



# SANITATION & HYGIENE GUIDELINES



**MINISTRY OF HEALTH**  
GOVERNMENT OF VANUATU

## FOREWORD

The Sanitation and Hygiene Guidelines (from here referred to as the *Guidelines*) constitute a major milestone to achieve the Ministry of Health's vision of 'a healthy population that enjoys a high quality of physical, mental, spiritual and social well-being' (National Sustainable Development Goal, Society Goal 3).

The Guidelines aim to improve the quality of sanitation infrastructure in Vanuatu and increase the accountability of stakeholders working in the sector. Its key principles are based on international and contextualised standards: technical adequacy, environmental sustainability, inclusiveness, cultural acceptability, affordability and risk reduction/resilience.

The Guidelines were produced under the leadership of the Environmental Health, Health Standards and Inspection Unit in the Department of Public Health, with contributions from many stakeholders at the National and Provincial levels. This publication is part of a collective effort between the Ministry of Health, donors and implementing partners to create a common reference document to guide communities' initiatives and governmental investments in rural households and health and education institutions, with the provision of minimum standards for sanitation systems in rural areas.

We acknowledge that the guidelines are an evolving set of documents, and the Environmental Health, Health Standards and Inspection Unit team remains committed to review their content every two years, with more regular updates where necessary. The aim of these reviews is to promote continuous learning and improvement so that the guidelines continue to be useful for all practitioners. We welcome therefore any suggestions for further improvement.

Sincerely,



Public Health Director



## ACKNOWLEDGEMENTS

The Environmental Health, Health Standards and Inspection Unit would like to acknowledge the following partners who have all contributed to the guidelines in an alphabetic order:

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- Department of Justice
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- Engineers Without Borders (EWB)
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- IsraAid
- Live and Learn
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- Other teams from the Ministry of Health, in particular the Health Promotion Unit and the Neglected Tropical Disease team / WHO, Provincial Environmental Health team
- Provincial authorities and non-governmental stakeholders in the Luganville and Malampa Provinces
- Save the Children
- UNICEF
- Vanuatu Red Cross Society
- Vanuatu Society for People with Disability
- World Vision Vanuatu

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## ACRONYMS AND ABBREVIATIONS

|      |   |
|------|---|
| JMP  | Joint Monitoring Program                |
| MHHM | Menstrual Health and Hygiene Management |
| NGO  | Non-Governmental Organisation           |
| NTD  | Neglected Tropical Diseases             |
| OH&S | Occupational Health and Safety          |
| PPE  | Personal Protective Equipment           |
| VIP  | Ventilated Improved Pit                 |
| WASH | Water, Sanitation and Hygiene           |

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## INTRODUCTION

### 1.1 Update since the first edition of the guidelines

This is the second edition of the Vanuatu Sanitation & Hygiene Guidelines. As the Guidelines are a living document, proposed to be reviewed every two years from their last approval.

Throughout the initial consultation period, the need for some standards and a guideline was recognised by many government departments and sanitation practitioners in the Santo Provincial workshop on 2<sup>nd</sup> April 2019 (see box 1). The Guidelines address the following issues:

*Box 1: Why an update is necessary:*

*“We need to have one standard for all NGOs and communities to ensure better quality of toilets”*

*“We need to ensure quality for sustainable products, not breaking down after the project’s life cycle”.*

*“The guidelines will help enforcing the new standards”*

- Inconsistency of sanitation interventions: different actors currently use different designs;
- Low quality: the current designs do not relate to any quality standards;
- Low accountability: It is currently difficult to measure quality with no standards;
- Limited scope for improvement: It is difficult to monitor and provide recommendations if the quality cannot be measured.

This second edition was updated based on the feed-back during the last two years of implementation. From an implementation perspective, stakeholders highlighted that the guidelines should include practical tools for government officers to monitor and enforce compliance of any new sanitation systems. The government institutions and third-party implementers will be enforced as a priority, but gradually the households will have to comply with minimum standards in order to obtain construction permits, for instance. The structure of the guidelines was also modified to make it more user-friendly, where the main document can be used as the basis for training packages for the government and non-government organisations, while appendices can be printed out independently for field workers.

Stakeholders providing feed-back included: National and Provincial Environmental Health teams from the Ministry of Health, Non-Government Organisations, UNICEF, and the Asian Development Bank (ADB). Feedback was also captured from construction of demonstration toilets.

### 1.2 Why are the sanitation and hygiene guidelines needed in Vanuatu?

In Vanuatu, while about 90% of the population has basic access to water, less than half of the population has access to basic sanitation (JMP, 2020). Only 28% of toilets in schools are in good condition. In health-care facilities, eight provincial clinics did not have toilets at the time of a UNICEF report (UNICEF, 2018) and the lack of available soap was a critical factor in all locations. Hand hygiene practices are very low in Vanuatu, with only 25% national coverage but an even lower 17% in rural areas. Handwashing with water and soap is the **most impactful hygiene practice one can do to prevent disease**.

The impact from **Neglected Tropical Diseases**, in particular **yaws** and **scabies**, is significant and is endemic throughout the country, with Tafea and Efate province at the highest burden (National NTD Health Report, 2018a). **Intestinal helminths** are prevalent throughout the country, with the entire population at risk of infection. The general poor hygiene and lack of sanitation contribute to the spread of infectious diseases such as tuberculosis (TB) and **Acute Respiratory Infection (ARI)**.

**Diarrhoea is the lead cause of death of under-five year olds (WHO, 2017)**. Poor sanitation facilities and hand hygiene practices disproportionately affects maternal and child health. Diarrhoea is an immediate (**acute**) reaction to ingesting something wrong but long term exposure to faecal contamination can cause the intestines to become inflamed and as a result they are unable to absorb sufficient nutrients from our food. This long-term (**chronic**) condition is linked to stunting (relatively short height for age). In Vanuatu, 29% of all

children under 5 are stunted. Children infected with intestinal helminths suffer from **deficits in learning, memory, and intelligence** (Pabalan et al. 2018). Children suffering from malnutrition (wasting and stunting in particular) due to poor nutritional habits and long-term exposure to fecal matter, show higher rate of school entry delay and school dropouts and poorer school performance, leading to lower human capital in their adulthood (Victoria et al. 2008, Misirli et al. 2008).

### 1.3 Vision

The Sanitation and Hygiene Guidelines (henceforward referred to as ‘the guidelines’) are a set of processes, tools and resources, whose vision was developed during an Environmental Health Planning workshop organised in November 2018 (see 2 below).

The Sanitation and Hygiene guidelines and standards should be an **easy-to-use** document, **well known** by all sanitation and hygiene service providers to ensure the **quality and safety** of **construction** and **operation and maintenance** activities, ultimately leading to **healthy communities** living in a **safe environment**.

### 1.4 Definitions

The following definitions are used:

- Improved **sanitation** facilities: facilities designed to hygienically separate excreta from human contact (JMP, 2019).
- **Hygiene** refers to conditions and practices that help to maintain health and prevent the spread of diseases, such as regular hand and body washing and proper cooking.
- **Menstrual Health and Hygiene Management (MHHM)**: Women and adolescent girls are using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management materials.
- **Solid waste** is defined as any garbage or discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.
- **Wastewater** includes any used water from domestic, industrial, commercial or agricultural activities, and also surface runoff or stormwater.
- **Safety** is here defined as the prevention of health adverse effects to communities and construction workers in relation to sanitation service provisions.
- **Healthy settings** include water and environmental resources.

### 1.5 Regulatory framework

The **National Sustainable Development Plan (2016-2030)** provides the overall objectives that the guidelines seek to contribute to:

- ECO 2.2: Ensure all people have reliable access to safe water and sanitation infrastructure
- ENV 4.2: Strengthen local authorities and municipal planning authorities to enact and enforce land use planning laws and regulations
- SOC 3.2: Reduce the incidence of communicable and non-communicable diseases
- SOC 3.3: Promote healthy lifestyle choices and health seeking behaviour to improve population health and well-being
- SOC 6.5: Strengthen local authorities and municipal institutions to enable decentralised service delivery

Within the Ministry of Health, the guidelines are a direction under the **Public Health Act Amendment (2020)** (part 8), to “prescribe standards for proper and adequate sanitation systems for rural areas”.

Failure to comply with the standards set herein is punishable upon conviction according to the penalties set forth in the Acts of the Government of Vanuatu.

The Guidelines are directly referred to by two key Environmental Health Policies and Strategies in place:

**Sanitation and Hygiene Policy (MoH, 2018):**

- Policy statement #v: Developing sanitation standards and technical guidelines to help address the low quality of sanitation infrastructure and support the monitoring and compliance activities by the Provincial and Municipal Councils.
- Policy statement #vi: Strengthening Provincial & Municipal Councils to monitor and approve partners’ delivery activities in the sanitation and hygiene promotion sector against the requirements of the relevant national technical guidelines in place, supplementing the Building Code and the Public Health Amendment Bill.

**Health Sector Strategy 2021-2030**, which objective is to guarantee that by 2020, 80% of population should have access to improved sanitation.

Other relevant acts and policies which are related to these guidelines are:

- Public Health Act [CAP 234]
- Water Resource Management Act [CAP 281]
- Environmental Protection and Conservation Act [CAP 283]
- Building Act (2013)
- Decentralization Act [CAP 230]
- Pollution (Control) Act (2013)
- Physical Planning Act [CAP 193]
- Utilities Regulatory Authority Act (2007)
- Waste Management Act (2014)
- National Policy and Strategy for Healthy Islands (2011-2015)
- Environmental Impact Assessment Regulations.



Figure 1: Legislation Framework

## 1.6 Scope

These guidelines primarily target government officers (Provincial officers, Sanitarians, Village Health Workers, WASH technicians), civil society and private sector partners involved in sanitation and hygiene activities. Although rural communities and individual households may of course utilise the information in these guidelines, the technical nature of the documents will in reality be beyond the average household to follow.

For village/household level, sanitation and hygiene information is disseminated through the Sanitation and Hygiene Behaviour Change Communication (BCC) Campaign, and the Rural WASH Committee Training and Village Plumber Training Manuals. This is supported by Village Health Workers (who are more engaged in awareness than technical support), Sanitarians (who will more likely be engaged in technical support and less so in awareness) and Village Plumbers who now received technical training and practice in toilet construction.

To support the BCC Campaign and the Water Committee and Village Plumber trainings, technical handouts of the two most common types of toilets (VIP and pour-flush) have been developed, including notes on use and maintenance. These technical handouts are to be handed out to the Village Plumbers, WASH Committees and Village Councils.

Much of the information contained in the S&H Guidelines can be used in urban and institutional settings as well, though separate guidelines for schools, health facilities will or have been developed, which should be consulted first.

The guidelines do not cover the management of solid waste, apart those derived from menstrual health management and the sludge material from a wastewater on-site treatment. Wastewater management is addressed as it relates to soak-away designs for hand-washing facilities and on-site sanitation systems.

## 1.7 Guiding principles

For all rural systems, whether for households or institutions, the guidelines were developed with the following three main principles:

- Adequacy – quality and safe sanitation solutions to protect human health;
- Environmental sustainability – sanitation solutions were developed to protect the environment for the current and future generations;
- Inclusiveness – accessible and convenient solutions for all users in the community (in particular women, children, people with disabilities, and the elderly);

In addition, the following considerations were made to tailor some of the technical solutions in Vanuatu:

- Acceptability – sanitation solutions have been trialled and users feedback gathered to suit the Vanuatu context.
- Affordability – options proposed promote the use of local materials to reduce the costs.
- Resilience/Disaster Risk Reduction – considerations were made to cater solutions in challenging environments (e.g., intermittent water supplies, cyclones).

### 1.8 How to navigate the guidelines?

This section aims to direct the reader to particular sections of interest.

|  |  |  |
|--|--|--|
|  <p><b>Main Document – Key considerations on Health, Hygiene and Sanitation and Compliance</b><br/>USERS: Government workers, NGOs, Village Health Workers, Sanitation Officers and hygiene promoters</p> |  <p><b>Annex 1 - Hygiene Key Messages, minimum principles &amp; Guide to Hygiene Promotion</b><br/>USERS: Government workers, NGOs, Village Health Workers, Sanitation Officers and Hygiene promoters</p> |  <p><b>Annex 2 – Sanitation Technical Documents &amp; Guide to build a good toilet</b><br/>USERS: Government workers, NGOs, Sanitation Officers, other construction workers</p> |
|  <p><b>Annex 3 - Maintenance, Safety</b><br/>USERS: Government workers, NGOs, Sanitation Officers, construction workers, Village health workers</p>   |  <p><b>Annex 4 - Monitoring and Compliance</b><br/>USERS: Government workers, NGOs, Sanitation Officers</p>   |  <p><b>Annex 5 and 6 – Guides for Septic tanks and approved technical sample designs</b><br/>USERS: Government, NGOs, contractors</p>   |

For example, Village Health Workers may be interested in Annex 1 on Hygiene messages and guide to Hygiene Promotion whereas Government workers and NGOs may particularly focus on Annex 3 and Annex 4 for their monitoring visits.

## HYGIENE AND HEALTH

### 2.1 Main hygiene and sanitation-related diseases

Hygiene and sanitation-related diseases can be grouped in three distinct categories. Figure 4 highlights how the extent of exposure to poor sanitation and hygiene practice can produce acute health impacts (short term), chronic health impacts (medium term) and ultimately affect other mental and social well-being factors (long term) through school attendance, physical morbidity, social stigma, anxiety and safety with lifelong consequences, especially for women and girls.

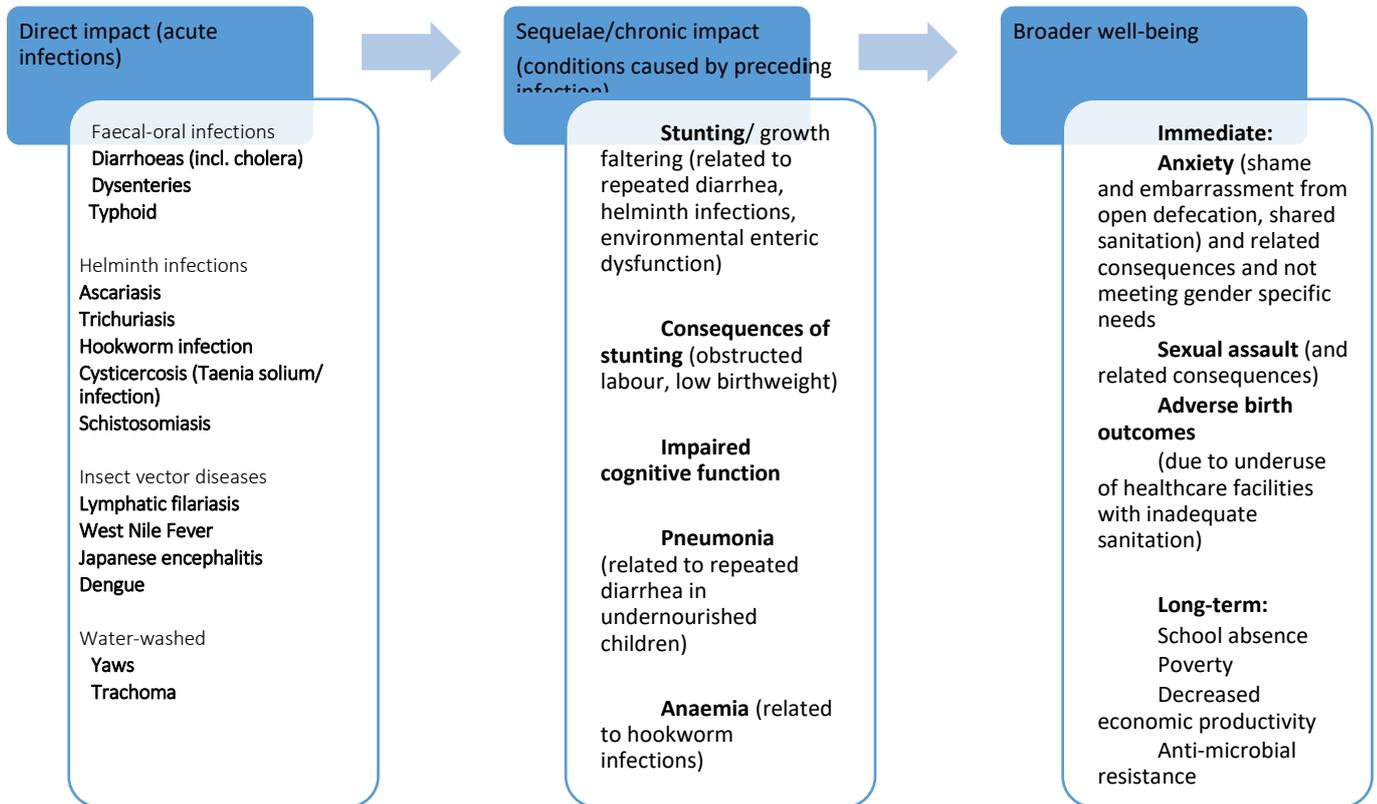


Figure 2: Health impact of unsafe water and sanitation (WHO 2018)

#### More about acute E. coli:

*Escherichia coli* (*E.coli*) is a kind of bacteria that is found in the gut and faeces of people and animals. Some kinds of *E. coli* bacteria cause symptoms like diarrhoea. *E. coli* bacteria is relatively easy to test for and as such it is used as an indicator to determine if water has been contaminated by human or animal faeces. Human and animal faeces can host other kinds of bacteria, viruses and worms which can be damaging to human health if ingested, cause diarrhoea, vomiting, and other symptoms.

Children are particularly susceptible to diarrhoea diseases and diarrhoea is the second leading cause of death in children under five globally (WHO, 2017). In addition, long term exposure to faecal contamination can cause the intestines in the gut to become inflamed and as a result they are unable to absorb the good nutrients from our food which is linked to stunting (relatively short height for age) (Ngure et al, 2014) .

If *E. coli* is present in a water sample it means that it has been contaminated by human or animal faeces. This can cause serious health issues, including death, especially for children under 5 years.

As mentioned in section 1.2, diarrhoea is the main cause of death for under five-year olds. Sustained ingestion of contaminated food and water can lead to stunting, which has long-term impacts on motor, cognitive and learning development, with nation-wide socio-economic impacts. In Vanuatu 29% of children under 5 are stunted.

Helminth infection has a similar impact on child development.

## 2.2 Socio-economic impacts relating to WASH

Beyond health, poor WASH has significant socio-economic impacts. The link between WASH interventions and health, performance and socio-economic development consequences is captured below. Unsafe sanitation and poor hygiene ultimately lead to high public and private health costs but more importantly to lower physical and intellectual productivity.

**Environmental Enteropathy** is a gut disorder that is prevalent among inhabitants of low-income countries living in environments with poor sanitation and hygiene. Chronic exposure to faecal pathogens causes inflammation and resultant structural changes in the small bowel, which ultimately result in functional changes. These functional changes include gut barrier disruption, carbohydrate malabsorption and chronic inflammation, and contribute to impaired gut immune function and ultimately growth faltering and impaired child development.

This disorder may occur in otherwise asymptomatic individuals without evidence of overt diarrhoea, but is often associated with chronic undernutrition (i.e., low-height-for-age or stunting).

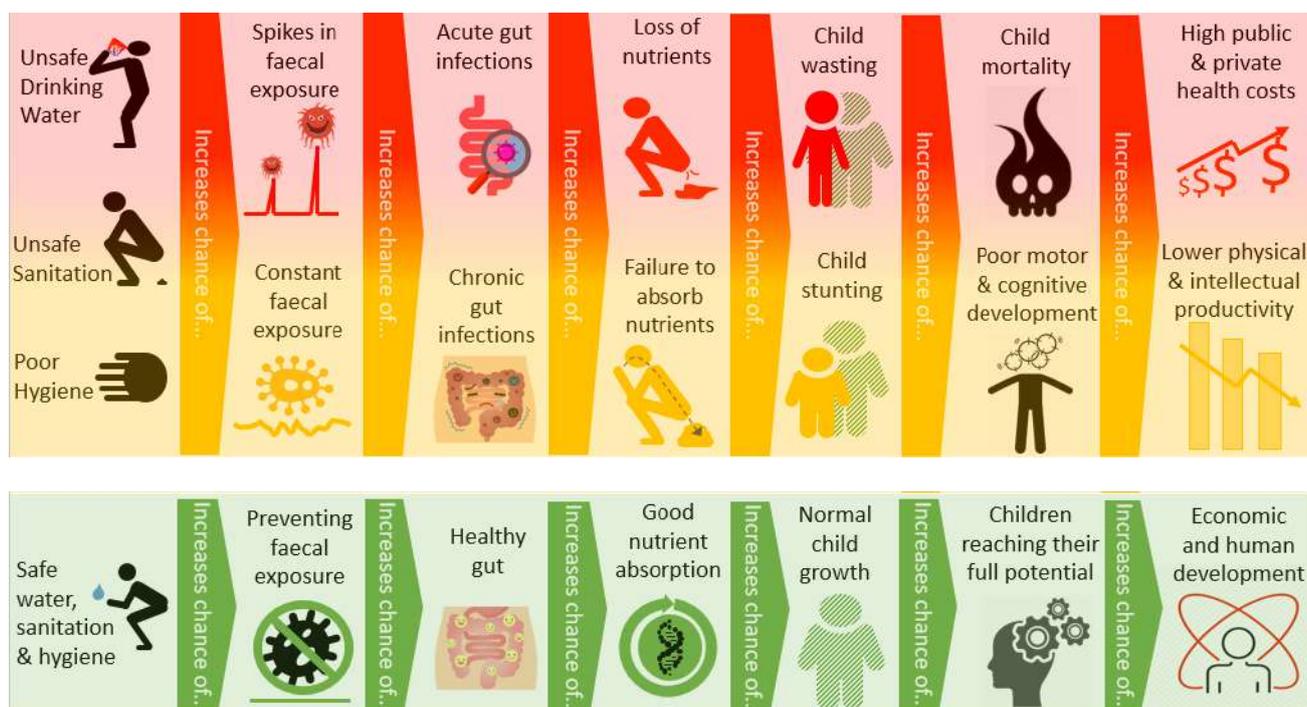


Figure 3: Link between WASH, Health and Socio-economic impact

Many of these impacts can be prevented through improving hygiene and sanitation. Mullany et al., (2007) and Yu et al. (2009) showed that regular maternal handwashing during the 14 days after delivery reduced neonatal mortality. A systematic review concluded that hand-washing can reduce diarrhoea risk by 47% (Curtis and Cairncross, 2003). Clean water, safe sanitation and good hygienic practices of healthcare staff and mothers can improve maternal and child health.

## 2.3 Knowledge, Attitudes, Practice in Vanuatu

A recent survey (IsraAid, 2023) showed that most people in Vanuatu are aware of the importance of handwashing with soap, yet less than 50% actually had soap available at the time of the survey. Many people consider ashes and lemon as good as soap, but in reality they do not nearly disinfect as well as soap.

The survey found awareness of stunting is virtually non-existent. This is not surprising, as stunting is more difficult to observe, certainly when compared to more visible impacts such as diarrhoea.

Some major barriers to good hygiene practices are:

- Lack of awareness of key issues (need to use soap, stunting);
- Funds and availability to pay soap (though it is cheap especially when compared to a visit to the clinic);
- Traditional lifestyle with close interaction of human and animals;
- WASH sector has lacked focus and resources to address sanitation and hygiene behaviour.

## 2.4 Faecal-oral route

As described in the sections above, the correlation between safe sanitation and health outcomes is well documented. The following figure is key to understand the main transmission routes, which lead to diarrhoea and several other enteric diseases and the barriers. The means of transmission are always one or several of the following:

- Fluids
- Fingers
- Flies
- Fields
- Food.

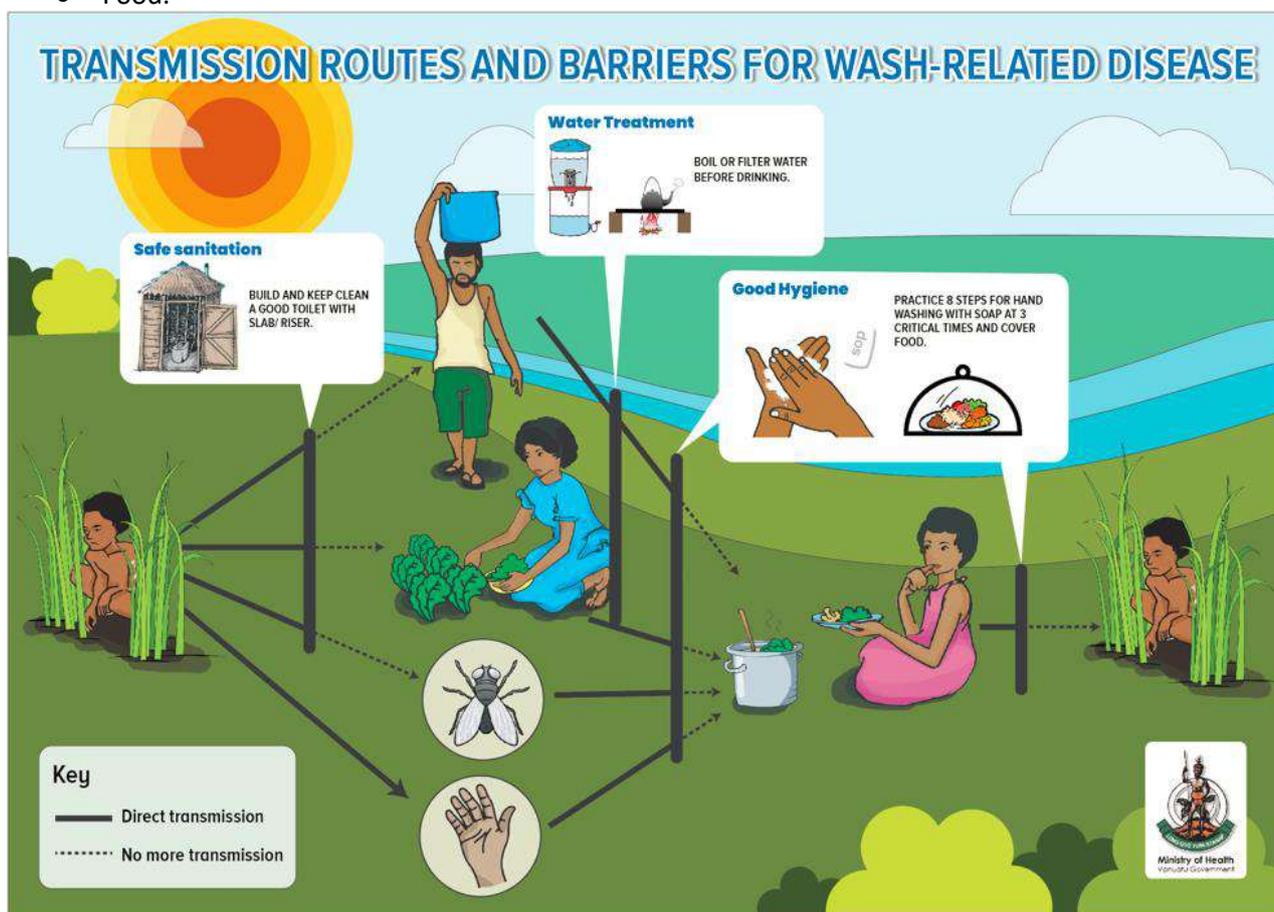


Figure 4: The Fecal-Oral route

The transmission routes can effectively be blocked with the following interventions:

- Safe sanitation
- Clean water supply such as water treatment
- Good hygiene practices, in particular handwashing with soap.

Washing hands with soap and water after going to the toilet and before eating is the MOST important hygiene action for healthy villages. Soap is cheap and is the best investment that households can make to improve health and protect members (especially children) from illness.

It must be noted that animal faeces are difficult to contain. Livestock may be fenced off but dogs, cats and rodents generally are not. Their faeces are a risk to human health as well, but are not the main focus of these guidelines. Washing hands with soap and food hygiene practices will nevertheless help reduce risks posed by this environmental contamination.

## 2.5 Menstrual Health and Hygiene Management

Absence of adequate Menstrual Health and Hygiene Management (MHMM) facilities at home, school, health facility or workplace, will pose significant restrictions to women and adolescent girls during the menstruation period. School attendance in particular drops, resulting in missed education and potential opportunities further on in life as a result (the Burnett Institute, 2017).

Key principals for MHMM facilities are as follows:

### Minimum principles for Menstrual Hygiene Management Facilities:

- Provide **privacy** for changing materials and for washing the body with soap and water.
- Provide **access to water and soap** in a place that provides an adequate level of privacy for washing stains from clothes and reusable menstrual materials.
- Provide **access to disposal facilities** for used menstrual materials (from collection point to final disposal).
- Have a **hook or shelf** inside the room to place/hang clothes on;
- Has a **mirror** in the shower/wash area so users can check themselves.

**Annex 1** provides a poster with key points of best practice MHMM management and behaviour. All WASH actors should provide these minimum standards in new WASH programs.

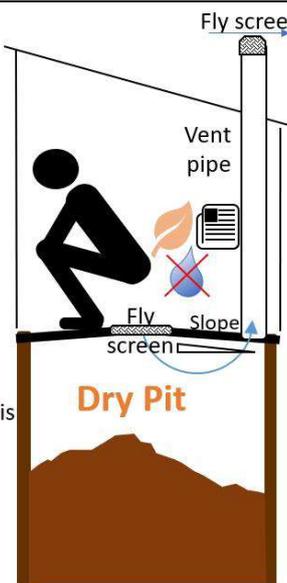
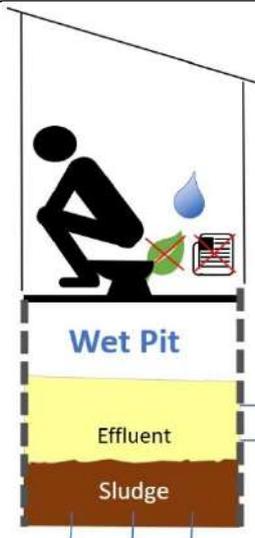
Disposable sanitary pads usually contain plastic which does not break down well. Ideally in rural areas, they should be burned in a shallow pit in the ground or buried with the solid waste in a pit. For wet systems, disposable sanitary pads **should never be thrown in any toilet**, as they will block the pipe.

## SANITATION

### 3.1 Different toilet types

Sanitation options approved in Vanuatu come in two main categories: wet and dry. Dry toilets and wet toilets are very different in how they function and how they must be used/operated.

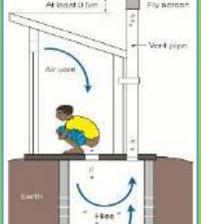
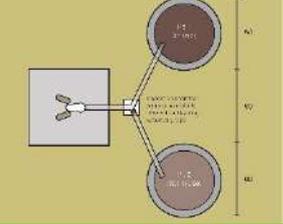
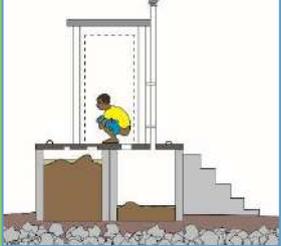
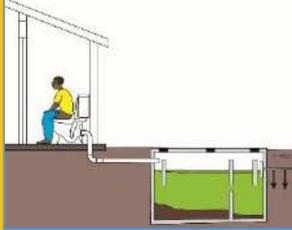
The picture below summarises the main differences, the main one being that **dry pits shall minimise the moisture** in the pit, while **wet pits shall need a reliable water supply to function**.

| DRY TOILET<br>(avoid water in the pit – keep dry!)                                 |   | WET TOILET<br>(needs a reliable water source for flushing – no water, do not chose a wet toilet!)  |
|--|---|--|
|  | <p><b>ANAL CLEANSING</b></p> <p>You can use:<br/>Toilet paper, newspaper, tissues, stones, leaves etc.</p> <p><u>Do NOT use:</u><br/>water</p> <p>Must be kept dry. Add ashes, dry leaves, sawdust to dry out more.</p> <p>Do not use where groundwater table is high</p> <p>When the pit is full, cover it up and dig a new pit.</p> <p>The pit content <b>may be safe</b></p> | <p><b>ANAL CLEANSING</b></p> <p>You can use:<br/>Water, toilet paper, tissues.</p> <p><u>Do NOT use:</u><br/>newspaper, stones, leaves, hygiene pads</p> <p><b>ENVIRONMENT</b></p> <p>Do not use where groundwater table is high OR if water supply is not reliable.</p> <p><b>SLUDGE MANAGEMENT</b></p> <p>When the pit is full, pump the content out and deposit in a safe place.</p> <p>Content is <b>NOT safe</b>.</p> |
|  | <b>ENVIRONMENT</b>  |    |

Dry and Wet system toilet types are summarised below and described further in [Annex 2](#).

**IMPORTANT NOTE:** This guideline includes recommendations about how to improve an existing bush toilet; however, the Ministry of Health recommends investing in a VIP toilet as soon as the household can afford the cost of materials, as described in [Appendix 2](#).

Table 1: Recommended toilets for RURAL settings

| DRY SANITATION  | <b>MUST KEEP THE PIT CONTENT DRY</b>   | WET SANITATION   | <b>NEEDS WATER TO FLUSH</b>   |
|---|--|--|---|
|    | <p><b>IMPROVED BUSH TOILET:</b></p> <ul style="list-style-type: none"> <li>- Cheap, as it uses locally available materials, but;</li> <li>- More difficult to keep clean (no slab);</li> <li>- Need to dig a new pit and replace toilet house once full;</li> <li>- Can use many materials for wiping the behind;</li> </ul>       |    | <p><b>POUR-FLUSH</b> (direct above pit):</p> <ul style="list-style-type: none"> <li>- Simplest common option for wet sanitation using less water and with fewer components that could break, but;</li> <li>- You need water to flush at all times;</li> <li>- Must use toilet paper;</li> <li>- Must dig new pit when full.</li> </ul>  |
|   | <p><b>VIP TOILET</b> (has a ventilation pipe):</p> <ul style="list-style-type: none"> <li>- Ventilation pipe improves airflow, thus drying the waste in the pit faster for less smell and therefore fewer flies, but;</li> <li>- A bit more expensive than pit latrine;</li> <li>- Need space to dig new pit when full;</li> </ul> |   | <p><b>TWIN-OFFSET FLUSH</b> (2 pits outside of the toilet house):</p> <ul style="list-style-type: none"> <li>- Permanent structure – no need to dig new pit: change to empty pit once first is full), but;</li> <li>- Expensive;</li> <li>- Needs water to flush;</li> <li>- Needs toilet paper;</li> </ul>                             |
|  | <p><b>COMPOST TOILET:</b></p> <ul style="list-style-type: none"> <li>- Seals off waste from the environment – good for fragile environments;</li> <li>- Permanent structure: no need to dig new pit and relocate;</li> <li>- Very expensive;</li> <li>- Needs good skills to build;</li> </ul>                                     |  | <p><b>SEPTIC TANK:</b></p> <ul style="list-style-type: none"> <li>- Permanent structure – no need to dig new pit each time;</li> <li>- Can use for grey water as well, but;</li> <li>- <b>MUST HAVE ACCESS TO PUMP-OUT SERVICE TO SAFELY REMOVE CONTENT*</b>;</li> <li>- Need water to flush;</li> <li>- Needs toilet paper.</li> </ul> |

\* Pump out services for septic tanks are only available for Port Vila and Luganville. Manual emptying puts operator at risk. Septic tanks should therefore only be used by those with access to pump-out services, leaving most rural villages out.

It is useful to emphasize the suitability of the most common types for rural Vanuatu. The table above should be read with the following colour key:

|   |  |  |   |
|---|--|--|---|
| <p>Steps for households who may not be able to afford a 'green' system in the short-term.</p> |  | <p>Recommended toilet systems in rural communities</p> | <p>Not recommended in rural communities (lack of septic pumping services)</p> |
|---|--|--|---|

### 3.2 Sanitation principles and performance standards

Performance standards are brief statements that describe the sanitation facilities outputs that agencies should aim at achieving and maintaining. They are based on the principle that everyone has the right to access good sanitation and hygiene facilities to have a healthy life in a safe environment.

