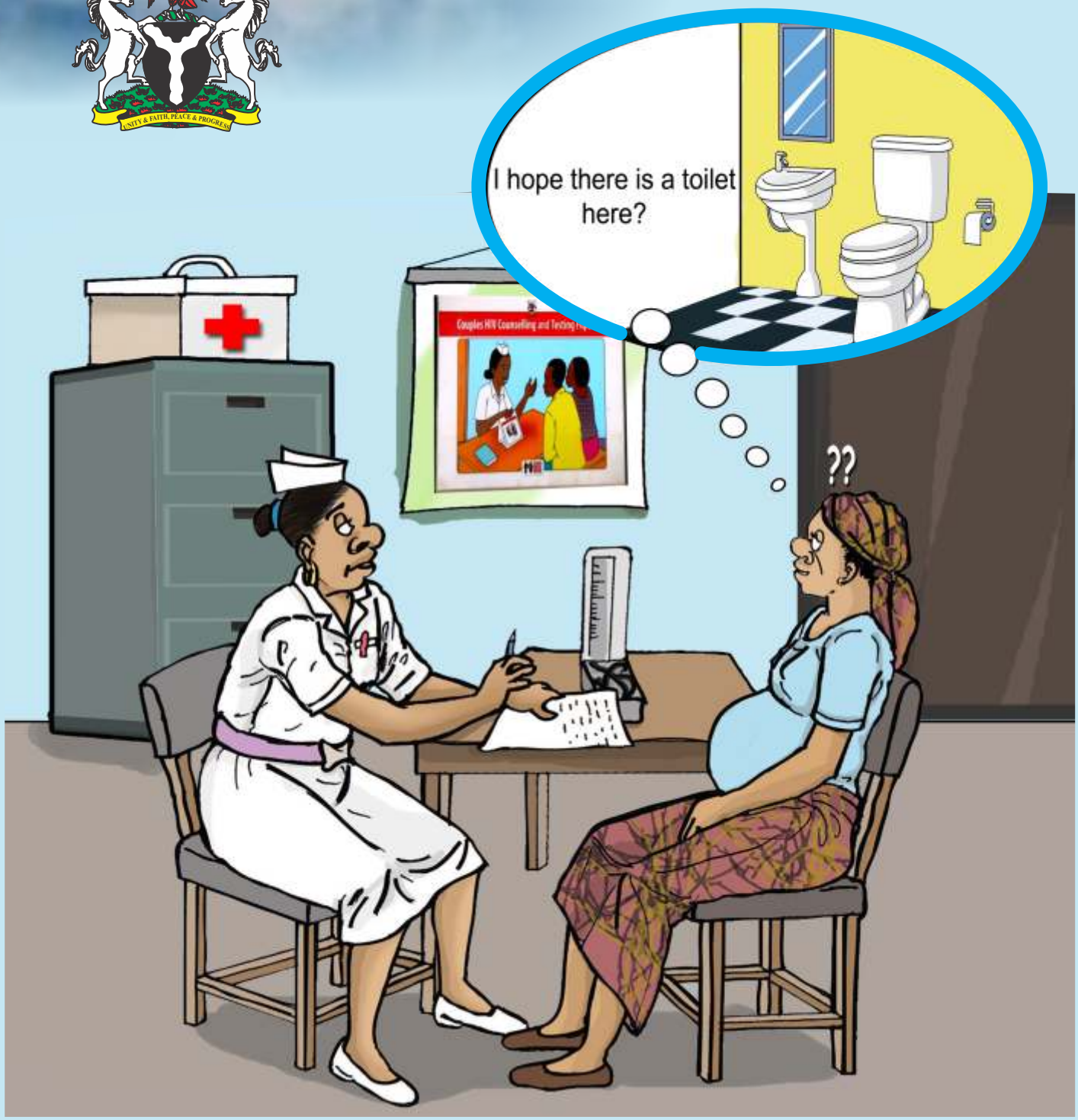

TECHNICAL GUIDE FOR WATER, SANITATION AND HYGIENE (WASH) IN PHC CENTRES IN NIGERIA

NATIONAL PRIMARY HEALTH CARE DEVELOPMENT AGENCY
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TECHNICAL GUIDE FOR WATER, SANITATION AND HYGIENE (WASH) IN PHC CENTRES IN NIGERIA

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

FOREWORD

Nigeria, is signatory to the Sustainable Development Goals (SDGs). This includes ensuring households, schools, health facilities, parks and other public places have access to WASH. This effort can be seen in areas of Water, Sanitation and Hygiene (WASH) in some PHC Centers that lack basic WASH facilities. The scourge of WASH related diseases, high mortality and morbidity rates are being addressed in some parts of the county, both urban and rural areas through the PHC Centers sited in the various stated and local governments in Nigeria.

The need for serious intervention can therefore not be underestimated, more so when several have been undertaken in the past with minimum impact, largely owing to lack of properly conceived integrated approach. The various interventions, especially in the area of WASH in PHCs, have been largely sectoral, resulting in the absence of separate WASH facilities in PHCS, apart from those constructed/located within the PHC Center' buildings, many of which may be non-functional.

The above situation, among others, dictated the reason for the development of this Technical Guide for WASH in Primary Health Care (PHC) Centers in Nigeria. This Technical Guide was developed with critical and leading support by the WASH section of UNICEF with inputs from key stakeholders, including relevant line Ministries/agencies of Government and other Development partners.

The aim is to come up with standard (models) guide for the design, construction, operation and maintenance of WASH facilities (latrines/toilets, urinals and hand washing facilities) in PHC Centers. This will assist in the process of giving the Centers standard functional WASH facilities that are capable of not only improving the Health of the patients, staff and care-givers but through them, the local communities. The expectation is that the users of the PHC Centers will be in the best position to positivity influence the WASH habits of their community members and so contribute to improvement in the health status of the people in the health center catchment communities.

The Development of this Technical Guide which was sponsored by UNICEF will support the government efforts of ensuring provision of adequate WASH facilities in all PHC Centers in Nigeria.

Dr. Ado J.G Muhammad, OON
Executive Director
NPHCDA

PREFACE

69% of Nigerians have access to improved water sources, while only 29% had access to improved sanitation in 2015. Nigeria was seriously off-track with respect to its MDG sanitation target of 65%. As at 2015, 57 million Nigerians lacked access to improved water sources, while 130 million people were without access to improved sanitation, of which 46 million Nigerians practiced open defecation. Nigeria ranks third globally with respect to large number of people practicing open defecation. Access to Water, Sanitation & Hygiene (WASH) facilities in schools, health facilities, markets and public places continue to be low further aggravating public health risks.

A 2015 WHO/UNICEF report revealed that 38% of health care facilities in low and middle-income countries have no source of water. Almost one-fifth of the facilities did not have toilets or basic latrines, and means for hand washing (water and soap or alcohol based hand rubs) absent in over one-third of the facilities. Although national data is not available, from available surveys, it is clear that the situation of WASH in health facilities in Nigeria is not too different from the global findings.

Nigeria is signatory to the Sustainable Development Goals (SDGs). SDG-6 is specifically dedicated to universal access to water and sanitation for all by 2030. This includes ensuring households, schools, health facilities, parks and other public places have access to WASH. Achieving and maintaining WASH services is critical to achieve quality universal health coverage, infection prevention and control, and child and maternal health and thereby contributes to SDG-3 (targets – 3.1 and 3.2 on reducing maternal & neo-natal mortality and 3.8 on universal health coverage). Cross-sectional studies in India and Bangladesh revealed high correlation of patient's rating of health services with clean toilets and availability of drinking water & hygiene facilities.

The recent Ministerial launch of the National Road Map for eliminating open defecation signals government commitment to eliminate open defecation through promotion/ uptake of latrines by households and includes provision of toilets in schools, health centres and public places. Under universal health care for Nigerians, the Ministry of Health is also promoting "Primary Health Care (PHC) centre under one roof", for which proper WASH facilities is a must.

Presently Nigeria lacks specific standards and guidelines for WASH facilities in Health centres. This technical guideline was conceived to address this vital gap. The technical guide details the minimum standards for WASH facilities in health centres; provides guidance on site selection; designs of water, sanitation, hygiene and waste management facilities taking into consideration gender, privacy, access, and the needs of physically challenged persons. To facilitate provision of uniform WASH facilities for health centres across the country with provision for regional/ socio-cultural differences, the guideline includes detailed specifications and covers supervision and operation & maintenance of WASH facilities.

The guideline is a result of the series of long consultations and iterations led by the Federal Ministry of Health, Federal Ministry of Water Resources, UNICEF and other stakeholders with funding from the EU and UK Aid. The technical guide will support the present efforts of the Government of Nigeria in standardizing WASH facilities for scaling-up quality WASH services in health centres across the country - in rural, peri-urban and urban settings.

Kannan Nadar
Chief of Water, Sanitation & Hygiene, UNICEF Nigeria
& Chair of WASH Development Partner's Group

ACKNOWLEDGMENT

Various Ministries/Agencies of Government, Development partners and other stakeholders contributed to the successful development of this Technical Guide document. The funding and technical support from Water, Sanitation and Hygiene (WASH) Section of UNICEF are highly appreciated as these were crucial to the development of this technical guide.

The entire process and the emergence of this document as well as the production for nationwide availability was greatly enhanced by the support of the Executive Director of NPHCDA, Dr. Ado J. G. Muhammad. Te efforts and assistance of the UNICEF WASH Section officers, especially WASH Specialists (Bisi Agberemi and Job Ominyi), in the course of documenting the existing designs and drawings are also acknowledged. Further, the contributions and commitment of the technical team members of the department of Community Health Services of NPHCDA are so highly appreciated. We strongly recognize and acknowledge the contributions of representatives of the Federal Ministry of Health (FMOH), Federal Ministry of Environment, Federal Ministry of Water Resources and National Bureau of Statistics. Our appreciation also goes to other development partners, including the Management Sciences for Health (MSH) for support and helpful inputs in the course of the development of this important document.

Finally, the development of this Guideline marks the achievement of an important milestone by the National Primary Health Care Development Agency (and for the department of Community Health Services, in particular), UNICEF and other Stakeholders in WASH domain. By this achievement, the potential of NPHCDA and stakeholders at the federal and sub-national levels to coordinate effective, quality and sustainable implementation of standard WASH interventions in Nigeria are greatly enhanced.

Dr. Emmanuel Odu
Director of Community Health Services
NPHCDA

EXECUTIVE SUMMARY

The technical guide for WASH facilities (latrines, toilets, urinals, hand washing and waste management) in Nigeria was prepared to address the issue of lack of separate WASH facility designs and construction in PHCs, non- compliance of the various designs with the standard specifications and the un-satisfactory quality of construction materials and workmanship of most of the separate WASH facilities where available in Nigeria.

The process for the development of this technical guide included:

- consultations and meetings with officials of the National Primary Health Care Development Agency and members of National Sanitation Task Group, as well as the National Working Group on WASH in PHCs, on appropriate designs for PHCs WASH facilities including latrine/toilet, urinal, hand washing and waste management;
- desks review of all existing WASH documents and drawings;
- preparation of a draft technical guide for WASH in PHCs;
- critique of the draft technical guide at a national stakeholders' workshop; and
- finalization of the technical guide incorporating comments from the stakeholders' workshop.

In order to make the facilities user-friendly, the designs have taken into consideration the needs of the physically challenged, including blind or poorly sighted people, people in wheelchairs or with crutches, and people with missing or paralyzed arm(s).

On the basis of this, the various designs were developed and the detailed designs of each of the options done. Three types of hand pump boreholes (HPB) are recommended for PHCs as shown below:

- Hand Pump Borehole;
- Force Lift Hand Pump Borehole; and
- Motorised/Solar/Electricity Pump Borehole.

Also, three types of excreta disposal systems (Ventilated Improved Pit (VIP) latrine, Pour-Flush Toilet, and Water Closet Toilet) are recommended for PHCs in rural, peri-urban and urban areas. The VIP latrines and Pour-Flush/Water Closet toilets are designed in such a way that the sizes include 3, 4, 5, and 6 compartments, according to the needs of the PHC. In this guide, provisions have been made for 2 separate units of: empty-able, lined ventilated improved pit (VIP) latrine; urinal and hand washing, one unit each for males and females. Also, there are various types of urinal in front of the latrine/toilet structures, as well as waste management facilities.

The supervision/management procedures/guidelines necessary for the effective use and longevity of the facilities are also described in this guide. While the problem of poor/inadequate WASH facilities is generic, the specific approaches and designs differ between the six geo-political zones, states or even local governments. The designs recommended in the technical guide have therefore been developed to be relevant to local practices as well as optimizing use of local materials and construction approaches.

1

CHAPTER ONE

WASH IN PRIMARY HEALTH CENTERS

INTRODUCTION

1.1 WASH IN PHCS

1.1.1 Background

Among the component parts of a healthy primary health care (PHC) centre's environment are improved and adequate water, sanitation and hygiene (WASH) facilities. The adequacy and quality of these facilities are medical requirements that are essential for effective and efficient healing in the PHCs. In Nigeria, access to improved WASH facilities in most PHCs has been found to be grossly inadequate. This is often due to various reasons, among which are: lack of awareness about the linkages between poor sanitation and impaired health; and inadequate plans by policy makers and other stakeholders to allocate sufficient resources to provide WASH facilities in various PHCs, especially for out-patients, relatives and visitors. This often leads to non-existence or existence of sub-standard and poorly maintained WASH facilities. Compounding this problem is lack of technical depth to supervise construction of PHC WASH facilities when adequate finances have been appropriated.

Where available, the WASH facilities, especially toilets, in most PHC Centres are not adequate and not meeting the recommended WHO standard of toilet to patient ration of 1:20, that is, one latrine/toilet to twenty users at in-patient centres, and at least four toilets per out-patient centre, with separate latrines/toilets for patients, including people with special needs (disabled, pregnant women, elderly and child patients) and staff (WHO and UNICEF, 2015). Thus, in order to have a functional PHC Centre, the minimum WASH requirements should be met in such PHC Centres. All the WASH facilities should be accessible for PHC staff, patients, caregivers and visitors.

Lack of WASH facilities in PHCs is one of the major contributory factors for improper hygiene practices thereby increasing the risk of hospital-acquired infections. Adequate WASH facilities on the other hand allow patients to keep their dignity. There is high significance of WASH in PHCs in protecting the well-being of staff, patients and visitors, to prevent epidemics and to act as a role model for the PHC host communities.

Specific WASH in PHC issues include the following:

Water is needed for:

- cleaning of wards, linen, medical equipment, toilets;
- food preparation;
- cleaning of patients;
- maternity ward;
- hand washing of personnel, patients and visitors;
- re-hydration; and
- surgical processes.

Sanitation is needed for:

- proper disposal of excreta in order to prevent outbreaks of diseases;
- adequate sanitation infrastructure for special needs of various groups (disabled, pregnant women, elderly); and
- proper disposal of solid waste (including health care/medical waste).

Hygiene is required to:

- ensure cleanliness of environment, equipment and staff.

It was in recognition of the important roles provision of water, sanitation (latrine/toilet, urinal and hand washing facilities) could play in ensuring safe and healthy PHC environment that prompted the intervention of Water, Sanitation and Hygiene (WASH) programme in PHC, under the current Federal Government of Nigeria/UNICEF WASH programme in the country.

Considering the huge investment in provision of WASH facilities in PHCs and its impact on promoting health care services in the country, the need for development of guidelines and standards for provision of these facilities cannot be over emphasized towards achieving project objectives and sustainability. Thus, in order to achieve quality service delivery in the construction of PHC WASH facilities, UNICEF is supporting NPHCDA to develop technical guidelines for PHC WASH facilities in the country. The Technical guidelines will provide framework and standards for construction of PHC WASH facilities in the country.

1.1.2 Importance of WASH in PHCs

WASH in PHCs refers to the combination of hardware and software components that are necessary to produce a healthy PHC environment as well as develop and support safe hygiene behaviors at PHC. The hardware components include: safe water supply options such as hand/motorised pumps installation, and tap connection and rain water harvesting; while sanitation facilities include latrines/toilets, urinals, hand-washing and solid waste management facilities. Software components include capacity building programme for staff, hygiene education for behavioral change and monitoring/support mechanisms.

PHCs play a very important role within the host community with the provision of essential medical care to the sick, playing the role of resource centre for prevention, and helping to provide an early warning signal of communicable diseases, among others. One key method of achieving improved, effective and efficient PHC environment is through improvement in PHC WASH, because of the important role patients could play as change agents, not only in the PHC, but also at the community level and, ultimately, the country at large.

The following are the advantages to be derived from a well-structured and properly implemented WASH in PHC project:-

- **Effective healing:** Patients, visitors and staff generally in healthy PHC environments are healed more effectively.
- **Consistent usage of PHC:** Provision and usage of WASH facilities in PHC will encourage patients in many settings to use such PHC facilities.
- **Patient rights:** Healthy and happy life is assured as patient right; good WASH facilities being the right of patients, visitors and staff.
- **Gender equity:** There can be greater gender equity in access to PHC and meeting

WASH-related needs.

- **Reduced diseases and worm infestations:** Improved WASH facilities and good hygiene practices will prevent infections and infestation, thereby reducing disease burden among patients, visitors, staff and their families.
- **Reaching the home and community:** Patients, visitors and staff are able to introduce and reinforce hygienic behaviours in the homes and communities.
- **Environmental cleanliness:** Properly used hygiene facilities will prevent pollution of the environment and limit health hazards for the community at large.
- **WASH sustainability:** Patients, visitors and staff can learn and practice life-long positive hygiene behaviours and also promote safe environments at homes and in the communities.

WASH in PHCs is based on the recognition that water, sanitation and hygiene are not charity, but human rights, which are part of international human rights law. Thus, there is need for the consolidation of the political consensus and broad support for the rights to water, sanitation and hygiene in PHCs in Nigeria. Moreover, there must be strategies of turning the rights into reality. Everybody must work to translate the rights into a day-to-day reality for everyone and everywhere.

Consequently, the human right to WASH in PHCs entitles every PHC staff, patient and visitor to sufficient, safe, acceptable, physically accessible and affordable WASH facilities for personal uses. And this right must be met in Nigerian PHCs.

1.2 OBJECTIVES OF WASH IN PHC

WASH in PHC project is a major component of FGN/UNICEF WASH Programme in Nigeria, which aims at:

- provision of gender sensitive, people friendly WASH facilities in PHCs thereby reducing the incidence of hospital water and sanitation related diseases among patients, visitors and staff;
- promotion of hygiene practices among the patients, visitors and staff and ensure environmentally friendly PHC environment for adequate healing;
- increase awareness about hygiene practices among patients, visitors and staff, which can be passed on to other members of the host and neighbouring communities; and
- community sensitisation and mobilisation for WASH at community level.

1.3 POLICY ISSUES ON WASH IN PHC

Availability of WASH facilities (safe drinking water, sanitation and good hygiene) influences healing in PHCs, while its lack has contributed significantly to low patronage of PHCs in Nigeria. Promotion of hygiene and sanitation in PHCs is also essential because PHCs could offer an important point of entry for raising the profile of hygiene and sanitation, as well as improving the environmental health conditions in the communities, since PHCs are integral parts of the communities. patients, visitors and staff of PHC could prove to be effective change agents when they learn and encourage to imbibe good WASH behaviour: always washing their hands with soap at critical times, using toilets properly, and drinking safe

water. Moreover, those who adopt good hygiene practices at PHCs not only work as peer advocates but are also likely to reach their full mental and physical healing, as well as being health conscious, thereby transferring the knowledge, skills and practices to the rest of their families.

Although, there is no existing policy on WASH in PHCs in Nigeria, this technical guide for WASH in PHC in Nigeria will set the minimum requirements to ensure a clean and healthy PHC environment by adopting efficient, sustainable and cost-effective strategies to safeguard public health and wellbeing, in line with national development objectives and international best practices.

1.4 PURPOSE AND SCOPE OF THE TECHNICAL GUIDE

In Nigeria, there are various WASH facilities' designs and most of these designs do not comply with the standard specifications. The quality of construction of most of the WASH facilities is also not satisfactory. In addition, experience has shown that there are divergent designs of water sources, VIP latrines, urinals and hand-washing facilities in the country.

The need, therefore, arises for quality control vis-à-vis designs and construction procedures, as well as strict adherence to specifications by the appropriate implementation agencies and contractors. Moreover, there is the need to develop technical guidelines for construction of WASH facilities in PHCs. It is against this background that this technical guide is being developed. Thus, UNICEF is supporting quality assurance of WASH in PHC projects through the development of this technical guide for PHC WASH facilities.

The technical guide document covers all the stages of PHC WASH facilities, including: design, site selection, construction, operation and maintenance. It stresses the importance of patients, visitors and staff, and the PHC host communities in the entire process so that they can by themselves find solutions to problems that may arise during operation and maintenance: in short, it enables them own the projects and manage them for posterity.

The scope of the guide covers the different technical options for the PHC WASH facilities, namely: improved water sources, VIP latrines, pour flush and water closet toilets, urinals and hand washing. The guide describes in detail the practical designs and construction of each facility, while also providing easily accessible guidance on operation and maintenance. Thus, this technical guide is meant to be used by Planners, Engineers, Sanitation Officers, Contractors, Builders, Health Officials, Policy Makers, among others, as basis for possible adaptation to particular PHC environment. The annexes to the guide show the various detailed designs and bill of quantities of the recommended facilities, namely: improved water sources, ventilated improved pit (VIP) latrines, pour flush toilet (PFT), water closet (WC) toilet, urinals and hand washing facilities. The technical drawings show in detail the dimensions and types of the facilities, the construction materials and the operation and maintenance of all the recommended technological options.

Thus, this technical guide for WASH in PHC in Nigeria will contribute to ensuring that all PHCs in Nigeria have adequate user-friendly WASH facilities and hygiene education necessary for effective and efficient healing environment.

2

CHAPTER TWO

MINIMUM STANDARDS FOR WASH FACILITIES IN PHC

MINIMUM STANDARDS FOR WASH FACILITIES IN PHC

2.1 INTRODUCTION

According to the National Primary Health Care Development Agency (NPHCDA), the minimum standards for Primary Health Care in Nigeria as shown in Table 2.1 reveal that the smallest health care facility, the Health Post, is expected to serve 500 people within a village. The Primary Health Clinic, is supposed to serve between 2,000 to 5,000 people within a group of villages or communities, while the Primary Health Centre is to cater for between 10,000 and 20,000 people within a political ward (Table 2.1).

Table 2.1: Minimum Standards for Primary Health Care in Nigeria

S/N	Service Delivery Area	Health Facility	Estimated Coverage Population
1.	Settlement, Neighbourhood and/or Village Level	Health Post	500
2.	Group of Settlements/Neighbourhood, Villages or Communities	Primary Health Clinic	2,000 to 5,000
3.	Political Ward	Primary Health Centre (Ward Health Centre)	10,000 to 20,000

The actual quantities of WASH facilities required in each of the heath facilities depend on several factors, such as the population to be served, climate, availability and type of WASH facilities, and local practices. The location of the WASH facilities, however, should be based on the site selection criteria in this technical guide.

2.2 SITE SELECTION

The following points should be considered in selecting the sites and the layout of the WASH facilities:

- **Privacy:** The facilities, while being located in an open place for safety reasons, should not be at less than six (6) metres away from the health centre block, for users not to travel long distance and not to create nuisance.
- **Wind direction:** The facilities, especially latrine/toilet and waste management facility should face wind direction for proper ventilation. Moreover, latrine/toilet should be at least 2 metres away from anything (e.g. branches of trees) that may impede the action of the wind across the vent pipe, thus not interfering with ventilation in the pipes.
- **Water source:** Latrine should not be a source of contamination for the water and should be positioned downhill and at least 15m away from the water source.

- **Socio-cultural aspects:** The final selection of the WASH facilities should look at different prevailing, social and cultural aspects of the locality for it to mitigate against the risk of not being used.

Fig. 2.1 shows the recommended layout or site plan of a typical PHC in relation to the sitting of the WASH facilities. It should be noted that the direction of the prevailing wind should be considered in the location of VIP latrine.

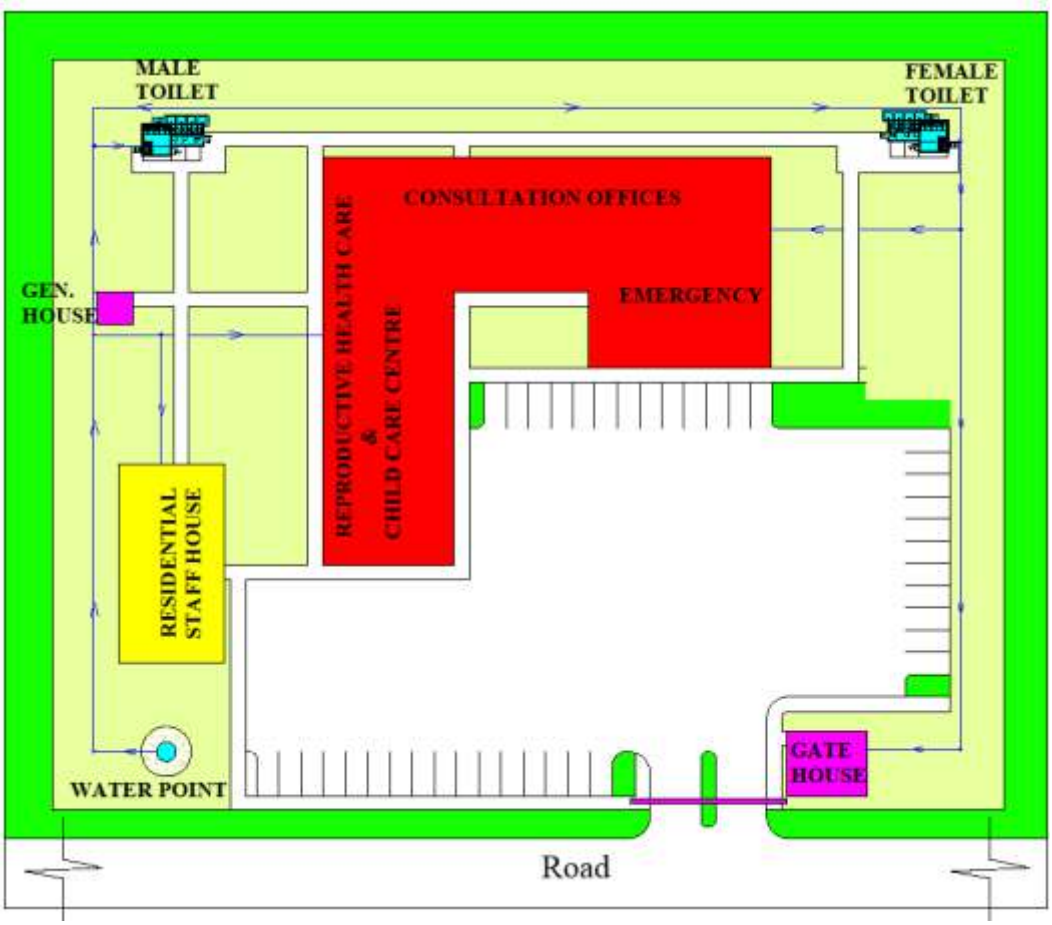

Fig. 2.1: Layout of a Typical PHC and the Sitting of WASH facilities

2.3 OPTIMAL STANDARDS FOR WATER FACILITIES IN PHC

In developing nations, PHC needs clean water, sanitation facilities and hygiene education to be able to provide an adequate and safe level of health-care. Water is essential for life, and it constitutes a major percentage of body fluid, which help in transportation of nutrients and cells to various parts of the body.

