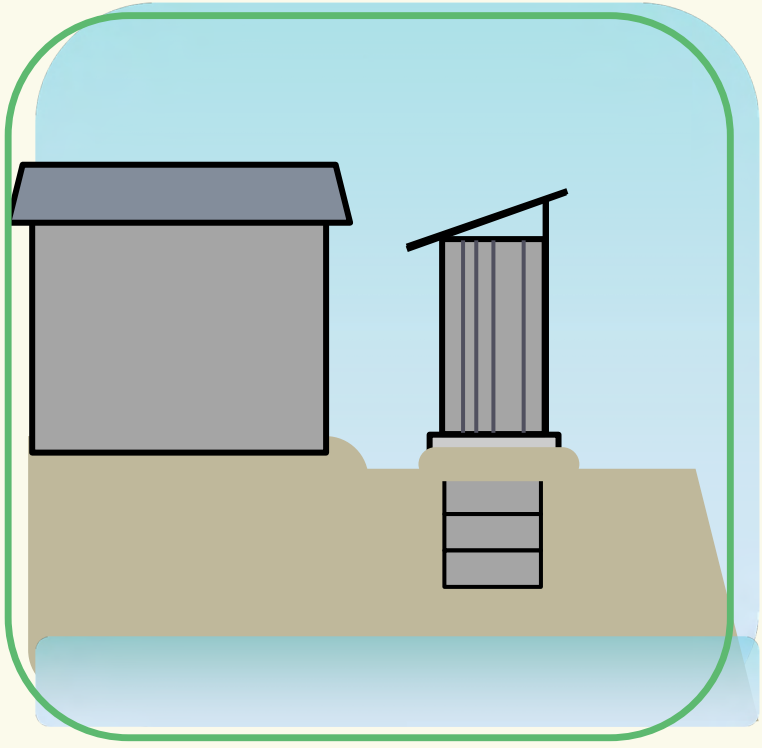
Haor Installation





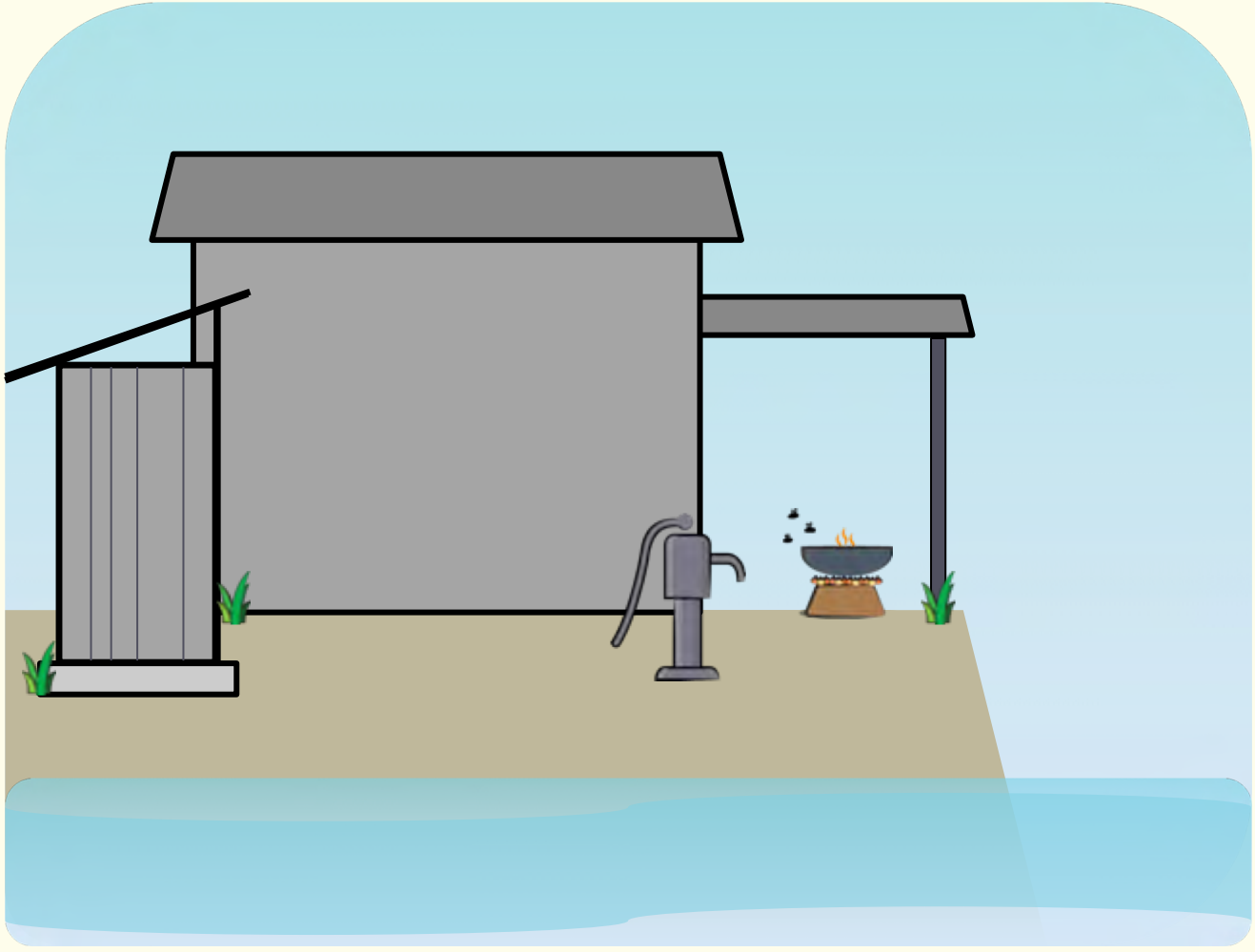
Char Installation





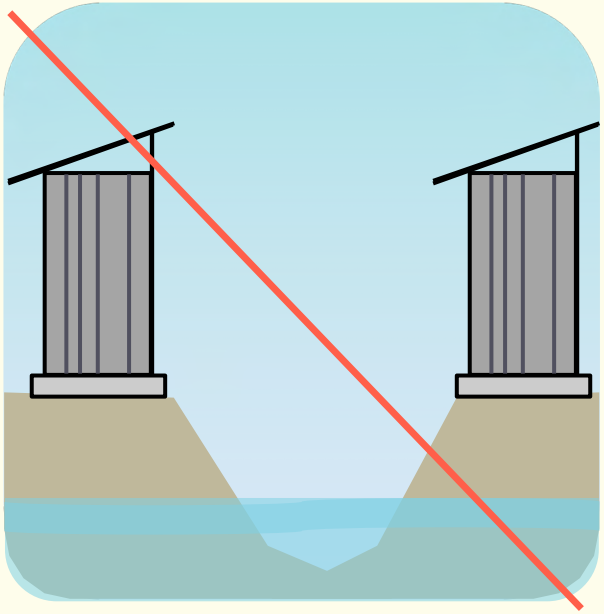
LOCATION

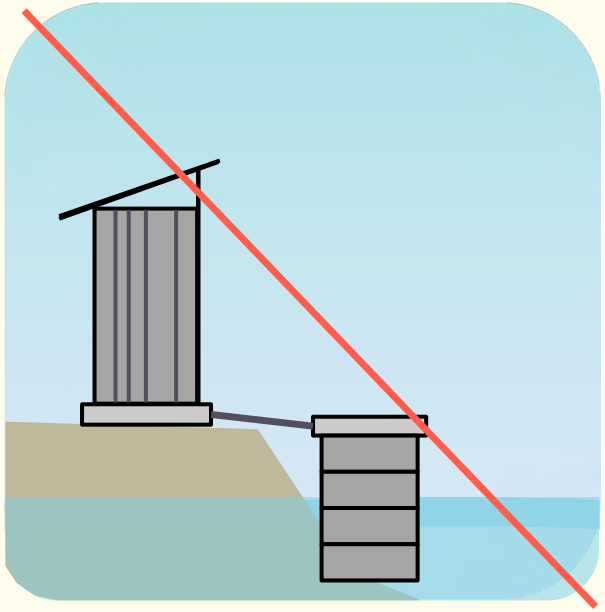
1	Distance from kitchen
2	Distance from tubewell
3	Distance from water
4	Distance from property edge
5	Close to home
6	Accessible path
7	Accessible door
8	Accessible step/entry
9	Accessible space inside
10	Cultural placement

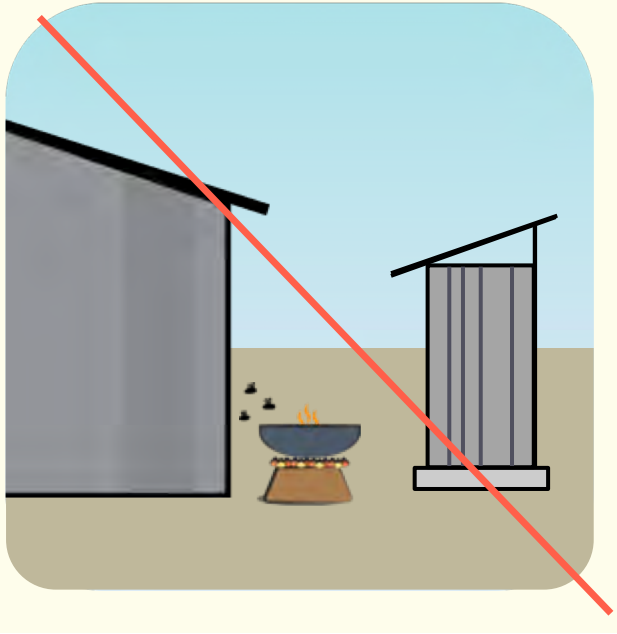


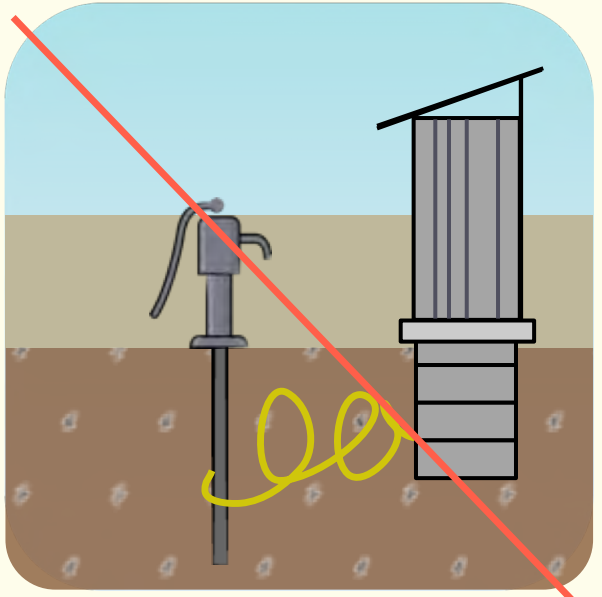
LOCATIO

1	~~Distance from kitchen~~
2	~~Distance from tubewell~~
3	~~Distance from water~~
4	~~Distance from property edge~~
5	~~Close to home~~
6	~~Accessible path~~
7	~~Accessible door~~
8	~~Accessible step/entry~~
9	~~Accessible space inside~~









Superstructure

1	Does the latrine have walls?
2	Does the latrine have a roof?
3	Is the shelter greater than or equal to 33” wide?
4	Is the shelter taller than 5’?
5	Does the shelter have a door?