The type of toilet may depend on household's budget available and/or technical suitability for a particular location or situation; however, whichever type of toilet, it must at least have the following 8 minimum performance standards:

Contact with the excreta must be prevented, by people and animals such as flies, rats and cockroaches. This means:

1. No holes in the floor;
2. No holes in the side of pit;
3. Must have a lid or fly mesh on toilet hole;
4. Should not pollute a nearby water source;
5. A strong floor that can be kept clean easily;
6. A toilet house that provides safety and privacy for the user – including being able to cater for adequate Menstrual Health and Hygiene practices;
7. The path to the toilet can be used by everyone - including disabled, children, elderly and pregnant women;
8. Has a handwashing station with water and soap within 3m of the toilet.

In addition, the minimum performance standards for hand-washing facilities are:

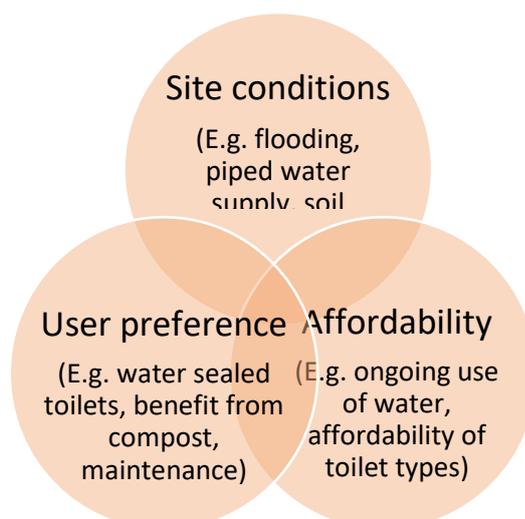
A hand-washing facility shall include:

- A shelf/device to hold the soap
- A soak away system to avoid ponding of wastewater that will allow mosquitos to breed.

**Annex 2** includes a Poster – **Minimum Sanitation and Hygiene standards** - to promote these standards in the field.

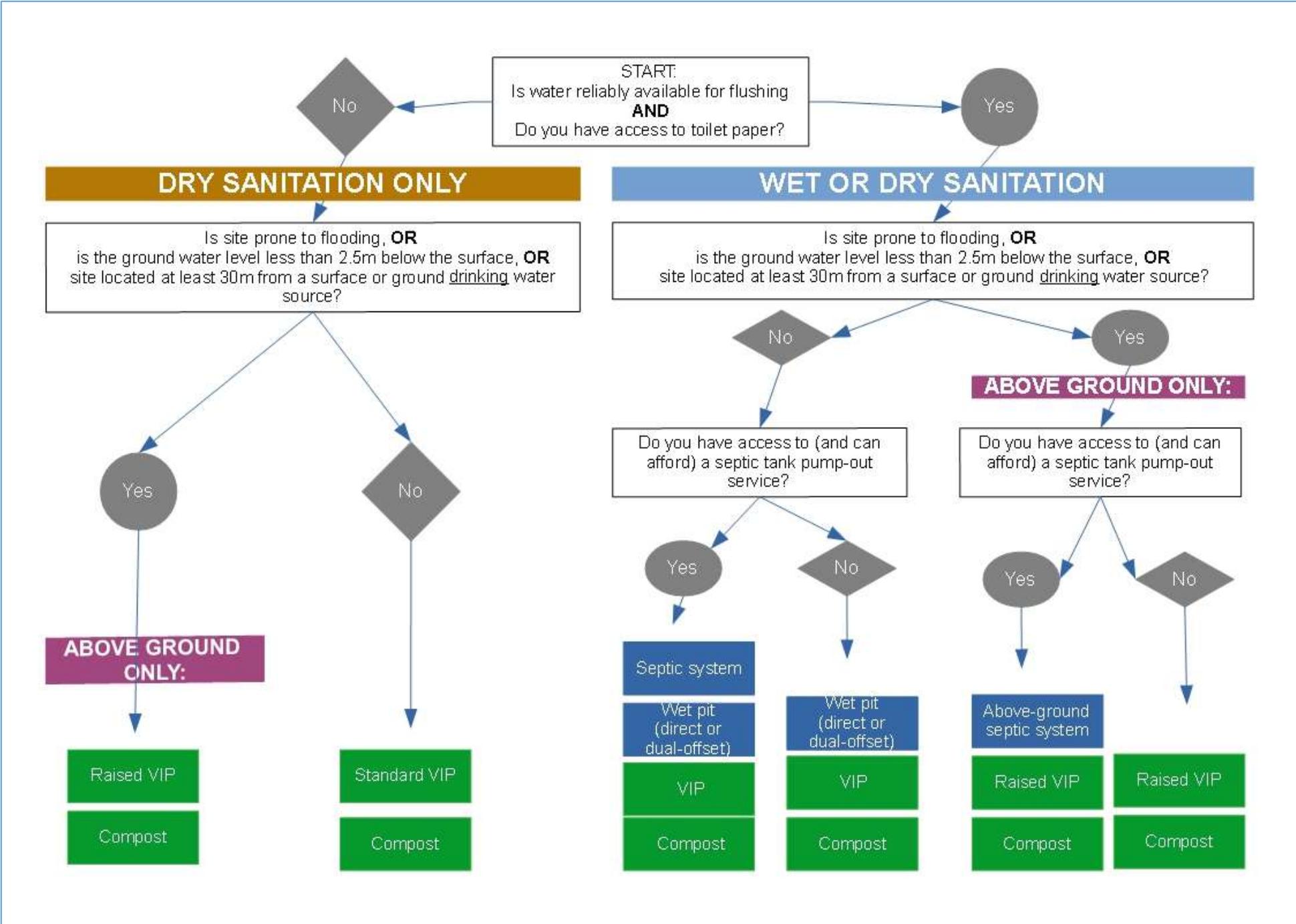
### 3.3 Toilet selection guide

The toilet selection guide was decomposed into three sets of questions for community members or implementing partners to answer in order to select an appropriate type for the household: Site conditions, user preference and affordability, as shown in the figure below.



Toilet selection starts with the question: ***do I have a reliable water supply for flushing AND do I have access (and can afford) toilet paper?*** Note that rainwater is NOT a reliable water supply.

If the answer is yes, then one may select a wet toilet but does not necessarily have to – cost, convenience, space, preference etc. may affect the toilet type selection to what best suits the user, including dry options.



**Annex 2** provides further technical documentation including:

- An overview of all the toilet types
- Guidelines to improve an existing dry or wet toilet system
- Design guides for each toilet type
- Design examples for each toilet type
- Construction guide

**Annex 2** also provides samples of **toilet systems designs**, based on the **Minimum Design Criteria**, that describe the quantities and qualities expected from donor- or government-funded sanitation interventions. They are derived from the international practice, particularly WHO recommendations (WHO, 2018b), and existing manuals and handbooks developed nationally such as the Vanuatu Building Code and regionally such as the Clean Community manual (Live and Learn, 2011), Korosan guidelines in Fiji (NIWA, 2017), Solomon Islands sanitation guidelines (SI Rural water supply and hygiene program, 2018). They were discussed further and tested by Vanuatu stakeholders to reflect the specific country conditions.

As discussed in the **Chapter 4** of this document, compliance will be following the design principles and minimum performance standard, whereas the standard drawings are only provided for guidance.

### 3.5 Operation and maintenance

Operation and maintenance requirements will depend on the type of toilet system. Main requirements for dry systems are:

#### DRY SYSTEMS



Figure 5: Dry pit operation & maintenance

It is essential that moisture ingress is minimised and that airflow/ventilation is maximised in order to keep the pit content as dry as possible. Where practical/acceptable, urination in the toilet should be avoided.

Other recommendations, such as: promoting ventilation, reducing flies by using mesh, cleaning practices for wet and dry toilets (sweeping vs washing), maintaining privacy, accessibility are available in **Annex 3**. Information on safe decommissioning is also available in **Annex 3**.

## **WET SYSTEMS**

The above operation requirements for dry systems apply for wet system as well, but in addition only toilet paper should be used:



*Figure 6: Use only toilet paper in water sealed toilets*

Fats, oils and grease should not go in wet pits, nor should they receive water from showers and kitchens etc.. In dense silty soils (soils through which water moves slowly), water use should be minimised (using pour-flush rather than cistern flush).

**Water must be available at all times for the toilet to operate!**

If a septic tank is installed, safety protocols for emptying are provided in [Annex 4](#).

## 4 MONITORING AND COMPLIANCE

It is important for NGOs and construction businesses to be aware of the compliance pathways for implementing these guidelines:

For private sector or NGOs implementing project, agencies must either:

- 1) follow the approved drawings in **Annex 6**, or
- 2) develop a 'designed solution' where the designer must comply with the minimum performance standards and principles in the **section 3.2** above.

Non-compliance will have to be justified and approved by the Environmental Health team of the Department of Public Health. Within this Department, the Sanitarians have the responsibility to enforce compliance. They are responsible for coordinating the overall implementation of the Public Health Act.

The following indicators are used by MoH's teams to help tracking progress:

- **Indicator 1** – Hygiene and Sanitation promotion campaigns should focus on the use of soap for washing hands.
- **Indicator 2** - Hygiene and Sanitation promotion campaigns should promote households to upgrade or build their own toilets according to one of the approved toilet types in **section 3.1** above.
- **Indicator 3** – All existing sanitation system should have the following 8 minimum requirements, described in the **section 3.2** above.
- **Indicator 4** - All sanitation systems should score “Unchanged” in the sanitary inspection forms in the **Annex 4**.
- **Indicator 5** - An operational and maintenance poster such as the one on ‘How to use a toilet’ in **Annex 3** is printed and hung behind a newly constructed toilet door.
- **Indicator 6** - Any NGOs or contractor of larger projects shall get approval of their design from Provincial EH Officer and the Provincial Technical Advisory Committee. It can be noted that households upgrading their own toilets are not required to get this approval.

The monitoring of Sanitation and Hygiene indicators shall employ the three following approaches:

- Ad hoc inspections of sanitation implementers and sanitation facilities
- Annual collection and recording of partners’ interventions’ outputs
- Scheduled (5 yearly) sanitation and hygiene national survey.

For rural households, monitoring and compliance will be a joint responsibility of the Village Council (through village rules regarding sanitation & hygiene) and provincial officers utilising these guidelines and their provincial sanitation & hygiene bylaws (once the latter are available).

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## **ANNEX 1: HYGIENE MESSAGING**

TOOL 1.1: KEY HYGIENE MESSAGES

TOOL 1.2: MENSTRUAL HEALTH AND HYGIENE FACILITIES AND MANAGEMENT IN PRACTICE

TOOL 1.3: POSTERS AND MATERIAL REGARDING HYGIENE PROMOTION

## Introduction:

This annex contains tools for WASH actors to support hygiene promotion programming including: Key Hygiene Promotion Messages, Menstrual Health and Hygiene Facilities and Management in practice, Posters and other IEC materials to be used in information dissemination with community groups.

### Tool 1.1 – Key hygiene promotion messages

Specific key messages recommended to practitioners to assist their hygiene promotion work in communities are described in the box below.

#### GOOD HYGIENIC PRACTICES

1) Soap is cheap and is the best investment that households can make to improve health and protect members (especially children) from illness. Alternatives such as lemon and ash are not as efficient to kill bacteria.

2) The 3 key times to wash hands **with soap** to stop spreading germs in the community are:

- after going to the toilet
- before eating
- before preparing food.

If you are a parent, there are 2 additional key times:

- after cleaning baby's bottom
- before feeding the baby.

3) Washing the face **with clean hands** in daily routine is critical to prevent trachoma, an eye infection affecting the inner surface of the eyelids, which can eventually lead to blindness.

4) Fencing off animals is key to prevent worm transmission from animals to humans.

5) The F-diagram (available in **chapter 2.4** of these guidelines) also highlights that washing food prior to eating, safe storage of food and safe storage of water will reduce the transmission of faecal contamination from faeces to mouth.

#### GOOD SANITATION PRACTICES

5) Always use a toilet to defecate.

6) A toilet is not a toilet without:

- a handwashing facility, with soap and good drainage, placed on the way between the toilet and the house.

7) Babies' faeces are as contaminated as adults' with germs:

- If found on the ground, dispose of babies' faeces into the toilet
- If using disposable nappies: Put nappies into the rubbish collection point or in a safe rubbish place to be buried or burnt, if there is no rubbish collection system
- If using washable nappies: Dispose of babies' stools into the toilet, then wash appropriately with soap and water then safely dispose of the wash water.

8) Keep the toilet riser and slab clean at all times using soap and water to avoid spreading germs, but do not place any chemicals in the toilet. Chemicals used for cleaning full flush toilets with septic should say: "safe for septic".

9) Use dry leaves only and add regularly fire ash will help keep dry a dry toilet system which is key to avoid bad smells (refer to **Annex 3** of the guidelines for further information and operation tips on dry and flush toilets)

10) Toilets should be convenient to use for all users. **Consider the following recommendations for your household:**

- Put a bin with a lid in the toilet house to safely dispose sanitary pads or tampons. Dispose in a safe rubbish place to be buried or burnt if there is no rubbish collection.
- Consider having a private tap for washing menstrual hygiene cloth.
- Consider design improvements to cater for people with disabilities.

*Tool 1.2 – Menstrual Health and Hygiene Facilities and Management in practice*

Here are some examples of applications of the minimum principles for MHH facilities in practice:

- 1) Privacy;
- 2) Access to water and soap;
- 3) Access to solid waste disposal facilities for used menstrual materials;
- 4) A hook or shelf, and
- 5) A mirror:

|  |  |   |
|--|--|---|
|  |  |   |
| <p>Bin with lid. Source: <a href="https://conflictandhealth.biomedcentral.com/articles/10.1186/s13031-021-00346-9">https://conflictandhealth.biomedcentral.com/articles/10.1186/s13031-021-00346-9</a></p> | <p>Water inside the toilet for washing hands and pads. Source: <a href="https://ewb.org.au/blog/2020/02/10/work-on-water-guidelines-in-vanuatu/">https://ewb.org.au/blog/2020/02/10/work-on-water-guidelines-in-vanuatu/</a></p> | <p>Good door for privacy. Source: <a href="https://ewb.org.au/blog/2019/11/19/how-demonstration-toilets-inform-the-socialisation-of-vanuatous-sanitation-and-hygiene-guidelines/">https://ewb.org.au/blog/2019/11/19/how-demonstration-toilets-inform-the-socialisation-of-vanuatous-sanitation-and-hygiene-guidelines/</a></p> |

The following posters may help you explain best practices for menstrual health and hygiene to households in a village. They can be found at: <https://mol.gov.vu/index.php/en/advocate-awareness>



*Tool 1.3 - Selection of Hygiene Promotion posters and material*

This tool summarises below some of the main existing health and hygiene posters and materials with associated references available online.

The following documentation sources are approved and in use in Vanuatu:

| Preview   | Description                                | Languages available   | URL   |
|---|--|---|---|
|    | Face and Hand Washing Poster (A3 or A4)    |    | <a href="https://www.applesandpears.nz/Portals/0/Vanuatu%20Hand%20Washing.pdf?ver=2020-03-25-185836-640">https://www.applesandpears.nz/Portals/0/Vanuatu%20Hand%20Washing.pdf?ver=2020-03-25-185836-640</a> |
|   | Hand Washing Poster (A3 or A4)             |    | <a href="https://bit.ly/3hnXK1r">https://bit.ly/3hnXK1r</a>   |
|  | What Time to Wash Hands? Poster (A3 or A4) |  | <a href="https://mol.gov.vu/images/News-Photo/water/DoWR_File/Monitoring_Evaluation/WASH-Posters.pdf">https://mol.gov.vu/images/News-Photo/water/DoWR_File/Monitoring_Evaluation/WASH-Posters.pdf</a>       |
|  | Menstrual Hygiene Poster (A3 or A4)        |  | <a href="https://bit.ly/2S4whrc">https://bit.ly/2S4whrc</a>   |

|  |  |  |  |
|--|--|--|--|
|  | <p>You Must Drink Clean Water Poster (A3 or A4)</p>              |  | <p><a href="https://mol.gov.vu/images/News-Photo/water/DoWR_File/Monitoring_Evaluation/WASH-Posters.pdf">https://mol.gov.vu/images/News-Photo/water/DoWR_File/Monitoring_Evaluation/WASH-Posters.pdf</a></p> |
|  | <p>Point of Use Water Treatment Poster – ceramic filter (A4)</p> |  | <p>TBC</p>   |
|  | <p>Point of Use Water Treatment Poster – SODIS (A4)</p>          |  | <p>TBC</p>   |
|  | <p>Point of Use Water Treatment Poster – chlorine (A4)</p>       |  | <p>TBC</p>   |
|  | <p>Point of Use Water Treatment Poster – boiling water (A4)</p>  |  | <p>TBC</p>   |
|  | <p>Why WASH?</p>   |  | <p>TBC</p>   |
|  | <p>No westem wota!</p>   |  | <p>TBC</p>   |

|   |  |   |  |
|---|--|---|--|
|    | <p>Right and wrong ways to use the toilet – poster (A4)</p>                        |    | <p><a href="https://bit.ly/35T8MrA">https://bit.ly/35T8MrA</a></p>   |
|    | <p>Rap blong WASH</p>  |    | <p><a href="https://www.youtube.com/watch?v=zp-NrHvnotE">https://www.youtube.com/watch?v=zp-NrHvnotE</a></p>   |
|    | <p>Water purification tablets poster (A4)</p>                                      |    | <p><a href="https://drive.google.com/file/d/1W1YGEi8OqH2E9Gn67Ur463mL2XW8zOv/view">https://drive.google.com/file/d/1W1YGEi8OqH2E9Gn67Ur463mL2XW8zOv/view</a></p> |
|   | <p>General toilet maintenance (A4)</p>   |  | <p><a href="https://drive.google.com/file/d/1UrJhKuMX9z7URCFJcpy10uZevbaqdM/view">https://drive.google.com/file/d/1UrJhKuMX9z7URCFJcpy10uZevbaqdM/view</a></p>   |
|  | <p>Kipim bebe blong yu i seif!<br/>Baby sanitation practices poster (A3 or A4)</p> |  | <p><a href="https://mol.gov.vu/attachments/article/661/BabyPoohPosterUrban.pdf">https://mol.gov.vu/attachments/article/661/BabyPoohPosterUrban.pdf</a></p>       |

Other key references are:

- Healthy Islands IEC Package – 3<sup>rd</sup> edition (available in March 2019)
- Vanuatu Village Health Worker Program Aid Post Manual (April 2017)
- WHO Guidelines for Sanitation and Hygiene (Oct 2018)
- Live and Learn’s Clean Community Manual (2011) and new hygiene promotion materials based on nudges identification (2019).

It is advised that all stakeholders should consult the website of the Department of Water Resources: <https://mol.gov.vu/index.php/en/advocate-awareness> for additional health and hygiene resources approved by the Ministry of Health, not available at the time of the publication of this guidelines.

The following posters may help you explain the importance of hygiene to households in a village:

WAN PLES BLONG WASEM HAN, WETEM SOP MO WAN GUD DRENEJ

SAMFALA EXAMPOL  
LO PLES BLO WASEM HAN



Kontena wetem tap



Bamboo tipi tap



Tap long oilfala dram



Wan paep blong wota we i stanap.

Ples blong waseh han  
hemi isi blong luk afta  
we yu yusum toelet



Pit blong toti wota

## WASH Behaviors to prevent NTDs



Wash hands with water and soap



Boil/filter water before drinking or bathing



Use a latrine



Wash your face



Wash/peel/cook vegetables and fruit



Wash affected limbs



These behaviours protect against



Schistosomiasis



Trachoma



Lymphatic Filariasis



Podoconiosis



Soil-transmitted helminths

Reference: WHO / Neglected Tropical Unit

## ANNEX 2: TOILET & HANDWASHING FACILITIES



GUIDE TO BUILDING A GOOD TOILET AND HANDWASHING FACILITY

Tool 2.1 – Information about various toilet systems

Tool 2.2: Toilet improvement instructions for existing toilet

Tool 2.3: Design guides for new toilet

Tool 2.4 – Construction guide and specifications

## Introduction:

This annex contains tools for WASH actors to implement sanitation programming such as guides for designing and constructing good toilet and handwashing facilities. It includes the breakdown of technologies following dry versus wet technologies and provides guidance for upgrading a bush toilet if the household is not able to reach the minimum requirement in the short term.

## Tool 2.1 – Details about approved toilet systems

The following section provides an overview of all the toilet types that are recommended by Ministry of Health for implementation in rural areas, as summarised in the [chapter 3.1](#) of the main document of the guidelines. They are broken down into dry systems not requiring water for functioning versus wet system.

Field practitioners will find information regarding conditions where every system can be applied (e.g., no reliable source of water for flushing) and where it cannot (e.g., high ground water or risk of inundation); what is needed (e.g., land to move the superstructure when full) and what is not needed (e.g., Budget considerations).

## DRY SYSTEMS

### Main dry system recommended: VIP Toilet

**Description:** VIP stands for Ventilated Improved Pit, and is comprised of a pit to collect and store waste and a ventilation pipe to promote airflow through the pit. The pit is fully or partially lined, with a slab placed over the pit and a seat riser positioned directly above the pit. A superstructure is placed over the slab and seat riser to enclose this system. A vent pipe located outside the structure extending above the roofline provides ventilation to the pit below ground and functions as a fly trap.

This system relies on flow of air through the seat riser and out via the vent pipe to control odour. Insect netting is fitted to the top of the vent pipe to prevent flies from exiting the pit and spreading contamination. According with the users' preferences the base slab could support the toilet seat riser as show in the figure 1 or a squat plate (See [Tool 2.3: Design Guides](#) for details).

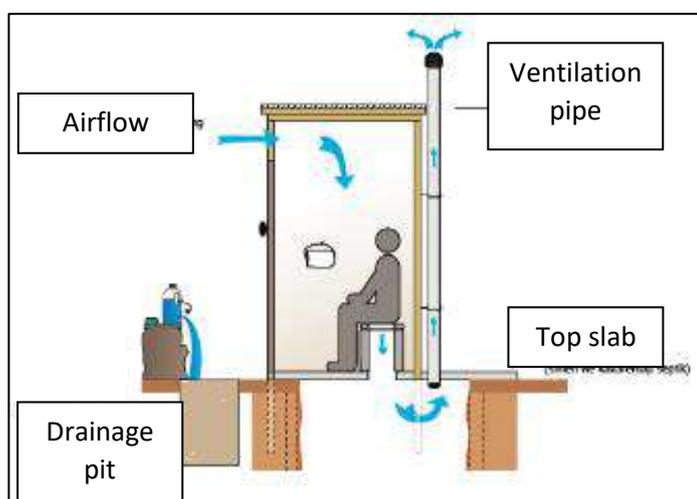


Figure 7: VIP latrine and function schematic

### Dry variation #1: Raised VIP

VIP toilets can be raised or have a shallow pit to suit rocky grounds or high groundwater tables as is presented in the figures below (ie. where the bottom of the pit is less than 1.5m above ground water).



Figure 8: Raised toilet (source: Solomon Islands Mekem Raet Choise brochure)

### Dry variation #2: VIP with a tap inside

Description: This system functions in the same way as the VIP toilet but includes a tap (whether piped or a bucket with a tap) and drain inside the toilet house to increase privacy for women in relation to Menstrual Hygiene Management, as well as encouraging all users to practice handwashing immediately after toilet use.

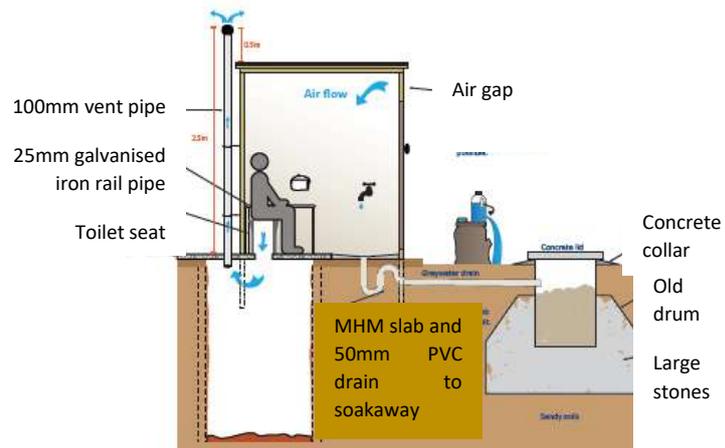
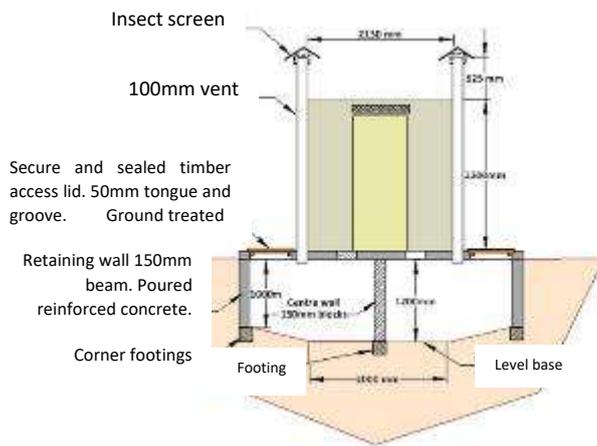


Figure 9: VIP with water inside + schematic

### Dry variation #3: Inclusive VIP toilet with dual pit

Description: This system functions in the same way as the VIP toilet with ventilation playing a key part of its functioning. It differs as it includes two separate chambers to be used in an alternate way. One chamber is “active”, meaning that it is used while the other is closed off until the first one is full. When the first chamber is full, the chambers are switched to let the content of the first chamber to decompose. After 18 months in the “passive” pit, the dry decomposed matter can be emptied in a pit and covered up or used as compost (Refer to Annex 4 for safety procedures). Given the toilet house does not have to be moved, this design is proposed to be accessible for people living with disability.



**Dry variation #4: Above ground compost chambers**

**Description:** This system functions in the same way as VIP above and only differs in that the compost chambers are located in above ground chambers or wheelie bins for easy management. This system requires urine diversions or screens to separate liquid from solid, as compared to underground versions where soil performs this separation. It is critical to have a suitable access and procedure for manual handling the waste.

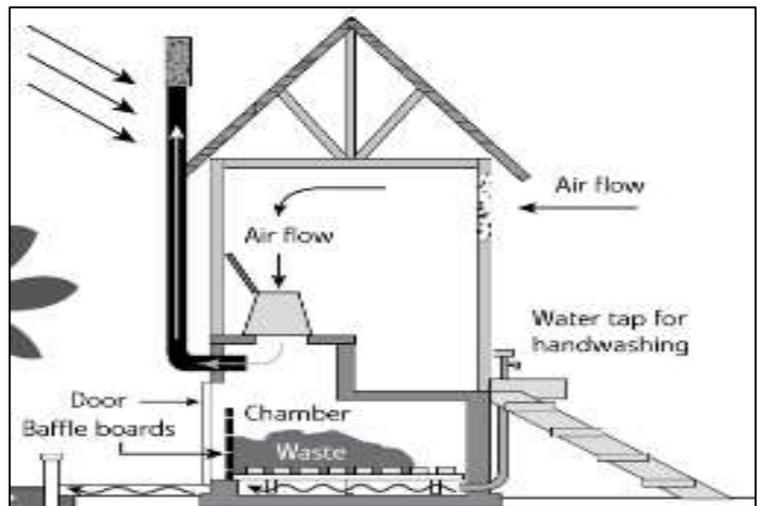


Figure 10: Compost toilet

**Dry variation #5: Portable Toilet**

**Description:** This technology was first developed in times of emergencies but is a solution to be considered for improving access to sanitation for a range of users in rural areas. It consists of a bucket fitted with a toilet seat and lid mounted on a chair with or without arm rests. The content of the bucket is to be emptied in a separate toilet facility available nearby as soon as possible. The bucket inside must have a tight lid to be removed during the use and put back after to minimise contamination chances. Also, dry natural additives, such as wood fire ash or agricultural lime can be used to minimise odours, especially if the faecal material cannot be removed straight away after the use.



Figure 11: Portable toilet examples

**WET SYSTEMS**

*Main wet system recommended: Flush toilet with direct pit*

**Description:** This system is the first of the flush toilet technologies. It can either function as a pour flush with a small amount of water (approximately 5L/use) to flush a water-sealed pan, or full flush with a cistern. The liquids in the pit are dispersed into the ground, whilst the solids remain in the pit. In this technology, the pit can is a direct pit (located under the toilet house).

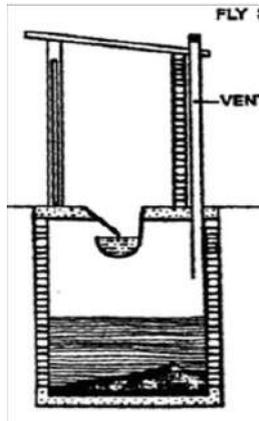


Figure 12: Flush toilet with direct pit (showing pit lining and foundation ring on the right)

*Wet variation #2: Flush toilet with dual pit*

**Description:** In this variation, the pit is offset with a pipe connecting to a pit behind the toilet, in general functioning with a dual pit.

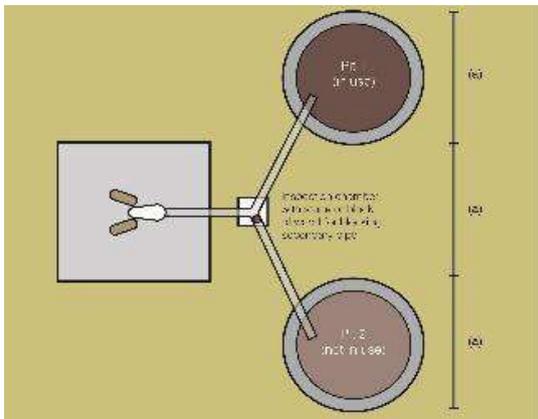


Figure 13: Dual offset pit toilet

*Wet variation #3: Flush toilet with septic tank*

**Description:** A flush toilet (or button flush) typically has a plumbed water supply and a button to flush water (or is manually pour flushed) into a septic tank in line with a soakaway trench to process and dispose of wastewater produced. If technically feasible, the advantage of a household in a rural village upgrading to a septic tank is that they would be able to discharge grey water (FOGs & detergents) to the same receptacle.

**IMPORTANT NOTE:** This option should not be considered where there is no access for a septic tank pumping service or truck.

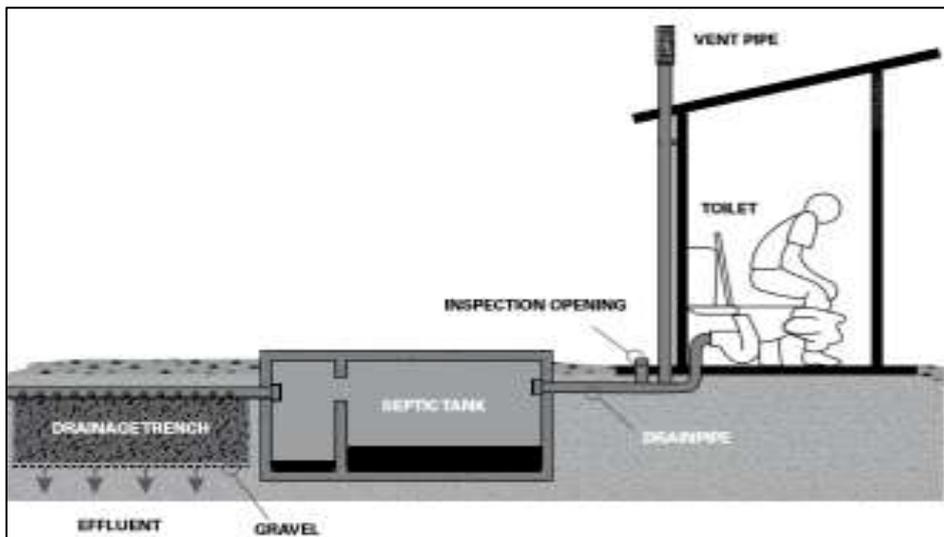
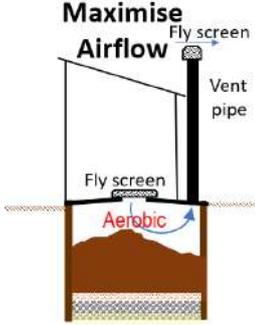
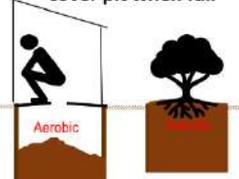


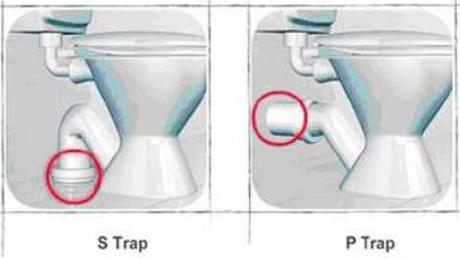
Figure 14: Toilet with septic tank and drainage trench

## Tool 2.2 –Toilet improvement instructions for existing bush toilets

### Improving a dry toilet system

|   |   |
|---|---|
| <p>1. <i>Block flies and rats from entering pit.</i></p> <ul style="list-style-type: none"> <li>● Make sure that there are no gaps in the toilet floor or where the floor joins the pit. Use mud, clay, sand, coral or concrete to fill any holes or gaps in the timber platform or slab.</li> <li>● Cover the toilet hole with a solid or fly mesh cover to stop flies from going in and out of the pit (contacting the excreta in the pit).</li> <li>● If there is a vent pipe, make sure that there is fly mesh covering the end.</li> </ul> | <p><b>Maximise Airflow</b></p>                                 |
| <p>2. <i>Minimise moisture in pit</i></p> <ul style="list-style-type: none"> <li>● Make sure that the surface water can't flow into the toilet pit. <ul style="list-style-type: none"> <li>○ Raise height of toilet</li> <li>○ Repair holes in roof</li> </ul> </li> <li>● Don't wash out the toilet house (sweep out only)</li> <li>● The toilet floor should slope down away from the toilet hole</li> <li>● Build separate urinals</li> </ul>  | <p><b>Minimise Moisture</b></p>                               |
| <p>3. <i>Maximise air flow to manage odours</i></p> <ul style="list-style-type: none"> <li>● Install a vent pipe (big bamboo or large (at least 100mm) PVC pipe with a fly net on one end.</li> <li>● Layer materials (like stones, coral, etc) at the bottom of the pit to separate liquids and solids.</li> <li>● Periodically layer dry leaves or ash or lime or wood chips or saw dust or coconut husks in the pit</li> <li>● Don't use chemicals to clean the slab</li> </ul>  | <p><b>Manage Odours</b></p>                                  |
| <p>4. <i>Cover when full</i></p> <ul style="list-style-type: none"> <li>● Dig a new pit</li> <li>● Move the toilet house</li> <li>● Cover the old pit with soil</li> <li>● Plant a tree on top of the old pit!</li> </ul>   | <p><b>Move superstructure &amp; cover pit when full</b></p>  |

Improving a wet toilet system

|   |   |
|---|---|
| <p><b>1. Need a reliable water supply for flushing</b></p> <ul style="list-style-type: none"><li>a. Rainwater is not reliable as tanks are empty sometimes</li><li>b. River water or piped water only are acceptable</li></ul>  |    |
| <p><b>2. Pour flush toilets are preferred</b></p> <ul style="list-style-type: none"><li>a. They use less water</li><li>b. They are more durable (have less failures) than systems with cistern</li><li>c. The less water reduces the load on the soak-away area.</li></ul>  |    |
| <p><b>3. Toilet pan:</b></p> <ul style="list-style-type: none"><li>● P-trap pans are used for direct pit latrines (toilet house built <b>directly above</b> pit).</li><li>● S-trap pans are used for offset pit latrines (toilet house is <b>near</b> the pit and waste is piped into the pit).</li><li>● Use silicone rather than cement to fix the pan to the floor. This is still very strong and it means that the pan can be re-used in the future and it is easier to make repairs to the pipe, or inspect the pit if needed.</li></ul> |  <p style="text-align: center;">S Trap                      P Trap</p> |

### Tool 2.3 - Design guides for new toilet

Designing any type of inclusive toilet involves the following four steps. Steps 1 and 2 are similar for all types of systems and are therefore discussed in a joint section. Steps 3 and 4 are described separately for main toilet types.



#### Step 1 - Designing for users and operators

This step is to ensure the toilet is suitable for the users and operators of the toilet.

#### Women and girls

For the safety and dignity of women and girls, all toilets should be provided with a lock and a rubbish bin or bucket with lid inside the toilet to safely dispose of personal used sanitary products. Ideally in rural areas, disposable products are burned in a shallow pit in the ground and if it not possible, they can be thrown in the VIT pit. For wet systems, sanitary products **should never be thrown in any toilet**, as they will block the pipe.