According to the National Guidelines for Development of Primary Health Care System in Nigeria (2012), major health problems in Nigeria are preventable diseases associated with consumption of unclean water and lack of proper environmental sanitation. These contribute

significantly to high infant mortality (death) and morbidity (illness) and to poor quality of life due to:

- inadequate and inaccessible water supply;
- poor personal and environmental hygiene;
- poor and inadequate refuse and extra disposal; and
- inadequate housing.

Objectives of provision of safe water in PHC, according to the Guidelines are:

- provision of adequate water points for safe drinking;
- monitoring of water quality;
- protection of water sources;
- promotion of personal and environmental hygiene; and
- provision of excreta disposal.

It is often said that about 90% of communicable diseases can be prevented if water is provided adequately in quantity and quality. Thus, the major strategy is the provision of safe water point(s), which should be between fifteen (15) to thirty (30) meters away from pollution source, such as latrine, soak away pit, septic tanks or refuse dumping grounds.

Table 2.2 shows the estimated average daily flow of in-patients and out-patients in each of the health institutions calculated based on 1% (for out-patients) and 0.1% (for in-patients) of the total estimated coverage population (applicable to Primary Health Centre alone).

Table 2.2: Estimated Average Patients Flow for Primary Health Care in Nigeria

S/N	Service Delivery Area	Health Facility	Estimated Coverage Population	Average Patients Per Day		
				In - Patients (0.1%)	Out - Patients (1%)	Total Patients
1.	Settlement, Neighbourhood and/or VillageL evel	Health Post	500	0	5	5
2.	Group of Settlements/Neighbour hood, Villages or Communities	Primary Health Clinic	2,000 to 5,000	0	50	50
3.	Political Ward	Primary Health Centre (Ward Health Centre)	10,000 to 20,000	20	200	220

2.3.1 Water Supply for PHC Sanitation

Adequate supply of water is required to ensure effective usage of virtually all the sanitation facilities but particularly for the hand washing facility and the pour flush or water closet toilet. Hence, adequate water supply is very essential. Water supply may be through:

- provision of borehole with motorized pump and pipes to fill the tank automatically;
- provision of borehole/deep well with handpump; and
- installation of rainwater harvester.

In situations where the water is supplied by handpump, people may need to collect water with buckets to fill the storage tank. In such a situation, the tank is provided with steps to

enable people reach the tank cover. Force lift hand pump can also be used to ensure direct supply of water from the borehole to water tank.

Rainwater harvesters gather rainwater from the roof of the latrine or toilet building. It has gutters and down pipes (made from wood, bamboo, galvanized iron sheet or PVC) that go to the storage container (water tank). A pour flush device or detachable down pipe is provided to collect the first 20 litres of the run-off during a rainstorm that may be contaminated with dust, leaves, insects etc. Filters are provided at both ends of the pipe.

Just before the start of the rainy season, the system should be checked for leakages and broken or otherwise affected parts for repair. During the rainy season, the system has to be checked regularly or every other month and cleaned when dirty and sand washed at least every six months. Chlorination of the water may be necessary at intervals.

Rooftop harvesting systems can lose water from taps, if left dripping. Rainwater harvesting will provide additional supply of water for the hand-washing storage tank during the rainy season.

2.3.2 Water Demand

The actual quantities of water required in a PHC will depend on several factors, such as the population to be served, climate, availability and type of water-use (WASH) facilities, and local water-use practices. However, for the purpose of this technical guide, and based on the WHO (2007) estimates, the basic quantities (including for drinking, handwashing and cleaning) of water required per person (staff, out-patient) per day should be five (5) litres (Table 2.3). The in-patient requires between 40 and 60 litres of water per day. But where pour-flush and water closet toilets are being used, the additional average quantities of water required per person (staff, out-patient) per day will be as follows:

- water closet toilet, 10–20 litres;
- pour-flush toilet, 1.5–3.0 litres; and
- anal washing, 1–2 litres

Table 2.3: Estimated Average Water Demand for Primary Health Centre in Nigeria

S/N	Users	Consumption rate/Litre	No of Users/Day	Water Demand/Day
1.	Staff	5	12	60
2.	In - Patients	40-60	20	800-1,200
3.	Out - Patients	5	200	1,000
4.	Caregivers	5	20	100
	Total	-	-	1,960 - 2,160

2.3.3 Water Quality

Water for drinking, hand washing and cleaning should be safe for the purpose intended, especially the first two (drinking and hand washing) should be treated to:

- ensure microbiological safety with no escherichia coli or thermotolerant coliform

bacteria detectable in any 100-ml sample;
- meet WHO Guidelines for drinking-water quality or national standards concerning chemical and radiological parameters; and
- no tastes, odours or colours that would discourage consumption of the water.

The taste and odour of drinking-water need to be acceptable to PHC staff, patients and visitors, or else they may not drink enough, or may drink water from other unprotected sources, which could be harmful to their health.

Moreover, the water must be free of pathogens and protected from contamination inside the Centre itself. Thus, the LGA PHC Department and WASH Unit, among other line departments and agencies should be involved in monitoring the microbiological quality of the water in the PHC, as part of a routine surveillance and control programme.

Sufficient water should be available at all times for drinking, handwashing, and cleaning. The reliable drinking-water point must be accessible to staff and patients, including those with disabilities, at all times Also, a reliable water point, with soap or a suitable alternative must be available at all handwashing stations and other critical points within the PHC. If possible, all water in the PHC should be drinking-water quality.

2.4 OPTIMAL STANDARDS FOR SANITATION FACILITIES IN PHC

Since the total number of latrines/toilets required by any PHC depends on the population a center is serving, it is then being recommended that sufficient numbers of adequate, accessible, appropriate and safe sanitation facilities are provided for patients, staff and visitors.

2.4.1 Sanitation Demand

Using the WHO minimum standard of 1:20, that is 1 latrine/toilet to 20 users will mean that the PHC with staff, patients and caregivers of about 260 will need 13 toilet/latrine compartments (6 for males and 7 for females). This may be un-realistic and un-practicable, considering the physical space occupied by some of these PHCs. Thus, alternative provision could be made for a maximum of 4 or 6 compartment VIP latrine or Pour Flush/WC toilets divided into two for male patient/male staff and female patient/female staff. The latrines/toilets could also be appropriated as follows: one each for staff female and staff male, one each for female patient and male patient. One could also be dedicated for child patients, especially in the primary health centres.

2.4.2 Sanitation Supply

Three types of excreta disposal systems are recommended for PHCs in rural, peri-urban and urban areas:
- ventilated improved pit (VIP) latrine for rural and peri-urban PHCs;
- pour-flush toilet for urban and peri-urban PHCs; and
- water closet toilet for urban PHCs.

For PHCs in rural and peri-urban areas and where no water or insufficient water for flushing is available close to the latrine/toilet or where leaves, stones or sticks are used for anal cleansing, the VIP latrine is the most suitable option. In the urban and peri-urban areas, where adequate supply of water is available close to the latrine and the facilities can be well maintained; pour-flush and water closest toilets may be considered. Regular cleaning of pour-flush and water closet toilets is particularly essential; otherwise they will become dysfunctional and un-useable within a short time. More importantly, the needs of the users and the resources available should be carefully considered to ensure that the most appropriate type of facility is selected.

2.5 OPTIMAL STANDARDS FOR WASTE MANAGEMENT FACILITIES IN PHC

Like the sanitation standard, the size and type of waste management facility required by any PHC depends on the population a facility is serving. According to the report of the Baseline Assessment on Injection Safety and Health Care Waste Management in Nigeria (UNICEF, 2012), the health facilities generate an assortment of waste; the most commonly reported being sharps (98%), followed by general waste (86%) and then infectious waste (83%), while chemical waste and radioactive waste were the least generated, accounting for 32 percent and 20 percent, respectively. Thus, adequate waste management facilities should be provided in the PHCs for the use of patients, staff and visitors.

2.5.1 Waste Management Demand

The waste generated by the health facility depends on the service delivery area the health center. Thus, these can be estimated based on the total bed space, the average daily occupancy rate, and the total number of out-patients treated on daily basis. However, the daily average waste generation of 1.79kg/bed/day for in-patient and 0.035kg/day for out-patient could be used for the calculation.

2.5.2 Waste Management Supply

The risks associated with medical waste and the ways of managing them are not new in health literature, this technical guide, therefore addresses the issue of normal waste generated in a typical PHC where 10-20 per cent of such wastes are hazardous wastes (sharp, entailing risk of contamination/infectious, anatomical, pharmaceutical, chemical, cytotoxic, heavy chemical, radioactive, etc). Thus, such wastes could be managed through any of these ways:

- general pit, for composting of waste and burying of ash from incinerators;
- sharp pit, for managing sharp waste objects; and
- incinerator, for burning of combustible waste.

3

CHAPTER THREE

DESIGNS OF PHC WASH FACILITIES

DESIGNS OF PHC WASH FACILITIES

3.1 WASH FACILITIES IN PHC

In many countries, there exists a high prevalence of WASH related diseases, causing many people to fall ill or even die. Improved WASH practices are therefore essential if transmission routes of these diseases are to be reduced. Whereas appropriate WASH education can bring about the intention for positive change, for sustained behaviours, however, appropriate WASH facilities are needed to allow people to transform intention into real change.

PHCs are important health-care facilities necessary to provide an adequate and safe level of health-care in addition to minimizing the nosocomial risk to patients, staff and visitors, as well as the infectious risk to surrounding communities. The PHCs could provide an ideal environment for people in the stimulation and initiation of positive change. If WASH facilities are, therefore, available in PHC, they can be made to function as role models for the host communities. PHCs can more easily influence communities through outreach activities by the staff who are mostly in touch with a large proportion of the households in the community.

Although the importance of WASH facilities for PHCs is acknowledged, in practice the real situation in many PHCs in developing countries, including Nigeria, is deplorable. Most of the PHCs are faced with a myriad of WASH related problems. This section of the technical guide, therefore covers the basic designs of WASH facilities that can be used in PHCs.

3.2 WATER SOURCES

3.2.1 Boreholes

Three types of boreholes are recommended for PHCs as shown below:

- Hand Pump Borehole (Figures 3.1- 3.4)
- Force Lift Hand Pump Borehole (Figure 3.5)
- Motorised/Solar/Electricity Pump Borehole (Figures 3.6 - 3.13)

Figure 3.14 shows the cross section of the soak pit details.