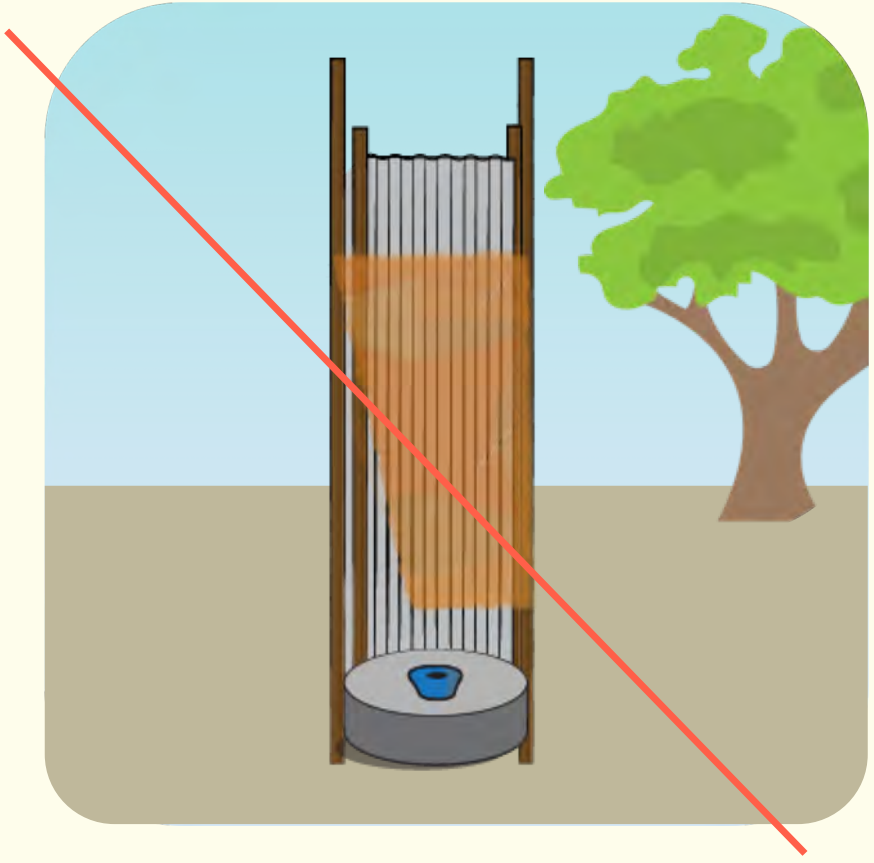
SUPERSTRUCTURE

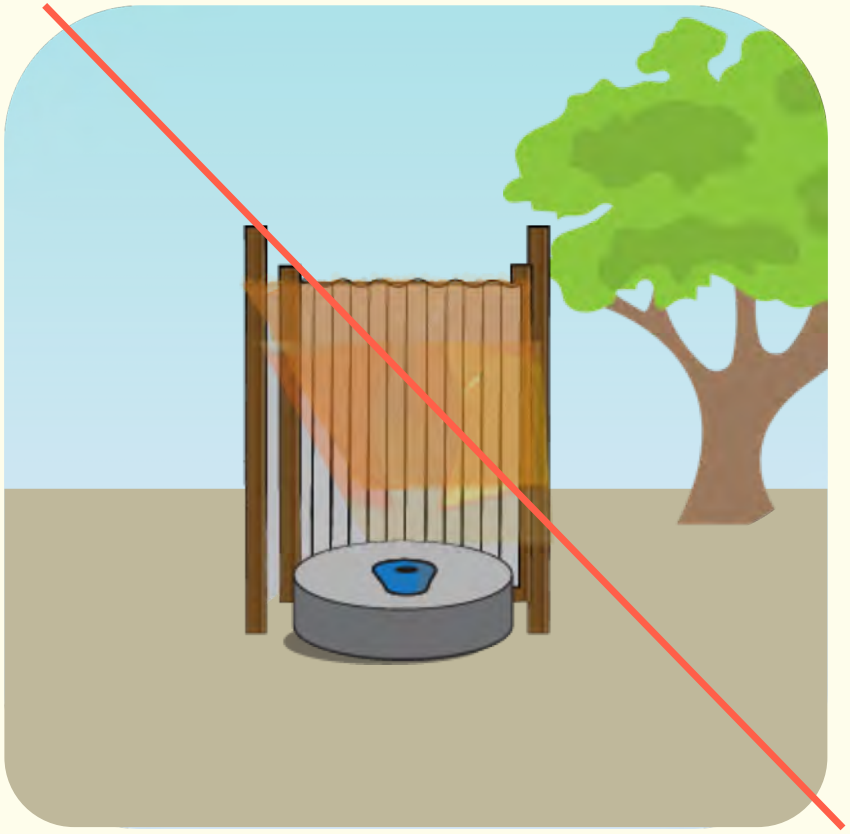
1	Walls
2	Roof
6	33” wide +
7	5’ tall +
8	Door

SUPERSTRUCTURE

6	~~36” wide +~~
8	~~Door~~
9	~~Latch~~

7	~~6’ tall +~~
8	~~Door~~
9	~~Latch~~





Midstructures

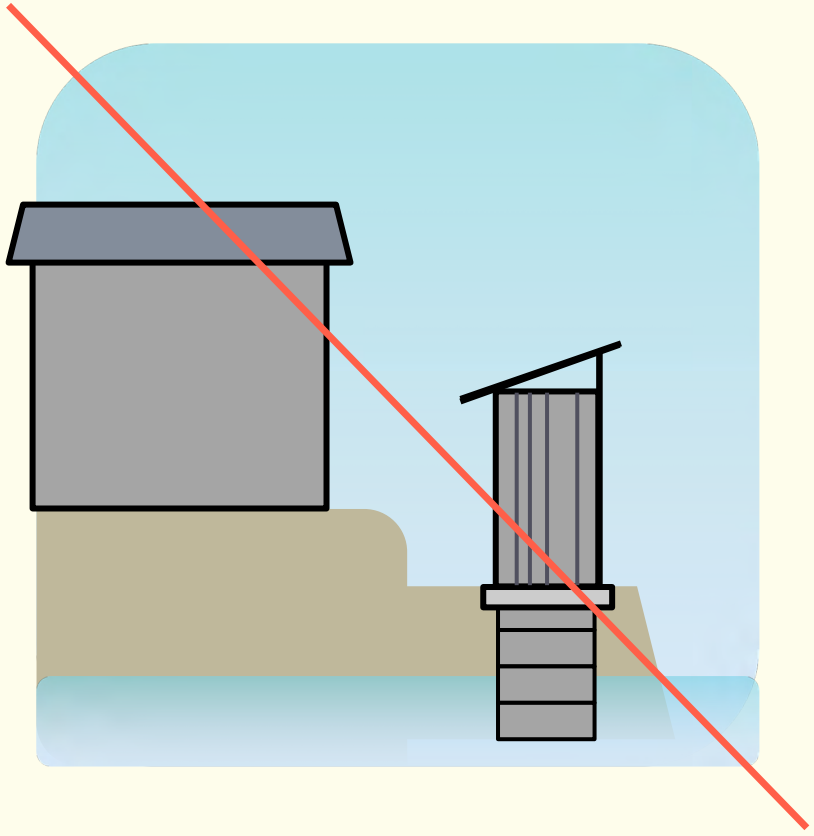
1	Is the slab a minimum diameter of 33”?
2	Is the pan on the list of recommended pans?
3	Is the latrine raised to the height of the home?
4	Is the platform wider than the diameter of the slab?
5	Is the slab level and stable?

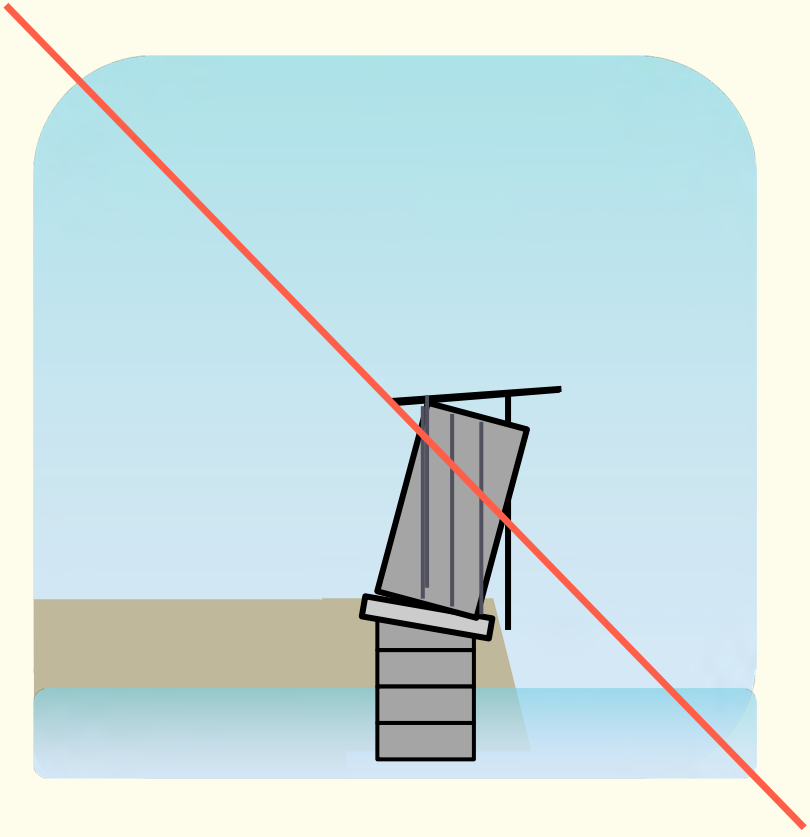
MIDSTRUCTURE

1	Slab Width 33” +
2	Platform Width 36” +
3	Quality Pan & Waterseal
4	Raised same as home
5	Stable platform/stairs

MIDSTRUCTURE

4	~~Raised same as home~~
5	~~Stable platform/stairs~~



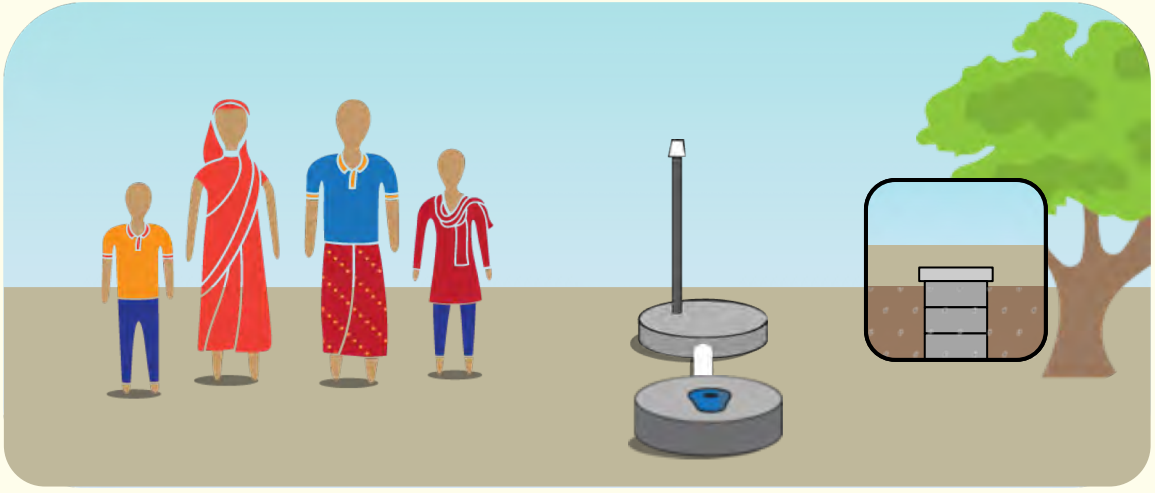


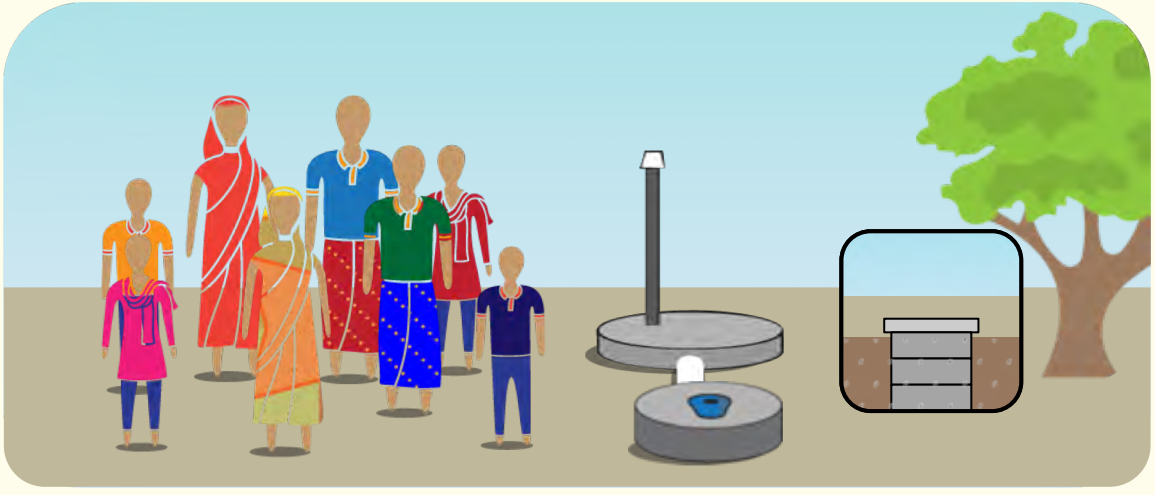
Substructures

1	Are the slab and ring touching the top ring sealed with cement?
2	Are the rings below the surface of ground ring **unsealed**?
3	Is the pit lined/back filled with sand?
4	Is the pit four or less rings deep?
5	Are the rings over 30” diameter for families <6, or over 36” diameter for families >6?

