

Annexure 4 – Excreta Disposal Guidelines¹

¹ To be read with Disaster Response Approach Chapter of ‘Pakistan Approach to Total Sanitation (PATS)’ document of Ministry of Climate Change, Government of Pakistan

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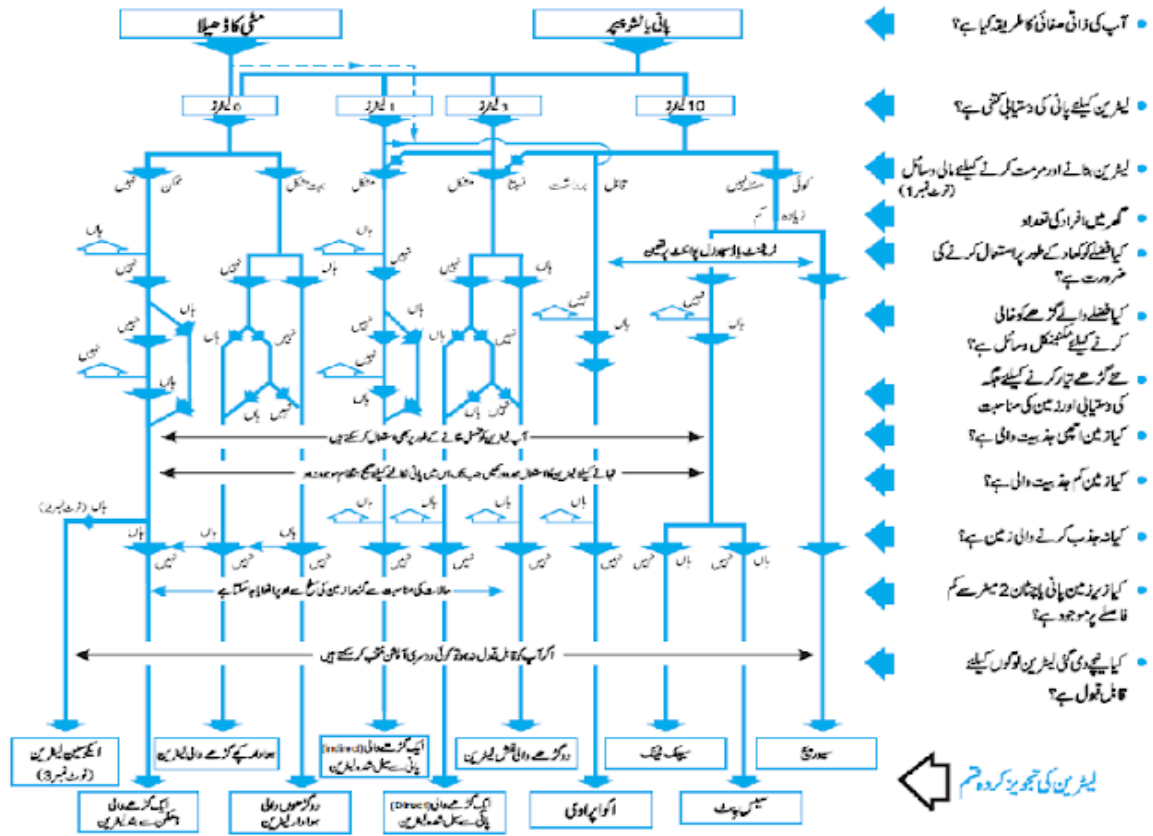
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1. Sanitation Options

Safe containment of human excreta creates the first barrier to excreta-related disease, helping to reduce disease transmission through direct and indirect routes. There are different types of latrines/sanitation facilities that can be used during disaster response. Please note that the selection of the specific type of latrine is dependent upon the following main considerations based on the field assessment and one or few standards designs cannot be specified for use.

1. Geographical locations
2. Already in use latrines and its use
3. Water table positioning (in case of floods, this require due consideration)
4. Availability of material for latrines during in emergencies
5. Access for the persons with disability
6. Drainage system and availability of water for toilet use

Charts below are simplified adaptations of latrine selection guidelines from WASH in emergencies literature translated into local language. It is very important to note that identification of the latrine type is only one aspect which must be accompanied by meaningful engagement with, and participation by, the community. This includes vulnerable groups such as women, children, elderly, disabled, socially marginalized, etc. Community engagement is fundamental for ensuring equal access to and use of sanitation facilities, without which the full public health benefits of improved sanitation and hygiene services cannot be realized.



نوٹ 1: تمام کنڈیشنوں کو جاننا یا کیا کیا کیونکہ یہ ضروری ہے کہ پانی کی دستیابی برداشت سے متعلق ہے۔
 نوٹ 2: زیادہ سے زیادہ استعمال کریں یا لٹھلکا لٹھلکا ہونے پر نوٹ کریں۔
 نوٹ 3: یہ لیٹرین چھوٹے پیمانے پر کوئی بھی چیز کرنے کی رفتار میں بھی لگے کی غلب اور کھانسی کا برا ہے۔

Figure 1: Latrine Selection Guideline

Note: For more details, please refer to PATS latrine construction guidelines booklet of UNICEF and UN-Habitat²

نمبر نمبر	لیٹرین کی اقسام	زیرو زمین پانی کی سطح 10 فٹ	پچھلے پانی کے ذریعے سے 30 فٹ	پچھلی مٹی	چھری مٹی	ریٹی مٹی	پانی کی عدم دستیابی
1	ایسے ساؤہ گڑھے والی لٹرین (VIP) لیٹرین	X	X	✓	✓	X	✓
2	پانی سے نکلنا بند پانی گڑھے سے منسلک لیٹرین	X	X	X	✓	✓	X
3	پانی سے نکلنا بند پانی لائن سے منسلک لیٹرین	X	X	✓	✓	✓	X
4	اوپری سطح والی لیٹرین	✓	✓	✓	✓	✓	✓
5	ایکڑے والی لیٹرین (Eco-San)	✓	✓	✓	✓	✓	✓

² [Low cost sanitation for unicef.cdr \(unhabitat.org.pk\)](http://lowcostsanitationforunicef.cdr.unhabitat.org.pk)

WASH sector partners field staff can refer to following simplified table to understand some key excreta disposal options:

Table 1: Key Excreta Disposal Options

Key Excreta Disposal Options		
S. No.	Safe excreta disposal type	Application remarks
1	Demarcated defecation area (e.g. with sheeted-off segments)	First phase: the first two to three days when a huge number of people need immediate facilities
2	Trench latrines	First phase: up to two months
3	Direct/Offset Simple pit latrines	Plan from the start through to long-term use
4	Direct/Offset Simple pit Mound/raised latrines	Plan from the start through to long-term use in high-water table areas
5	Ventilated improved pit (VIP) latrines (Mound/raised if req)	Context-based for middle- to long-term response for both for low and high-water table areas
6	Offset Pour Flush Latrine with soakage pit	Context-based: in response to high water table and flood situations, right from the start or middle to long term
7	Pour Flush Latrine with Septic tank and soakage pit/connected with sewer	Middle- to long-term phase

Sanitation Technical Working Group recommended the following latrine types in different contexts of Pakistan flood emergency 2022

