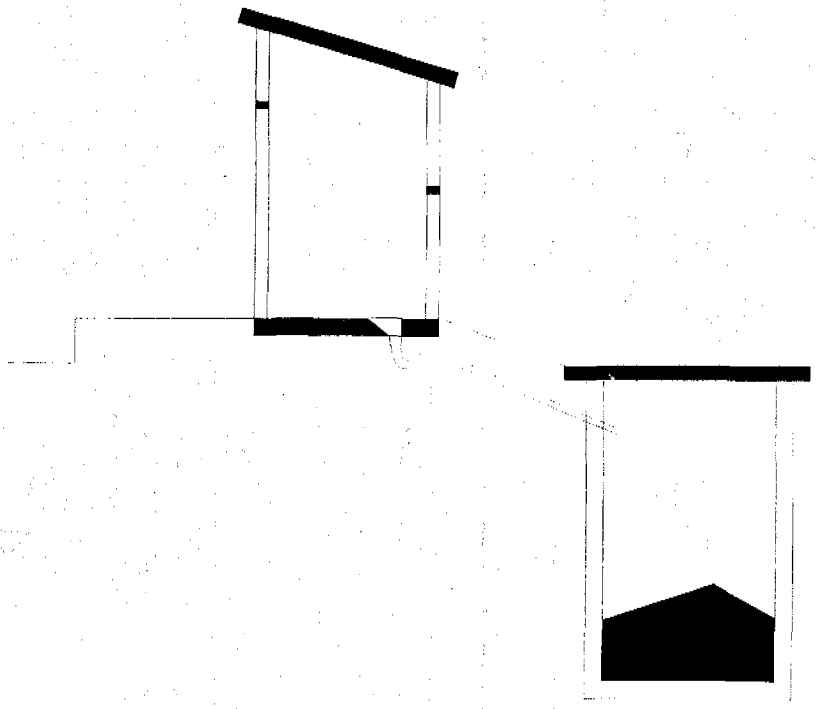
Final draft
For field-testing

GUIDELINES

FOR THE IMPROVEMENT OF SCHOOL SANITATION



Part 2:

Implementation of school sanitation improvements

Technologies covered:

- Direct single pit latrine
- Direct double pit latrine
- Single offset pit pour-flush latrine, optional with soak-away
- Double offset pit pour-flush latrine, optional with soak-away
- Pour-flush latrine with 2-chamber septic tank with either soak-away, drainage field or evapo-transpiration mound
- Urinal
- Latrine superstructures

IRC International Water and Sanitation Centre

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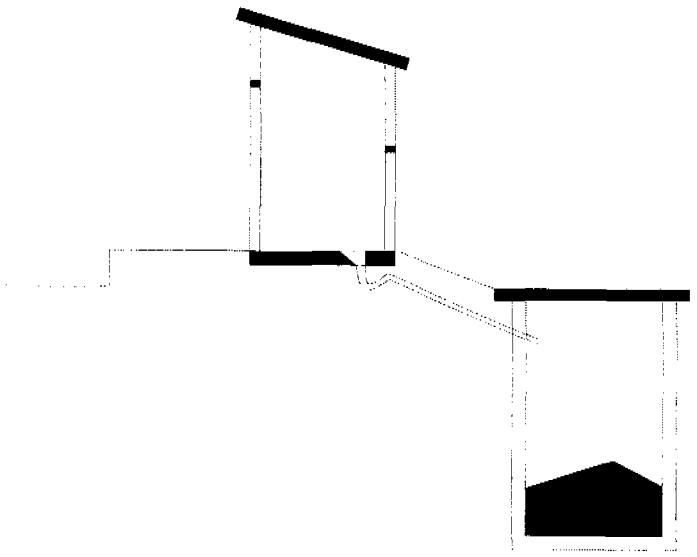

Part 2:

Implementation of school sanitation improvements

Authors:
Mr. Jo Smet, IRC
Ms. Hasin Jahan, ITN
Ms. Leonie Postma, IRC

June 2001

IRC International Water and Sanitation Centre

P.O. BOX 2869
2601 CW DELFT
THE NETHERLANDS
telephone: +31 (0)15 219 29 39
telefax: +31 (0) 15 219 09 55
e-mail: general@irc.nl
website: http://www.irc.nl

ITN Bangladesh
International Training Network
Centre for Water Supply & Waste Management

CIVIL ENGG. BUILDING
(3RD FLOOR)
BUET, DHAKA-1000
BANGLADESH
telephone: +880 2 9663693 / +880 2 9663695
telefax: +880 2 9663695
e-mail: itn@dhaka.agni.com / itn@vasdigital.com
website: http://www.agni.net.itn

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INTRODUCTION

This *Guide Part 2* helps the School Management Committee (SMC) and the School Sanitation Implementation Committee (SSIC) to go through the second part of the School Sanitation Improvement Process, *the implementation*. The second phase starts with the receiving of funds (perhaps first instalment) from the supporting organisation(s) and ends with the commissioning of the physical structures of school latrines and urinals constructed by local mason(s) and other local labour using locally available materials.

The *Guide Part 2* assists the in particular the SSIC in planning, contracting, steering of construction, monitoring of construction and commissioning the school sanitation. The advice and support from the Sub-Assistant Engineer (SAE) is required a few times, particularly just before construction of the sub-structures starts, before construction of the superstructure starts and before commissioning (end total construction). The plan for implementation should be sent to the SAE so that (s)he can plan his/her visits to the school and assist the SSIC in these activities.

The steps of this process in this *Guide Part 2* are:

1.	**RECEIVING FINANCIAL SUPPORT FROM THE SUPPORTING ORGANISATIONS**
2.	**MAKE DETAILED PLAN FOR IMPLEMENTATION INCLUDING TASK DIVISION AND CONTRACTING LOCAL LABOUR**
3.	**IMPLEMENTATION OF THE CONSTRUCTION OF THE SANITATION IMPROVEMENTS**
4.	**MONITORING OF THE CONSTRUCTION PROCESS AND UTILISATION FUNDS**
5.	**COMMISSIONING IMPROVEMENTS AND OFFICIAL OPENING**

1. RECEIVING FINANCIAL SUPPORT FROM THE SUPPORTING ORGANISATIONS FOR SSIC

INTRODUCTION

We have received the positive response from the Supporting organisations on our request to get financial support for improving our school sanitation. We must compare what we will receive with what we asked for. If the two do not match, we have to decide together with the SMC, teachers, parents and the student representatives, what we shall do; reduce the number of latrines to build or increase the contribution from our own sources or raise more funds.

GOAL

To make a final decision on the school sanitation improvements, i.e. number of latrines and urinals to build, based on allocated funds from Supporting organisations, and our own funds.

ISSUES

- Listing of the financial resources allocated and locally available
- Meeting to take decision on the number of latrines and urinals to be built

2.1 Listing financial resource allocation

With the response of the supporting organisations we will compare what we will receive with what we asked for. We can use the following tables for completing this exercise. The use of the table will enable us to understand, if the received funds match with what we requested, and if this is not the case, why they do not match. We will use the results of this exercise in a meeting during which we together with the SMC, teachers, parents and the student representatives will make a final decision on the number and type of sanitation facilities to be constructed and water supply improvements to be made.

Example for single pit pour-flush latrines

Infrastructure	*Total Estimated Cost*	*Fund received from Supporting organisations (Thaka)*	*Local contribution from SMC, parents, raised funds etc. (Thaka)*	*Remarks*
Sanitation Facilities:				
Rehabilitation of 2 latrines	8,000	4,000		
Construction of 6 new latrines	89,400	70,000		
Construction of 4 new urinals	5,400	4,500		
Water Supply Facilities:				
Maintenance of No.6 handpump	250	0		
Rehabilitation of concrete platform	1,000	0		
TOTAL	104,050	78,500	20,000	Short of Tk 5,550

In our own situation the financial resource allocation looks like this:

Infrastructure	*Total Estimated Cost*	*Fund received from Supporting organisations (Thaka)*	*Local contribution from SMC, parents, raised funds etc. (Thaka)*	*Remarks*
Sanitation Facilities:				
Water Supply Facilities:				
TOTAL				

1.2 Meeting to take decision on number and type of sanitation facilities to be constructed and water supply improvements to be made

During this meeting we, the SSIC, the SMC, teachers, parents and the student representatives, will have to take a decision on the number and type of sanitation facilities to be constructed and the improvements that will be made to the water supply facilities. First the SSIC will present their findings. If a difference exists between what we have asked for and what we will receive we will have to identify the reason and decide how to solve it.

There are three options:

1. Funds received match the requirements (as requested): we can build what we planned
2. Funds received are less than requested because the external funders supported a lower number of facilities. We will reduce the number of sanitation facilities accordingly but maintain the sanitation type and construction quality
3. Funds received are less than requested because the external funders finance only the basic sanitation service. We either have to change the sanitation technology to construct or we have to raise extra funds to fill the gap between what we have and what we need for the preferred technology, which is above the basic service level.

We have to take this decision in a full meeting of the SMC, teachers, the parents and the student representatives, as financial consequences have to be discussed and solved and supported by all of us.

2. MAKE DETAILLED PLAN FOR IMPLEMENTATION INCLUDING TASK DIVISION AND CONTRACTING LOCAL LABOUR FOR SMC AND SSIC

INTRODUCTION

The SSIC has to prepare a detailed plan for implementation of the activities to be carried out. Then we can all clearly see what to do, when, who needs to be involved, and what type of materials we need and when. We can also see how much money we need for what improvement. When the plan has been completed, we will organize a meeting during which the plan will be presented, discussed and after adaptation approved. During this meeting we will also divide the responsibilities for the different activities between ourselves.

GOAL

To prepare a detailed plan for the implementation of the activities to be carried out and to divide the responsibilities.

ISSUES

- Detailed listing of labour and materials required per improvement activity.
- Detailed listing of activities, activity responsibility and timing.
- Organizing a special meeting for approval of plans and division of responsibilities
- Contracting skilled and unskilled labour.
- Selection of the best site.

2.1 Detailed listing of labour and materials required per improvement activity and totals

For the substructure (part below the ground and the floor/slab) and the superstructure (the latrine building above the ground) of the latrine, we have added to this Guide Bills of Quantities (BoQ) with specifications of all materials and labour required for construction. With the BoQs the SSIC can determine what labour and materials are needed. In the example below, the labour and materials needed are for the offset single pour-flush latrine as the technology option. Bills of Quantities for the all sanitation technology options and the superstructure (latrine building) options are attached to this Guide Part 2.

Example

Activity -- Resource	*Rehabilitation of 2 latrines*	*Construction of 6 latrines*	*Construction of 4 urinals*	*Totals*	*Remarks*
Labour needed					
Masons	5 days	68 days	5 days	78 days	
Unskilled labourers	5 days	97 days	12 days	114 days	
Sub-Assistant Engineer (SAE)	once	once	Once		(s)he will visit from time to time.
Materials needed					
Cement	4 bags	47 bags	6 bags	57 bags	From district market
Khoa	0.5 m^3	11.5 m^3		12 m^3	
Sand	0.5 m^3	11.5 m^3	1.0 m^3	13 m^3	
Gravel					
Bricks	150	5225	488	5863	
Steel bars	10 kg	36 kg		46 kg	
Latrine Slab					
Latrine pan	1	6		7	From thana market.
Water seal -U-shape	2	6		8	From thana market.
Latrine door	1	6		7	From thana market.
Hinges-catch hooks; Angle irons	4	24 36		28 36	From thana market.
Roofing sheets CI	2	24 m^2		26 m^2	From thana market.
PVC pipe Ø 100mm		45		45	
PVC pipe Ø40/50mm	4 m	6	4	14 m	
Perforated concrete rings Ø 3 feet		90		90	
Non-perforated concrete rings Ø 3 '	2	33		35	
Concrete ring slabs	2	12		14	
RCC slabs					
Other materials			Special paint	Special paint	

For our own situation, and for the selected latrine technology, the labour and materials needed are:

Activity -- Resource	*Rehabilitation of 2 latrines*	*Construction of 6 latrines*	*Construction of 4 urinals*	*Totals*	*Remarks*
Labour needed					
Masons					
Unskilled labourers					
Sub-Assistant Engineer (SAE)					
Materials needed					
Cement					
Khoa					
Sand					
Gravel					
Bricks					
Steel bars					
Latrine Slab					
Latrine pan					
Water seal -U-shape					
Latrine door					
Hinges-catch hooks; Angle irons					
Roofing sheets CI					
PVC pipe Ø 100mm					
PVC pipe Ø40/50mm					
Perforated concrete rings Ø 3 feet					
Non-perforated concrete rings Ø 3 '					
Concrete ring slabs					
RCC slabs					
Other materials			Special paint	Special paint	

2.2 Detailed listing of activities, activity responsibility and timing

We are responsible for making a detailed list of the activities, also indicating who will be responsible for the activities and the timing when the activities should be completed. Below we can find an example how this can look like.

Example of Chart for activities, responsible persons, and time schedule

(Comment: this example gives only rough and estimated time lines)

Nr	Activities	Responsibility	Weeks									
			w1	w2	w3	w4	w5	w6	w7	w8	W9	W10
			dates	dates	dates	dates	dates	dates	dates	dates	dates	dates
1.	Preparation of plan	SSIC										
2.	Site Selection	SSIC										
3.	Meeting for approval plan and site	SSIC and SMC										
4.	Purchase of materials	SSCI										
5.	Contracting masons and unskilled labour	SSCI and SMC										
6.	Rehabilitation existing latrines	Masons; other labour										
7.	Excavations	Unskilled labour										
8.	Foundations	Masons; other labour										
9.	Construction of pits	Masons; other labour										
10.	Construction of latrine up to slab level	Masons; other labour										
11.	Construction of latrine buildings	Masons; other labour										
12.	Construction of urinals	Masons; other labour										
13.	Supervision of construction work	SSIC and SMC										
14.	visits by SAE	SAE										
15.	Commissioning	SSCI; SAE*, SMC										

SAE = Sub-Assistant Engineer (DPHE)

For our own situation, the chart would look like this:

Nr	Activities	Responsibility	Weeks									
			w1	w2	w3	w4	w5	w6	w7	w8	W9	W10
			dates	dates	dates	dates	dates	dates	dates	dates	dates	dates
1.	Preparation of plan	SSIC										
2.	Site Selection	SSIC										
3.	Meeting for approval plan and site	SSIC and SMC										
4.	Purchase of materials	SSCI										
5.	Contracting masons and unskilled labour	SSCI and SMC										
6.	Rehabilitation existing latrines	Masons; other labour										
7.	Excavations	Unskilled labour										
8.	Foundations	Masons; other labour										
9.	Construction of pits	Masons; other labour										
10.	Construction of latrine up to slab level	Masons; other labour										
11.	Construction of latrine buildings	Masons; other labour										
12.	Construction of urinals	Masons; other labour										
13.	Supervision of construction work	SSIC and SMC										
14.	visits by SAE	SAE										
15.	Commissioning	SSCI; SAE*, SMC										

2.3 Organizing a special meeting for approval of plans and taking of the responsibilities

When the plan has been completed, we will organize a meeting where SMC, teachers, parents and the student representatives will be present. During this meeting the plan will be presented and discussed. If we do not all agree with the plan and the financial consequences, we will adapt the plan according to our wishes. It is important we all are clear on whom is responsible for what and which contributions are expected from each one of us. During this meeting we will divide the responsibilities for the different activities between the SSIC and ourselves.

2.4 Siting of the new sanitation facilities

During this meeting we will also select the best site for the latrines and the water supply facilities. We must consider the following aspects for good site selection:

- ➔ Not too far from the class rooms, if possible next to the school building
- ➔ Boys' and male teachers' latrines can be located together
- ➔ Girls' and female teachers' latrines can be located together but must be separate from the boys' latrines (girl students must feel safe and comfortable
- ➔ Female teachers may want to have their own latrine
- ➔ Teachers must be able to see the girls' latrines from the class rooms
- ➔ Closer than 15 metres from the school hand-washing facility
- ➔ More than 15 metres from the ground water source used for drinking purposes
- ➔ Not in a low area (risk for flooding)

Make a map of the school premises indicating the following features: roads, entrance gate, class rooms, possibly ground water source used for drinking, hand-washing facility (could be STW, TW or standpost), existing latrines etc, and the planned location for the new latrines and urinals.

2.5 Contracting skilled and unskilled labour, or getting agreement with local contractor

Using the table with the detailed list of all the required materials and labour for each of the sanitation improvements, we can approach local masons and unskilled labourers to discuss with them their possible inputs. We have to agree with them on the total days' inputs per activity, the total payment, when they will be paid, the time in which this job is to be done and the quality control procedures. This agreement (the contract) with all the details must be put on paper and signed by the mason, chairperson of the SSIC and the chairperson of the SMC.

If there are contractors in the village or the thana, they may be interested to contract the entire work (or one or more activities) on a fixed price basis. The SSIC could ask them to submit an (price) offer for the work. The SMC has to consider the offers and decide if they want to give the work to a contractor and who will get it for the offered price. Issues as reliability of the contractor and quality of his work need to be considered. A contract has to be made with all the details, indicating the description of the work, the required quality, the quality control procedures, the amount of the contract for which the contractor will do the job, when he will be paid. The contractor, chairperson of the SSIC and the chairperson of the SMC will sign this contract.

The final payment for either the mason or contractor will be paid when the Sub-Assistant Engineer has approved the quality of the structures built, i.e. at the commissioning

3. IMPLEMENTATION OF THE CONSTRUCTION OF THE SANITATION IMPROVEMENTS FOR SSIC

INTRODUCTION

Now we have made the detailed plan for implementation of our school sanitation and water supply. We have reached also the moment of the real thing: the construction. This needs to be done very well, using good materials and exactly according to the descriptions on the drawings. If the latrines and pits are not constructed properly and not with materials of good quality then we will face problems with the operation and maintenance and possible with the structures of the buildings. Problems may occur afterwards such as pits filling up too quickly, pipes getting easily choked, water seals get blocked, concrete rings sink away, cement plaster inside latrine crumbles off, door does not close properly, etc.

This chapter gives us a detailed description of activities on all steps. It also mentions what the SMC and the SSIC can supervise and how we do control the quality of the work using a checklist and simple tests.

GOAL

To have school latrines constructed according to the specifications and of the required quality using correct materials and workmanship.

ISSUES

- Purchasing of materials and storage
- Excavation
- Foundation and construction of pits, chambers and installation of pipes
- Backfilling
- Placing of the slab
- Construction of the latrine buildings
- Construction of the urinals

3.1 Purchasing of building materials

Before the excavating, we have to purchase the required materials. Not all materials may be directly available at the village bazar, and some need to be ordered or to be purchased from the thana or even the district bazar. Thus, it may take a few weeks before we have all the materials. If we know that we will have all the materials within a week then we can start organizing the excavation.

Quantities of required labour and materials and related cost

We use the table with all required labour and materials for the sanitation improvements to make an updated cost estimate (see below), which we can use during the purchasing and the control of our expenditures. We best make a simple shopping list, against which we can tick what we bought.

No	Item description	No. units needed	Unit price (Thaka)	Present market costs	Remarks
	Masons				
	Unskilled labourers				
	Sub-Assistant Engineer (SAE)				
	Cement				
	Khoa				
	Sand				
	Gravel				
	Bricks				
	Steel bars				
	Latrine Slab				
	Latrine pan				
	Water seal -U-shape				
	Latrine door				
	Hinges-catch hooks; Angle irons				
	Roofing sheets CI				
	PVC pipe Ø 100mm				
	PVC pipe Ø40/50mm				
	Perforated concrete rings Ø 3'				
	Non-perforated concrete rings Ø 3 '				
	Concrete ring slabs				
	RCC slabs				
	Other materials				

Prices of materials

If there are more suppliers of building materials around, we may give the list to them and ask them for a pro-forma invoice. By comparing the prices and qualities, we can decide from which supplier to buy. We have to pay attention to the specifications and quality of the materials as that can result in big price differences.

If we plan to build several latrine blocks, we can best do the purchasing batch-wise and complete the latrine blocks one-by-one, so start only the next block when the other is completed. So we avoid a too large stock of building materials that may be difficult to control.

Below, we can find a list of materials with indicative prices. We will have to check these prices as the prices at the bazar in our thana may be slightly lower or higher than those indicated.

Indicative prices of sanitation materials (price indication as per November 1998)

Type of material	*Unit*	*Price per unit in Thaka*
GI- Sheets 0.28 mm	Width 30 inch; bundle =72 ft	800
0.35 mm	Width 30 inch; bundle =72 ft	2,400
0.45 mm	Width 30 inch; bundle =72 ft	2,900
Sand	truck load (±180 cft)	800-2,000 (variation per location)
Cement	50 kg	230
Khoa (broken burnt bricks)	Truck load (±170 cft)	
Bricks	Truck load of ± 1,000	2,000
Concrete rings ; dia 2.5 ft	Height 1 foot ; each	80
Concrete rings ; dia 3 ft	Height 1 foot ; each	120
Concrete pillars/columns/ 8 ft	Width : L= 8 ft	275
Concrete pillars/columns/ 10 ft	Width : L= 10 ft	300
Concrete pillars/columns/ 12 ft	Width : L= 12 ft	350
Cement slab with goose neck	Circular Dia 2 ft 9 inch	175
Cement slab with goose neck	Rectangular 3ftx 3 ft	225
Plastic pan with siphon/neck	Each	120
Steel bars dia 10 mm/3/8 inch	Ton	16,000
Steel bars dia 12 mm/1/2 inch	Ton	15,000
PVC pipe dia 4 inch	Grade C per feet	16
PVC pipe dia 4 inch	Grade D per feet	25
PVC vent pipe 2 inch	Grade C per feet	
Mason and skilled labour	Per day	150
Unskilled labour	Per day	100

Quality control of materials

While we purchase the required materials we have to pay attention to the quality of these materials. Below we can find a list of the required materials and a description of what which qualities we have to control.