SUBSTRUCTURE

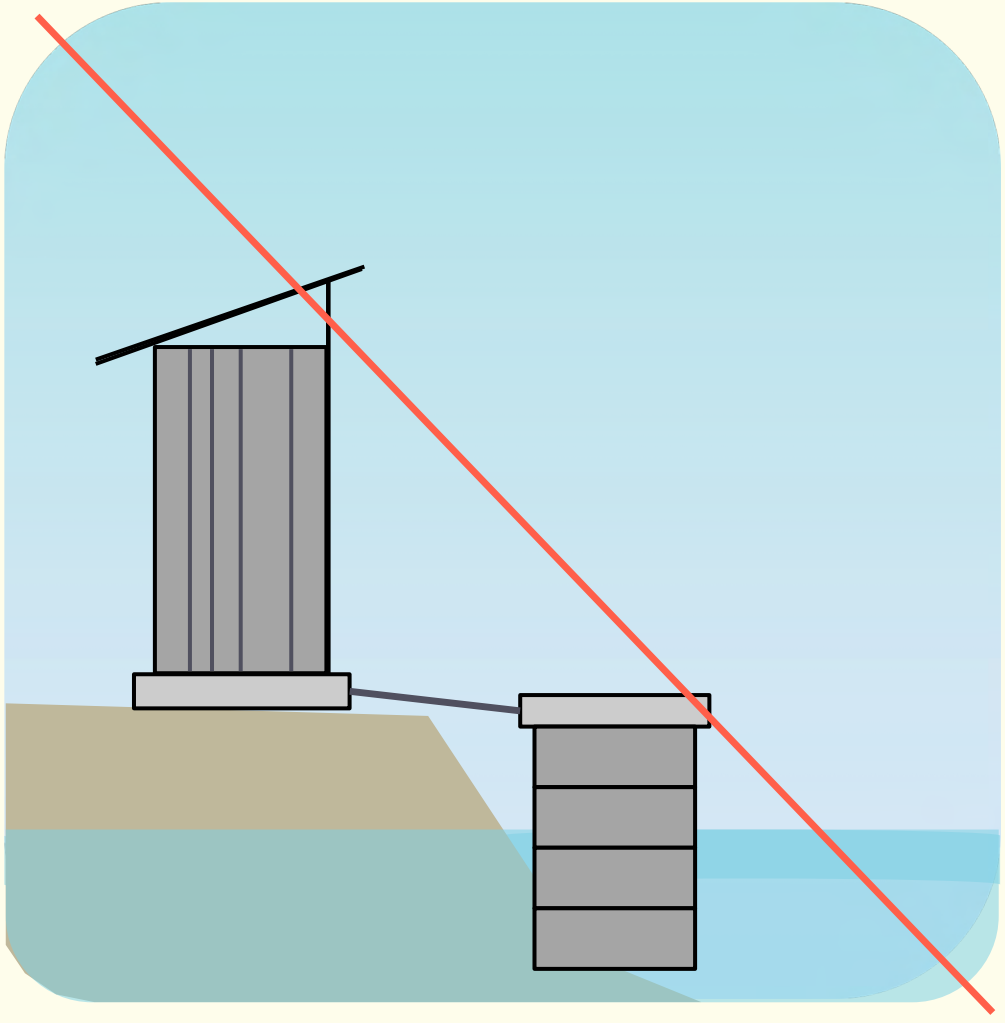
1	Top ring + cover sealed
2	Lower rings unsealed
3	Backfilled with sand
4	No more than 4 rings
5	30” - small families or 36” rings - large families





SUBSTRUCTURE

1	~~Top ring + cover sealed~~
2	~~Lower rings unsealed~~
3	~~Backfilled with sand~~
4	~~No more than 4 rings~~
5	~~30” - small families~~ ~~or 36” rings - large families~~

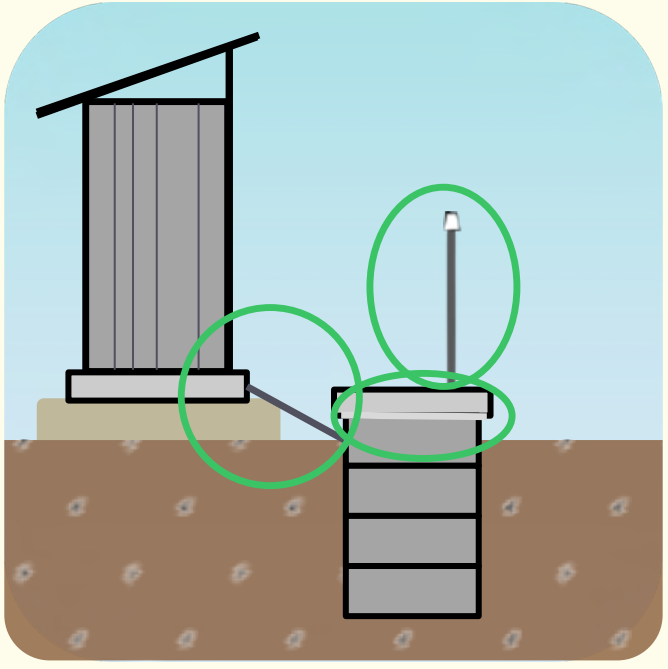


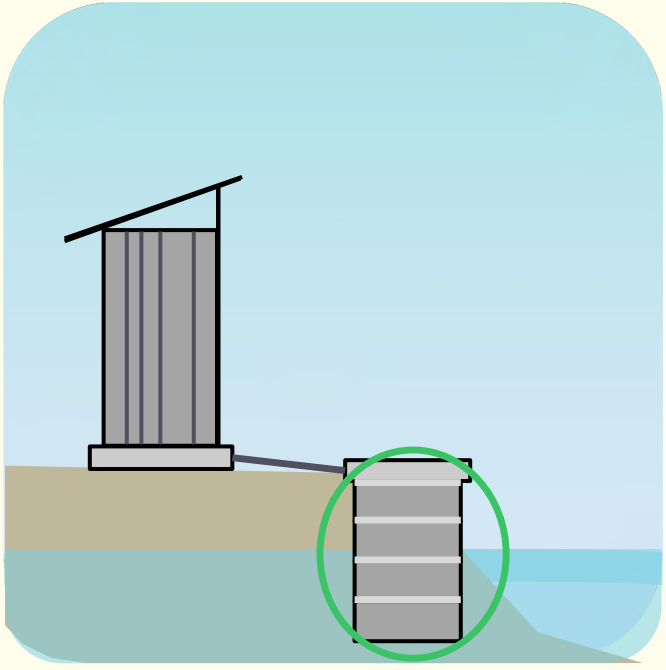
Substructure - Offset

6	Is the layout on the recommended layout list for an upgrade?
7	Do the pipes utilize a bend as a diversion valve?
8	Is the entry of the pipe into the pit at the top for easy pit switching?
9	Is the pipe sloped into the pits?
10	Does the pit have a gas pipe?

SUBSTRUCTURE - OFFSET

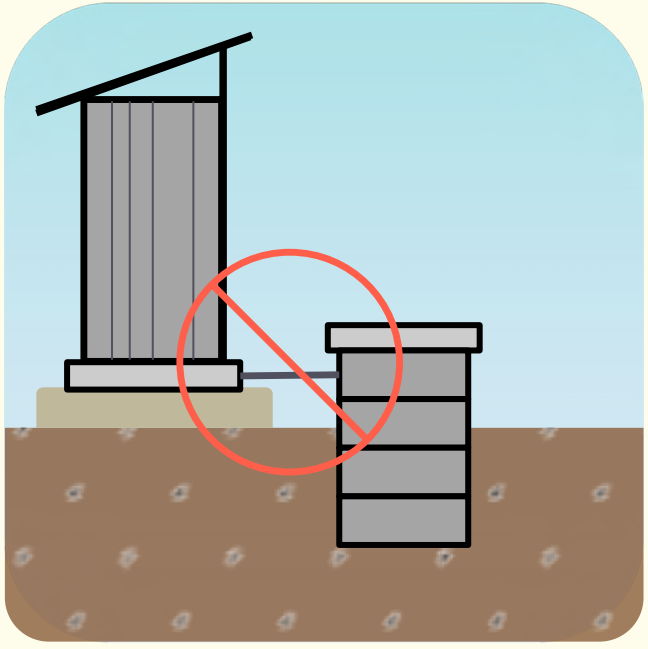
1	Appropriate layout
2	Using elbow bend
3	Quality hole into pit
4	Sloped pipe
5	Gas pipe 6’ +

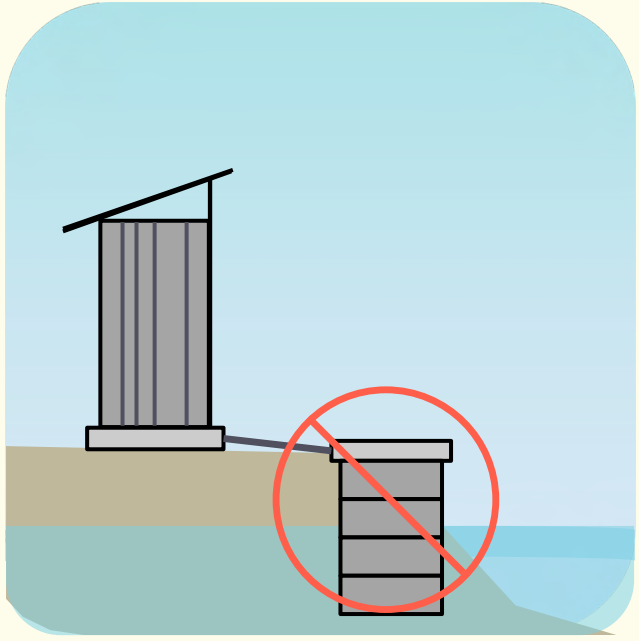




SUBSTRUCTURE - OFFSET

1	~~Appropriate layout~~
2	~~Using bend~~
3	~~Quality hole into pit~~
4	~~Sloped pipe~~
5	~~Gas pipe 6’ +~~





Maintenance

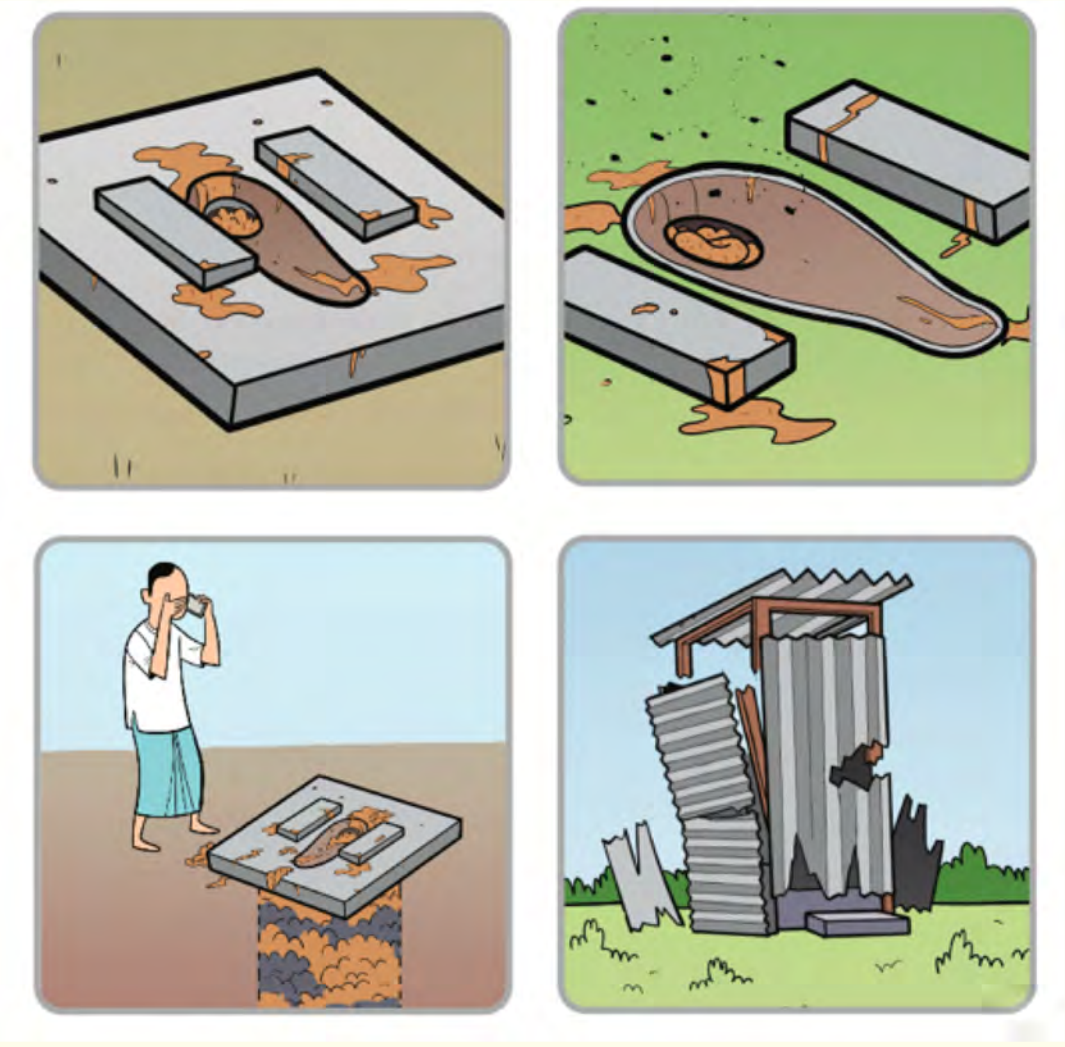
1	Does the latrine have a bodna?
2	Is there flushing water available nearby?
3	Does the latrine smell?
4	Is the latrine being swept at appropriate times? (dry season, yearly?)
5	Is the pan/slab free from feces?
6	Is the pan/slab free from flies and bugs?
7	Is the shelter complete and stable?
8	Is the roof complete and stable?
9	Is the waterseal in tact and functioning?
10	Is the slab complete and stable?
11	Is the pit complete and stable?
12	Is the pit free from leaking sludge?
13	Does the latrine have soap?
14	Does the latrine have a light?
15	Are sandals available for all members of the household?