1. Direct/Offset Simple pit latrines
2. Direct/Offset Simple pit Mound/raised latrines
3. Ventilated improved pit (VIP) latrines (Mound/raised if required)
4. Offset Pour Flush Latrine with soakage pit
5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer

Estimated cost of floods 2022 Emergency Latrine: USD 70-120

Table 2: Recommended types of Latrines for flooded affected areas

Recommended types of Latrines for flooded affected areas				
Regions (Flooded Affected Areas)	Soil	Water Table	Recommended Latrine Types ³	Level

³ Pit is recommended to be brick lined with honeycombing

North KPK (Chitral, Upper Dir, Lower Dir, Swat)	Stable	Low	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 4. Offset Pour Flush Latrine with soakage pit 5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer 	Natural Ground Level
(Central KPK) Charsadda, Nowshera	Stable	Low	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 4. Offset Pour Flush Latrine with soakage pit 5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer 	Natural Ground Level
South KPK (Tank, DI Khan)	Stable	Medium	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 4. Offset Pour Flush Latrine with soakage pit 5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer 	Natural Ground Level
South Punjab (Rajanpur)	Semi stable	Medium to High	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 4. Offset Pour Flush Latrine with soakage pit 5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer 	Natural Ground Level
Sindh West	Unstable	Very High	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 	Raised, Earth Mound
Sindh East	Unstable	High	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 	Raised, Earth Mound

Balochistan West	Stable	Low	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 4. Offset Pour Flush Latrine with soakage pit 5. Pour Flush Latrine with Septic tanks and soakage pit/connected with sewer 	NGL
Balochistan East	Unstable	High	<ol style="list-style-type: none"> 1. Direct/Offset Simple pit latrines 2. Direct/Offset Simple pit Mound/raised latrines 3. Ventilated improved pit (VIP) latrines (Mound/raised if required) 	Raised, Earth Mound

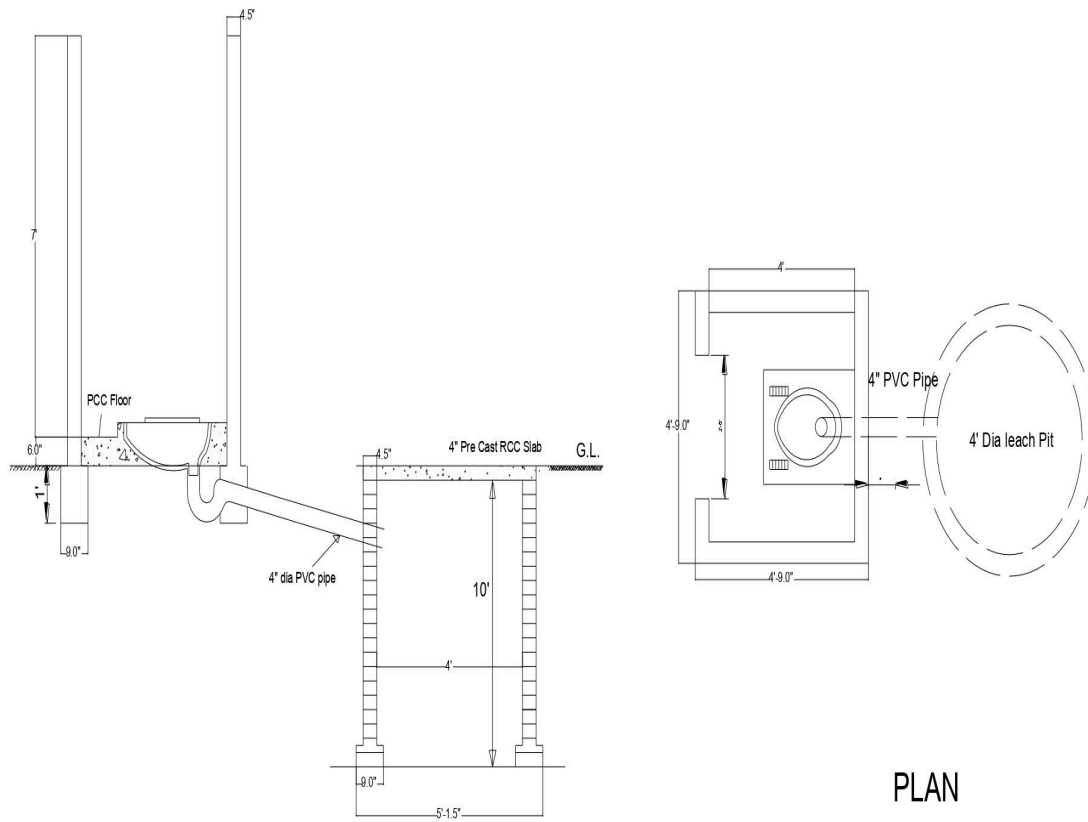
2. Types of Recommended Latrines

2.1 Simple Pit Latrines/VIP latrines

This type of latrine is a basic type of latrine. This latrine is constructed by digging a hole in the ground. To remove gases from the pit, there is no ventilation pipe provided in this type of latrine. . The gases emit from the pit through the squatting hole which can create bad smells in and around the latrine which are unpleasant for the user and can attack flies and spread disease⁴ . In the floods emergency 2022, design of latrines successful in 2010 floods response can be replicated as shown below. These designs can be then upgraded for long term used during early recovery and reconstruction phase as per drawings/sketches in these guidelines.



⁴ Low cost sanitation for unicef.cdr (unhabitat.org.pk)