→ Sand:

Sand should be clean, so not containing clay, organic materials etc.
A simple test is by doing two hands of sand in a plastic bottle using a paper-folded funnel and fill that up was clean water. Rinse firmly and leave for ten minutes. If there is a lot of clay and debris (more than 5%) on top of the sand then it is not good. This dirty sand will weaken the strength of your concrete and cement structures. You could wash the sand in a concrete or metal box (e.g. cut oil drum)
River sand containing much coarse sand is the best for construction. Sand for plastering should be finer to get a smooth surface. The finer the sand, the more cement to be used.

→ Gravel:

Gravel must be hard material if used for concrete. The diameter of the most of the gravel must be in the range of 6-20 mm. The gravel should not contain silt, clay or debris. That must be removed by washing the gravel in a concrete, plastic or metal container with a lot of water.

→ Khoa:

That is broken bricks. Khoa is much softer than gravel but acceptable for the concrete for support rings (under pit and soak-away walls) but not for lintels that carry the walls of the latrine building. Preferably the more bluish bricks are used for the concrete purposes. The diameter range may be smaller than for gravel.

When khoa is used as a filler for an infiltration envelope than no strength qualifications are required, so soft red bricks are acceptable. The diameter range may be between 4-30mm.

➔ **Lime:**
Lime is readily available in bags from the hardware shops. Lime is fine powder that should not have lumps or "rocks". These are the result of contact with water or high humidity/moisture. Buy only small quantities and first check the quality.

➔ **Cement:**
New cement is usually of good quality if it has not been in contact with water. Lumps in the cement indicate that either the cement is old or it has been in contact with water or high humidity. Such cement should be rejected. Lumps are thrown out if too hard to be squashed in the hand.
Taking care of cement stock: Make sure that you store the bags of cement at a dry place, away from the floor (put bags on bamboo logs) and cover it with plastic sheets!

➔ **Steel bars:**
Check diameter and length. When using them the bars should be clean, that is free of clay or organic material. This would reduce the contact between concrete and steel.

➔ **Bricks:**
Broken bricks can be used as *khoa*. The best (bluish) bricks must be used for the foundation and lower courses. To prevent damage, bricks should be stacked in clamp. Bricks must we wetted before using to avoid that the water from the mortar is soaked away by the dry bricks, weakening the joints structure.

➔ **Concrete covers:**
These are commonly bought at the market. Check their thickness and dimensions. Check whether the surface is smooth. The slabs must be in good condition. Check for flaking, chipping, cracks, exposed reinforcement steel and damage to the overlapping edges.
The concrete covers must all have two iron lifting handles (diameter 6mm) so that we can easily remove the covers by putting a pole through the lift-eyes.
Concrete covers and rings:
These are commonly bought at the market. Check their thickness and dimensions. Check whether the surface is smooth. The slabs must be in good condition. Check for flaking, chipping, cracks, exposed reinforcement steel and damage to the overlapping edges. All concrete rings except the upper two for each pit must have circular holes perforating the wall to allow for good infiltration. These holes should have a diameter of 50 mm diameter except when *khoa* is put around the rings then the holes must not be larger than 15 mm or when the soil consists of sand, then the holes must be smaller than 8 mm). The holes are staggered about 100 to 200 mm apart (depending on the diameter of the holes).
These concrete rings are not commonly available at the market but could be ordered at the Sanitation Production Centres.
The concrete covers must all have two iron lifting handles (diameter 6mm) so that we can easily remove the covers by putting a pole through the lift-eyes.

➔ **Latrine slab with pan:**
These are commonly bought at the market. Check their thickness and diameter. Check whether the surface of slab is smooth; it should be finished with cement finish or punning (i.e. applying a mixture of very fine sand and cement (1:1)). A smooth surface makes cleaning effective. Check also smoothness of the pan; when this is made of concrete also here punning must be applied for easy cleaning.
The slabs must be in good condition. Check for flaking, chipping, cracks, exposed reinforcement steel and damage to the overlapping edges.

➔ **Goose neck with water seal in concrete slab:**
Check before buying the functioning of the seal, by putting the slab level. Then pour water in the pan. The outlet should be completely closed now and no air, smoke or insects can get through.

➔ **Plastic pan with plastic siphon:**
Check for scratches on the inside of the pan; these would make proper cleaning difficult. The siphon must ensure a proper water seal. This can be checked as above. The siphon needs to be properly fixed with putty (or solvent cement) to the pan.

➔ **Plastic pipes (for drains and vent pipes):**
Check for breakage and smooth ends

➔ **Plastic vent pipes:**
Check for breakage and smooth ends

➔ **Corrugated galvanised iron sheets:**
check for smoothness at the edges. Handle and store with care.

➔ **Galvanised iron doors:**
Arrange with supplier that the doors be painted using red lead primer both on the inside and the outside.

➔ **Wooden doors:**
Arrange with supplier that the doors be painted twice with primer both on the inside and the outside

➔ **Water:**
The water to be used for concrete and cement mortar needs to be fresh (not saline) and be free from organic impurities. This can be tested by putting water in a plastic bottle and inspect it.

3.2 Excavation

At the selected site, the grasses and shrubs are cleared off. Using the dimensions from the drawings. (attached to this Guide) The masons will stake the outline of the substructures (pit and possibly the soak-away) over which the latrine building will be built. They can use either steel stakes or wooden or bamboo pegs.

Supervision of the excavation

Supervision concentrates on the right location of the latrine components, and measurements of the pit. (length, width and depths).

➔ The area to be excavated for the pit should be at all sides 0.10m larger to allow for backfilling with coarse material to increase the infiltration capacity of the soil.

➔ If a soak-away is needed than the distance from the pits must be at least as much as the depth of the pit below ground level.

➔ Excavation must be to the depth indicated on the drawing. For loose soils the pit will be larger as the shaft of the excavated pit will not be vertical.

➔ Earth removed from the pit can be used to raise the level of the site or to put around the upper ring and latrine building.

3.3 Foundation and construction of pit s and soak-aways

3.3.1 For Direct Pits

For the pits a foundation is made as per drawing of the direct pit, included in this Guide as appendix. The ring beams are cast in the dug trenches. (Strip foundation of concrete, 150x250mm2 (depth x width)). The level of the ringbeam needs to be carefully determined, depending on the depth of the pit.

The construction of this pits must be implemented as per drawing.

After curing of the strip foundation for at least three days, the construction of the masonry open walls can start. All around, the pit must have open brick work (a honeycomb type) except for the upper 300 mm which must be fully sealed. The mortar mix to be used is 1:4. The open vertical joints between the bricks will be 12-15mm. This is to allow for good infiltration

For issues on supervision of the foundation and the construction of the pit: see further down.

3.3.2 For leach pits (of pour-flush systems) and soak-aways

Construction of latrine (up to slab level), junction chamber, pits, soak-away, and installation of pipes

The construction must be done as per drawing (appendix).

Construction of the latrine walls up to the slab level

The walls of the latrine building can be constructed up to the slab level except for the backside through which the siphon must be installed and the drainpipe must be connected. The space will be backfilled till the slab level, leaving enough space for the pan and installation of the siphon. The latrine slab is put in place. The siphon must be carefully installed (levelled) and fixed and sealed with putty. The functioning of the water seal must be checked and if needed the position of the siphon adjusted. Then the drainpipe is carefully connected. Below the siphon, and the drainpipe lean concrete (ration 1:4:8) needs to be put to fix these parts properly. Then the back-wall can be constructed

Construction of the junction chamber

The drainpipe from the latrine to the junction chamber and from there to the pit should have a slope of 1:10, i.e. when the pit entrance is 2 metres from the latrine pan, the height difference is 200mm. A good slope is important as it ensures a good flow of the faeces to the pit, and prevents choking. A plan and a section drawing of the junction chamber are included in the detailed drawings.

Construction of leach pits (for pour-flush system)

After curing of the strip foundation for at least three days, the installation of the concrete perforated rings can start. The concrete rings must be lowered down in a very careful way to avoid any damage; this can be done using a tripod. The concrete rings are perforated (as described in section 4.2 "Quality Control of Materials") to allow easy infiltration in the surrounding gravel envelope and soil.

The upper ring will have a hole (dia 100mm) at a height of about 50 mm above the lower end for allowing the PVC drainpipe (dia 100mm) to enter the pit. Always make sure that the slope of the drainpipe is some 1:10, to prevent choking. In case of soils with low permeability a soak-away is needed. The fluids from the pit will overflow to the soak-away through a 50-mm PVC pipe. The slope should be slightly towards the soak-away.

To allow for gases to escape a small diameter (40-50mm) and short (1.0m) PVC pipe will be installed coming from the side wall of the junction chamber and attached to the back-wall of the latrine.

Construction of soak-away

If the soil is sufficiently stable, the soak-away does not need to be lined. Two courses of masonry form the foundation for only one or two concrete non-perforated rings.
The concrete rings must be carefully lowered down. The soak-away will have a hole of 50 mm at the lower side of the second ring to allow the overflow pipe (PVC diameter 50mm) from the pit in use to enter the soak-away. The drainpipe continues about 75 mm inside the soak-away.
If the soil is not stable, perforated concrete rings should be installed. If the soil has a low infiltration capacity, an envelope of *khoa* needs to be installed around the lining of 0.10m.
The depth of the soak-away should be as deep as possible. That means up to 0.50 m below lowest groundwater level, but with a maximum depth of 4.50m.

GENERAL:

Supervision of the foundation and the construction of the pit

For the foundation, the supervision is on the right location and direction (square?) of the foundation, the right dimensions of the strip foundation, use of the prescribed reinforcement bars and the right concrete quality (concrete mixture ratio).

For the construction of the pit it is important to take the following into consideration:

➔ **Mixture for concrete:**
A good mixture ratio is 1:2:4 for cement:sand:gravel. This is measured by volume, and using dry sand. If wet sand is used than the sand volume is to be increased with 25%. One bag of cement (50 kg) gives a volume of 35 litres. It is quite convenient to use a gauge box of some 20-25 litres. Contractors and masons tend to reduce the volume of cement! The amount of water to be added must be enough to moisten the ingredients but the mixture must remain stiff. Too much water decreases the strength of the concrete. The gravel must be of hard material. Thorough mixing is needed. Only if the forces applied to the structure remain low, *khoa* can be used as aggregate. Any concrete product ***must be cured for at least seven days!*** By covering the surface with wet material such as gunny bags, mats, banana leaves and stems, and keeping it wet. If there is no proper curing then the product will loose much of its strength!
Lean concrete has a mixture ratio of 1:4:8.

➔ **Cement mortar:**
A good mixtures makes the ratio 1:3 for cement: sand.

3.4 Backfilling

3.4.1 Backfilling around open brickwork of Direct Pits

After the brickwork is completed, the excavated material has to be backfilled and compacted. When the soil has a low absorption capacity, an envelope of at least 0.10m of khoa must be put around the brickwork to allow for optimal absorption surface. The backfill against the upper 0.30m of the brickwork should create a seal around the brickwork. Impermeable material such as clay should be used. In case of soil with low infiltration capacity, the earth at the bottom of the pit is loosened with a pick and all surplus/spilt mortar is removed prior to the placement of the slabs.
In case the soil is not stable and an expected highest water table above the bottom of the pit, the bottom of the pit needs to be sealed with 100mm thick lean concrete (1:4:8) or stiff clay to prevent loose soil entering the pit.

Supervision of foundation and pit construction

➔ Make sure that the brickwork is plumb, square and level.
➔ Make sure that the open joints are of correct size and really open

3.4.2 Backfilling around concrete rings for leach pits (pour-flush system) and soak-aways

After installation of the concrete rings, the excavated material has to be backfilled and well compacted. The backfill against the upper ring should create a seal around the ring. Impermeable material such as clay should be used. In loose soils the bottom of the pit has to be sealed with clay or lean concrete (100mm).

3.5 Placing of the beam and slab

Placement of the pre-cast beam

To support the latrine slab and the removable slab, a supporting beam needs to be cast. The dimensions are given on the drawing. The beam has to be properly located and put level.

Placement of the slab

When the brick walls of the pit have cured for some three days, the two cover slabs can be placed. The latrine slab with pan and ventilation hole (see drawing) is permanently in place. The other slab needs to be removed to facilitate the regular emptying of the pit.
The slabs need to be placed 50 mm on all supporting walls or beam (see drawing).

Supervision placement slab

➔ Make sure that the slabs are in good condition and the slab and ventilation hole at right location
➔ Make sure that the slabs are properly placed

3.6 Construction of the latrine building

Superstructure options:

- Brick walls and RCC roof with either wooden or GI door
- Brick walls and corrugated iron roof with either wooden or GI door
- Corrugated iron walls and roof with either wooden or GI door

The detailed technical drawings and BoQs are attaches as appendices.

Walls

The latrine building will be constructed as per detailed drawing (attached). The hardest bricks (bluish tint) will be used for the lower part as this has to carry the rest of the building. The outer and inner walls of the latrine need to be plastered with the usual plaster mix.

➔ **Plaster:** A good plaster makes the ratio 1:2:8 for cement:lime:sand. The sand must be clean and finer than river sand used for concrete.

Ventilation

To allow for gases causing bad smells to escape and to prevent fly breeding and mosquito nuisance, a ventilation pipe is to be installed on the pit through a hole in the latrine slab, inside the latrine. If there are more than one pit, each pit gets its own ventilation pipe. The diameter of the vent pipe must be 100 mm and the length about 2.5-3.0m. The top of the vent pipe must extend some 0.50m above the highest point of the roof to ensure good draft in the pipe.
A hole must be made in the roof sheets (CIS) or in the RCC roof to erect the vent pipe. Two pipe clamps should fix the vent pipe on small timber wall plates (100mm x 50mm) which have been wired through the latrine walls.

A fly-screen must be put over the upper opening of the vent pipe and well tightened with galvanised wire.

Roof

The roof must accommodate the vent pipe. So in case of RCC roof, an open space must be left in the roof to extend the vent pipe above the roof. This vent pipe must be sealed on the roof with cement mortar. In case of CIS, these must be cut to accommodate the vent pipe. The vent pipe must be sealed in the roofing material with putty or solvent cement.

Door

Special attention needs to be paid to the fixing of the doors. The irons for the hinges need to be cemented in the wall while putting the bricks. The door must close the entire opening to ensure privacy for teachers and students and not leave spaces (possible peep-holes).

Supervision of the construction of the latrine building

➔ Make sure that the latrine slab is smoothly cement finished (punning)
➔ Make sure that the inner and outer walls are well plastered with right plaster mixture
➔ Make sure that the vent pipe is properly placed, fixed to the walls, sealed at the passage through the roof and covered with a properly tightened fly-screen
➔ Make sure the door is well fixed with no openings at either side

3.7 Implementation of the urinal

The implementation of the urinal follows the same process as for the latrines.
If we need to build two or more urinals, we can make some financial savings by constructing double urinals (for two people).

The detailed drawings and the Bill of Quantities are attached.

The quality control of materials, construction of foundation and walls are as for the latrine construction. Also the supervision follows the same points.

4. MONITORING OF THE CONSTRUCTION PROGRESS AND UTILISATION OF FUNDS FOR SSIC

INTRODUCTION

As we are implementing our school latrine project, we would like to know how we are progressing and how we are doing financially. In our plan we included a time plan for the implementation showing different stages of work versus time. Next to the progress in time, we want to see whether we do not spend more than the funds we have available. We therefore have to keep track what we spent and whether that is according to the plan.

GOAL

To monitor the progress of the sanitation project in time and the spending of the funds, and take action if not as planned.

ISSUES

- Implementation progress versus time
- Implementation progress versus funds spent
- Possible actions to correct situation

5.1 Implementation progress versus time

The implementation plan we made in chapter 2.2 is our guiding schedule. We can put it on a larger sheet of paper and pin it on the wall of the teachers' room. At the end of every week the secretary of the SSIC assesses the physical progress in implementation. If a certain part is not yet completely ready, the secretary of the SSIC indicates the percentage of completion. This progress is entered in a different colour on the time-plan sheet.

Example:

Sl no.	*Activities*	*Responsibility*	*Weeks*									
			w1	w2	w3	w4	w5	w6	w7	w8	W9	W10
1.	Preparation of plan	SSIC										
2.	Site Selection	SSIC										
3.	Meeting for approval plan and site	SSIC and SMC										
4.	Purchase of materials	SSCI										
5.	Contracting masons and unskilled labour	SSCI										
6.	Rehabilitation existing latrines	Masons; other labour										
7.	Excavations	Unskilled labour										
8.	Foundations	Masons; other labour										
9.	Construction of pits	Masons; other labour										
10.	Construction of latrine up to slab level	Masons; other labour										
11.	Construction of latrine buildings	Masons; other labour										
12.	Construction of urinals	Masons; other labour										
13.	Supervision of construction work	SSIC and SMC										
14.	visits by SAE	SAE										
15.	Commissioning	SSCI; SAE										

4.2 Implementation progress versus funds spent

In our implementation plan we also indicated what the expected expenditures were and for what exactly. During the implementation we can now check whether we have spent more or less than planned. We will therefore break the expenditures in parts as related to certain activities.

The following table gives an example how this could be done. But it very much depends on the type and number of latrines and urinals we want to construct.

Example for substructure of six new offset single pour-flush latrines including the superstructures (There may be differences with total expected costs in proposal)

No	*Item description*	*Expected number units needed*	*Unit price (Thaka)*	*Present market costs*	*Actual number units used*	*Actual paid unit price (Thaka)*	*Amount of money spent*	*Remarks / balance + or -*
	Masons	68 days	150	10,200				
	Unskilled labourers	97 days	100	9,700				
	Sub-Assistant Engineer (SAE)	Once						
	Cement	47 bags	230	10,810				
	Khoa	11.5 m^3	1000	11,500				
	Sand	11.5 m^3	300	3,450				
	Gravel							
	Bricks	5225	2.8	14,630				
	Steel bars	36 kg	17	612				
	Latrine Slab							
	Latrine pan	6	200	1,200				
	Water seal -U-shape	6	25	150				
	Latrine door	6	1500	9,000				
	Hinges-catch hooks; Angle irons	24 36	10 25	240 900				
	Roofing sheets CI	24 m^2	150	3,600				
	PVC pipe Ø 100mm	45 m	25	1,125				
	PVC pipe Ø40/50mm	6 m	16	96				
	Perforated concrete rings Ø 3'	90	120	10,800				
	Non-perforated concrete rings Ø 3 '	33	120	3,960				
	Concrete ring slabs	12	220	2,640				
	RCC slabs							
	Other materials							
	Sub-Totals Thaka			94,613				
	Miscellaneous	5%		4,730				
	Grand Totals Thaka			99,343				
				Expected amount			**Actual spent**	**Total balance**

For the example: The same monitoring table needs to be made for the rehabilitation of the two latrines and the four new urinals.

The same type of monitoring tables we have to make for each of our own sanitation improvements, that would mean (depending on what we want to improve) for the rehabilitation of existing latrines, the construction of new latrines, the construction of urinals, etc.

No	*Item description*	*Expected number units needed*	*Unit price (Thaka)*	*Present market costs*	*Actual number units used*	*Actual paid unit price (Thaka)*	*Amount of money spent*	*Remarks / balance + or -*
	Masons							
	Unskilled labourers							
	Sub-Assistant Engineer (SAE)							
	Cement							
	Khoa							
	Sand							
	Gravel							
	Bricks							
	Steel bars							
	Latrine Slab							
	Latrine pan							
	Water seal -U-shape							
	Latrine door							
	Hinges-catch hooks; Angle irons							
	Roofing sheets CI							
	PVC pipe Ø 100mm							
	PVC pipe Ø40/50mm							
	Perforated concrete rings Ø 3'							
	Non-perforated concrete rings Ø 3 '							
	Concrete ring slabs							
	RCC slabs							
	Other materials							
	Sub-Totals Thaka							
	Miscellaneous							
	Grand Totals Thaka							
				Expected amount			**Actual spent**	**Total balance**

4.3 Possible actions to correct problems during implementation

In general it is difficult to speed up implementation of this type of projects, if there are delays in time. We could hire more masons but because of the size of the project that would not make a very big difference in total time, unless the hired mason got ill or moved to another area or another project. In the contract with him/her, we have to agree on the time period in which we want to have the latrines completed. We further have to pay him/her in instalments, that means in parts of the total for what he/she has completed. The final payment will only be done when the latrines are completed according to the designs and construction quality. So when the Sub-Assistant Engineer has approved the structures and commissioned them.