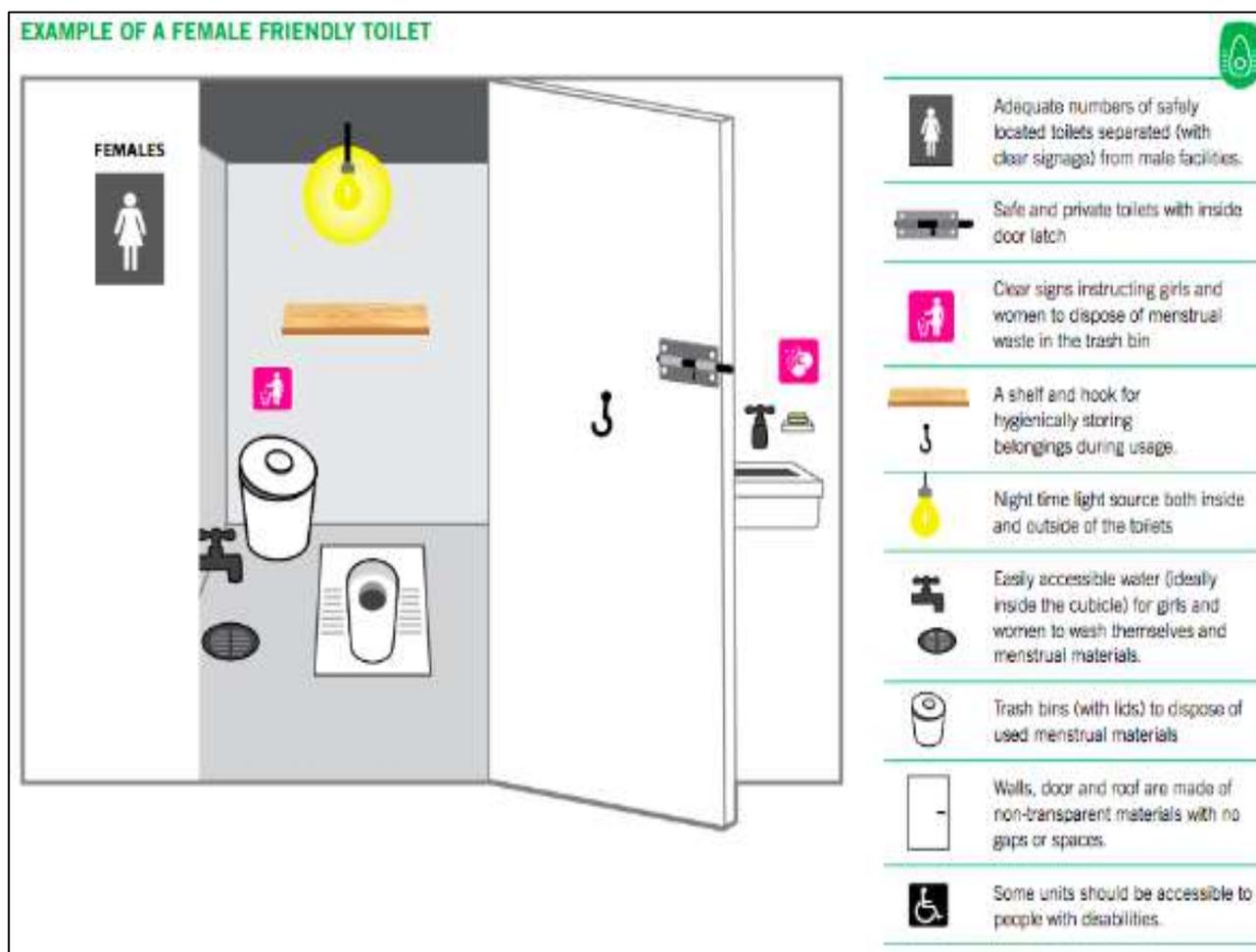


Figure 15: Female-friendly toilet design

#### People living with a disability and the elderly

If the toilet is likely to be used by people with a disability (e.g., wheelchair users, people using crutches/other walking aids), or elderly members of the family/community, then it is recommended the path leading to the toilet and the entrance is step free (e.g. without the need to climb stairs to enter). Furthermore, the addition

of handrails within close reach of the seat riser will assist elderly and people with disabilities in conveniently and safely using the toilet. The toilet description in [Tool 2.1](#) / Standard drawing SD4 in [Annex 6](#) is particularly well tailored to be accessible.

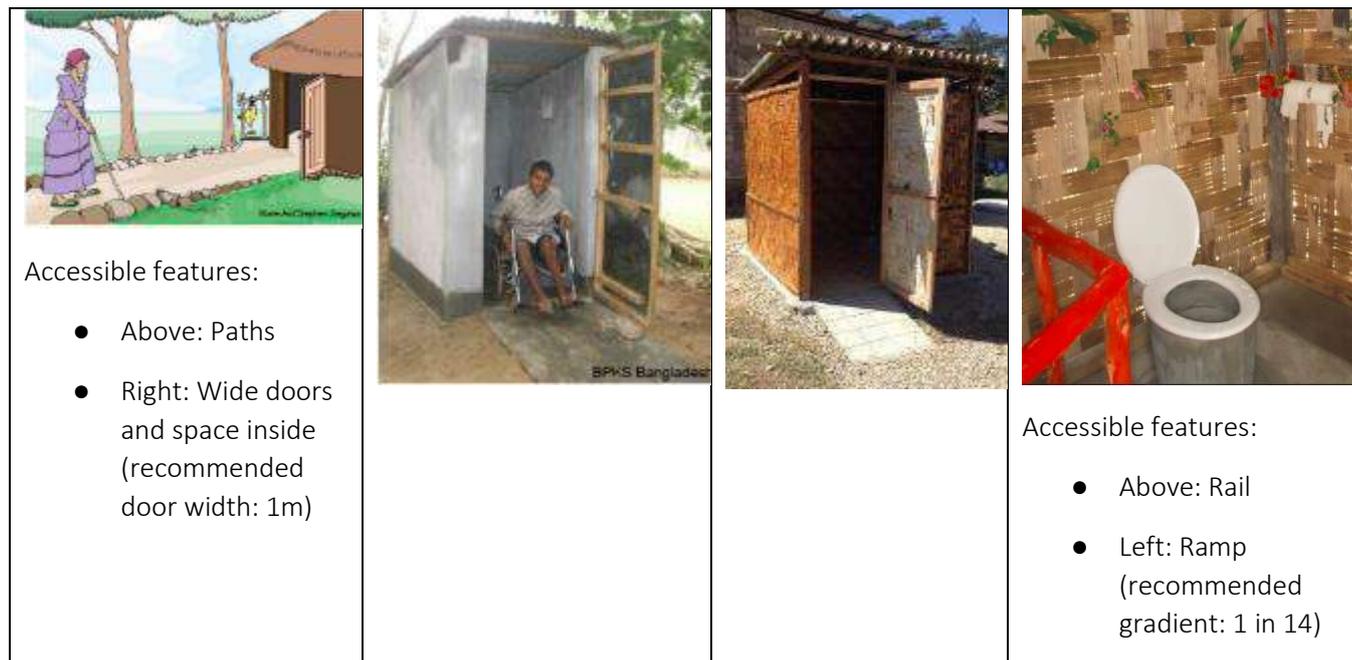


Figure 16: Inclusive design samples (Left pictures: abstracts from Hazel Jones and Jane Wilbur (2014). Right pictures: credit: Plan Timor-Leste)

Handrails can assist people who are pregnant, have disabilities, are visually impaired, or are unwell or frail to access improved sanitation facilities. Handrails should be fixed in the ground to provide the necessary support when the toilet structure is made from local materials. Assemble the pipe handrails at approx. 700mm high from the slab and push them into the wet slab or locate them in the formwork prior to pouring the slab. Support the handrails with timber, rope or other appropriate material while the slab is drying. Use off-cuts of PVC pipe to surround the galvanised pipe at the base for increased stability.

The minimal internal space recommended for the toilet accessible for people living with disability are 2.0 metres by 1.6 metres, and 1.9 metres in height to allow for additions such as handrails, and additional space to allow the user to move (e.g., with wheelchair, crutches or other walking aids). It is also recommended the average height of 800mm for the wash station and handrails to allow the space to sit down in the toilet riser and to have both hands free when washing hands.

The toilet door should open inwards rather than outwards as easier when in a wheelchair. However, if inside is too small to close door behind after entering with a wheelchair, then door must swing outwards. Door handles and closing support should be a horizontal handrail the full width of the door on the inside, what can be made with wood timber, pipe, chain or cord. To ensure privacy and safety during the use, the door locking device must be easy and accessible.

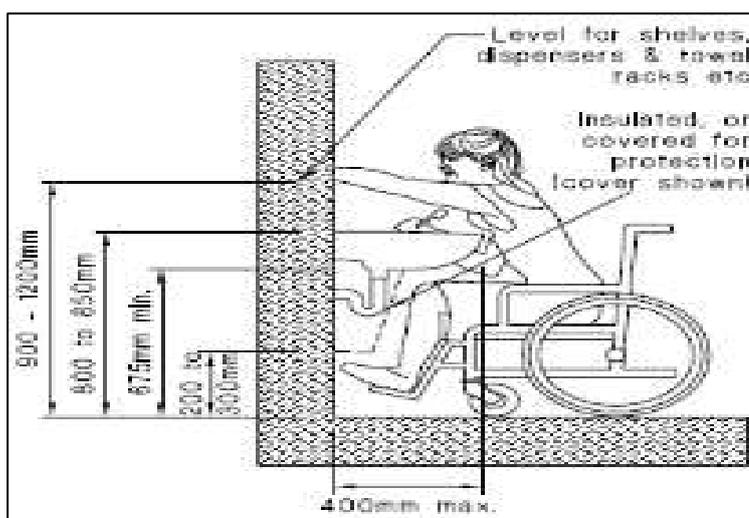


Figure 17: Basin design Accessible basin (source: NZ Department of Building and Housing, Compliance Document for New Zealand Building Code. Clause G1. Personal Hygiene – Second Edition, 2011)

If a toilet is too dark, it can make using the toilet difficult especially for the visually impaired. Dark toilets can also increase the risk of sexual violence against women and children. To ensure sufficient light if electricity is not available, it is suggested to use transparent roofing sheets or to slightly increase the superior and inferior gaps (while maintaining privacy).

At public or collective buildings, it is required to install a sign to orientate people living with disabilities towards the location where the appropriate toilet is available. When the toilet is serving health centres or hospitals, consider using larger internal dimensions as it should have enough space inside for nurse to help patients.

### Children

Toilets should be made safe and easy to use for children, whether by adjusting the height of the toilet seat or adding an aid at the riser base. Handwashing facilities should also be child-friendly.

### All users

It is important to make the toilet desirable to encourage its full usage. It could have a coral path leading to it or other adornments.

### Toilet cleaners/operators

Whether using imported or local material for the walling, it is advised to leave a small 5cm gap under the walls to make it easy to wipe off cleaning water from the surface floor of the toilet.

Consideration must also be given to the position of the toilet to any access road if the toilet type requires emptying out by a vacuum truck. In these guidelines, in the absence of a certified septic tank company, designers shall either consider the dual pit flush toilet option or contact the relevant officer from Ministry of Health to get approval of the design based on alternative sludge emptying techniques.

Refer to the **Annex 4** - Safety Protocols for further information regarding some procedures and requirements for the emptying process.

### Step 2 - Design of structure

Another step influencing greatly the cost of the toilet is deciding on the structure for the toilet. Standard designs and associated Bills of Quantities are illustrated in **Annex 6** and provide a range of structure options from local material to imported ones.

Also, the option between using the seat riser or the squat plate should be made in accordance with the cultural and/or individual comfort. The figures below show examples of simple squat slabs for dry toilets and flush toilets (Refer to **Annex 6: Standards drawings** SD1.03 for constructive details of squat keyhole slab).



*Figure 18: Sample squat slabs*

### Materials

As well as using concrete blocks, iron roofing and timber purchased from a hardware store, the use of local materials and traditional building techniques is encouraged if it makes the project more affordable. Local or minimal cost substitutes to store-bought timber and roofing are:

|   |   |   |   |
|---|---|---|---|
| <p>Natangora / vegetated walls</p>  <p>Credit: MoH Vanuatu</p> | <p>Woven bamboo</p>  <p>Credit: Plan Timor</p> | <p>Copra bags or blankets, with cement rendered to the outside</p>  <p>Credit: Care International Vanuatu</p> | <p>Second hand roofing or weather-resistant timbers</p>  <p>Credit: MoH, Vanuatu</p> |
|---|---|---|---|

Figure 5: Types of locally made toilet houses

Plans included in these sanitation guidelines show structures built with imported materials such as concrete blocks, corrugated iron and timber; however these are recommendations only. Should local materials be used, the structure will need to be adapted to suit the available materials accordingly. At minimum, the following dimensions shall be ensured for use of local materials:

- Timber post - minimal diameter: 50mm
- Wooden seat riser – plywood for sides and 2' x 2' vertical timber nailed in each corner.

#### Size

The size of the structure is to be set by the space inside for the user. The minimum internal size of the structure as shown by the included standard drawings is 1.2 metres by 1.2 metres, and 1.9 metres in height.

Ideally, to ensure people with disabilities can also use the toilet, the internal size of the structure should be increased 2.0 metres by 1.6 metres, and 1.9 metres in height to allow for additions such as handrails, and additional space to allow the user to move (e.g. with wheelchair, crutches or other walking aids).

Regarding the size of the walls, all timber frame toilets shall have a 50mm gap under the bottom plate to assist with cleaning, ventilation and natural light.

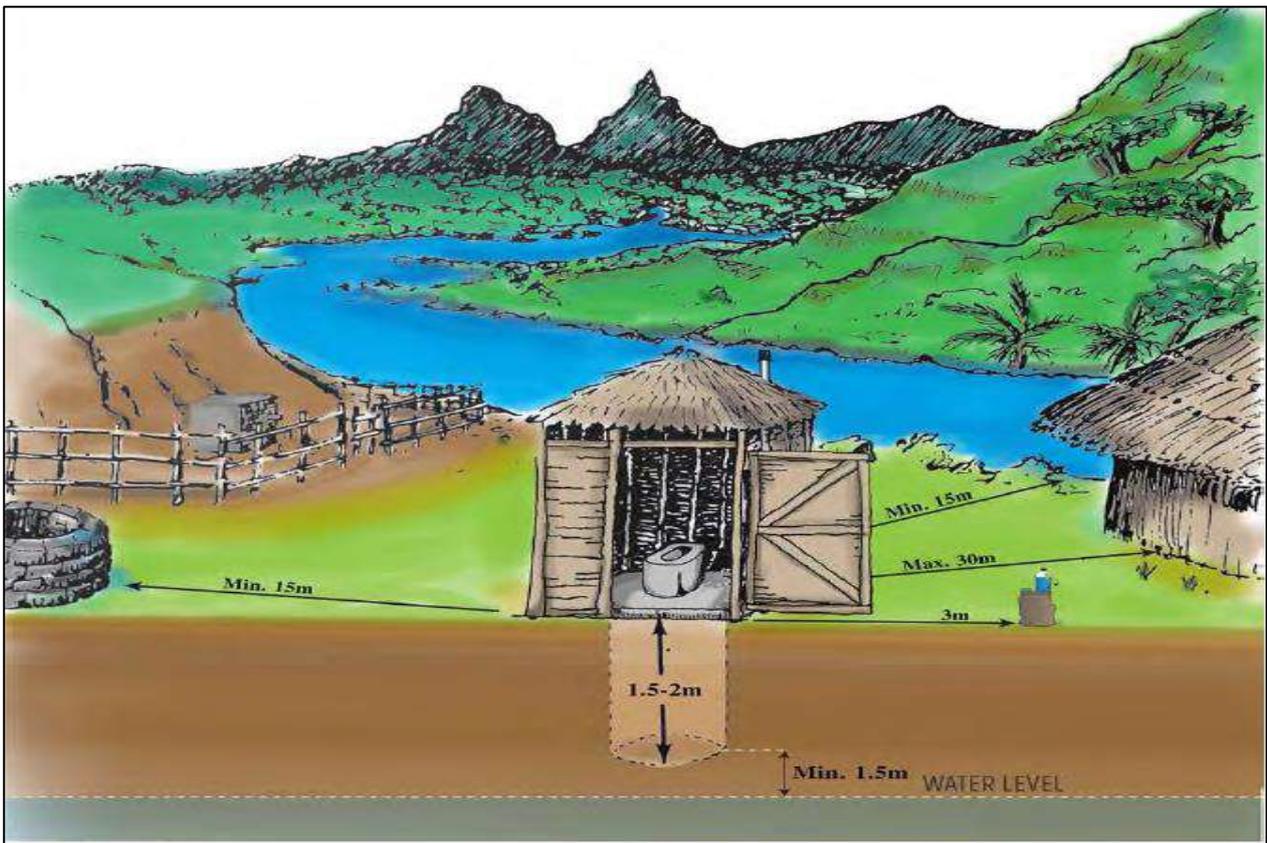
#### Access and access level

The floor level of the toilet should be as close as practically possible to the surrounding ground level, to ensure convenient access for the elderly and people with disabilities without the need for steps. Any need to raise the toilet structure to protect it from flooding risks should be adequately mitigated with small ramps and rails. The toilet can have its own structure or be located in a home or other building, if it is a flush system with a septic tank.

#### Step 3 – Choosing the location:

##### Protecting the environment and community health

It is important that the VIP toilet is safely located away from drinking water sources to avoid contamination. For this reason, the toilet should be located at least 30 metres from any rivers, wells, lakes or streams. However, the distance could decrease to 15m if the flow of groundwater is downstream from the closest water bodies. Note that for underground tanks – which are sealed off from the environment – the distance requirements are not applicable: they are not at risk of contamination from the outside. During the wet season, when the water table is high, the bottom of the pit must still be at least 2.5 meters higher than the groundwater level (WHO, 2019b; Ravenscroft and al, 2017). A VIP toilet should not be built in a location prone to flooding to prevent contamination by flood waters and must be built to avoid surface water flow to ingress in the pit.



Convenience for the users

To prevent odour from the VIP from being a nuisance, it should be located 6 metres away from a neighbouring home.

Additionally, VIPs should be located in areas with sufficient available land to be able to construct another VIP in several years’ time when the current pit is full. This is to allow time for the waste in the pit to be safe to remove before the pit can be reused again as a VIP.

Step 4 a - Design of in-ground pit:

Once a location has been chosen for the toilet, the next step is to design the pit size.

Pit Sizing

It is recommended that the pit be dug preferably round with a minimum diameter of 1m diameter or rectangle with sides of 1m x 0.8m, and ideally 2 metres in depth (deeper pits may lead to safety risks, ie. excavation collapsing or excessive costs for excavation shoring). The volume shall not be less than 1000 litres in volume or the pit depth be less than 1.5m. The below table provides an estimation of the life of the pit depending on the depth.

For a household of five people (time is halved for 10 people):

Table 2: Pit filling time

| Depth of pit / Volume:   | Time until the pit is full:<br><i>With 25L/d/user if pit is only filled with faeces and urine (i.e., no other waste)</i> | Time until the pit is full:<br><i>With 40L/d/user if pit is filled with other waste in addition to faeces and urine)</i> |
|--------------------------|--|--|
| 1.5 metres / 1200 litres | 10 years   | 6 years  |
| 2 metres / 1600 litres   | 13 years   | 8 years  |

### Lining

The pit can either be partially or fully lined. It is important that the 20cm of the pit below ground level is lined with either bricks, blocks, stones or an old drum to support the pit. If using bamboo or timber, sufficient structural support shall be installed to guarantee that the hole is not collapsing, such as timber installed across the pit.

If the soil below one metre levels is loose, contains sand or gravel, or tends to collapse in on itself, then the remainder of the depth of the pit must be lined down to the bottom. Where the pit is fully lined, horizontal joints are to be mortared while vertical joints are not. This ensures liquids can drain away from the pit contents.



*Figures 6: Toilet collapsing due to lack of pit lining and foundational slab (Credit: Noreve Consulting)*



Bamboo



Perforated drum



Plywood boxing filled in with stones and cement

*Figure 7: Types of locally made pit linings*

### Water table

It is important to ensure that the bottom of the pit is at least 1.5 metres above the higher groundwater table level to prevent ground water contamination. Where the water table is too high or when a white line is visible when digging the pit (indicating the water table previous level), then a raised pit VIP or a shallow pit is recommended. A raised pit VIP latrine consists of the pit lining extending above ground level, and soil from the dug pit being heaped against the outside of this lining. Stairs are then constructed up to this raised slab and structure level of the VIP. This is also a good alternative in an area prone to low level flooding (i.e., flooding below the floor level of the VIP).

### Dual pit system

Dual pit systems have the advantage that pits can be shallower to VIP toilets (eg. 1m) and there is no need to relocate the whole toilet house once the pit is full, however they have to have lining and footings at the bottom of the pit to ensure the pit stability.

## Tool 2.4 – Construction guides

### VIP TOILET

|   |  |
|---|--|
| <p>1. Dig a pit - The pit should be dug either circular with a width of 800mm wide or rectangular with dimensions of 800mmx1000mm; and should be around 1.5m or 2m deep. Keep some of the soil material dug up to create a mount around the foundation slab (step 5).</p> <p><i>Note:</i> if a white line becomes apparent when digging the pit, indicating the highest point of groundwater level, the location is unlikely to be suitable for a VIP toilet due to a high risk of contamination. Raised VIP toilets can be considered.</p>   |    |
| <p>2. Make the pit lining of 20cm depth - Materials such as bamboo, timber, stones, bricks, cement or available metal sheeting or drums are all appropriate to prevent erosion and excavation collapsing.</p> <p><i>Safety note:</i> There are potential risks associated with manual digging considering pit from 1.5m to 2m. To minimise the chances of an accident observe the following instructions:</p> <ul style="list-style-type: none"><li>i) If the surrounding soil is loose, the whole pit should be lined with a structural supporting material, such as tight bamboo or timber works.</li><li>ii) Check weather conditions before work; be mindful to avoid recently heavy rain and storms.</li><li>iii) Always work with at least a fit adult supervision and use appropriate ropes and ladder when digging inside of a deep pit (&gt;1.5m).</li></ul> |    |
| <p>3. Build a foundation slab for the top 150mm of the pit – A hardwood frame of 800x1000mm should be placed on top of the pit. Another frame should be built round the pit. The space in between is filled with stones. Add support sticks to hold off the frames. The reinforced concrete foundation can be poured surrounding the outside of the hardwood frame. These frames can be used for at least 10 other toilets.</p> <p>4. Leave it for about 6 hours/overnight to make it easy for removal of frames the next day.</p> <p>5. Create a mount around the foundation slab - Using some of the soil from the pit, build up the area surrounding the toilet approx. 150mm above the ground level to prevent erosion into the pit and allow an easy cleaning outside of the toilet.</p>   |  |



6. Make the top slab - Build the formwork with 50 x 50 timber on a small flat surface. Ensure that the formwork is square. The formwork should be high enough for the slab to be minimum 50mm thick however a thicker slab will help ensure the slabs longevity. Be careful not to make it so thick as to make moving the slab on to the pit difficult or dangerous. Old oil can be painted on the formwork to ease removal later.
7. Cut the wire mesh to 100mm less than the dimensions of the slab (in this design 1m x 1.5m). Cut out 2 holes in the mesh wire to allow room for the two holes in the slab. Use a short (100mm long) piece of the PVC ventilation pipe for the ventilation pipe hole and use a 350mm piece of formwork for the toilet hole. Use the seat riser mould to shape the hole of the waste.

*Note:* If there is no access to prefabricated mesh wire a reinforcement mesh can be made from tie wire. Twist 23 sets of three strands of tie wire tightly together about 1600mm long. Put nails along the edge of the formwork at 100mm spacing and stretch the twisted tie wire across the nails and weave them into a mesh. Tie the wires together where they cross and cut off any excess wire.

8. Pour the concrete in the seat riser. The lid of the toilet seat must be removed or be made of mesh to allow airflow.

*Note 1:* squat plate is an alternative to seat risers. Refer to photo across and to further details in [Tool 2.3 in this Annex](#).

*Note 2:* In the absence of a mould during the construction (preferred option), one can follow the technique developed by CARE: Cut the ends off the 20kg rice sack, this should leave you with a cylindrical sleeve with 300mm diameter. Cut a 300mm diameter circle from another rice sack and sew the circular piece onto one end of the rice sack. Fill the sack with sand so that it is 500-600mm tall. This is the mould for the riser (it can also be used as formwork in the slab for the toilet hole).

Draw an outline of the toilet seat onto the piece of plywood, ensure to include the locations of the attachment points. Cut out the plywood piece. Place the mould on top of the plywood base. Cut approx. 1000mm to 1200mm length of rat wire (900mm wide). Fold the rat wire length ways so that you have a double folded piece 450mm x 1000mm. Wrap the rat wire around the mould and secure in place with tie wire. Trim back any excess wire. Mix some concrete with ratio of 2 parts sand to 1 part cement with water to provide a consistency with which to render. Using the trowel apply cement from the base up the sides of the riser and work through the rat wire mesh. Include additional rat wire around the end where the toilet seat attachment holes will be located. Use two sticks to provide formwork for the toilet seat attachment points. Only add cement to width of plywood piece and taper in towards the top of the riser. Ensure the top is flat and level and smooth the outside of the riser with a wet sponge to make it easier to clean. Allow to dry for 1-2 days. Once dry, remove the mould and the plywood and add further cement to the inside of the riser and smooth as per the outside. Once dry (1-2 days) turn the riser upside down so that the top of the riser is the end that is the same shape as a toilet seat. The riser should be 400-500mm high and approx. 20mm thick. Use a cement mix to render the toilet riser to the slab above the toilet hole. Remove the sticks that have provided formwork for the toilet seat connection and mount the toilet seat to the riser. The toilet seat cover/lid should be REMOVED to assist with airflow from the house to the pit to the vent pipe which will help with removal of flies and odours.



9. Assemble slabs and toilet riser - Move the top slab over the foundation and plaster it with cement to seal them and prevent water entering the pit. Put the riser on top of it, seal it and add the toilet seat on top of it.



10. Build the toilet's house – A wide range of material is available to ensure safety and privacy for the users: natangura, bamboo. If corrugated iron or flat iron sheets are used, foundations of 400mm should be constructed to hold the structure in place in times of cyclone.

A good guide is to locate studs at 600mm centres and rafters at 900mm centres. Secure the iron roofing to the rafters with roof nails.

Mix a concrete mix of 2 parts sand and 1-part cement with water. Make the mix wet enough so that the blankets can be dipped into the mix and become wet. Wet the blankets in water then wet them in the cement mix. Secure them to the timber frame with staples, nails or another suitable fastener. Leave to dry. Further cement mix can be trowelled onto the dry walls to increase thickness and strength.



**Note:** this VIP toilet construction can be modified and accessibility can be tailored to the needs of the particular users (disability, vision impairment, frailty, or pregnancy). Refer to [Tool 2.3](#) in this Annex for all information related to Inclusive designs.

VIP TOILET WITH TAP

|   |  |
|---|--|
| <p>1. Follow steps 1 to 4 of the VIP toilet construction</p>  |  |
| <p>2. An additional concrete slab with a drain and tap standpipe can be added to the female toilet to provide a clean, safe, private wash space.<br/>The larger slab should be minimum 700mm x 600mm with raised edges and lower centre point to assist with drainage. The centre of the slab is to be fitted with a 50mm PVC drain to a soak-away pit complete with a trap and a shower drain grate. Dig a trench from the soak-away pit to the location of the drain point in the slab. Run a 50mm PVC drain pipe from the slab to the soak-away pit, including a U-bend trap. The remainder of the drain to be run on a 1:50 gradient to the pit. Set up the formwork in place for the slab to be poured. Pour the slab with the same concrete ratios and techniques as per the main toilet slab. The height of the centre of the slab should be up to the top of the drain pipe, approx. 50mm thick. Ensure that the edges are raised up to approx. 75mm to promote drainage. Leave to cure for 3-4 days. Once dry fit shower drain grate to top of drain pipe, this should finish level with top of slab. Connect an existing water source to the new tap standpipe with 50mm poly pipe. Dig a trench for the pipe to prevent damage. Ensure that the tap is usable from inside the house and is above the centre of the MHM slab.</p> |    |
| <p>3. Follow steps 5 to 10 of the VIP toilet construction</p>   |  |
| <p>4. Build the toilet's house and rather than a tap, it is possible to install a water container inside.</p>   |  |

**FLUSH TOILET WITH DIRECT PIT**

|  |  |
|--|--|
| <p>1. Dig a pit - The pit should be dug either circular with a width of 800mm wide or rectangular with dimensions of 800mmx1000mm, and should be around 1.5m or 2m deep. Keep some of the soil material dug up to create a mount around the foundation slab (step 5)</p> <p><i>Note:</i> if a white line becomes apparent when digging the pit, indicating the highest point of groundwater level, the location is unlikely to be suitable for a flush toilet with a pit due to a high risk of contamination.</p>  |    |
| <p>2. Make the pit lining - Materials such as bamboo, timber, stones, bricks, cement or available metal sheeting or drums are all appropriate to prevent erosion.</p> <p><i>Safety note:</i> There are potential risks associated with manual digging considering pit from 1,5m to 2m. To minimise the chances of an accident observe the following instructions:</p> <ul style="list-style-type: none"> <li>i) If the surrounding soil is loose, the whole pit should be lined with a structural supporting material, such as tight bamboo or timber works.</li> <li>ii) Check weather conditions before work, be mindful to avoid heavy rain and storms.</li> <li>iii) Always work with at least a fit adult supervision and use appropriate ropes and ladder when digging inside of a deep pit (&gt;1,5m).</li> </ul>                   |   |
| <p>3. Build a foundation slab for the top 150mm of the pit – A hardwood frame of 800x1000mm should be placed on top of the pit (here the drum replaces the inner frame). Another frame should be built round the pit. The space in between is filled with stones. Add support sticks to hold off the frames. The reinforced concrete foundation can be poured surrounding the outside of the hardwood frame. These frames can be used for at least 10 different toilets.</p> <p>4. Leave it for about 6 hours/overnight to make it easy for removal of frames the next day.</p> <p>5. Create a mount around the foundation slab - Using some of the soil from the pit, build up the area surrounding the toilet approx. 150mm above the ground level to prevent erosion into the pit and allow an easy cleaning outside of the toilet.</p> |  |
| <p>6. Make the top slab - Build the formwork with 50 x 50 timber on a small flat surface. Ensure that the formwork is square. The formwork should be high enough for the slab to be minimum 50mm thick, however a thicker slab will help ensure the slabs longevity. Be careful not to make it so thick as to make moving the slab on to the pit difficult or dangerous. Old oil can be painted on the formwork to ease removal later.</p> <p>7. Cut the wire mesh to 50mm less than the dimensions of the slab (in this design 1m x 1m) ensuring that there is still</p>  |  |

|  |   |
|--|---|
| <p>structural overlap between the two slabs. Cut out one hole in the mesh wire to allow room for the hole for the waste, using a 350mm piece of formwork. Use the seat riser mould to shape the hole of the waste.</p> <p><i>Note:</i> If no access to prefabricated mesh wire a reinforcement mesh can be made from tie wire. Twist 23 sets of three strands of tie wire tightly together about 1600mm long. Put nails along the edge of the formwork at 100mm spacing and stretch the twisted tie wire across the nails and weave them into a mesh. Tie the wires together where they cross and cut off any excess wire.</p> |   |
| <p>8. Pour the concrete in the seat riser</p>  |     |
| <p>9. Assemble slabs and toilet riser - Move the top slab over the foundation and plaster it with cement to seal them and prevent water entering the pit. Put the riser on top of it, seal it and add the toilet seat on top of it.</p>  |   |
| <p>10. Build the toilet's house – A wide range of material is available to ensure safety and privacy for the users: natangura, bamboo. If corrugated iron or flat iron sheets are used, foundations of 400mm should be constructed to hold the structure in place in times of cyclone.</p> <p><i>Note:</i> the hand washing facility location could be improved as it is out of view when the person opens the door. In this situation, the implementers could hang a poster on the inside of the door reminding to turn right when exiting the toilet, or steps/nudges toward the hand washing station.</p>                   |  |

## Concrete Specifications

A concrete mix requires cement, sand, aggregate (gravel, coral, crushed rock) and water. Crushed rock or coral can be used in place of gravel depending on location. If using sand from a beach or coral, it must be adequately washed in fresh water or left in a location where it will be rinsed adequately by rain prior to construction. Salt in the concrete causes the steel reinforcement to corrode and dramatically reduces the integrity and life of the concrete. Sand and the aggregate should be sieved to remove dirt, sticks and other impurities which will weaken the concrete.

Mix the appropriate ratio for the application on a flat concrete surface, on a tarpaulin, in a bucket, or wheelbarrow. The following ratios apply – note the difference when using **black** sand or **white** sand:

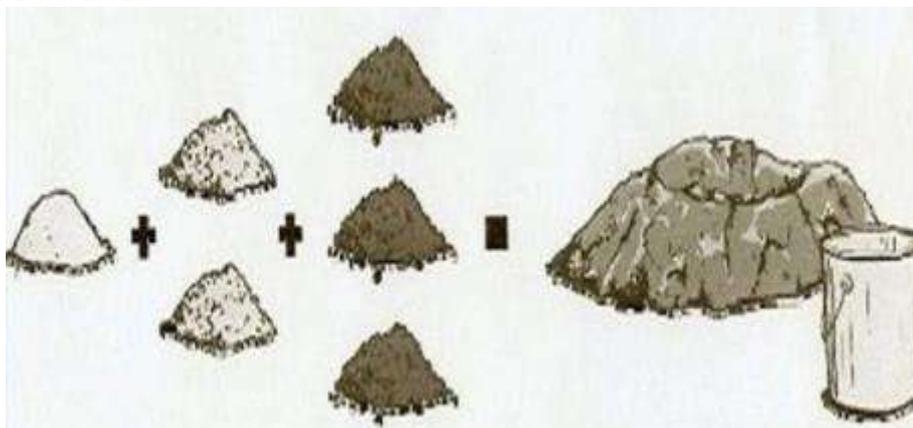
Table 2: Concrete mix with **WHITE SAND**

| USE              | CEMENT | SAND | AGGREGATE |
|------------------|--------|------|-----------|
| Slab (on ground) | 1      | 2    | 4         |
| Slab (toilet)    | 1      | 2    | 3         |
| Footing          | 1      | 2.5  | 3.5       |
| Toilet riser     | 1      | 2.5  |           |
| Walls and Posts  | 1      | 2    | 3         |
| Block/brick      | 1      | 4    |           |
| Mortar           | 1      | 4    |           |
| Rendering        | 1      | 3    |           |

Table 3: Concrete mixes using **BLACK SAND**

| USE              | CEMENT | SAND | AGGREGATE |
|------------------|--------|------|-----------|
| Slab (on ground) | 1.5    | 2    | 4         |
| Slab (toilet)    | 1.5    | 2    | 3         |
| Footing          | 1.5    | 2.5  | 3.5       |
| Toilet riser     | 1.5    | 2.5  |           |
| Walls and Posts  | 1.5    | 2    | 3         |
| Block/brick      | 1.5    | 4    |           |
| Mortar           | 1.5    | 4    |           |
| Rendering        | 1.5    | 3    |           |

Using white sand, a concrete mix requires 1-part cement, 1-part sand, and 1-part aggregate. A part is the same as an amount or a quantity. **Quantities should be measured using the same container.** If using a bucket, the bucket should be filled and levelled at the top - NO HEAPS allowed. The size of the heaps will vary and therefore your mixture is not consistent. Shovels should never be used to measure the quantities as the amount you pick up each time will differ.



When starting the mix, DO NOT add water right away. Dry mix it first until the mix is homogeneous (i.e., one colour). Add water and mix thoroughly. Push the mix into a mound and make a hole in the top approximately half the diameter of the mound. Pour water into the hole and fold the dry mix on the outside up into the middle slowly until the water has mixed through the dry materials.

The mix should be just runny enough to “pour” but not too runny. Too wet and the concrete components may segregate thus weakening it. A drier mix will cure more uniformly and be stronger in the end. Approximately ½ bucket of water for every bucket of cement. Do not use salt water – use fresh water instead that is clean.