Section Of Super Structure And Pit

Figure 2: Simple Pit Latrine

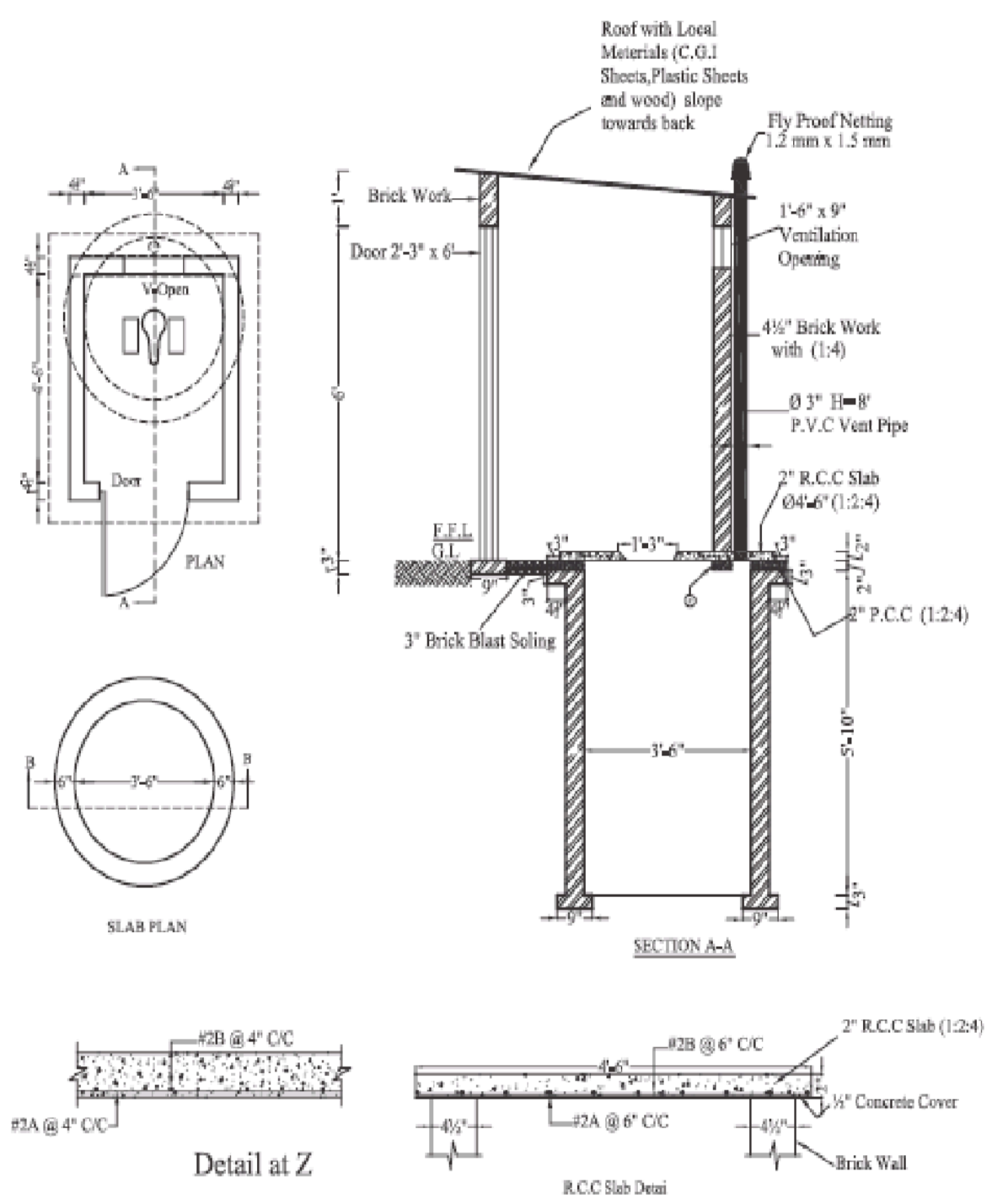


Figure 3: VIP Pit Latrine

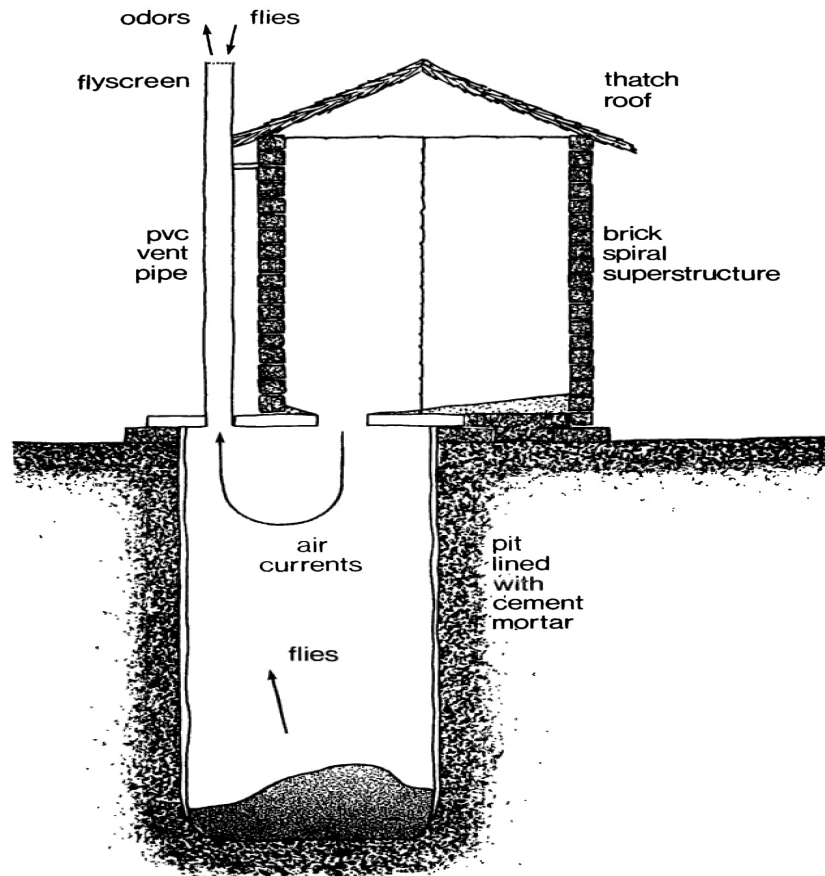


Figure 4: Schematic Diagram of ventilated improved pit latrine

The Ventilated Improved Pit (VIP) latrine has a number of key design features that distinguish it from the simple pit latrine specifically for controlling odor and insects and hence “improving” the user experience and public health benefits of the latrine. The main feature is a large diameter vent pipe (or flue) connected to the pit and extending above the roof line of the superstructure which is fitted with a fly screen (plastic or metal with aperture 1.2mm x 1.5mm). This pipe induces air movement through the squat hole into the pit and up the vent pipe. This is achieved by a number of key design features, including 1) extending the ventilation pipe atleast 500mm above the highest point of the roof to allow the wind passing over the pipe to effectively suck air out of the vent pipe and pit below; 2) painting the ventilation pipe a dark color to enhance thermal convection; 3) orientating the doorway and/or opening of the superstructure to face the prevailing wind; 4) ensure darkness/shade on the squat hole to ensure that newly emergent flies are not attracted to leave pit via squat hole but rather up the ventilation pipe following the air current and towards the vent pipe opening and fly screen. Addition design considerations⁵

Both the simple pit latrine and the VIP latrines can be designed with two pits. This helps keep the latrine in continuous use. Under this arrangement the pits are used in alternating order. Therefore, when one of the pits is filled it is closed off and not used while the second

⁵ Mara, D (1984) Design of Ventilated Improved Pit Latrines. Technical Note 13. United Nations Development Programme and World Bank. a <https://www.ircwash.org/sites/default/files/321.4-1989.pdf>

pit is being used. During the period of use of the second pit, the contents of the first pit undergo various chemical and biological processes breaking down the waste and destroying/deactivating the pathogens. This process takes a minimum of 1 year, and therefore it is critically important to size the pits accordingly, so there is sufficient residence time to allow for pathogen destruction. In all cases, safety precautions should be taken when emptying the pit contents (e.g., use of personal protective equipment), and waste should be treated as infectious.