Regarding the spending of funds, we must negotiate with the suppliers to keep the prices within our budget. If we do not stay within our budget, we have to request for extra funds from the SMC and the parents. That may be difficult and may not result in more funds. That would mean that we end up with unfinished facilities because of poor financial management. We can negotiate with the masons and unskilled labourers on a good deal. At the end we must be within our budget.

If we have contracted out the work to a contractor, he will purchase all the materials himself unless otherwise agreed.

5. COMMISSIONING IMPROVEMENTS AND OFFICIAL OPENING FOR SMC

INTRODUCTION

The commissioning is the final check whether the project was implemented according to the details. If this final check is positive, the school can start using the new facilities.
After this commissioning, we as the SMC should officially open this.
We should see this opening as an opportunity to raise the sanitation issue at school and in the village. We must really use this opportunity and get the maximum out of it.

GOAL

To have a final check on the new facilities and to organize an opening ceremony for the school and village also to raise the profile of sanitation at school and village level.

ISSUES

- The commissioning of the new school facilities
- The preparation of the opening ceremony
- The opening ceremony

5.1 Commissioning of the facilities

The supervisor of the implementation of the project is the secretary of the SSIC. It is good that the final check is done together with some other people, possibly from the SMC with some assistance from the thana level. The Sub-Assistant Engineer (SAE) from the thana will advise the SSIC and the SMC on the commissioning. He/she has a wide experience in building or construction supervision of sanitation facilities. But, he/she will only be an adviser to the SMC as we are the owners of the facilities. We must take his/her advice seriously and may want the mason to do some final corrections or final touches. The SAE may have to report to the thana to report back whether the funds from the Supporting organisations were properly spent.

5.2 Preparation of opening ceremony

Target group to be invited:

The entire school, teachers and students, their parents and other important village people could be invited, as well as some officials from the thana level.
But it must remain clear, the achievement is the result of efforts and hard work done by the SMC and the school. They and not the thana officials should get the credits for this achievement.

Goal

The opening is a great opportunity to raise the issue of sanitation, its importance for the school but also for the village as a whole.
Because reduction in sanitation-related diseases can only be achieved if all households improve their sanitation facilities and more so their sanitation behaviour. The school is only one component in this process, although crucial as it is the educational centre for the students.

Possible activities

- Welcome by student representative
- Opening speech by Chairman of SMC
- Address by special guest
- History of project, lessons from project and follow-up activities (including operation and maintenance) by chairperson of the SSIC
- School sanitation and hygiene, linkages and activities by secretary of the SSIC or a teacher

- School curriculum (different subjects) with links to sanitation and hygiene by a teacher
- Presentation of School Health Clubs: their goal, objectives and programme of activities
- Importance of village sanitation and people's sanitation behaviour (links and activities)
- Visit to and explanation of new sanitation facilities
- Drinks and snacks
- Contests on hygiene and sanitation

5.3 Opening ceremony

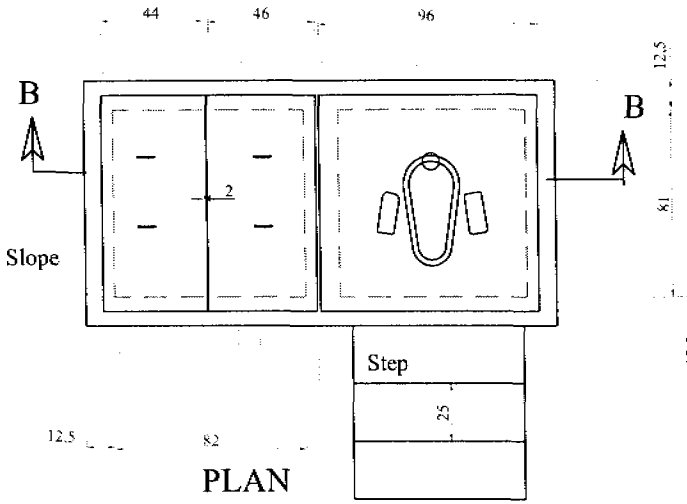
(Details of the opening programme, framework for speeches, example materials for contests and for curriculum, ideas for School Health Clubs etc. have to be developed by another project)

APPENDIX 1

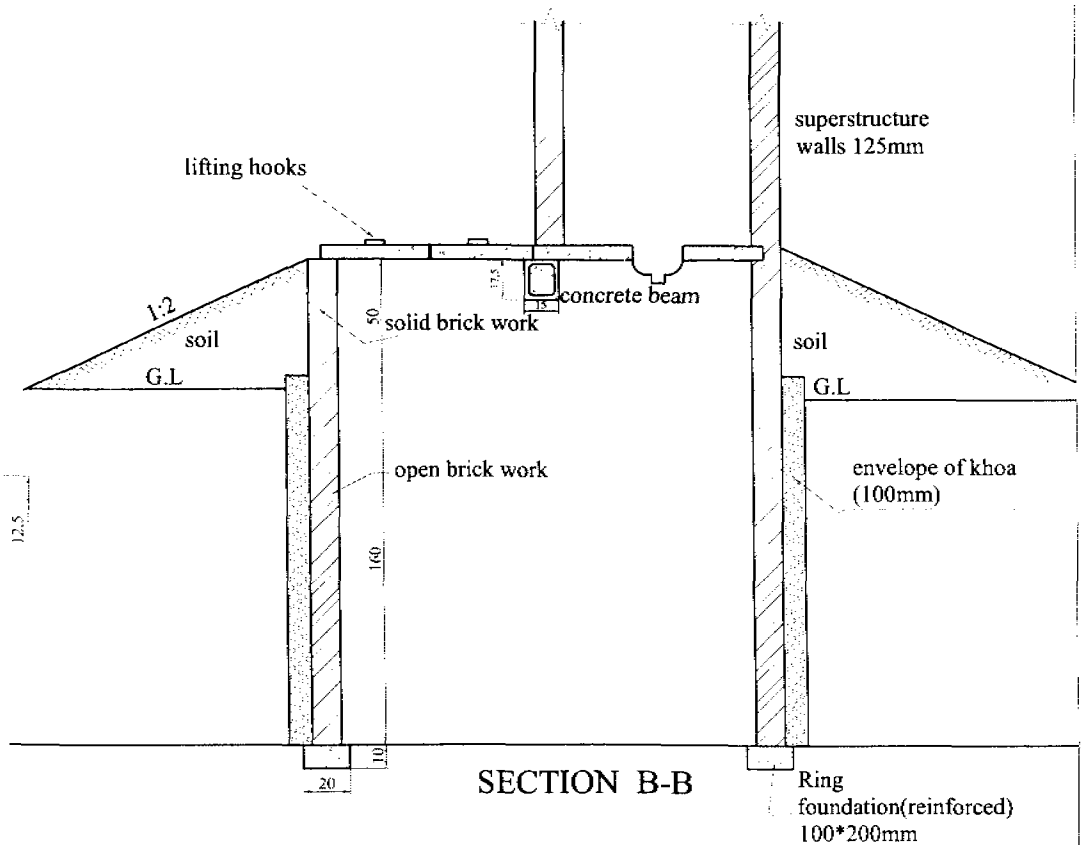
CONSTRUCTION DRAWING

SINGLE DIRECT PIT

DIRECT SINGLE PIT LATRINE



PLAN



SECTION B-B

* all dimentions are in cm

APPENDIX 2

BOQ

SINGLE DIRECT PIT

Bills of quantities and cost estimate for Direct Single pit latrine

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labour
			Goods	quantity	price	Total amount	worker	position	Total days	wage /day	total amount	
1	Earth work in excavation											
	a)Latrine, cum	0										
	b) pit, cum	5.8					mason	skilled	0.20	150	30.74	
	c) soak wawy, cum	0					labour	Un-skilled	2.56	100	256.18	
	Total	**5.8**									**286.93**	286.93
2	(1:3:6) mass concrete in foundation 100mm & step		Bricks, nr	37	2.8	102.86	mason	skilled	0.04	150	6.36	
	a)Latrine wall, cum	0	cement, bag	0.51	235	119.42	labour	Un-skilled	0.42	100	42.40	
	b)Latrine floor, cum	0	sand, cum	0.05	300	16.16						
	C) pit foundation, cum	0.12										
	Total	**0.12**				**238.43**					**48.76**	287.19
		0.205	Bricks, nr	80	2.8	224.00	mason	skilled	0.0797	150	11.95	
	1st brick work in steps with cement and sand mortar		cement, bag	0.3	235	68.15	labour	Un-skilled	0.31	100	30.79	
3	(1:6) , cum		sand, cum	0.07	300	22.15						
						314.30					**42.74**	357.03
		14.45	Bricks, nr	747	2.8	2092.50	mason	skilled	0.94	150	140.44	
	125 mm thick brick work with 1st class bricks cement		cement, bag	4.1	235	961.42	labour	Un-skilled	4.92	100	491.55	
4	sand mortar (1:6) , sqm		sand, cum	0.75	300	224.13						
						3278.05					**631.99**	3910.04
		0.213	Bricks, nr	64	2.8	179.20	mason	skilled	0.08	150	11.29	
	RCC slab (1:2:4) with cement, sand and picked		cement, bag	1.36	235	319.60	labour	Un-skilled	0.55	100	54.57	
	jhama chips (khoa) including 6 mm dia reinforcement		sand, cum	0.10	300	28.76	carpenter	skilled	0.21	150	31.95	
	both way 20 cm spacing, cum		M.S Rod, kg	8.5	17	144.50	Helper	Un-skilled	0.21	100	21.3	
5						**672.06**					**119.11**	791.17
	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0	100	0.00	
6						**0.00**					**0.00**	0.00
		0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
	38 mm thick artificial patent stone (1:2:4) Latrine		cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
7	floor; sqm		sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	2	5	10.00	mason	skilled	0.05	150	7.50	17.50

9	Latrine pan of PVC fixed in position		PVC pan	1	200	200.00	mason	skilled	0.5	150	75.00	275.00
10	U- shape water seal		PVC trap	0	25	0.00	mason	skilled	0	150	0.00	0.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	0	82	0.00	Mystery	skilled	0	180	0.00	0.00
12	50 mm dia PVC ventilation pipe		PVC pipe	4	46	184.00	Mystery	skilled	0.5	180	90.00	274.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and gatvanised iron plain sheet		steel door	0	1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	3.04	cement	0.5	235	115.77502	mason	skilled	0.49	150	73.90	
			sand	0.05	300	13.8928	labour	Un-skilled	0.41	100	41.05	
						129.66782					**114.95**	244.62
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0.00	labourer	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	2.2	khoa	2.2	1060	2332	labourer	Un-skilled	1.05	100	105.12	2437.12
	Total											**8,880.61**

Materials and Labour required for *Direct Single pit latrine*

Discription	units	Quantities
Labour		
Masons	days	3.1
Unskilled Labourers	days	10.4
Materials		
Cement	bags	6.7
Khoa	m3	2.2
Sand	m3	1.02
Gravel	m3	
Bricks	nr	928
Steel bars	kg	8.5
Latrine slab	nr	
Latrine pan	nr	1
Latrine door	nr	
Hinges, catch hooks etc.	nr	4
Roofing sheets CI	nr	
Drain pipe 100mm	m	
Vent pipe 40/50 mm	m	4
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

APPENDIX 3

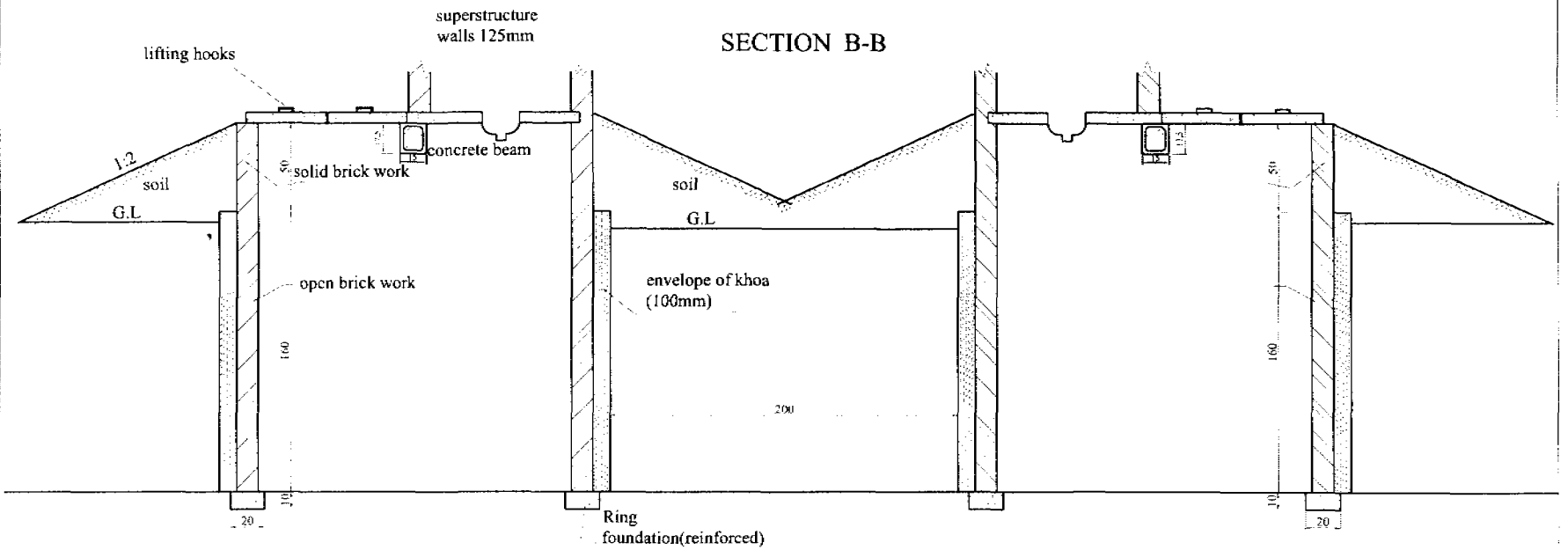
CONSTRUCTION DRAWING

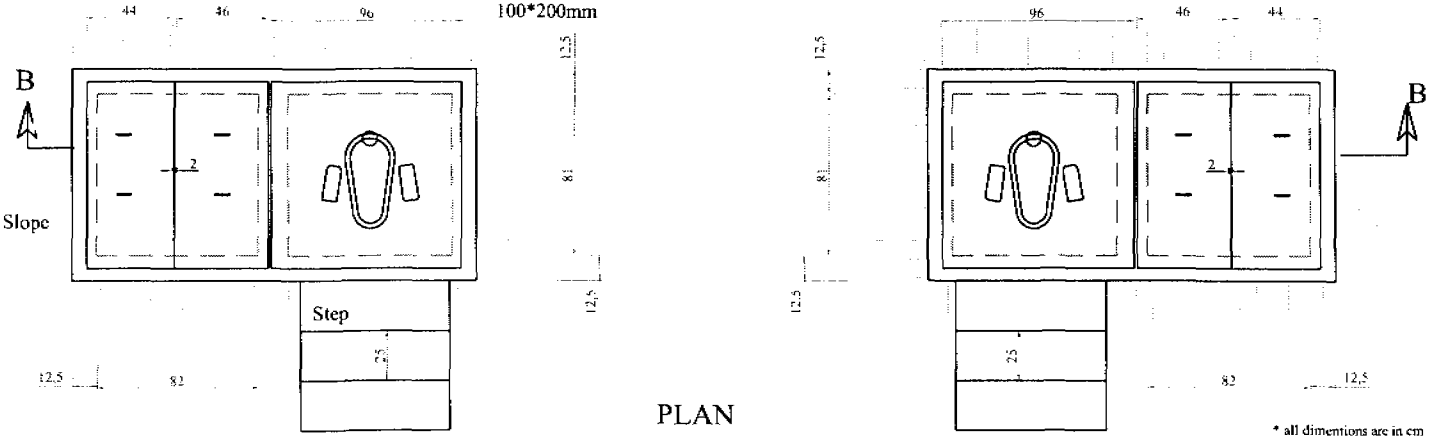
TWO ADJACENT

SINGLE DIRECT PITS

DIRECT SINGLE PIT LATRINE TWO ADJACENT

SECTION B-B





PLAN

* all dimentions are in cm

APPENDIX 4

BOQ

TWO ADJACENT

SINGLE DIRECT PITS

Bills of quantities and cost estimate for Direct Single Pit latrine - two adjacent

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labour
			Goods	quantity	price	Total amount	worker	position	Total days	wage/day	total amount	
1	*Earth work in excavation*											
	a)Latrine, cum	0										
	b) pit, cum	12.2					mason	skilled	0.43	150	64.66	
	c) soak wawy, cum	0					labour	Un-skilled	5.39	100	538.87	
	Total	**12.2**									**603.53**	603.53
2	(1:3:6) mass concrete in foundation		Bricks, nr	67	2.8	188.57	mason	skilled	0.08	150	11.66	
	a)Latrine wall, cum	0	cement, bag	0.9	235	218.93	labour	Un-skilled	0.78	100	77.74	
	b)Latrine floor, cum	0	sand, cum	0.10	300	29.62						
	C) pit foundation, cum	0.22										
	Total	**0.22**				**437.12**					**89.40**	526.52
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.41	Bricks, nr	160	2.8	448.00	mason	skilled	0.16	150	23.90	
			cement, bag	0.6	235	136.30	labour	Un-skilled	0.62	100	61.57	
			sand, cum	0.15	300	44.29						
						628.59					**85.48**	714.07
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , sqm	25.96	Bricks, nr	1343	2.8	3759.25	mason	skilled	1.68	150	252.31	
			cement, bag	7.3	235	1727.24	labour	Un-skilled	8.83	100	883.09	
			sand, cum	1.34	300	402.66						
						5889.14					**1135.40**	7024.54
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.42	Bricks, nr	126	2.8	353.35	mason	skilled	0.15	150	22.26	
			cement, bag	2.7	235	630.20	labour	Un-skilled	1.08	100	107.60	
			sand, cum	0.19	300	56.72	carpenter	skilled	0.42	150	63	
			M.S Rod, kg	21	17	357.00	Helper	Un-skilled	0.42	100	42	
						1397.27					**234.86**	1632.13
6	*Brick flat soiling Latrine floor;* sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	4	5	20.00	mason	skilled	0.1	150	15.00	35.00
9	Latrine pan of PVC fixed in position		PVC pan	2	200	400.00	mason	skilled	1	150	150.00	550.00
10	*water seal* (U- shape)		PVC trap	0	25	0.00	mason	skilled	0	150	0.00	0.00

11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe	8	46	368.00	Mistry	skilled	1	180	180.00	548.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door	0	1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	5.28	cement	0.9	235	201.08294	mason	skilled	0.86	150	128.35	
			sand	0.08	300	24.1296	labour	Un-skilled	0.71	100	71.31	
						225.21254					**199.66**	424.87
16	Minimum 12mm thick cement plaster (1:6) to super-structure wall both inner and outer surface ;sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	3.55	khoa	3.55	1060	3763	labourer	Un-skilled	1.70	100	169.62	3932.62
	Total											**16, 22.15**

Materials and Labour required for *Direct single Pit latrine- two adjacent*

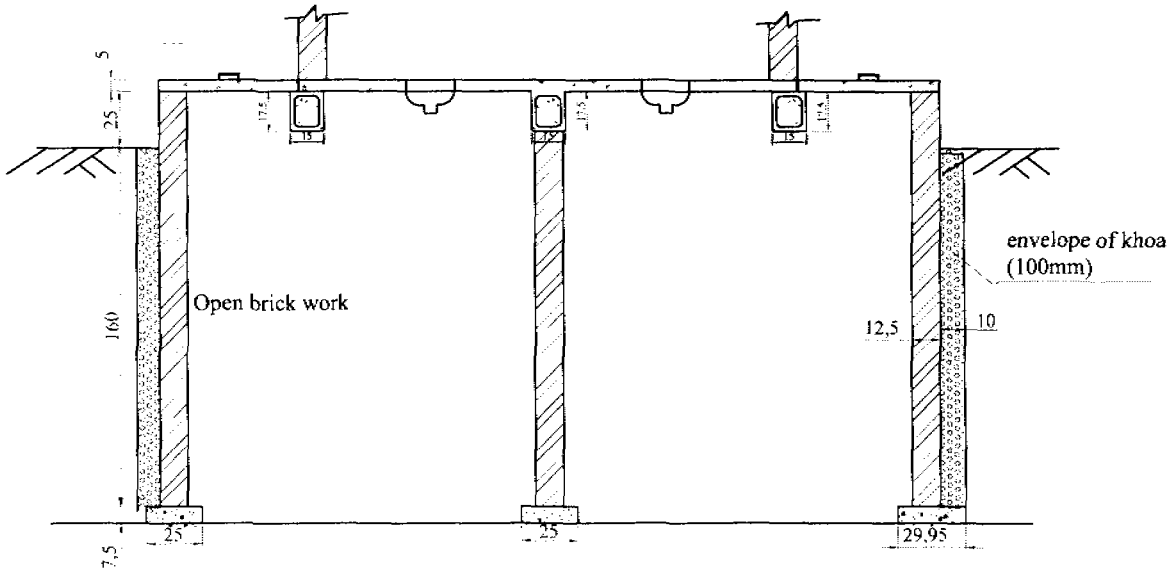
Discription	units	required qnt.
Labour		
Masons	days	5.87
Unskilled Labourers	days	19.52
Materials		
Cement	bags	12.4
Khoa	m3	3.55
Sand	m3	1.86
Gravel	m3	
Bricks	nr	1696
Steel bars	kg	21
Latrine slab	nr	
Latrine pan	nr	2
Latrine door	nr	
Hinges, catch hooks etc.	nr	4
Roofing sheets CI	nr	
Drain pipe 100mm	m	
Vent pipe 40/50 mm	m	8
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