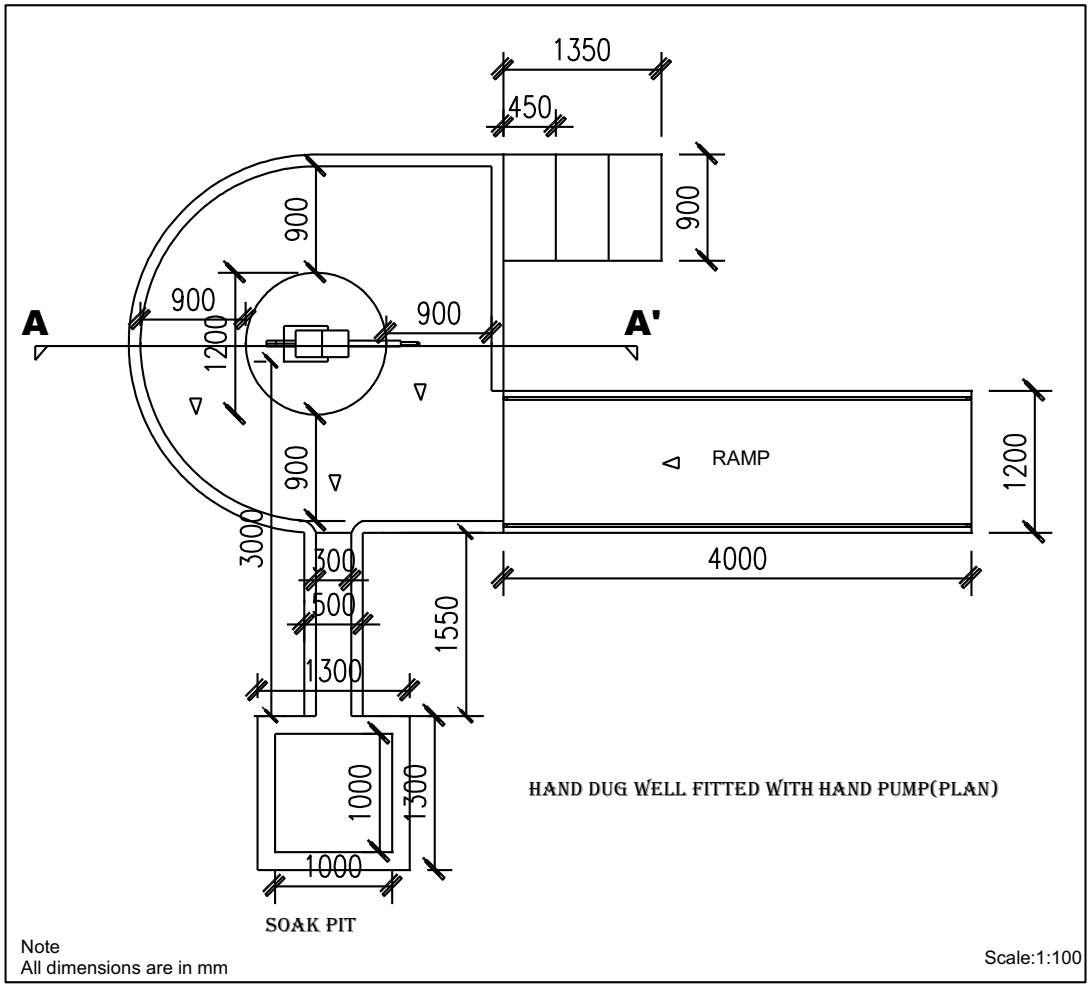

Fig. 3.1: Floor Plan of Hand Dug Well Fitted with Hand Pump Borehole

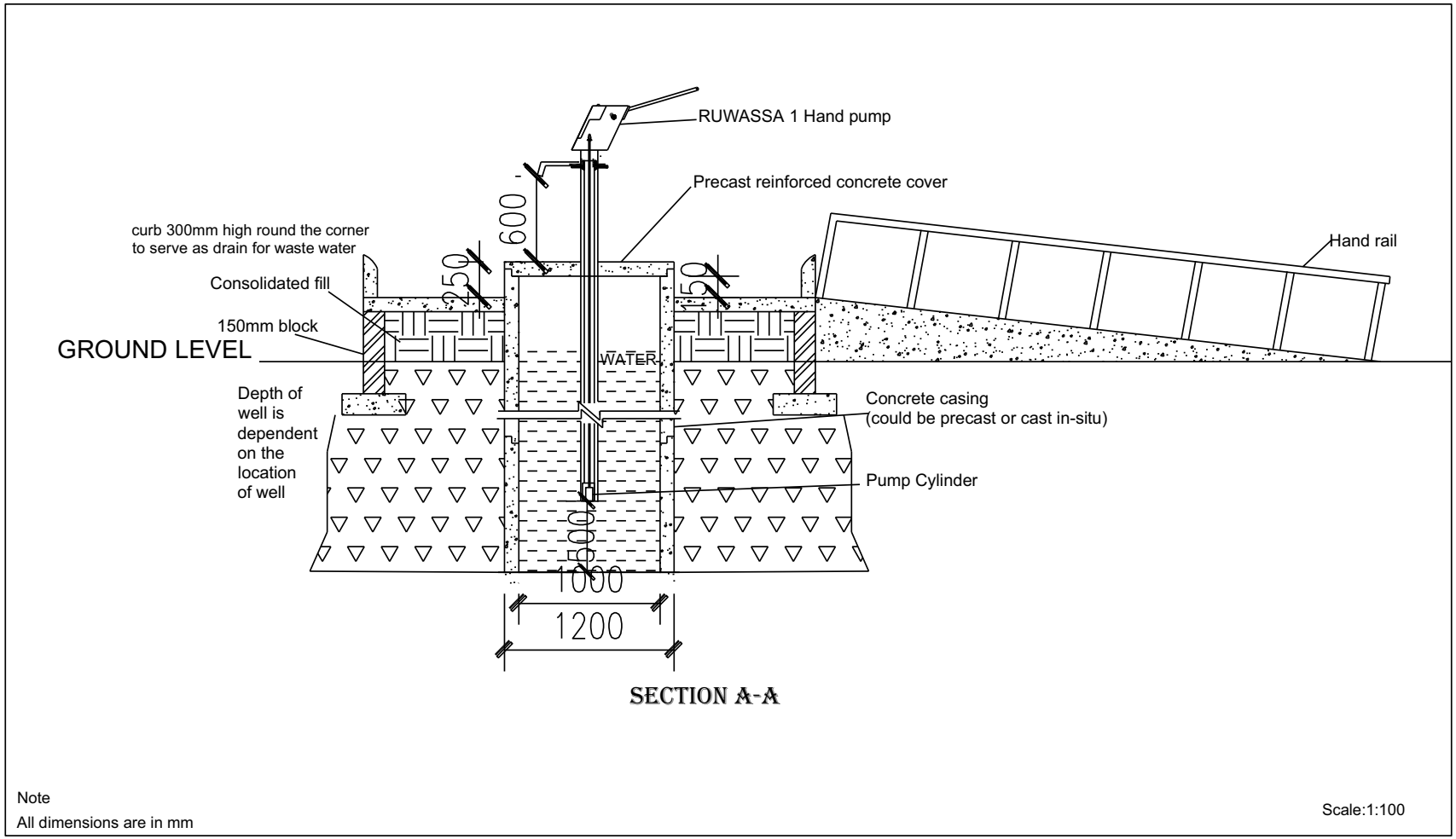

Fig. 3.2: Cross Section of Hand Dug Well Fitted with Hand Pump Borehole

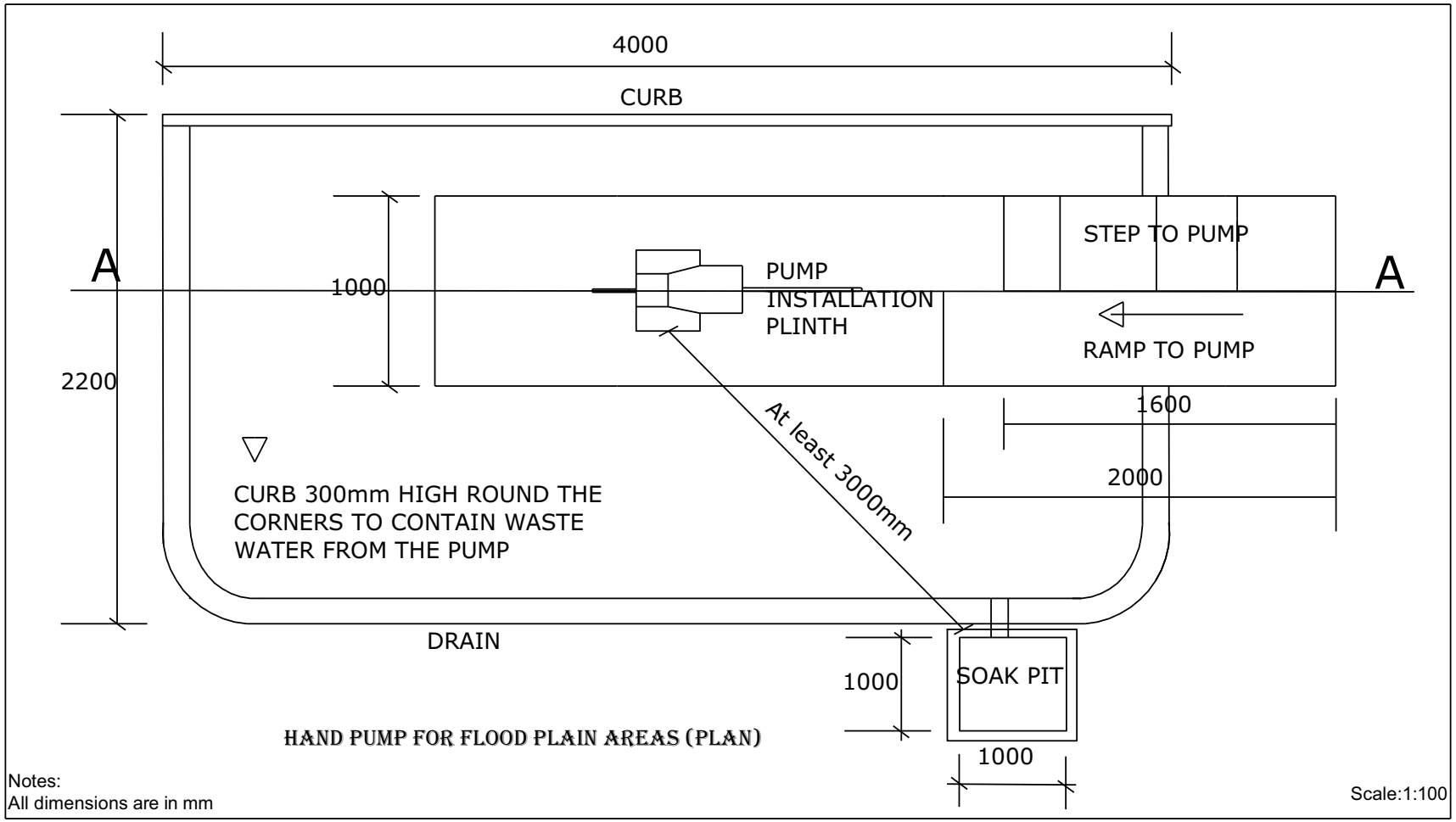

Fig. 3.3: Floor Plan of Hand Pump Borehole for Flood Prone Area

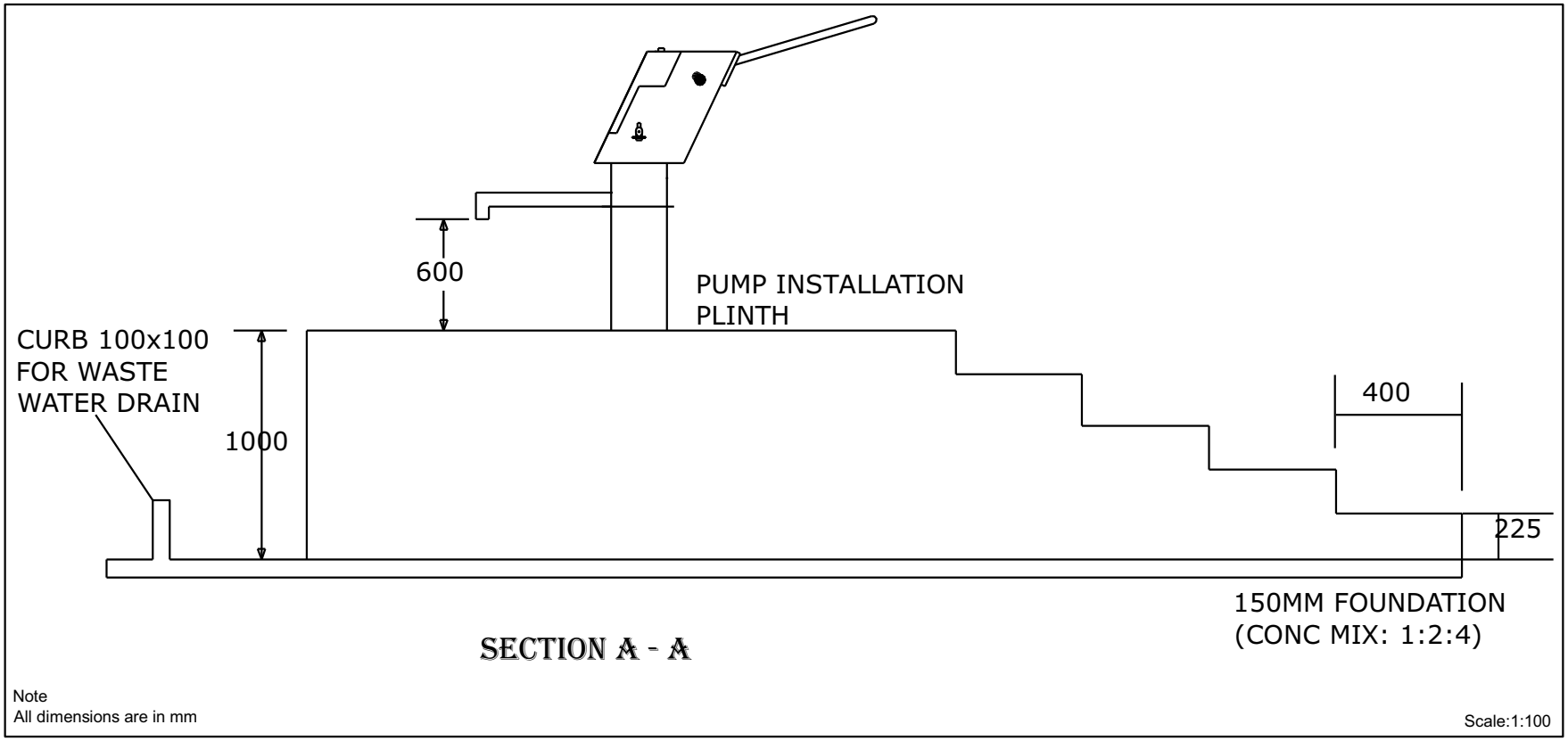

Fig. 3.4: Cross Section of Hand Pump Borehole for Flood Prone Area

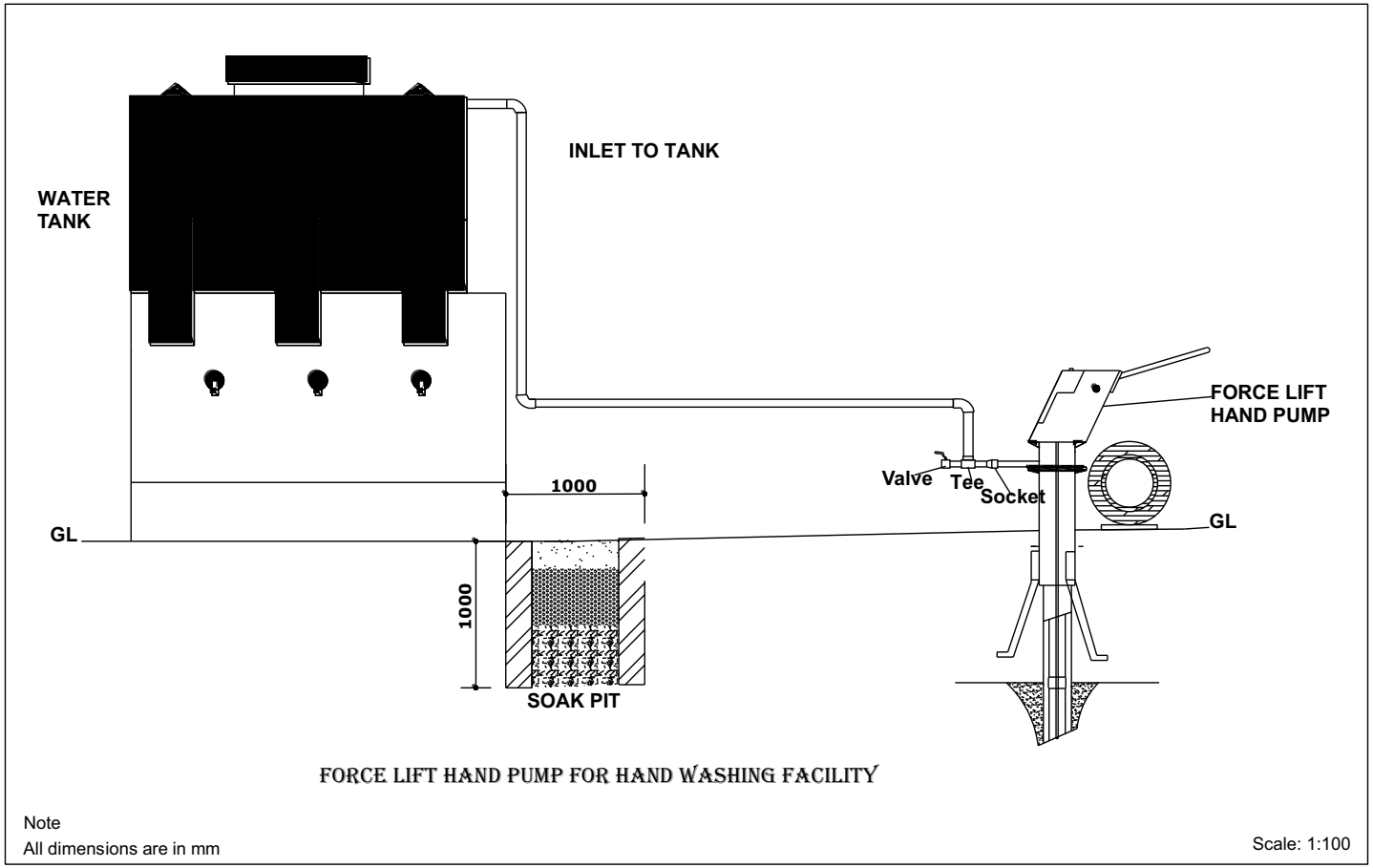

Fig. 3.5: Cross Section of Force Lift Hand Pump Borehole

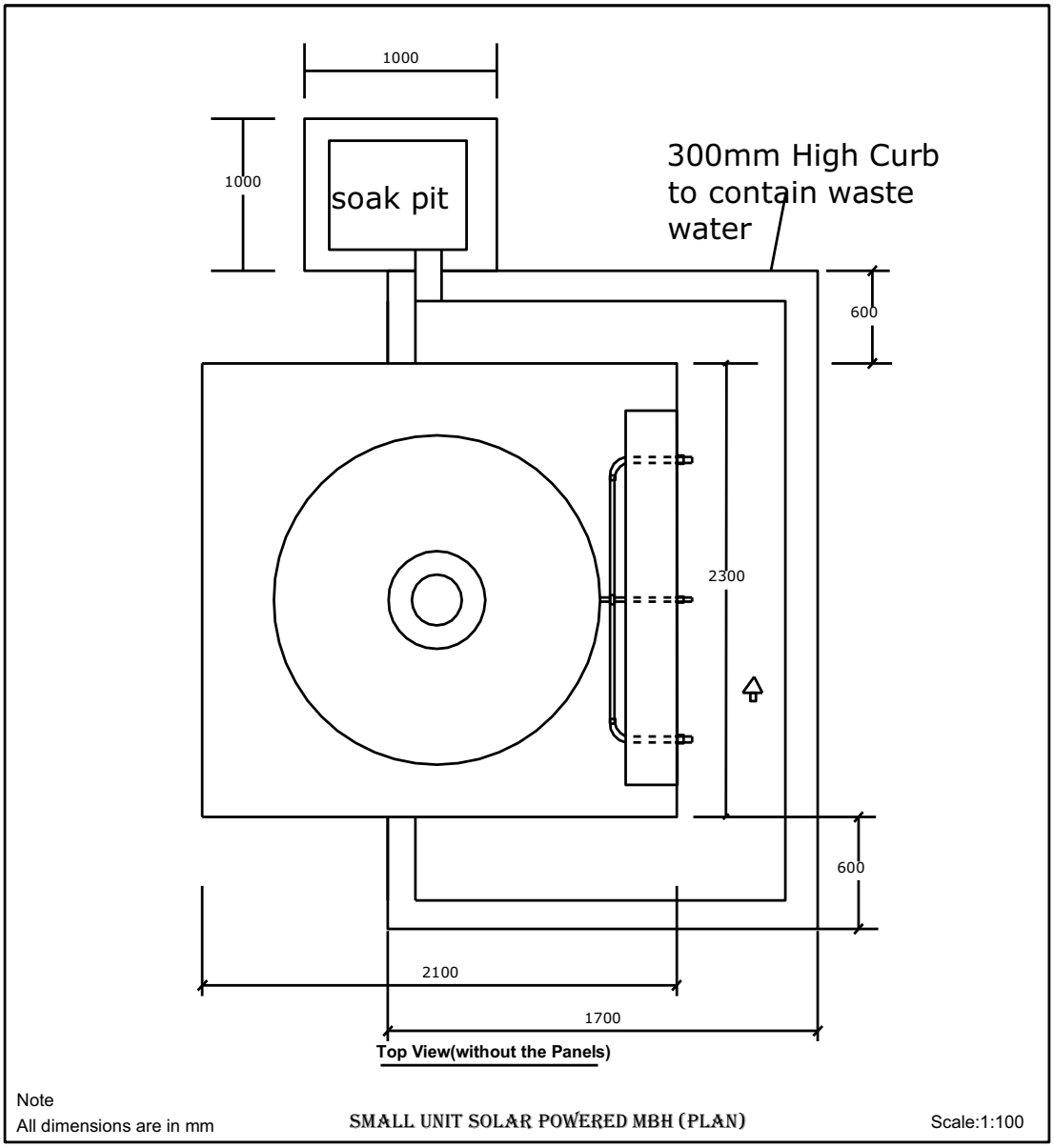

Fig. 3.6 : Floor Plan of Solar Powered Motorised Borehole

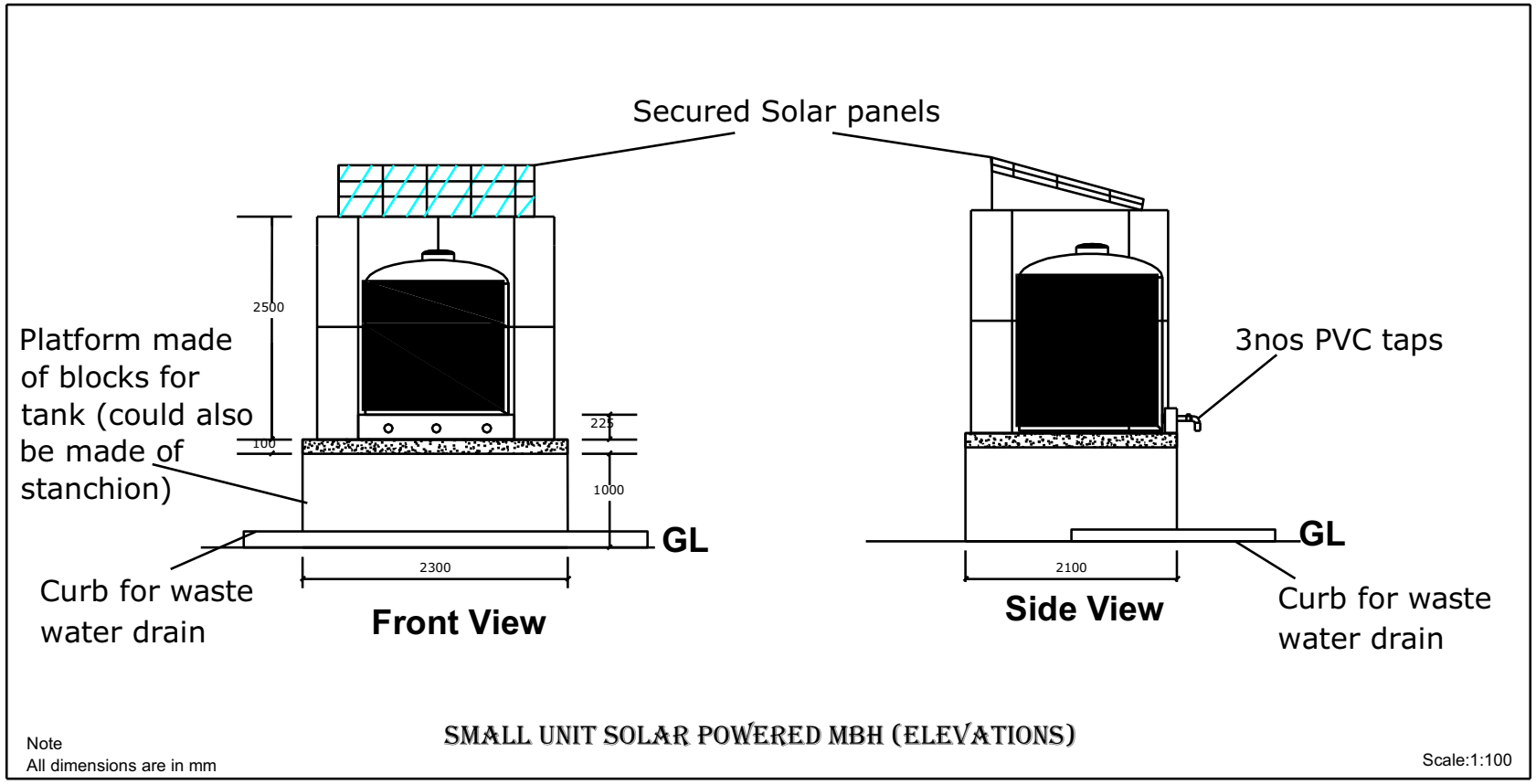

Fig. 3.7: Front and Back Elevations of Solar Powered Motorised Borehole

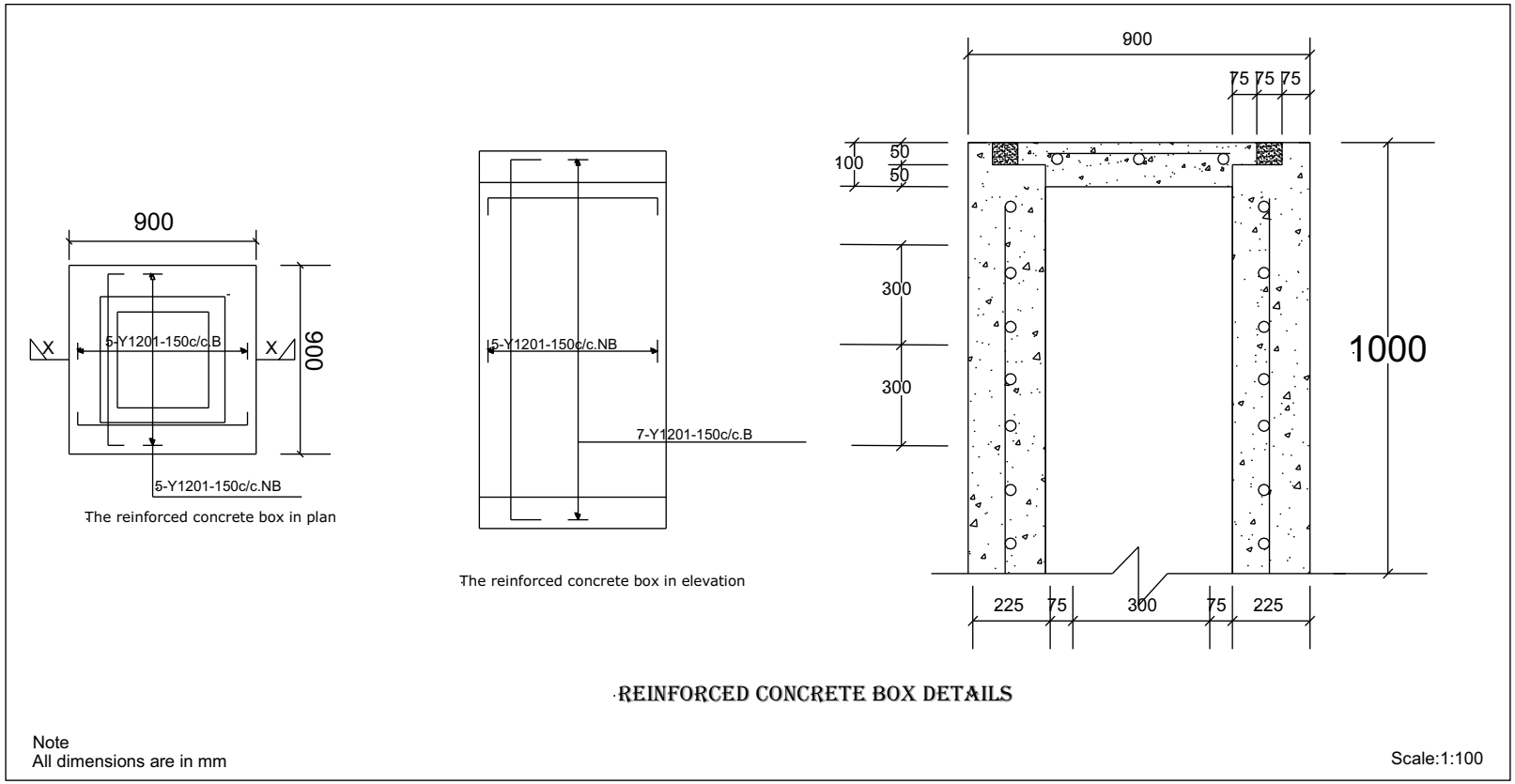

Fig. 3.8: Cross Section of Reinforced Concrete Box Details

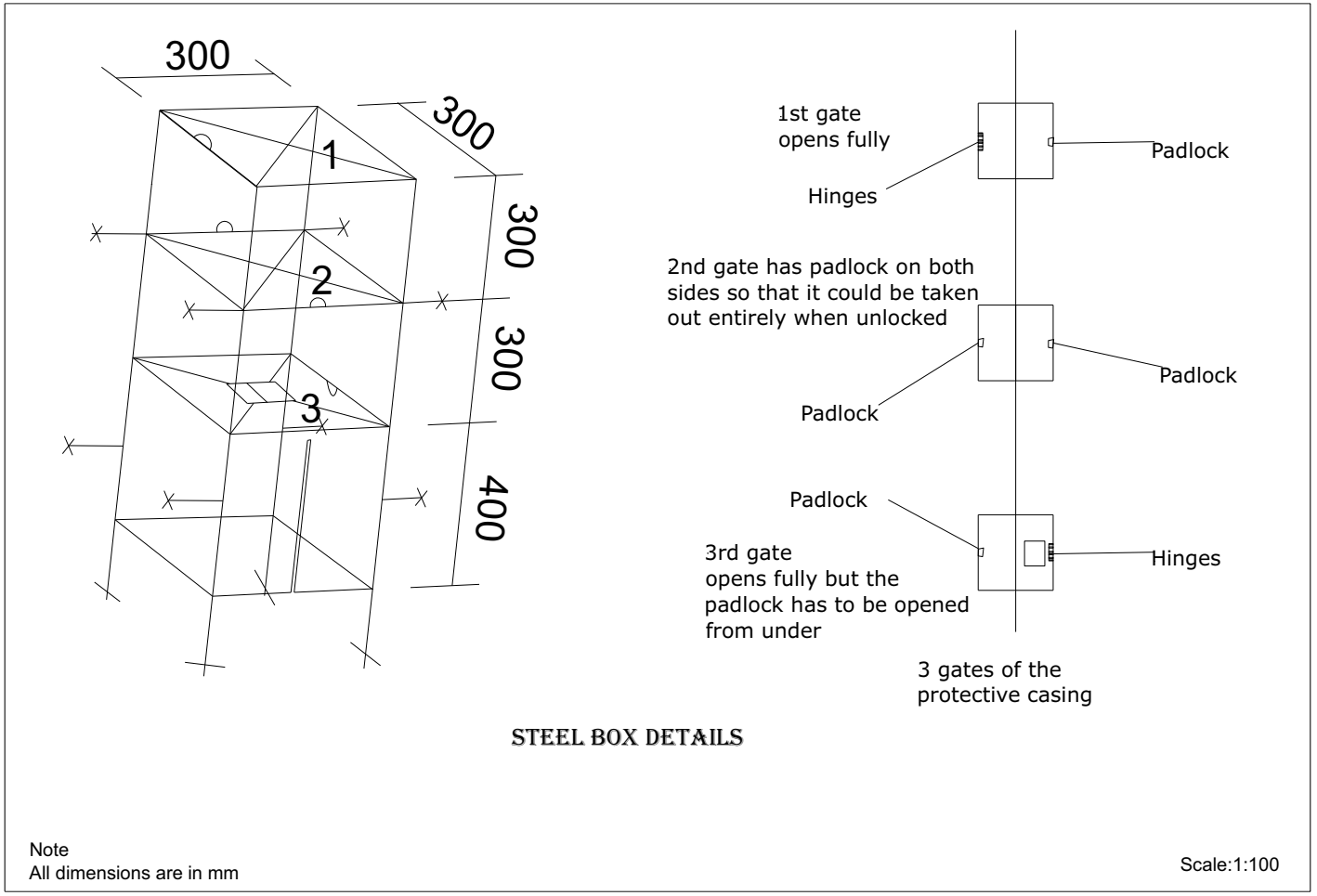

Fig. 3.9: Steel Box Details

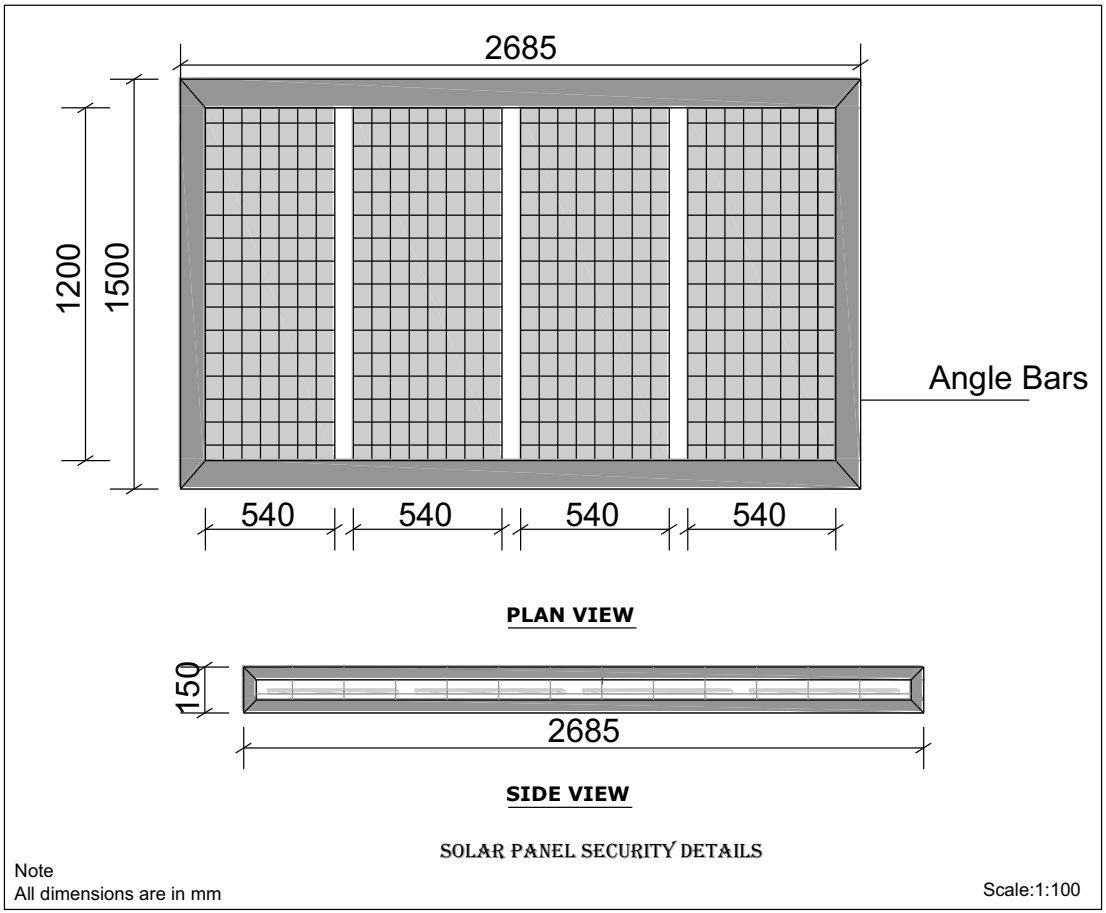

Fig. 3.10: Cross Section of Solar Panel Security Details

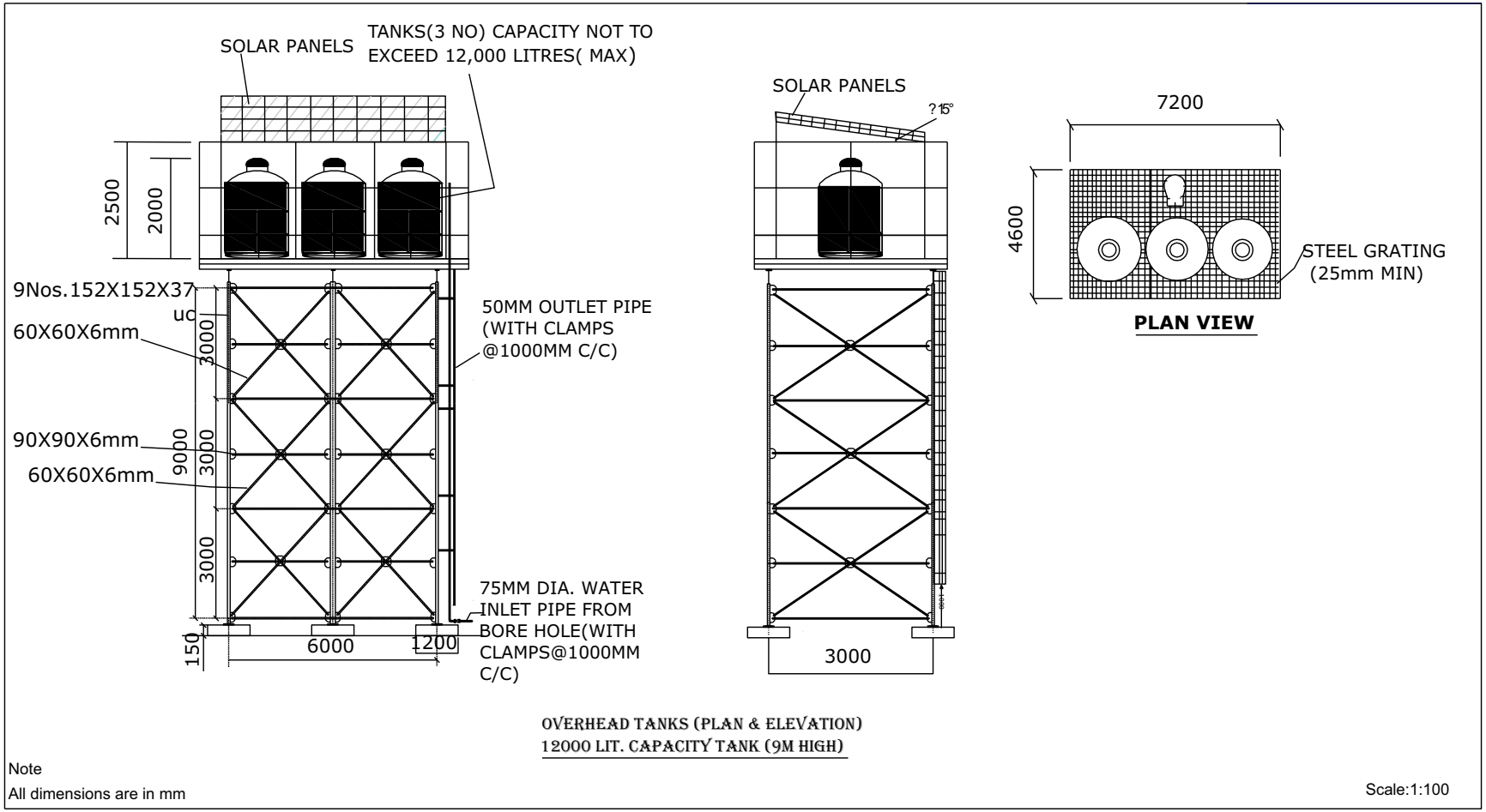

Fig. 3.11: Floor Plan and Cross Sections of Overhead Tanks

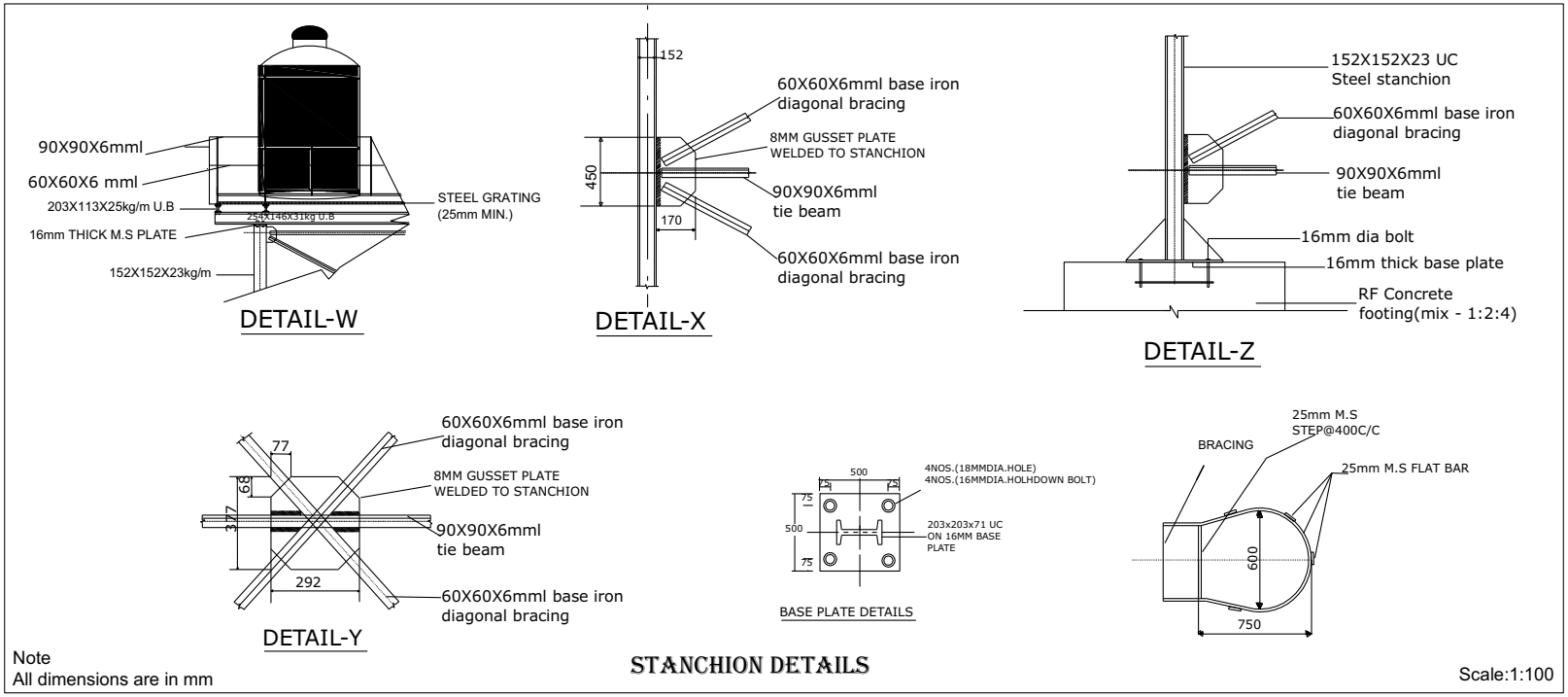

Fig. 3.12: Cross Section of Stanchion Details

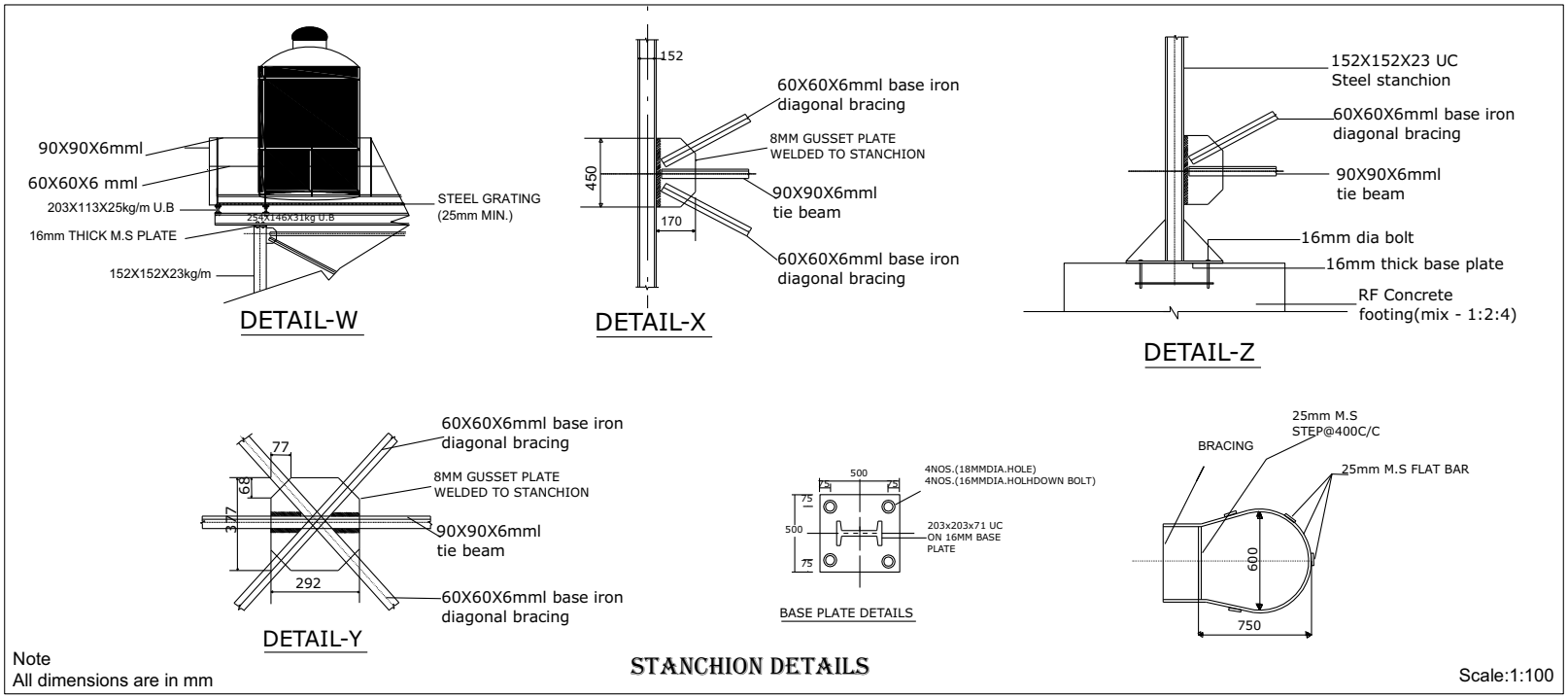

Fig. 3.13: Cross Section of Stanchion Foundation Details

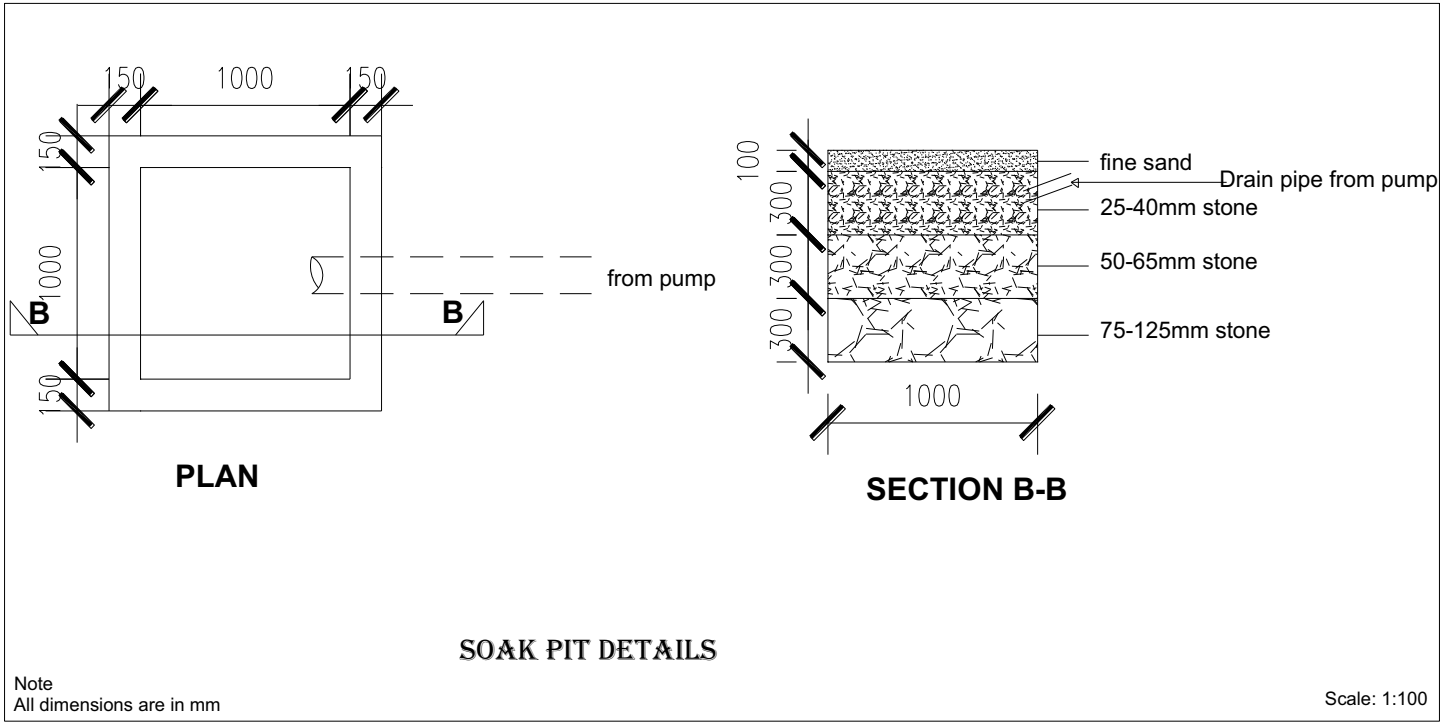

Fig. 3.14: Cross Section of Soak Pit Details

3.3 EXCRETA DISPOSAL FACILITIES

3.3.1 Introduction

The three types of excreta disposal systems (Ventilated Improved Pit latrine, Pour-Flush Toilet, and Water Closet Toilet) recommended for PHCs in rural, peri-urban and urban areas are described in detailed in this section.

3.3.2 Ventilated Improved Pit (VIP) Latrine

This is the improved type of pit latrine that removes odour and prevents flies from breeding. It consists basically of a pit, a cover slab with a squat hole and a vent pipe cast through the slab. A superstructure is built, which must be kept semi-dark, and the vent pipe is raised to at least 0.5 metres above the top of the roof. A durable fly screen is placed on the top of the vent pipe. It is important that the latrine is far from high buildings or trees to avoid shading the ventilation pipe. The VIP latrine offers a simple, safe and reliable method of excreta disposal where there is inadequate water supply, as prevalent in many Nigerian rural communities.

The typical VIP latrine consists of two separate pits, each with its own squat hole and vent pipe but only one superstructure. The squat holes not in use are usually sealed. The pit is usually designed for a life span of two or more years, as empty-able sanitation facility. One pit is used at a time and when full (usually 1-3 years), the second pit is put to use. When the second pit is almost full (about another 2 years), the first pit is emptied and put back to use. This allows the two pits to be used virtually indefinitely. It is suitable for use in rural, peri-urban and even urban areas where there is inadequate water supply.

VIP systems are essential and desirable if:

- the pits are to be emptied manually;
- off-site treatment or hygienic disposal of the emptied pit contents is impracticable;
- excreta re-use is to be practised;
- very shallow pits are required to avoid groundwater pollution; and
- there is solid rock at shallow depth and raised pits are not feasible.

Some of the advantages of VIP latrine include:

- suitable for water scarce areas;
- suitable for communities using dry anal cleansing materials;
- limited water required for occasional cleaning of squat hole;
- can be built with local materials;
- relatively low construction cost;
- simple to construct and maintain;
- excreta biodegraded into essentially pathogen-free product that can be handled without risk to public health, hence, manual emptying is permissible;
- shallow pit can be used to avoid groundwater contamination;
- alternating cycle permits the restoration of the infiltrative capacity of the pit-soil interface;
- greater flexibility in the precise time when the pit is emptied;
- long lasting;

- the digested sludge (excavated excreta) can be used in the farms as soil conditioner; and
- Suitable for areas where free space is not available for relocating latrine when full.

However, user education is necessary to ensure that both pits are not used at the same time. More importantly, the squat hole not in use must be properly sealed.

3.3.2.1 Basic Features of VIP Latrine

Odour Control

The mechanism by which odour is controlled in VIP latrines is through the action of wind blowing across the top of the vent pipes. Foul air produced from decomposition of faecal material in the pit rises to the top of the pipe when it is heated by direct sunlight. Thereafter, fresh air entering the superstructure passes through the squat hole to continue the cycle (Fig. 3.15). The result is an odour-free latrine.

Fly Control

The vent pipe controls flies in two ways:-

- Flies approaching the latrine from outside are strongly attracted to the head of the pipe because of the faecal odour emanating from it, but they are prevented from entering the pit latrine by the fly-screen (Fig. 3.15).
- Some flies entering the superstructure and squat-hole lay their eggs in the pit. Adult flies emerging from those eggs are attracted towards the brightest source of light from the vent pipe. The flies fly up the vent pipe, where they get trapped, while the fly-screen prevents them from escaping. Subsequently, they die and fall back into the pit (Fig. 3.15).

Mosquito Control

Many of the newly emergent mosquitoes will leave via the squat hole rather than being attracted to the vent pipe like the flies. Mosquitoes breeding in the pit of VIP latrines can be controlled in any of the following

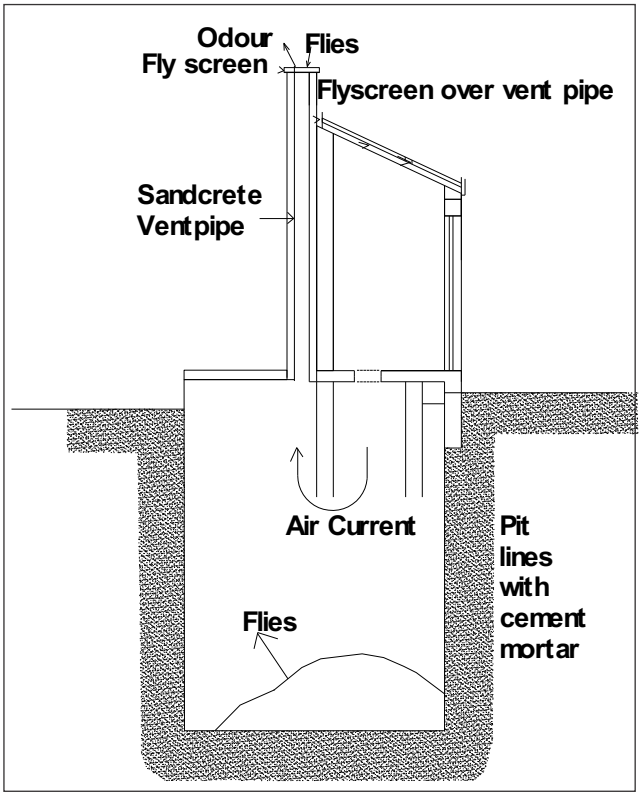

Fig. 3.15: Schematic Diagram of a VIP Latrine

ways:

- By adding substances which will kill the mosquito larvae to the pit e.g. bio-insecticide, kerosene, used engine oil, etc.
- Covering the squat hole with a mosquito trap.
- Polystyrene balls (half a kilogram) poured into the pit, float and prevent the mosquitoes from getting in contact with water, thus making breeding impossible.

3.3.2.2 Components of VIP Latrine

Introduction

The VIP latrine consists of a substructure and a superstructure. The substructure consists of the pit (lined) and the cover slabs; while the superstructure consists of the wall, door, roof, and vent pipe. VIP latrine has two separate pits, each with its own vent pipe. The cover slab has two squat holes, one over each pit. The component parts of VIP latrine and the design requirements are described below.

Substructure

The Pit

The pit serves two essential functions (Mara, 1984):-

- The liquid (urine) fraction of the excreta with small amount of water used for anal cleansing and cleaning of the cover slab infiltrates into the surrounding soil.
- The faecal matter deposited in the pit is digested anaerobically by bacterial activity into:
    - gases (e.g. methane, hydrogen sulphide, and carbon dioxide),
    - liquid containing soluble compounds which infiltrate into the soil
    - Solids which accumulates at a rate which depends on whether the pit is a dry (0.03 – 0.06m3/person/year) or wet (0.02 – 0.040/person/year) type.

Effective Pit Volume