Table 3: Sample BoQ for VIP Latrine

Sample BoQ for VIP Latrine			
No.	Items	Unit	Quantity
For the Pit			
1	Sand/ Fine Aggregate	cft	8
2	Bajri / crush/ Coarse Aggregate	cft	1
3	Bricks	No	350
4	Cement (50kg bag)	bag	1
5	Steel (2- sutar)	kg	5
For Latrine Slab			
1	Sand/ Fine Aggregate	cft	2
2	Bajri / Crush/ Coarse Aggregate	cft	3.5
3	Cement (50kg bag)	bag	1
4	Steel (2-sutar)/ #3 Bar	kg	5
5	3" dia Ventilation Pipe with fly screen/ mesh/ Cowel	rft	11
For Super Structure			
1	Wooden Poles 3" x 3" cross section and 8ft length - good quality and well-seasoned. To be used as vertical posts for corners	No.	4
2	Wooden Posts 1.5" x 1.5" cross section for door and bracing	No.	2
3	Wooden Poles 3" x 3" cross section and 4ft length	No.	14
4	Plain Galvanized Iron (PGI) Sheet - cut to size of 4' x 7' for sides - good quality, 28 gauge	No.	3
5	PGI Sheet - cut to size 4' x 6' - Good quality 28 gauge	No.	1

6	PGI Sheet - cut to size 4' x 4' for sides - Good quality 28 gauge	No.	1
7	Hold fast (kabza) 4" - Good quality	No.	3
8	Nails 5"	kg	2
9	Cap washer - Good quality	kg	1
10	Nails 2" with washers - Good quality	kg	2
11	Door handle 4" - Good quality	No.	2
12	Door bolt - Good quality	No.	2
For Labor			
1	Skilled Labor	person days	1
2	Unskilled Labor	person days	3
Sample BoQ for VIP Latrine			
No.	Items	Unit	Quantity
For the Pit			
1	Excavation of the pit (3.5 ft or 1 m diameter)	day	1
2	Sand	cft	8
3	Bajri / crush	cft	1
4	Bricks	No	350
5	Cement (50kg bag)	bag	1
6	Steel (2- sutar)	kg	5
For Latrine Slab			
1	Sand	cft	2
2	Bajri / Crush	cft	3.5
3	Cement (50kg bag)	bag	33.5
4	Steel (2-sutar)	kg	5
5	Ventilation Pipe	rft	11
For Super Structure			

1	Wooden Poles 3" x 3" cross section and 8ft length - good quality and well-seasoned. To be used as vertical posts for corners	No.	4
2	Wooden Posts 1.5" x 1.5" cross section for door and bracing	No.	2
3	Wooden Poles 3" x 3" cross section and 4ft length	No.	14
4	Plain Galvanized Iron (PGI) Sheet - cut to size of 4' x 7' for sides - good quality, 28 gauge	No.	3
5	PGI Sheet - cut to size 4' x 6' - Good quality 28 gauge	No.	1
6	PGI Sheet - cut to size 4' x 4' for sides - Good quality 28 gauge	No.	1
7	Hold fast (kabza) 4" - Good quality	No.	3
8	Nails 5"	kg	2
9	Cap washer - Good quality	kg	1
10	Nails 2" with washers - Good quality	kg	2
11	Door handle 4" - Good quality	No.	2
12	Door bolt - Good quality	No.	2
13	Vent pipe PVC 4" dia (with cawal cap)	Rft	8
For Labor			
1	Skilled Labor	Person days	1
2	Unskilled Labor	Person days	3

2.2 Pour Flush Latrine

This system is designed with latrine which has water seal at the commode, and plumbing which is connected to one or more septic tanks. The water seal helps keep away the odour and vector issues.

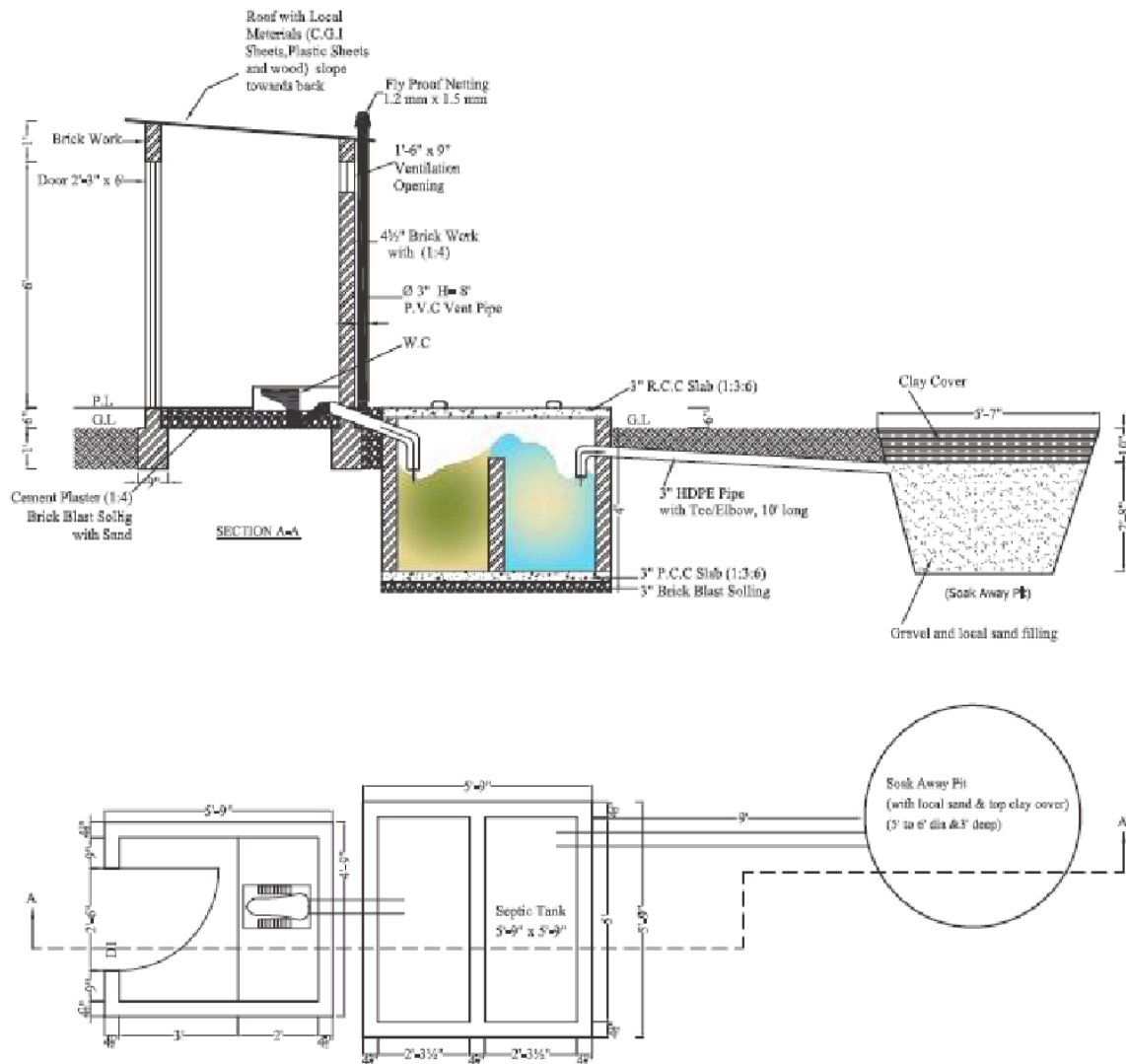


Figure 5: Pour Flush Latrine with septic tank and storage pit

This system can also be developed with double pits. As discussed previously, these pits can be used on alternating basis.