Position the formwork for the holes into the frame at the correct locations. Pour the mix into the formwork and fill it halfway (approx. 25-40mm). Place the mesh wire on top of the bottom layer of concrete mix. Pour the remaining mix into the frame to the top of the formwork. Use a straight piece of timber spanned between the formwork to level the concrete mix. Scrape off any areas where too much cement mix is present and add more cement mix where it is low. Alternatively, the centre of the slab can be made up to 10mm thicker to aid with drainage. Keep in mind the weight of the slab when determining thickness.

Reinforcement options are steel (500Mpa) or premix fibre cement. No other options (rope, natural fibre, twigs etc.) will be strong or durable and must not be used.

Cover the slab with plastic or leaves and leave to dry for 3-4 days. Sprinkle the slab with water each day to help the slab cure uniformly. **Curing concrete is not the same as drying it.** For concrete to be strong, it must be kept moist. The water in the concrete mix helps to bond the cement with the sand and aggregate. If concrete mix dries out too quickly, the concrete will not be strong.

Once dry, lift the slab on top of the pit location to its final location ensuring both vent pipe hole and toilet hole are positioned correctly above the pit.

### Handwashing stations:

The following types of hand-washing facilities are recommended:

- 1) Tippy-tap (bamboo or plastic bottle)
- 2) Improved bucket with tap
- 3) Improved bottle or large bamboo, with a hole and nail system
- 4) Two basins, one for washing, one for rinsing.



Tippy-tap equipped with soap bar or liquid and soak way of gravels to avoid water ponding



Improved bucket with a tap installed, with a shelf to keep the soap

# Oi fasiliti blong wasem han

## Oi simpel opsen blong wasem han

Evri toalet imas gat ol fasiliti blong wasem han wetem wota mo sop. Oi pikja aninit oli soemaot ol simpel fasiliti blong wasem han we i save setap long ol horn, ol skul o ol komiunit senta. Oli no sas mo oli nidim smol wota nomo.



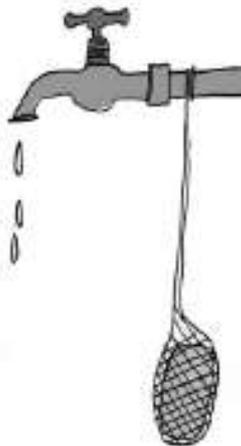
Ova wan besin



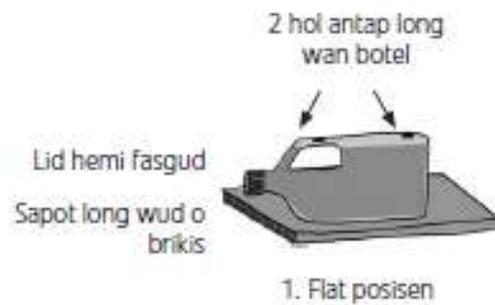
Dipa wetem wan hol mo sop



Risaekel kontena (Tippy-Tap)



Sop long wan rop  
Wan plastik o fabrik  
net raon long sop  
hemi no holem  
nomo, be hemi wan  
gud brash we i help  
skrabem ol han gud  
moa.



Abstract from Clean Community Manual (Live and Learn, 2012)

# BILDIM TIPITAP BLONG YUMI

Wanem yu nidim blong mekem tipitap



2 stik blong 2 mita we i gat foh long wan en.  
+ 2 stik blong 1 mita



Sped mo savel

Kontena blong wota



Ston mo korel



Sop

Ol smol rop

Nil, Kandel, Matjes

## Hao blong mekem tipitap

1. Digim hol haf mita dip mo 1 mita dip long spes.



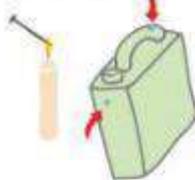
2. Planem tufala pos mo mekem sua se tufala pos i stanap stret.



3. Berem hol mo pos wetem graon mo ston.



4. Bonem nil mo mekem hol long kontena olsem we aro i soem.



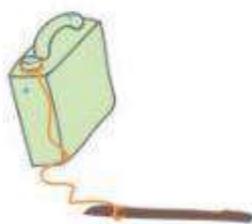
5. Mekem hol long sop mo fasem rop long hem.



6. Hangem sop mo kontena we i gat wota insaed long stik antap.



7. Fasem wan en blong rop long kontena mo fasem narafala en long stik we i stap long graon.



8. Digim hol andanit mo fulumap wetem ston mo korel blong wota i lus insaed.



Abstract from Ministry of Lands website:: [https://mol.gov.vu/images/News-Photo/water/DoWR\\_File/Promotional\\_Materials/Calender-2019.pdf](https://mol.gov.vu/images/News-Photo/water/DoWR_File/Promotional_Materials/Calender-2019.pdf)

For tippy taps and systems described above, Soak away designs can be a 0.5m x 0.5m x 0.5 m deep pit filled with corals.

## ANNEX 3: OPERATION & MAINTENANCE



- 1) O&M and DECOMMISSIONING A DRY SYSTEMS
- 2) O&M and DECOMMISSIONING A WET SYSTEMS
- 3) SAFETY PROTOCOLS FOR MANUAL SLUDGE HANDLINE

## Operation and Maintenance

Operation and maintenance (O&M) requirements will depend on the type of sanitation facility. However, the main operation and maintenance principles for wet and dry systems are presented below:

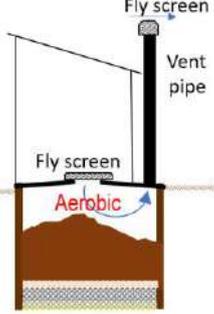
### DRY Systems

#### O&M guidance for DRY sanitation systems

Dry sanitation systems include simple pit toilets, ventilated improved pit (VIP) toilets and compost toilets. These systems are best maintained by keeping the pit contents dry by minimizing moisture and promoting ventilation.

## Dry pit toilet



|           |   |  |
|-----------|---|--|
| OPERATION | Close the lid of cover the toilet hole after using the toilet |    |
|           | Do not throw rubbish into the toilet                          |  |
|           | Men reduce urine loading where appropriate.                   |  |
|           | Do not stand on a toilet seat riser or pan                    |  |

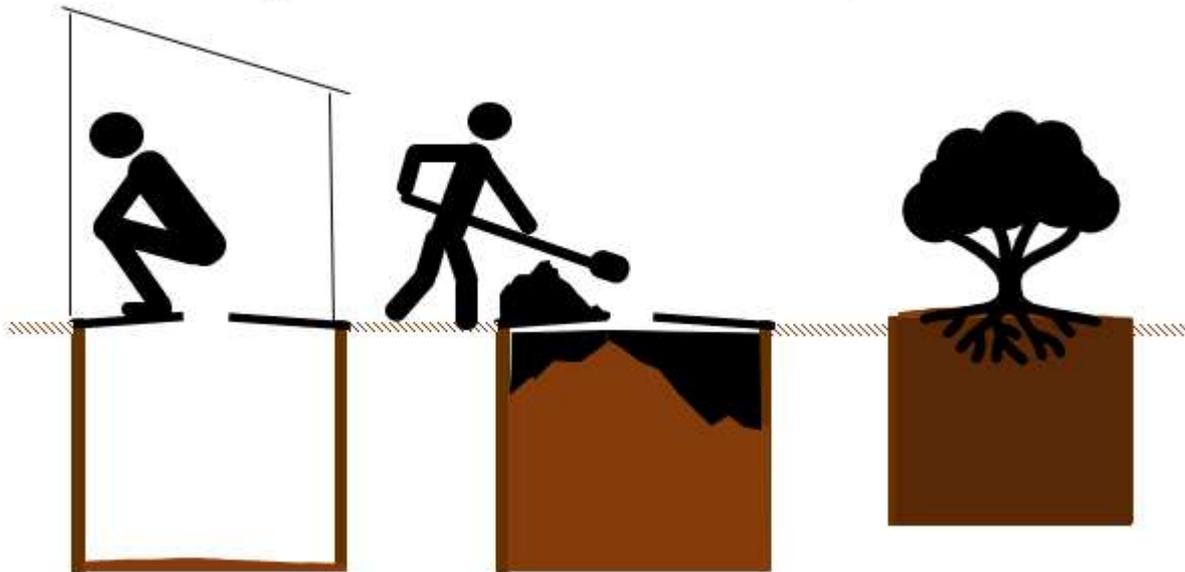
|  |  |   |
|--|--|---|
|  | <p>Add ashes, dry leaves, lime or wood chips in the toilet pit after each use to manage odours</p> | <p><b>Manage Odours</b></p>   |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">MAINTENANCE</p> | <p>Sweep your toilet floor every day to keep it clean (Do not wash with water)</p>                 |   |
|  | <p>Reduce moisture in the pit by fixing any holes in the roof.</p>                                 |    |
|  | <p>Keep the path to the toilet clear and clean</p>   |   |
|  | <p>Make sure water and soap are available for washing hands at all times</p>                       |   |

### *Decommissioning guidance for DRY sanitation systems*

Dry sanitation systems cannot be pumped out by a vacuum truck. The contents of a dry pit contain many harmful viruses and bacteria so when dry toilets become full they need to be safely decommissioned. The steps to safely decommission a pit toilet are shown below. A decommissioned dry pit should not be disturbed for at least 2 years.

1. Dig a new pit
2. Move the toilet superstructure
3. Cover the old pit with soil
4. Dig out the old pit after 2 years or plant a tree!

## **Move superstructure & cover pit when full**



### **WET SYSTEMS**

#### *O&M guidance for WET sanitation systems*

Wet sanitation systems include pour flush or cistern flush toilets where the waste is stored and treated in pits or septic systems. These systems are best maintained by keeping the pit contents wet and by making sure that there is a reliable supply of water for flushing.

### **WET pit toilet**



|  |   |  |
|--|---|--|
|  | <p>Ensure there is always water available for flushing</p>                                  |    |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">OPERATION</p>   | <p>Do not throw anything except toilet paper into the toilet</p>                            |    |
|  | <p>Do not stand on toilet pan</p>   |    |
|  | <p>(For dual pits) switch the elbow in the diversion chamber to alternate pits use</p>      |   |
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">MAINTENANCE</p> | <p>Wash toilet and surrounding area to keep clean<br/>(DO NOT USE BLEACH IN THE TOILET)</p> |  |
|  | <p>Keep the path to the toilet clear and clean</p>  |  |
|  | <p>Soap is available for washing hands at all times</p>                                     |  |

### *Emptying and decommissioning guidance for WET sanitation systems*

Wet sanitation systems are different to dry toilets because the contents of the pit or septic tank are liquid and they can be removed using a vacuum truck.

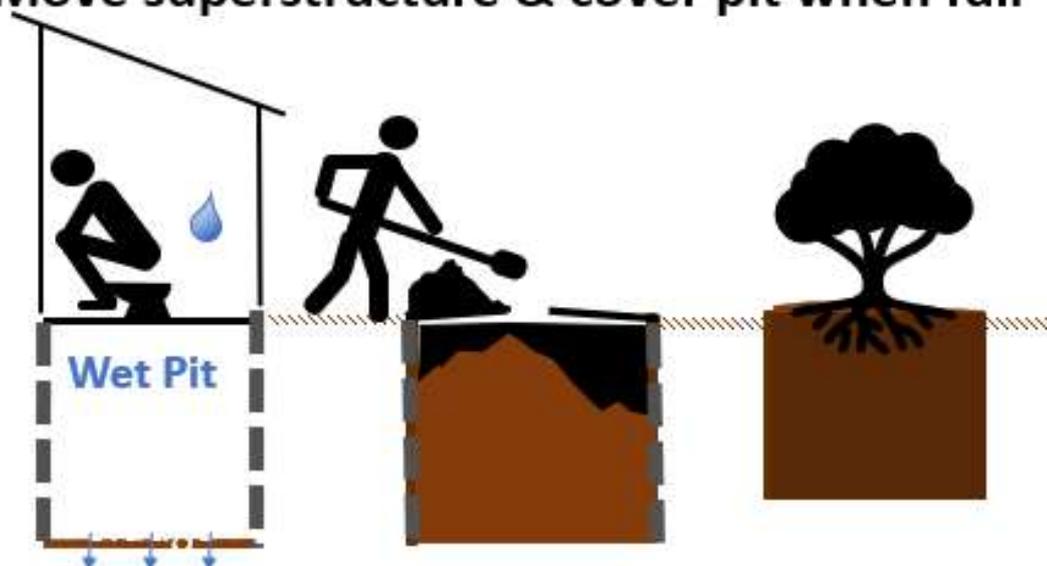
**PUMP OUT IS ONLY AVAILABLE IN SOME AREAS OF VANUATU LIKE PORT VILA AND LUGANVILLE.**

If pump out is not available then users **MUST** decommission wet sanitation systems when they become full.

1. Dig a new pit
2. Move the toilet superstructure
3. Cover the old pit with soil
4. Dig out the old pit after 2 years or plant a tree!



### **Move superstructure & cover pit when full**



### **Important messages for good toilet use**

The below pages include 3 useful common messages for toilet use:

**IMPORTANT!**



**Afta yu finis yusum  
toilet karem smol  
saw dust sakem  
insaet lo toilet**





# Rul blo toilet

Kipim toilet i klin  
oltaem

Toti blo sikmun mo  
nara toti putum lo  
rubbish bin

Wasem han bifo yu aot  
lo toilet

yu save usum toilet paper  
nomo lo toilet



**WARNING**



**NO SAKEM TOTI  
BLO SIKMUN MO  
ENI NARA TOTI  
INSAET LO  
TOILET**

### Safety Protocols for Manual Sludge Management

If a pit or septic system MUST be emptied and a vacuum pump out service is not available, manual emptying of the sanitation system must be done safely. Employers have a responsibility to their staff to ensure they are protected against harmful pathogens present in the sanitation system.

There is a high risk of pathogens being present even in treated sewage, *fecal sludge (Biosolids)* or recycled wastewater. The two primary routes of exposure are skin contact, mucosa or direct inhalation. Affected areas may include the nose, throat, respiratory tract, eyes and any part of the body directly contacted or splashed by sewage.

The following instructions and procedures must be adopted to ensure the sanitary workers and community safety and minimize the environment contamination risks. The following requirements were extracted or adapted from *Department of Health and Department of Mines Industry Regulation and Safety, Western Australia (2018)*.

### Companies and Employers Responsibilities

Employers must, so far as is practicable, provide and maintain a working environment where their employees, as well as all contractors and visitors, are not exposed to hazards. The general duties of an employer to maintain a safe workplace include:

Ensure safe systems of work are in place according with OH&S rules for the sector:

- Provide safe work practices and information, instruction, training and supervision
- Encourage an environment of consultation and co-operation
- Provide personal protective equipment (PPE), and ensure there are systems for PPE inspection, maintenance, cleaning and storage
- Ensure that safe systems of work are in place for the use of plant, toxic substances and confined spaces
- Ensure the provision of hand washing facilities, showers, change rooms, equipment storage areas and eating facilities. In the case of workers in the field, portable sanitation equipment including clean water and soap should be provided
- Provide suitable labelling and warning signs
- Provide first aid supplies and first aid training on a risk basis
- Ensure the provision of separate areas for storage of clean and contaminated equipment
- Ensure that there are clear procedures in place for reporting incidents, injuries and disease. The employer should develop and implement policies and operational procedures for hazardous material exposure and management
- Provide eye wash stations in splash hazard areas or areas where chemicals are handled

### Training and Capacity-building

Employers shall ensure that induction and periodic training is provided to all workers, including onsite contractors and, where relevant, site visitors. The training should include information on the following:

- Appropriate hygiene practices and the reasons they are required
- Human effluent, biosolids and recycled water safe work practices as relevant to the site
- Adequate use, storage, cleaning or disposal of contaminated PPE and other equipment
- Reporting procedures for damaged PPE and other equipment, incidents and potential work-related illness/symptoms
- Signs and symptoms of waterborne diseases and notification procedures
- Evacuation and emergency procedures if fire, natural disasters or explosions are a risk in the workplace
- Confined space procedures, where relevant

Truck workers transporting sewage should be trained on how the truck operates, procedures to safely handle the product including methods for venting vacuum pump exhaust vapours and how to drive safely with hazardous materials.

### Personal Protective Equipment (PPE)

Employers must ensure that PPE appropriate to the task being undertaken is provided for workers. PPE that is usually required when working with human effluent, *biosolids* or recycled water includes:

- Work clothes (coveralls or clothes with long sleeves and long pants)
- Enclosed liquid repellent shoes or rubber boots with non-slip soles
- Waterproof gloves. Waterproof gloves should always be worn when cleaning pumps, filters or screens and when handling effluent, recycled water biosolids or grit.
- Eye protection shall be worn at all times where the eyes may be exposed to dust, flying particles, or splashes
- Liquid repellent coveralls, a disposable or reusable respirator and/or splash-proof face shield may be required in some circumstances when dealing with raw sewage or confined spaces. (Air purifying respirators may filter for particulates and/or gases, however in confined spaces or where there is a risk of low oxygen levels an air supplied respirator may be required).
- Any other PPE identified as necessary during risk assessment processes

### Hygiene and Good Practices

Employers must ensure that the following hygiene and good practices are implemented:

- Wash hands with soap and clean water immediately and every time after working
- Keep fingernails short. Nails should be scrubbed well with soap after work
- Ensure hands are clean before eating, drinking, smoking or using the toilet
- Avoid direct contact with sewage or recycled water and unnecessary exposures to sprays and aerosols.
- Avoid touching the face, mouth, eyes, nose, ears or open sores and cuts when handling sewage, biosolids or recycled water
- Before eating, remove soiled work clothes, wash hands and face and only eat in designated areas away from sewage contaminated areas
- Keep open sores, cuts, lacerations, abrasions and wounds covered with clean, dry bandages or waterproof dressings
- Wash eyes with drinking water if sewage or recycled water contact eyes
- Remove work clothing at the end of the shift and if possible leave it at work
- Ensure soles of boots are clean to minimise spread of biosolids outside application areas
- Keep work clothes separate from other clothes
- Wherever possible, separately launder and store work clothes. Clean work clothing with 0.05% chlorine solution (1 part of bleach to 100 parts of water)
- Clean work tools after use
- Shower after work and change clothes before leaving

### Health Checks and Immunization

Employers must provide or support occupational immunisations on a risk basis. A vaccination program should be in place where there is a significant risk of exposure to Hepatitis A or Tetanus (e.g., workers in regular contact with sewage). The Australian Immunisation Handbook recommends vaccinations for Hepatitis A and Tetanus for these workers.

- A vaccination program may include agreement in relation to vaccination as an employment prerequisite.
- Where required on a risk basis, vaccination should be provided free of charge to employees.

Workers should visit the medical practitioner if they have one or more of the symptoms below:

- Cramping stomach; fever; nausea; diarrhoea; vomiting; yellowing of the skin;
- Symptoms of breathlessness, chest tightness and wheezing;
- Redness and pain of the eyes; skin rash and/or pain.

Make sure you tell your medical practitioner you work with either human effluent, biosolids or recycled water.

## References

CAWST (2016) Centre for Affordable Water and Sanitation Technology. *Technical Brief: Sanitation System Emptying and Transporting Fecal Sludge*. Calgary, Canada (accessed online in October 2019). [https://www.fsmttoolbox.com/assets/pdf/30\\_Sanitation\\_TB\\_Emptying\\_and\\_Transporting\\_2016-07\\_en.pdf](https://www.fsmttoolbox.com/assets/pdf/30_Sanitation_TB_Emptying_and_Transporting_2016-07_en.pdf)

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## ANNEX 4: MONITORING & COMPLIANCE



#### Tool 4.1 – Minimum standards / Sanitary inspection check-lists

The following sanitation inspection checklists summarise the minimum standards that any toilet should comply with. They were developed from a more comprehensive set of **performance** and **minimum design standards**, which are available in Appendix 2 of the full rural volume of the sanitation and hygiene guidelines and standards.

The first table below summarises the minimum standards to comply to during the construction of a toilet, as they are difficult to check on site after the toilet’s construction, which is when the following checklists are best used for.

#### INSPECTION CHECK - DURING THE CONSTRUCTION

CIRCLE ONE

| MINIMUM (ESSENTIAL) CRITERIA – IMPROVED SANITATION SERVICE |   |   |   |
|--|---|---|---|
| <b>For Dry and Wet pit toilets</b>                         |   |   |   |
| 1.   | The pit is to be 2m deep only to avoid excavation protection costs to the construction but more than 1.5m to allow sufficient time for using before moving to another pit | Y | N |
| 2.   | The toilet pit is lined for a minimum of 1m depth   | Y | N |
| 3.   | The bottom of the pit should be at least 2.5m metres above the higher groundwater table level (end of wet season)   | Y | N |
| 4.   | The pit should be at least 30m metres of horizontal distance from drinking water sources (15m if source is downhill from toilet)  | Y | N |
| <b>For Septic systems</b>                                  |   |   |   |
| 1.   | The septic tank is well sealed and does not leak into the groundwater   | Y | N |
| 2.   | There is a well-designed vegetated leach field in line with the septic tank   | Y | N |
| 3.   | The bottom of the leach field (soakaway) should be at least 2m metres above the higher groundwater table level (end of wet season)  | Y | N |
| 4.   | The leach field (soakaway) should be at least 30m metres of horizontal distance from drinking water sources (15m if source is downhill from toilet)                       | Y | N |

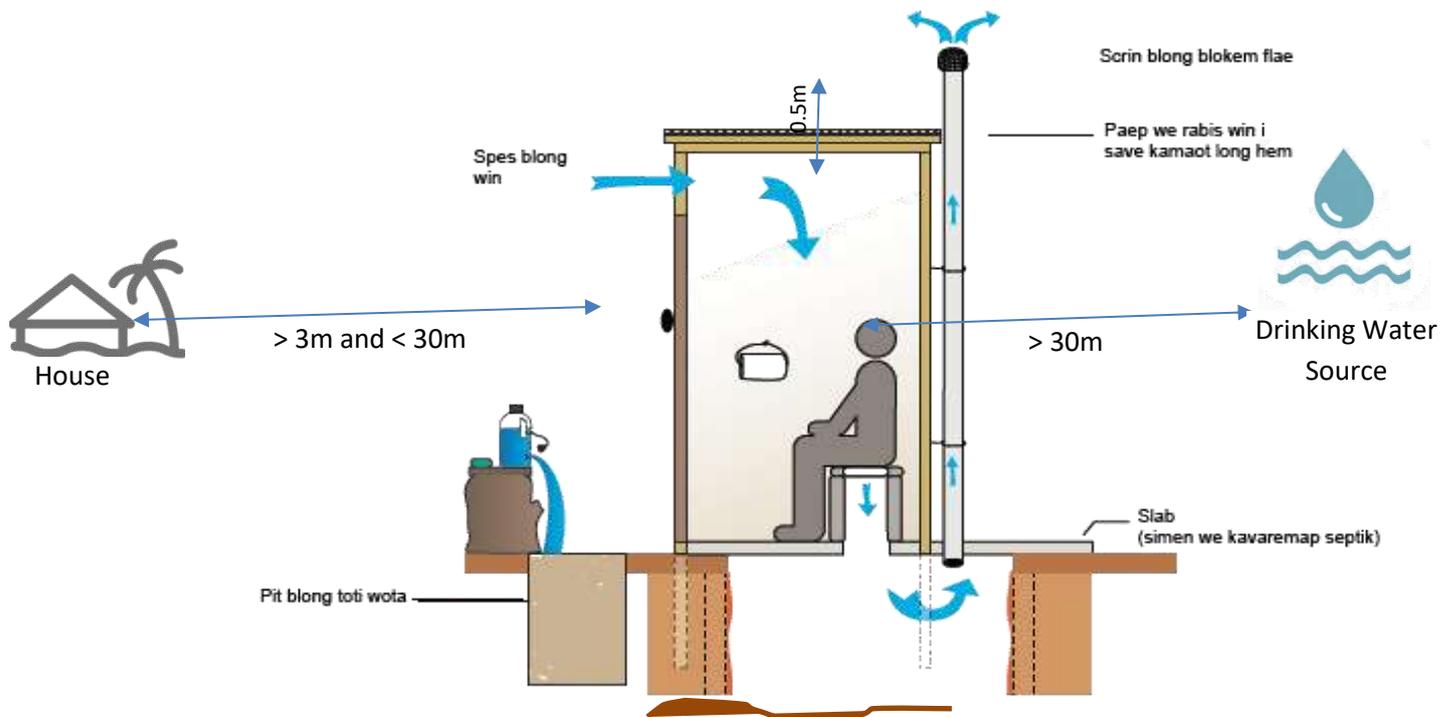
## Sanitation Inspection Checklist

# VENTILATED IMPROVED PIT (VIP)

Toilet Owners Name: .....

Inspection Date: .....

### 1) Ventilated Improved Pit Latrine



INSPECTION CHECK

CIRCLE ONE

#### MINIMUM (ESSENTIAL) CRITERIA – IMPROVED SANITATION SERVICE

|    |  |   |   |
|----|--|---|---|
| 1. | The toilet is used by one household only   | Y | N |
| 2. | Access path is cleared between the house and the toilet  | Y | N |
| 3. | Toilet is located between 3- 30m from house served   | Y | N |
| 4. | Toilet is located downhill of drinking water sources (well, river, spring), and at a minimum horizontal distance of 15m (if not sure of flow direction, min. is 30m) | Y | N |
| 5. | There is either a mound or dug channel to prevent surface water entering the pit   | Y | N |
| 6. | There is a handwashing facility with soap within 3m and a soak-away between the toilet and the house   | Y | N |
| 7. | Toilet and handwashing are easy to use for everyone in the house (children, elderly, people with disability)   | Y | N |
| 8. | There is a vent pipe of 100mm minimum of diameter  | Y | N |
| 9. | The vent pipe is finishing 50cm above the rooftop  | Y | N |

|     |  |   |   |
|-----|--|---|---|
| 10. | The vent pipe has fly net, well attached, covering the end                             | Y | N |
| 11. | Toilet is reasonably dark inside yet safe to use                                       | Y | N |
| 12. | Toilet has an appropriate door with internal lock and external locks to keep it secure | Y | N |
| 13. | There is a toilet lid made of fly screen mesh  | Y | N |
| 14. | Toilet top slab has no cracks and sealed to foundation slab                            | Y | N |
| 15. | Toilet floor is clean and there is no strong smell                                     | Y | N |
| 16. | There is a bin with lid inside the toilet house  | Y | N |
| 17. | There is more than 50cm from the underside of slab to the top of waste pile            | Y | N |

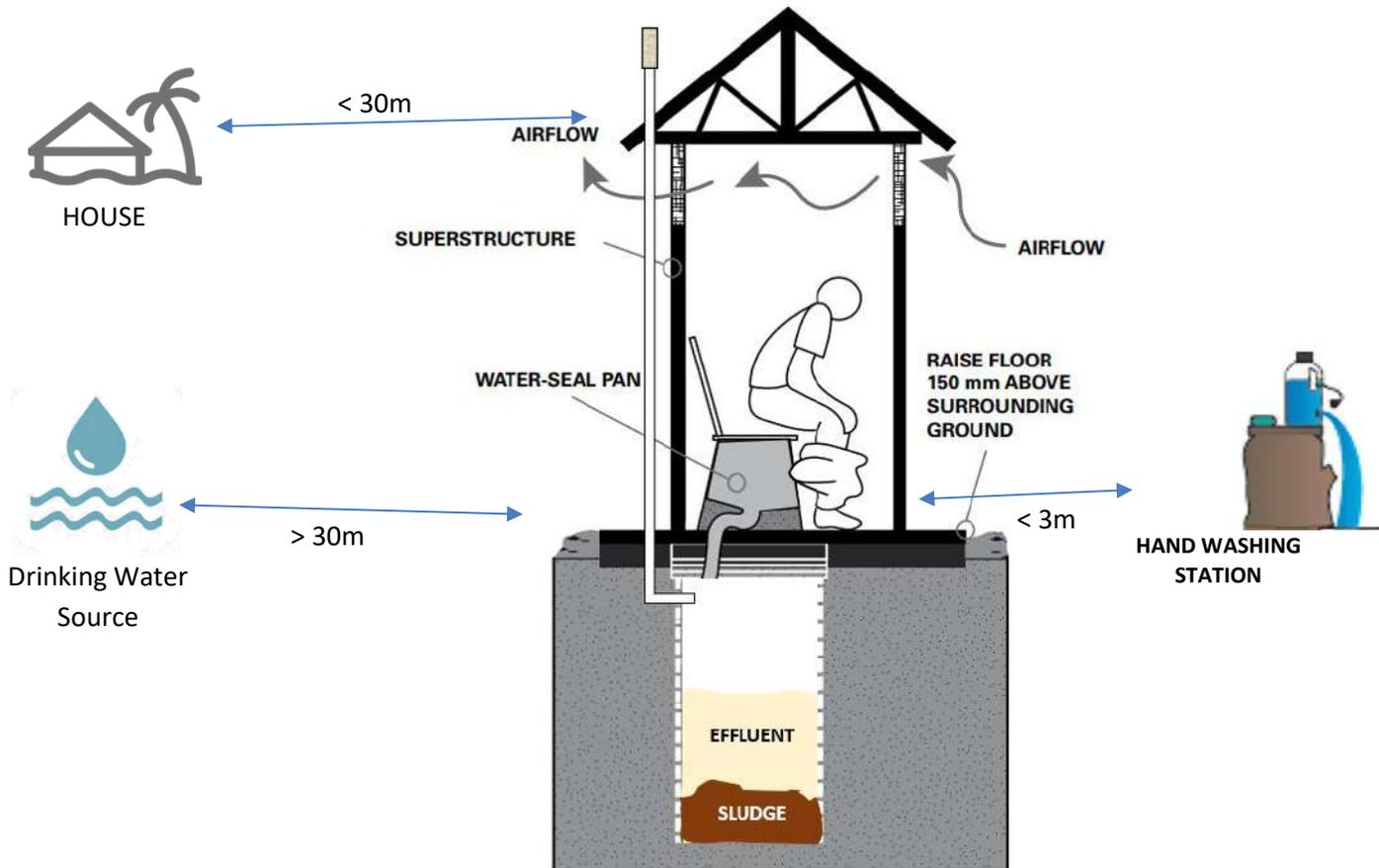
Overall, this toilet should be:  UNCHANGED  UPGRADED  REPLACED (if question #1, 3, 4, 17 are 'no')

# Sanitation Inspection Checklist

## Flush toilet with a pit

Toilet Owners Name: \_\_\_\_\_

Inspection Date: \_\_\_\_\_



INSPECTION CHECK

CIRCLE ONE

### MINIMUM (ESSENTIAL) CRITERIA – IMPROVED SANITATION SERVICE

|    |  |   |   |
|----|--|---|---|
| 1. | The toilet is used by one household only   | Y | N |
| 2. | There is sufficient water supply available for flushing throughout the year  | Y | N |
| 3. | Access path is cleared between the house and the toilet  | Y | N |
| 4. | Toilet is located less than 30m from house served  | Y | N |
| 5. | Toilet is located downhill of drinking water sources (well, river, spring), and at a minimum horizontal distance of 15m (if not sure of flow direction, min. is 30m) | Y | N |
| 6. | There is either a mound or dug channel to prevent surface water from entering the pit  | Y | N |
| 7. | There is a handwashing facility with soap and a soak-away within 3m between the toilet and the house   | Y | N |

|     |  |   |   |
|-----|--|---|---|
| 8.  | Toilet and handwashing are easy to use for everyone in the house (children, elderly, people with disability)                       | Y | N |
| 9.  | There is a vent pipe on the pit and the pipe opening is covered  | Y | N |
| 10. | The vent pipe is a minimum of 32 mm in diameter  | Y | N |
| 11. | Toilet has an appropriate door with internal lock and external locks to keep it secure   | Y | N |
| 12. | The toilet riser is sealed to the top slab and the top slab sealed to the foundation slab to prevent insects from entering the pit | Y | N |
| 13. | Toilet slabs are strong and have no cracks   | Y | N |
| 14. | Toilet floor is clean and there is no strong smell   | Y | N |
| 15. | There is a bin with lid inside the toilet house  | Y | N |
| 16. | If offset pit only: Pit to have access hatch / lid   | Y | N |

Overall, this toilet should be:  UNCHANGED  UPGRADED  REPLACED (if question #1, 2, 4, 5, 9 are 'no')

# Sanitation Inspection Checklist

## Flush toilet with septic tank

Toilet Owners Name: \_\_\_\_\_

Inspection Date: \_\_\_\_\_

HANDWASHING STATION TO BE PROVIDED, EITHER INSIDE OR OUTSIDE STRUCTURE



FRONT PERSPECTIVE

BACK PERSPECTIVE

### INSPECTION CHECK

CIRCLE ONE

#### MINIMUM (ESSENTIAL) CRITERIA – IMPROVED SANITATION SERVICE

|     |  | Y | N |
|-----|--|---|---|
| 1.  | The toilet is used by one household only   | Y | N |
| 2.  | There is sufficient water supply available for flushing throughout the year  | Y | N |
| 3.  | Access path is cleared between the house and the toilet  | Y | N |
| 4.  | Toilet is located less than 30m from house served  | Y | N |
| 5.  | Toilet is located downhill of drinking water sources (well, river, spring), and at a minimum horizontal distance of 15m (if not sure of flow direction, min. is 30m) | Y | N |
| 6.  | The septic tank is sealed to prevent insects from accessing the waste  | Y | N |
| 9.  | The septic tank has a total length of at least 3 times the width   | Y | N |
| 10. | There is a vent pipe on the pipe going to the septic tank and the opening is covered with insect netting   | Y | N |
| 11. | The vent pipe is a minimum of 32 mm in diameter  | Y | N |

|     |  |   |   |
|-----|--|---|---|
| 12. | The septic tank has an access hatch / lid  | Y | N |
| 13. | The access hatch is installed where pumping out of the septic tank is practical                              | Y | N |
| 15. | There is no ponding of wastewater (from both handwashing and septic tank)                                    | Y | N |
| 16. | There is a handwashing facility with soap within 3m between the toilet and the house                         | Y | N |
| 17. | Toilet and handwashing are easy to use for everyone in the house (children, elderly, people with disability) | Y | N |
| 18. | Toilet has an appropriate door with internal lock and external locks to keep it secure                       | Y | N |
| 19. | Toilet floor is clean and there is no strong smell   | Y | N |
| 20. | There is a bin with lid inside the toilet house  | Y | N |

Overall, this toilet should be:  UNCHANGED  UPGRADED  REPLACED (if question #1, 2, 4, 5, 8, 13, 14, are 'no')

In addition to the minimum standards summarised in the checklists above, communities and designers may consider the following design characteristics which are presented here as recommendations but are not enforceable like the minimum standards.

*Table 3: Additional technical recommendations*

| <b>Additional design features</b>  | <b>Toilet type</b>               | <b>Why</b>  |
|--|----------------------------------|---|
| Round pit  | VIP and flush toilets with a pit | A round pit has a slightly reduced capacity however is better for the stability of the pit or when the surrounding soil is loose. |
| The ventilation pipe to be located outside the toilet house, where it is exposed to the sun  | VIP toilet                       | This is to heat up the air in the pipe to induce an airflow from the house into the pit which reduces odours.                     |
| Pipe to be painted in black  | VIP toilet                       | This feature is also to facilitate heat and upward ventilation  |
| If wind direction is constant in the location, orientation of the toilet to be facing dominant wind (i.e., door facing the wind direction) | VIP toilet                       | This will promote air flow in the toilet house, through the toilet seat and out through the ventilation pipe.                     |

## ANNEX 5: SEPTIC TANKS



### GUIDE FOR DESIGN AND CONSTRUCTION OF WET TOILETS WITH SEPTIC TANKS

TOOL 6.1: DESIGN

TOOL 6.2: CONSTRUCTION

#### **Introduction:**

This annex contains tools for WASH actors to implement a rural sanitation project in locations where a septic pumping service is available.

## Tool 6.1 – Design

NOTE: Please refer to Tool 2.2. (Annex 2) for a general design guide for all toilet types.

### Choosing a location:

When choosing a location for a flush toilet and septic system, it is important to provide sufficient separation away from other water sources and dwellings.