The effective pit volume depends on the solid accumulation rate, number of users and the pit design life. The pit must not be allowed to fill up completely; a free space of about 0.5m must be left at the top of the pit. Hence, the effective pit volume space V (m3) of pits less than 4 meters deep may be calculated from this equation:

V (m3) = CPN where,

C = solids accumulation rate

P = no. of people using the latrine

N = no. of years the pit is to be used

Solid accumulation rate for:

dry pit = 0.04 -0.05m3/person/year

wet pit = 0.02 – 0.03m3/person/year

A factor of 1.25 is introduced if bulky anal cleaning material is used and it is assumed that the pit will be emptied when it is three quarters full.

Slabs

The reinforced concrete precast slabs (75mm thick) should be used for construction of VIP latrine. It should be made with clean and well graded aggregates (1:2:4) and should be used to cover the pits.

- Double squat hole cover slab

  Pre-cast reinforced concrete slabs (1,350 x 1,275mm) should be used. Clean sheet of cement paper or a thin sheet of plastic sheet should be spread on the platform before arranging the formworks for casting concrete. After casting, the slab should be allowed to cure for at least 7 days in the shade before positioning. The design detail of the squat hole is shown in Fig. 3.16.

  Two keyhole squat holes (300mm x 150mm each) are made into the squat slab. A gentle slope should me made towards the squat hole to prevent excreta from falling unto the squatting slab and to ease cleaning.

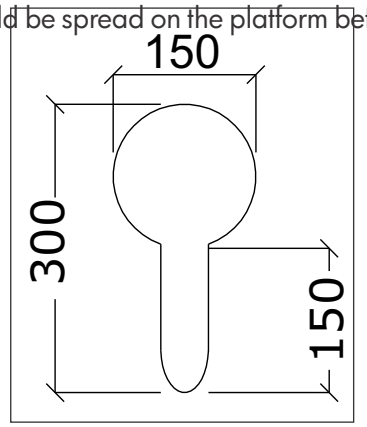

Fig. 3.16: Details of Double Squat Hole Cover Slab

- Vent and evacuation cover slabs

  Fig. 3.17 shows the removable cover slab of 1,420mm x 285mm, made of reinforced concrete to allow access for evacuation, while figure 3.18 shows the vent of 300mm x 300mm. The Vent and Cover slabs should be arranged in such a way that there is no gap between the slabs to prevent escape of flies and odour from the pits. Cement mortar should be used to join the slabs to make them airtight.

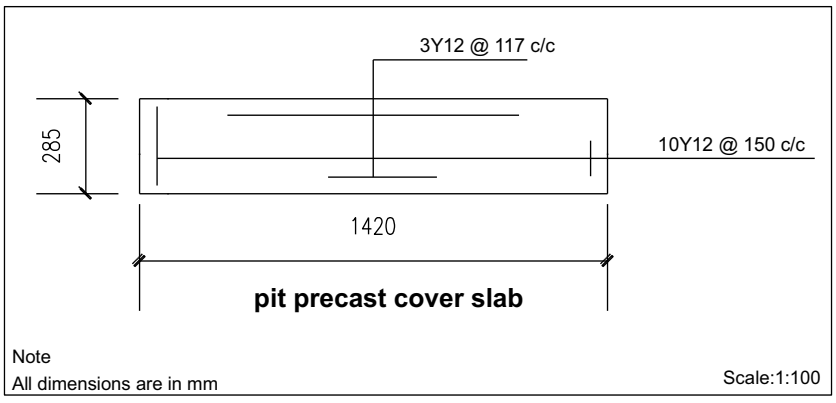

Fig. 3.17: Details of Cover Slab

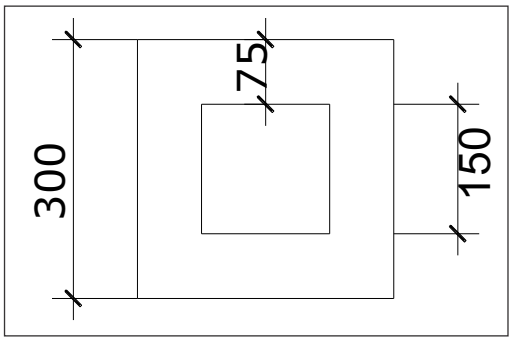

Fig. 3.18: Details of Vent Slab

Superstructure

The superstructure is the part of the VIP latrine above the ground level which provides privacy, comfort and protection for the users and protects the latrine from weather. It also serves to provide sufficient shade over the squat hole so that light rays come in only through the vent pipe. The superstructure consists of wall, door, roof and vent pipe. It can be built using a wide variety of materials. In urban areas, materials such as brick, block-work or ferrocement are often used; the roof can be tiled or made from a thin concrete slab, long span aluminum sheet, corrugated iron steel (CIS) or fibre concrete roofing (FCR) tiles/sheets.

The design adopted in any one locality depends largely on socio-cultural preference and the availability and affordability of materials; in general, the superstructure form should be architecturally similar to the local houses and buildings, and this principle normally determines what materials are used. In this way are local sensibilities taken into account and so not offended.

The VIP latrine superstructure should be fairly dark to discourage flies (carrying disease-causing organisms) that enter the pit from leaving it through the squat hole. This works on the principle that flies are attracted to light. To a fly in the pit, the squat hole will not be brightly illuminated so it will try to leave by going up the vent towards the sunlight shining down into the pit. The fly-screen will stop it escaping and it will eventually die.

The wall

The wall of the superstructure should be built with 150mm x 225mm x 450mm blocks fixed together with cement mortar following the specified dimensions. Each of the compartments should have its own entrance with door and key to ensure safety of the people especially the women.

The superstructure should be off-set from the pit and only part of it should be over the cover slab. The rest of the superstructure is supported on a single course of blocks laid in cement mortar at right angles to the superstructure. The superstructure should be plastered inside and outside with cement mortar to give smooth finish. There should be a ramp (with a fall of 1:10) at the entry for easier entry especially for the physically challenged people.

The internal space for each of the compartments should be 1,275mm wide and 1,350mm long, with each having two squat holes; or 1,350mm wide and 1,350mm long for the compartment for the physically challenged people (to provide enough room for movement within the compartment when using the latrine). Moreover, guardrails should be provided on the side-walls (horizontally between 500mm and 700mm above the latrine slab) or any other type of rails that may provide support for those who may have difficulty in squatting and standing up. A sitting structure of 225 mm height should be provided (in the physically challenged compartment).

Short screening (dwarf) walls should be constructed in front of the latrine units to provide full visual protection for the user from someone more than 3 metres away from the latrines. The dwarf walls can be used to:

- Indicate male and female latrine
- Advertise WASH messages, e.g. need to carry water to the latrine and need for hand-washing with water and soap after using the latrine.

Door/Latrine Entrance

Traditionally the latrine is entered through a doorway, with the door providing the user with privacy. It is very important that the door, which opens outside, extends to the floor, with space of 150-450mm and 175-450mm (covered by fly-screen) provided at the bottom and top for effective ventilation (Fig. 3.19) The door should always be closed, to provide privacy and security for the users, especially women; if it is left open, flies in the pit will be presented with an alternative source of bright light and escape the latrine via the squat-hole and superstructure. Fly control, which is one of the principal advantages of VIP latrines, therefore becomes ineffective. Self-closing doors can be used (a counterweight attached to the top of the door via a rope and pulley is sufficient for this purpose). Also, the latrine should be locked on the outside in order to prevent casual use of the latrine by unauthorized people, such as passers-by or members of neighbouring communities without latrines.

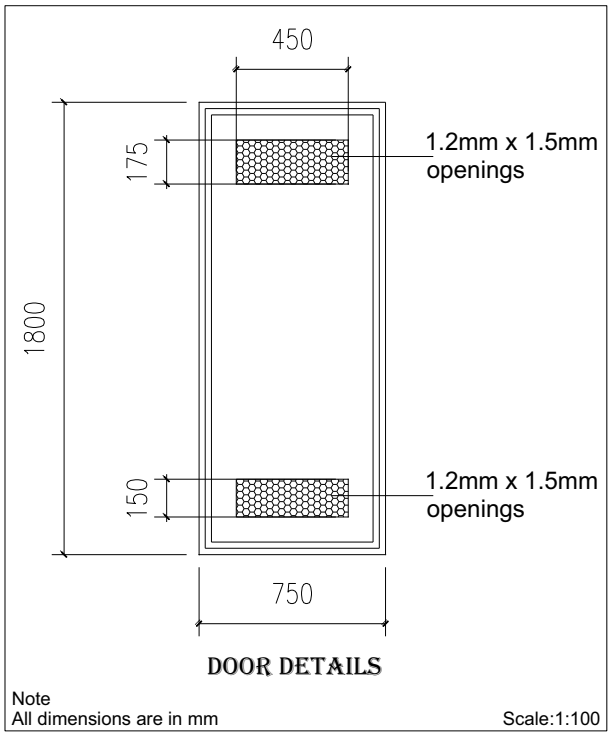

Fig. 3.19: VIP Door Details

Vent Pipe

This is the most important component of a VIP latrine. It is a major factor in the control of odour and insects in the latrine. It should be made of sandcrete blocks with external measurement, 225mm x 225mm and the internal wall should be smoothly connected to the pit. The top of the pipe should be covered with fly-screen to stop flies using the vent to enter or leave the pit (Plate 3.1; Fig. 3.20). To prevent the fly-screen deteriorating due to the sunlight or corrosive gases from the latrine, it should be of glass fibre or stainless steel and not plastic or normal steel mesh. Wind blowing across the top of the vent pipe sucks air out of the pit while fresh air flows into the pit through the squat hole. This flow of air is helped if the door faces the direction from which the wind normally blows.

The block vent pipe is advantageous in that it forms part of the superstructure and may last for as long as the structure stands. The vent pipe should be at least 500mm above the roof level.