Table 4: Sample BoQ for Water Sealed Pour Flush Latrine

Sample BoQ for Water Sealed Pour Flush Latrine			
For Super Structure			
No	Item	Unit	Quantity
1	Excavation for walls (Long walls 1' x 5'-9" x 9") and (Short walls 1' x 4'-9" x 9")	cft	15.75
2	Cement 50kg	bags	6

3	Sand (Fine) Locally available	cft	39
4	Crush/Bajri (3/4 " down)/ locally available / coarse aggregate	cft	16
5	Concrete Block/ Mud Blocks / Bricks / Stones (for calculation bricks is used 9" X 4.5" X 2.5")	No.	885
6	CGI Sheet (10'x3') 28 Gauge	No.	2
7	Steel (2-sutar)	kg	11
8	Steel Door 6' x 2'-6" (22 gauge) painted or Wooden Door with hold fast	No.	1
9	Ventilator 1'x1' with Angle iron frame and wire mesh	No.	1
10	Indian W/C - Size Medium	No.	1
11	3" dia PVC pipe with cowel/ fly mesh for Ventilation (Dark Color pipe)	Rft	8
12	P-Trap 4" dia Full size ceramics	No.	1
13	Elbow 4" dia UPVC with socket	No.	2
14	Tee 4" x 2" dia UPVC	No.	1
For Septic Tank (5'-9" x 5'-9" x 4')			
1	Excavation for Septic Tank (5'-9" x 5'-9" x 4')	cft	132.25
2	3" thick brick blast solling / stone blast solling whichever is locally available	cft	8.27
3	Cement	bags	3.00
4	Sand	cft	8.60
5	Bajri / Shingle / Crush / Coarse Aggregate	cft	29.00
6	Stone Masonry/ Brick Masonry in the walls of septic tank (Bricks used for Calculations)	No.	560
7	Steel (2-sutar) / #3 bar	kg	11
For Soakage Pit (5' to 6' dia with 3' depth)			
1	Excavation for Soakage Pit - 6ft dia	cft	84.82
2	Stone Masonry in walls with 1.25' thickness	cft	56.00
3	Stone or Clay Fill (upto 1.5 ft height)	cft	42.41
4	Cement 50kg for slab	bags	1.5

5	Sand (Fine) Locally available	cft	6
6	Bajri / Shingle / Crush / Coarse Aggregate	cft	15
7	Steel (2-sutar)	kg	9
For Labor			
1	Skilled Labor	Day	3
2	Unskilled	Days	6

3. Latrines for Persons with Disability

The census results suggest that Pakistan has disability prevalence of 2.38% in its population. In addition, in certain disasters, number of persons with injuries resulting in physical disabilities suddenly increase (e.g. earthquakes). In addition to those groups with physical disabilities while designing sanitation facilities.

. It is important to take those people in consideration while designing sanitation facilities.

The following are general recommendations regarding design of these special latrines:

- The recommended internal space is minimum 6'X6' or more (any of the side not less than 6'), which provides ease in the movement and rotation of wheel chair as some space is also occupied by toilet fixtures
- Entrance to latrines and bathing areas should be at least 36" (can be up to 30" if there are space issue) wide (not including the frame).). The door should not have any threshold that might prevent easy access.
- Provision of hand rail besides latrine entrance and door for assistance of people on wheel chair and elderlies.
- All taps and/or door handles should be easy to grasp and also the handles on the doors are larger than normal. All doors need to lock from the inside.
Inner flooring surface should be rough to avoid slipping. A minimum slope should be provided to the slab so that water does not accumulate.
- Ramps with handrail are provided at entrance to the facilities, recommended slope is 1:12 (acceptable up to 1:10 only if there are space issues on site).
- Doors and door frames may be painted to allow those with visual impairment to distinguish between an open (unoccupied) and closed (occupied) door.

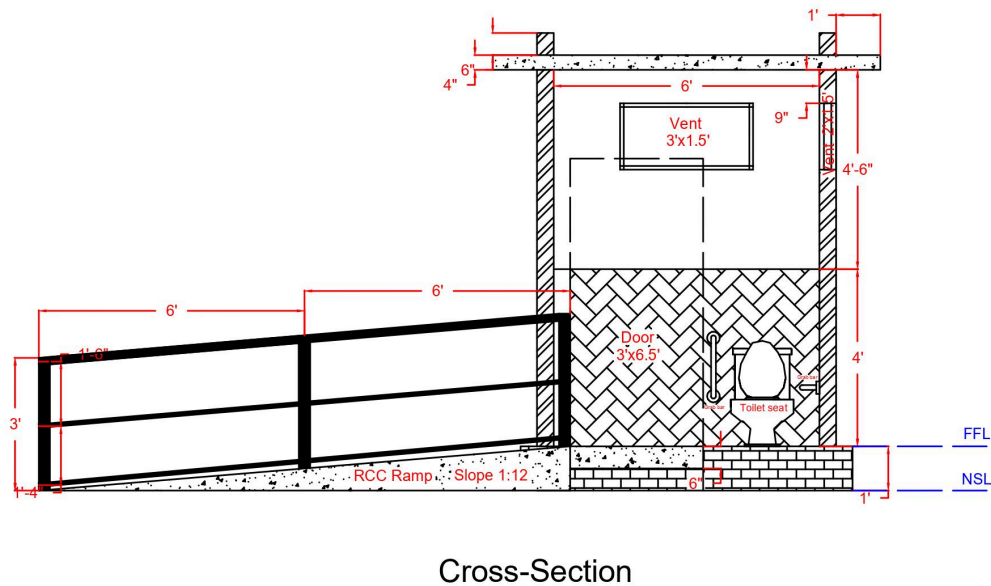


Figure 6: Latrine Design for Persons with Disability

In addition to the above listed general considerations, the following technical considerations are important to be incorporated in provision of these special latrines:

- Provision of an elevated seat (standard height available in local market but should be minimum @ 1'-3" high from the finished floor level for an children with special need and varies upto min. 1'-6" for adults) or else provide toilet chairs.
- Build something to hold when using the latrine (hand rails or ropes, etc)
- For Indian WC: ideally provide rails on both side of WC at a distance of at-least 6" from foot rests.
- For English commodes: provide hand rails (or Grab handles) mounted in wall on one side.
- Provision of a seat or bench inside the bathing area.
- Doors should open outwards, and handrail should be flip up type

Guidance on designing accessible sanitation facilities for persons with disabilities was developed following the 2010 floods in Pakistan and can be found here⁶.

⁶

https://www.humanitarianlibrary.org/sites/default/files/2013/05/accessiblewash-technicalsheets-handicapinternationaloct_2010.pdf

4. Considerations for Women and Girls

- The latrines should be provided in a location which is safe and easy to access and provide privacy to the user.
- Provide privacy (parda) wall at the front and provide latrine door to ensure privacy of the user.
- Provide covered container/dust bin inside the toilet for managing solid was including menstrual materials.
- Provide separate private washing point/wash basin
- Doors should be made of a non-transparent material with no gaps or spaces
- Ensure easy access to water and soap for washing themselves and menstrual materials
- Provide convenience features like shelves, hooks, and mirrors

For more information on design considerations for sanitation facilities see the Toolkit for Integrating Mensural Hygiene Management into Humanitarian Response⁷.