MAINTENANCE AND USE

1	No Smell
2	Functional waterseal
3	No feces visible on slab
4	No flies or bugs visible
5	No leaking sludge
6	Weekly cleaning and yearly sweeping
7	Flushing/handwashing water accessible
8	Bodna
9	Soap and Soap Case
10	Light
11	Sandals
12	Brush
13	Complete and stable shelter/roof
14	Complete and stable slab
15	Complete and stable pit

MAINTENANCE AND USE

1	~~No Smell~~
2	~~Functional waterseal~~
3	~~No feces visible on slab~~
4	~~No flies, bugs visible~~
5	~~No leaking sludge~~
6	~~Sweeping yearly~~
7	~~Flushing/handwashing water accessible~~
8	~~Bodna~~
9	~~Soap and Soap Case~~
10	~~Light~~
11	~~Sandals~~
12	~~Complete and stable shelter~~
13	~~Complete and stable roof~~
14	~~Complete and stable slab~~
15	~~Complete and stable pit~~



Section 3
Install Guidelines

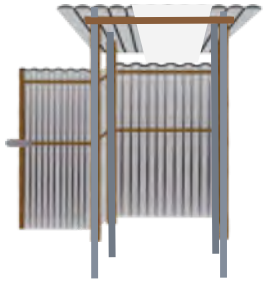
BASIC

1

Shelter A
Slab A
Pit A

BASIC+

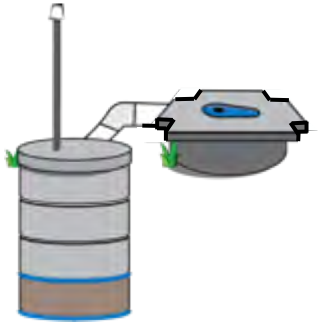
2



Shelter B
Slab B
Pit B

OFFSET

3



Shelter A
Slab C
Pit B

OFFSET+

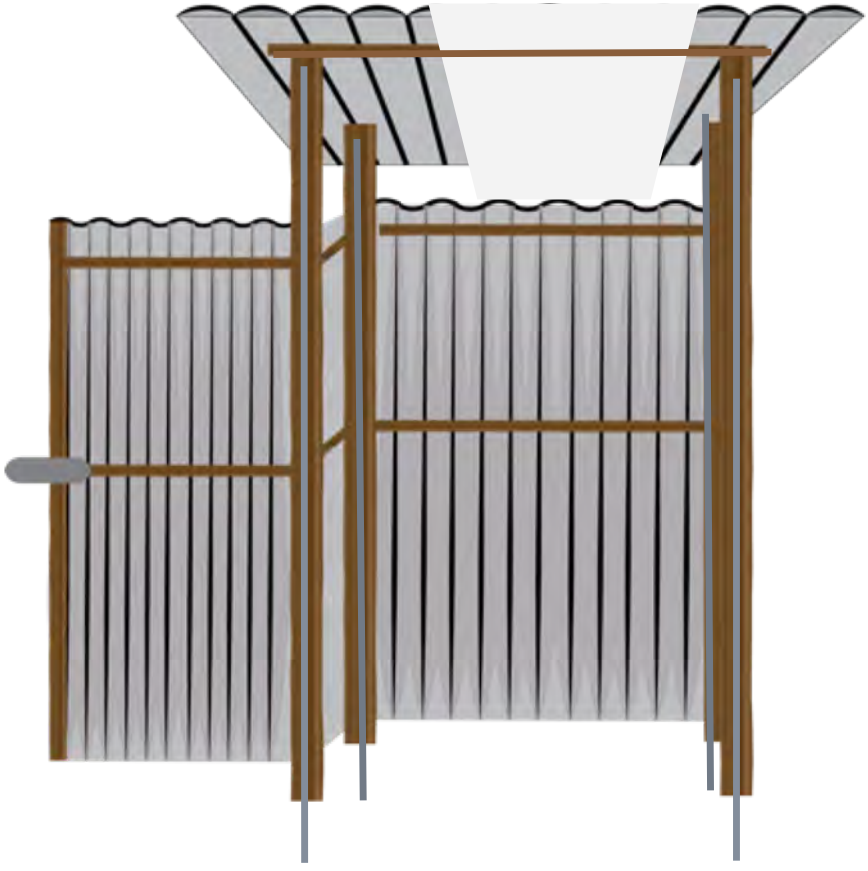
4

Shelter B
Slab C
Pit B

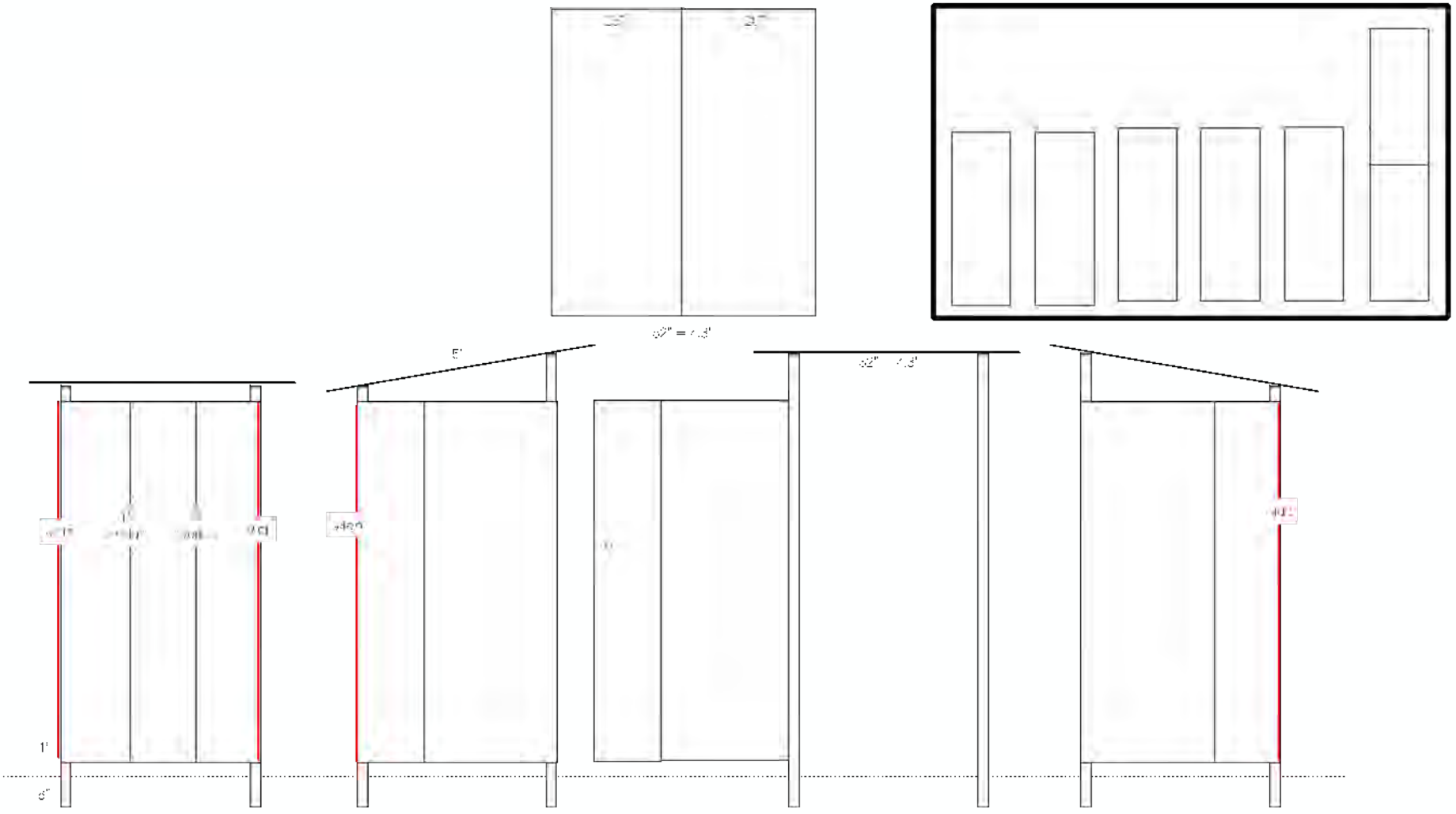
Shelters

Shelter Type A

Shelter Type B



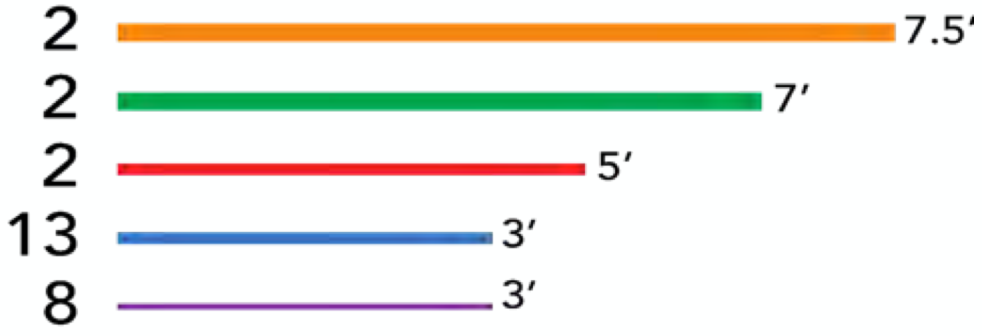
Shelter A

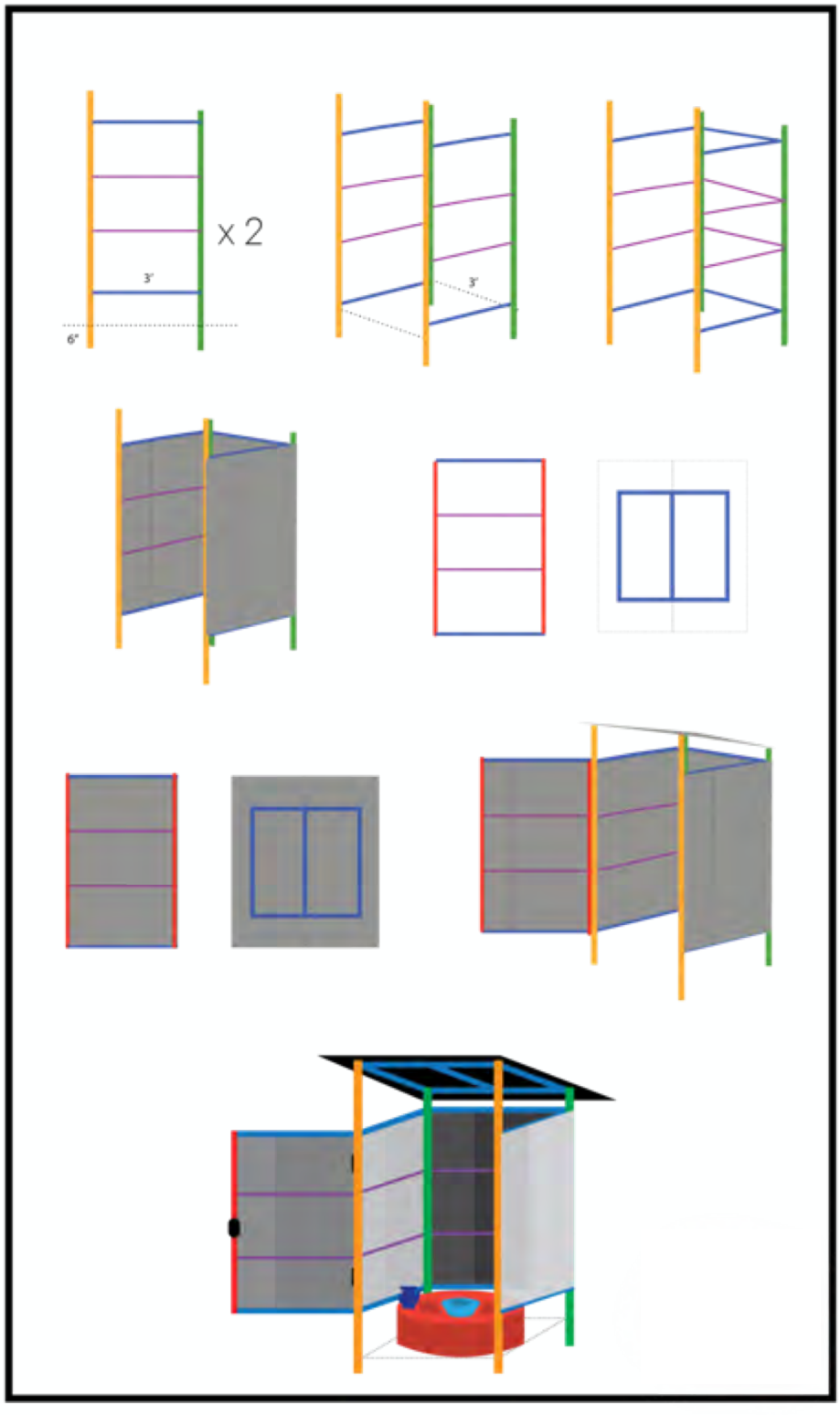


Tools

Handsaw	
Measuring Tape	
Hammer	
Level	
Blade/Knife	

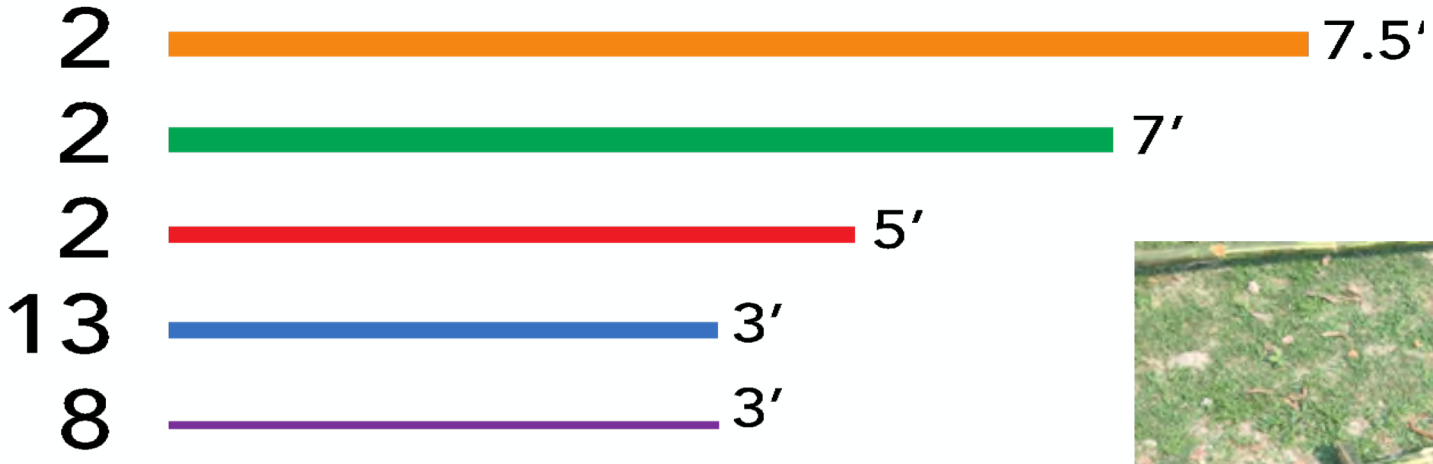
Materials – Main Materials

Wood/bamboo posts	
Tin 6 x 27″ x 6′ 1 x 27″ x 10′	


x 2
3'
6"
3'

1

Cut all pieces of wood/bamboo and tin (see tin cutting diagrams)



Coat underground components with a bug repellent

Rip the tin like fabric –make a small cut at 5'

2

Install 4 corner poles with 6” of the posts under the ground

High poles at the front, short poles at the back

3

Install 3 crossbar skeleton pieces on the sides and back and nail together securely

Crossbars on the outside of the posts, but as tight to the frame as possible

Install extra support poles on the sides for homes with elderly residents

5

Layout the door skeleton, nail together and check to see it fits on the frame

Attach tin to the door frame with nails and washers

4

Wrap tin around the shelter piece by piece. Secure with nails and washers

Keep overlap to a minimum (no more than 2”)