Fly-Screen Specification

The purpose of the fly-screen is to prevent the passage of flies and mosquitoes; therefore, the mesh aperture must not be larger than 1.2 mm x 1.5 mm (smaller apertures are not recommended as they will result in decreased ventilation rates, due to increased frictional losses). The fly-screen must be made of corrosion-resistant material that is able to withstand intense rainfall, high temperatures and strong sunlight. It is preferable to use stainless steel screens, which last indefinitely. The fly-screen should be mounted on a wooden frame (454mm x 254mm x 10mm) made from hardwood (Fig. 3.20).

Plate 3.1: Back elevation of the VIP latrine superstructure showing the blockwork vent pipe

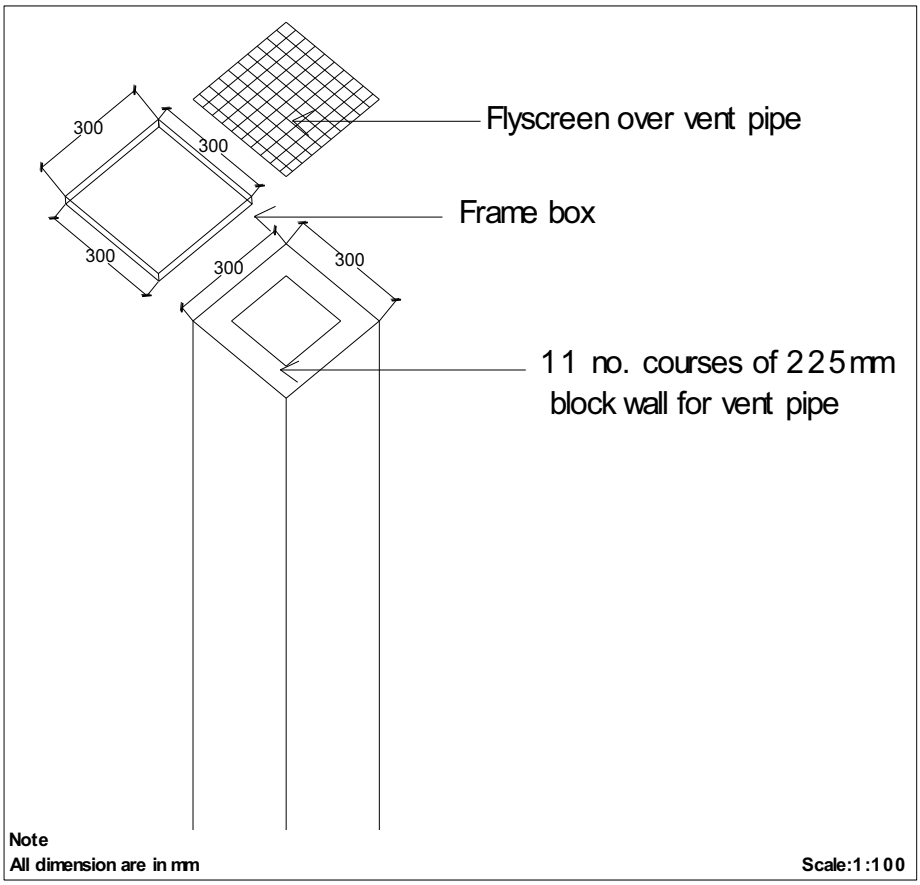

Fig. 3.20: Details for Fixing Fly-Screen to Vent Pipe (Blockwork)

Roof

The roof could be made of aluminum, corrugated iron sheets (CIS) or fibre concrete roofing tiles/sheets supported by timber members: rafters (75mm x 50mm), purlins (50mm x 50mm) and wall plate (50mm x 75-100mm). Fascia boards (150mm x 25mm) should be provided to conceal the internal roofing timber. These should be well treated to avoid attack by termites. The roof should slope away from the vent pipe (Fig. 3.21).

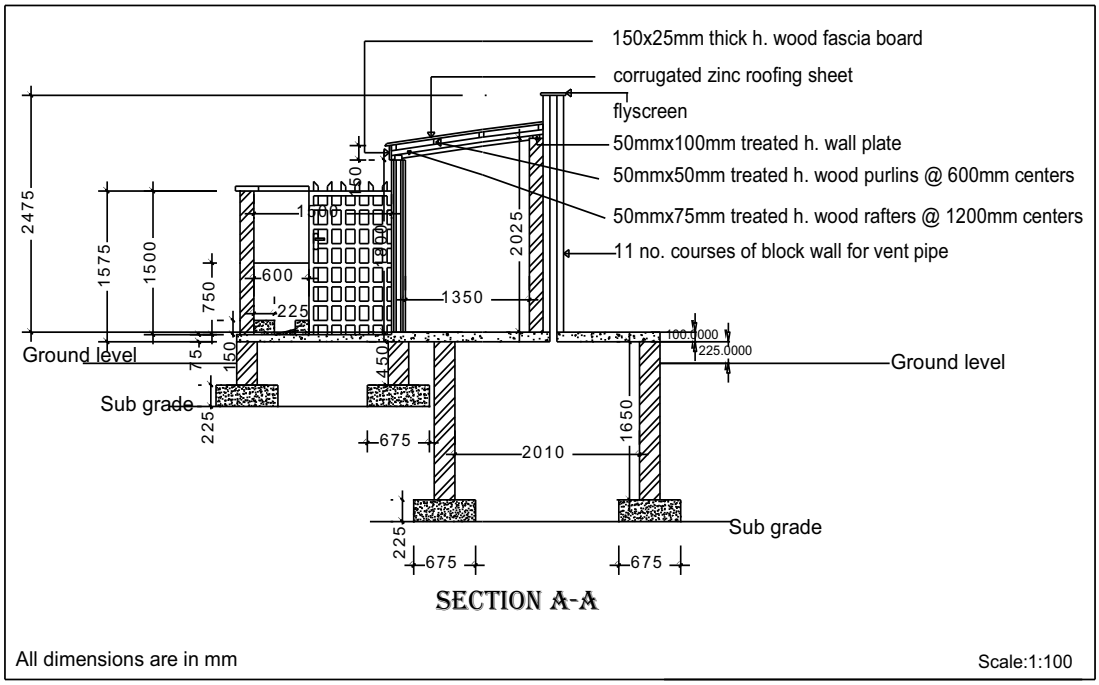

Fig. 3.21: Cross Section of the VIP latrine Showing Details of the Roof Structure

3.3.2.3 Design Options of VIP Latrines

The VIP latrines are designed in such a way that the sizes include 3, 4, 5, and 6 compartments, according to the needs of the PHC. In this guide, provisions have been made for 2 separate units of: empty-able, lined ventilated improved pit (VIP) latrine; urinal and hand washing, one unit each for males and females. Depending upon the population and other criteria, there may be 6, 5, 4 or 3 compartments of the VIP latrine per unit.

In the case of the 5 and 3 compartment latrine, 1 compartment will be for the female staff, while the remaining will be for other female users. The same system applies to the other units for males. The other alternative is a single building housing 4 or 6 compartments latrine, whereby a single building will accommodate both female and male users with a wall dividing the two users. Figures 3.22-3.25 and Plates 3.2-3.4 show some of these typical designs.

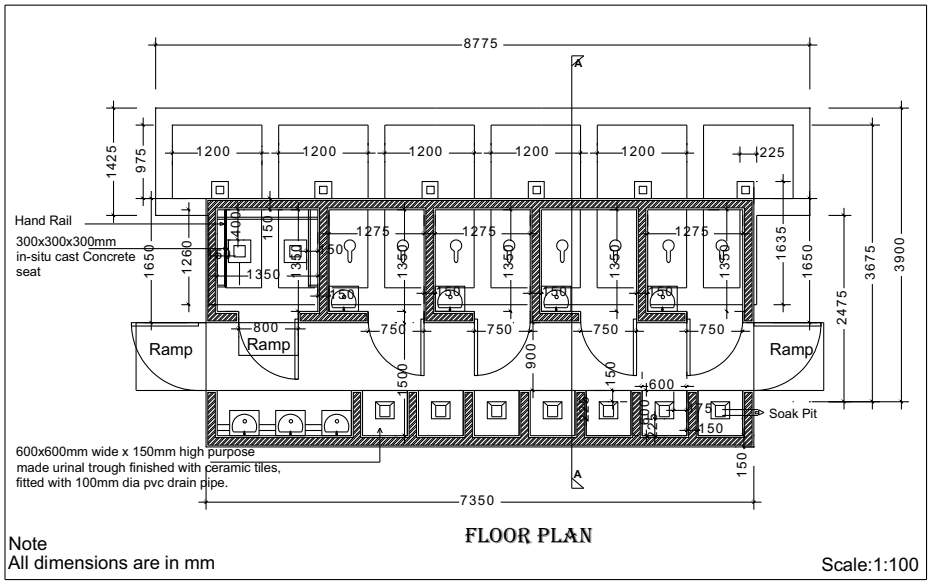

Fig. 3.22: Floor Plan of 5 Compartment VIP Latrine with Urinals and Hand Washing Facilities (Female)

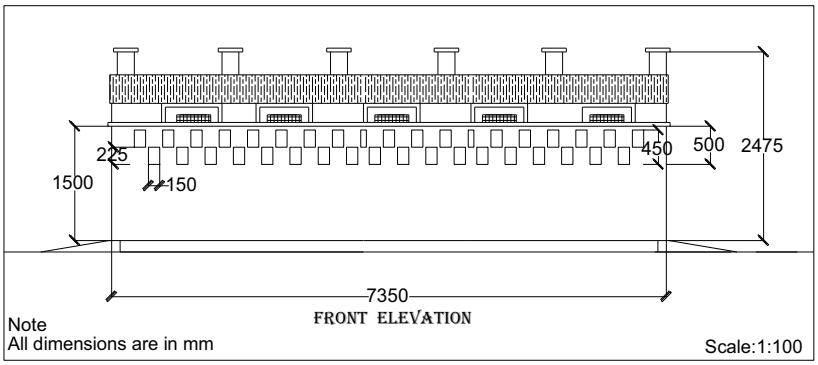

Fig. 3.23: Front Elevation of 5 Compartment VIP Latrine with Urinals and Hand Washing Facilities

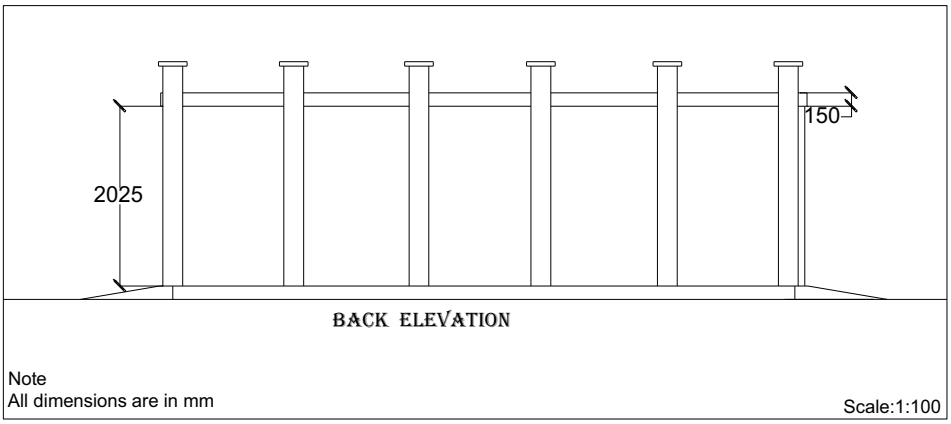

Fig. 3.24: Back Elevation of 5 Compartment VIP Latrine with Urinals and Hand Washing Facilities

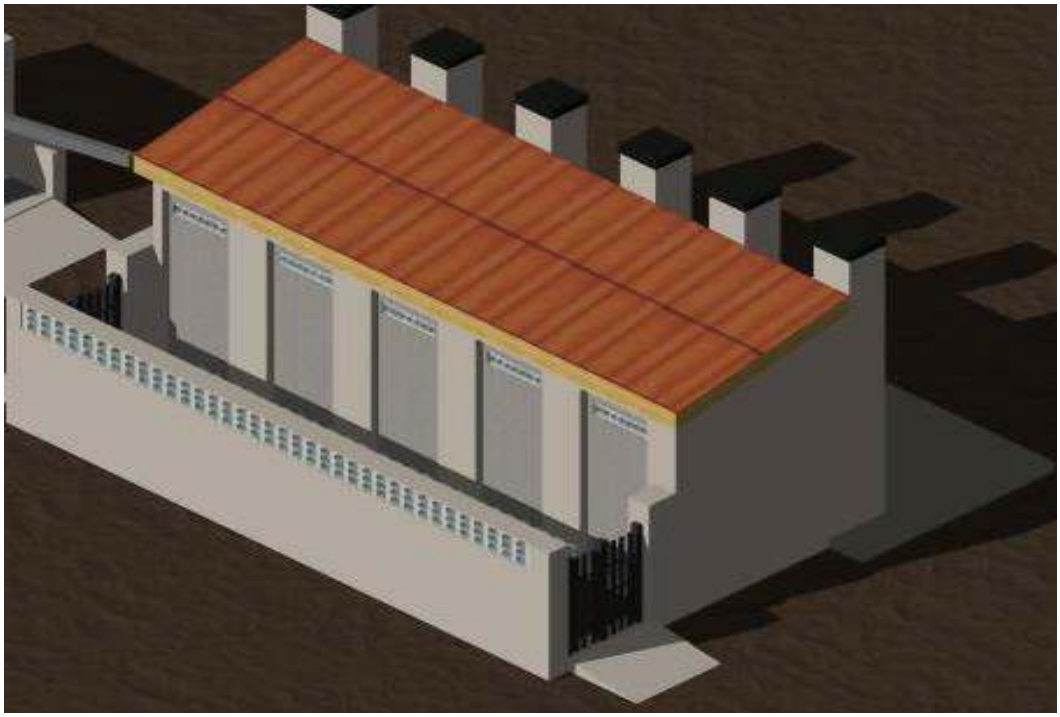

Plate 3.2: Front Elevation Perspective View of 5 Compartment VIP Latrine

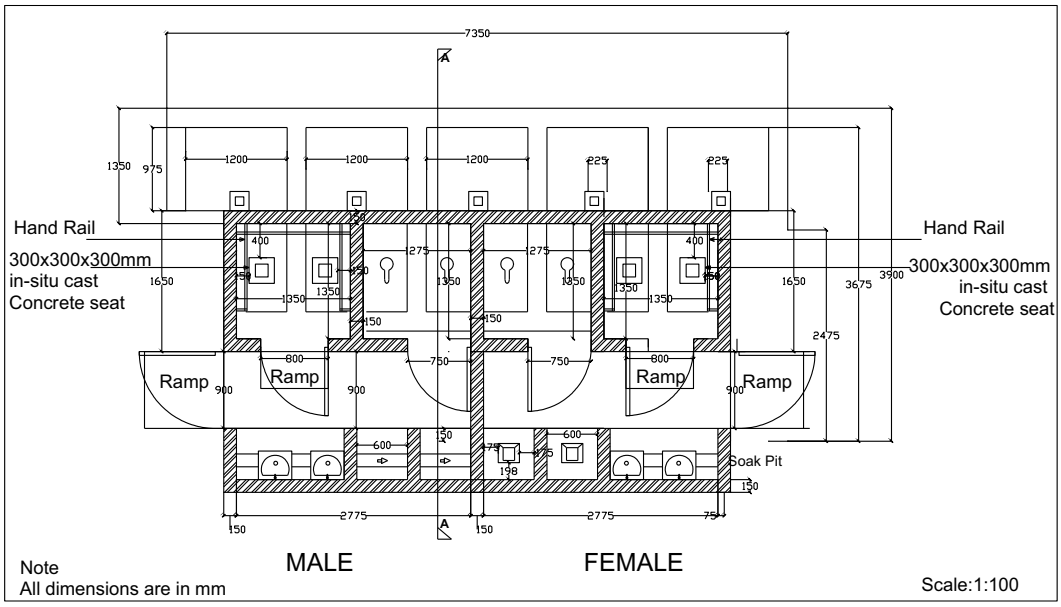

Fig. 3.25:Floor Plan of 4 Compartment VIP Latrine, Urinals and Hand Washing Facilities (Males and Females Combined)

Plate 3.3: Front Elevation Perspective View of 3 Compartment VIP Latrine

Plate 3.4: Back Elevation Perspective View of 3 Compartment VIP Latrine

3.3.2.4 Design Details of VIP Latrines

The pit is rectangular in shape and extends to the rear of the superstructure to make evacuation easy. The design details are the same for the 3, 4, 5 and 6-compartment VIP latrines. The dimensions of the pit and the other various components of each type of VIP latrines are as shown in table 3.1

Table 3.1: Dimensions of the Various Compartments of VIP Latrines

Components		Compartments			
		3	4	5	6
Cover slab		12	15	18	21
Vent		4	5	6	7
Double Squat		3	4	5	6
Pit	Number	4	5	6	7
	Length (mm)	5925	7350	8775	10200
	Breadth (mm)	2685	2685	2685	2685
	Depth (mm)	1650	1650	1650	1650
Wall	Length (mm)	4500	5850	7350	8850
	Breadth (mm)	3675	3675	3675	3675

3.3.3 Pour-Flush Toilet (PFT)

Introduction

Pour flush toilet is designed with a U-shaped squatting pan partly filled with water under the slab. It uses water to flush excreta into the pit. After use, excreta is manually flushed by pouring water into the pan with a scoop. An average of between 1.5 and 3.0 litres water is required for each flush, though the amount of water required depends mainly on the design of the toilet and U-trap. The pour flush pan can be made from plastic and ceramic, or from galvanized sheet metal. It can either be made in squatting or seating type.

Pour flush toilets can only be properly used in regions where water is available for flushing. This may require the construction of a (septic) tank/biogas digester/pit. Also, pour flush toilets are appropriate, especially where dry handling of excreta is socio-culturally inappropriate. Moreover, pour flush slabs are suitable where people use water for anal cleaning and either seat or squat to defecate. No material that could obstruct the U-trap, which serve as a water seal, should be thrown in the toilet. Unlike the VIP latrine, the pour flush toilets' vent pipe should be made of PVC pipe, which is connected from the junction box to the pit with another PVC pipe.

Pour flush toilet could be the single pit or twin-pit pour flush system, which consists of a pan and trap (the bowl), with a single pit or twin-pit either just below the bowl (on-set type), or slightly away from the bowl (off-set type). It is a specially designed water-seal latrine with the water-seal eliminating odour, and preventing rodents from entering the latrine room from the pit. The advantages and disadvantages of the pour flush toilets are as shown below:

Advantages of PFT:	Disadvantages of PFT:
- Odour free. - Provides privacy. - Little chance for transmission of excreta-related disease. - Can support good health and hygiene practices. - Appropriate where water is available. - Water requirement for flushing is low (1.5-3 litres). - Hygienic for the users since they have to wet the squatting slab before defecation and flush immediately after use - The U-trap overcomes problem of flies, mosquitoes, and odour by serving as a water seal - Construction and maintenance are cheap and easy. - Suitable for less populated areas where space is available for relocating the pit once filled-up for single pit type, but for twin-pit it can also be suitable for densely populated areas because of the way it works.	- Water is necessary for flushing. - In high ground water table, there is a risk of groundwater pollution. - Not appropriate where communities use dry cleansing materials, which cannot be flushed through the U-trap. - Needs training for the initial users on how to use and maintain the pans. - The U-bend can easily become blocked, thereby preventing excreta from flowing easily into the septic tank - The U-trap needs to be checked monthly for blockages. - If excreta are not properly flushed, the latrine can get choked and become a health hazard.

Design Details

The design details of the pour flush toilet are similar to VIP latrine, with the following few differences:

Pit

The pits are rectangular in shape and located at the rear (for off-set type) of the superstructure to make evacuation easy. Although, the pits could be double or single, the double pits septic tank and soak away type are described here. The dimensions for each type of pour flush toilets are as shown in table 3.2. The pour flush toilets could be 3, 4, 5, and 6 compartments. Figures 3.26–3.33 and Plates 3.5-3.6 show the plans and elevations of the pour flush toilets.

Table 3.2: Dimensions of the Various Compartments of Pour Flush Toilets

Components		Compartments			
		3	4	5	6
Cover slab		12	15	18	21
Vent		3	4	5	6
Single Squat		3	4	5	6
Septic Tank Pit	Number	1	1	1	1
	Length (mm)	4675	4675	4675	4675
	Breadth (mm)	4450	4450	4450	4450
	Depth (mm)	2800	2800	2800	2800
Soak away Pit	Number	1	1	1	1
	Length (mm)	4950	4950	4950	4950
	Breadth (mm)	3930	3930	3930	3930
	Depth (mm)	2200	2200	2200	2200
Wall	Length (mm)	4200	5550	6900	8250
	Breadth (mm)	1650	1650	1650	1650