APPENDIX 5

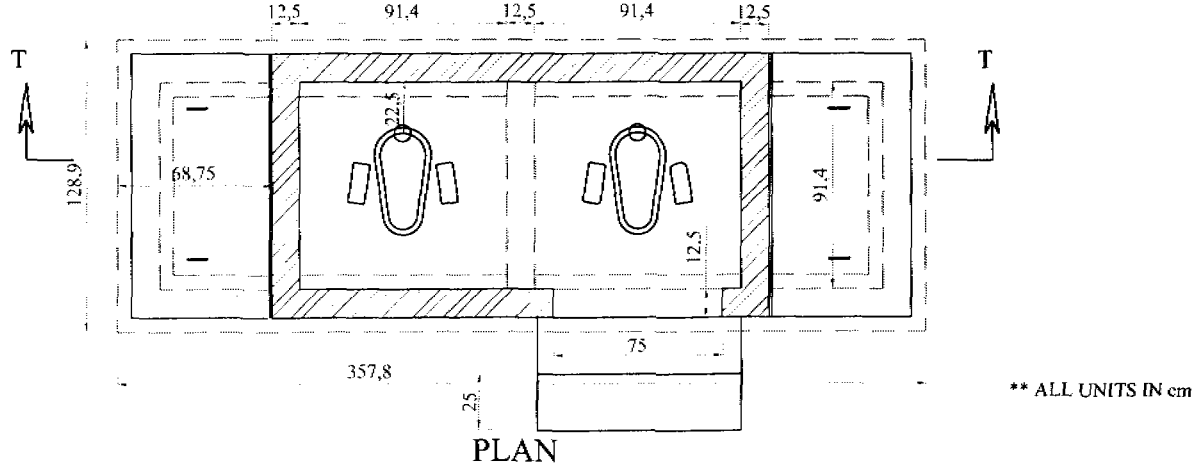
CONSTRUCTION DRAWING

DOUBLE DIRECT PIT

DIRECT DOUBLE PIT LATRINE



SECTION T-T



PLAN

** ALL UNITS IN cm

APPENDIX 6

BOQ

DOUBLE DIRECT PIT

Bills of quantities and cost estimate for direct double pit latrine

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labour
			Goods	quantity	price	Total amount	worker	position	Total days	wage/day	total amount	
1	Earth work in excavation						mason	skilled	0.28	150	42.67	
	a)Latrine, cum	0					labour	Un-skilled	3.56	100	355.57	
	b) pit, cum	8.05									**398.23**	398.23
	c) soak wawy, cum	0										
	Total	**8.05**										
2	(1:3:6) mass concrete in foundation		Bricks, nr	49	2.8	137.14	mason	skilled	0.06	150	8.48	
	a)Latrine wall, cum	0	cement, bag	0.7	235	159.22	labour	Un-skilled	0.57	100	56.54	
	b)Latrine floor, cum	0	sand, cum	0.07	300	21.54						
	C) pit foundation, cum	0.16										
	Total	**0.16**				**317.91**					**65.02**	382.93
		0.205	Bricks, nr	80	2.8	224.00	mason	skilled	0.08	150	11.95	
			cement, bag	0.3	235	68.15	labour	Un-skilled	0.31	100	30.79	
3	1st brick work in steps with cement and sand mortar (1:6) , cum		sand, cum	0.07	300	22.15						
						314.30					**42.74**	357.03
		18.34	Bricks, nr	949	2.8	2655.80	mason	skilled	1.19	150	178.25	
	125 mm thick brick work with 1st class bricks cement sand		cement, bag	5.2	235	1220.24	labour	Un-skilled	6.24	100	623.88	
4	mortar (1:6) , cum		sand, cum	0.95	300	284.47						
						4160.51					**802.13**	4962.64
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.32	Bricks, nr	96	2.8	269.22	mason	skilled	0.11	150	16.96	
			cement, bag	2.0	235	480.15	labour	Un-skilled	0.82	100	81.98	
			sand, cum	0.14	300	43.21	carpenter	skilled	0.32	150	48	
			M.S Rod, kg	15.2	17	258.40	Helper	Un-skilled	0.32	100	32	
						1050.98					**178.94**	1229.92
6	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	4	5	20.00	mason	skilled	0.10	150	15.00	35.00
9	Latrine pan of PVC fixed in position		PVC pan	2	200	400.00	mason	skilled	1.00	150	150.00	550.00
10	Water seal (U -shape)		PVC trap	0	25	0.00	mason	skilled	0.00	150	0.00	0.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe	8	46	368.00	Mistry	skilled	1.00	180	180.00	548.00

13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door	0	1200	0.00	mason	skilled	0.00	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
				0			labour	Un-skilled	0.00	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	2.11	cement	0.3	235	80.3570067	mason	skilled	0.34	150	51.29	
			sand	0.03	300	9.6427	labour	Un-skilled	0.28	100	28.50	
						89.9997067					**79.79**	169.79
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	3.39	khoa	3.39	1060	3593.4	labourer	Un-skilled	1.62	100	161.98	3755.38
	Total											**12,819.78**

Materials and Labour required for direct double pit latrine

Discription	units	required qnt.
Labour		
Masons	days	4.38
Unskilled Labourers	days	13.15
Materials		
Cement	bags	7.9
Khoa	m3	3.39
Sand	m3	1.20
Gravel	m3	
Bricks	nr	1125
Steel bars	kg	15.20
Latrine slab	nr	
Latrine pan	nr	2.00
Latrine door	nr	
Hinges, catch hooks etc.	nr	8.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	8.00
Water seal (U -shape)		0.00
CI manhole cover 450mm dia. With frame		0.00
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

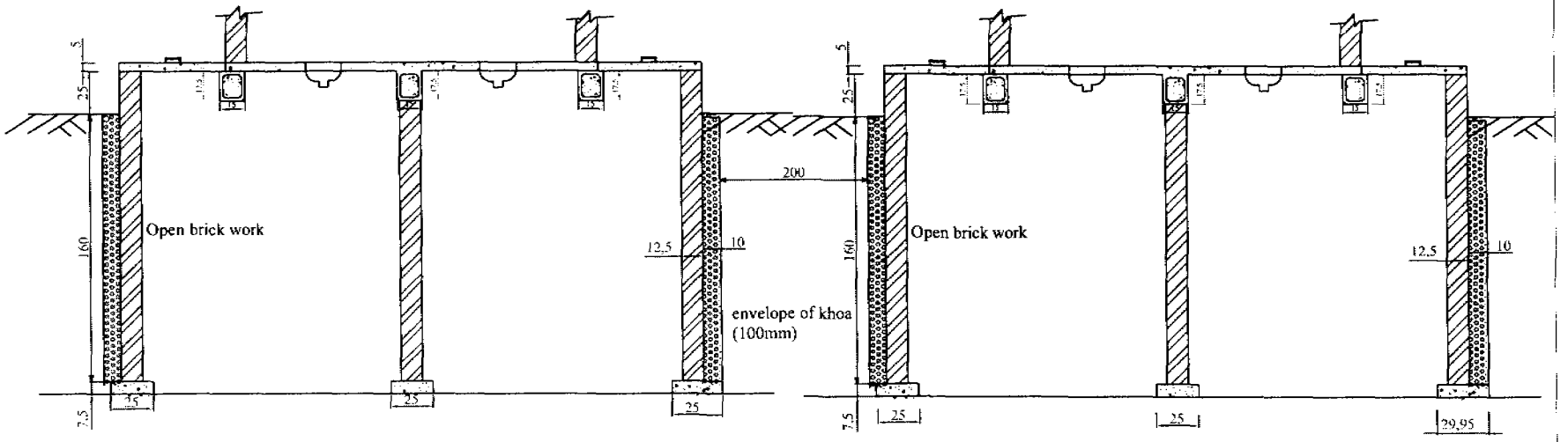
APPENDIX 7

CONSTRUCTION DRAWING

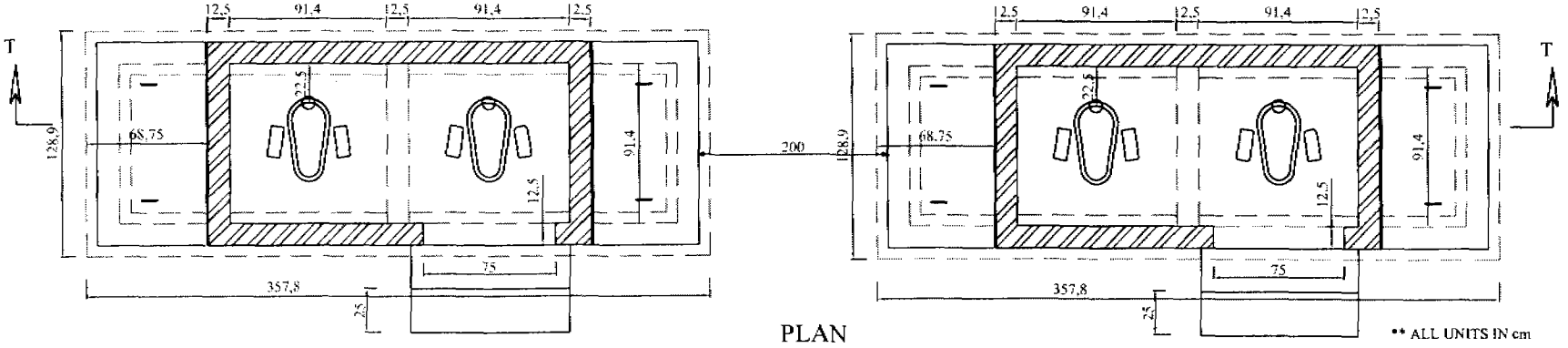
TWO ADJACENT

DOUBLE DIRECT PIT

DIRECT DOUBLE PIT LATRINE Two Adjacent



SECTION T-T



PLAN

** ALL UNITS IN cm

APPENDIX 8

BOQ

TWO ADJACENT

DOUBLE DIRECT PIT

Bills of quantities and cost eastimates for direct double pit latrine-two adjacent

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.57	150	85.07	
	a)Latrine, cum	0					labour	Un-skilled	7.09	100	708.92	
	b) pit, cum	16.05									**793.99**	793.99
	c) soak wawy, cum	0										
	Total	**16.05**										
2	(1:3:6) mass concrete in foundation		Bricks, nr	98	2.8	274.29	mason	skilled	0.11	150	16.96	
	a)Latrine wall, cum	0	cement, bag	1.4	235	318.45	labour	Un-skilled	1.13	100	113.07	
	b)Latrine floor, cum	0	sand, cum	0.14	300	43.08						
	C) pit foundation, cum	0.32										
	Total	**0.32**				**635.82**					**130.04**	765.85
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.41	Bricks, nr	160	2.8	448.00	mason	skilled	0.16	150	23.90	
			cement, bag	0.6	235	136.30	labour	Un-skilled	0.62	100	61.57	
			sand, cum	0.15	300	44.29						
						628.59					**85.48**	714.07
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) ,sqm	36.68	Bricks, nr	1897	2.8	5311.61	mason	skilled	2.38	150	356.50	
			cement, bag	10.4	235	2440.49	labour	Un-skilled	12.48	100	1247.75	
			sand, cum	1.90	300	568.93						
						8321.03					**1604.25**	9925.28
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.64	Bricks, nr	192	2.8	538.44	mason	skilled	0.23	150	33.92	
			cement, bag	4.1	235	960.30	labour	Un-skilled	1.64	100	163.96	
			sand, cum	0.29	300	86.43	carpenter	skilled	0.64	150	96	
			M.S Rod, kg	32	17	544.00	Helper	Un-skilled	0.64	100	64	
						2129.17					**357.88**	2487.05
6	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	8	5	40.00	mason	skilled	0.20	150	30.00	70.00
9	Latrine pan of PVC fixed in position		PVC pan	4	200	800.00	mason	skilled	2.00	150	300.00	1100.00
10	Water seal (U -shape)		PVC trap	0	25	0.00	mason	skilled	0.00	150	0.00	0.00

11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe	16	46	736.00	Mistry	skilled	2.00	180	360.00	1096.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door	0	1200	0.00	mason	skilled	0.00	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	4.22	cement	0.7	235	160.71401	mason	skilled	0.68	150	102.58	
			sand	0.06	300	19.2854	labour	Un-skilled	0.57	100	56.99	
						179.99941					**159.57**	339.57
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	6.78	khoa	6.78	1060	7186.8	labourer	Un-skilled	3.24	100	323.96	7510.76
	Total											**25,233.43**

Material and Labour required for direct double pit latrine-two adjacent

Discription	units	quantities
Labour		
Masons	days	8.18
Unskilled Labourers	days	26.27
Materials		
Cement	bags	15.9
Khoa	m3	6.78
Sand	m3	2.40
Gravel	m3	
Bricks	nr	2251
Steel bars	kg	32.00
Latrine slab	nr	
Latrine pan	nr	4.00
Latrine door	nr	
Hinges, catch hooks etc.	nr	16.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	16.00
Water seal (U -shape)		0.00
CI manhole cover 450mm dia. With frame		0.00
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

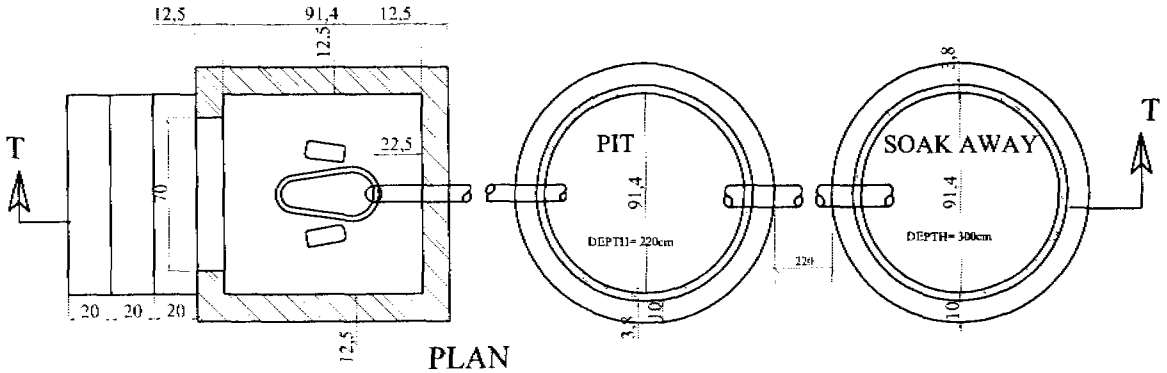
APPENDIX 9

CONSTRUCTION DRAWING

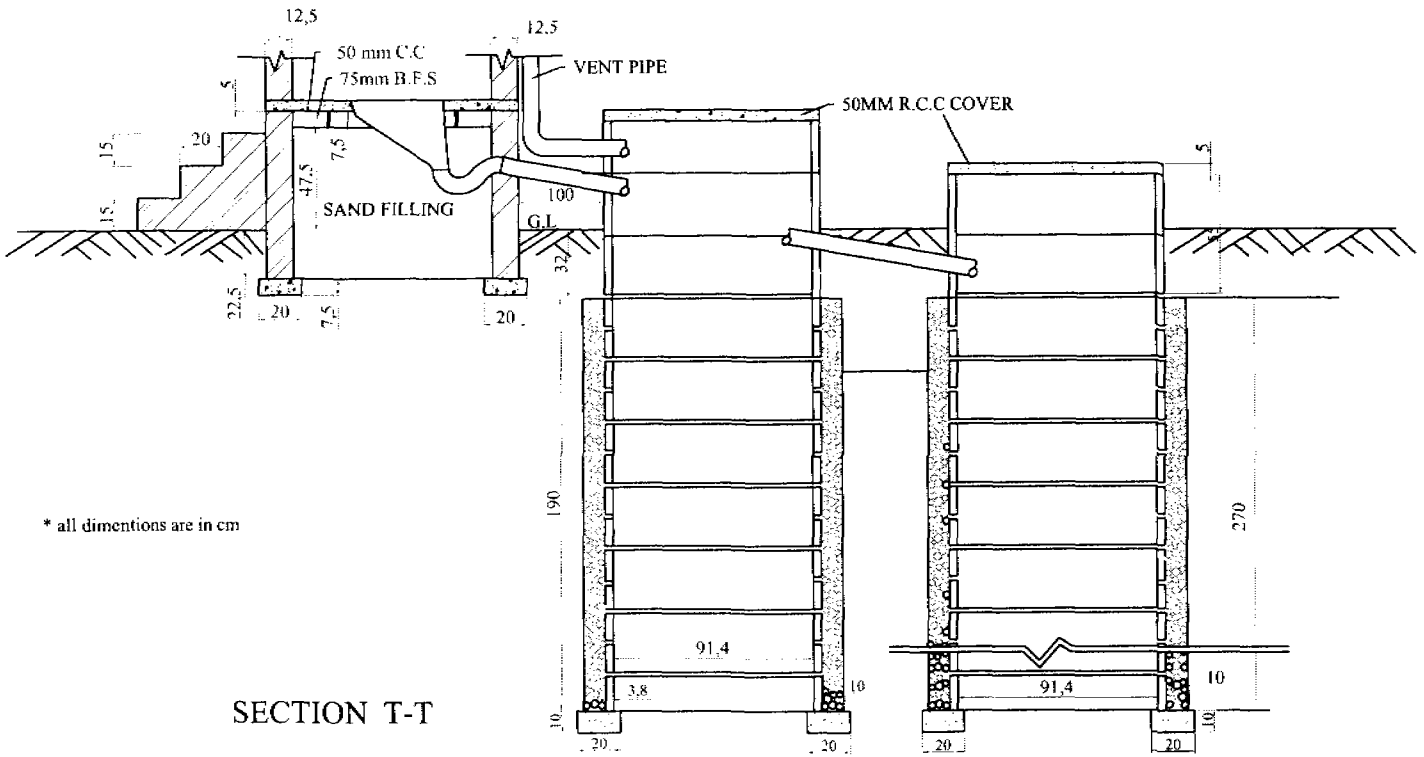
SINGLE OFFSET

POUR-FLUSH LATRINE

OFFSET SINGLE PIT LATRINE WITH POUR-FLUSH



PLAN



* all dimentions are in cm

SECTION T-T

APPENDIX 10

BOQ

SINGLE OFFSET

POUR-FLUSH LATRINE

Bills of quantities and cost estimate for Offset pour flush single pit latrine

SL.N	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.25	150	37.21	
	a)Latrine, cum	0.6					labour	Un-skilled	3.10	100	310.07	
	b) pit, cum	2.74										
	c) soak wawy, cum	3.68										
	Total	**7.02**									**347.28**	347.28
2	(1:3:6) mass concrete in foundation		Bricks, nr	89	2.8	248.57	mason	skilled	0.10	150	15.37	
	a)Latrine wall, cum	0	cement, bag	1.2	235	288.59	labour	Un-skilled	1.02	100	102.47	
	b)Latrine floor, cum	0.16	sand, cum	0.13	300	39.04						
	C) pit foundation, cum	0.13										
	Total	**0.29**				**576.21**					**117.84**	694.05
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.165	Bricks, nr	64	2.8	180.29	mason	skilled	0.06	150	9.62	
			cement, bag	0.2	235	54.85	labour	Un-skilled	0.25	100	24.78	
			sand, cum	0.06	300	17.82						
						252.97					**34.40**	287.37
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , sqm	3.35	Bricks, nr	173	2.8	485.11	mason	skilled	0.22	150	32.56	
			cement, bag	0.9	235	222.89	labour	Un-skilled	1.1396	100	113.96	
			sand, cum	0.17	300	51.96						
						759.96					**146.52**	906.48
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.2	Bricks, nr	60	2.8	168.26	mason	skilled	0.07	150	10.60	
			cement, bag	1.3	235	300.09	labour	Un-skilled	0.51	100	51.24	
			sand, cum	0.09	300	27.01	carpenter	skilled	0.20	150	30	
			M.S Rod, kg	6	17	102.00	Helper	Un-skilled	0.20	100	20	
						597.37					**111.84**	709.20
6	Brick flat soiling Latrine floor; sqm	0.756	Bricks, nr	24	2.8	68.45	mason	skilled	0.05	150	6.79	
			sand, cum	0.01	300	3 46	labour	Un-skilled	0.08	100	8.15	
						71.90					**14.94**	86.84
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	2	5	10.00	mason	skilled	0.05	150	7.50	17.50
9	Latrine pan of PVC fixed in position		PVC pan	1	200	200.00	mason	skilled	0.5	150	75.00	275.00
10	Water seal (U -shape)		PVC trap	1	25	25.00	mason	skilled	0.25	150	37.50	62.50