Washers on the outside of the tin

6

Layout the roof skeleton, nail together and check to see it fits on frame

8

Attach tin to the roof frame with nails and washers

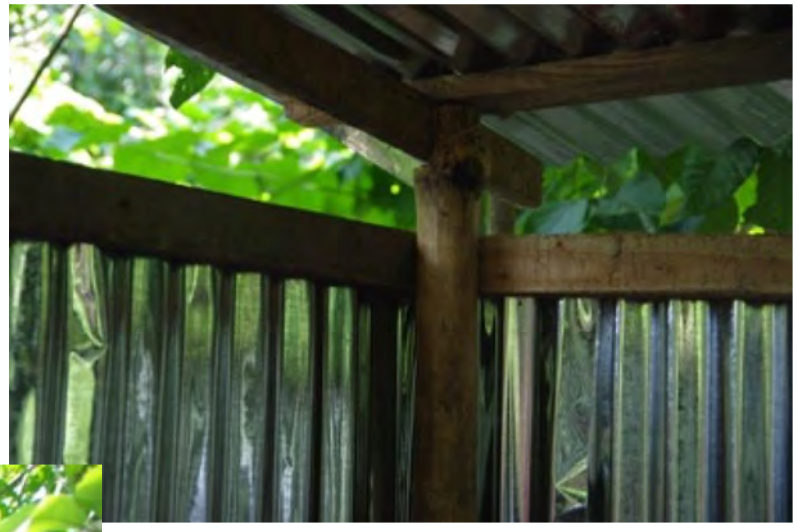
9

Attach door to the frame with hinges

Hinge can be a long strip of rubber, small rubber pieces or

10

Attach roof to the frame with nails and washers



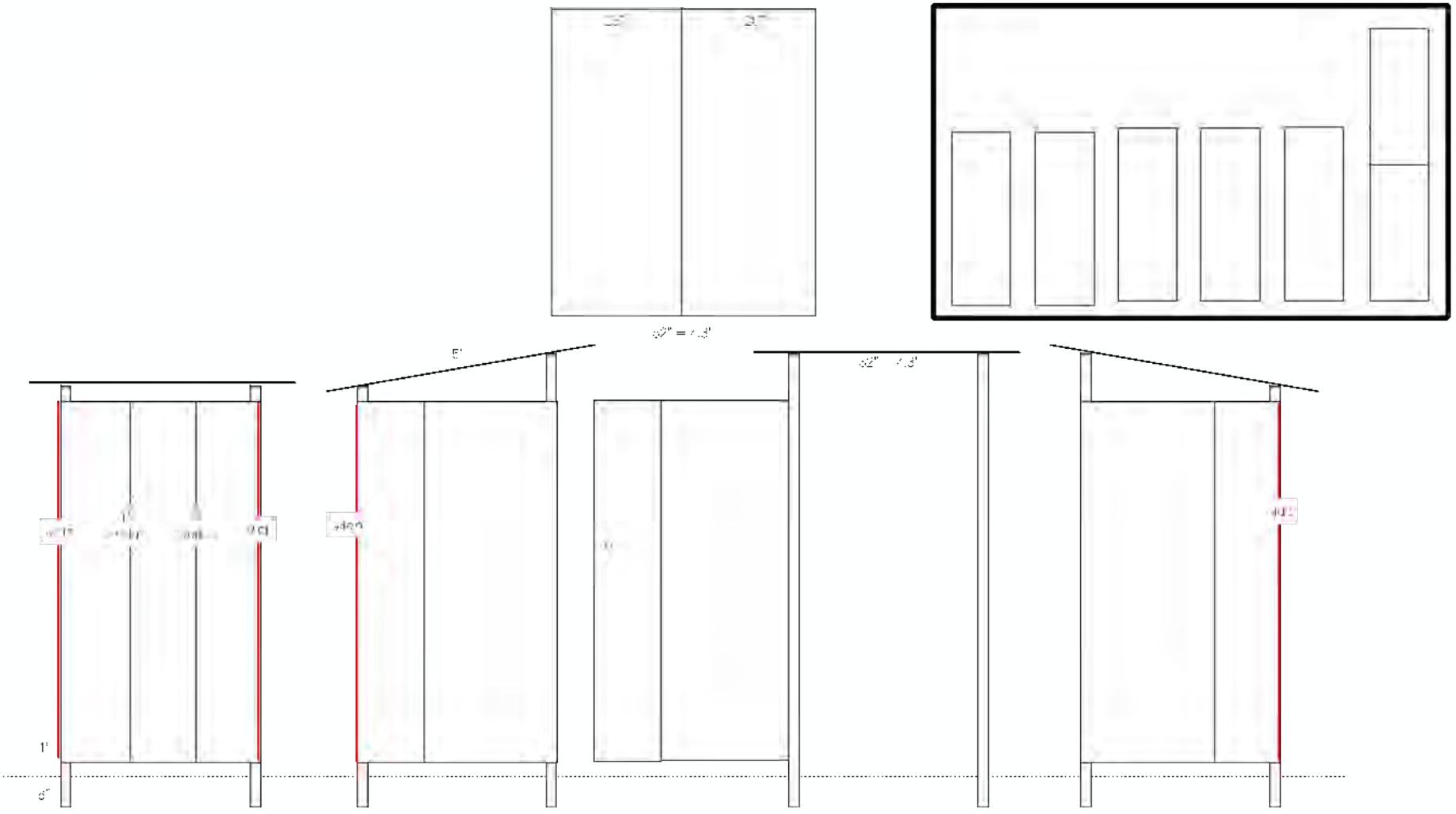
Attach chain

to the door

and secure the

lock

Shelter B

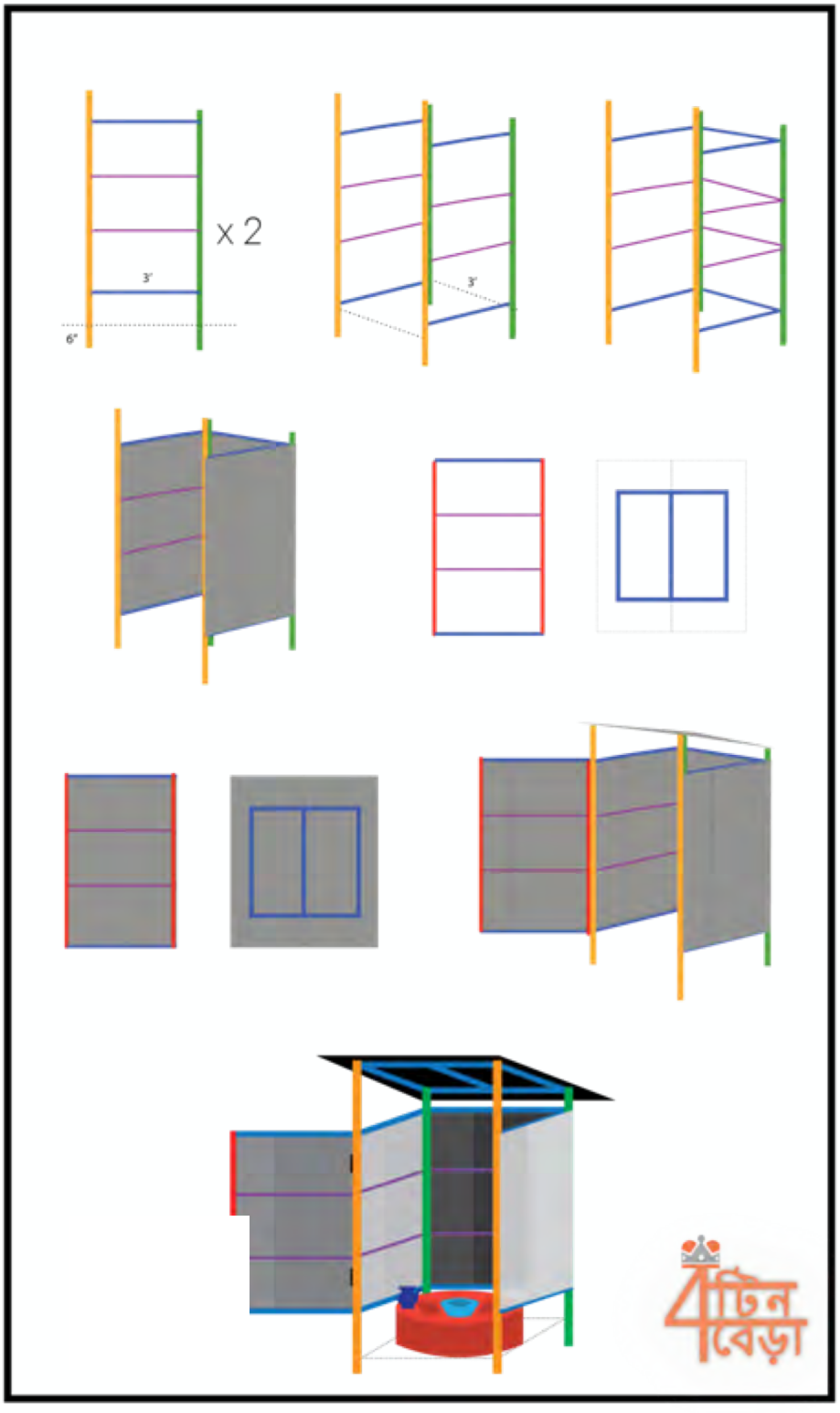


Tools

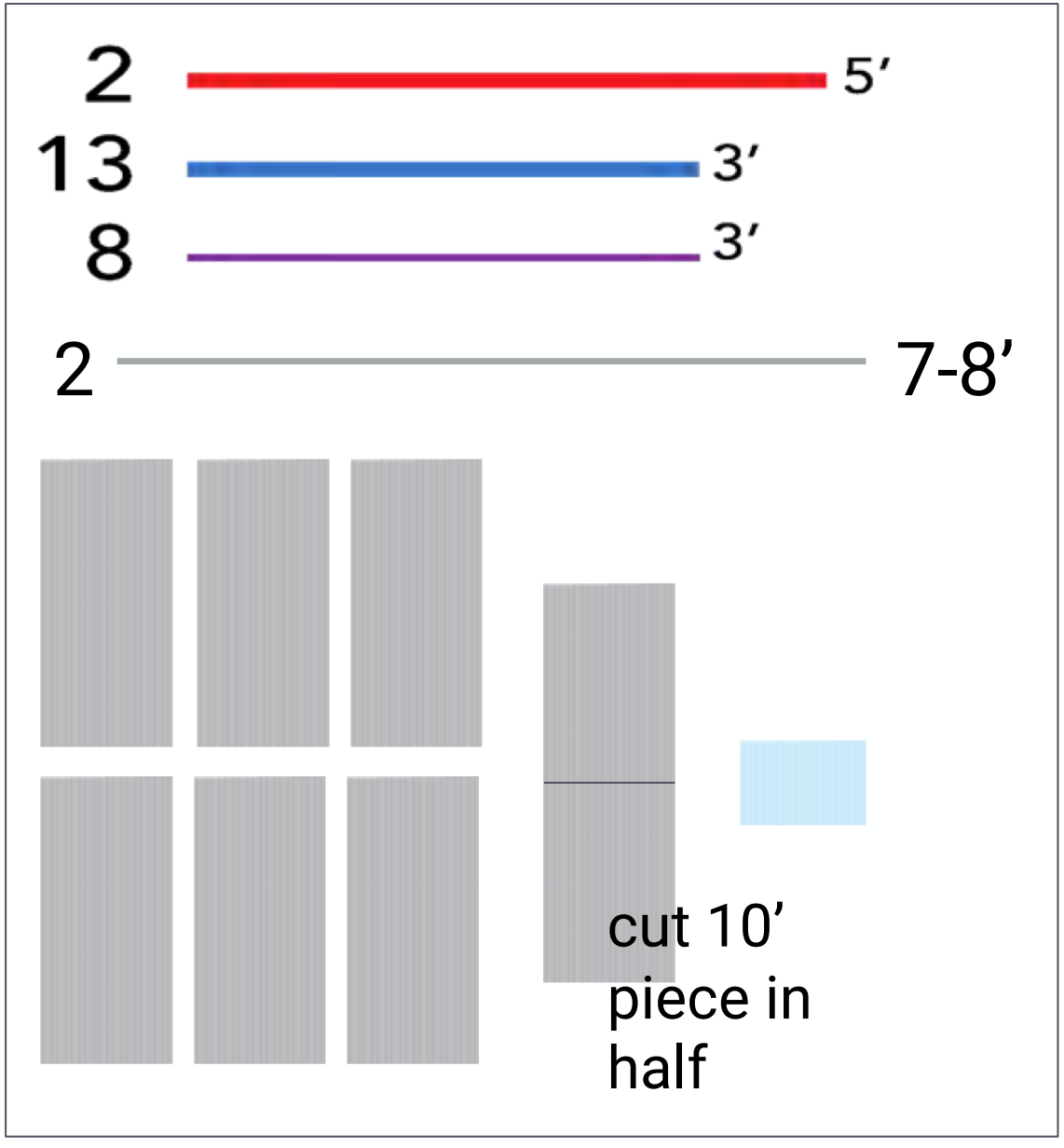
Handsaw	
Measuring Tape	
Hammer	
Level	
Blade/Knife	

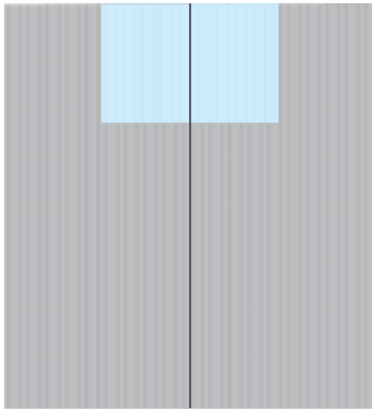
Materials – Main Materials

Wood/bamboo posts	
Concrete pillars	
Tin 6 x 27″ x 6′ 1 x 27″ x 10′	
Transparent coregated plastic 1 x 27″ x 1.5′	


x 2
3'
6"
3'

1 Cut all pieces of wood/bamboo and tin





Bring two halves together for roof.

Cut out space for transparent piece.

2

Install 4 corner poles with 6” of the posts under the ground

3