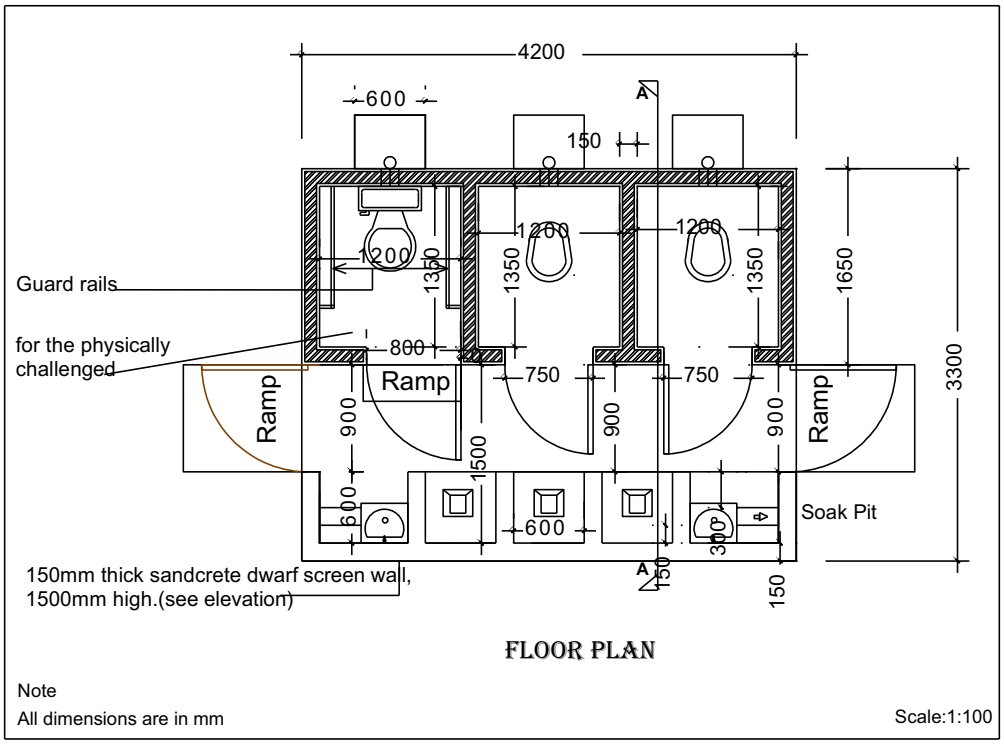

Fig. 3.26: Floor Plan of 3 Compartment Pour Flush Toilet

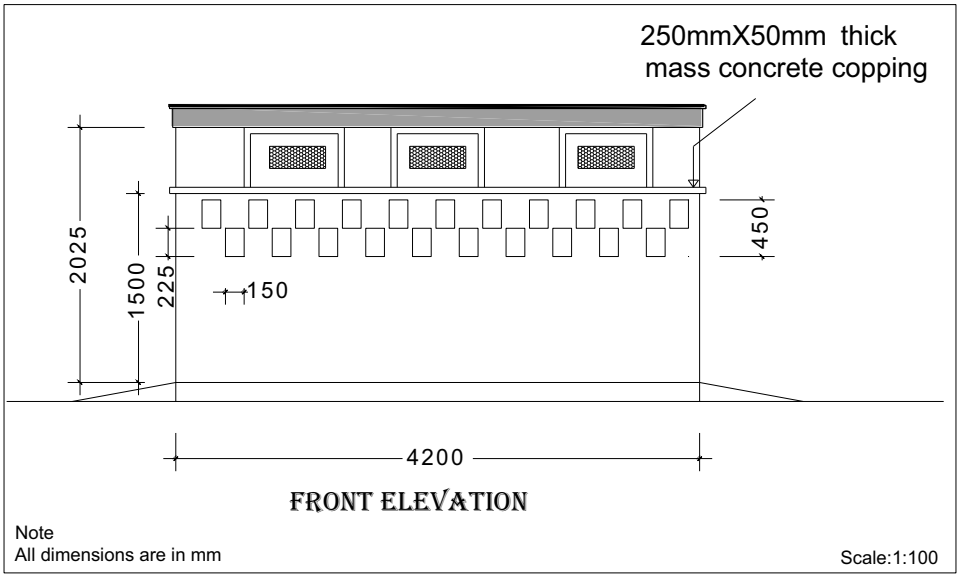

Fig. 3.27: Front Elevation of 3 Compartment Pour Flush Toilet

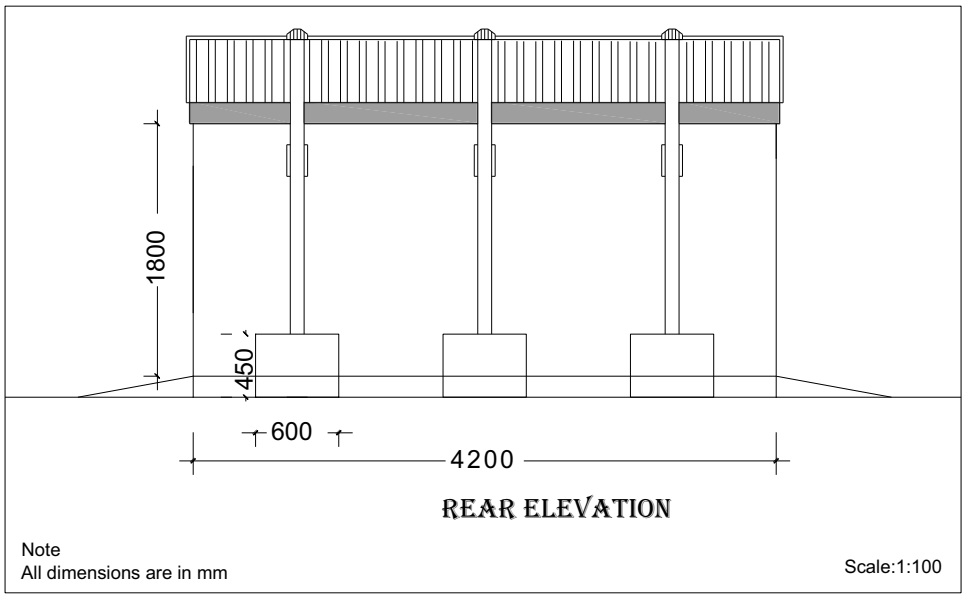

Fig. 3.28: Back Elevation of 3 Compartment Pour Flush Toilet

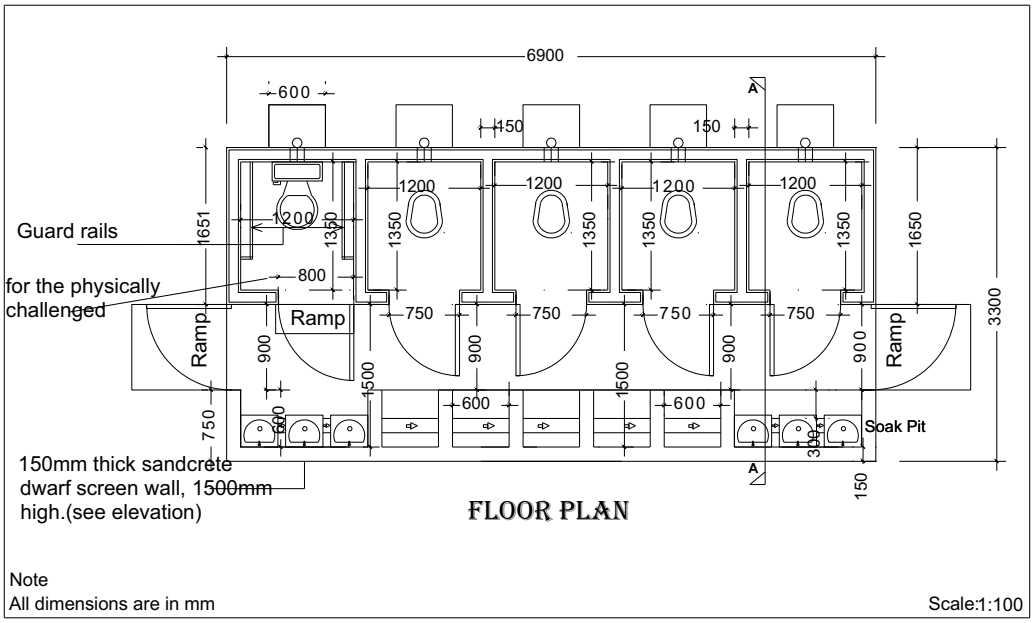

Fig. 3.29: Floor Plan of 5 Compartment Pour Flush Toilet

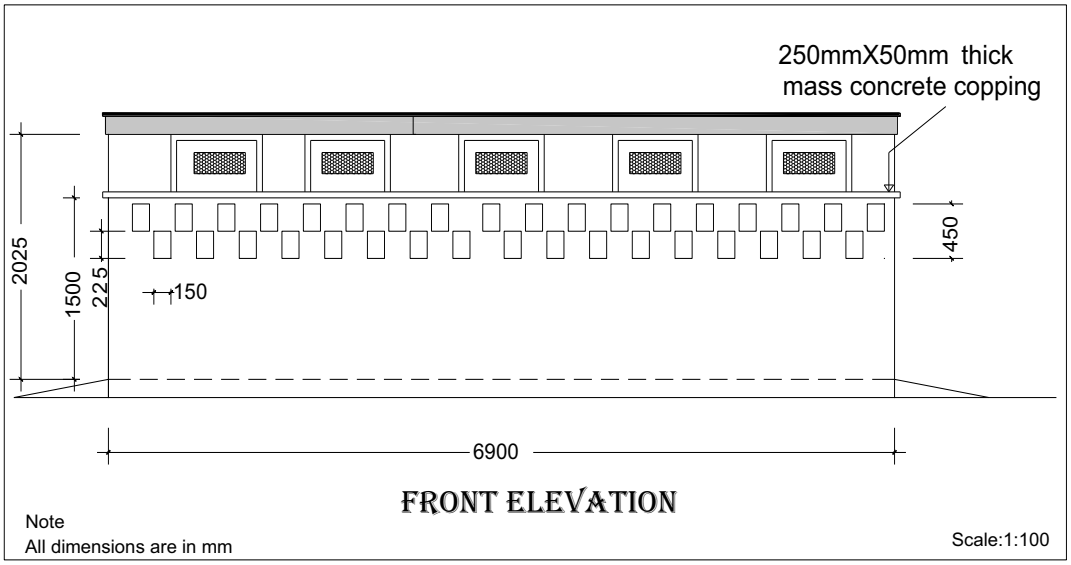

Fig. 3.30: Front Elevation of 5 Compartment Pour Flush Toilet

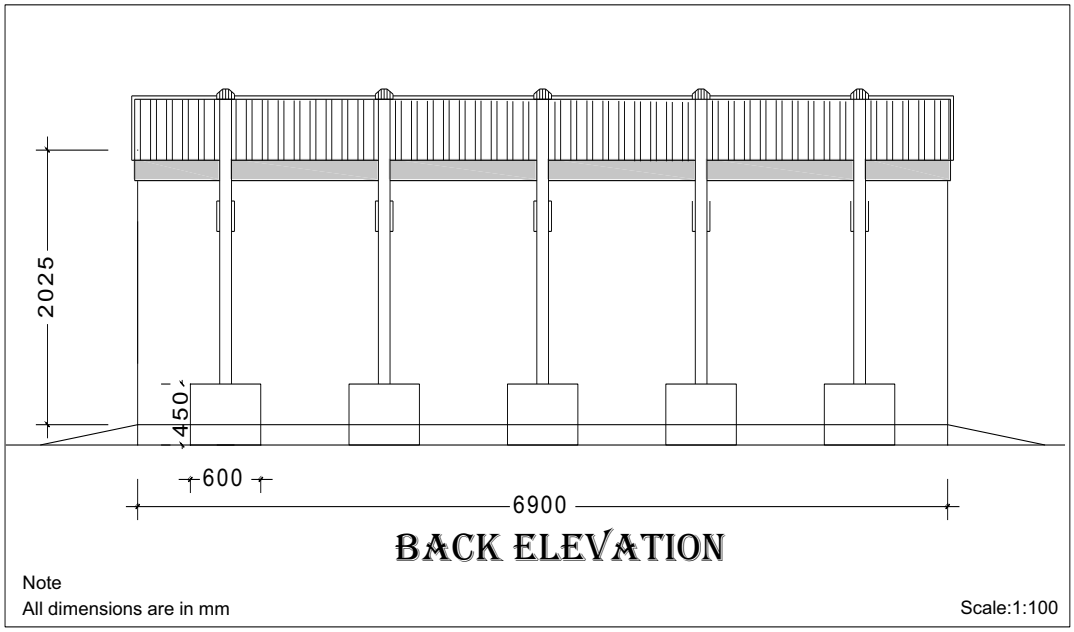

Fig. 3.31: Back Elevation of 5 Compartment Pour Flush Toilet

Plate 3.5: Front Elevation Perspective View of 5 Compartment Pour Flush Toilet

Plate 3.6: Back Elevation Perspective View of 5 Compartment Pour Flush Toilet

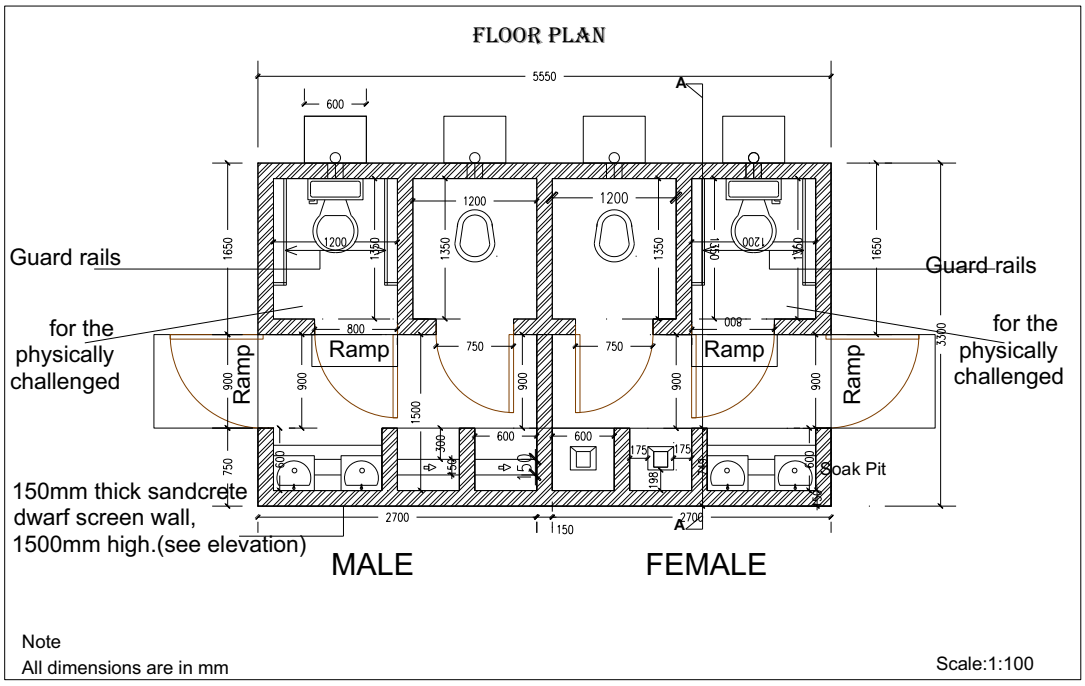

Fig. 3.32: Floor Plan of 4 Compartment Pour Flush Toilet (Males and Females Combined)

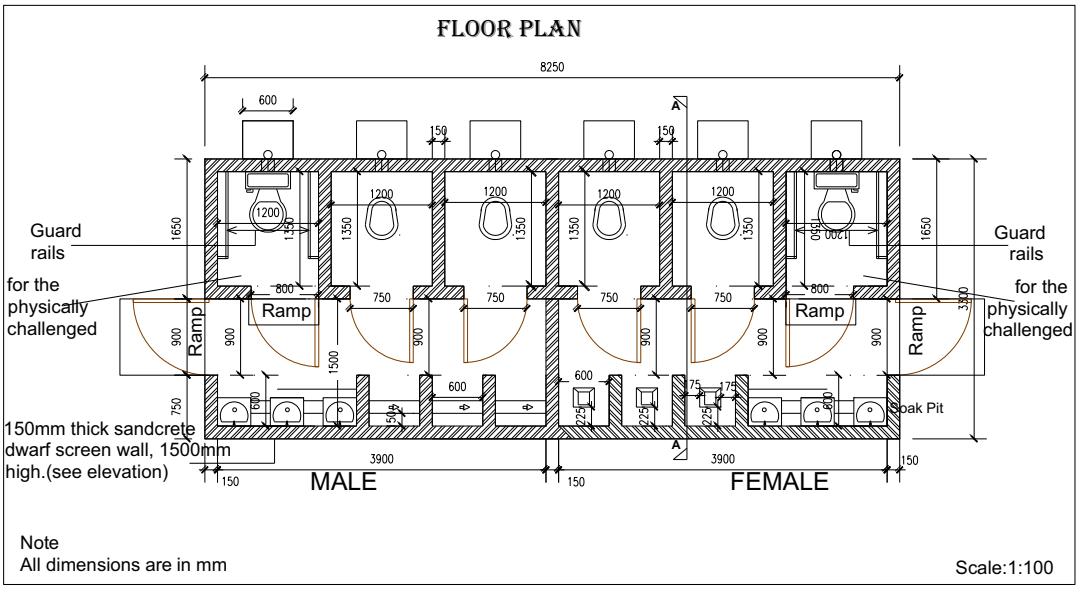

Fig. 3.33: Floor Plan of 6 Compartment Pour Flush Toilet (Males and Females Combined)

Pit lining

The entire pit is recommended to be lined, while the lower part of the lining should have weep holes (25mm) so that liquid can seep through the holes and out of the pit.

Single squat hole cover slab

A single squat hole, 500mmx220mmx310mm, is made into the squat slab. Foot rest of 275mm x 100 mm could be added on both sides of the hole to prevent excreta from falling unto the squatting slab.

The wall

The internal space for each of the compartments should have only one squat hole. The dimensions of the compartments by type of facility are as stated in Table 3.2.

Vent pipe

Although it is not compulsory for pour flush toilet to have a vent pipe, for the purpose of this guide, PVC pipe is recommended. The PVC pipe could be embedded in the wall (conduit) or attached to it (surface). While figure 3.34 shows the cross section of typical pour flush toilet, details of the pan and trap are shown in figure 3.35.

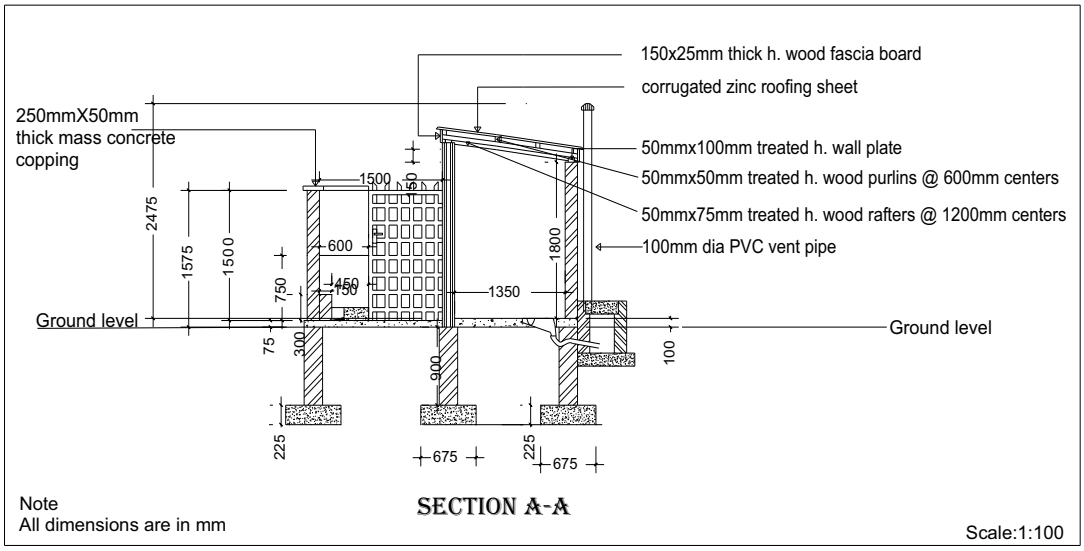

Fig. 3.34: Cross Section of the Pour Flush Toilet Showing Details of the Pan, Trap, and Junction Box (Inspection Chamber)

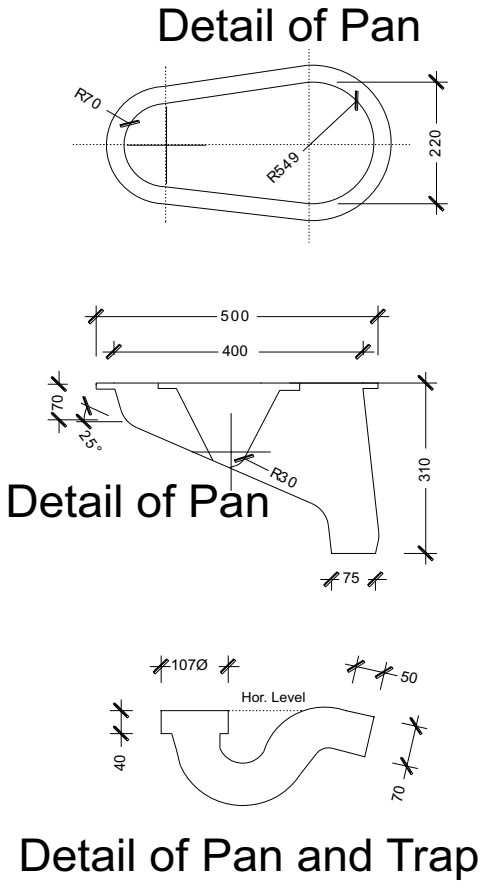

Fig. 3.35: Details of the Pour Flush Pan and Trap

3.3.4 Water Closet Toilet

This is the conventional water closet toilet that uses water for flushing. Thus, it is only useful in an environment where water is readily available, because it requires water connection system or adequate water located close to the facility for flushing.

The Water Closet (WC) toilets are also designed like the VIP latrine and the PFT. However, provisions have been made for only 1 separate unit of: septic tank and soak away pits; urinal and hand washing, one unit each for males and females. Depending upon the population and other criteria, there may be 3, 5, or 6 compartments of the WC toilets per unit.

The design of the facility consists of combined facilities of WC toilet, urinal and hand washing, all within the same block (Figs. 3.36 - 3.44; Plates 3.7-3.8). In the designs, the urinals and the hand washing facilities are located in the traffic pattern of the building, just like the VIP latrine and PFTs. The alternative options of 4 and 6 compartment (combined for males and females) are also included (Figs. 3.43 - 3.44).

Design Details

The design details of the WC toilet are similar to VIP latrine, with the following differences:

Pit

The two pits (septic tank and soak away) are rectangular in shape and located at the rear of the superstructure to make evacuation easy. The dimensions for each type of WC toilets are as shown in table 3.3.

Table 3.3: Dimensions of the Various Compartments of WC Toilets

Components		Compartments	
		3	5
Cover slab		3	3
Vent		3	5
Single Squat		3	5
Septic Tank Pit	Number	1	1
	Length (mm)	4675	4675
	Breadth (mm)	4450	4450
	Depth (mm)	2800	2800
Soak Away Pit	Number	1	6
	Length (mm)	3750	3750
	Breadth (mm)	2730	2730
	Depth (mm)	2200	2200
Wall	Length (mm)	4200	6900
	Breadth (mm)	3300	3300