11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	15	120	1800	mason	skilled	1	150	150.00	
							labour	Un-skilled	1	100	100.00	
	b) solid ring		RCC ring	5	120	600	mason	skilled	0.42	150	62.50	
							labour	Un-skilled	0.42	100	41.67	
	c) pit cover	2	RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						2400					**354.17**	2754.17
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	0.55	cement	0.1	235	20.9461392	mason	skilled	0.09	150	13.37	
			sand	0.01	300	2.5135	labour	Un-skilled	0.07	100	7.43	
						23.4596392					**20.80**	44.26
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm		cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm		cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in tatrine floor and around the pit to soak away; cum	0.59	sand	0.59	300	177	labourer	Un-skilled	0.28	100	28.16	205.16
19	envelope of khoa around the pit and soak away ; cum	1.87	khoa	1.87	1060	1982.2	labourer	Un-skilled	0.89	100	89.35	2071.55
	Total											**8,892.22**

Materials and Labour required for *Offset pour flush single pit latrine*

Discription	units	required qnt.
Labour		
Masons	days	3.82
Unskilled Labourers	days	8.97
Materials		
Cement	bags	3.78
Khoa	m3	1.87
Sand	m3	1.06
Gravel	m3	
Bricks	nr	411
Steel bars	kg	6.00
Latrine slab	nr	
Latrine pan	nr	1.00
Water seal (U -shape)	nr	1.00
Latrine door	nr	
catch hooks etc.	nr	4.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	15.00
Non-Perforated concrete rings, 3ft	nr	5.00
Concrete ring slabs	nr	2.00
RCC Slabs of	nr	

APPENDIX 11

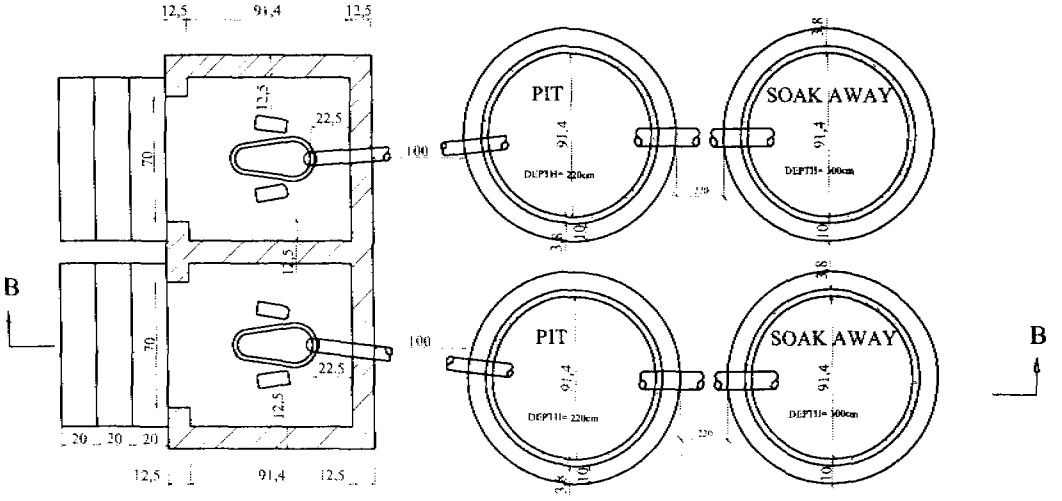
CONSTRUCTION DRAWING

TWO ADJACENT

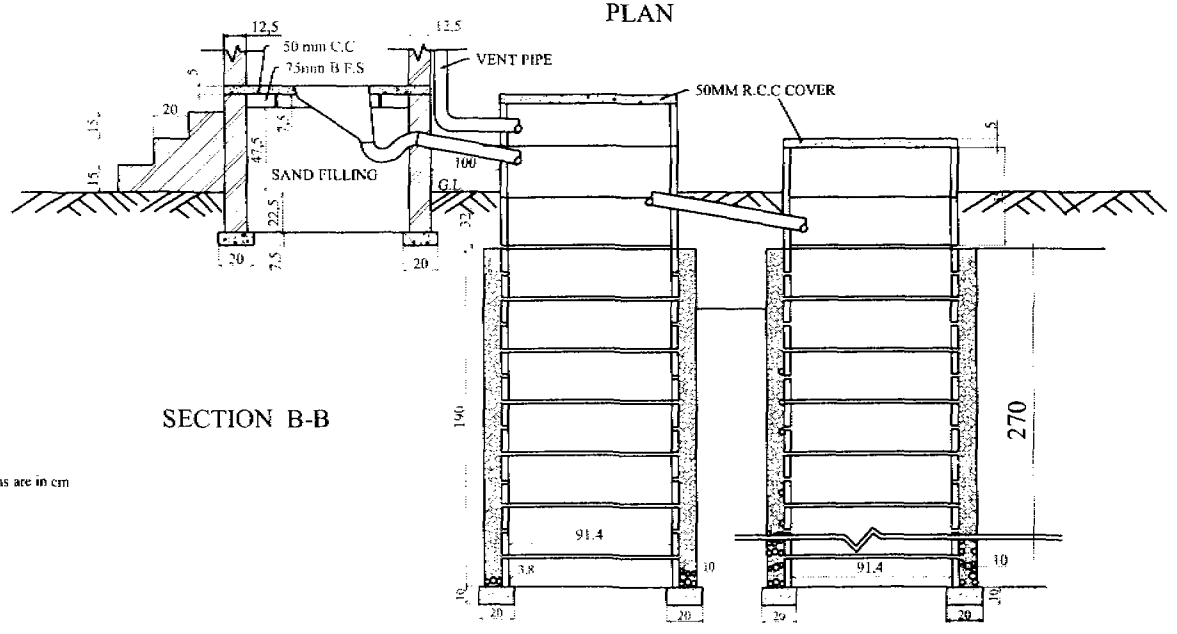
SINGLE OFFSET

POUR-FLUSH LATRINE

OFFSET SINGLE PIT LATRINE WITH POUR-FLUSH TWO ADJACENT



PLAN



SECTION B-B

* all dimentions are in cm

APPENDIX 12

BOQ

TWO ADJACENT

SINGLE OFFSET

POUR-FLUSH LATRINE

Bills of quantities and cost estimate for Offset pour flush single pit latrine - two adjacent

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.48	150	72.67	
	a)Latrine, cum	1.21					labour	Un-skilled	6.06	100	605.57	
	b) pit, cum	5.2										
	c) soak wawy, cum	7.3										
	Total	**13.71**									**678.23**	678.23
2	(1:3:6) mass concrete in foundation		Bricks, nr	171	2.8	480.00	mason	skilled	0.20	150	29.68	
	a)Latrine wall, cum	0	cement, bag	2.4	235	557.29	labour	Un-skilled	1.98	100	197.88	
	b)Latrine floor, cum	0.3	sand, cum	0.25	300	75.39						
	C) pit foundation, cum	0.26										
	Total	**0.56**				**1112.68**					**227.56**	1340.24
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.33	Bricks, nr	129	2.8	360.59	mason	skilled	0.13	150	19.24	
			cement, bag	0.5	235	109.70	labour	Un-skilled	0.50	100	49.56	
			sand, cum	0.12	300	35.65						
						505.94					**68.80**	574.74
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , cum	6.59	Bricks, nr	341	2.8	954.29	mason	skilled	0.43	150	64.05	
			cement, bag	1.9	235	438.46	labour	Un-skilled	2.24	100	224.17	
			sand, cum	0.34	300	102.22						
						1494.97					**288.22**	1783.20
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.4	Bricks, nr	120	2.8	336.53	mason	skilled	0.14	150	21.20	
			cement, bag	2.6	235	600.19	labour	Un-skilled	1.02	100	102.47	
			sand, cum	0.18	300	54.02	carpenter	skilled	0.40	150	60	
			M.S Rod, kg	12	17	204.00	Helper	Un-skilled	0.40	100	40	
						1194.73					**223.67**	1418.41
6	Brick flat soiling Latrine floor; sqm	1.51	Bricks, nr	49	2.8	136.71	mason	skilled	0.09	150	13.56	
			sand, cum	0.02	300	6.90	labour	Un-skilled	0.16	100	16.28	
						143.62					**29.84**	173.46
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	4	5	20.00	mason	skilled	0.1	150	15.00	35.00
9	Latrine pan of PVC fixed in position		PVC pan	2	200	400.00	mason	skilled	1	150	150.00	550.00
10	Water seal (U -shape)		PVC trap	2	25	50.00	mason	skilled	0.5	150	75.00	125.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86

12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	30	120	3600	mason	skilled	2	150	300.00	
							labour	Un-skilled	2	100	200.00	
	b) solid ring		RCC ring	11	120	1320	mason	skilled	0.92	150	137.50	
							labour	Un-skilled	0.92	100	91.67	
	c) pit cover	4	RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						4920					**729.17**	5649.17
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	1.05	cement	0.17	235	39.988084	mason	skilled	0.17	150	25.52	
			sand	0.02	300	4.7985	labour	Un-skilled	0.14	100	14.18	
						44.786584					**39.70**	84.49
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	1.18	sand	1.18	300	354	labourer	Un-skilled	0.56	100	56.32	410.32
19	envelope of khoa around the pit and soak away ; cum	3.74	khoa	3.74	1060	3964.4	labourer	Un-skilled	1.79	100	178.70	4143.10
	Total											**17,396.21**

Materials and Labour required for *Offset pour flush single pit latrine - two adjacent*

Discription	units	required qnt.
Labour		
Masons	days	7.13
Unskilled Labourers	days	17.77
Materials		
Cement	bags	7.43
Khoa	m3	3.74
Sand	m3	2.11
Gravel	m3	
Bricks	nr	810
Steel bars	kg	12
Latrine slab	nr	
Latrine pan	nr	2
Water seal (U -shape)	nr	2
Latrine door	nr	
catch hooks etc.	nr	8
Roofing sheets CI	nr	
Drain pipe 100mm	m	4
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	30
Non-Perforated concrete rings, 3ft	nr	11
Concrete ring slabs	nr	4
RCC Slabs of	nr	

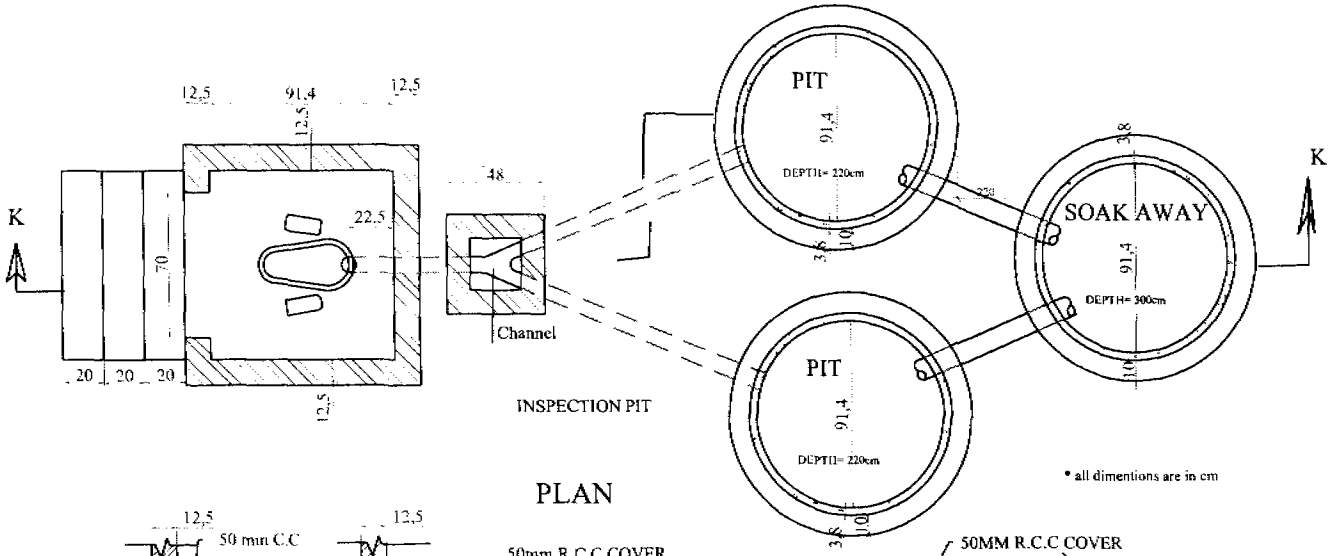
APPENDIX 13

CONSTRUCTION DRAWING

DOUBLE OFFSET

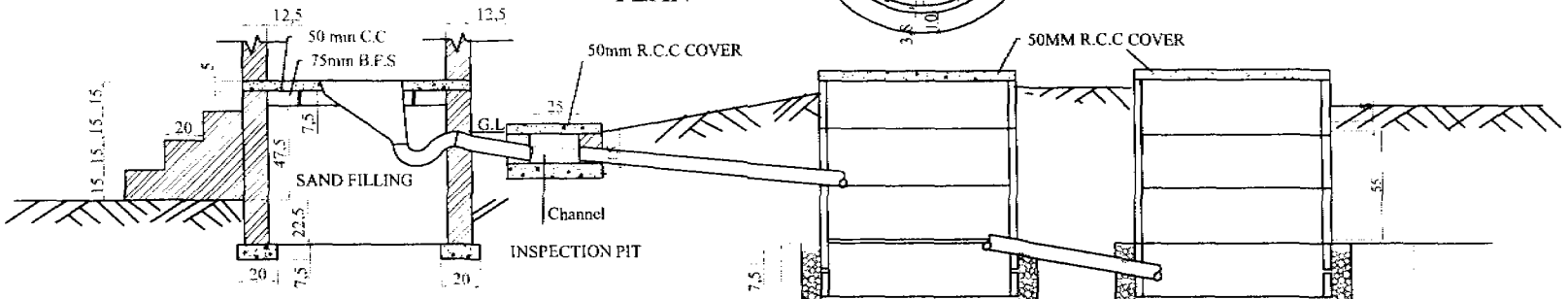
POUR-FLUSH LATRINE

OFFSET DOUBLE PIT LATRINE WITH POUR FLUSH



PLAN

* all dimentions are in cm



SECTION K-K

* all dimentions are in cm

APPENDIX 14

BOQ

DOUBLE OFFSET

POUR-FLUSH LATRINE

Bills of quantities and cost estimate for Offset pour flush Double pit latrine

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.32	150	48.55	
	a)Latrine, cum	0					labour	Un-skilled	4.05	100	404.59	
	b) pit, cum	5.48										
	c) soak wawy, cum	3.68										
	Total	**9.16**									**453.14**	453.14
2	(1:3:6) mass concrete in foundation		Bricks, nr	132	2.8	368.57	mason	skilled	0.15	150	22.79	
	a)Latrine wall, cum	0	cement, bag	1.8	235	427.92	labour	Un-skilled	1.52	100	151.94	
	b)Latrine floor, cum	0.22	sand, cum	0.19	300	57.89						
	C) pit foundation, cum	0.21										
	Total	**0.43**				**854.38**					**174.73**	1029.11
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.165	Bricks, nr	64	2.8	180.29	mason	skilled	0.06	150	9.62	
			cement, bag	0.2	235	54.85	labour	Un-skilled	0.25	100	24.78	
			sand, cum	0.06	300	17.82						
						252.97					**34.40**	287.37
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , sqm	5.15	Bricks, nr	266	2.8	745.77	mason	skilled	0.33	150	50.05	
			cement, bag	1.5	235	342.65	labour	Un-skilled	1.75	100	175.19	
			sand, cum	0.27	300	79.88						
						1168.30					**225.24**	1393.54
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.31	Bricks, nr	93	2.8	260.81	mason	skilled	0.11	150	16.43	
			cement, bag	2.0	235	465.15	labour	Un-skilled	0.79	100	79.42	
			sand, cum	0.14	300	41.86	carpenter	skilled	0.31	150	46.5	
			M.S Rod, kg	10	17	170.00	Helper	Un-skilled	0.31	100	31	
						937.82					**173.35**	1111.16
6	Brick flat soiling Latrine floor; sqm	0.756	Bricks, nr	24	2.8	68.45	mason	skilled	0.05	150	6.79	
			sand, cum	0.01	300	3.46	labour	Un-skilled	0.08	100	8.15	
						71.90					**14.94**	86.84
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	2	5	10.00	mason	skilled	0.05	150	7.50	17.50
9	Latrine pan of PVC fixed in position		PVC pan	1	200	200.00	mason	skilled	0.50	150	75.00	275.00
10	Water seal (U -shape)		PVC trap	1	25	25.00	mason	skilled	0.25	150	37.50	62.50

11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0.00	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0.00	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	22	120	2640	mason	skilled	1.47	150	220.00	
							labour	Un-skilled	1.47	100	146.67	
	b) solid ring		RCC ring	8	120	960	mason	skilled	0.67	150	100.00	
							labour	Un-skilled	0.67	100	66.67	
	c) pit cover	2	RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						3600					**533.33**	4133.33
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	2.1	cement	0.34	235	79.976168	mason	skilled	0.34	150	51.05	
			sand	0.03	300	9.597	labour	Un-skilled	0.28	100	28.36	
						89.573168					**79.41**	168.98
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0.59	sand	0.59	300	177	labourer	Un-skilled	0.28	100	28.16	205.16
19	envelope of khoa around the pit and soak away ; cum	2.81	khoa	2.81	1060	2978.6	labourer	Un-skilled	1.34	100	134.27	3112.87
	Total											**12,767.38**

Materials and Labour required for *Offset pour flush Double pit latrine*

Discription	units	Quantities
Labour		
Masons	days	5.18
Unskilled Labourers	days	12.79
Materials		
Cement	bags	5.83
Khoa	m3	2.81
Sand	m3	1.29
Gravel	m3	
Bricks	nr	580
Steel bars	kg	10.00
Latrine slab	nr	
Latrine pan	nr	1.00
Water seal (U -shape)	nr	1.00
Latrine door	nr	
catch hooks etc.	nr	4.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	22.00
Non-Perforated concrete rings, 3ft	nr	8.00
Concrete ring slabs	nr	3.00
RCC Slabs of	nr	