Install 3 crossbar skeleton pieces on the sides and back and nail together securely

Crossbars on the outside of the posts, but as tight to the frame as possible

Install extra support poles on the sides for homes with elderly residents

4

Wrap tin around the shelter piece by piece. Secure with nails and washers

Keep overlap to a minimum (no more than 2”)

Washers on the outside of the tin

5

Layout the door skeleton, nail together and check to see it fits on the frame

Attach tin to the door frame with nails and washers

6

Layout the roof skeleton, nail together and check to see it fits on frame

8

Attach tin to the roof frame with nails and washers

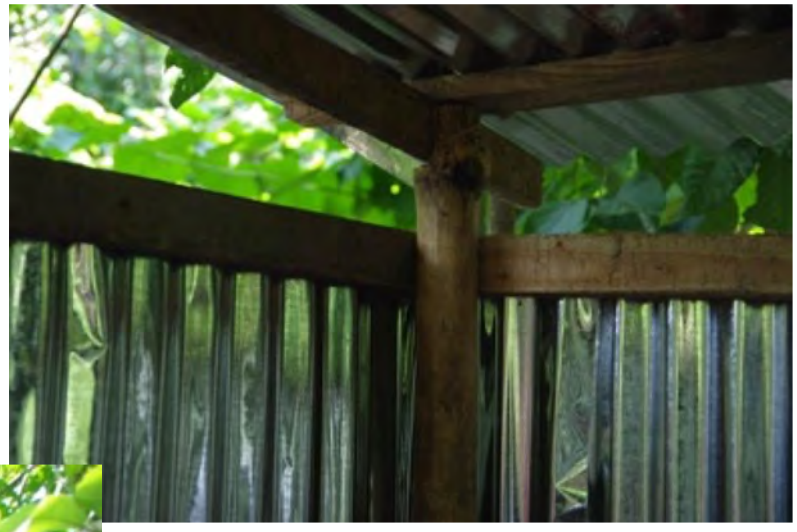
9

Attach door to the frame with hinges

Hinge can be a long strip of rubber, small rubber pieces or

10

Attach roof to the frame with nails and washers

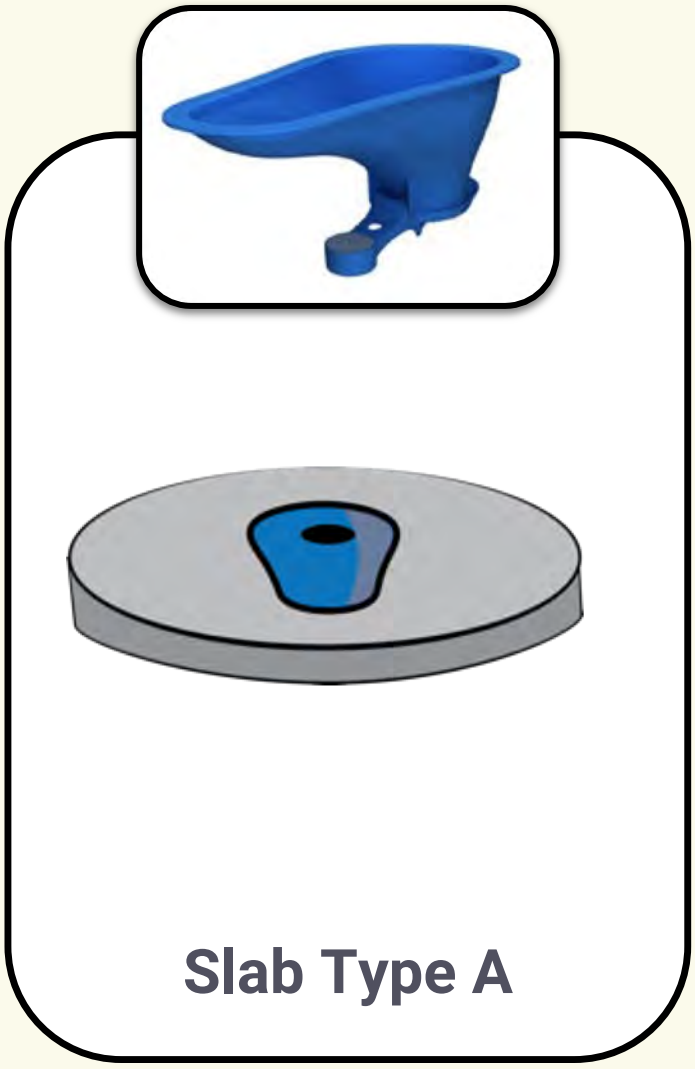


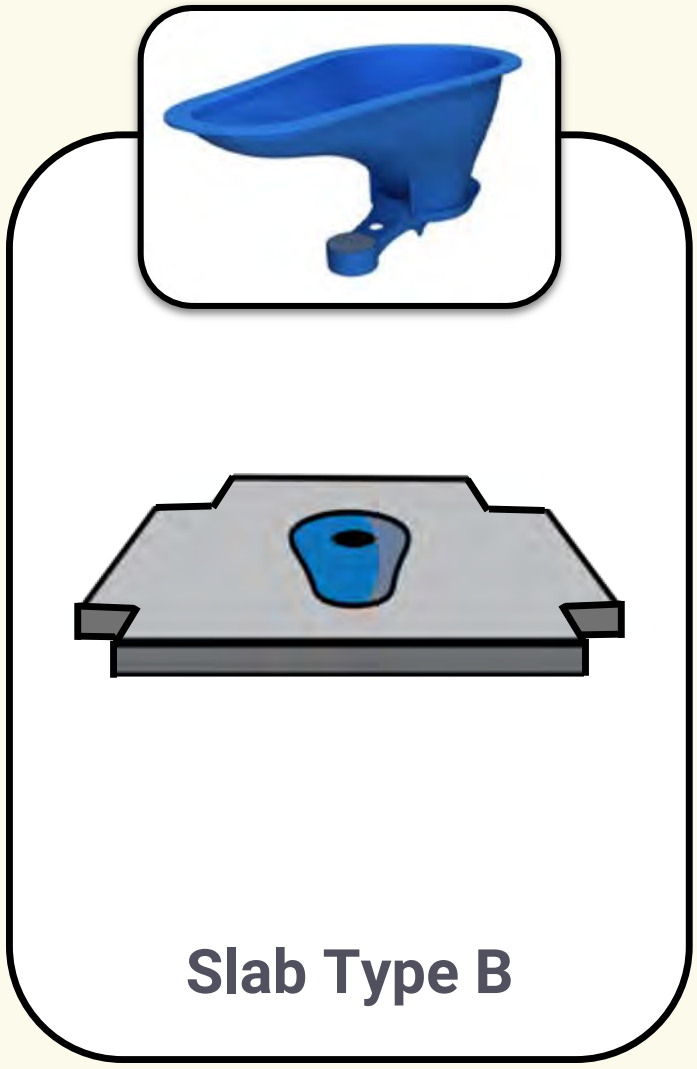
Note this photo does not have concrete pillars or transparent tin.