5. Environmental and Technical Issues (Latrine Designs)

The range of technical options that can be applied in any particular condition will depend both on human environment and the physical environment in which the emergency occurred. Use locally available materials and labour for latrine construction where appropriate. This enhances participation in the use and maintenance of the facilities. The following environmental and technical issues should be considered;

- Ground conditions – soil type, infiltration rate, groundwater table, bearing capacity of soil, ease of excavation
- Location and risk of water sources
- Topography and drainage patterns
- Climate and rainfall patterns
- Natural, physical and human resources (and skills) available locally and that can be procured rapidly,
- Possible environmental constraints and impacts

Adequate toilet under varied circumstances of soil type, water availability in the intervention area and underground water table level collated from different WASH projects implemented across Pakistan are tabulated below:

The following table suggests safe distance suggested for sanitation facilities from critical structure.

Table 6: Safe Distance between Latrine and Critical Structure

⁷ <https://www.rescue.org/sites/default/files/document/2113/themhminemergenciestoolkitfullguide.pdf>

F		
S. No.	Facilities	Distance of a Latrine
1	Large trees, houses, buildings and boundary wall	Min. 10 ft
2	Drinking Water sources including natural springs and wells	Min. 100ft**
3	Water supply pipes	Min. 50 ft

*** These recommendations are to be considered strictly for construction of pit latrines as in case of pour flush latrines the distances may vary if the septic tanks and conveyance pipes are properly sealed and disposed off.*

6. Suggested Beneficiaries per Sanitation Facility

Based on the past experience, the WASH cluster in KP, Pakistan has following suggestions regarding beneficiary numbers per sanitation facility to ensure adequate service provision. It is important to note that this guidance is provided based on a low access to sanitation facilities across returning areas in the newly merged KP districts (ex-FATA) is very low, so the minimum indicators below are designed to cover a wider range of population with small funding, before progressively improving coverage.

Table 7: Suggested Beneficiaries per Sanitation Facility

Suggested Beneficiaries per Sanitation Facility	
Camp Settings (TDPs)	<ul style="list-style-type: none"> • Minimum of 1 latrine and Handwashing station per 50 persons (8 households) to be reduced to 1 latrine per 20 people (5 households) as soon as possible separate for men and women, • 10% to have suitable access for persons with disability/elderly and are child friendly
Off-camp or communal settings (Hosting areas)	<ul style="list-style-type: none"> • Minimum of 1 latrine per 30 persons (5 households) reducing to 1 latrine for 20 as soon as possible
School	<ul style="list-style-type: none"> • Minimum of 3 toilets per school in different locations – one for staff and two for students, (In KP/FATA the schools for girls and boys are separate) progressing to 1 toilet to max. 30 girls, and 1 toilet to max. 60 boys in the later stages. • The girls' schools should also cater MHM needs, at design stage.
Health Facility	<ul style="list-style-type: none"> • 1 toilet to 20 beds or 50 out-patients

The above guidance should be implemented keeping in view the SPHERE guidelines (provided below). If there is any doubt then SPHERE guidelines needs to be adopted.

Table 8: SPHERE Guidelines on Various Sanitation Parameters

SPHERE Guidelines on Various Sanitation Parameters	
Parameter	Standards
Coverage	<u>Maximum 20 people per latrine</u> (In the 1 st phase of emergency it is reasonable to aim for 50 persons/latrine).
Location	<u>Toilets should be no more than 50m from dwellings.</u> Pit latrines should be a minimum of 6m from dwellings. Latrines should be available in public places such as markets, health centers and food/non-food distribution points.
Pit Depth	<u>The bottom of the latrine should be at least 1.5m above the water-table.</u> In fine unsaturated soils and unconsolidated strata within 1.5m, virtually all bacteria, viruses and other faecal organisms are removed. This distance will increase in large-grained soils, gravels or fissured/fractured rock.
User Issues	All latrine doors should be lockable from the inside. Provision of anal-cleansing material such as water or other material like tissue papers, etc should also be provided. Provision of Handwashing facilities. <u>There should be a ratio of 3:1 for female to male cubicles.</u> Special rails, access ramps and larger cubicle spaces may also be necessary to assist persons with disability, elderly or chronically sick people. Provision of spaces for washing and drying menstruation cloths may also be necessary. Lighting arrangements should also be considered in the latrine facilities or in the compound to enable people to use the facilities in night times also, lighting also ensures protection.

The following are the number of toilet requirements as per SPHERE guidelines:

Table 9: SPHERE Guidelines on Number of Sanitation Facilities

SPHERE Guidelines on Number of Sanitation Facilities		
Location	Short term	Medium and long term
Community	1 toilet for 50 persons (communal)	1 toilet for 20 persons (shared family)

		1 toilet for 5 persons or 1 family
Market areas	1 toilet for 50 stalls	1 toilet for 20 stalls
Hospitals / Medical centres	1 toilet for 20 beds or 50 outpatients	1 toilet for 10 beds or 20 outpatients
Feeding centres	1 toilet for 50 adults 1 toilet for 20 children	1 toilet for 20 adults 1 toilet for 10 children
Reception / transit centres	1 toilet for 50 individuals 3:1 female for male	
Schools	1 toilet for 30 girls 1 toilet for 60 boys	1 toilet for 30 girls 1 toilet for 60 boys
Offices		1 toilet for 20 staff

7. Sizing of Pit for emergency latrines

Single Pit Latrines vary in size and are typically at least 83 (4'X4'X5.2') cubic feet in volume during emergencies. ⁸To determine what volume a pit will have to be, we have to know how much of these solids (sludge) will accumulate during its period of use. The liquids in the pit will normally infiltrate into the soil, and excreta and anal cleansing material will decompose over time. What stays behind in the pit are decomposed solids. If the pit needs to be lined to prevent the collapse of the soils, the lining may take an important volume. In addition if the lining is made of cement and it covers the base and all walls, this will significantly, and potentially eliminate, the infiltration of the liquids.

The volume of the sludge that will accumulate over the design life (i.e. the total time over which the pit will be used) can be calculated with the formula:

$$V_s = R \times P \times N$$

V_s : approximate volume of sludge that will be produced (cubic feet)

R : estimated sludge accumulation rate per person (60 L/ person/ year or 2.12 ft³/person/year)⁹

⁸ <https://www.emersan-compendium.org/en/technologies/technology/single-pit-latrine>

Item

Unit

Quantity per facility

GI pipe, 3 inch

ft

20

GI reducer, 3 x 1 inch

pcs

1

GI cap, 3 inch

pcs
19
Brass faucet, 1/2 inch
pcs
12
Drain PVC pipe, 2 inch
ft
3
PVC 90 degree bend, 2 inch
pcs
1
GI sheet metal, 4x8 ft, including steel supports
pcs
3
<https://wedc-knowledge.lboro.ac.uk/resources/booklets/G023-Latrine-pit-design-online.pdf>

Figure 8: Handwashing station design for schools

Table 12: BOQs for School Handwashing Station

SI #	Sr#	Item	QTY	Unit
20-86		Supply and fix UPVC soil and waste pipe 75mm bore (outside dia) complete with Z joint and rubber ring all as specified, class B, including trenching and back filling, complete in all respect.	1	
			8.00	meter
20-85		Supply and fix UPVC soil and waste pipe 50mm bore (outside dia) complete with Z joint and rubber ring all as specified, class B.	2	
			3	meter
20-139		Supply and fix UPVC Yee Tee 75 mm dia complete with Z joint and rubber ring all as specified.	3	