APPENDIX 15

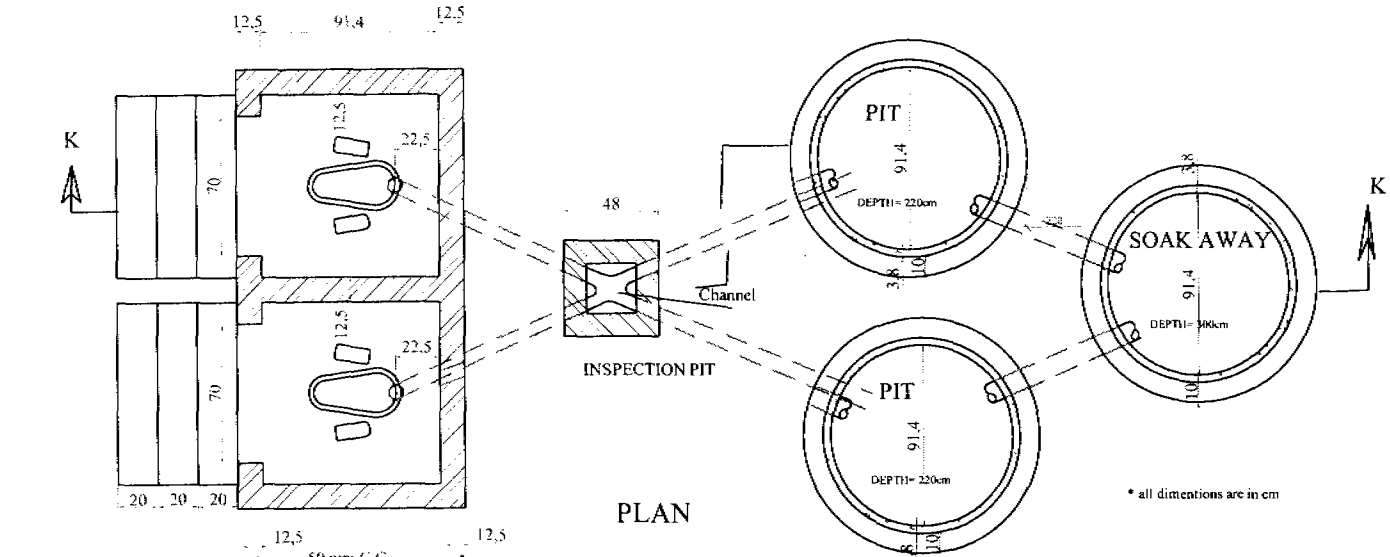
CONSTRUCTION DRAWING

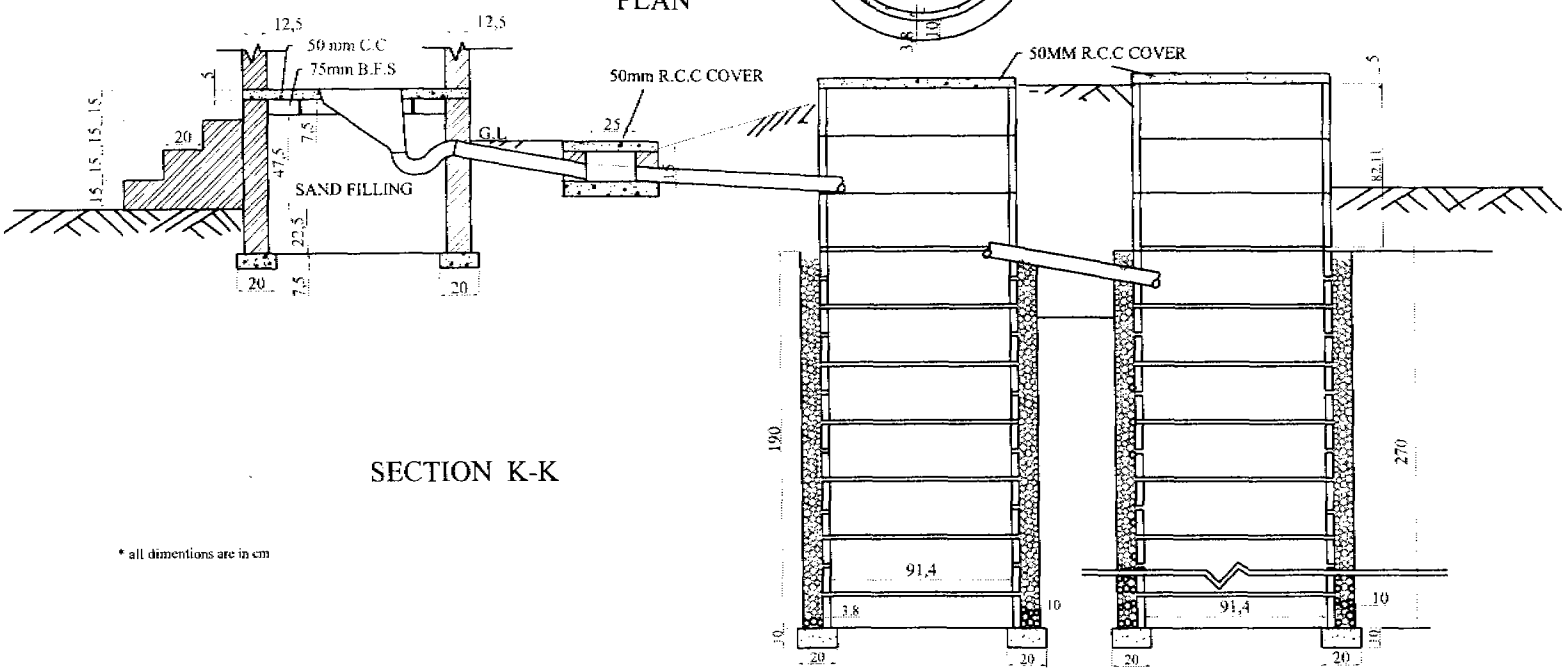
TWO ADJACENT

DOUBLE OFFSET

POUR-FLUSH LATRINE

OFFSET DOUBLE PIT LATRINE WITH POUR FLASH TWO ADJACENT





APPENDIX 16

BOQ

TWO ADJACENT

DOUBLE OFFSET

POUR-FLUSH LATRINE

Bills of quantities and cost estimate for Offset pour flush Double pit latrine - two adjacent

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.32	150	48.55	
	a)Latrine, cum	0					labour	Un-skilled	4.05	100	404.59	
	b) pit, cum	5.48										
	c) soak wawy, cum	3.68										
	Total	**9.16**									**453.14**	453.14
2	(1:3:6) mass concrete in foundation		Bricks, nr	202	2.8	565.71	mason	skilled	0.23	150	34.98	
	a)Latrine wall, cum	0	cement, bag	2.8	235	656.80	labour	Un-skilled	2.33	100	233.22	
	b)Latrine floor, cum	0.45	sand, cum	0.30	300	88.86						
	C) pit foundation, cum	0.21										
	Total	**0.66**				**1311.37**					**268.20**	1579.57
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0.33	Bricks, nr	129	2.8	360.59	mason	skilled	0.13	150	19.24	
			cement, bag	0.5	235	109.70	labour	Un-skilled	0.50	100	49.56	
			sand, cum	0.12	300	35.65						
						505.94					**68.80**	574.74
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , sqm	7.79	Bricks, nr	403	2.8	1128.06	mason	skilled	0.50	150	75.71	
			cement, bag	2.2	235	518.30	labour	Un-skilled	2.65	100	264.99	
			sand, cum	0.40	300	120.83						
						1767.20					**340.71**	2107.90
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	0.31	Bricks, nr	93	2.8	260.81	mason	skilled	0.11	150	16.43	
			cement, bag	2.0	235	465.15	labour	Un-skilled	0.79	100	79.42	
			sand, cum	0.14	300	41.86	carpenter	skilled	0.31	150	46.5	
			M.S Rod, kg	10	17	170.00	Helper	Un-skilled	0.31	100	31	
						937.82					**173.35**	1111.16
6	Brick flat soiling Latrine floor; sqm	1.52	Bricks, nr	49	2.8	137.62	mason	skilled	0.09	150	13.65	
			sand, cum	0.02	300	6.95	labour	Un-skilled	0.16	100	16.38	
						144.57					**30.04**	174.61
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	4	5	20.00	mason	skilled	0.10	150	15.00	35.00
9	Latrine pan of PVC fixed in position		PVC pan	2	200	400.00	mason	skilled	1.00	150	150.00	550.00
10	Water seal (U -shape)		PVC trap	2	25	50.00	mason	skilled	0.50	150	75.00	125.00

11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0.00	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0.00	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	22	120	2640	mason	skilled	1.47	150	220.00	
							labour	Un-skilled	1.47	100	146.67	
	b) solid ring		RCC ring	8	120	960	mason	skilled	0.67	150	100.00	
							labour	Un-skilled	0.67	100	66.67	
	c) pit cover	2	RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						3600					**533.33**	4133.33
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	3.1	cement	0.5	235	118.06006	mason	skilled	0.50	150	75.36	
			sand	0.05	300	14.167	labour	Un-skilled	0.42	100	41.87	
						132.22706					**117.22**	249.45
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	1.2	sand	1.2	300	360	labourer	Un-skilled	0.57	100	57.28	417.28
19	envelope of khoa around the pit and soak away ; cum	2.81	khoa	2.81	1060	2978.6	labourer	Un-skilled	1.34	100	134.27	3112.87
	Total											**15,054.91**

Materials and Labour required for *Offset pour flush Double pit latrine - two adjacent*

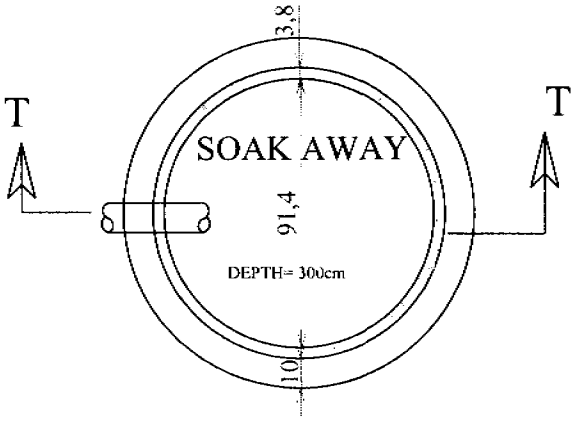
Discription	units	required qnt.
Labour		
Masons	days	6.51
Unskilled Labourers	days	15.26
Materials		
Cement	bags	7.9
Khoa	m3	2.81
Sand	m3	2.23
Gravel	m3	
Bricks	nr	876
Steel bars	kg	10.00
Latrine slab	nr	
Latrine pan	nr	2.00
Water seal (U -shape)	nr	2.00
Latrine door	nr	
catch hooks etc.	nr	4.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	22.00
Non-Perforated concrete rings, 3ft	nr	8.00
Concrete ring slabs	nr	3.00
RCC Slabs of	nr	

APPENDIX 17

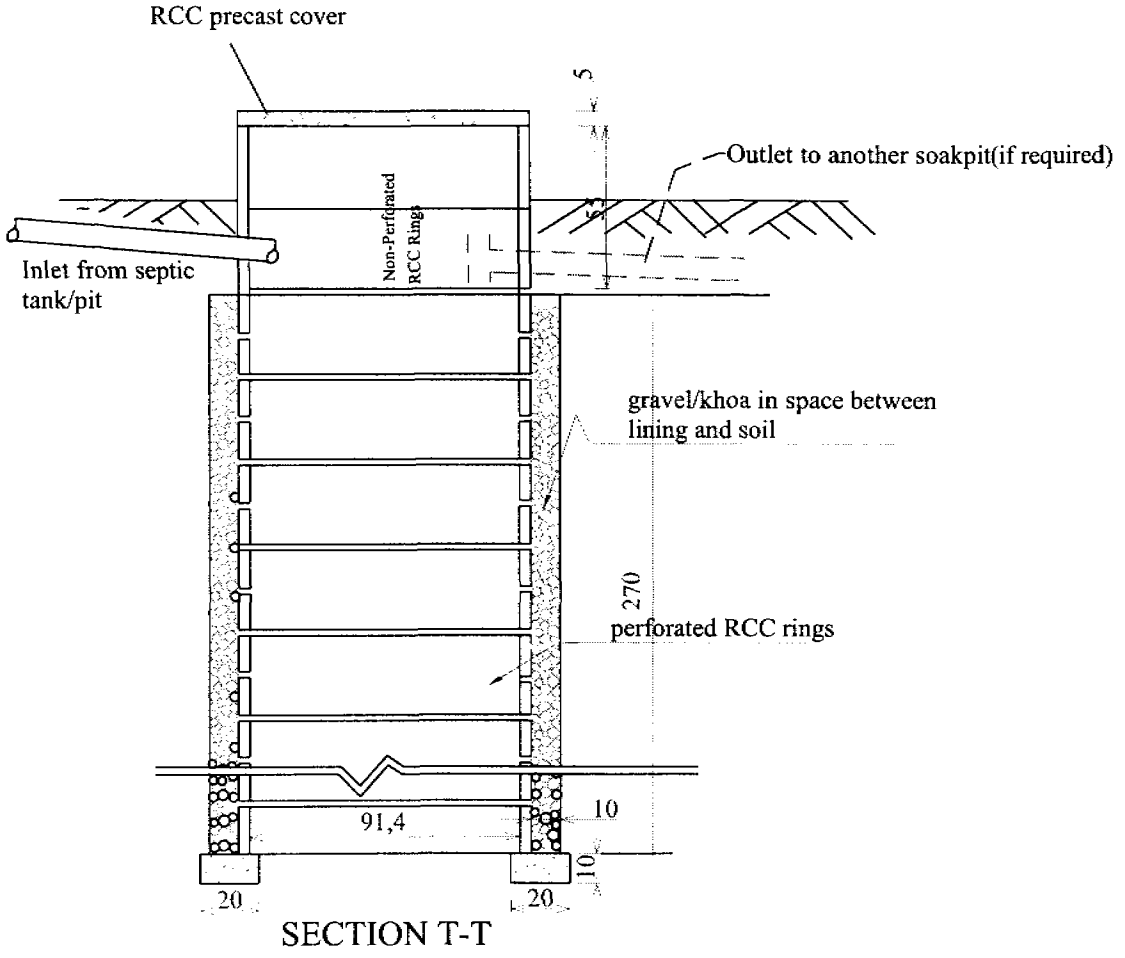
CONSTRUCTION DRAWING

SOAK-AWAY

SAOK AWAY PLAN AND SECTION



** ALL DIMENTIONS ARE IN cm



SECTION T-T

APPENDIX 18

BOQ

SOAK-AWAY

Bills of quantities and cost estimate for soak away

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.1633	150	24.49	
	a)Latrine, cum	0					labour	Un-skilled	2.0406	100	204.06	
	b) pit, cum	0									**228.55**	228.55
	c) soak wawy, cum	4.62										
	Total	**4.62**										
2	(1:3:6) mass concrete in foundation		Bricks, nr	21.4286	2.8	60.00	mason	skilled	0.0247	150	3.71	
	a)Latrine wall, cum	0	cement, bag	0.29643	235	69.66	labour	Un-skilled	0.2473	100	24.73	
	b)Latrine floor, cum	0	sand, cum	0.03141	300	9.42						
	C) soak away foundation, cum	0.07										
	Total	**0.07**				**139.09**					**28.45**	167.53
		0.04	Bricks, nr	12.0188	2.8	33.65	mason	skilled	0.0141	150	2.12	
			cement, bag	0.2554	235	60.02	labour	Un-skilled	0.1025	100	10.25	
			sand, cum	0.02	300	5.40	carpenter	skilled	0.04	150	6	
	50mm RCC cover (1:2:4) with cement, sand and picked		M.S Rod, kg	2.8	17	47.60	Helper	Un-skilled	0.04	100	4	
5	jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum					**146.67**					**22.37**	169.04
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe	0	46	0.00	Mistry	skilled	0	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door	0	1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	10	120	1200	mason	skilled	0.6667	150	100.00	
							labour	Un-skilled	0.6667	100	66.67	
	b) solid ring		RCC ring	2	120	240	mason	skilled	0.1667	150	25.00	
							labour	Un-skilled	0.1667	100	16.67	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						1440					**208.33**	1648.33
19	envelope of khoa around the pit and soak away ; cum	2.04	khoa	2.04	1060	2162.4	labourer	Un-skilled	0.9747	100	97.47	2259.87
	Total											**4,904.19**

Materials and Labour required for soak away

Discription	units	Quantities
Labour		
Masons	days	1.04
Unskilled Labourers	days	3.99
Materials		
Cement	bags	0.3
Khoa	m3	2.04
Sand	m3	0.02
Gravel	m3	
Bricks	nr	12
Steel bars	kg	2.80
Latrine slab	*nr*	
Latrine pan	nr	0.00
Latrine door	nr	
Hinges, catch hooks etc.	nr	4.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	0.00
Perforated concrete rings, 3ft	nr	0.00
Non-Perforated concrete rings, 3ft	nr	0.00
Concrete ring slabs	nr	
RCC Slabs of	nr	

APPENDIX 19

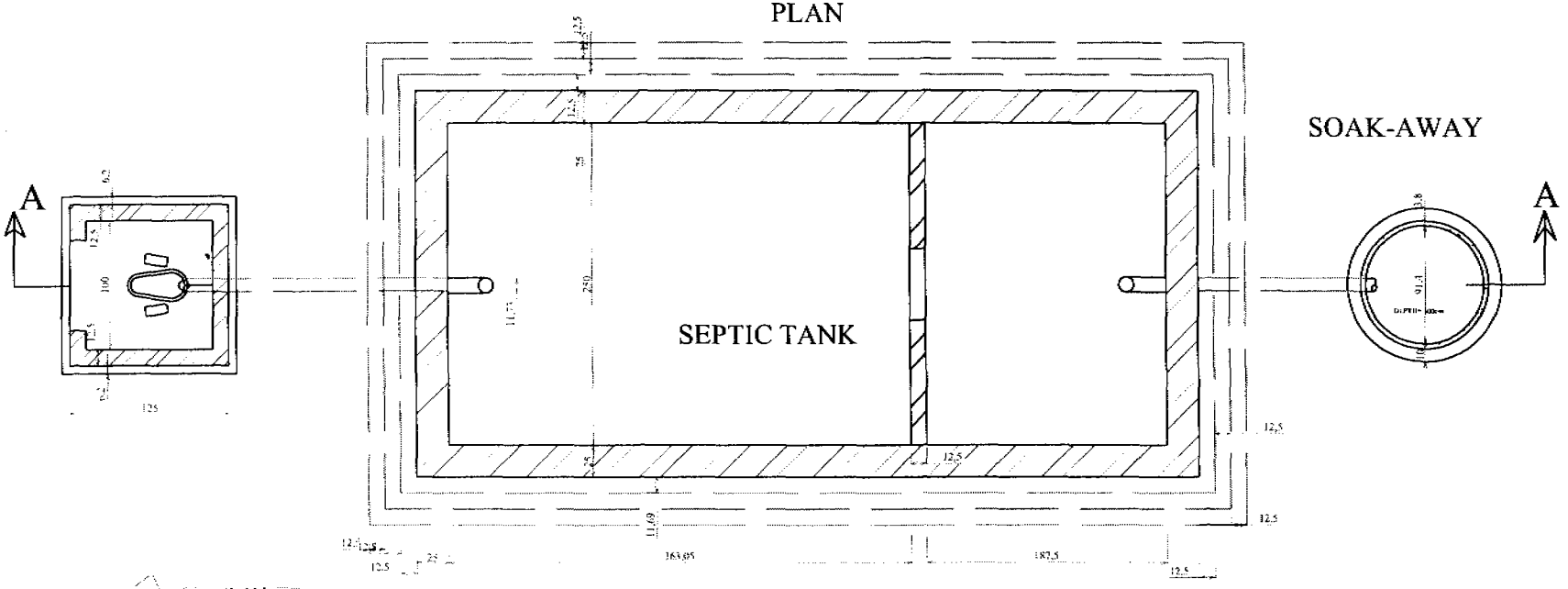
CONSTRUCTION DRAWING

TWO-CHAMBER SEPTIC TANK

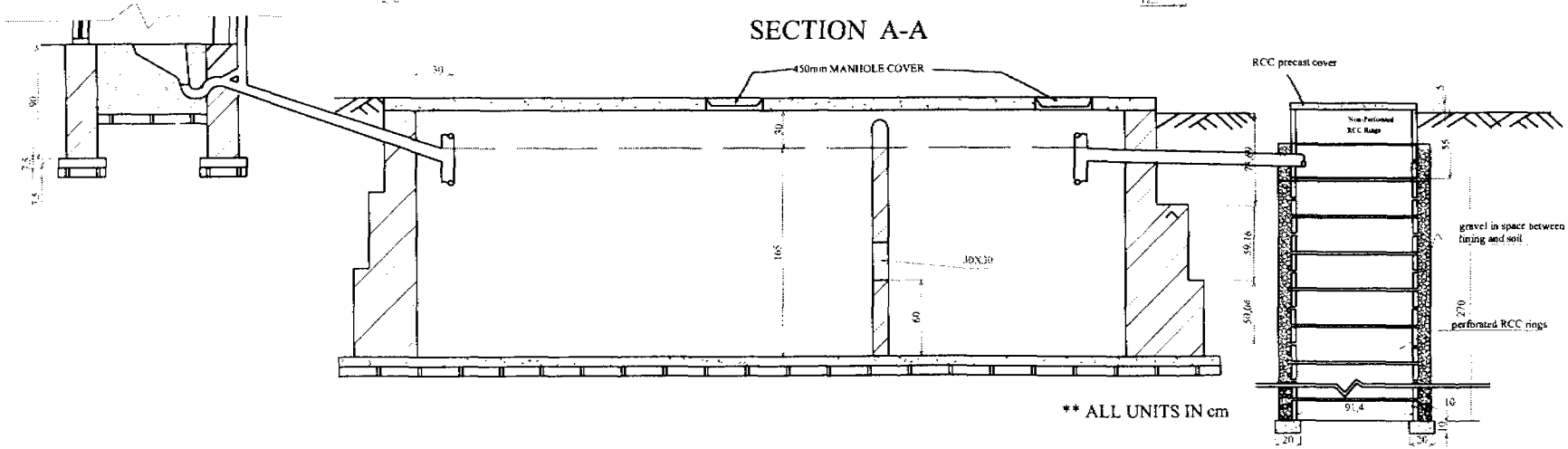
WITH SOAK-AWAY

POUR-FLASH LATRINE WITH 2-CHAMBER SEPTIC TANK WITH SOAKAWAY

PLAN



SECTION A-A



** ALL UNITS IN cm

APPENDIX 20

BOQ

TWO-CHAMBER SEPTIC TANK

WITH SOAK-AWAY

Bills of quantities and cost estimate for pour flush latrine with SepticTank and soak away

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labou
			Goods	quantity	price	Total amount	worker	position	Total days	wage/day	total amount	
1	Earth work in excavation						mason	skilled	2.37	150	355.76	
	a)septic tank, cum	56.72					labour	Un-skilled	29.65	100	2964.66	
	b) I nspection pit, cum	0.95									**3320.42**	3320.42
	c) soak wawy, cum	9.45										
	Total	**67.12**										
2	(1:3:6) mass concrete in foundation											
	a)Inspection pit , cum	0.115	Bricks, nr	116	2.8	325.71	mason	skilled	0.13	150	20.14	
	b)saok away , cum	0.11	cement, bag	1.61	235	378.16	labour	Un-skilled	1.34	100	134.28	
	b)latrine , cum	0.155	sand, cum	0.17	300	51.16						
	Total	**0.38**				**755.03**					**154.42**	909.45
3	1st brick work in septic tank, soak away and inspection pit wall with cement and sand mortar (1:6) , cum	13.45	Bricks, nr	5249	2.8	14696.59	mason	skilled	5.23	150	784.19	
			cement, bag	19.03	235	4471.30	labour	Un-skilled	20.20	100	2019.88	
			sand, cum	4.84	300	1452.95						
						20620.84					**2804.06**	23424.91
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , cum		Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
5	RCC floor and roof slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum	3.85	Bricks, nr	1157	2.8	3239.06	mason	skilled	1.36	150	204.06	
			cement, bag	24.58	235	5776.81	labour	Un-skilled	9.86	100	986.31	
			sand, cum	1.73	300	519.91	carpenter	skilled	3.85	150	577.5	
			M.S Rod, kg	52	17	884.00	Helper	Un-skilled	3.85	100	385	
						10419.78					**2152.87**	12572.65
6	Brick flat soiling latrine, septic tank and Ins. Pit floor; sqm	30.46	Bricks, nr	985	2.8	2757.82	mason	skilled	1.82	150	273.59	
			sand, cum	0.46	300	139.28	labour	Un-skilled	3.28	100	328.31	
						2897.10					**601.90**	3499.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0.835	Bricks, nr	10	2.8	28.00	mason	skilled	0.01	150	1.50	
			cement, bag	0.2	235	47.00	labour	Un-skilled	0.08	100	8.00	
			sand, cum	0.0141	300	4.24						
						79.24					**9.50**	88.74
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	2	5	10.00	mason	skilled	0.05	150	7.50	17.50
9	Latrine pan of PVC fixed in position		PVC pan	1	200	200.00	mason	skilled	0.50	150	75.00	275.00
10	Water seal (U -shape)		PVC trap	1	25	25.00	mason	skilled	0.25	150	37.50	62.50
11	100mm dia PVC pipe laying of joining inspection pit with septic tank and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86