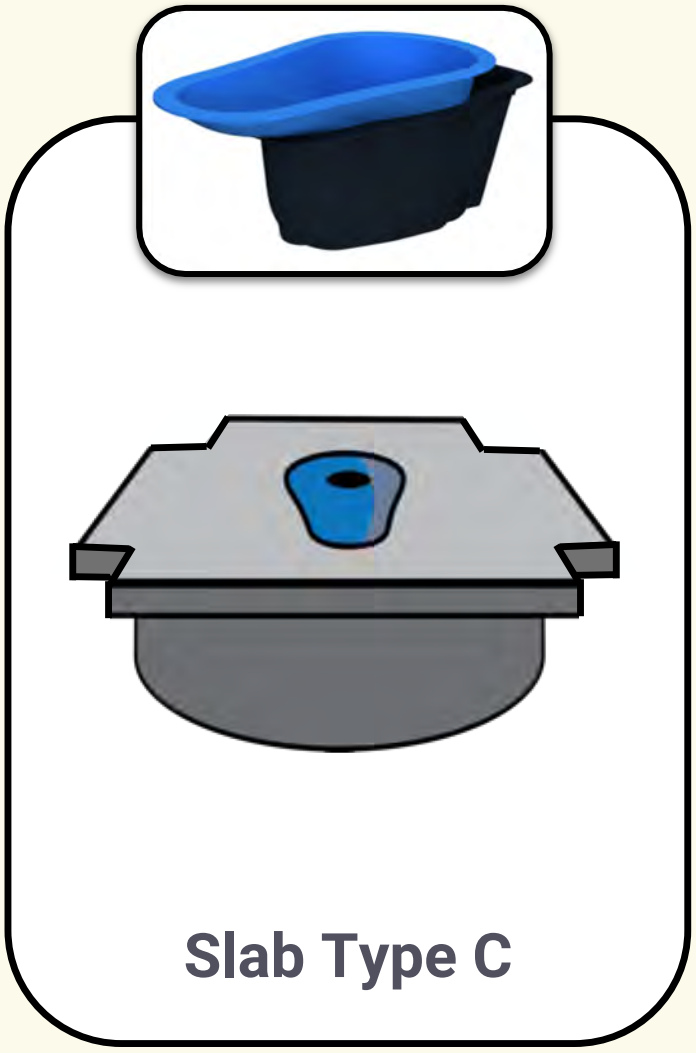
Attach chain to the door and secure the lock

Note this photo does not have concrete pillars or transparent tin.

Slabs

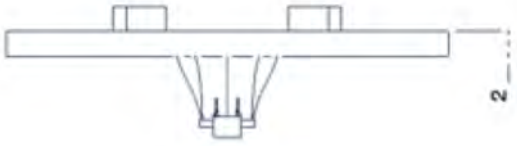

Slab Type A


Slab Type B

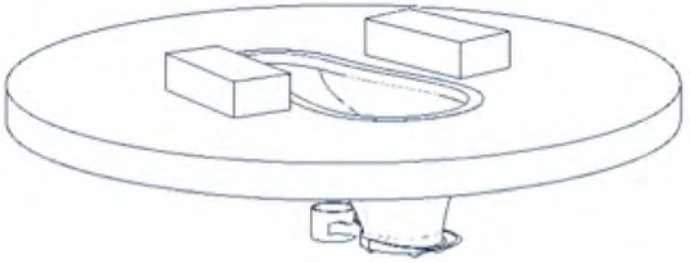

Slab Type C

Slab A

Front view
Scale: 1:3



Bottom view
Scale: 1:3



Isometric view
Scale: 1:2

Front view
Scale: 1:2

Bottom view
Scale: 1:2

Left view
Scale: 1:2

Isometric view
Scale: 1:2

Prepare Slab
Step 1

Set the SaTo Pan on the ground leaving 2” clearance

Maintain inward slope towards the pan

Keep ratio at 1:2:3 – cement: sand:brickchips

Prepare Slab
Step 2

Lay the plastic foil on the ground around the SaTo Pan, set the steel/wooden mold around the pan and pour the concrete mixture in the mold

Apply rebar wire

to increase

strength

Prepare Slab
Step 3

Wait for 2 hours and create 2 symmetric ‘foot rests’ on the slab on the sides of the pan

Prepare Slab
Step 4

Pour some concrete mixture in the pan trap door cup

Fill only to the

inner rim only

Prepare Slab
Step 5

Keep the slab for 7 days for maximum compressive strength

Prepare Slab
Step 6

Snap the trap door onto the SaTo Pan

Do not over flex the snap holder or it may break

Slab B

Prepare Slab
Step 1

Set the SaTo Pan on the ground leaving 2” clearance

Maintain inward slope towards the pan

Keep ratio at 1:2:3 – cement: sand:brickchips

Prepare Slab
Step 2

Lay the plastic foil on the ground around the SaTo Pan, set the steel/wooden mold around the pan and pour the concrete mixture in the mold

Apply rebar wire

to increase

strength

Prepare Slab
Step 3

Wait for 2 hours and create 2 symmetric ‘foot rests’ on the slab on the sides of the pan

Prepare Slab
Step 4

Pour some concrete mixture in the pan trap door cup

Fill only to the

inner rim only

Prepare Slab
Step 5

Keep the slab for 7 days for maximum compressive strength

Prepare Slab
Step 6

Snap the trap door onto the SaTo Pan

Do not over flex the snap holder or it may break

Slab C

Step-1

Use solvent cement on the flange of the collection box where the SaTo Pan fits on the collection box.

Step-2

Set the SaTo on top of the collection box so that the top of pan maintain ground level balance.

Use solvent cement in the connecting part of SaTo and collection box after setting the SaTo pan on the collection box.

Step-3

After putting solvent cement in the gap or touch points between collection box and SaTo pan, keep the those in open space for certain time so that the glue can be dry to make the bond stronger. The open space in the front side of the collection box can be covered with light cardboard or with plastic paper.

Step-4

Matching with the midstructure ring the slab can be 30” or 36” in circular or square type. At first select a clean level ground and lay plastic foil on the ground. Set the collection box with pan in the middle of the foil and and set the wooden/steel/brick mould around.

Step-5

After that the concrete mixture will be poured inside the mould. Ratior of mixture should be Cement:Sand:Brick Chips 1;2:3 or 1:2:4. For maximizing compressive strength use MS wire as reber inside the casting.

Step-6

The collection box with pan should be placed in the middle and MS wire should be inside the concrete mixture poured inside the mould. The thickness of the slab should cover the flange of the collection box at least half an inch inside of the concrete.

Step-7

The mould can be separated after 15-20 minutes of pouring the concrete mixture. Keep the slab in open space and do curing for 7 days for maximum compressive strength.

SATO GENERATION 1 - INSTALLATION GUIDE

1 Fill the cup of Flap Door with sufficient cement paste

2 Allow it to dry

3 Connect Flap Door with pan

4 Dig according to the size of collection box

5 Put collection box inside the dig

6 Connect the pipe with collection box

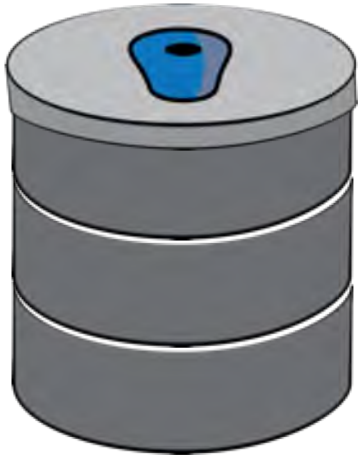
7 Close flap

8 Attach pan

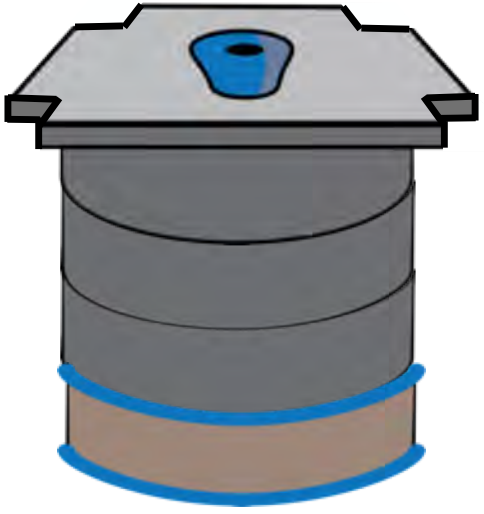
9 Construct concrete flooring

10 Spread the mixture of sand and cement paste

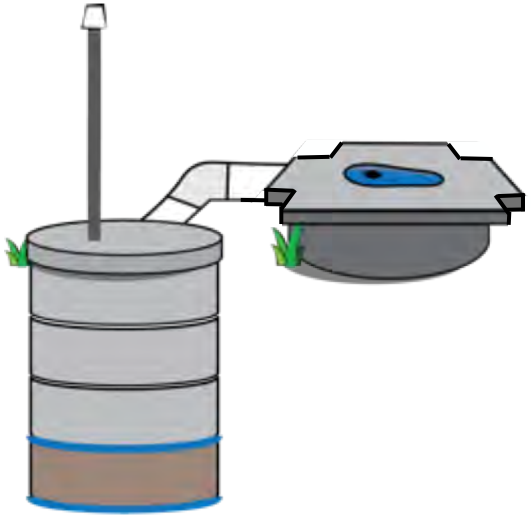
Pits



Pit Type A

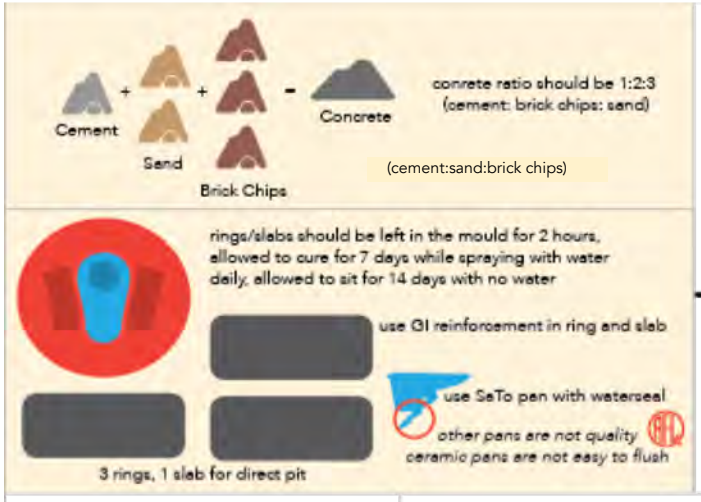


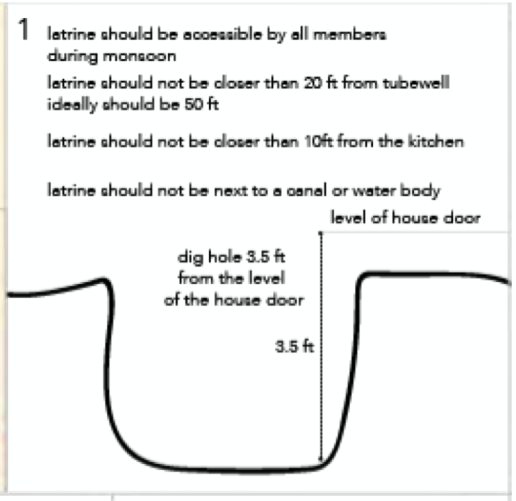
Pit Type B

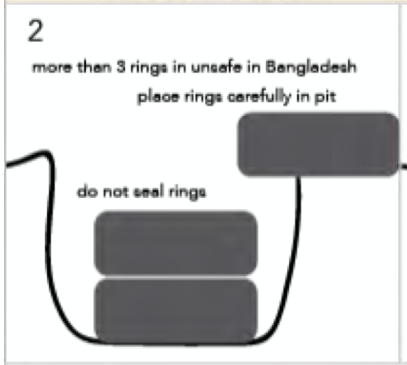


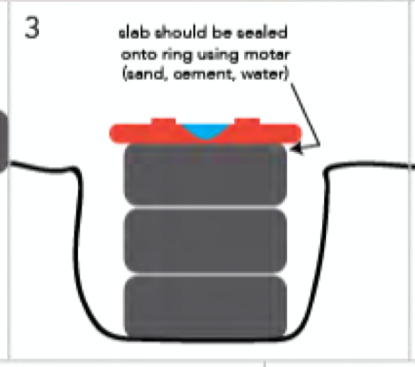
Pit Type C

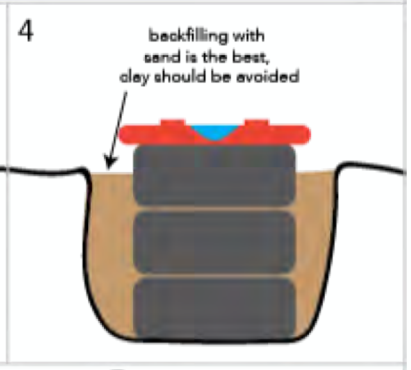
Pit A

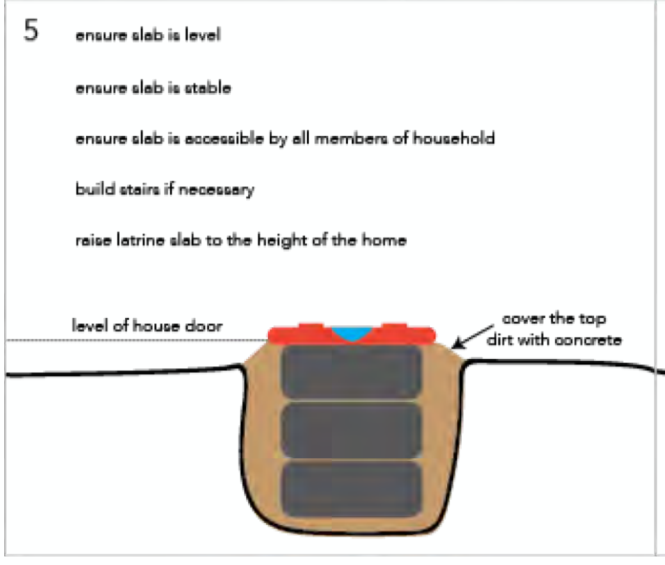

Cement
Sand
Brick Chips
Concrete
concrete ratio should be 1:2:3
(cement: brick chips: sand)
(cement:sand:brick chips)
rings/slabs should be left in the mould for 2 hours, allowed to cure for 7 days while spraying with water daily, allowed to sit for 14 days with no water
use GI reinforcement in ring and slab
use SaTo pan with waterseal
other pans are not quality
ceramic pans are not easy to flush
3 rings, 1 slab for direct pit