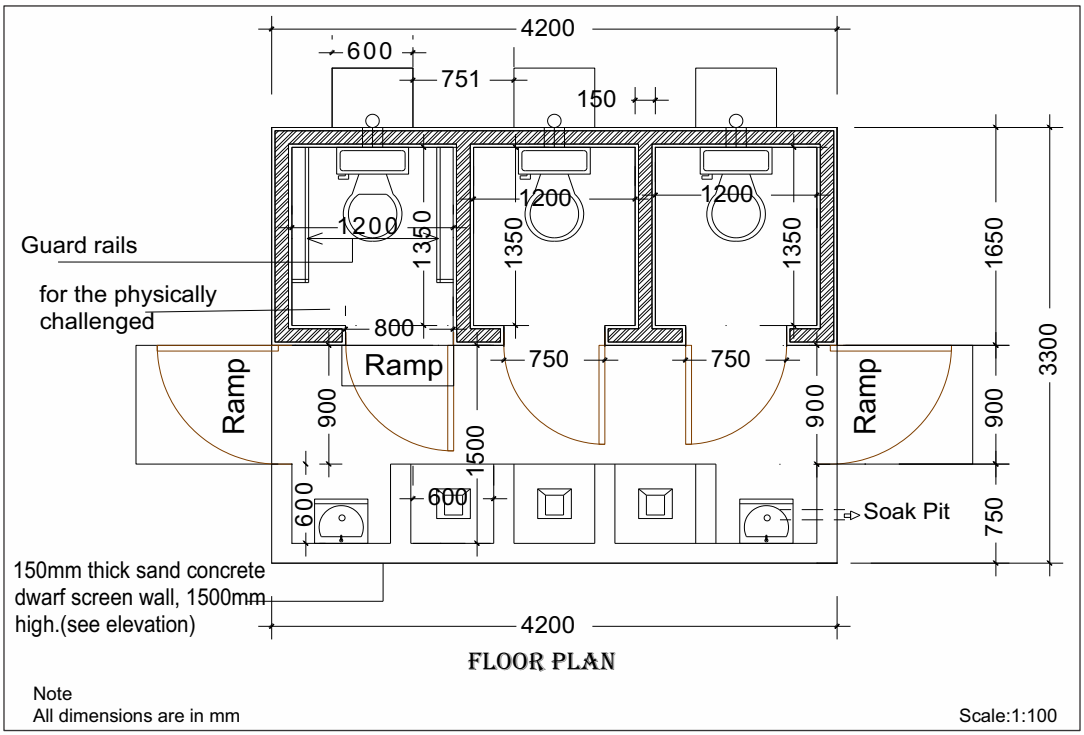

Fig. 3.36: Floor Plan of 3 Compartment WC Toilet

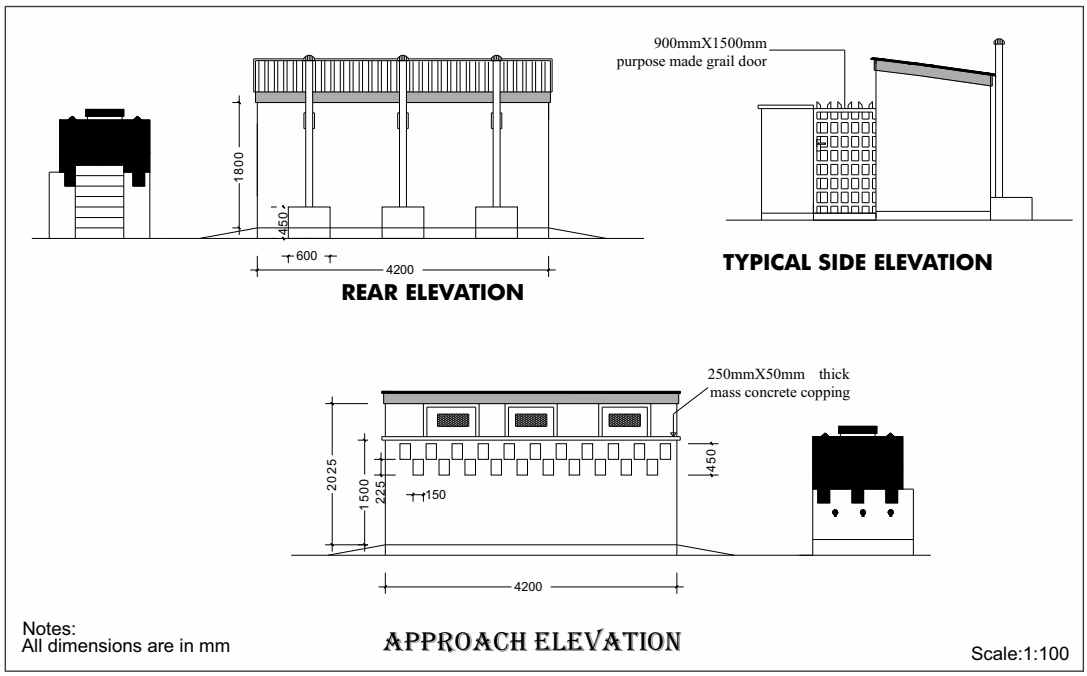

Fig. 3.37: Front Elevation of 3 Compartment WC Toilet

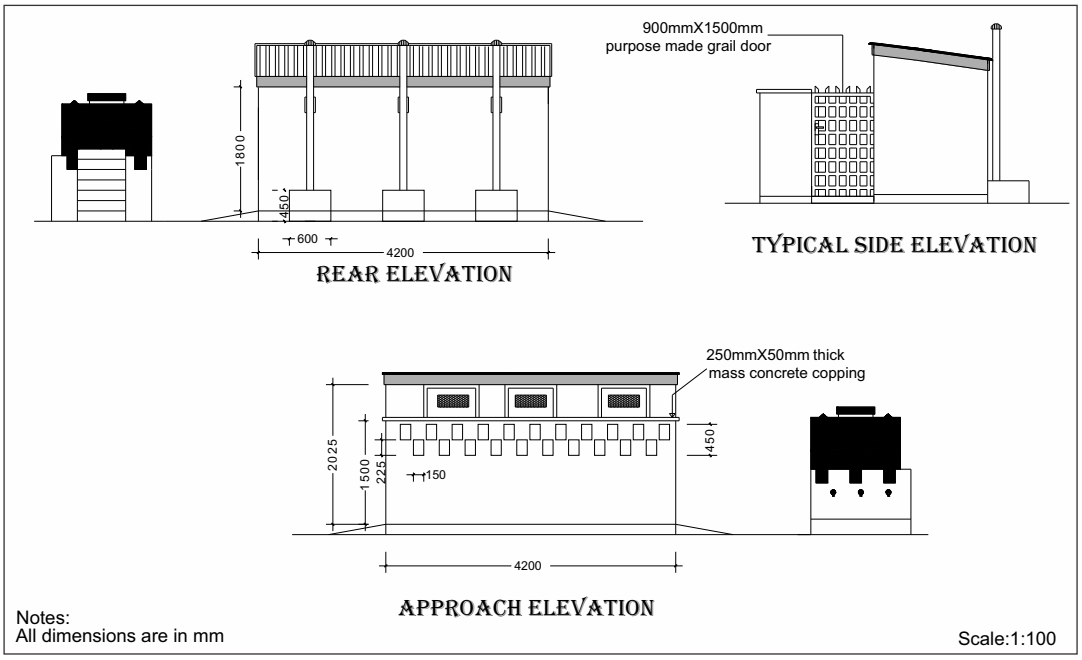

Fig. 3.38: Back Elevation of 3 Compartment WC Toilet

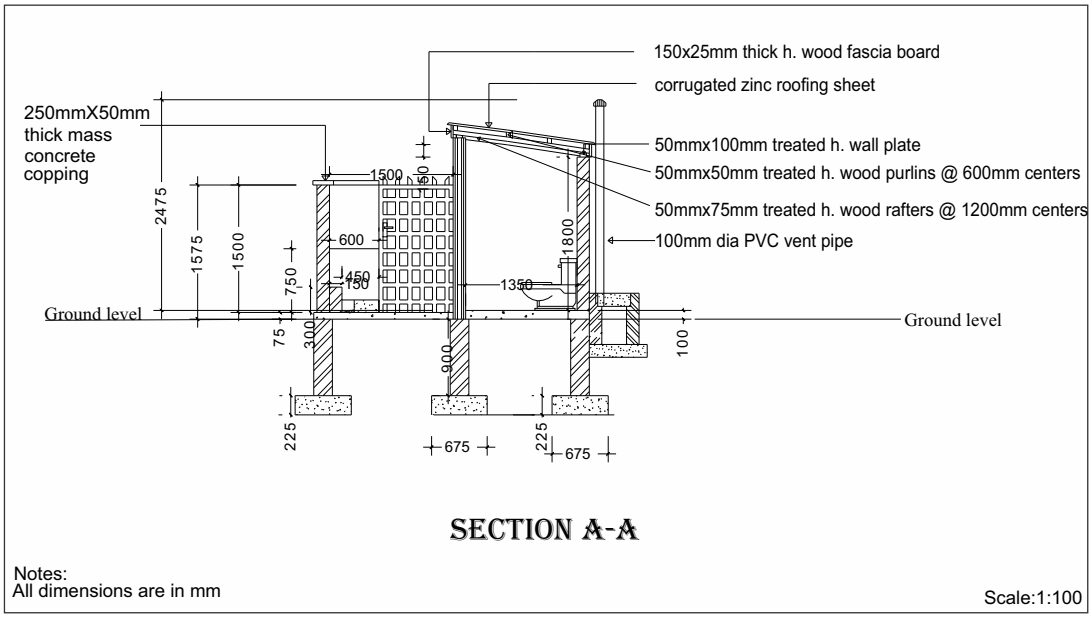

Fig. 3.39: Cross Section Plan of 3 Compartment WC Toilet

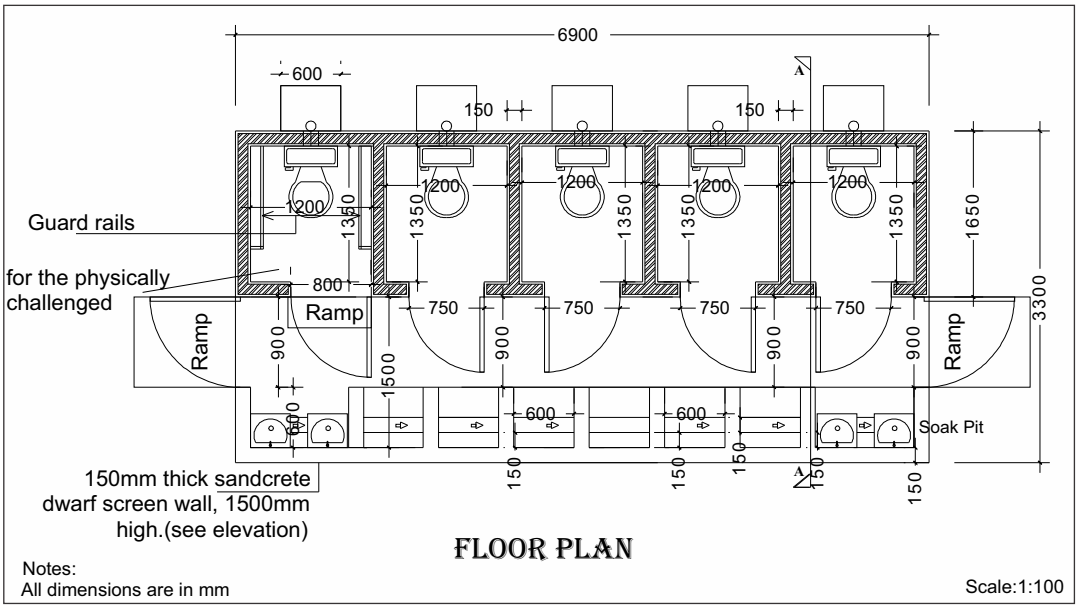

Fig. 3.40: Floor Plan of 5 Compartment WC Toilet for Male

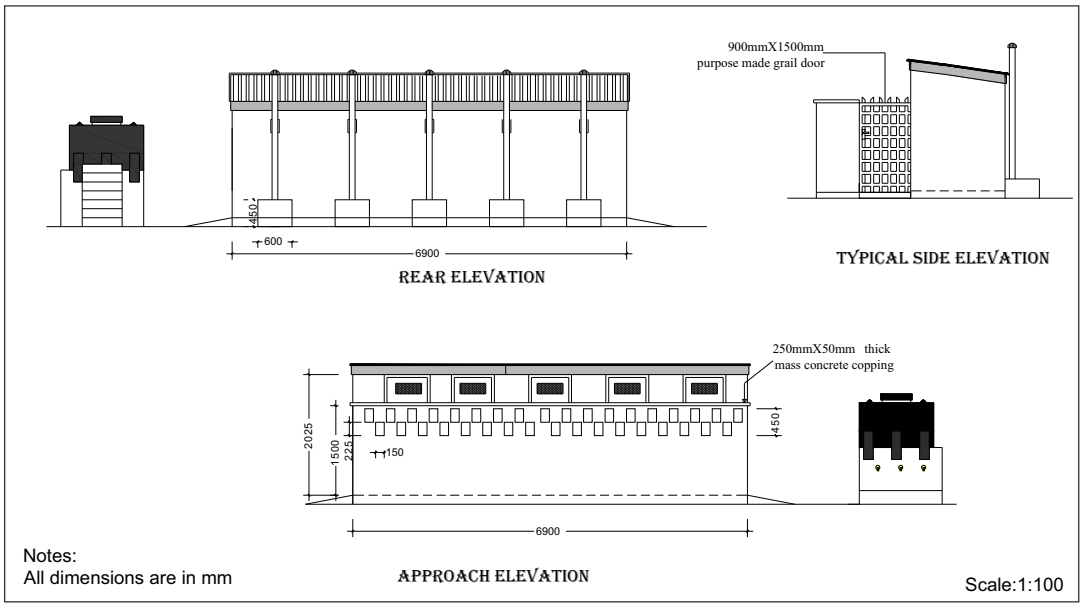

Fig. 3.41: Front Elevation of 6 Compartment WC Toilet

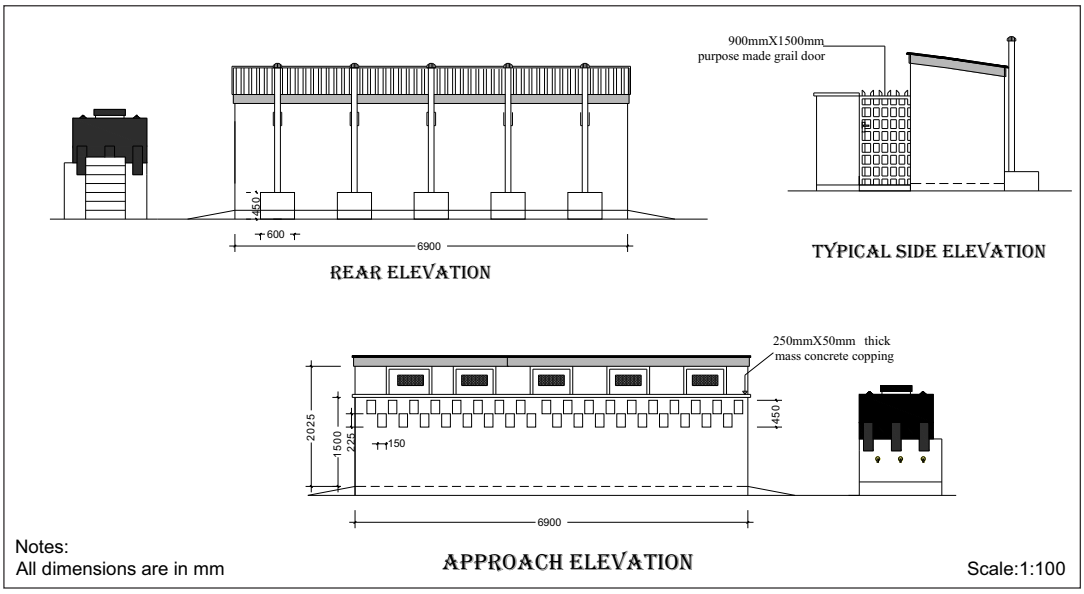

Fig. 3.42: Back Elevation of 5 Compartment WC Toilet

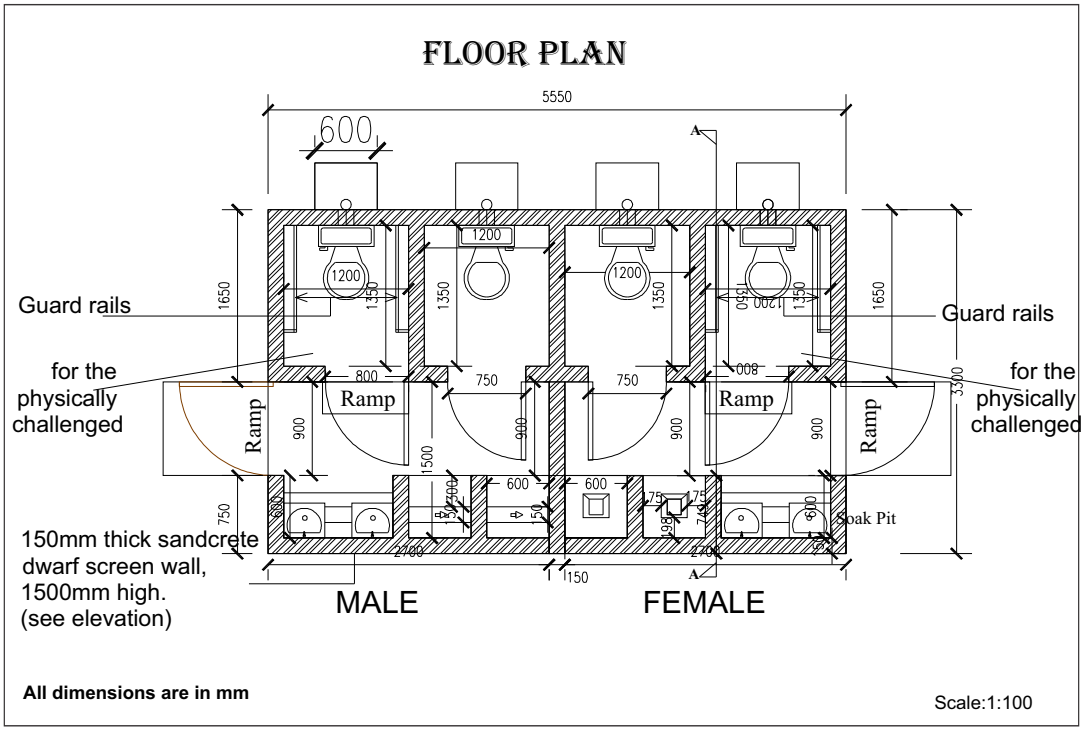

Fig. 3.43: Floor Plan of 4 Compartment WC Toilet (Males and Females Combined)

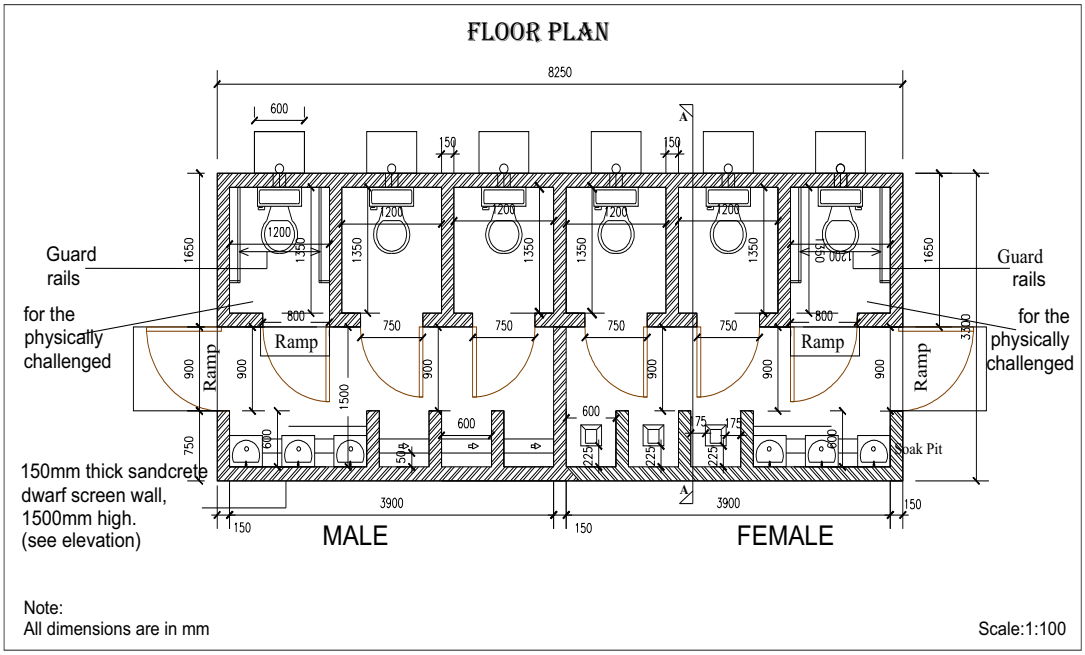

Fig. 3.44: Floor Plan of 6 Compartment WC Toilet (Males and Females Combined)

Plate 3.7: Front Elevation Perspective View of 3 Compartment Water Closet (WC) Toilet

Plate 3.8: Back Elevation Perspective View of 5 Compartment Water Closet (WC) Toilet

3.4 URINALS

3.4.1 Introduction

A urinal is any specially designed sanitation facility or container for urinating by people. It could be built as part of the VIP latrine or Pour Flush/WC toilet unit or built as a separate (stand alone) unit. The waste (urine) will, however, drain into a separate soak-pit, in which case the connection is underground through thick-walled PVC piping or of block work.

The recommended urinals are designed with partitions or dividers to provide some privacy for the users, especially the women. The design also incorporates two methods of flushing system: hand washing dependant and manual, to rinse urine from the collector and prevent foul odor. The hand washing dependant system operates automatically whenever the hand washing facility is used. This system does not require any action from the urinal's users, but from the users of the hand washing facility. The manual on the other hand, involves deliberate flushing of the urinal after use. The drain floor is sloped to aid effective removal and ease cleaning. The drain is designed to have a plastic mesh guard to prevent solid objects from causing plumbing stoppage or blockage.

Unlike the latrine, the walls of the urinals are dwarf so that the users' heads are always in plain sight to everyone within the facility. However, small partitions or dividers have been introduced for privacy or hiding of the exposed private area of the users, while the rest of the body will be in plain view. The urinals are spaced far apart to create an air of comfort. Overall, the urinals are designed in such a way that the users do not need to hover awkwardly or to bring their genitals into close contact with the facility. Separate designs are made for females and males so that they could use them without touching the facility.

3.4.2 Design options

The front section of the VIP latrine building is converted into a urinal (Fig. 3.45). The urinal is built over a foundation, which does not cover a pit. The wastewater from the hand washing facility, which is besides the urinal is channeled to flush down urine from the slab into a soak away pit.

The design details include the following:

- The dimension of the foundation depends on the length of the latrine/toilet
- The facility is in front of the latrine/toilet
- The facility has two entrances (those of the latrine/toilet building) with iron doors and ramps
- Fig. 3.49: The Floor Plan of the 6-User Urinal (for Female) in Front of the Latrine/Toilet
- Wastewater from the hand washing facility (beside the urinal) flushes the urine before being led into the soak away pit through a channel.
- The hand washing facility could be on either one side or both sides of the urinals

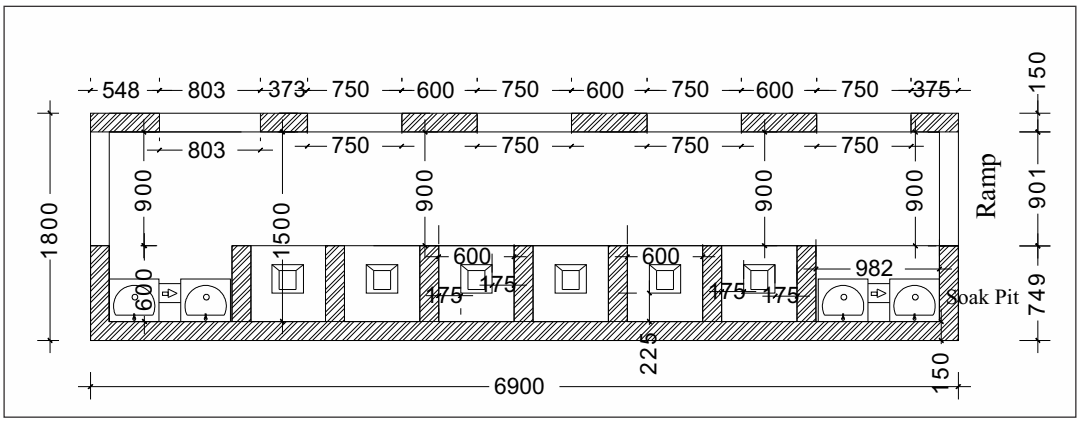

Fig. 3.45: The Floor Plan of the 6-User Urinal in Front of the Latrine/Toilet

3.5 HAND WASHING FACILITIES

Regular washing of hands is one of the most effective means of preventing WASH related diseases. It is particularly important that patients, staff and visitors wash their hands after defecating, urinating, cleaning of the latrines, or touching anything, especially before eating or drinking from a tap or a hand pump. It is difficult for most people to wash hands at PHC, where there is no such facility, or where facilities are not functioning properly, for a variety of reasons, including poor design and/or construction, missing or broken taps, inaccessibility to water, and so on. Simple and low-cost handwashing points can be made with a properly constructed handwashing facility with a base and an overhead water tank (Figs. 3.46-3.50).

As in the other cases described above, the hand washing facility has been designed to reflect the importance of washing hands in PHC, in such a way that it may not easily get dirty or

spoilt. Moreover, people of all ages can easily reach and operate the taps. Also, the designs have been done to achieve the maximum impact, by locating it in such a way that it works as hygiene barriers between the dirty and clean hand areas and by ensuring that the water source is not contaminated by contact with dirty hands. Wastewater from the hand washing facility will be channeled to flush urinals in order to help conserve water and promote hygiene.

Stand alone facility

The foundation of the facility is 1450mm x 800mm with ramp on the two sides to enable the physically challenged have access to the facility. The facility consists of a storage tank in which water is stored and a block work or concrete or steel base of 750mm high, which should be plastered (if block work) with 1:3 cement mortar internally and externally to prevent leakages. Three sides of the facility have a total of eight (8) taps for washing hands. Eight (8) 150mm x 300mm steps and one (1) 150mm x 400mm step are attached to the storage tank to enable people fetch water from any available source and pour it into the tank (Figs. 3.46 - 3.50). The hand washing facility is positioned in such a way that water from it is channeled through the urinals into a soak pit (Fig. 3.51). The facility can be used to propagate hygiene education messages, which can be inscribed on the wall of the tank in written and pictorial forms.

Combined facility

The combined facility involves the construction of hand washing facilities in front of the VIP latrine/pour flush toilet/water closet toilet and beside the urinals, all enclosed by a wall. The floor plan design detail is as shown in figure 3.45, while figure 3.52 shows details of the wash hand basin.

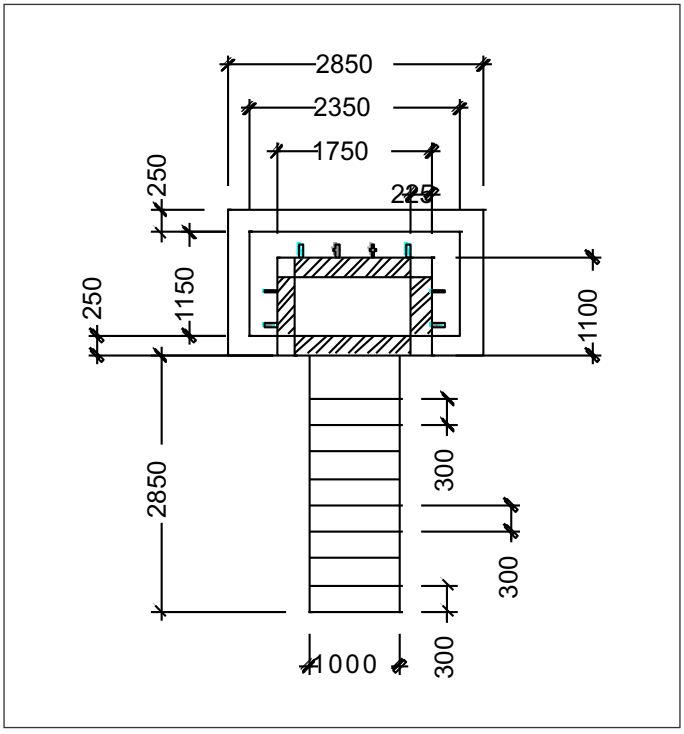

Fig. 3.46: Floor Plan of the Hand Washing Facility

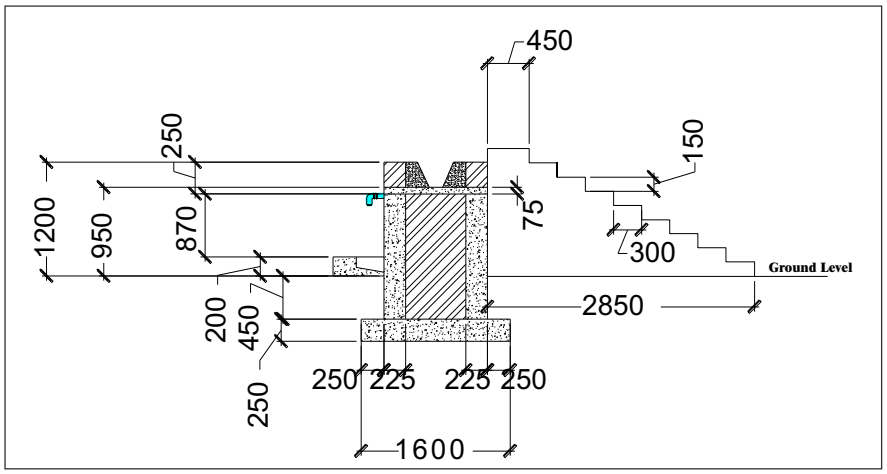

Fig. 3.47: Cross Section of the Hand Washing Facility

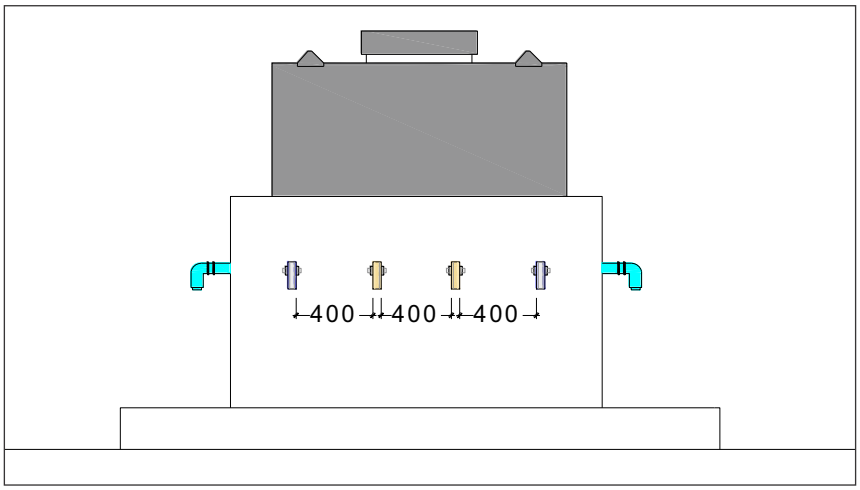

Fig. 3.48: Front Elevation of the Hand Washing Facility

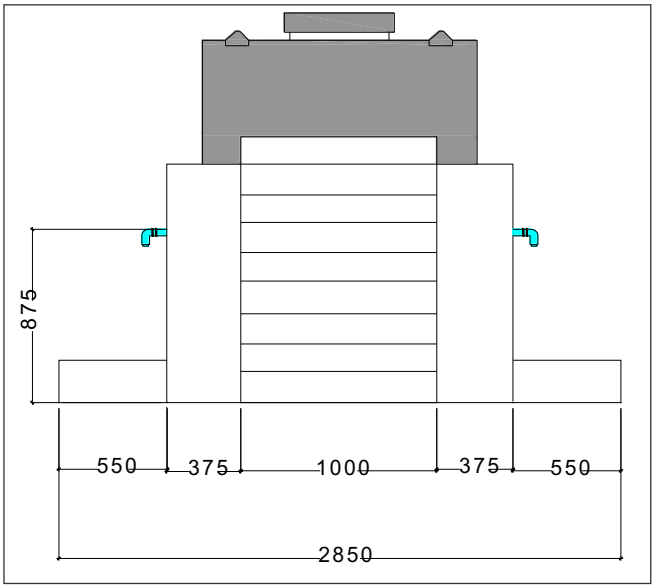

Fig. 3.49: Back Elevation of the Hand Washing Facility

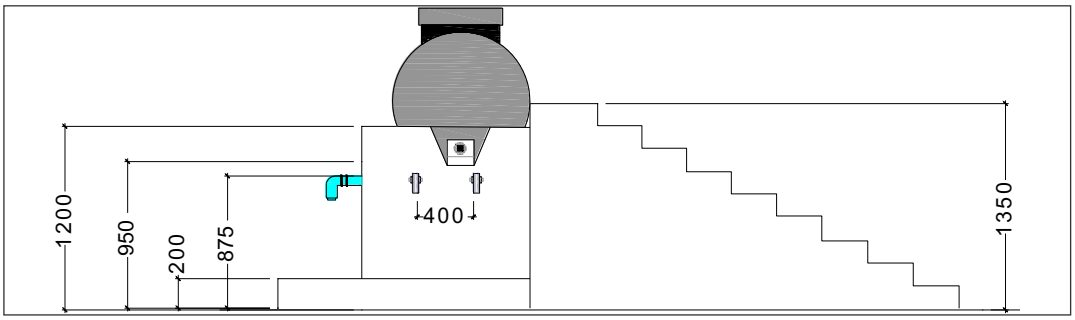

Fig. 3.50: Side Elevation of the Hand Washing Facility

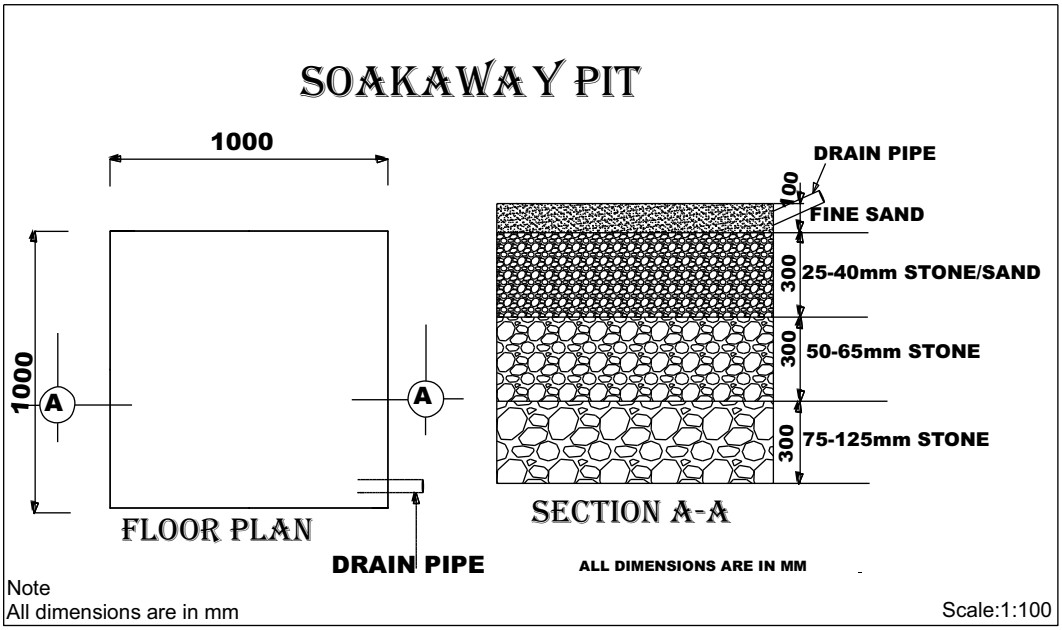

Fig. 3.51: Floor Plan and Cross Section of the Soak Away Pit

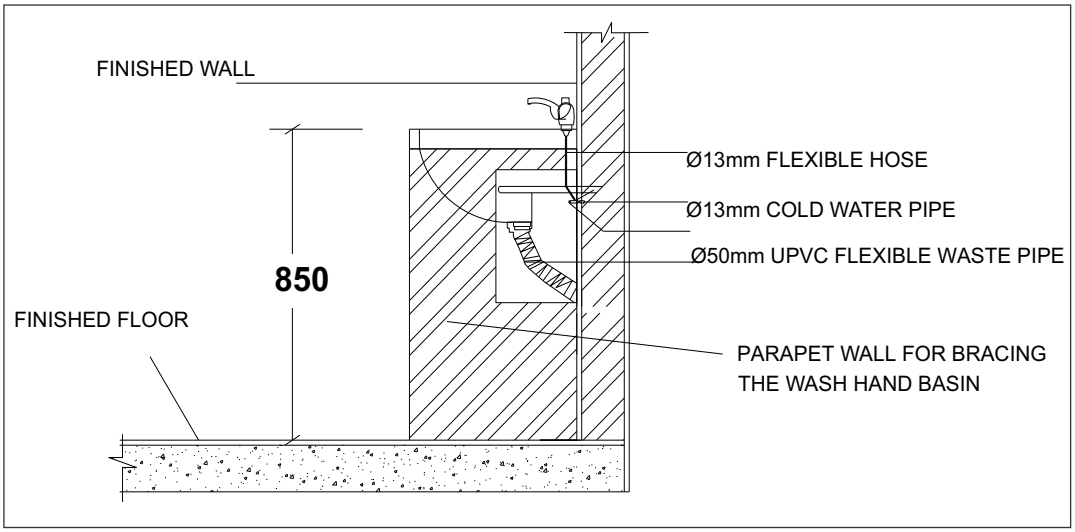

Fig. 3.52: Cross Section of Wash Hand Basin

3.6 PHYSICALLY CHALLENGED-FRIENDLY DESIGNS

User (physically challenged) – friendly considerations were also given prominence in the designs. Thus, the designs satisfied the special requirements of people in general and women in particular. The needs of some women who may require more privacy have been taken into account in the designs. Provisions have been made in the designs for physically challenged users, since one in five of the world's poorest are disabled and for them access to basic services (such as sanitation and safe water) is a daily problem and may lead to reduced opportunities, isolation, poor health and poverty (Zomwelaag et al, 2005). Thus, efforts have been made to incorporate facilities for the following categories of physically challenged people, as shown in figure 3.53 and described below:

- Blind or poorly sighted people: special grips and guiding systems.
- People in wheelchairs or with crutches: ramp, wider doors, special grips, block filled with concrete seats or foldable seats.
- People with missing arm(s) or paralyzed arms: taps and knobs that can be opened with one hand, are not heavy or can be opened with the feet.

When incorporated in the original design, the above adaptations can be made using locally available materials, while making a big difference in a disabled person's life and access to the facility. Thus, the facilities will enable, motivate and promote appropriate hygiene practices among people, thereby creating enabling healing environment in the PHCs.

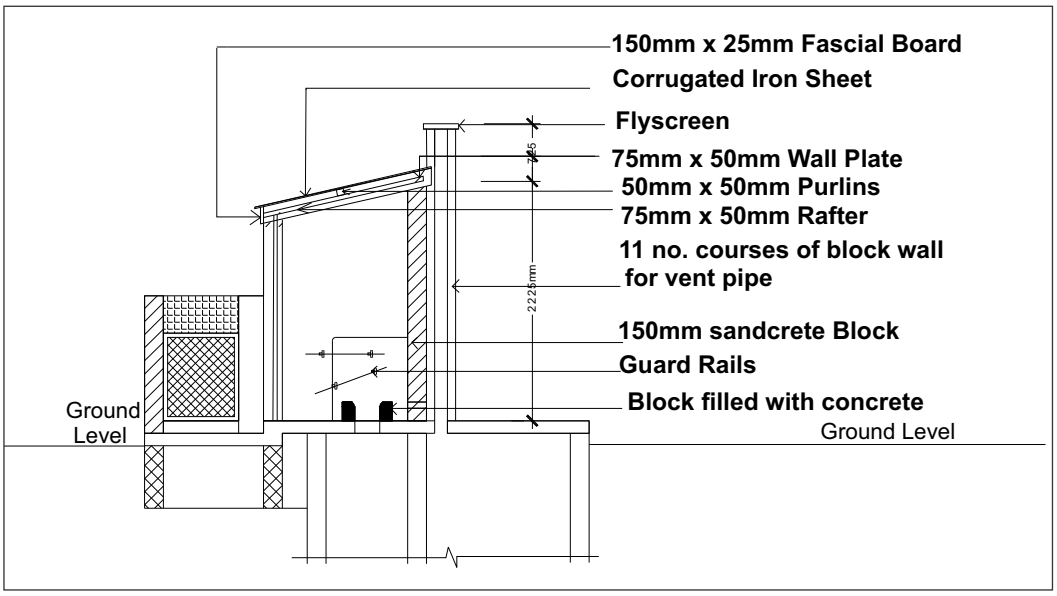

Fig. 3.53: Guardrails and Seats for People with Disability

3.7 WASTE MANAGEMENT FACILITIES IN PHC

3.7.1 Introduction

The best way to manage solid waste from PHC is for the waste to be managed within the Centre. However, to do this in a sustainable manner, such waste should be separated, if possible, from the source. Thus, waste should be properly stored, handled, transferred and disposed based on its potential risks.

Moreover, management of waste from PHC requires appropriate education of everybody (staff, patients, visitors) that may come into contact with the waste, as well as special training for the handlers of such waste. The location of the waste management facility should take cognizance of the prevailing winds (north-east and south west) and should be at the back of the PHC.

3.7.2 Solid Waste Management Facilities

- General Pit: A pit of 2metres long, 2.5metres wide and 1-metre-deep can contain all solid waste to be generated by a PHC within two years. When it is filled up, it should be covered with soil, while another one is prepared.
- Sharp Pit: A pit of 2metres long, 2.5metres wide and 1-metre-deep can be prepared to accommodate all sharp objects being generated by the PHC. The pit, which can be lined or un-lined should have a sealed cover, constructed of a reinforced concrete and with a steel, asbestos or PVC hole of approximately 200mm diameter.
- Incinerator: The size of the incinerator will depend on the volume of waste to be generated. Thus, it can be built by using an old/used oil drum or bricks and concrete with iron or metal doors. For construction using bricks, the following specifications are being recommended:
    - Foundation: 2.5metres long, 2.5metres wide and 0.5metre deep, construct with reinforced concrete.
    - Ash Pit: 0.96metre long, 0.96metre wide and 0.3metre deep, construct with reinforced concrete.
    - Combustion Chamber: Construct with burnt brick and covered with reinforced concrete.
    - Chimney: Construct with burnt brick with a minimum height of 1.5metres.

The ash pit should be located in front of the incinerator, with an ash removal door for easy removal of the combusted wastes.

4

CHAPTER FOUR

SPECIFICATIONS AND GUIDELINES FOR SUPERVISION OF CONSTRUCTION, OPERATION AND MAINTAINANCE OF WASH FACILITIES IN PHC

SPECIFICATIONS AND GUIDELINES FOR SUPERVISION OF CONSTRUCTION, OPERATION AND MAINTAINANCE OF WASH FACILITIES IN PHC

4.1 INTRODUCTION

Supervising the construction, operation and maintenance of WASH facilities in PHCs should adopt an integrated and overlapping approach. All the important stakeholders should be involved, including representatives of the PHC management, LGA PHC Department and WASH Unit, WDC, Communities, Contractors, Due Process and WASH consultants. The LGA PHC Department should take the lead and ensure quality assurance of the materials and processes used during construction of PHC WASH facilities. It is particularly important to involve representatives of the communities, so that they can replicate the good designs and construction of such facilities in their various communities. However, the responsibility of day to day supervision of the construction should be the responsibility of the Agency (a consultant could be engaged) that awarded the contract, with support from the beneficiary PHC/Communities representatives, where the construction work would be implemented.

In this regard, it is required that Officers of line agencies at State and local government levels should be trained, in the first instance, on the protocol of constructing the WASH facilities, from site selection to formwork development, appropriate mixes of sand: gravel: cement, for foundation, reinforced concrete slabs, sub-surface pit lining construction, superstructure, plastering and other finishing activities.

In addition, the officers so trained should be competent and know the technical details of the construction from inception to completion. This would equip them with requisite skills needed to effectively supervise the construction (operation and maintenance) of VIP latrines/pour flush toilets/water closet toilets, urinals and hand washing facilities for the desired results/outputs. The supervising and monitoring responsibilities; the power to sign off the contract and the issuance of contract completion certificates should mostly be based on the report of the supervising officers, since they are to be with the contractors throughout the construction period. It should be noted, however, that the officers so trained should be involved in the supervision of construction.

Other stakeholders, such as State governments, through the Due Process office, State WASH consultant, State Ministry of Health, NPHCDA and other interested partners should play a supportive role to the leading Agencies. However, the leading Agency supervising the construction of WASH facilities should do it with active participation of sanitation officers of the LGA WASH Units where the PHC is located.

Apart from the above mentioned arrangement, it is also necessary for the coordinating MDAs at the Federal level, such as NPHCDA, Federal Ministry of Health and Federal Ministry of Water Resources, UNICEF Field Offices and donors to play a supportive role to ensure quality and effective supervision during the construction exercises.

4.2 GUIDELINES FOR THE CONSTRUCTION OF WASH FACILITIES

4.2.1 VIP Latrine/Pour Flush Toilet Construction

The following procedure is essential to be observed for a successful construction of VIP latrines and Pour Flush toilets:

General: The bidder(s) visit(s) and examine(s) the site(s) to obtain necessary information for the bidding exercise. The cost of such visit(s) is to be borne by the bidder(s).

Work schedule: The successful bidder(s) on acceptance of the contract(s) submit(s) comprehensive work schedule(s) which should fall within the agreed/prescribed contract execution period. This will be done prior to the mobilization of men, materials and equipment to the site(s).

Personnel: The contractor(s) shall use competent personnel, including qualified and experienced builders, professionals and artisans.

Mobilization: The contractor(s) arrange(s) for the storage and security of materials and equipment in such a way and manner as not to constitute any nuisance to the environment and the job(s). It will be essential for the contractor(s) and the client(s) to visit the PHC(s) and meet with the expected beneficiaries.

Concrete Work(s):

- Good quality Precast Reinforce Concrete Slabs (PRCS) should be used for the pit.
- It is particularly important to ensure that the sand, cement, gravel, water and reinforcements meet the prescribed quality standards. It is the duty of the supervising body to ensure this as well as other quality standards
- The recommended concrete for the slab shall be 1:2:4, while that of the pit walling and binding concrete shall be 1:3:6.
- The reinforced concrete slab shall be left to cure (air dry) for at least 7 days before installation.
- All concrete for slab after placing in framework shall be thoroughly compacted to ensure smooth and good surfaces free from cavities

- The upper surface of the concrete shall be finished with 1:1 cement and sand mixture.
- Prior to arranging the formworks for casting concrete, thin plastic sheet (e.g. cement bag) should be spread on the platform. Casting of reinforced concrete on bare floor is not acceptable.
- All reinforced concrete slabs shall be 75mm thick.

Cement: Ordinary Portland Cement shall be used for the construction

Aggregates (Washed gravel and granite):
- The coarse aggregates to be used should be clean and free from clay.
- The size of the coarse aggregates shall be 10-20mm diameter
- Both smooth and sharp sand would be required (free from clay).

Steel Reinforcement:
- All steel reinforcement for the casting of slab shall be hot rolled mild steel bars, 10mm diameter in size
- The steel shall be kept clean and free from rust, oil, grease, oily paint or any material which may impair the bond between the concrete and the reinforcement or which may cause corrosion or deterioration of the concrete.
- 10mm diameter high yield steel bars may also be used where the mild steel bars are not available (The BOQ is based on mild steel).

Block work:
- 225x225x450mm (9"x9"x18") blocks shall be used for pit lining
- 150x225x450mm (6"x9"x18") blocks shall be used for construction of superstructure.

Artwork:
- Simple hygiene education messages (to be translated to local languages) are to be inscribed on the walls of the latrines/toilets, e.g.
    - Keep our toilet clean always
    - Prevent diseases, use sanitary latrines
    - Wash your hands with soap after using latrine
- Latrines should be labelled: Staff (Male, Female); Patient (Male, Female); Visitors (Male, Female) (using local languages, cultures, figurines, etc.)
- The artwork could also be pictorial

Site Completion/Security:
- Site should be restored as far as possible to the condition found on arrival, by proper landscaping and removal of all left over materials, equipment, etc.
- Doors should be properly locked before handing over to the client or beneficiaries.

Report:
- The contractor should produce a report, containing:
    - Name(s) of PHC(s)
    - Type(s) of latrine/toilet
    - Number of blocks/compartments per block

- GPS coordinates of the PHC and the facilities

Mode of Payment

- Pay according to BOQ, following issue of authentic certificate by the client
- The tranches should be determined by the Agency awarding the contract and based on the signed MOU
- There could be a retention fee of between 5-10% to be paid 3-6 months after successful completion of the contract and any remedy effected.

4.2.2 Urinal Construction

Foundation and wall

The foundation and wall should be part of the latrine/toilet structure.

Urinal base slab

The base slab of the urinal is laid down within the foundation, which will be made with concrete (4 parts gravel, 2 parts sharp sand to 1 part cement) of 75mm thick. It is to be constructed with the latrine/toilet structure.

· Urinal floor

This is laid on the urinal base slab, with a slight to slope running into a channel. The channel is formed at the base of the wall and at the lower end of the sloping floor, which is constructed with each measuring 600mm x 600mm x 225mm high purpose made urinal through finished with ceramic tiles, fitted with 100mm diameter PVC drain pipe.

Fitting the drainage pipe

Before the final plaster work is laid over the working surfaces of the urinal, the drainage pipe is laid between the urinal channel and the soak pit. PVC pipe is used for this purpose and PVC bend will also be required. The length of the pipe will depend on the distance between the urinal and the soak-away pit. The bend should be positioned so that it can drain all urine into the pipe that runs through an evacuated trench to the soak pit.

Alternatively, the drainage channel can be constructed with blocks to reduce cost and increase the life span of the structure. Another advantage of this is that the PVC pipes may be vandalized by people and sometimes they crack due to prolonged exposure to the sun.

The used water from the hand washing facility is diverted to the urinal. The waste water enters through the urinal from the two sides to flush the urine away from the channels to the soak away pit.

The soak pit is made by digging a pit 1500mm across and 2000mm deep and lining it with blocks, which should be spaced apart at the bottom of the pit. The pit should be filled with stones of different sizes - 75-125mm, 50-65mm, 25-40mm in different layers of 300mm depth and fine sand. The top of the pit is covered with a concrete cover slab. The urinal drainage pipe should be led into this pit. If drainage conditions are poor, the soak pit may require enlarging. The waste water from the hand washing facility is channeled into the urinal.

Plaster work

The urinal wall, the urinal channel and the urinal floor should be plastered with cement mortar. The splash wall should be made of hard, shiny plaster (sand/cement mix of 3:1) or ceramic tiles.

Roof

A roof is not essential for the urinal, but it is useful during the rains and aids the appearance of the structure. Corrugated iron sheets, ferro-cement slabs, fibre concrete roofing tiles/sheets can be used.

Finishing and Landscaping

The area around the urinal can be built up with soil, and the trench leveled. The finished structure can be plastered and painted. It is advisable to place a stainless steel sieve over the channel drainage hole to avoid blockage.

4.2.3 Hand Washing Facility Construction

- Should be connected to urinal for flushing
- The soak pit should be located in such a way as not to cause injury to the people
- The soak pit should be filled with stones or broken blocks and topped with sand
- The mix for all the concrete works shall be 1:2:4
- The concrete and the block work should be plastered with cement mortar both internally and externally. The mix for the mortal should be 1:3
- Provision should be made for simple artwork and messages, as for the toilet.
- A very good plastic overhead water tank should be procured.

4.3 GUIDELINES FOR ROUTINE OPERATION AND MAINTENANCE

4.3.1 Introduction

A well organized system of cleaning and maintenance of the PHC WASH facilities is of utmost importance. Badly maintained WASH facilities often cause an even bigger health risk. Stagnant water around tap stands and in blocked drainage channels attracts rodents and forms breeding place for mosquitoes. Thus, it is important that proper arrangement is made for maintenance of the facilities. A good cleaning and maintenance system requires fund, spare parts, people and equipment, and a clear definition of roles and responsibilities among the actors involved. The plan for the maintenance and upkeep of PHC WASH facilities should be produced before the facility is constructed. Details of the maintenance are provided in this section.

4.3.2 Operation and Maintenance Plans

The overall situation in the PHC and the condition of its WASH facilities is closely linked and should be developed by inclusive participation of all stakeholders, before the facilities are completed. When staff, patients, visitors and the communities are involved, apart from representatives of other stakeholders, the plan has a better chance of being implemented

through the commitments of all stakeholders, including community, PHC management, among others.

An operation and maintenance plan should have the following attributes:

Developed and agreed upon before the facilities are completed
It is important to start thinking about operation and maintenance at an early stage. PHC management, staff and the host community's residents should be made aware of the maintenance implications during the planning phase, such as the availability and affordability of spare parts and cleaning supplies needed for the chosen solution and how their regular supply can be arranged.

Defined responsibilities and monitoring
The division of responsibilities among the different stakeholders should be clear and complete, covering all the necessary activities from filling up water containers for hand washing and keeping the surroundings tidy, to purchasing spare parts and supplies and supervising maintenance activities. Appropriate allocation of the latrines/toilets compartments helps to improve the use, cleanliness and maintenance because the responsibility is with a small clearly defined group. The plan should also define monitoring and actions in the event of non-compliance.

Non-discrimination towards sex, age, caste, nationality, religion, ethnic group and social class
All responsibilities should be shared and not determined by any of the factors mentioned. The PHC is a place for adequate and safe level of health-care in addition to minimizing the nosocomial risk to patients, staff and visitors, as well as, the infectious risk to surrounding communities. Thus, all staff, patients and visitors should be responsible for maintenance of the WASH facilities.

Linked to other PHC's community improvement efforts
A people-friendly, health-promoting and truly community-based PHC requires more than clean and well-maintained WASH facilities. The operation and maintenance plan for the WASH facilities can be part of an overall plan to improve the entire PHC and host community's environment.

Ensured open and continuous dialogue among stakeholders
Problems related to operation and maintenance can be discovered before they can negatively affect the WASH situation at the PHC and the community. The operation and maintenance plan should allow for easy diagnosis and reporting of problems. In addition, it should be reviewed periodically as deemed appropriate.

4.3.3 General Guidelines

Routine preventive maintenance and upkeep
This entails daily activities carried out by the PHC cleaners, with supervision by the appropriate department(s) and management. Daily, the latrines/toilets and urinals should

be washed, with application of disinfectants, surroundings (including those of other WASH facilities) swept and remnants of faeces dislodged and washed into the pit, cutting bushes around the facility. This will make the facilities sanitary and people friendly to use.

Corrective maintenance and upkeep

This may take place in several ways, such as:

- inspecting the facility for minor damages and fixing them;
- ensuring that the surroundings of the facilities are not littered with refuse and faeces;
- ensuring regular inspection of the facilities for anomalies and misuse by people; and
- dislodging cob webs on the vent structure netting through pouring water into it to dislodge them, once a month

Rehabilitation

Rehabilitation entails making major repairs to the existing facility, including the following:

- fixing broken vent structures and weak nettings;
- fixing collapsing facilities; and
- mending cracks around the slab and superstructure of the latrine/toilet.

4.3.4 Specific Guidelines

Latrines/Toilets

The routine maintenance protocol for VIP latrines and pour flush toilets includes the following:

- washing compartments (floor) with water, soap and disinfectants, everyday;
- sweeping surroundings daily to make it neat, attractive to users and people friendly;
- sweeping the slab and drop holes' areas daily; and
- keeping the latrines/toilets under lock and key, especially when not in use, to prevent abuse by nearby residents.

Urinals

The basic maintenance regimen for the urinal:

- channelling waste water from the hand washing facility to the urinal before flowing to the soak pit through gravity;
- washing daily to reduce odour and encourage people to use it;
- disinfecting the facility, once a week;
- cutting the bushes surrounding the urinals; and
- maintaining always the footpath leading to the urinal.

Hand washing facility

The hand washing facility should be maintained as follows:

- constantly have water for use;
- soap pan must always have soap to enable people practice hand washing effectively;
- the tap should constantly be inspected to avoid water waste through leaking taps;
- the hand washing facility should be dislodged, at least, once in three months to avoid sediments coming out, instead of water when the water level is low; and
- the path of the waste water from the hand washing facility to the urinals should be

cleaned to prevent stagnation and blockage of the pipes by sediments.

4.3.5 The organization and maintenance of PHC WASH facilities

The organization of cleaning and maintenance of PHC WASH facilities is of the utmost importance. Badly maintained WASH facilities often cause an even bigger health risk to the people. Stagnant water around tap stands and in blocked drainage channels attracts rodents and forms a breeding place for mosquitoes. It is not so important who cleans and maintains facilities, but that arrangements for it are made, and that this is done before construction starts. A good cleaning and maintenance system requires funds, spare parts, people and equipment, and a clear division of roles and responsibilities among the actors involved. A number of organizational options for maintenance exist:

- through a cleaning committee;
- by PHC staff employed for that purpose; and
- external cleaning personnel.

Staff (especially the junior ones) could also be involved and trained to operate and maintain the facilities. Responsibility for cleaning and maintenance and involvement in it are often seen as being synonymous. Often senior staff refer to junior staff, especially cleaners, who have been given the task to clean latrines, as being finally responsible for the latrines' upkeep, whereas the final responsibility, involving supervision and corrective action if needed, should remain with the PHC management. The establishment of maintenance section/unit under the supervision of PHC management will go a long way in addressing the issue and exposing people, including members of the community, to:

- knowledge on the importance of proper sanitation and hygiene at critical times;
- a good understanding of the link between faeces and diarrhoea, and of the importance of barriers;
- a good knowledge of the importance of using clean or running water, and using soap to get rid of germs; and
- ability to distinguish the signs and symptoms of diarrhoea, cholera and dysentery.

The members of the community become a kind of WASH Evangelists and may be involved in a wide range of activities, including hygiene promotion to fellow residents.

In order to become effective promoters and implementers of PHC WASH facilities, PHC staff require a certain level of hygiene awareness and commitments. These include:

- a working knowledge of the relationship between water, sanitation, hygiene behaviour and health;
- awareness about their importance as a role model, resulting in proper hygiene behavior;
- skills to work with members of the community in a participatory way; and
- commitment to bring about improvement by themselves or to get third parties involved if necessary.

Training of staff and community members, who, if motivated and enthusiastic, are a key element for effective hygiene education, should also include effective teaching methodologies, e.g. the use of participatory techniques. For bringing about or facilitating

improvements in WASH situation, staff and WDC members will need to know how and where to apply for assistance, how to mobilize people, other staff and community members, etc. Construction of a latrine/toilet at the PHC's premises will help enhance the PHC's appreciation of sanitary facilities and at the same time be a motivating factor to other community members. Selection of staff for training should be done carefully. Selection criteria include:

- the staff can act as a role model and have good contacts in the community;
- the staff has a genuine interest in WASH; and
- the staff can be allocated some time for taking WASH activities in the community a bit further.

Care should also be taken that male as well as female staff get involved in PHC WASH. However, staff may not be able to put their knowledge and commitment to effective use if the WASH facilities are not available, not functioning or if agencies do not respond to requests for assistance in the renovation of damaged WASH facilities. Training of staff should therefore never be carried out in isolation, which also calls for inter-agency cooperation. The basic professional training of staff should include emerging issues in WASH in PHC. Staff already in service have to get the opportunity to upgrade their knowledge and skills in this respect. Regular interdisciplinary workshops involving staff, other health workers, WASH consultants and policy makers, among others, can contribute significantly to the necessary cooperation and coordination of activities.

4.4 CONCLUSION

The overall objective of the provision of people-friendly WASH facilities in PHC is the improvement of hygiene conditions and related life skills, healthy and safe PHCs and communities. Operationalizing effective PHC WASH facilities should therefore go hand-in-hand with operation and maintenance, to ensure that the overall objective of PHC WASH project is met.

In addition, the selection, construction and monitoring of WASH facilities should be done by a combined team made up of representatives of PHC Staff and Management, WDC, host Community, LGA Primary Health Care Department, LGA WASH Units, State Ministry of Health, SPHCDA, NPHCDA and WASH Consultants (where available).

Post construction monitoring should be mainstreamed into the work of the LGA Primary Health Care Department and WASH Units, with constant dialogue with the PHC Management, WDC and Communities. The LGA Primary Health Care Department with support of the WASH unit and PHC Management should ensure post construction monitoring of the use, maintenance and upkeep of the PHC WASH facilities.

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