	3
each 20-131	
Supply and fix Eccentric Reducer 50 mm * 75 mm dia complete with solvent cement joint all as specified.	4
each 20-112	3
Supply and fix 75 mm dia UPVC Elbow / bend 45 degree complete with Z joint and rubber ring all as specified.	5
each 18-266	1
C.P Pillar cock high neck fancy head, screw down high pressure, lever type, with long screwed shanks and fly nuts fixed to iron pipe 15mm dia, supply and fixing.	6
each 18-895	3
S/F PPR Pipe (Poly propylene Random) with all fittings i,e sockets, bend, tee, elbow, reducers etc. where required, 32 mm dia, class PN 20	7
meter	23.77
Providing and fixing ball valve / handle valve - Brass - 32 mm dia, including all fittings complete in all respect	8
each MRR:Ch 19-item #7(iii)	1
Providing and fitting glazed earthen ware wash hand basin 56x40 cm (22"x16") including bracket set, waste pipe and waste coupling, etc. Brite, Porta, Master iii) White without pedestal	9
each MRR:Ch 19-item #19	3
Providing and fixing looking glass 55x40 cm (22"x16") size, and 5 mm thick, first quality.	10
each market item	3
provision and installation of Banner with Hand hygiene messages, 260 gsm, 150" * 24" size	11
each	24.5
Soakage pit (Excavation dia =3 ft, Depth=3 ft)	12

P : the average number of people using the latrine over the design life

N : the design life of the pit (in years).

If 50 people are using one pit of 83 cubic feet and using dry cleansing materials, it will fill after approximately 6 months. Normally, 6 months are taken as the life span for emergency pit latrines of all types.

page 28, ref # 8

Earthwork excavation in open cutting 5.01 ft. (1.5 m) to 10.0 ft. (3.0 m) depth for storm water channels, drains, sullage drains in open areas, roads, streets, lanes, including under pinning of walls and shoring to protect existing works, shuttering and timbering the trenches, dressed to designed level and dimensions, trimming, removal of surface water from trenches, back filling and surplus excavated material disposed of and dressed within 100 ft. (30 m) lead:-ii)hard

13

21.2

cft

page 41-5 (i)

14

Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate)(i) Ratio 1: 4: 8

0.52

cft

Page 53, reference # 4-1

15

Pacca brick work in ground floor:-cement, sand mortar:-(1:4)

$$A=(3.14)/4 *(4.75^2-4^2)$$

Solid Walls 4.5" thick

16

15.41

cft

page 43- ref# 6 a(ii) - 3

17

(a)(ii) Reinforced cement concrete in slab of rafts / strip foundation, base slab of column and retaining walls; etc and other structural members other than those mentioned in 5(a) (i) above not requiring form work (i.e. horizontal shuttering) complete in all respects:- (3) Type C (nominal mix 1: 2: 4)RCC(1:2:4) slab cover 3" thick

1.77

cft

page 45, 10 (i)

18

Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):- (b) Deformed bars (Grade-40) (1/2" Dia steel)

6.25

kg

After emergency and during recovery or rehabilitation phase, in rural areas, single pits should usually be dug as deep as possible so that it takes a long time for them to fill. A minimum design life of ten years is recommended.¹⁰

8. Decommissioning of Emergency Latrines

It is obligation of WASH sector partners to include the cost and execution of decommissioning the emergency latrines right from start of planning. Following are steps are recommended to be followed: -

8.1. Decommissioning of temporal/emergency pit latrine: -

1. WASH sector partner/government's Community Facilitator/Mobilizer notifies the responsible agency when the toilet is filled to 2ft from slab.
2. Provide the decommissioning person with gloves, shovel and pliers.
3. Disinfect and clean latrine and materials with 2% chlorine solution.
4. Remove all the tarpaulin and/or sandbags surrounding the toilet. Tarpaulin from the roof should be used for other toilets.
5. Remove all the bamboos or wooden poles to be used again.
6. The timber used for supporting the slab should also be removed to be re-used if possible.
7. Remove the plastic/fiber glass squatting slabs and allow it to dry in the sun for some days. The slabs can be reused.
8. Cover the pit with tarpaulin from the walls and then start back filling the soil. The back fill soil should be at least 2 ft thick and should cover all sides.
9. Mark the area where toilet has been decommissioned to prevent people digging up the same ground.
10. Add lime solution to the pit surrounding the trench to prevent smell.
11. The cost paid for decommissioning of one block should be 10-15 USD ± 15 USD

8.2. Desludging of semi-permanent pit latrine

- ☒ If desludging is required, it must be designed into operation and maintenance processes and budgets from the start.
- ☒ Pit latrines need to be emptied periodically to maintain their functionality over time, as well as their ability to be emptied . There are several techniques available for desludging, ranging from the most basic manual sludge removal to sophisticated vacuum truck operations. The choice of emptying and conveyance depends on the following factors:
 - ☒ Consistency and quantity
 - ☒ Accessibility to the pit latrines and distance to cover
 - ☒ Topography, soil type and groundwater characteristics
 - ☒ Financial resources available
 - ☒ Availability of a service provider
 - ☒ Management considerations and Local capacity.

¹⁰ Water, Engineering and Development Centre School of Civil and Building Engineering Loughborough University

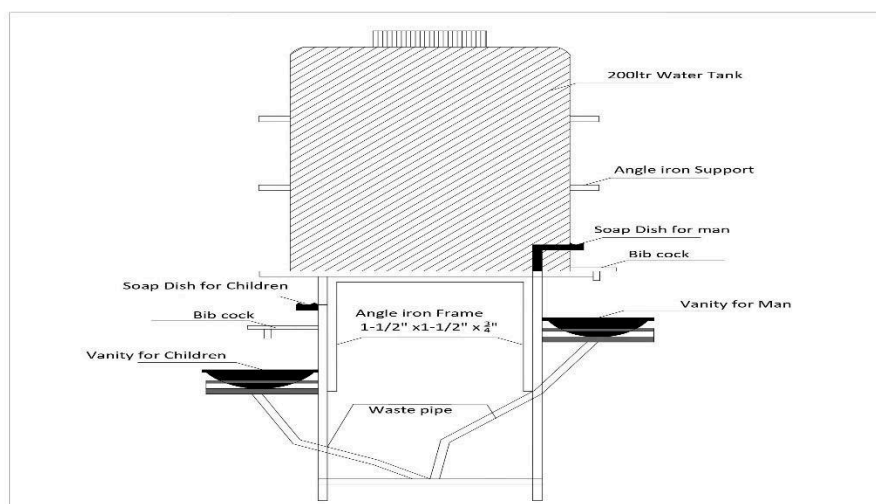
- ☐ Common methods of fecal sludge emptying and conveyance
 - o Manual Emptying and transport
 - o Motorized Emptying and transport
 - o Simplified sewerage
 - o Conventional gravity sewer
 - o Storm water drainage
 - o Transfer station and storage

- ☐ In emergency context we shall focus on the first two methods. That manual emptying and transport and Motorized emptying and transport of fecal sludge/human waste. The rest of the technologies require more advanced level of engagement and are capital intensive to operate and maintain
- ☐ WASH sector partner/government's Community Facilitator/Mobilizer notifies the responsible agency when the toilet is filled to 2 dt from slab.
- ☐ Provide desludging team with gloves & masks
- ☐ De-sludge the pit into tank/bowser
- ☐ Remove sludge to treatment/disposal site
- ☐ Clean slab and latrine as necessary
- ☐ The cost for desludging should be 5-10 USD ± 15 USD

9. Handwashing Station

Handwashing is critical to preventing the spread of disease and has high potential to reduce the health impact of disasters. Each latrine/latrine block must be implemented with a handwashing facility. Handwashing stations need a regular supply of water, soap and safe drainage. Materials and tools need to be available to maintain and repair stations, as well as engagement with management bodies and authorities. Also, steps may need to be taken to ensure the security of handwashing water supply. In addition to this, stations must be safe to use, with well-lit and maintained access paths.