12	50 mm dia PVC ventilation pipe		PVC pipe	3.5	46	161.00	Mistry	skilled	0.44	180	78.75	239.75
13	Supplying, fitting and fixing CI manhole cover 450mm dia. With frame		CI covere	3	585	1755.00	mason	skilled	0.50		0.00	1755.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	12	120	1440	mason	skilled	0.80	150	120.00	
							labour	Un-skilled	0.80	100	80.00	
	b) solid ring		RCC ring	2	120	240	mason	skilled	0.17	150	25.00	
							labour	Un-skilled	0.17	100	16.67	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						1680					**241.67**	1921.67
15	Minimum 12 mm thick cement plaster (1:4) to septic tank and ins.	42.65	cement	6.91	235	1624.277884	mason	skilled	6.91	150	1036.77	
	pits with N.C finishing; sqm		sand	0.65	300	194.9105	labour	Un-skilled	5.76	100	575.99	
						1819.188384					**1612.76**	3431.95
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm		cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
17	Back filling soak away by brick chips	0	bricks	10,000	2.8	28000	labourer	Un-skilled	2.00	100	200.00	28200.00
18	sand filling in latrine floor and around the pit to soak away; cum	0.6	sand	0.6	300	180	labourer	Un-skilled	0.29	100	28.64	208.64
19	envelope of khoa around the pit and soak away ; cum	2.04	khoa	2.04	1060	2162.4	labourer	Un-skilled	0.97	100	97.47	2259.87
	Total											**82,617.91**

Materials and labour for pour flush latrine with SepticTank and soak away

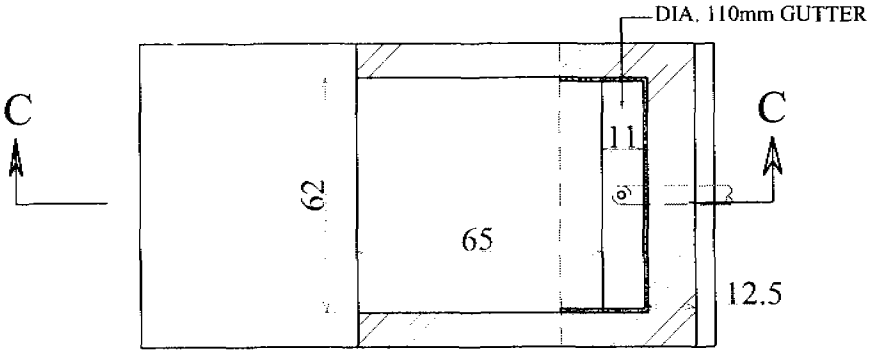
Discription	units	required qnt.
Labour		
Masons	days	24.00
Unskilled Labourers	days	77.28
Materials		
Cement	bags	52.3
Khoa	m3	2.04
Sand	m3	8.47
Gravel	m3	
Bricks	nr	17517
Steel bars	kg	52.00
Latrine slab	nr	
Latrine pan	nr	1.00
Latrine door	nr	
Hinges, catch hooks etc.	nr	6.00
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	3.50
Water seal (U -shape)		1.00
CI manhole cover 450mm dia. With frame		3.00
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

APPENDIX 21

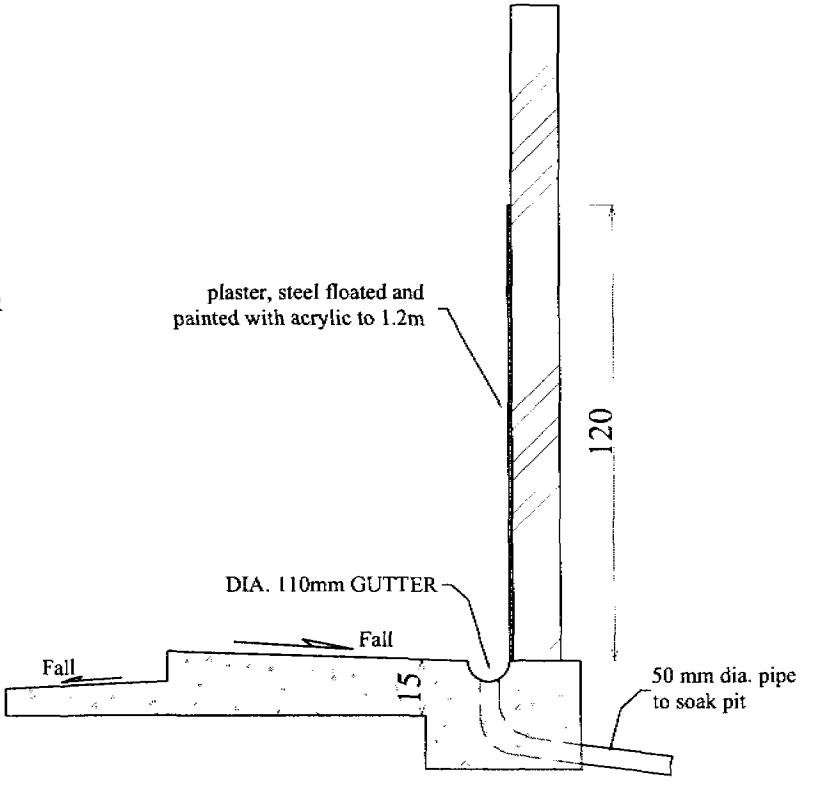
CONSTRUCTION DRAWING

SINGLE URINAL

URINAL FOR ONE PERSON



PLAN



SECTION C-C

** ALL UNITS IN cm

APPENDIX 22

BOQ

SINGLE URINAL

Bills of quantities and cost estimate for urinal (for one person)

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0.01	150	1.27	
	a)foundation, cum	0.24					labour	Un-skilled	0.11	100	10.60	
	b) pit, cum	0										
	c) soak wawy, cum	0										
	Total	**0.24**									**11.87**	11.87
2	(1:3:6) mass concrete in foundation		Bricks, nr	52	2.8	145.71	mason	skilled	0.06	150	9.01	
	a)floor, cum	0.17	cement, bag	0.7	235	169.18	labour	Un-skilled	0.60	100	60.07	
	b)Latrine floor, cum		sand, cum	0.08	300	22.89						
	C) pit foundation, cum											
	Total	**0.17**				**337.78**					**69.08**	406.86
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) ,sqm	1.8	Bricks, nr	93	2.8	260.66	mason	skilled	0.12	150	17.49	
			cement, bag	0.5	235	119.76	labour	Un-skilled	0.61	100	61.23	
			sand, cum	0.09	300	27.92						
						408.34					**78.73**	487.06
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0.00	300	0.00	carpenter	skilled	0	150	0	
			M.S Rod, kg		17	0.00	Helper	Un-skilled	0	100	0	
						0.00					**0.00**	0.00
6	Brick flat soiling Latrine floor; sqm		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting		5	0.00	mason	skilled	0	150	0.00	0.00
9	Latrine pan of PVC fixed in position		PVC pan		200	0.00	mason	skilled	0	150	0.00	0.00
10	Water seal (U -shape)		PVC trap	1	25	25.00	mason	skilled	0.25	150	37.50	62.50

11	*100mm dia PVC pipe laying of jointing inlet end from urinals to pit.*		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86
12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring		120	0	mason	skilled	0	150	0.00	
							labour	*Un-skilled*	*0*	100	0.00	
	b) solid ring		RCC ring		120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	c) pit cover		RCC slab		220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm		cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	3.6	cement	0.3	235	68.177293	mason	skilled	0.58	150	87.47	
			sand	0.07	300	19.909924	labour	Un-skilled	0.49	100	48.60	
						88.087217					**136.07**	224.16
17	Steel floated cement plastering and acryling painting	0.8	cement	0.04	235	10.380368	mason	skilled	0.13	150	19.44	
			paint	0.8	100	80	labourer	Un-skilled	0.10	100	9.60	
						90.38					**29.03**	119.41
18	sand filling in latrine floor and around the pit to soak away; cum		sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum		khoa	0	1060	0	labourer	Un-skilled	0	100	0.00	0.00
	Total											**1,742.72**

Materials and labour required for urinal for one person

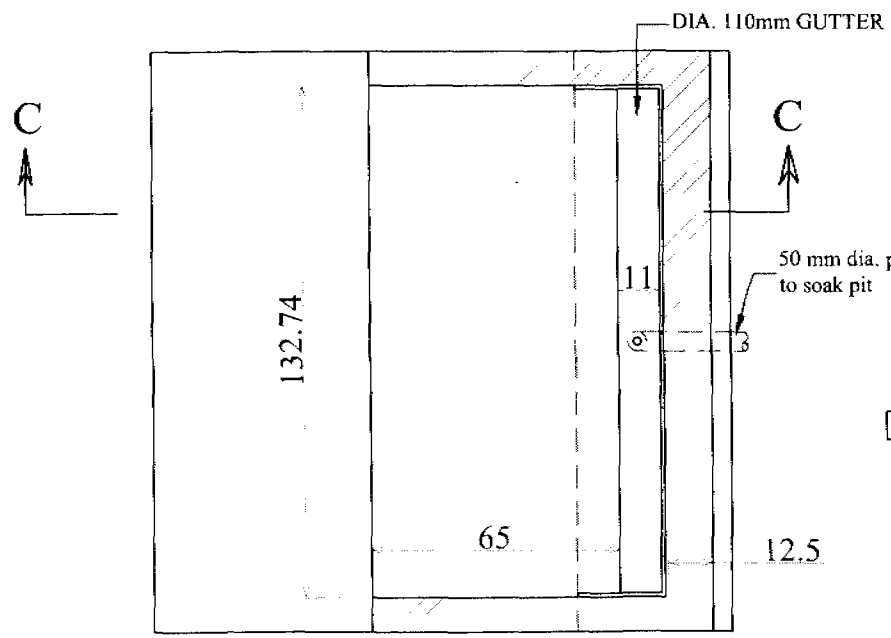
Discription	units	Quantites
Labour		
Masons	days	1.72
Unskilled Labourers	days	1.90
Materials		
Cement	bags	1.6
Khoa	m3	
Sand	m3	0.24
Gravel	m3	
Bricks	nr	145
Steel bars	kg	
Latrine slab	nr	
Latrine pan	nr	
Latrine door	nr	
Hinges, catch hooks etc.	nr	
Roofing sheets CI	nr	
Drain pipe 100mm	m	4
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

APPENDIX 23

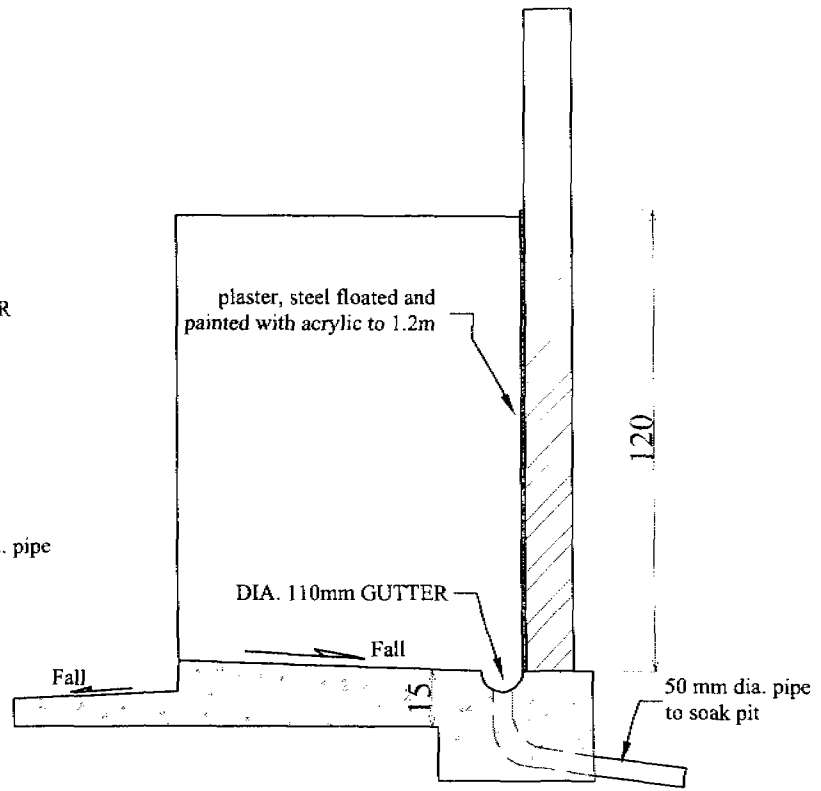
CONSTRUCTION DRAWING

DOUBLE URINAL

URINALS FOR TWO PERSONS



PLAN



SECTION C-C

* all dimentions are in cm

APPENDIX 24

BOQ

DOUBLE URINAL

Bills of quantities and cost estimate for urinal (for Two person)

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labour
			Goods	quantity	price	Total amount	worker	position	Total days	wage/day	total amount	
1	Earth work in excavation						mason	skilled	0.20	150	30.74	
	a)Latrine, cum	0.48					labour	Un-skilled	2.56	100	256.18	
	b) pit, cum	0									**286.93**	286.93
	c) soak wawy, cum	0										
	Total	**0.48**										
2	(1:3:6) mass concrete in foundation		Bricks, nr	104	2.8	291.43	mason	skilled	0.12	150	18.02	
	a)Latrine wall, cum	0.34	cement, bag	1.4	235	338.35	labour	Un-skilled	1.20	100	120.14	
	b)Latrine floor, cum		sand, cum	0.15	300	45.78						
	C) pit foundation, cum											
	Total	**0.34**				**675.56**					**138.16**	813.72
3	1st brick work in steps with cement and sand mortar (1:6) , cum	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , cum	2.7	Bricks, nr	140	2.8	390.99	mason	skilled	0.17	150	26.24	
			cement, bag	0.8	235	179.64	labour	Un-skilled	0.92	100	91.85	
			sand, cum	0.14	300	41.88						
						612.51					**118.09**	730.60
5	RCC slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 cm spacing, cum		Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0.00	300	0.00	carpenter	skilled	0.00	150	0	
			M.S Rod, kg		17	0.00	Helper	Un-skilled	0.00	100	0	
						0.00					**0.00**	0.00
6	Brick flat soiling Latrine floor; sqm		Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm		Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting		5	0.00	mason	skilled	0.00	150	0.00	0.00
9	Latrine pan of PVC fixed in position		PVC pan		200	0.00	mason	skilled	0.00	150	0.00	0.00
10	Water seal (U -shape)		PVC trap	2	25	50.00	mason	skilled	0.50	150	75.00	125.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86

12	50 mm dia PVC ventilation pipe		PVC pipe		46	0.00	Mistry	skilled	0.00	180	0.00	0.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet		steel door		1200	0.00	mason	skilled	0.00	150	0.00	0.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring		120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	b) solid ring		RCC ring		120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	c) pit cover		RCC slab		220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	5.4	cement	0.4	235	102.26594	mason	skilled	0.87	150	131.21	
			sand	0.10	300	29.8648862	labour	Un-skilled	0.73	100	72.89	
						132.130826					**204.10**	336.23
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	1.6	cement	0.09	235	20.7607362	mason	skilled	0.26	150	38.88	
			paint	1.6	100	160	labourer	Un-skilled	0.19	100	19.19	
						180.76					**58.07**	238.83
18	sand filling in latrine floor and around the pit to soak away; cum		sand	0	300	0	labourer	Un-skilled	0.00	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum		khoa	0	1060	0	labourer	Un-skilled	0.00	100	0.00	0.00
	Total											**2,962.16**

Material and labour required for urinal (for Two person)

Discription	units	required qnt.
Labour		
Masons	days	2.71
Unskilled Labourers	days	5.60
Materials		
Cement	bags	2.73
Khoa	m3	
Sand	m3	0.39
Gravel	m3	
Bricks	nr	244
Steel bars	kg	0.00
Latrine slab	nr	
Latrine pan	nr	
Latrine door	nr	
Hinges, catch hooks etc.	nr	
Roofing sheets CI	nr	
Drain pipe 100mm	m	4.00
Vent pipe 40/50 mm	m	
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

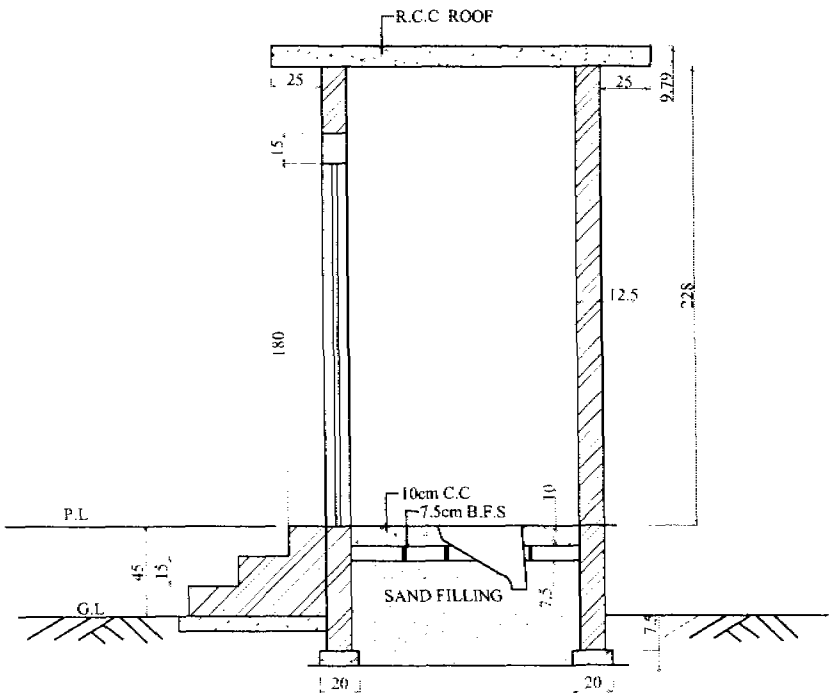
APPENDIX 25

CONSTRUCTION DRAWING

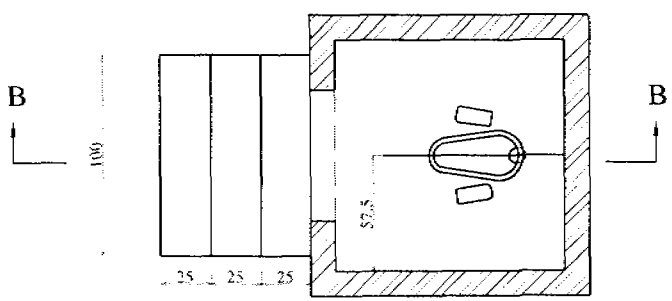
SUPERSTRUCTURE

BRICK WALLS
RCC ROOF
GI-DOOR

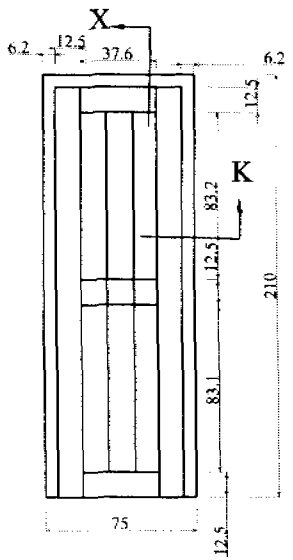
BRICK WALL AND R.C.C. ROOFING SUPERSTRUCTURE



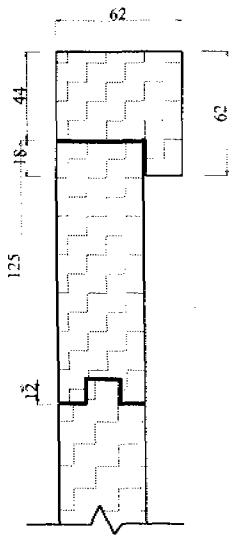
SECTION B - B



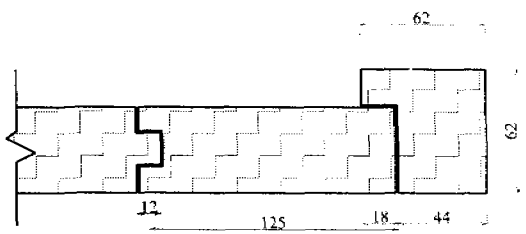
PLAN



ELEVATION OF DOOR



SECTION X



SECTION K

** ALL DIMENTIONS ARE IN cm

APPENDIX 26

BOQ

SUPERSTRUCTURE

BRICK WALLS
RCC ROOF
GI-DOOR

Bills of quantities and cost estimate for Brick wall and RCC Roof Superstructure

SL.No	Description of works	Quantity	Materials				Labour					total cost of materials & labour
			Goods	quantity	price	Total amount	worker	position	Total days	wage/day	total amount	
1	Earth work in excavation						mason	skilled	0	150	0.00	
	a)Latrine, cum	0					labour	Un-skilled	0	100	0.00	
	b) pit, cum	0									**0.00**	0.00
	c) soak wawy, cum	0										
	Total	**0**										
2	(1:3:6) mass concrete in foundation		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
	a)Latrine wall, cum	0	cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
	b)Latrine floor, cum	0	sand, cum	0	300	0.00						
	C) pit foundation, cum	0										
	Total	**0**				**0.00**					**0.00**	0.00
3	cum	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , cum	10.596	Bricks, nr	548	2.8	1534.40	mason	skilled	0.69	150	102.98	
			cement, bag	3.0	235	705.00	labour	Un-skilled	3.60	100	360.45	
			sand, cum	0.55	300	164.35						
						2403.75					**463.43**	2867.18
5	RCC roof slab (1:2:4) with cement, sand and picked jhama chips (khoa) including 6 mm dia reinforcement both way 20 c spacing, cum	0.361	Bricks, nr	108.4695	2.8	303.71	mason	skilled	1.00	150	150.00	
			cement, bag	2.3	235	541.67	labour	Un-skilled	4.00	100	400.00	
			sand, cum	0.16	300	48.75	carpenter	skilled	2.00	150	300	
			M.S Rod	10	17	170.00	Helper	Un-skilled	4.00	100	400	
	Total					**1064.13**					**1250.00**	2314.13
6	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0.00	100	0.00	
						0.00					**0.00**	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0.00	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0.00	100	0.00	
			sand, cum	0	300	0.00						
						0.00					**0.00**	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	0	5	0.00	mason	skilled	0.00	150	0.00	0.00
9	Latrine pan of PVC fixed in position		PVC pan	0	200	0.00	mason	skilled	0.00	150	0.00	0.00
10	Water seal (U -shape)		PVC trap	0	25	0.00	mason	skilled	0.00	150	0.00	0.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.57	180	102.86	430.86