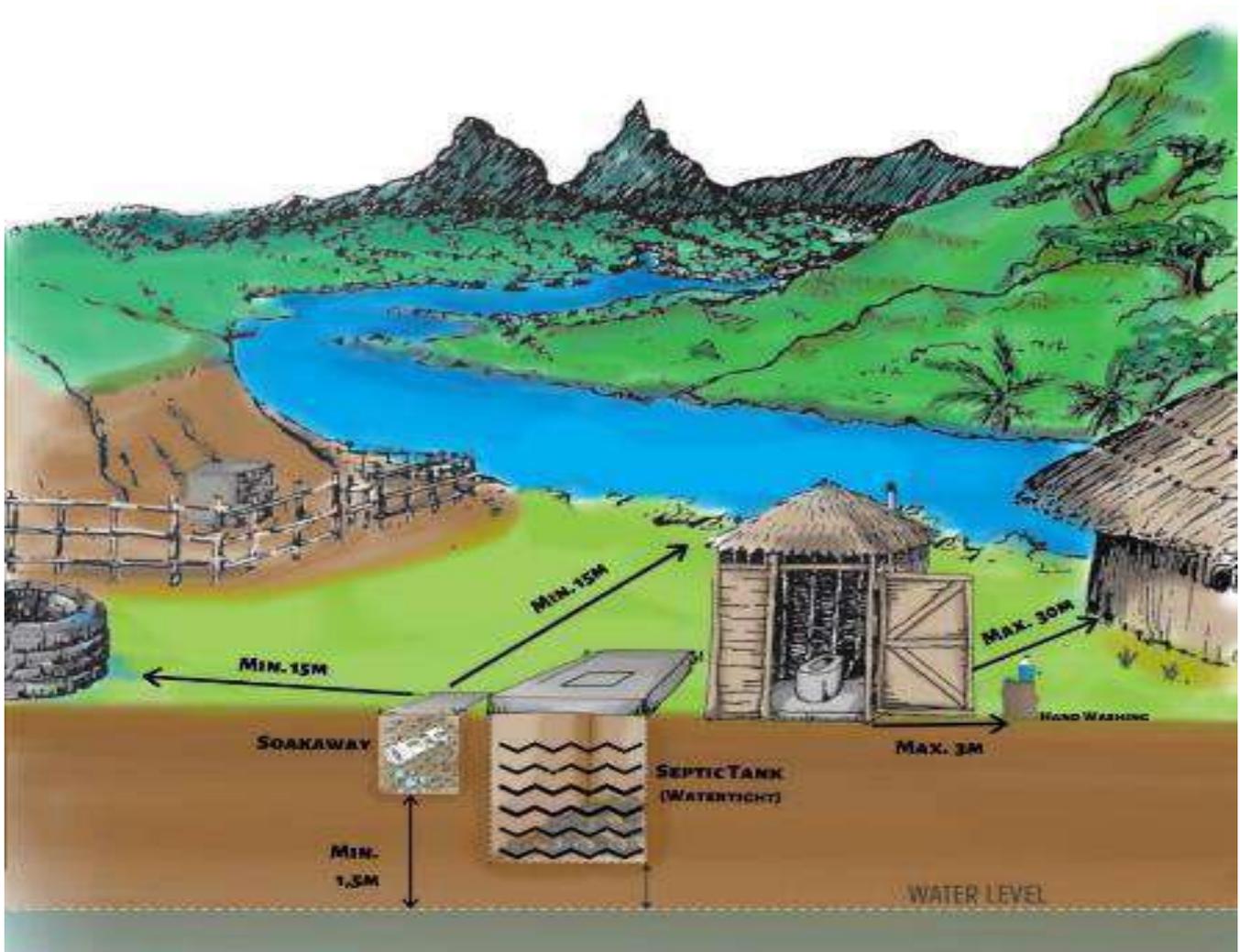


Figure 19: Siting a septic system

### Protecting drinking water sources

It is important that the flush toilet system is located to avoid contaminating drinking water sources. For this reason, the soak away pit or trenches should be located at least 30 metres from water sources or 15 metres downstream away when from rivers, lakes, streams or water wells and minimum 1.5 metres above higher groundwater table level (end of wet season). Note that for underground tanks – which are sealed off from the environment – the distance requirements do not apply.

### Flooding and storm water

To prevent the untreated wastewater from the septic tank escaping the system, the toilet should not be located in any areas prone to flooding, tidal surges, or large amounts of surface or storm water.

### Land availability

A flush toilet system should be constructed in an area which has land available to absorb the wastewater produced, therefore this may not be suitable solution for very small plots of land. A compost toilet would be an alternative solution for blocks not big enough for a septic system.

### Sizing the septic tank & soak-away drain:

Once a location has been chosen for the toilet, the next step is to design the septic tank and the soak-away drain.

### Septic tank sizing

A septic tank shall be sized based on the number of users, whether the system will receive black water only (just a toilet connected) or black & grey water (a toilet with other fixtures connected such as showers, washing machines, etc.) and considering an average of 2 years between removing the excess sludge in the 2 chambers. It is recommended to divert the greywater direct to the soak away trench to minimise the size of the septic tank.

The recommended design criteria for the septic tank is:

- 40L/day/person black water only (Household - Minimum household size to include 5 people).

For concrete septic tanks, constructed in-situ, refer to the following table for overall tank dimensions taken from the National Building Code of Vanuatu, 2017, for black water only (only toilet connected). Contractors will have to provide their own justifications for particular scenarios (e.g., Guest house, resorts, boarding schools...)

Table 4: Septic tank dimensions and volumes for desludging every 2 years (adapted from the National Building Code for Vanuatu, 2017)

| No. of Persons | ONLY TOILET WASTE |      |      |      |      |       |       |
|----------------|-------------------|------|------|------|------|-------|-------|
|                | A                 | B    | C    | D    | W    | V(m3) | F(m3) |
| 5-8            | 1000              | 400  | 1000 | 850  | 800  | 0.95  | 0.02  |
| 10-12          | 1000              | 600  | 1000 | 850  | 800  | 1.22  | 0.02  |
| 15             | 1000              | 600  | 1200 | 1050 | 800  | 1.34  | 0.03  |
| 25             | 1200              | 800  | 1200 | 1050 | 1000 | 2.10  | 0.05  |
| 50             | 1600              | 800  | 1400 | 1250 | 1000 | 3.00  | 0.06  |
| 100            | 2400              | 1200 | 1400 | 1250 | 1200 | 5.40  | 0.11  |
| 150            | 2600              | 1400 | 1600 | 1450 | 1400 | 8.12  | 0.16  |
| 200            | 3000              | 1600 | 1600 | 1450 | 1600 | 10.67 | 0.21  |
| 300            | 3400              | 1800 | 1800 | 1650 | 1800 | 15.44 | 0.31  |
| 400            | 4000              | 2200 | 1800 | 1650 | 2000 | 20.46 | 0.41  |
| 500            | 4200              | 2200 | 1800 | 1650 | 2400 | 25.34 | 0.51  |
| 600            | 4400              | 2400 | 2000 | 1850 | 2400 | 30.19 | 0.61  |

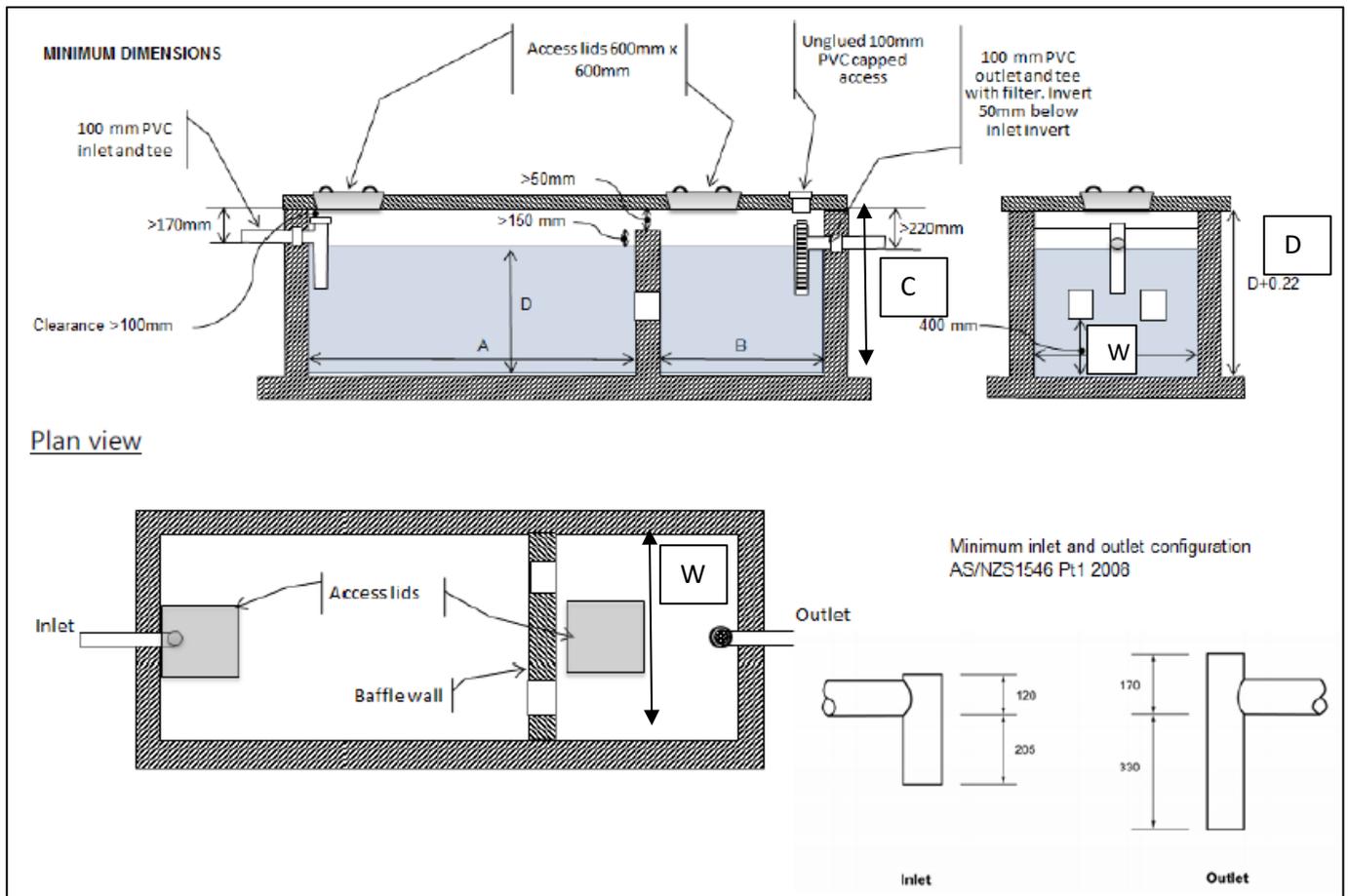


Figure 20: Concrete septic tank for domestic use (adapted from the Korosan guidelines in Fiji (NIWA, 2017))

In addition, the septic tank shall (National Building Code of Vanuatu and WHO Guidelines on Sanitation and Health):

- Have a total length of at least 3 times the width, with the solids retention chamber being double the size of the liquid retention chamber
- Have a liquid retention time of at least 36 hours



This guideline focuses on concrete septic tanks, constructed in-situ due to the general experience of the sanitation stakeholders with this technology; however, the following technologies are appropriate and available in Vanuatu:

## Concrete rings

This technology has the advantage to be easy to install and less likely to leak.



## Fiberglass and Poly/Plastic tanks

Some suppliers in Port Vila and Luganville sell pre-fabricated 'septic tanks' either fiberglass or Poly/Plastic ones. These would have the advantage of being easy to install and not likely to leak. Fiberglass tanks or poly/plastic tanks can also be redesigned to be used as septic tanks; however, investigations to date with local suppliers showed that simple tanks (with no separated chambers) are sold as septic tanks although they do not provide the same treatment levels.

It is possible to install two tanks inline to replicate waste treatment, similarly to a concrete septic tank, as per Figure 8.

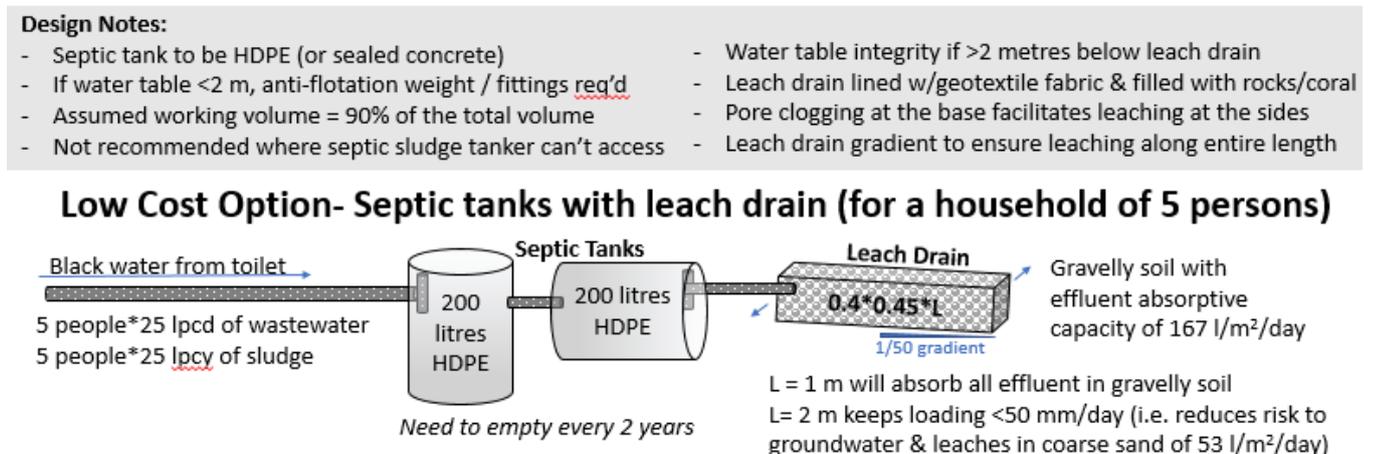


Figure 8: low cost option for septic tanks with leach drain

## Soak away sizing

The destruction of pathogens (bacteria, viruses and helminths) primarily occurs in the soil around the soakaway. As per the National Building Code of Vanuatu, if the toilet is within 50m of the sea or river (Marine and River Protection Zone), the soak away system needs to be extended as follows:

- Soak away shall be sized based on:
  - 40L/day/person black water only (Household - Minimum household size to include 5 people).
- Soak Away Pipe length must be:  $L (m) = \frac{0.02 \times \text{Litres per day}}{\text{Trench width (m)}}$ , assuming a coarse sandy soil with an absorptive capacity of around 53 litres/sqm/day leaching from the bottom.

(Maximum trench width to be 1 metre)

In addition:

- Soakaway pipe diameter to be minimum 100mm containing 8mm holes.
- Inspection points are to be provided at the beginning and end of the pipe run, with an end cap.
- Soakaway must be at least 15 meters horizontal distance from drinking water sources and minimum of 1.5 metres above high groundwater table level (end of wet season).
- 20cm of gravel is required above and below the drainage pipe, gravel aggregate size to be 20-40mm.
- A further 30cm of clean builders' sand is required on top of the gravel covering forming an above-ground mound.
- Soak away to be densely vegetated with nutrient and moisture absorbing plants, such as bananas and papayas. Large trees with invasive root growth are to be avoided. Refer to Tool 4 – Samples of Standard Drawings 3 Standard Flush Toilet with Septic Toilet, for further details.

## **ANNEX 6: APPROVED SAMPLE DESIGNS**

| DRAWING NUMBER | DRAWING NAME                                     | REVISION NO. | REVISION DATE |
|----------------|--|--------------|---------------|
| SD 0.01        | Drawings Schedule                                | 1            | 19/08/19      |
| SD 0.02        | Toilet Location Diagram                          | 2            | 20/11/19      |
| SD 0.03        | Technical Specifications                         | 1            | 19/08/19      |
| SD 0.04        | Seat Riser Mould                                 | 1            | 05/07/19      |
| SD 1.01        | VIP Toilet: Key Features                         | 2            | 20/11/19      |
| SD 1.02        | VIP Toilet: Pit Plan                             | 1            | 04/07/19      |
| SD 1.03        | VIP Toilet: Slab Plan                            | 1            | 04/07/19      |
| SD 1.04        | VIP Toilet: Floorplan                            | 1            | 04/07/19      |
| SD 1.05        | VIP Toilet: Framing Plan                         | 1            | 04/07/19      |
| SD 1.06        | VIP Toilet: Sections                             | 1            | 04/07/19      |
| SD 2.01        | Pour Flush Toilet: Key Features                  | 2            | 20/11/19      |
| SD 2.02        | Pour Flush Toilet: Pit Plan                      | 1            | 02/07/19      |
| SD 2.03        | Pour Flush Toilet: Slab Plan                     | 1            | 02/07/19      |
| SD 2.04        | Pour Flush Toilet: Floorplan                     | 1            | 02/07/19      |
| SD 2.05        | Pour Flush Toilet: Framing Plan                  | 1            | 02/07/19      |
| SD 2.06        | Pour Flush Toilet: Sections                      | 1            | 02/07/19      |
| SD 3.01        | Septic Toilet: Key Features                      | 1            | 04/07/19      |
| SD 3.02        | Septic Toilet: Floorplan                         | 1            | 04/07/19      |
| SD 3.03        | Septic Toilet: Framing Plan                      | 1            | 04/07/19      |
| SD 3.04        | Septic Toilet: Sections                          | 1            | 04/07/19      |
| SD 3.05        | Septic Toilet: Waste Treatment                   | 1            | 04/07/19      |
| SD 4.01        | Inclusive VIP Toilet with dual pit: Key Features | 1            | 20/11/19      |
| SD 4.02        | Inclusive VIP Toilet with dual pit: Pit Plan     | 1            | 20/11/19      |
| SD 4.03        | Inclusive VIP Toilet with dual pit: Slab Plan    | 1            | 20/11/19      |
| SD 4.04        | Inclusive VIP Toilet with dual pit: Floor Plan   | 2            | 28/11/19      |
| SD 4.05        | Inclusive VIP Toilet with dual pit: Framing Plan | 1            | 20/11/19      |
| SD 4.06        | Inclusive VIP Toilet with dual pit: Sections     | 2            | 28/11/19      |

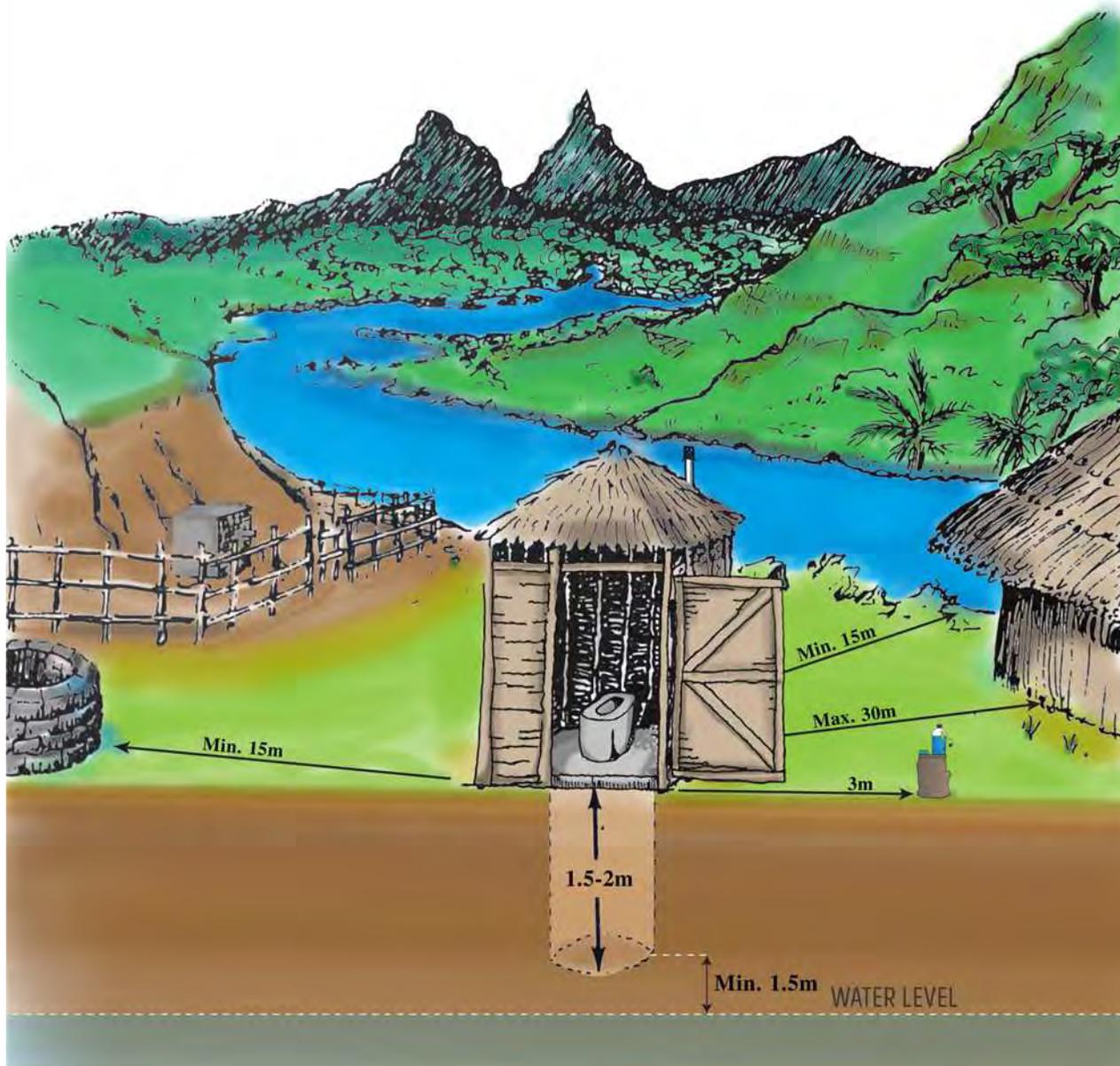


| REVISION | Date: | Name: | Description: |
|----------|-------|-------|--------------|
|          |       |       |              |
|          |       |       |              |
|          |       |       |              |

|               |   |
|---------------|---|
| Client:       | <b>Ministry of Health</b>                             |
| Project Name: | <b>Vanuatu Sanitation Guideline Standard Drawings</b> |
| Drafted:      | <b>December 4, 2019</b>                               |
| Checked:      |   |

|               |                         |
|---------------|-------------------------|
| Drawing name: | <b>Drawing Schedule</b> |
|---------------|-------------------------|

|                     |                |
|---------------------|----------------|
| Drawing no.:        | <b>SD 0.01</b> |
| Paper Size & Scale: | <b>A4</b>      |



| REVISION | Date: | Name: | Description: |
|----------|-------|-------|--------------|
|          |       |       |              |
|          |       |       |              |
|          |       |       |              |

|               |  |
|---------------|--|
| Client:       | Ministry of Health                             |
| Project Name: | Vanuatu Sanitation Guideline Standard Drawings |
| Drafted:      | November 20, 2019                              |
| Checked:      |  |

|               |                         |
|---------------|-------------------------|
| Drawing name: | Toilet Location Diagram |
|---------------|-------------------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 0.02 |
| Paper Size & Scale: | A4      |

## CONSTRUCTION SPECIFICATIONS

### CONCRETE

A concrete mix requires cement powder, sand and gravel. Crushed rock or coral can be used in place of gravel depending on location. If using sand from a beach or coral, it must be adequately washed in fresh water or left in a location where it will be rinsed adequately by rain prior to construction. Salt in the concrete causes the steel reinforcement to corrode and dramatically reduces the integrity and life of the concrete. Sand and gravel/coral should be sieved to remove dirt, sticks and other impurities which will weaken the concrete.

Mix the appropriate ratio for the application on a flat concrete surface, on a tarpaulin, in a bucket, or wheelbarrow.

Ratio for slab: 4 parts coral: 2 parts sand: 1-part cement

Ratio for riser: 2 parts sand: 1-part cement

Ratio for walls: 2 parts sand: 1-part cement

Ratio for repair work: 1-part sand: 1-part cement

Mix thoroughly. Push the mix into a mound and make a hole in the top approximately half the diameter of the mound. Pour water in to the hole and fold the dry mix on the outside up into the middle slowly until the water has mixed through the dry materials.

The mix should be just runny enough to “pour” but not too runny. A drier mix will cure more uniformly and be stronger in the end. Position the formwork for the holes into the frame at the correct locations. Pour the mix into the formwork and fill it half way (approx. 25-40mm). Place the mesh wire on top of the bottom layer of concrete mix. Pour the remaining mix into the frame to the top of the formwork. Use a straight piece of timber spanned between the formwork to level the concrete mix. Scrape off any areas where too much cement mix is present and add more cement mix where it is low. Alternatively, the centre of the slab can be made up to 10mm thicker to aid with drainage. Keep in mind the weight of the slab when determining thickness. Cover the slab with plastic or leaves and leave to dry for 3-4 days. Sprinkle the slab with water each day to help the slab cure uniformly. Once dry, lift the slab on top of the pit location to its final location ensuring both vent pipe hole and toilet hole are positioned correctly above the pit.

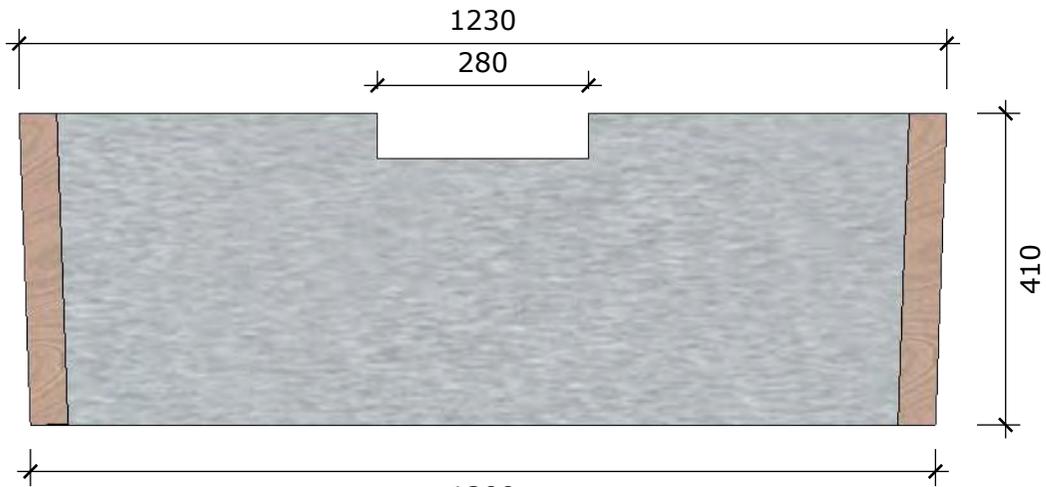


| REVISION | Date: | Name: | Description: |
|----------|-------|-------|--------------|
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|          |       |       |              |
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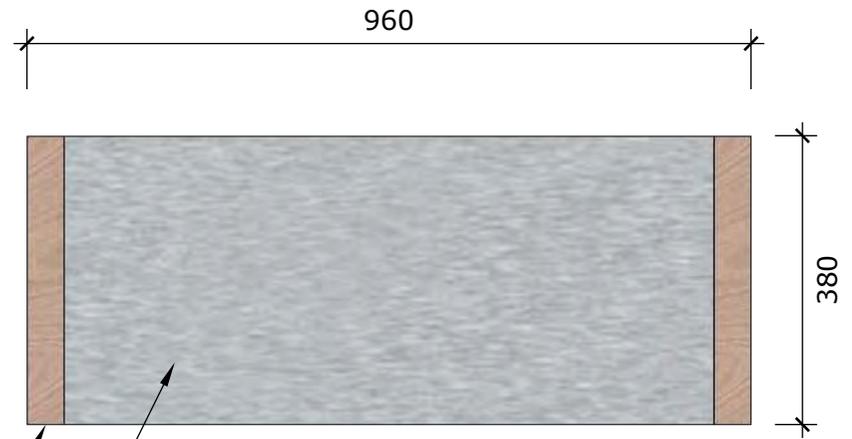
|               |  |
|---------------|--|
| Client:       | Ministry of Health                             |
| Project Name: | Vanuatu Sanitation Guideline Standard Drawings |
| Drafted:      | September 23, 2019                             |
| Checked:      |  |

|               |                          |
|---------------|--------------------------|
| Drawing name: | Technical Specifications |
|---------------|--------------------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 0.03 |
| Paper Size & Scale: | A4      |



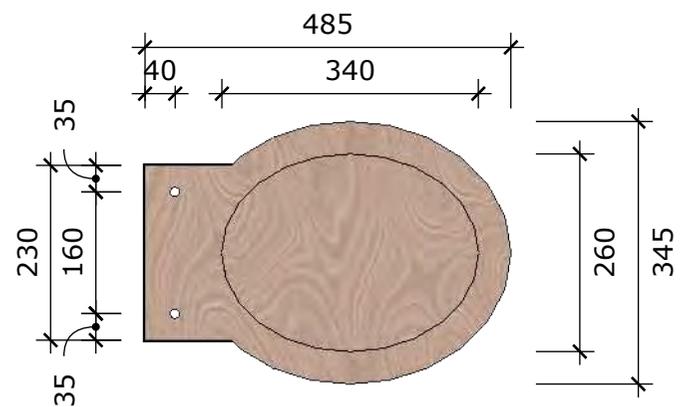
**1200**  
**OUTER MOULD**



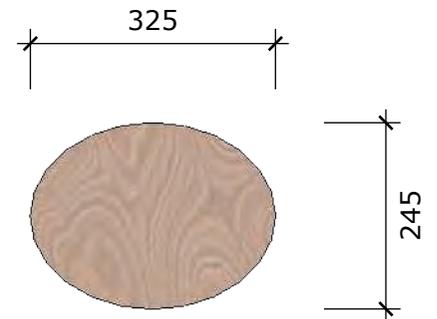
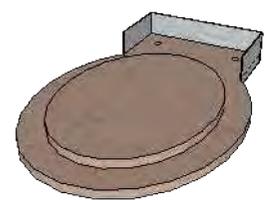
**INNER MOULD**

50MM X 50MM TIMBER  
OR SIMILAR

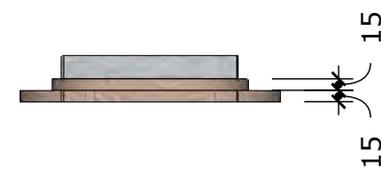
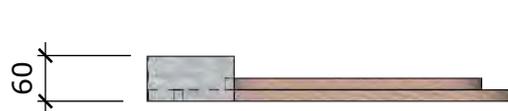
FLAT SHEET METAL



**BOTTOM MOULD**



**TOP MOULD**



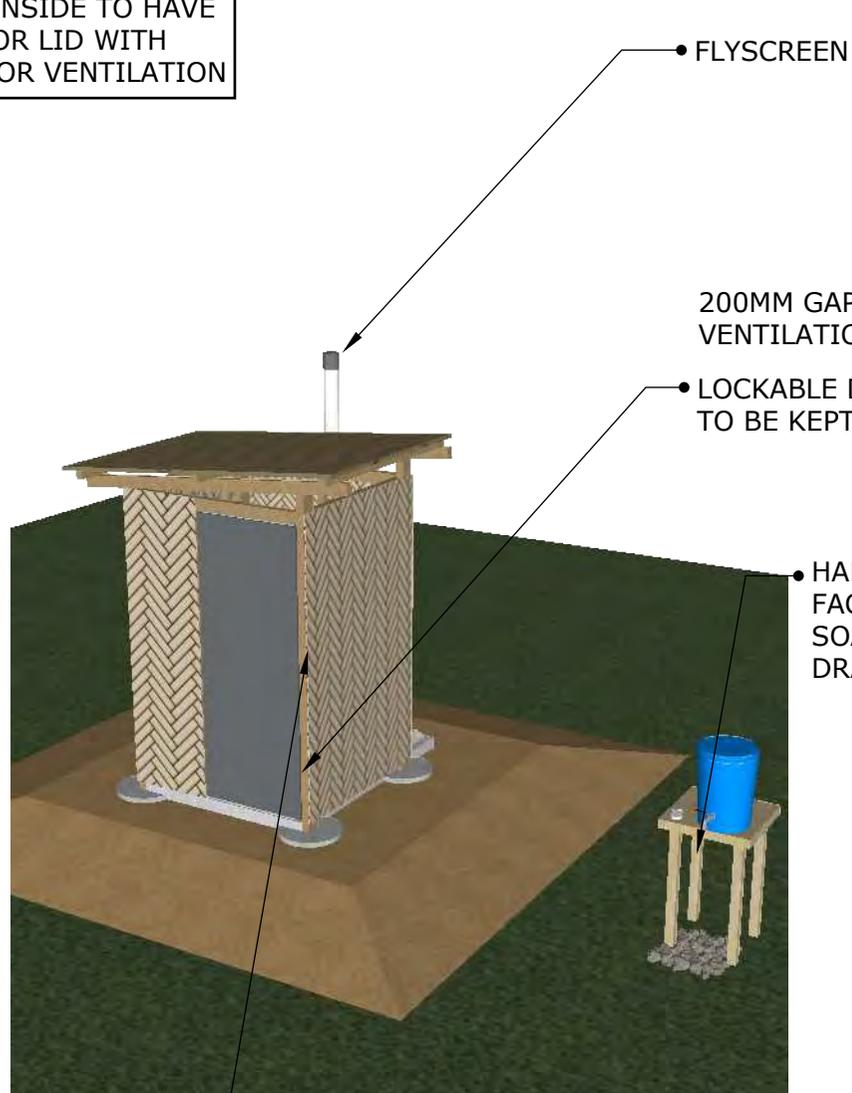
| REVISION | Date: | Name: | Description: |
|----------|-------|-------|--------------|
|          |       |       |              |
|          |       |       |              |
|          |       |       |              |

|               |  |
|---------------|--|
| Client:       | Ministry of Health                             |
| Project Name: | Vanuatu Sanitation Guideline Standard Drawings |
| Drafted:      | September 23, 2019                             |
| Checked:      |  |

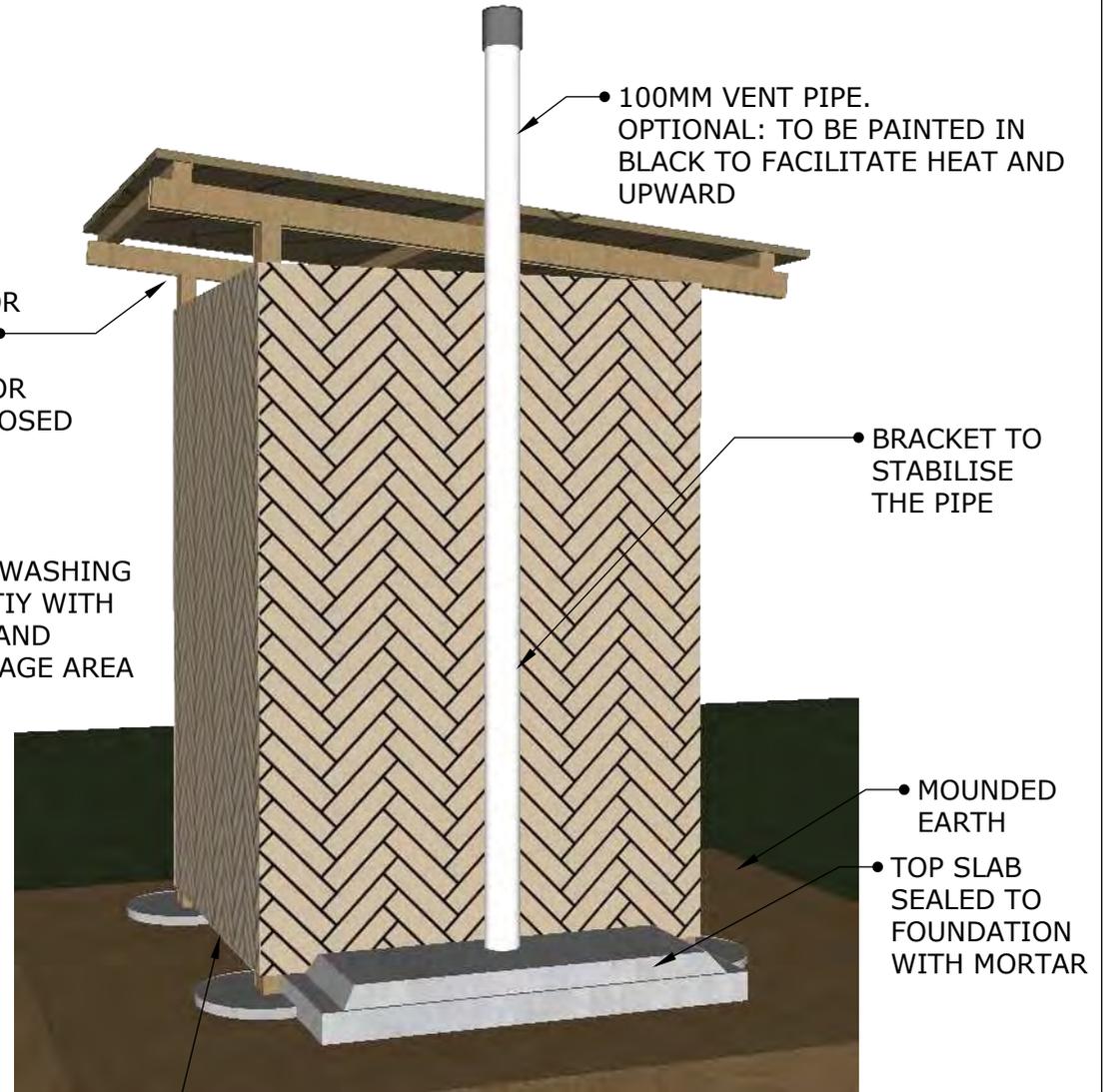
|               |                  |
|---------------|------------------|
| Drawing name: | Seat Riser Mould |
|---------------|------------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 0.04 |
| Paper Size & Scale: | A4      |