10. Designs and BOQs for Hand Washing Station



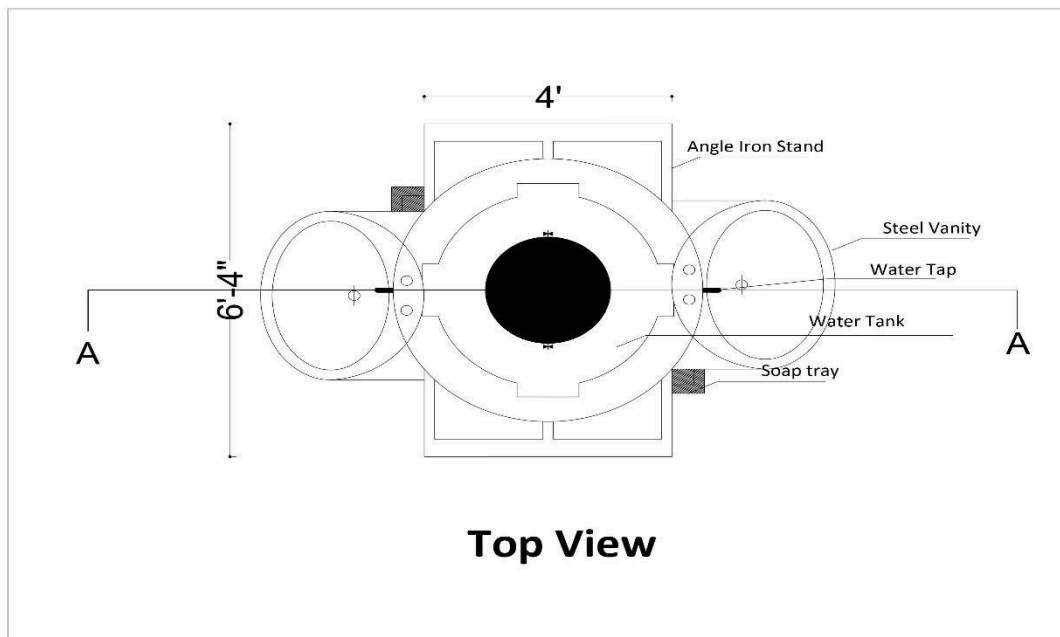


Figure 7: Designs for Paddle Hand Washing Station

Table 10: BOQs for Paddle Hand Washing Station

ITEM No.	MRS-2022 REF. No. / NS	DESCRIPTION	UNIT		QTY
(a)	(b)	(c)	(d)		(e)
1	14-06-b	Providing and fixing stainless steel sink (size 22"x18") including set of brackets, waste pipe etc (Best Quality)tainless Steel Camping Sink Basin Draining Board Outdoor	1	Each	2
2	14-24-b	Providing and fixing chromium plated (CP) bib-cock heavy duty of approved quality : 1.5 cm 1/2"	1	Each	2

3	14-28-f	Providing and fixing gun metal peet / gate valve (screwed) 20 mm (3/4") dia of approved quality.	1	Each	1
4	14-35-g	Providing, laying cutting, jointing, testing PPRC pipeline in walls/trenches with pipes (confirming to DIN 8077/8078, PN20 of approved quality & fittings conforming to DIN 16962, PN25 of the same manufacturer) for cold/hot water supply systems including specials complete in all respects as per specifications: except excavation 1/2" i/d	1	Rft	39
5	14-69-b-01	Supplying and Fixing Polyethylene Water Tank made from food grade FDA Certified raw material, 3 layers UV stabilized, inert with water, anti-fungus and anti-bacterial and have a service life of more than 10 years : 200 Ltr	1	Each	1
6	14-144-c	Supplying and Fixing UPVC soil waste class B : 3" dia	1	Rft	13
7	14-165-a	uPVC floor Cleanout including 2 No. 45o elbows, transition pipe, SS screwed lug/cover assembly jointed air-tight with pipe, breaking concrete or masonry work & then making it good, etc. complete in all respects. (i) 3" dia	1	Each	2
8	25-36	Providing and Fixing MS angle iron 1-1/2"x1-1/2"x3/4" edge protector nozing of steps of stands, complete	1	Rft	90

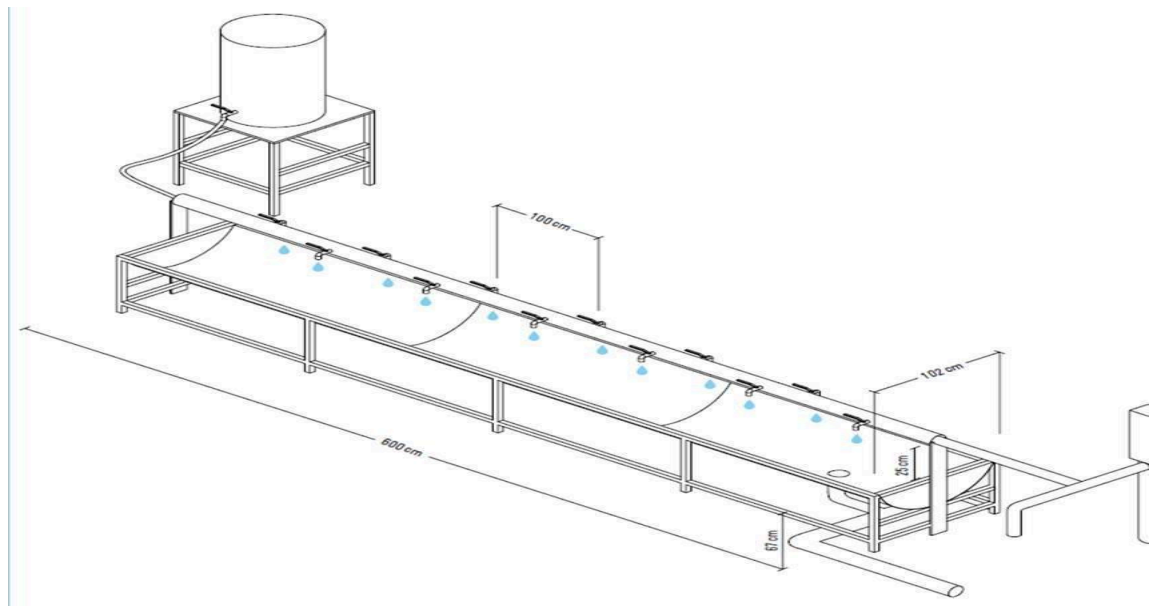


Figure 8: Design for Communal HandWashing Station

Table 11: BOQs for Communal Hand Washing Station