12	50 mm dia PVC ventilation pipe		PVC pipe	4	46	184.00	Mistry	skilled	0.50	180	90.00	274.00
13	supplying, fitting and fixing wooden door frame 75mm X 100mm X 1800mm and solid door shuter of 38mm thick.	1	steel door	1.5	2600	3900.00	mason	skilled	0.75	150	112.50	4012.50
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0.00	150	0.00	
							labour	Un-skilled	0.00	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0.00	150	0.00	
						0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	0	cement	0	235	0	mason	skilled	0.00	150	0.00	
			sand	0	300	0	labour	Un-skilled	0.00	100	0.00	
						0					**0.00**	0.00
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	20.55	cement	1.7	235	339.17872	mason	skilled	3.33	150	499.33	
			sand	0.38	300	113.65248	labour	Un-skilled	2.77	100	277.40	
						502.8312					**776.73**	1279.56
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	2.75	cement	0.2	235	35.682515	mason	skilled	0.45	150	66.82	
			sand	0.03	300	7.5153198	labourer	Un-skilled	0.33	100	32.98	
						43.20					**99.80**	143.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	0	khoa	0	1060	0	labourer	Un-skilled	0	100	0.00	0.00
	Total											**11,321.23**

Materials and Labour required for *Brick wall and RCC Roof Superstructure*

Discription	units	required qnt.
Labour		
Masons	days	8.71
Unskilled Labourers	days	14.71
Materials		
Cement	bags	7.11
Khoa	m3	
Sand	m3	1.11
Gravel	m3	
Bricks	nr	656
Steel bars	kg	10.00
Latrine slab	nr	
Latrine pan	nr	
Latrine wooden door	nr	1
Hinges, catch hooks etc.	nr	
Roofing sheets CI	nr	
Drain pipe 100mm	m	
Vent pipe 40/50 mm	m	4
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

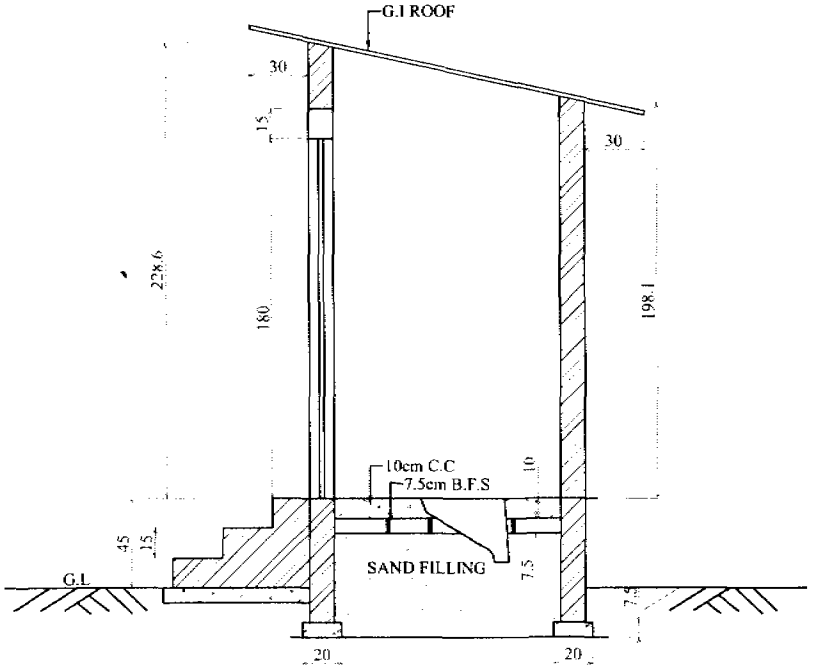
APPENDIX 27

CONSTRUCTION DRAWING

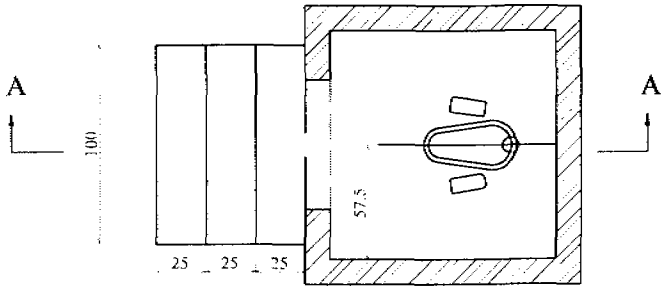
SUPERSTRUCTURE

BRICK WALLS
GI-ROOF
WOODEN-DOOR

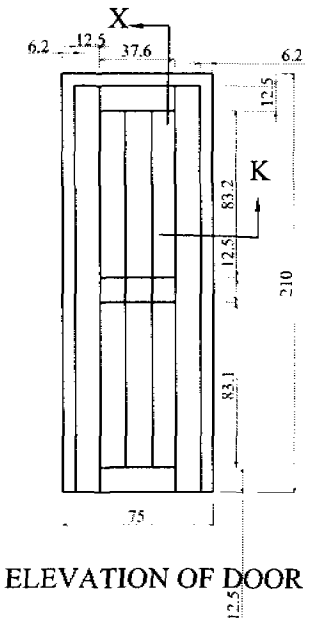
BRICK WALL AND G.I. ROOFING SUPERSTRUCTURE



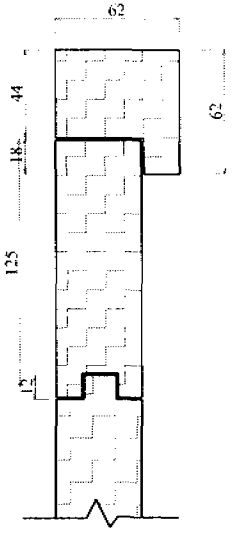
SECTION A - A



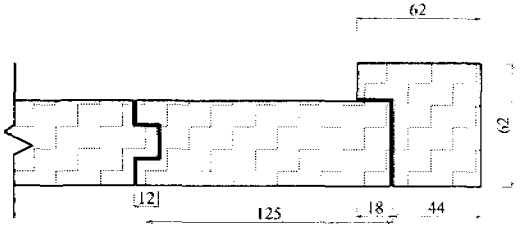
PLAN



ELEVATION OF DOOR



SECTION X



SECTION K

** ALL UNITS IN cm

APPENDIX 28

BOQ

SUPERSTRUCTURE

BRICK WALLS
GI-ROOF
GI-DOOR

Bills of quantities and cost estimate for *Brick wall and GI Roof Superstructure*

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0	150	0.00	
	a)Latrine, cum	0					labour	Un-skilled	0	100	0.00	
	b) pit, cum	0										
	c) soak wawy, cum	0										
	Total	0									0.00	0.00
2	(1:3:6) mass concrete in foundation		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
	a)Latrine wall, cum	0	cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
	b)Latrine floor, cum	0	sand, cum	0	300	0.00						
	C) pit foundation, cum	0										
	Total	0				0.00					0.00	0.00
3	cum	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					0.00	0.00
4	125 mm thick brick work with 1st class bricks cement sand mortar (1:6) , cum	10.596	Bricks, nr	548	2.8	1534.40	mason	skilled	0.69	150	102.98	
			cement, bag	3.0	235	705.00	labour	Un-skilled	3.60	100	360.45	
			sand, cum	0.55	300	164.35						
						2403.75					463.43	2867.18
5	Superstructure roof with 38mmX 38mm X 6 mm M.S angle and galvanized iron corrigated sheet, sqm	4		4	500	2000.00						
			angle iron,m	6.00		0.00	carpenter	skilled	1			
			GI sheet, sqm	4.00			Helper	Un-skilled	2			
			fixing nuts,nr	12								
	Total					2000.00					0.00	2000.00
6	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0	100	0.00	
						0.00					0.00	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					0.00	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	0	5	0.00	mason	skilled	0	150	0.00	0.00
9	Latrine pan of PVC fixed in position		PVC pan	0	200	0.00	mason	skilled	0	150	0.00	0.00
10	Water seal (U -shape)		PVC trap	0	25	0.00	mason	skilled	0	150	0.00	0.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86

12	50 mm dia PVC ventilation pipe		PVC pipe	4	46	184.00	Mistry	skilled	0.5	180	90.00	274.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron plain sheet	1	steel door	1.4	1055	1477.00	mason	skilled	0.7	150	105.00	1582.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	20.55	cement	1.7	235	389.17872	mason	skilled	3.33	150	499.33	
			sand	0.38	300	113.65248	labour	Un-skilled	2.77	100	277.40	
						502.8312					**776.73**	1279.56
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0	100	0.00	
	~~sand filling in latrine floor and around the pit to soak away;~~					**0.00**					**0.00**	0.00
18	cum	0	sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	0	khoa	0	1060	0	labourer	Un-skilled	0	100	0.00	0.00
	Total											**8,433.60**

Materials and Labour required for *Brick Wall and GI Roof Superstructure*

Discription	units	required qnt.
Labour		
Masons	days	6.22
Unskilled Labourers	days	8.38
Materials		
Cement	bags	4.66
Khoa	m3	
Sand	m3	0.93
Gravel	m3	
Bricks	nr	548
Steel bars	kg	
Latrine slab	nr	
Latrine pan	nr	
Latrine door	nr	1
Hinges, catch hooks etc.	nr	
Roofing sheets CI	m^3	4.00
angle iron	m	6.00
fixing nuts	nr	12.00
Drain pipe 100mm	m	
Vent pipe 40/50 mm	m	4
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	

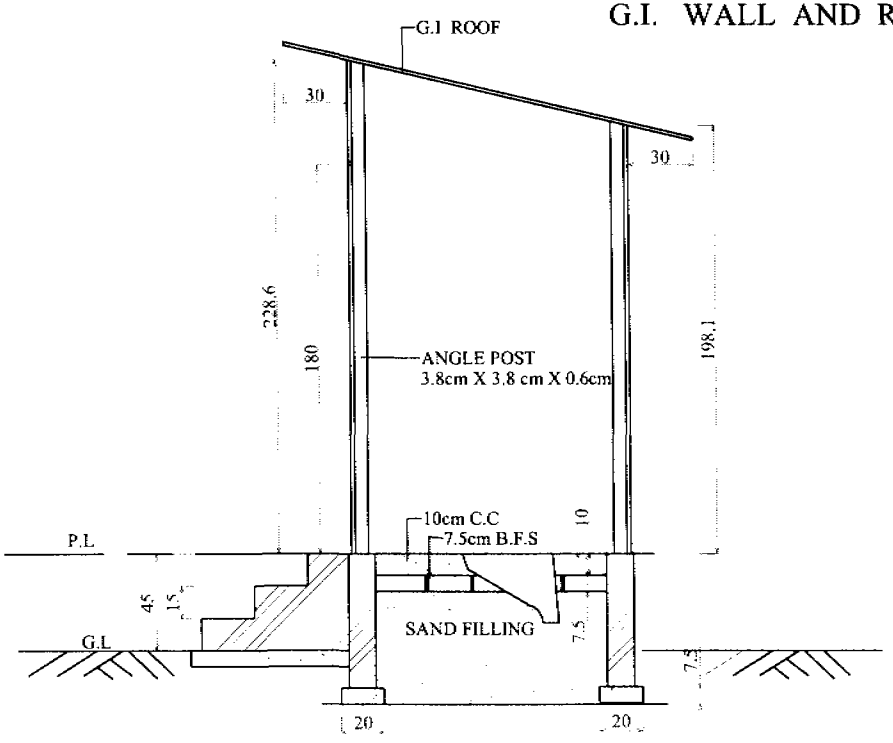
APPENDIX 29

CONSTRUCTION DRAWING

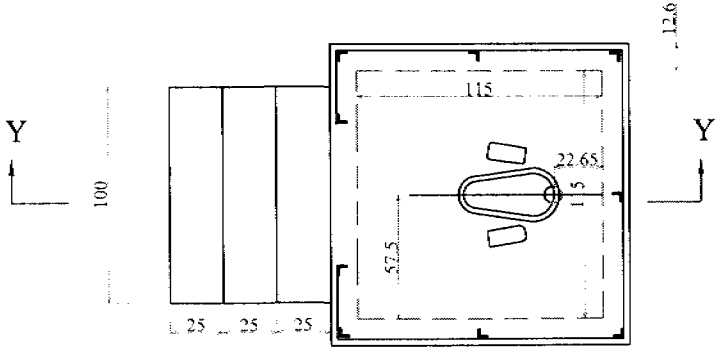
SUPERSTRUCTURE

GI-WALLS
GI-ROOF
GI-DOOR

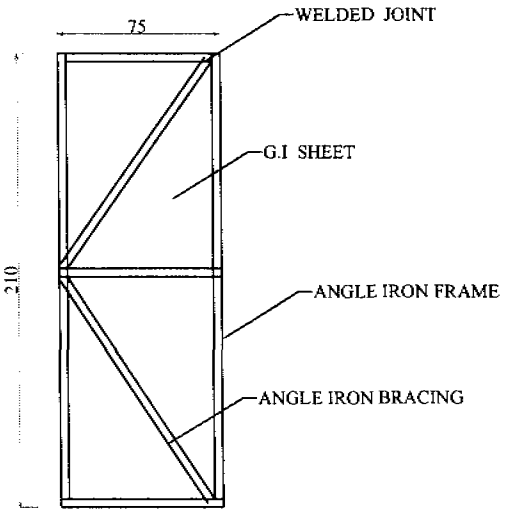
G.I. WALL AND ROOFING SUPERSTRUCTURE



SECTION Y - Y



PLAN



G.I FIXED ON ANGLE IRON FRAME DOOR

** ALL DIMENTIONS ARE IN cm

APPENDIX 30

BOQ

SUPERSTRUCTURE

GI-WALLS
GI-ROOF
GI-DOOR

Bills of quantities and cost estimate for GI Wall and Roof Superstructure

SL.No	Description of works	Quantity	Materials: Goods	quantity	price	Total amount	Labour: worker	position	Total days	wage/day	total amount	total cost of materials & labour
1	Earth work in excavation						mason	skilled	0	150	0.00	
	a)Latrine, cum						labour	Un-skilled	0	100	0.00	
	b) pit, cum											
	c) soak wawy, cum											
	Total	0									0.00	0.00
2	(1:3:6) mass concrete in foundation		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
	a)Latrine wall, cum		cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
	b)Latrine floor, cum		sand, cum	0	300	0.00						
	C) pit foundation, cum											
	Total	0				0.00					0.00	0.00
3	1st brick work in steps with cement and sand mortar (1:6) , cum		Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					0.00	0.00
4	Superstructure wall with 38mmX 38mm X 6 mm M.S angle and galvanized iron corrigated sheet.	9.36sqm		9.36	500	4680.00					0.00	
			angle iron, m	22.00			mason	skilled	0.2		0.00	
			GI sheet, sq	9.36			carpenter	skilled	1			
			fixing nuts, n	44			Helper	Un-skilled	2		0.00	4680.00
5	Superstructure roof with 38mmX 38mm X 6 mm M.S angle and galvanized iron corrigated sheet.	4 sqm		4	500	2000.00						
			angle iron	6.00		0.00	carpenter	skilled	1			
			GI sheet	4.00			Helper	Un-skilled	2			
			fixing nuts	12								
	Total					2000.00					0.00	2000.00
6	Brick flat soiling Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			sand, cum	0	300	0.00	labour	Un-skilled	0	100	0.00	
						0.00					0.00	0.00
7	38 mm thick artificial patent stone (1:2:4) Latrine floor; sqm	0	Bricks, nr	0	2.8	0.00	mason	skilled	0	150	0.00	
			cement, bag	0	235	0.00	labour	Un-skilled	0	100	0.00	
			sand, cum	0	300	0.00						
						0.00					0.00	0.00
8	Foot rest 20 mm thick of 1:3 cement mortar		casting	0	5	0.00	mason	skilled	0	150	0.00	0.00
9	Latrine pan of PVC fixed in position		PVC pan	0	200	0.00	mason	skilled	0	150	0.00	0.00
10	Water seal (U -shape)		PVC trap	0	25	0.00	mason	skilled	0	150	0.00	0.00
11	100mm dia PVC pipe laying of jointing inlet end from latrine to pit and soak away.		PVC pipe	4	82	328.00	Mistry	skilled	0.5714	180	102.86	430.86

12	50 mm dia PVC ventilation pipe	4	PVC pipe	4	46	184.00	Mistry	skilled	0.5	180	90.00	274.00
13	Fitting and fixing door frame with 38 mm *6 mm M.S angle and galvanized iron corrugated sheet	1	steel door	1.4	1055	1477.00	mason	skilled	0.7	150	105.00	1582.00
14	pre-cast RCC work including steel reinforcement complete laid in position.											
	a) perforated concrete ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	b) solid ring		RCC ring	0	120	0	mason	skilled	0	150	0.00	
							labour	Un-skilled	0	100	0.00	
	c) pit cover		RCC slab	0	220	0	mason	skilled	0	150	0.00	
						0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
15	Minimum 12 mm thick cement plaster (1:4) to latrine plinth and pits with N.C finishing; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
16	Minimum 12 mm thick cement plaster (1:6) to superstructure wall both inner and outer surface ; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labour	Un-skilled	0	100	0.00	
						0					**0.00**	0.00
17	6 mm thick cement plaster (1:4) to latrine ceiling; sqm	0	cement	0	235	0	mason	skilled	0	150	0.00	
			sand	0	300	0	labourer	Un-skilled	0	100	0.00	
						0.00					**0.00**	0.00
18	sand filling in latrine floor and around the pit to soak away; cum	0	sand	0	300	0	labourer	Un-skilled	0	100	0.00	0.00
19	envelope of khoa around the pit and soak away ; cum	0	khoa	0	1060	0	labourer	Un-skilled	0	100	0.00	0.00
	Total											**8,966.86**

Materials and Labour required for *GI Wall and Roof Superstructure*

Discription	units	Quantities.
Labour		
Masons	days	0.90
Unskilled Labourers	days	2.00
Mystery	days	1.07
Carpenter	days	2.00
Materials		
Cement	bags	
Khoa	m^3	
Sand	m^3	
Gravel	m^3	
Bricks	nr	
Steel bars	kg	
angle iron	m	28.00
fxing nuts	nr	56.00
Latrine slab	nr	
Latrine pan	nr	
Latrine door	nr	
Hinges, catch hooks etc.	nr	
Roofing sheets CI	m^2	13.36
Drain pipe 100mm	m	1
Vent pipe 40/50 mm	m	4
Perforated concrete rings, 3ft	nr	
Non-Perforated concrete rings, 3ft	nr	
Concrete ring slabs	nr	
RCC Slabs of	nr	