TOILET INSIDE TO HAVE NO LID OR LID WITH MESH, FOR VENTILATION



**FRONT PERSPECTIVE**



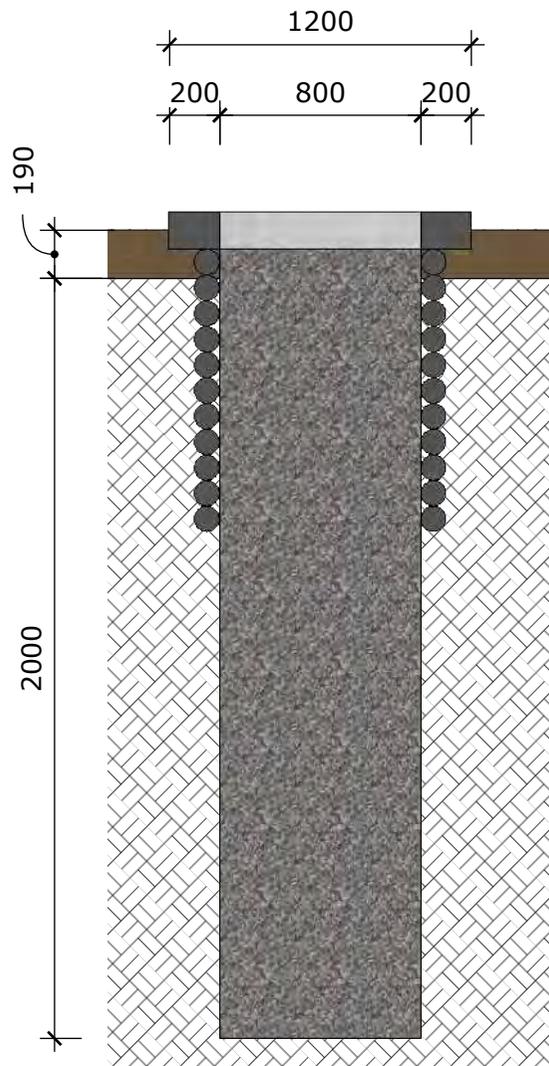
**BACK PERSPECTIVE**

LOCAL MATERIAL CLADDING

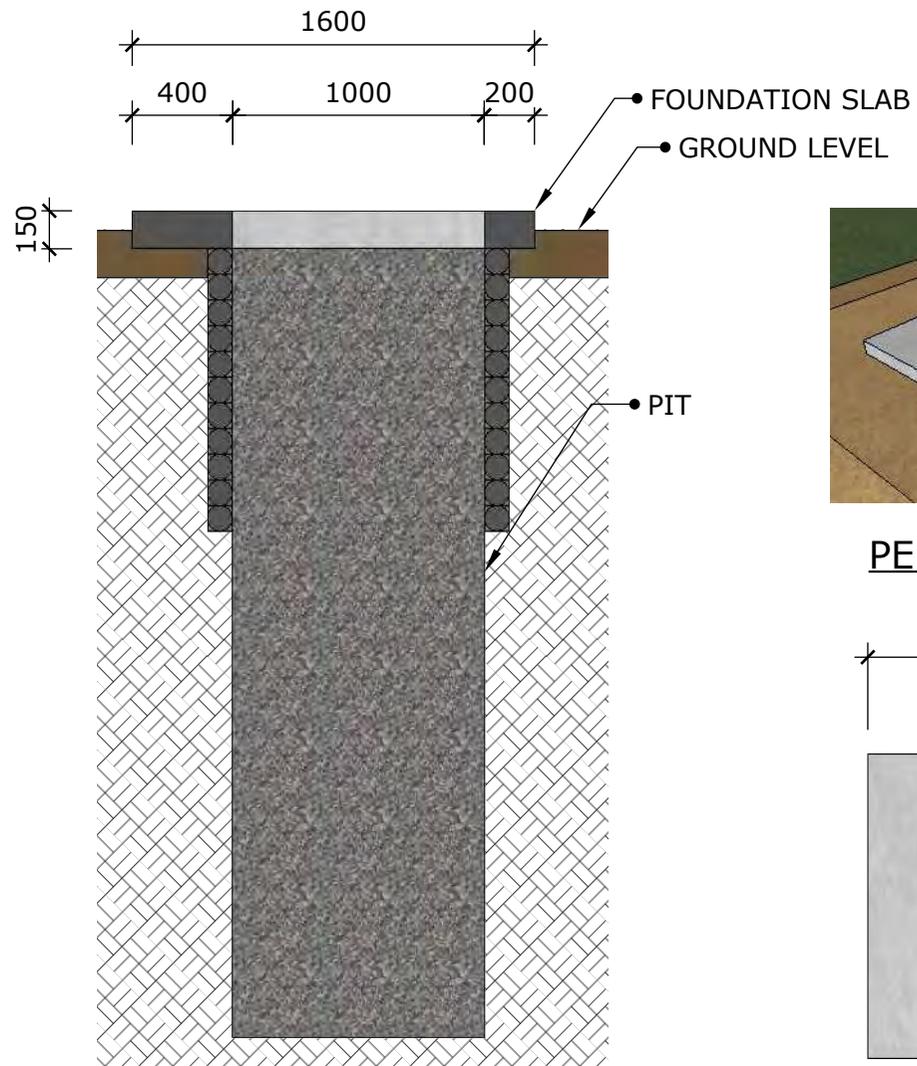
50MM GAP UNDER WALLING FOR EASY CLEANING

SURFACE AROUND TOILET TO BE COVERED WITH CORAL OR STONES

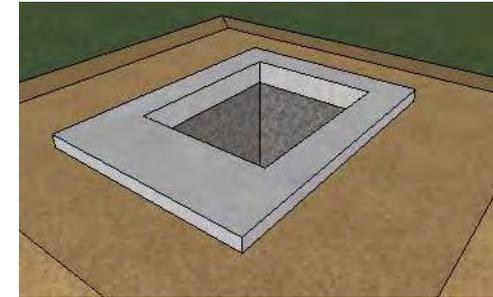
|   |          |          |                |              |               |                    |               |              |                     |         |
|---|----------|----------|----------------|--------------|---------------|--------------------|---------------|--------------|---------------------|---------|
|  | REVISION | Date:    | Name:          | Description: | Client:       | Ministry of Health | Drawing name: | Key Features | Drawing no.:        | SD 1.01 |
|   |          |          |                |              | Project Name: | VIP Toilet         |               |              | Paper Size & Scale: | A4      |
|   |          | 04/07/19 | Naomi Shanahan | Revision 1   | Drafted:      | November 13, 2019  | Checked:      |              |                     |         |



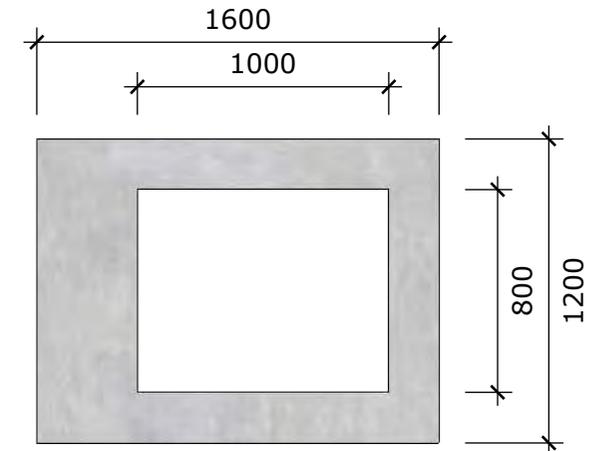
FRONT SECTION VIEW



SIDE SECTION VIEW



PERSPECTIVE VIEW



PLAN VIEW

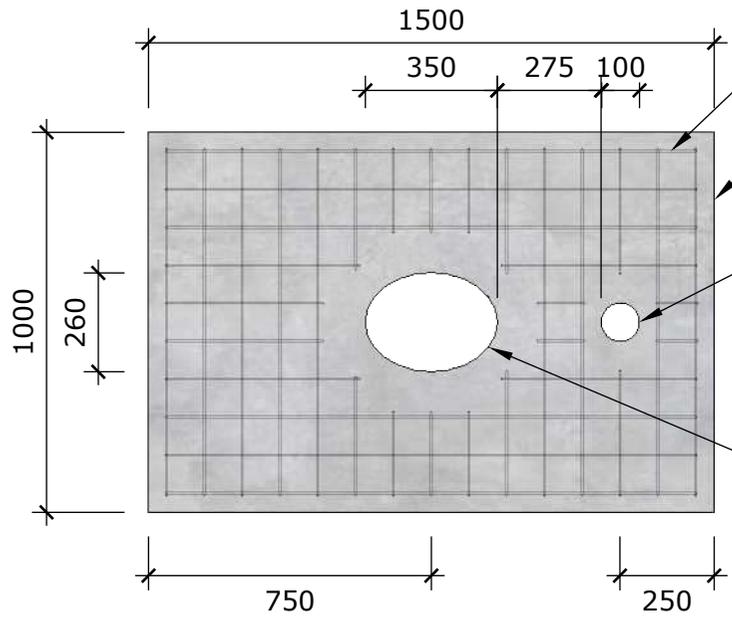


| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | VIP Toilet         |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.02 |
| Paper Size & Scale: | A4 1:30 |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.02 |
| Paper Size & Scale: | A4 1:30 |



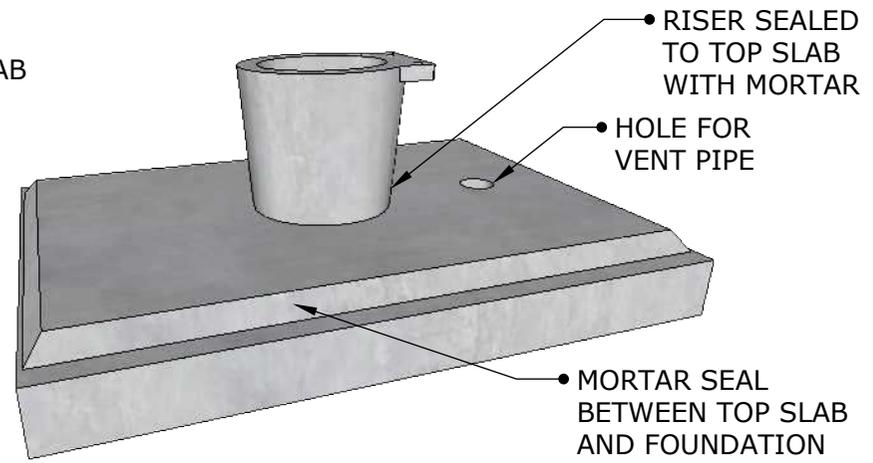
**TOP SLAB**

**OPTIONAL:** HANDLES PRECAST IN THE TOP SLAB TO ASSIST MOVING IT TO ANOTHER PIT.

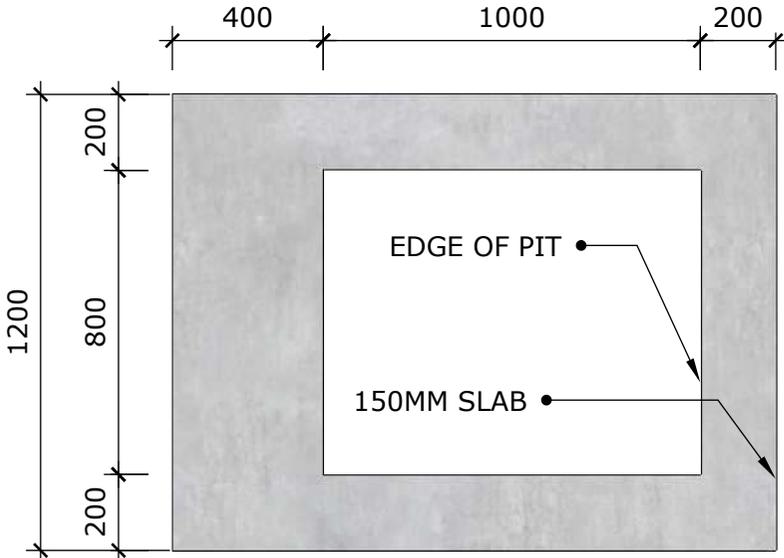
- 100MM X 100MM REINFORCING MESH
- 50MM REINFORCED SLAB OR 150MM UNREINFORCED SLAB

• HOLE FOR VENT PIPE

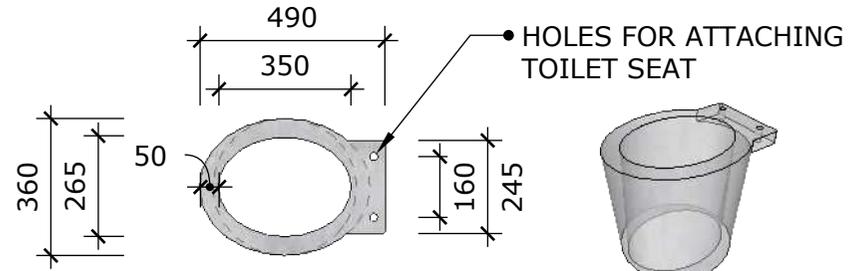
• HOLE FOR WASTE.  
 OPTION A: CONCRETE RISER  
 OPTION B: SQUAT KEY HOLE AND FOOT REST



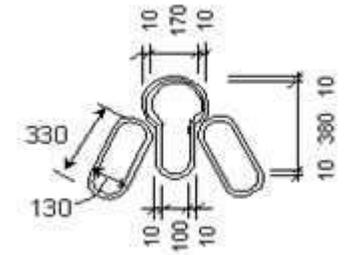
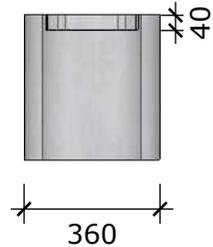
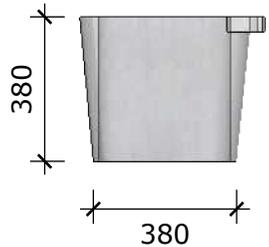
**SLAB PERSPECTIVE WITH CONCRETE RISER**



**FOUNDATION SLAB PLAN**

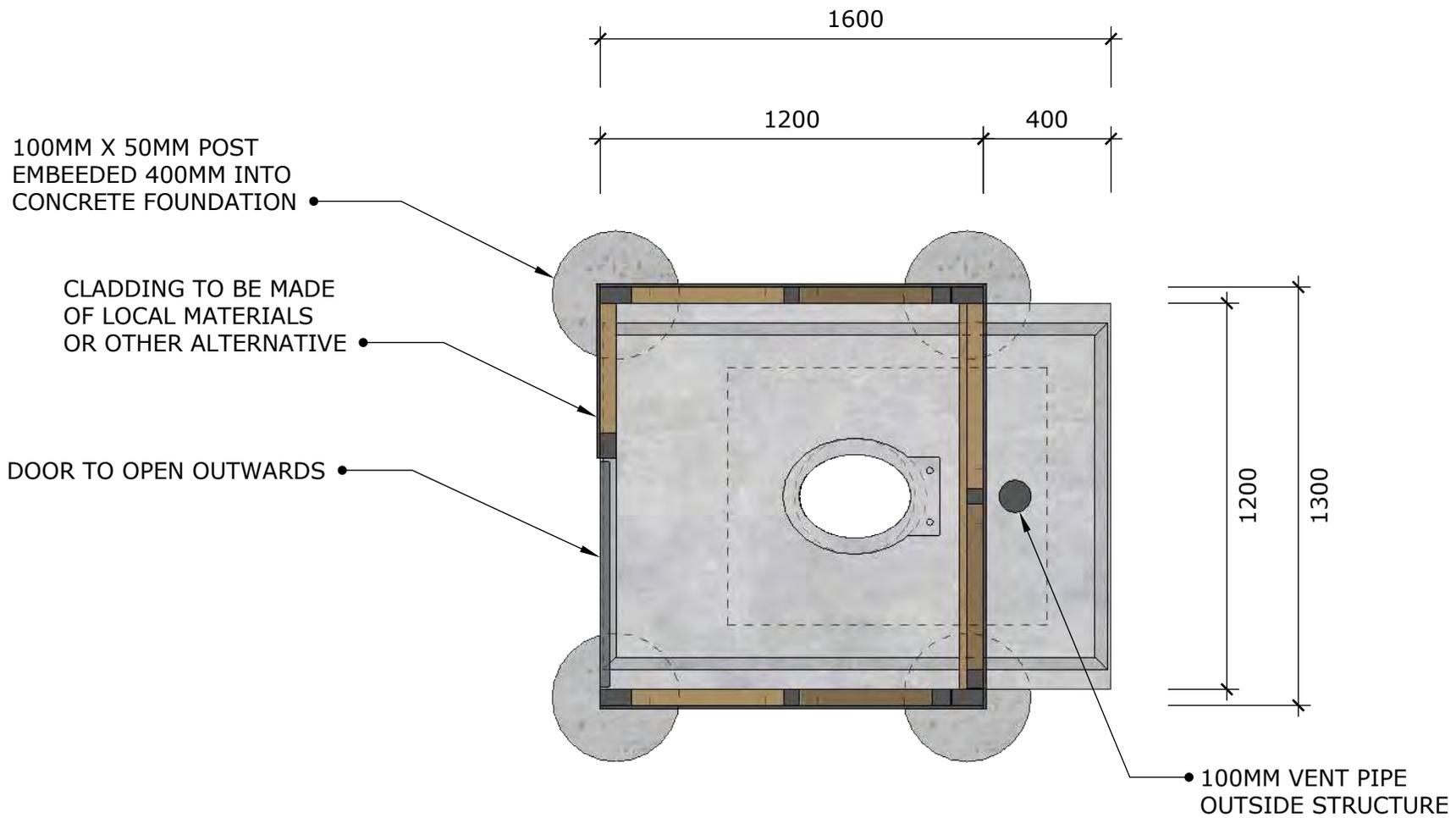


**OPTION A: CONCRETE RISER**



**OPTION B: SQUAT KEY HOLE**

|   |          |                |              |               |                    |               |           |                     |         |
|---|----------|----------------|--------------|---------------|--------------------|---------------|-----------|---------------------|---------|
|  | Date:    | Name:          | Description: | Client:       | Ministry of Health | Drawing name: | Slab Plan | Drawing no.:        | SD 1.03 |
|   | 04/07/19 | Naomi Shanahan | Revision 1   | Project Name: | VIP Toilet         |               |           | Paper Size & Scale: | A4 1:20 |
|   |          |                |              | Drafted:      | December 4, 2014   | Checked:      |           |                     |         |



## FLOORPLAN



| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | VIP Toilet         |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

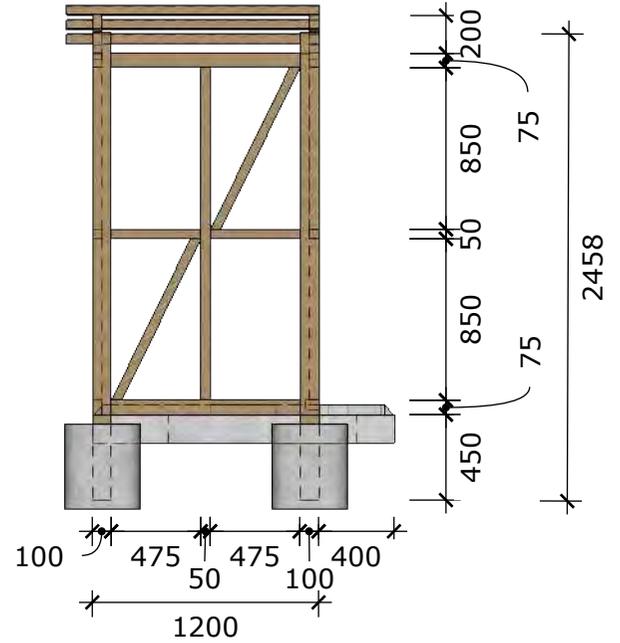
|               |           |
|---------------|-----------|
| Drawing name: | Floorplan |
|---------------|-----------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.04 |
| Paper Size & Scale: | A4 1:20 |

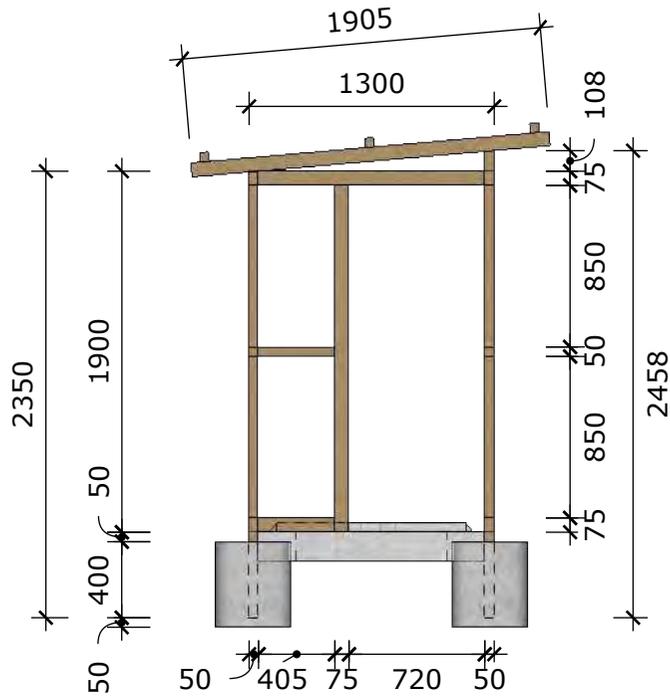


**PERSPECTIVE**

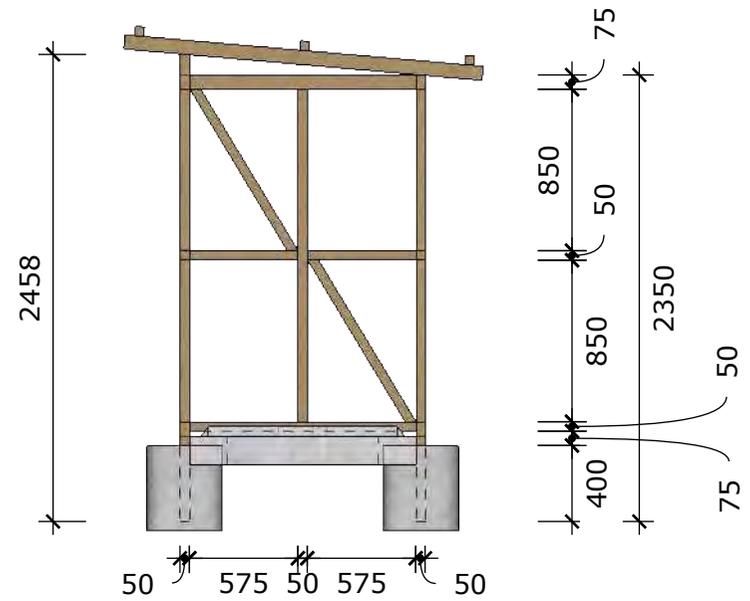
OPTIONAL: METALLIC BOLTED LIAISON BETWEEN CONCRETE AND TIMBER POLE TO HELP MOVING THE STRUCTURE TO ANOTHER PIT



**SIDE FRAME**



**FRONT FRAME**



**REAR FRAME**

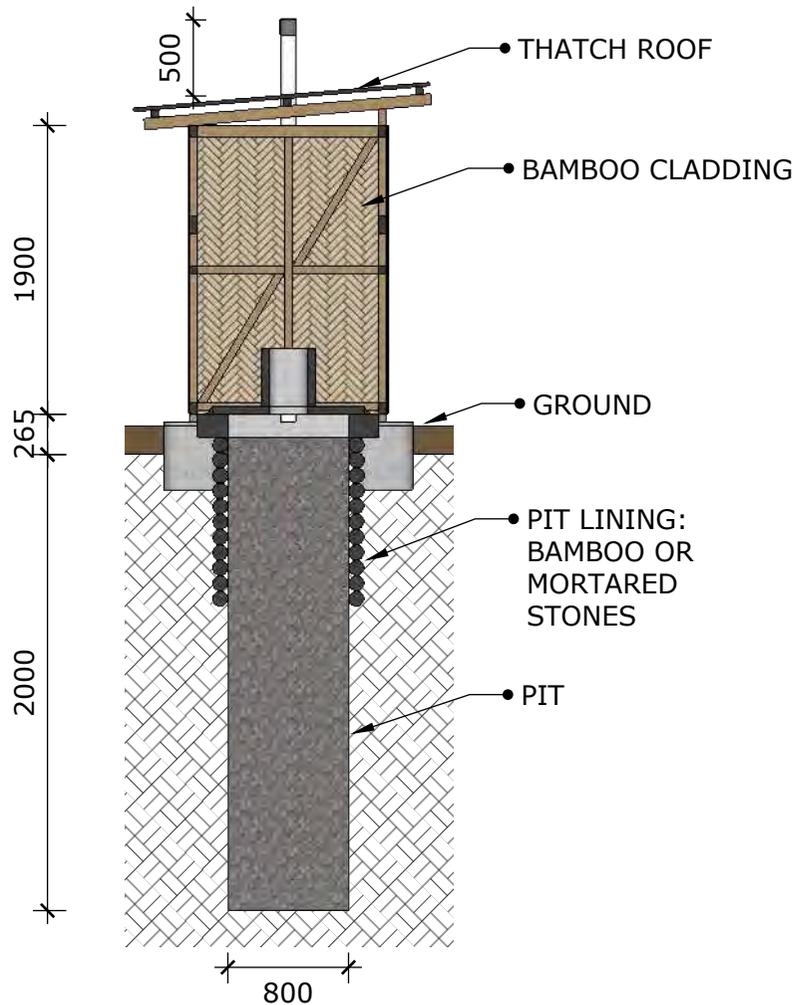


| REVISION | Date:    | Name:          | Description: |
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|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

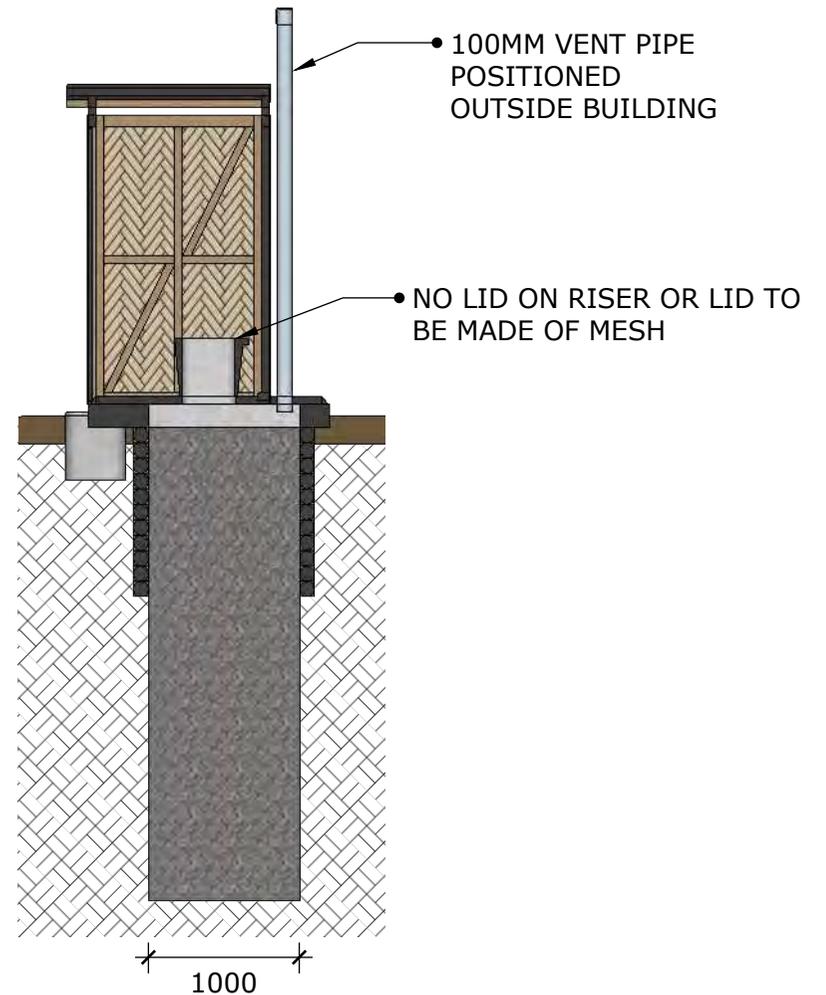
|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | VIP Toilet         |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

|               |              |
|---------------|--------------|
| Drawing name: | Framing Plan |
|---------------|--------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.05 |
| Paper Size & Scale: | A4 1:40 |



**FRONT SECTION**



**SIDE SECTION**



| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | VIP Toilet         |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

|               |          |
|---------------|----------|
| Drawing name: | Sections |
|---------------|----------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.06 |
| Paper Size & Scale: | A4 1:50 |

### MATERIAL LIST FOR ONE VIP TOILET - LOCAL MATERIAL

General notes:

- Costing for Efate Province

- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| DESCRIPTION  | QTY   | UNIT         | UNIT COST | Total Cost    | Notes   |
|--|---|--------------|-----------|---------------|---|
| <b>Slab, Vent Pipe, Seat riser and Foundation</b>                  |   |              |           |               |   |
| Cement 40kg bags   | 3   | Bags         | 1,000     | 3000          |   |
| Masonite for foundation slab frame                                 | 4   | Pcs          | 1000      | 4,000         |   |
| NO. 6 Rod Wire for slab reinforcement                              | 3   | pcs          | 762       | 2,286         | Rod wire and tie wire can be replacement by Mesh Reinforcing Weir F62 6mm x 5800 x 2300 |
| Tie wire for slab reinforcement                                    | 1   | kg           | 300       | 300           |   |
| Timber for slab mould - 50 x 50 x 1.5m                             | 1.5   | 4.8 m length | 1,290     | 1935          |   |
| Chicken wire - 10mm  | 0.5   | 1800x 500mm  | 300       | 150           | Purchase is often made for 1 full roll  |
| Plastic toilet seat (remove lid)                                   | 1   | Pcs.         | 1,140     | 1140          |   |
| PVC Pipe - 100mm x 2.9m  | 0.5   | 5.8 m length | 5,000     | 2500          | Cost is for full PVC pipe 5.8m  |
| Fly screen pieces - 40cm x 40cm square only                        | 1   | Pcs.         | 305       | 305           |   |
| <b>Sub-total A: Slab, Vent Pipe, Seat riser and Foundation</b>     |   |              |           | <b>15616</b>  |   |
| <b>Local House Structure</b>                                       |   |              |           |               |   |
| Door hinges Butt FP Brass 75mm (For right-hand outswing)           | 2   | Pcs.         | 873       | 1746          |   |
| Door locking system (inside and outside the toilet)                | 2   | Pcs.         |           | 0             |   |
| Nails - 4"   | 1   | kg           | 380       | 380           |   |
| Local Materials (small wood: 50mm diameter)                        | 35  | m            |           | 0             |   |
| Local Materials (medium wood: 75mm diameter)                       | 20  | m            |           | 0             |   |
| Local Materials (big wood: 100mm diameter)                         | 10  | m            |           | 0             | Exact sizes: Posts 2@ 2350mm and 2@ 2458mm  |
| Roof   | Appropriate roofing: natangura. If using, iron roof, refer to full house structure  |              |           |               |   |
| Walling  | Appropriate walling: bamboo or natangura. If using corrugated iron, flat iron sheets or masonite, refer to full house structure |              |           |               |   |
| <b>Sub-total B: Timber structure and local walling and roofing</b> |   |              |           | <b>2126</b>   |   |
| <b>Hand-washing facility</b>                                       |   |              |           |               |   |
| Handwashing station: tippy tap or equivalent                       | 1   | Unit         |           | 0             |   |
| <b>Materials for Construction</b>                                  |   |              |           |               |   |
| Mould for seat riser: Request one to Provincial Officer            | 1   | Unit         |           | 0             |   |
| Black plastic 4mx4m  | 1   | roll         | 450       | 450           |   |
| Spades, tape measure, hammer, hand saw, snip cutter, levels        |   |              |           |               |   |
| <b>Optional items</b>  |   |              |           |               |   |
| Black paint  | 0.25  | 1 Litre      | 2000      | 500           |   |
| Sand   | 0.216   | m3           | 4200      | 907.2         |   |
| Coral  | 0.108   | m3           | 4500      | 486           |   |
| Delivery of Sand and Coral   |   |              |           |               |   |
| <b>Total: A + B</b>  |   |              |           | <b>17,742</b> |   |

**MATERIAL LIST FOR ONE VIP TOILET - IMPORTED MATERIAL**

General notes:

- Costing for Efate Province
- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| DESCRIPTION  | QTY   | UNIT         | UNIT COST | Total Cost    | Notes   |
|--|-------|--------------|-----------|---------------|---|
| <b>Slab, Vent Pipe, Seat riser and Foundation</b>              |       |              |           |               |   |
| Cement 40kg bags   | 3     | Bags         | 1,000     | 3000          |   |
| Masonite for foundation slab frame                             | 4     | Pcs          | 1000      | 4,000         |   |
| NO. 6 Rod Wire for slab reinforcement                          | 3     | pcs          | 762       | 2,286         | Rod wire and tie wire can be replacement by Mesh Reinforcing Weir F62 6mm x 5800 x 2300 |
| Tie wire for slab reinforcement                                | 1     | kg           | 300       | 300           |   |
| Timber for slab mould - 50 x 50 x 1.5m                         | 1.5   | 4.8 m length | 1,290     | 1935          |   |
| Chicken wire - 10mm  | 0.5   | 1800x 500mm  | 300       | 150           | Purchase is often made for 1 full roll  |
| Plastic toilet seat (remove lid)                               | 1     | Pcs.         | 1,140     | 1140          |   |
| PVC Pipe - 100mm x 2.9m  | 0.5   | 5.8 m length | 5,000     | 2500          | Cost is for full PVC pipe 5.8m  |
| Fly screen pieces - 40cm x 40cm square only                    | 1     | Pcs.         | 305       | 305           |   |
| Sand   | 0.216 | m3           | 4200      | 907           |   |
| Coral  | 0.108 | m3           | 4500      | 486           |   |
| <b>Sub-total A: Slab, Vent Pipe, Seat riser and Foundation</b> |       |              |           | <b>17009</b>  |   |
| <b>Full House Structure</b>                                    |       |              |           |               |   |
| Door hinges Butt FP Brass 75mm (For right-hand outswing)       | 2     | Pcs.         | 873       | 1746          |   |
| Sliding latch for door lock (inside and outside the toilet)    | 2     | Pcs.         | 594       | 1188          |   |
| Timber 50mm x 50mm x 4.8m for purlins and door frame           | 7     | Pcs.         | 1,290     | 9030          | Or 6 @ 6m   |
| Timber 50mm x 75mm x 4.8m for the rafter                       | 4     | Pcs.         | 1,980     | 7920          | Or 3 @ 6m   |
| Timber 50mm x 100mm x 6m for the stud / house structure        | 2     | Pcs          | 2,500     | 5000          | Exact sizes: Posts 2@ 2350mm and 2@ 2458mm  |
| Nails - 4"   | 1     | kg           | 380       | 380           |   |
| Roof nails   | 1     | kg           | 550       | 550           |   |
| Door - door skin   | 4     | pcs          | 1,606     | 6424          |   |
| Corrugated iron for walling - 2.4m                             | 7     | Pc           | 1,776     | 12432         |   |
| Galvanised Iron roof - 2.4m                                    | 3     | Pcs.         | 2,705     | 8115          |   |
| <b>Sub-total B: Full imported structure</b>                    |       |              |           | <b>52785</b>  |   |
| <b>Hand-washing facility</b>                                   |       |              |           |               |   |
| Handwashing bucket with tap [Sub-total C]                      | 1     | Unit         | 1500      | 1500          | Free if using own bucket or tippy-tap   |
| <b>Materials for Construction</b>                              |       |              |           |               |   |
| Mould for seat riser: Request one to Provincial Officer        | 1     | Unit         | 0         | 0             |   |
| Black plastic 4mx4m  | 1     | roll         | 450       | 450           |   |
| Spades, tape measure, hammer, hand saw, snip cutter, levels    |       |              |           |               |   |
| <b>Optional items</b>  |       |              |           |               |   |
| Black paint  | 0.25  | 1 Litre      | 2000      | 500           |   |
| Delivery of Sand and Coral                                     |       |              |           |               |   |
| Galvanised jolt head nails 100x4.5MMx1KG 25/CTN                | 2     | kg           | 765       | 1530          |   |
| Galvanised flat head nail 25x1.6MMx1KG 25/CTN                  | 1     | kg           | 725       | 725           |   |
| M10x125mm dyna bolts for walls                                 | 8     | Pcs.         | 1,280     | 10240         |   |
| <b>Total: A + B + C</b>  |       |              |           | <b>71,294</b> |   |