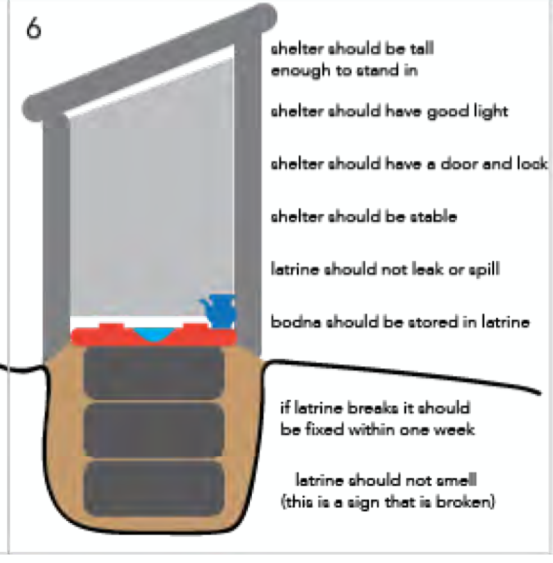

1
latrine should be accessible by all members during monsoon
latrine should not be closer than 20 ft from tubewell ideally should be 50 ft
latrine should not be closer than 10ft from the kitchen
latrine should not be next to a canal or water body
level of house door
dig hole 3.5 ft from the level of the house door
3.5 ft

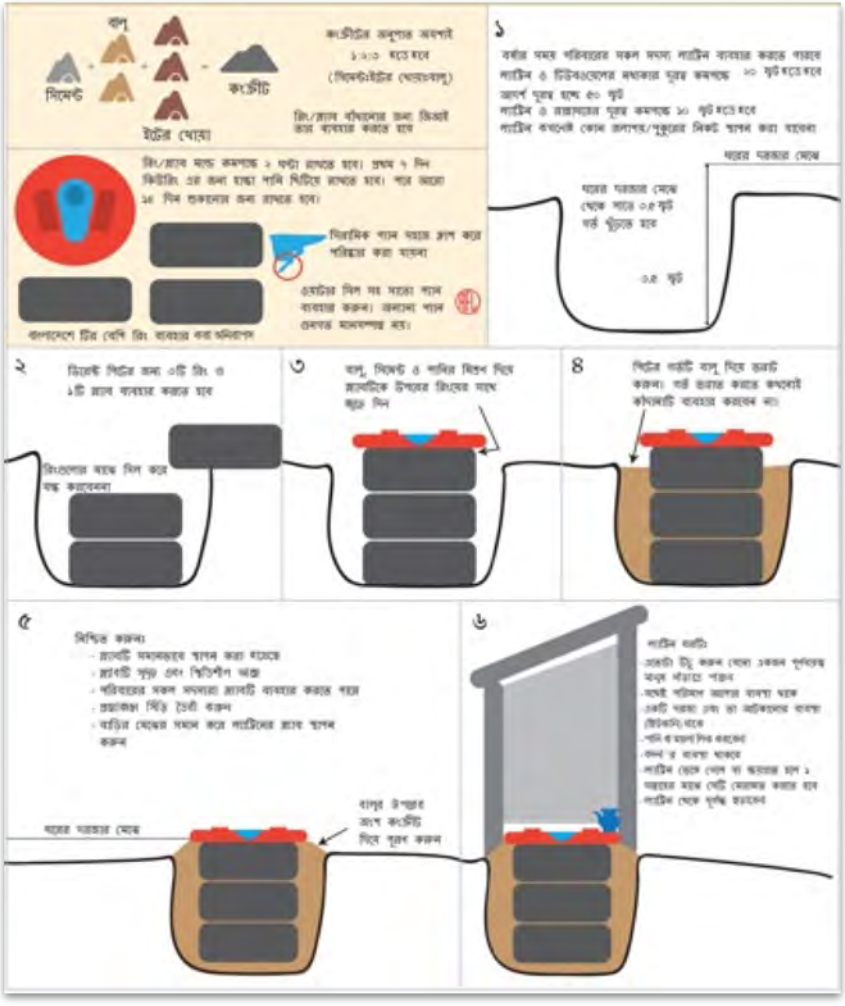

2
more than 3 rings in unsafe in Bangladesh
place rings carefully in pit
do not seal rings


3
slab should be sealed onto ring using motar (sand, cement, water)


4
backfilling with sand is the best, clay should be avoided


5
ensure slab is level
ensure slab is stable
ensure slab is accessible by all members of household
build stairs if necessary
raise latrine slab to the height of the home
level of house door
cover the top dirt with concrete


6
shelter should be tall enough to stand in
shelter should have good light
shelter should have a door and lock
shelter should be stable
latrine should not leak or spill
bodna should be stored in latrine
if latrine breaks it should be fixed within one week
latrine should not smell (this is a sign that is broken)



Prepare Pit
Step 1

Dig 3ft deep pit

Ring should be able to sit 6” above the surface of the ground

Prepare Pit
Step 2

Places 3 rings in pit

Sand should be used as a packing material around the pits

Installation
Step 3

Place SaTo Slab onto rings

Seal the slab to the ring using plaster (cement and water)

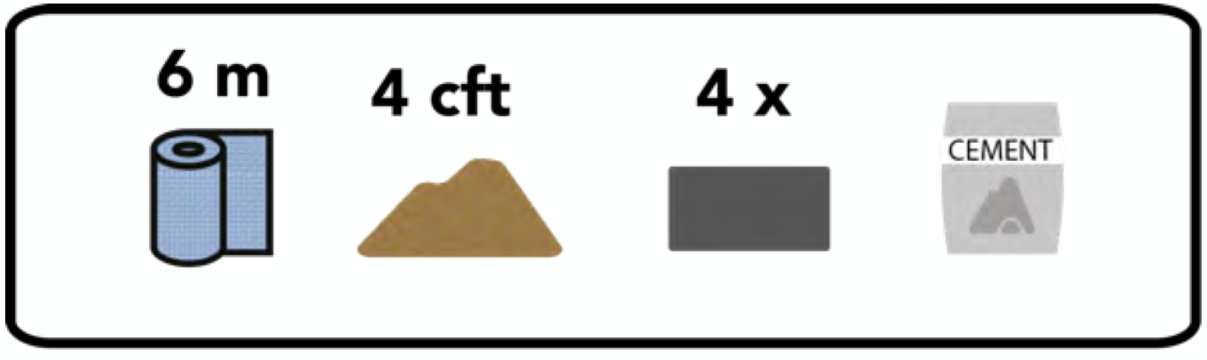
Ensure slab is level

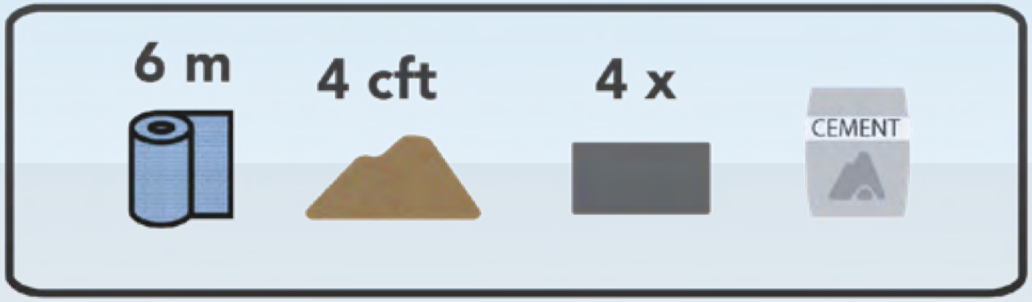
Create a level mud platform with a step

Pit B

Materials – Installation

4 latrine rings **30" Families less than 6 people** **36" Families more than 6 people**
4 cft Sand
1 bag Cement
6 m2 fingerling mesh **6 x 1m2 lengths**





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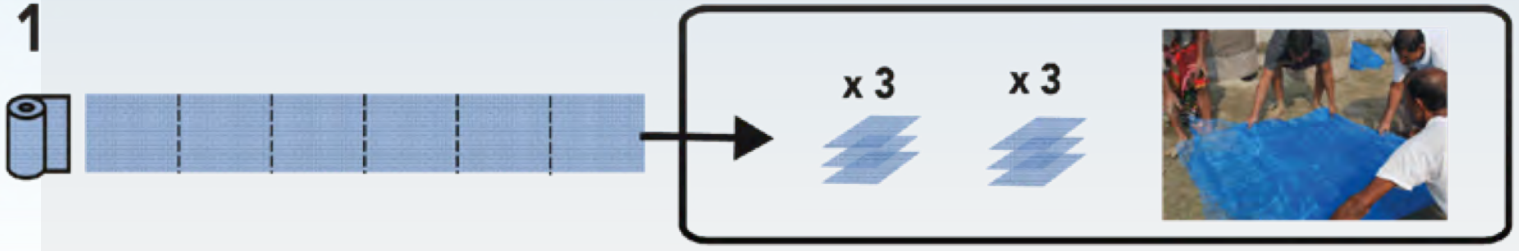


1

Cut mesh into 6 pieces

2

Dig Pit

3

Lay first layer of mesh and the bottom ring into pit

4

Fill bottom ring with sand

- if high quality brick/gravel is **not** available just use sand
- if high quality brick/gravel is available use 3” of brick chip at the top of the ring on top of sand

5

Add second layer of mesh

6

Fill sides of pit with sand

7

Add three more rings to top of pit

8

Seal rings to create a tank.

Backfill the pit with sand.

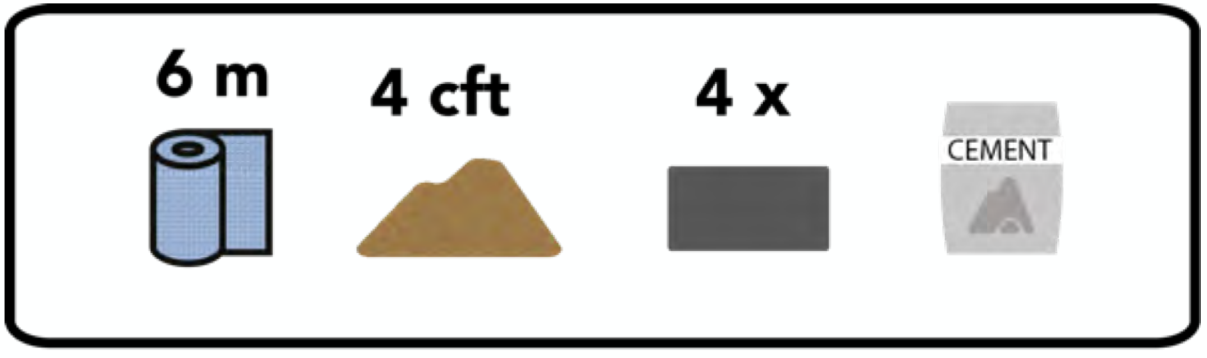
Seal the top ring to a cover and add gas pipe.

Pit C

Materials – Installation

5 latrine rings **30" Families less than 6 people** **36" Families more than 6 people**
4 cft Sand
1 bag Cement
6 m2 fingerling mesh **6 x 1m2 lengths**
Piping 4" with appropriate bends

For offset version chisel a hole in the top of the ring like this for the pipes.



0

Prepare layout of pit and cut piping in apporpirate lengths.

60° elbow

Straight

1

Cut mesh into 6 pieces

2

Dig Pit

3

Lay first layer of mesh and the bottom ring into pit

4

Fill bottom ring with sand

- **If high quality brick/gravel is not available** just use sand
- **If** high quality brick/gravel is available use 3” of brick chip at the top of the ring on top of sand

5

Add second layer of mesh

6

Fill sides of pit with sand

7

Add three more rings to top of pit

Seal rings with cement and water.

9

Attach and seal relevant piping.

8

Seal rings to create a tank.

Backfill the pit with sand.

Seal the top ring to a cover and add gas pipe.