HANDWASHING STATION TO BE PROVIDED

SURFACE AROUND TOILET TO BE COVERED WITH CORALS OR STONES

POUR AND FLUSH

LOCKABLE DOOR

WATER SEALED TOILET

GAP FOR VENTILATION AND LIGHT

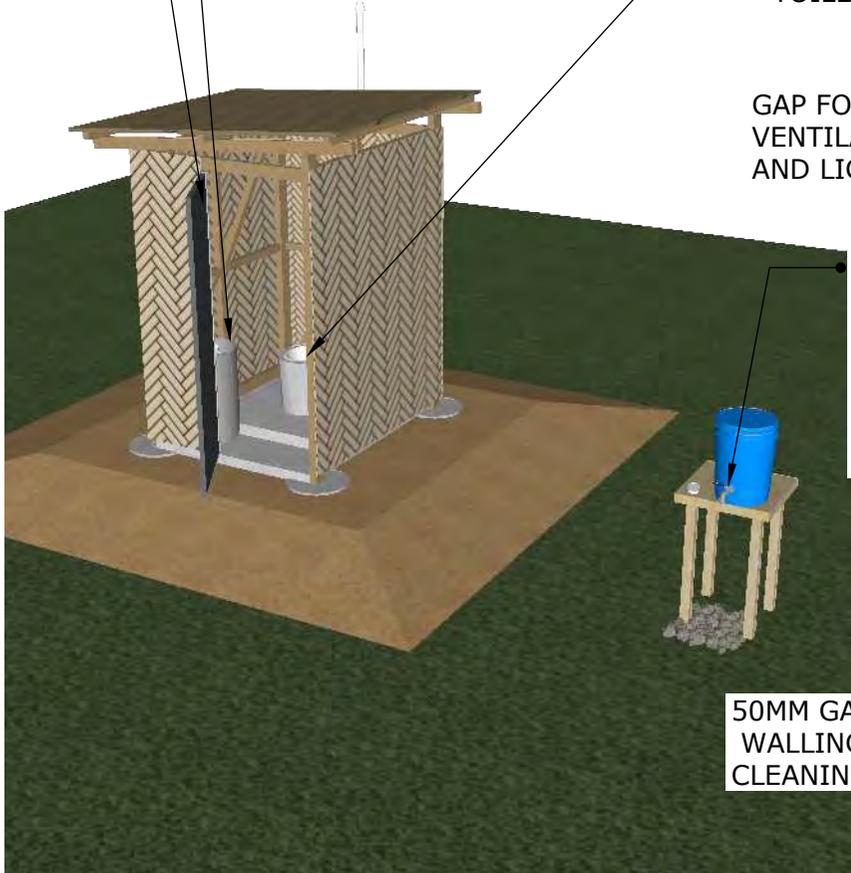
HAND WASHING FACILITY WITH SOAP AND DRAINAGE AREA

50MM GAP UNDER WALLING FOR EASY CLEANING

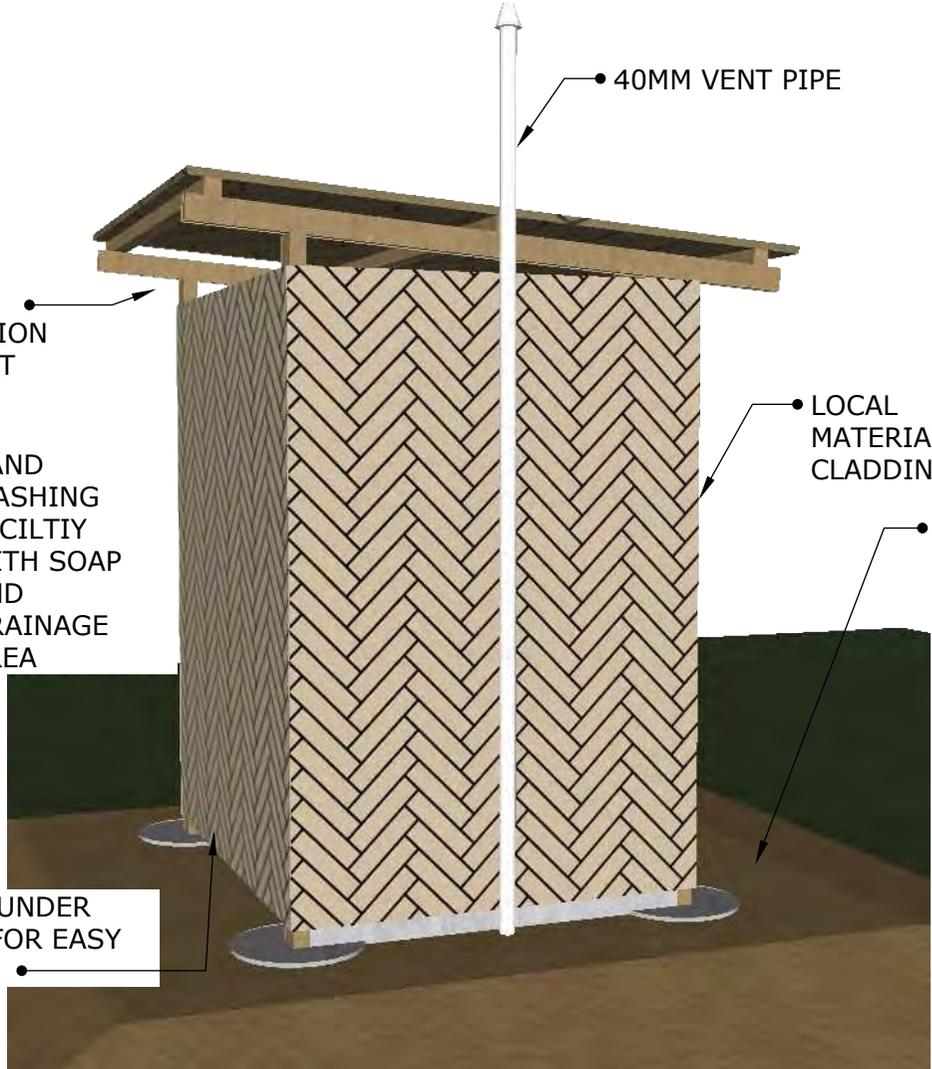
40MM VENT PIPE

LOCAL MATERIAL CLADDING

MOUNDED EARTH



FRONT PERSPECTIVE



BACK PERSPECTIVE

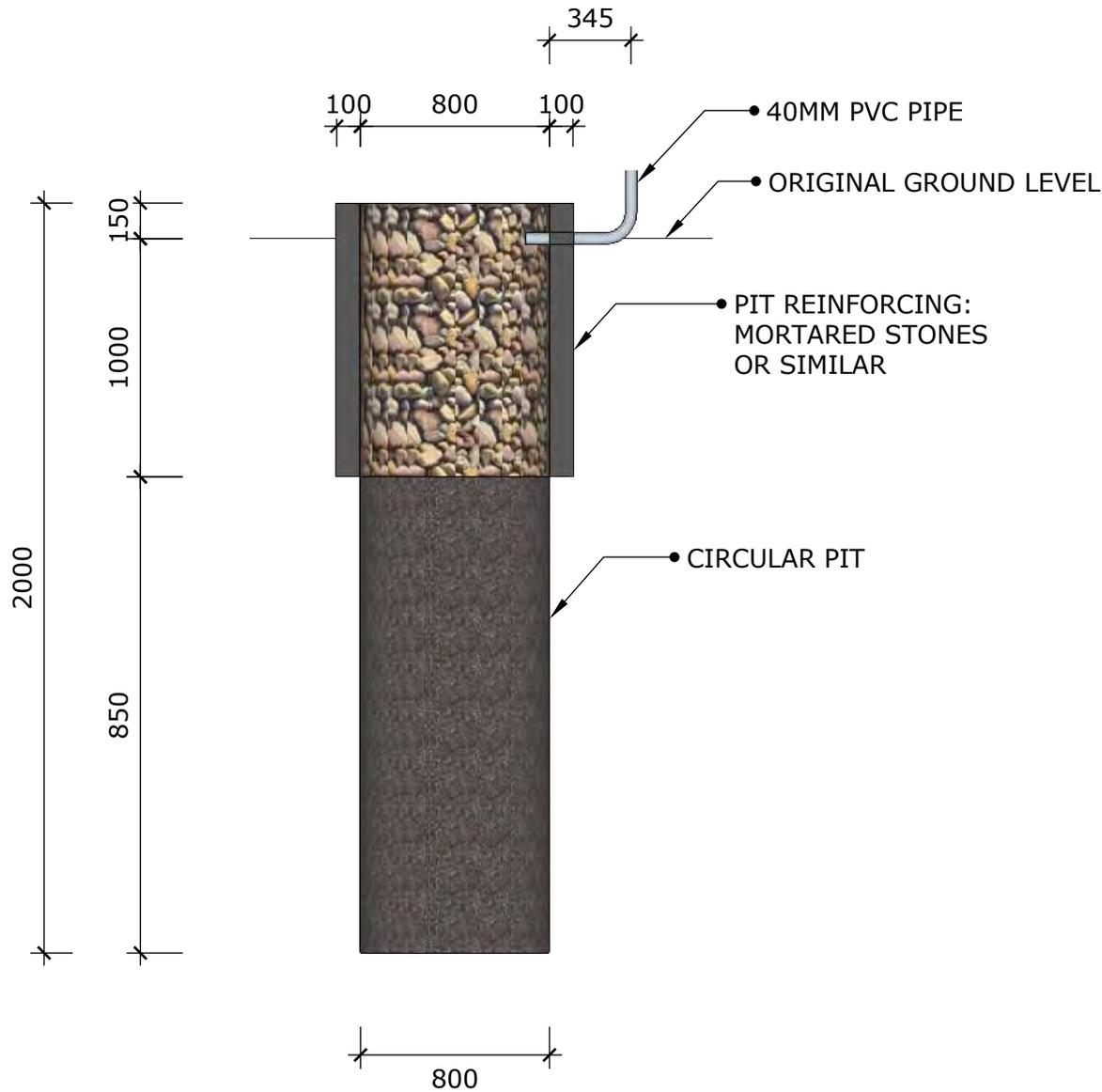


| REVISION | Date:          | Name:      | Description: |
|----------|----------------|------------|--------------|
| 02/07/19 | Naomi Shanahan | Revision 1 |              |

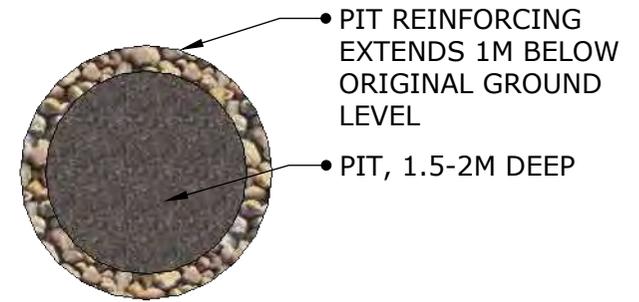
|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | Pour Flush Toilet  |
| Drafted:      | November 20, 2019  |

|               |              |
|---------------|--------------|
| Drawing name: | Key Features |
|---------------|--------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 2.01 |
| Paper Size & Scale: | A4      |



**SECTION VIEW**



**PLAN VIEW**

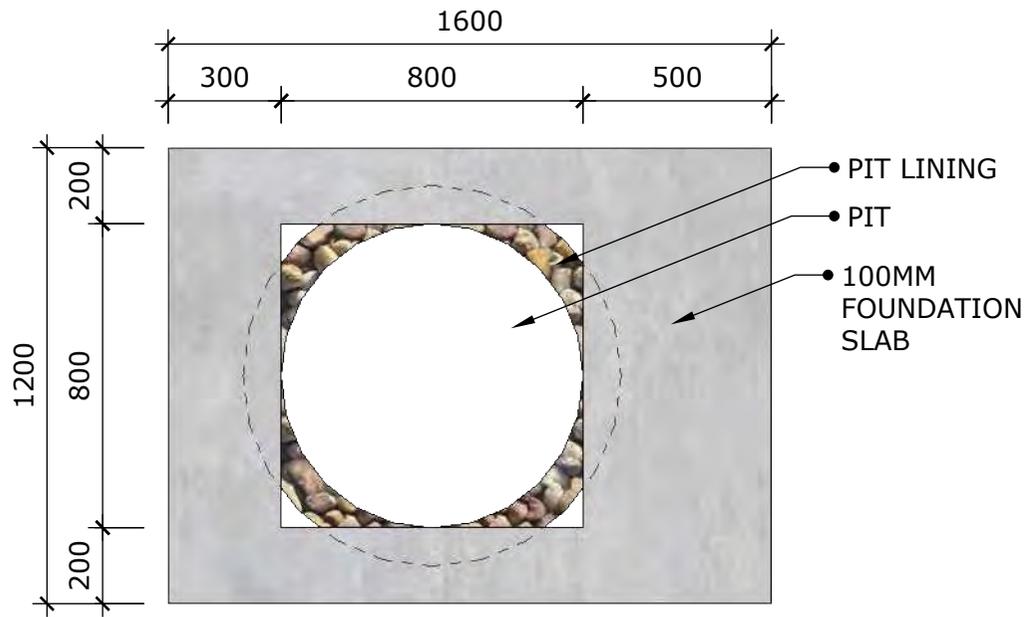


| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 02/07/19 | Naomi Shanahan | Revision 1   |

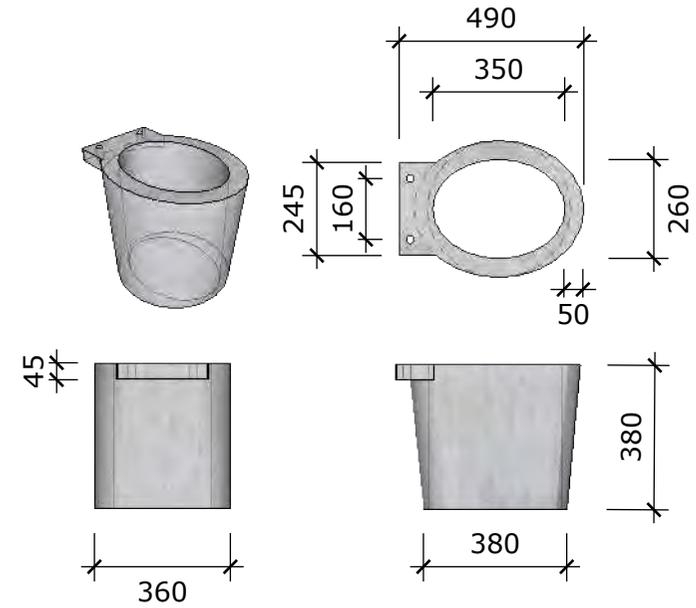
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| Client:       | Ministry of Health |
| Project Name: | Pour Flush Toilet  |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

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|---------------|----------|

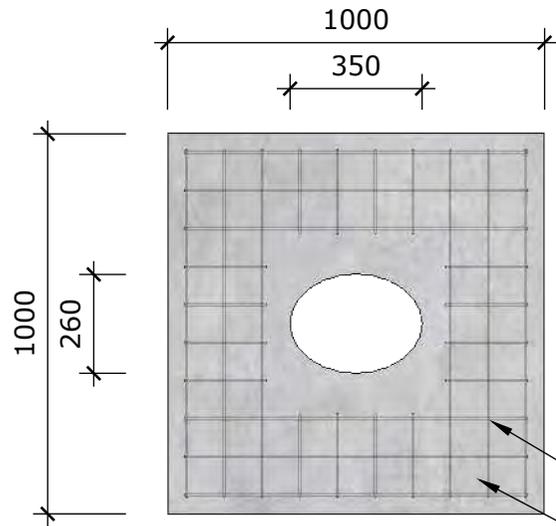
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| Paper Size & Scale: | A4 1:30 |



**FOUNDATION SLAB**

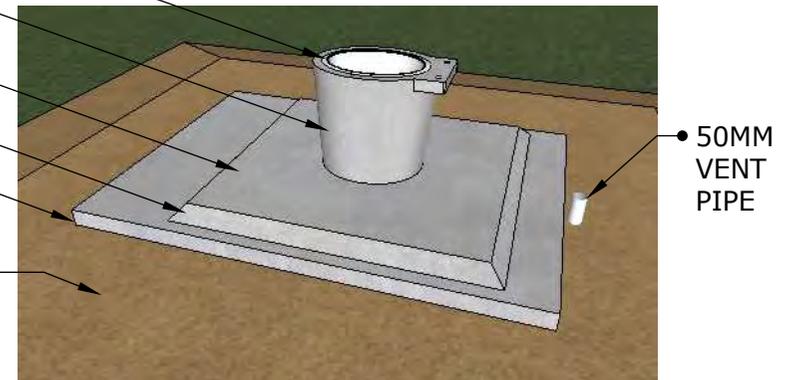


**CONCRETE RISER**



**TOP SLAB**

- FIBREGLASS TOILET BOWL
- CONCRETE RISER, SEALED TO SLAB
- TOP SLAB
- MORTAR SEAL
- FOUNDATION SLAB
- 150MM MOUNDED EARTH FROM PIT EXCAVATION



**SLAB PERSPECTIVE**

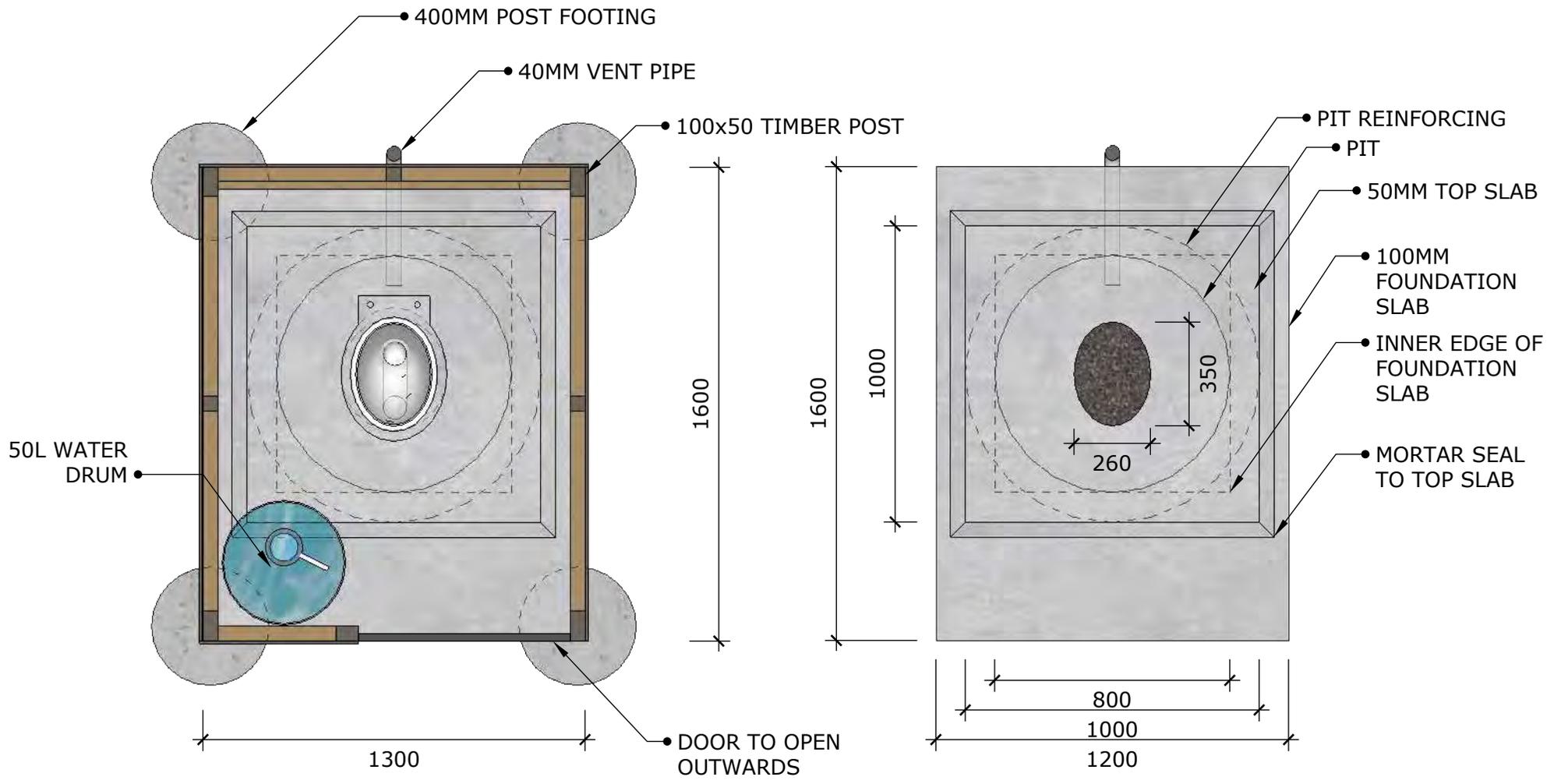


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|          | 02/07/19 | Naomi Shanahan | Revision 1   |

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|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | Pour Flush Toilet  |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

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|---------------|-----------|
| Drawing name: | Slab Plan |
|---------------|-----------|

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| Drawing no.:        | SD 2.03 |
| Paper Size & Scale: | A4 1:20 |



**FLOORPLAN**

**SLAB PLAN**



| REVISION | Date:    | Name:          | Description: |
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|          |          |                |              |
|          | 02/07/19 | Naomi Shanahan | Revision 1   |

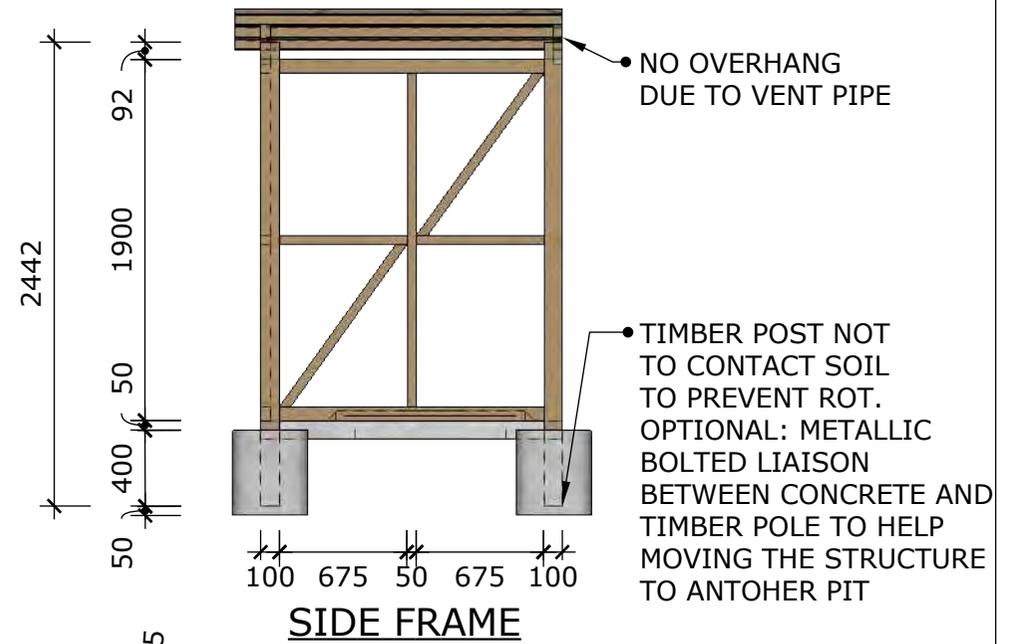
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| Project Name: | Pour Flush Toilet  |
| Drafted:      | November 20, 2019  |
| Checked:      |                    |

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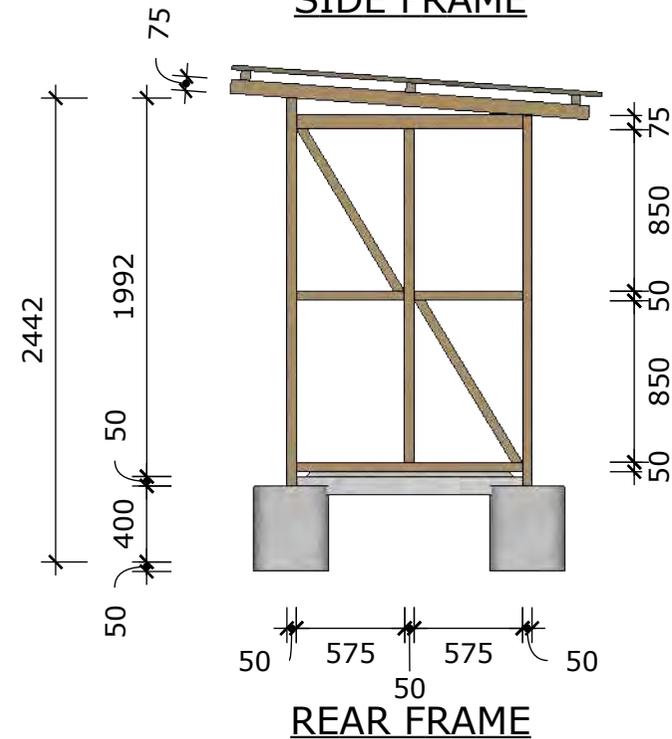
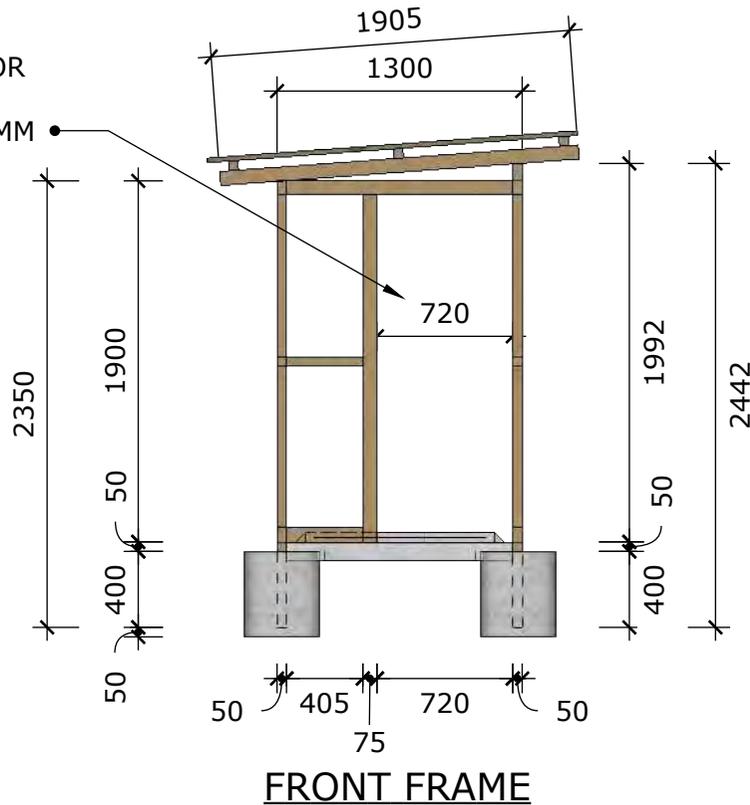
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| Drawing no.:        | <b>SD 2.04</b> |
| Paper Size & Scale: | <b>A4 1:20</b> |



**PERSPECTIVE**



OPENING FOR A DOOR OF WIDTH 700MM

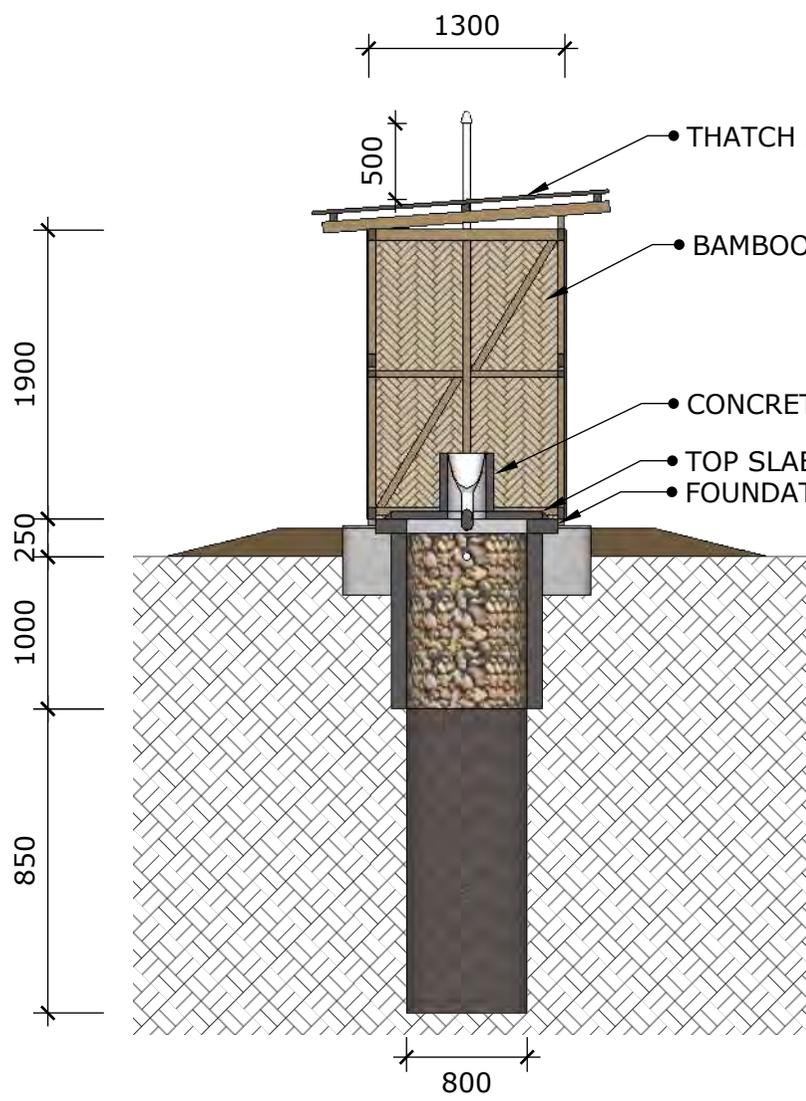


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|          | 02/07/19 | Naomi Shanahan | Revision 1   |

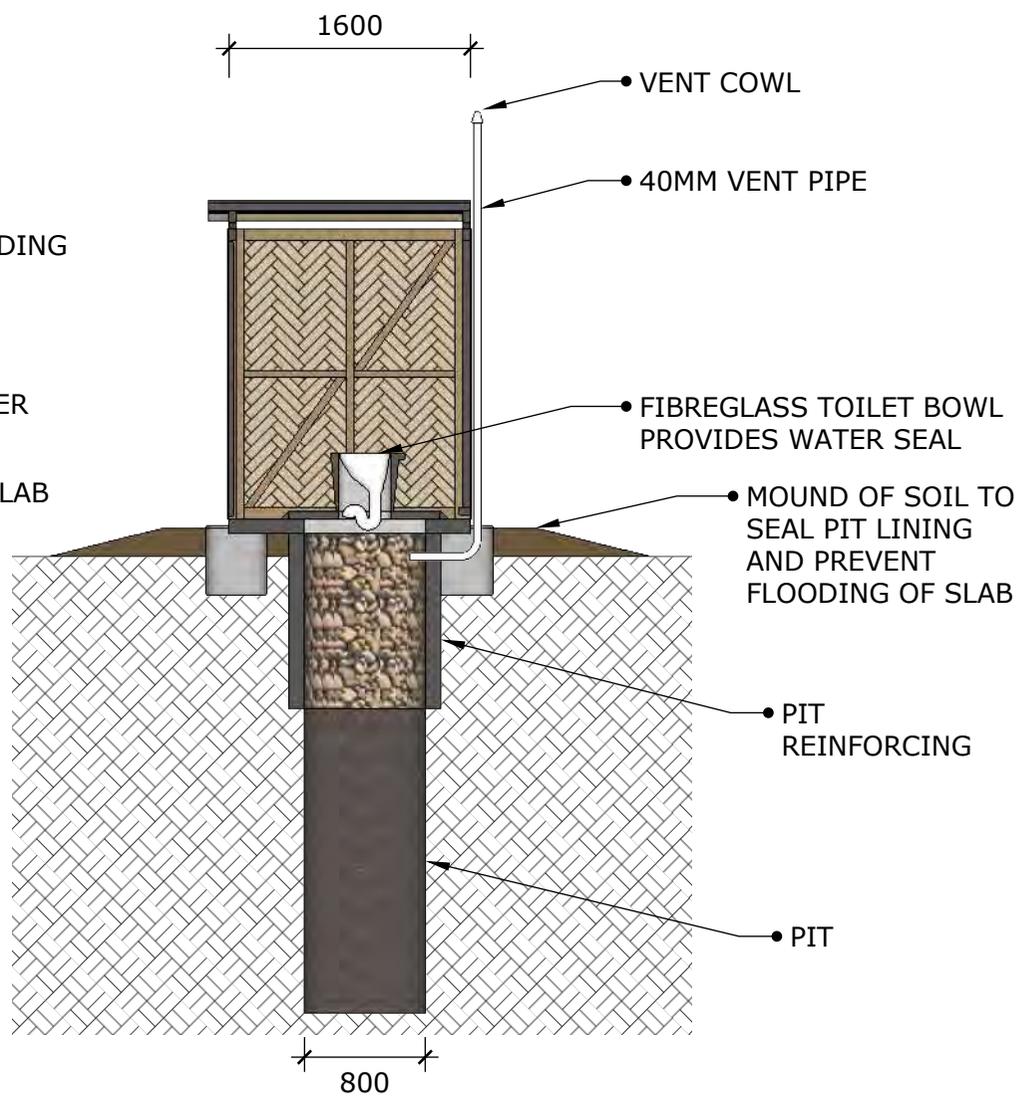
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| Client:       | Ministry of Health |
| Project Name: | Pour Flush Toilet  |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

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| Drawing name: | Framing Plan |
|---------------|--------------|

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| Drawing no.:        | SD 2.05 |
| Paper Size & Scale: | A4 1:40 |



**FRONT SECTION**



**SIDE SECTION**



| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 02/07/19 | Naomi Shanahan | Revision 1   |

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | Pour Flush Toilet  |
| Drafted:      | October 17, 2019   |
| Checked:      |                    |

|               |          |
|---------------|----------|
| Drawing name: | Sections |
|---------------|----------|

|                     |         |
|---------------------|---------|
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| Paper Size & Scale: | A4 1:50 |

**List of material for one Flush Toilet with a pit - LOCAL MATERIAL STRUCTURE**

General notes:

- Costing for Efaté Province

- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| Description   | Quantity  | Unit         | Unit cost | Amount (VT)   | Notes  |
|---|---|--------------|-----------|---------------|--|
| <b>Slab, Vent Pipe, Seat riser and Foundation</b>           |   |              |           |               |  |
| Cement 40kg bags  | 4   | Bags 40kg    | 870       | 3,480         |  |
| Masonite for foundation slab frame                          | 4   | Pcs          | 1000      | 4000          |  |
| NØ. 6 Rod Wire for slab reinforcement                       | 3   | pcs          | 762       | 2,286         | Rod wire and tie wire can be replacement by Mesh       |
| Tie wire for slab reinforcement                             | 1   | kg           | 300       | 300           | Reinforcing Weir F62 6mm x 5800 x 2300 (665) if budget |
| Timber for slab mould - 50 x 50 x 1.5m                      | 1.5   | 4.8 m length | 1,290     | 1935          |  |
| Chicken wire 10mm   | 0.5   | 1800x 500mm  | 300       | 150           | Purchase is often made for 1 full roll                 |
| Plastic toilet seat lid                                     | 1   | Pcs          | 1,140     | 1,140         |  |
| PVC Pipe - 50mm x 5.8Mtr DWV AS/NZS 1260                    | 1   | Pcs          | 2,138     | 2,138         |  |
| PVC Bend - 50mmx88° F&F IPLEX                               | 1   | Pcs          | 243       | 243           |  |
| Plug & Waste Rubber - 50x50mm (Pipe cow)                    | 1   | Pcs          | 2,311     | 2,311         |  |
| Water seal pan (inner skin)                                 | 1   | Pcs          | 4025      | 4025          |  |
| <b>Sub Total A</b>  |   |              |           | <b>22,008</b> |  |
| <b>Full House Structure</b>                                 |   |              |           |               |  |
| Door hinges Butt FP Brass 75mm (For right-hand outswing)    | 2   | Pcs.         | 873       | 1746          |  |
| Door locking system (inside and outside the toilet)         | 2   | Pcs.         |           | 0             |  |
| Nails - 4"  | 1   | kg           | 380       | 380           |  |
| Local Materials (small wood: 50mm diameter)                 | 35  | m            |           | 0             |  |
| Local Materials (medium wood: 75mm diameter)                | 20  | m            |           | 0             |  |
| Local Materials (big wood: 100mm diameter)                  | 10  | m            |           | 0             | Exact sizes: Posts 2@ 2350mm and 2@ 2458mm             |
| Roof  | Appropriate roofing: natangura. If using, iron roof, refer to optional items  |              |           |               |  |
| Walling   | Appropriate walling: bamboo or natangura. If using corrugated iron, flat iron sheets or masonite, refer to optional items |              |           |               |  |
| <b>Sub Total B</b>  |   |              |           | <b>2,126</b>  |  |
| <b>Hand-washing facility</b>                                |   |              |           |               |  |
| Handwashing station: tippy tap or equivalent                | 1   | Unit         |           | 0             | Free if using own bucket or tippy-tap                  |
| <b>Materials for Construction</b>                           |   |              |           |               |  |
| Mould for seat riser: Request one to Provincial Officer     | 1   | Unit         |           |               |  |
| Black plastic 4mx4m   | 1   | roll         | 450       | 450           |  |
| Spades, tape measure, hammer, hand saw, snip cutter, levels |   |              |           |               |  |
| <b>Optional items</b>                                       |   |              |           |               |  |
| Black paint   | 0.25  | 1 Litre      | 2000      | 500           |  |
| Sand  | 0.216   | m3           | 4200      | 907.2         |  |
| Coral   | 0.108   | m3           | 4500      | 486           |  |
| Delivery of Sand and Coral                                  |   |              |           |               |  |
| <b>Total: A + B</b>   |   |              |           | <b>24,134</b> |  |

**List of material for one Flush Toilet with a pit - IMPORTED MATERIAL STRUCTURE**

General notes:

- Costing for Efate Province

- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| Description   | Quantity | Unit         | Unit cost | Amount (VT)   | Notes  |
|---|----------|--------------|-----------|---------------|--|
| <b>Slab, Vent Pipe, Seat riser and Foundation</b>           |          |              |           |               |  |
| Cement 40kg bags  | 4        | Bags 40kg    | 870       | 3,480         |  |
| Masonite for foundation slab frame                          | 4        | Pcs          | 1000      | 4000          |  |
| N0. 6 Rod Wire for slab reinforcement                       | 3        | pcs          | 762       | 2,286         | Rod wire and tie wire can be replacement by Mesh       |
| Tie wire for slab reinforcement                             | 1        | kg           | 300       | 300           | Reinforcing Weir F62 6mm x 5800 x 2300 (665) if budget |
| Timber for slab mould - 50 x 50 x 1.5m                      | 1.5      | 4.8 m length | 1,290     | 1935          |  |
| Chicken wire 10mm   | 0.5      | 1800x 500mm  | 300       | 150           | Purchase is often made for 1 full roll                 |
| Plastic toilet seat lid                                     | 1        | Pcs          | 1,140     | 1,140         |  |
| PVC Pipe - 50mm x 5.8Mtr DWV AS/NZS 1260                    | 1        | Pcs          | 2,138     | 2,138         |  |
| PVC Bend - 50mmx88* F&F IPLEX                               | 1        | Pcs          | 243       | 243           |  |
| Plug & Waste Rubber - 50x50mm (Pipe cow)                    | 1        | Pcs          | 2,311     | 2,311         |  |
| Water seal pan (inner skin)                                 | 1        | Pcs          | 4025      | 4025          |  |
| <b>Sub Total A</b>  |          |              |           | <b>22,008</b> |  |
| <b>Full House Structure</b>                                 |          |              |           |               |  |
| Door hinges Butt FP Brass 75mm (For right-hand outswing)    | 2        | Pcs.         | 873       | 1746          |  |
| Sliding latch for door lock (inside and outside the toilet) | 2        | Pcs.         | 594       | 1188          |  |
| Timber 50mm x 50mm x 4.8m for purlins and door frame        | 7        | Pcs.         | 1,290     | 9030          | Or 6 @ 6m  |
| Timber 50mm x 75mm x 4.8m for the rafter                    | 4        | Pcs.         | 1,980     | 7920          | Or 3 @ 6m  |
| Timber 50mm x 100mm x 6m for the stud / house structure     | 2        | Pcs          | 2,500     | 5000          | Exact sizes: Posts 2@ 2350mm and 2@ 2458mm             |
| Nails - 4"  | 1        | kg           | 380       | 380           |  |
| Roof nails  | 1        | kg           | 550       | 550           |  |
| Door - door skin  | 4        | pcs          | 1,606     | 6424          |  |
| Corrugated iron for walling - 2.4m                          | 7        | Pc           | 1,776     | 12432         |  |
| Galvanised Iron roof - 2.4m                                 | 3        | Pcs.         | 2,705     | 8115          |  |
| <b>Sub Total B</b>  |          |              |           | <b>52,785</b> |  |
| <b>Hand-washing facility</b>                                |          |              |           |               |  |
| Handwashing bucket with tap [sub-total C]                   | 1        | Unit         | 1500      | 1500          | Free if using own bucket or tippy-tap                  |
| <b>Materials for Construction</b>                           |          |              |           |               |  |
| Mould for seat riser: Request one to Provincial Officer     | 1        | Unit         |           |               |  |
| Black plastic 4mx4m   | 1        | roll         |           |               |  |
| Spades, measuring tape, hammer                              |          |              |           |               | Keith to complete                                      |
| <b>Optional items</b>                                       |          |              |           |               |  |
| Black paint   | 0.25     | 1 Litre      | 2000      | 500           |  |
| Sand  | 0.216    | m3           | 4200      | 907.2         |  |
| Coral   | 0.108    | m3           | 4500      | 486           |  |
| Delivery of Sand and Coral                                  |          |              |           |               |  |
| Corrugated Iron for roofing - 2.4m                          | 3        | Pcs.         | 2,705     | 8115          |  |
| Corrugated iron for walling - 2.4m                          | 7        | Pc           | 1,776     | 12432         |  |
| Roof nails  | 1        | kg           | 550       | 550           |  |
| Galvanised jolt head nails 100x4.5MMx1KG 25/CTN             | 2        | kg           | 765       | 1530          |  |
| Galvanised flat head nail 25x1.6MMx1KG 25/CTN               | 1        | kg           | 725       | 725           |  |
| M10x125mm dyna bolts for walls                              | 8        | Pcs.         | 1,280     | 10240         |  |
| <b>Total: A + B + C</b>                                     |          |              |           | <b>76,293</b> |  |

HANDWASHING STATION TO BE PROVIDED, EITHER INSIDE OR OUTSIDE STRUCTURE

LOCKABLE DOOR



FRONT PERSPECTIVE

40MM VENT PIPE

LOCAL MATERIAL CLADDING

NUTRIENT ABSORBENT PLANTS

GAP FOR VENTILATION



• MOUNDED EARTH

• TWO CHAMBER SEPTIC TANK WITH ACCESS LIDS

• VEGETATED LEACHFIELD PARTIALLY ABOVE GROUND

BACK PERSPECTIVE

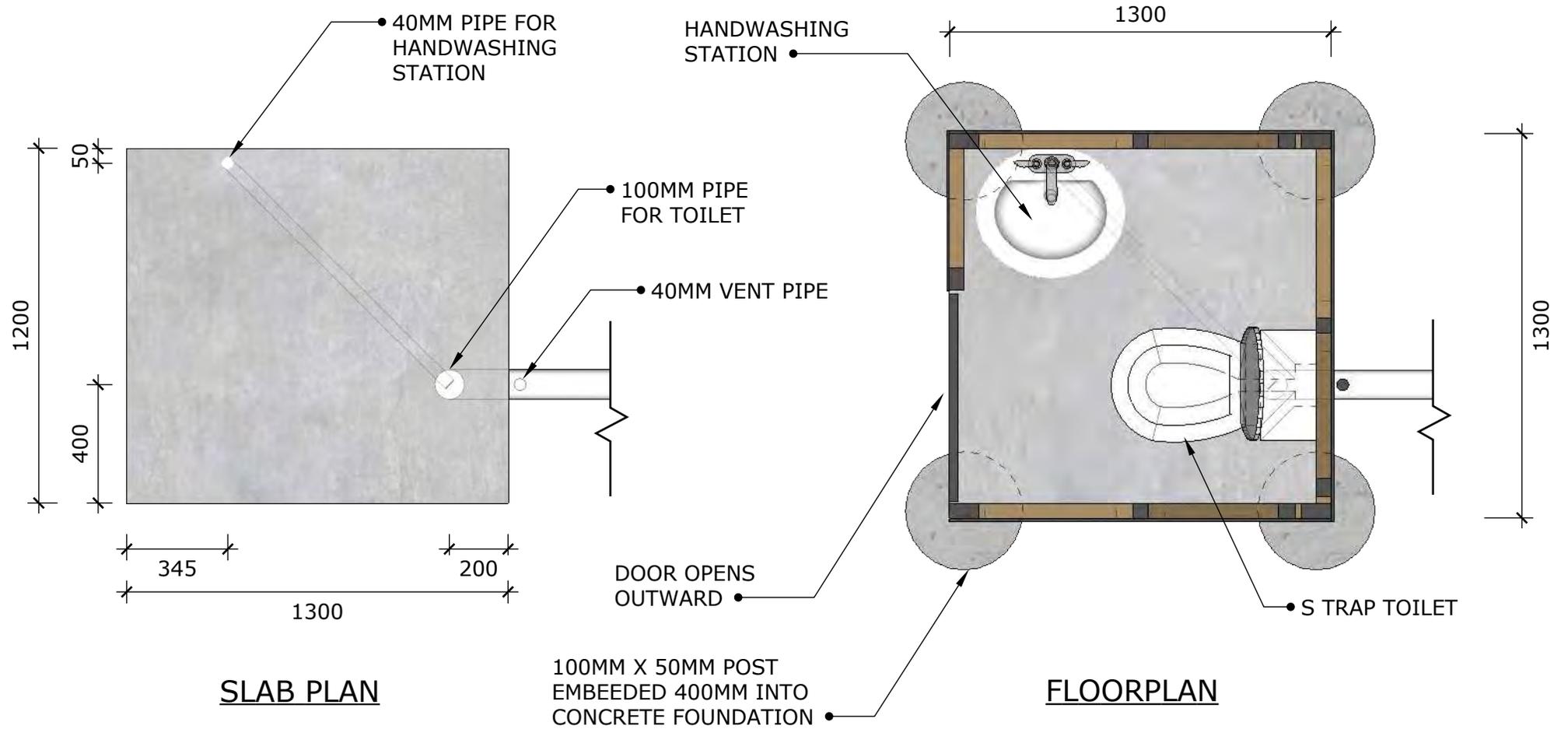


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|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | Septic Toilet      |
| Drafted:      | July 5, 2019       |
| Checked:      |                    |

|               |              |
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| Drawing name: | Key Features |
|---------------|--------------|

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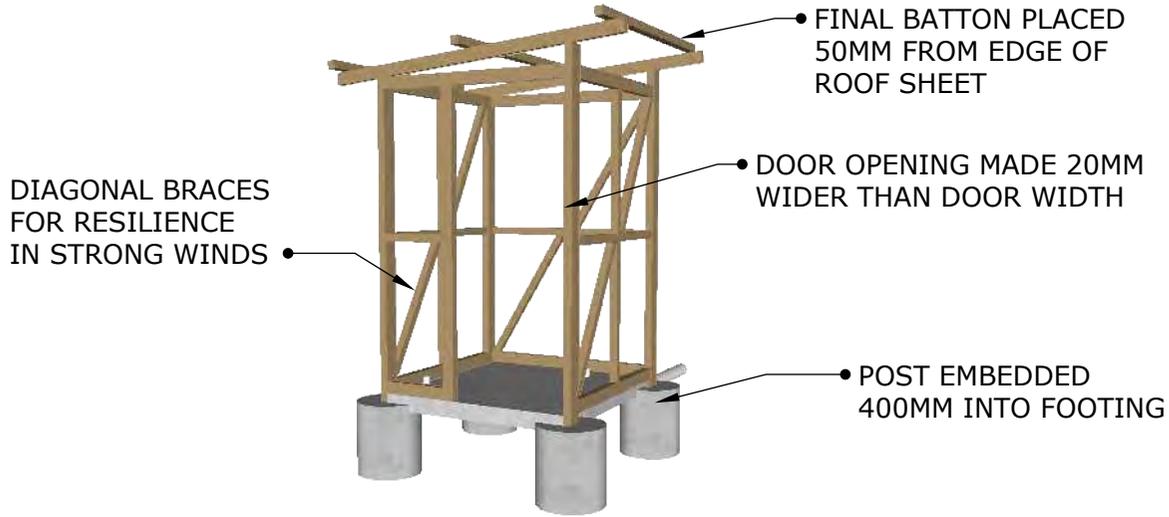


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|          | 04/07/19 | Naomi Shanahan | Revision 1   |

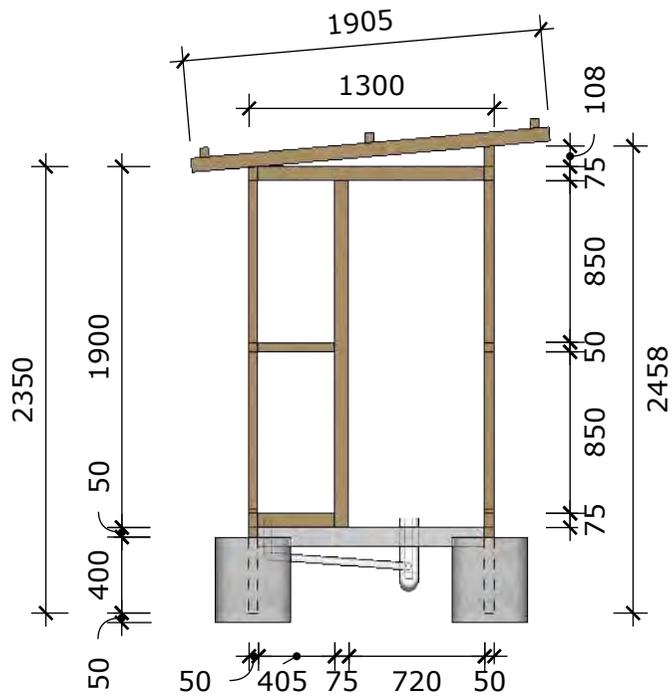
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| Project Name: | Septic Toilet      |
| Drafted:      | July 5, 2019       |
| Checked:      |                    |

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| Drawing name: | Floorplan |
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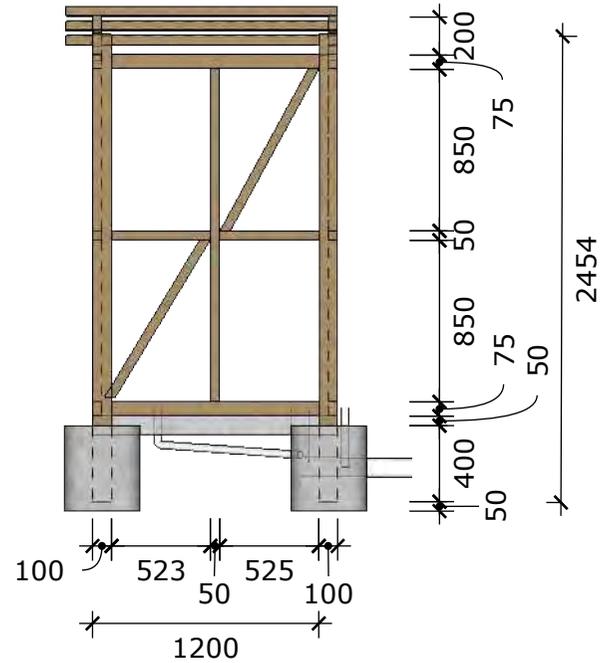
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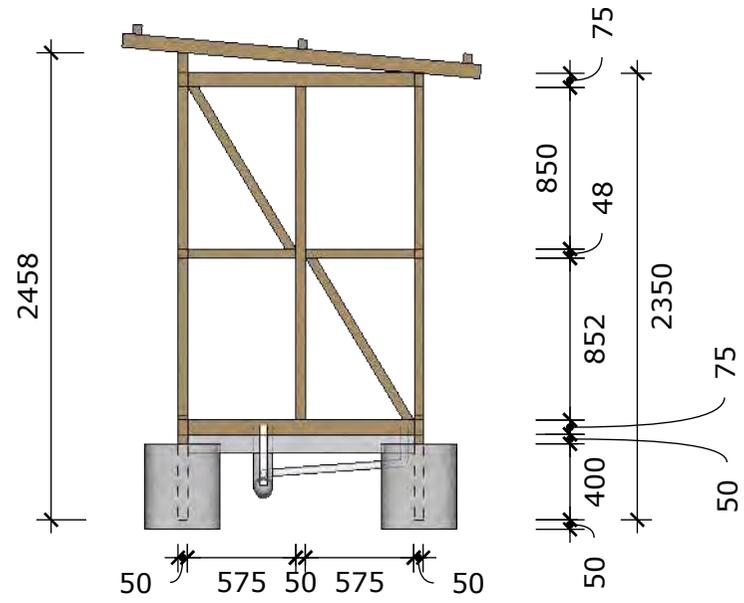
**PERSPECTIVE**



**FRONT FRAME**



**SIDE FRAME**



**REAR FRAME**

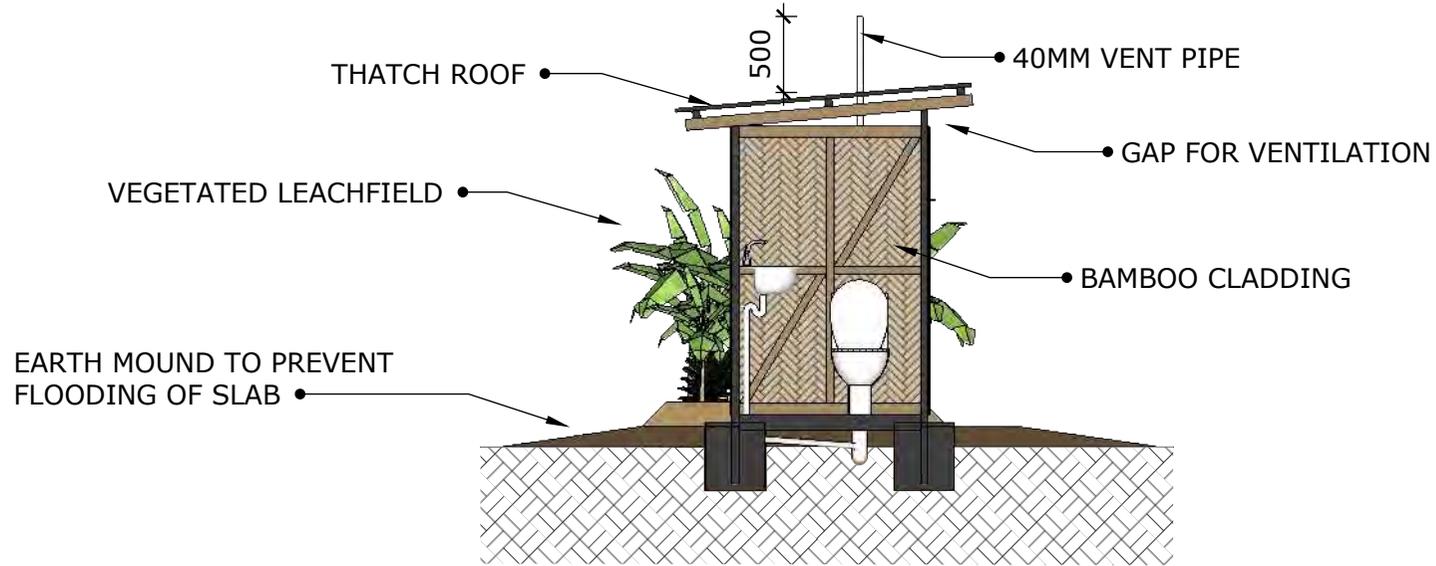


| REVISION | Date:    | Name:          | Description: |
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|          | 04/07/19 | Naomi Shanahan | Revision 1   |

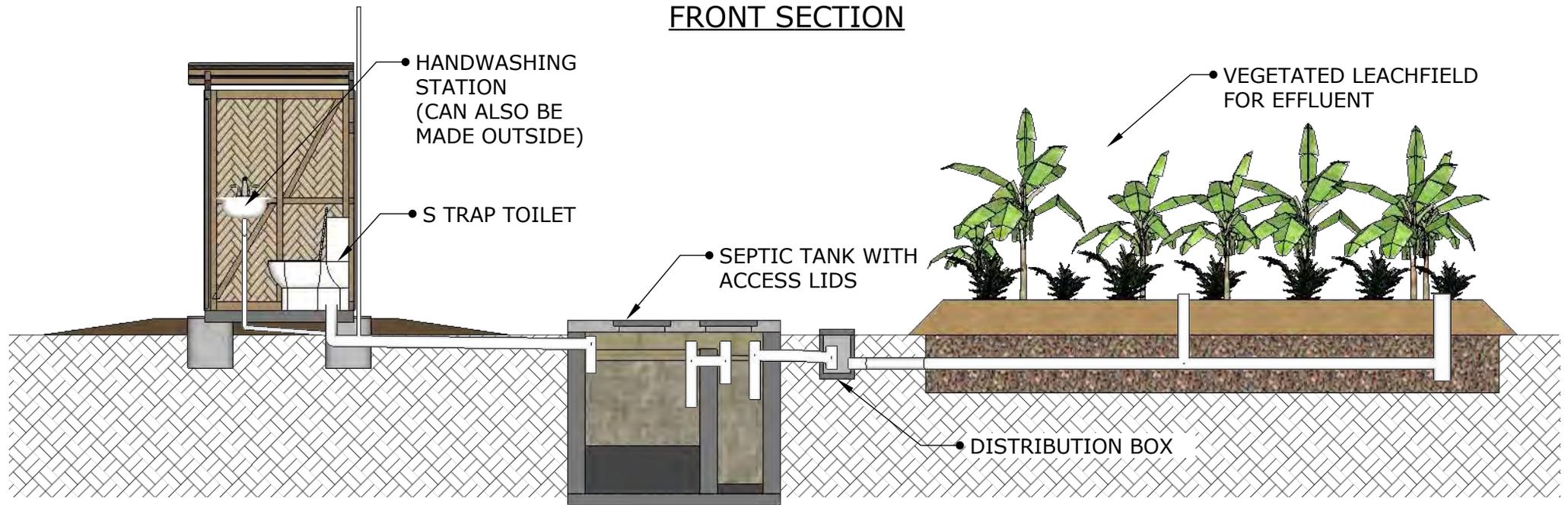
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| Client:       | Ministry of Health |
| Project Name: | Septic Toilet      |
| Drafted:      | July 5, 2019       |
| Checked:      |                    |

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| Drawing name: | Framing Plan |
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| Drawing no.:        | SD 3.03 |
| Paper Size & Scale: | A4 1:40 |



**FRONT SECTION**



**SIDE SECTION**

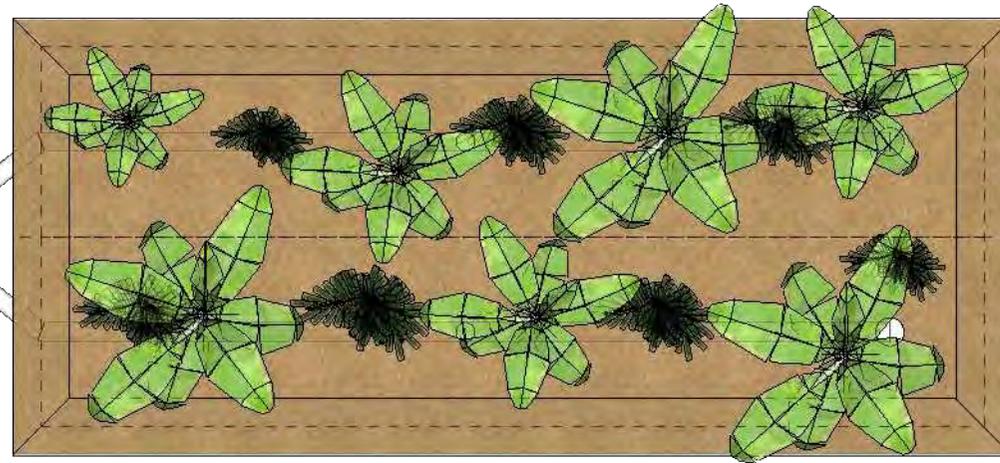
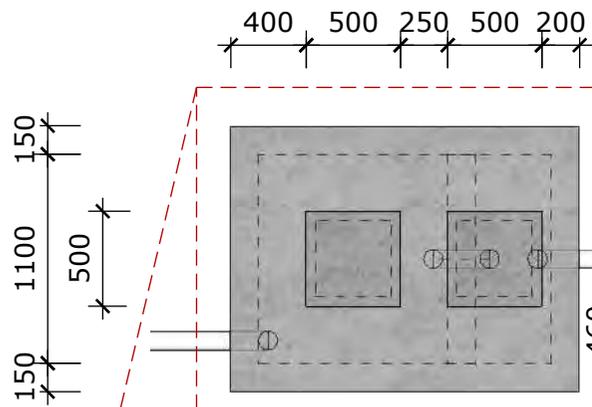


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|          | 04/07/19 | Naomi Shanahan | Revision 1   |

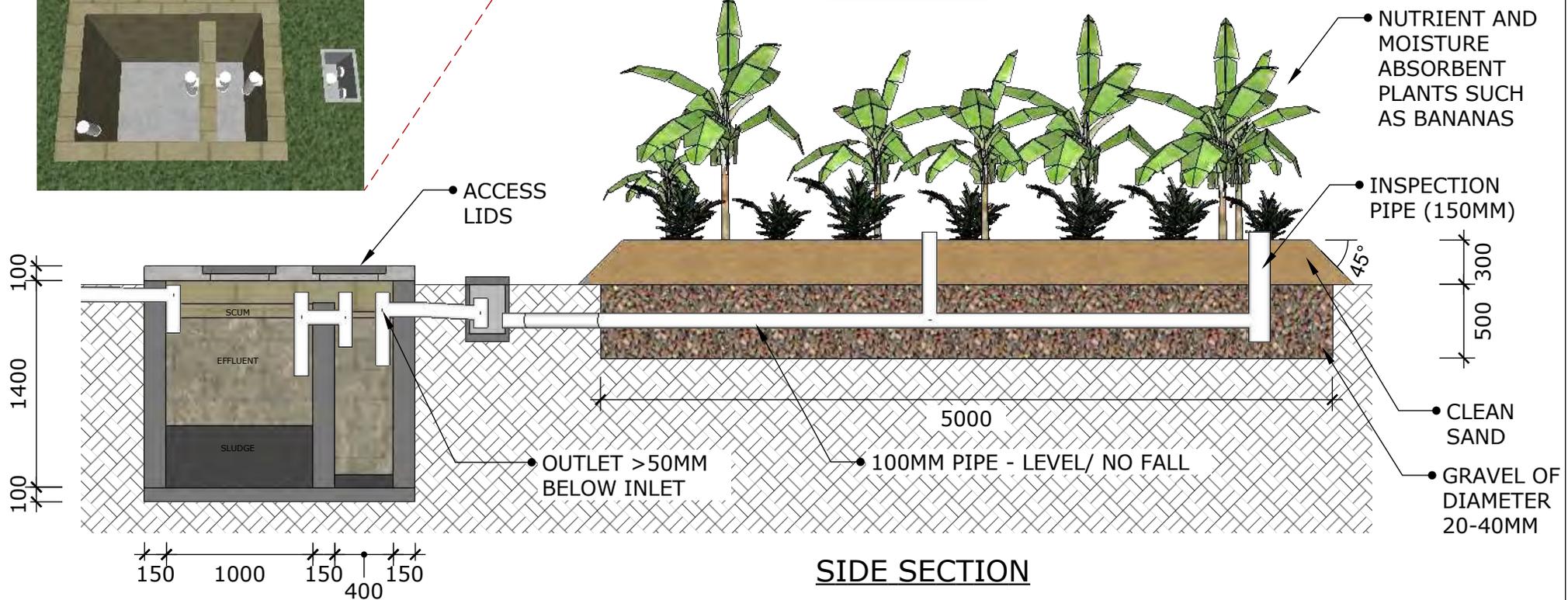
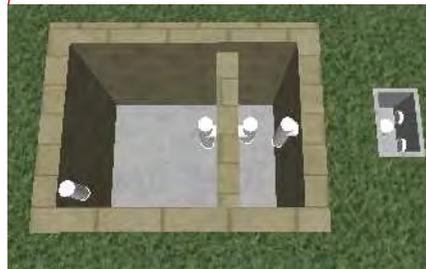
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| Client:       | Ministry of Health |
| Project Name: | Septic Toilet      |
| Drafted:      | July 5, 2019       |
| Checked:      |                    |

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| Drawing no.:  | SD 3.04       |
| Project Name: | Septic Toilet |
| Drawing name: | Sections      |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 3.04 |
| Paper Size & Scale: | A4 1:50 |



**PLAN VIEW**



**SIDE SECTION**



| REVISION | Date: | Name: | Description: |
|----------|-------|-------|--------------|
|          |       |       |              |
|          |       |       |              |
|          |       |       |              |

04/07/19 Naomi Shanahan Revision 1

|               |                    |
|---------------|--------------------|
| Client:       | Ministry of Health |
| Project Name: | Septic Toilet      |
| Drafted:      | July 5, 2019       |
| Checked:      |                    |

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|---------------|-----------------|
| Drawing name: | Waste Treatment |
|---------------|-----------------|

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|---------------------|---------|
| Drawing no.:        | SD 3.05 |
| Paper Size & Scale: | A4 1:40 |

**MATERIAL LIST FOR ONE SEPTIC TANK @ 2.5M X 1.3M & LOCAL TOILET STRUCTURE @ 1.2M X 2M**

General notes:

- Costing for Efate Province

- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| Item   | Specification   | Quantity | Unit Cost | Total Cost   | Notes   |
|--|---|----------|-----------|--------------|---|
| <b>Concrete</b>                              |   |          |           |              |   |
| Cement                                       | 40kg  | 12       | 1000      | 12000        |   |
| Sand   | m3  | 2        | 4200      | 8400         |   |
| Coral  | m3  | 1        | 4500      | 4500         |   |
| Delivery                                     | sand/coral  | 1        | 1000      | 1000         |   |
| Steel rod                                    | 6mm x 5.8m  | 2        | 270       | 540          |   |
|  | 10mm x 5.8m   | 2        | 610       | 1220         |   |
|  | 12mm x 5.8m   | 8        | 830       | 6640         |   |
| Floor mesh                                   | 5mm x 2.3 x 5.8m  | 1        | 3200      | 3200         |   |
| Tie wire                                     | 1.6mm   | 1        | 300       | 300          |   |
| Sub-total                                    |   |          |           | <b>37800</b> |   |
| <b>Nails /bolts/Screws</b>                   |   |          |           |              |   |
| Galv nails                                   | 75mm  | 1        | 410       | 410          |   |
| Concrete nail                                | 75mm  | 1        | 510       | 510          |   |
| Sub-total                                    |   |          |           | <b>920</b>   |   |
| <b>Plumbing</b>                              |   |          |           |              |   |
| PVC Pipe                                     | 100mm x 5.4m  | 1        | 3400      | 3400         |   |
|  | 50mm x 5.4m   | 1        | 1500      | 1500         |   |
| Junction                                     | 100mm   | 5        | 520       | 2600         |   |
|  | 50mm  | 1        | 130       | 130          |   |
| Bend Plain                                   | 100mm x 88*   | 2        | 380       | 760          |   |
|  | 50mm x 88*  | 3        | 80        | 240          |   |
| Toilet seat                                  | Ceramic   | 1        | 5000      | 5000         | Refer to alternative with cistern in options below                          |
| 50L drum / container                         |   | 1        | 0         | 0            |   |
| Pan collar                                   | 100mm   | 1        | 490       | 490          |   |
| Reducer                                      | 100mm x 50mm  | 1        | 100       | 100          |   |
| Vent Cap                                     | 50mm  | 1        | 50        | 50           |   |
| Pvc glue                                     | 250ml   | 1        | 490       | 490          |   |
| Sub-total                                    |   |          |           | <b>14760</b> |   |
| <b>Local House Structure</b>                 |   |          |           |              |   |
| Door hinges Butt FP Brass 75                 | Pcs.  | 2        | 873       | 1746         |   |
| Door locking system (inside)                 | Pcs.  | 2        |           | 0            |   |
| Nails - 4"                                   | kg  | 1        | 380       | 380          |   |
| Local Materials (small wood: 50mm diameter)  | m   | 35       |           | 0            |   |
| Local Materials (medium wood: 75mm diameter) | m   | 20       |           | 0            |   |
| Local Materials (big wood: 100mm diameter)   | m   | 10       |           | 0            | Exact sizes: Posts 2@ 2350mm and 2@ 2458mm                                  |
| Roof   | Appropriate roofing: natangura. If using, iron roof, refer to full house option       |          |           |              |   |
| Walling                                      | Appropriate walling: bamboo or natangura. If using blocks, refer to full house option |          |           |              |   |
| Sub-total                                    |   |          |           | <b>2126</b>  |   |
| <b>Hand-washing facility</b>                 |   |          |           |              |   |
| Handwashing bucket with tap                  |   | 1        | 1500      | 1500         | Free if using own bucket or tippy-tap                                       |
| <b>Options</b>                               |   |          |           |              |   |
| Toilet set including cistern                 | ceramic   | 1        | 20000     | 20000        | These items are all necessary if using the toilet set including the cistern |
| Flowpex                                      | 16mm  | 5        | 150       | 750          |   |
| Junction /Tee                                | 16mm  | 2        | 340       | 680          |   |
| Bend/Elpow                                   | 16mm  | 4        | 270       | 1080         |   |
| Adaptor /ML                                  | 16mm x 1/2  | 2        | 550       | 1100         |   |
| Adaptor /FM                                  | 16mm x 3/4  | 2        | 240       | 480          |   |
| Tape teff                                    | 10m   | 1        | 100       | 100          |   |
| Flexible                                     | 600mm   | 2        | 900       | 1800         |   |
| Sub-total                                    |   |          |           | <b>25990</b> |   |
| <b>Total cost</b>                            |   |          |           | <b>55606</b> |   |

**MATERIAL LIST FOR ONE SEPTIC TANK @ 2.5M X 1.3M & FULL TOILET STRUCTURE @ 1.2M X 2M**

General notes:

- Costing for Efate Province

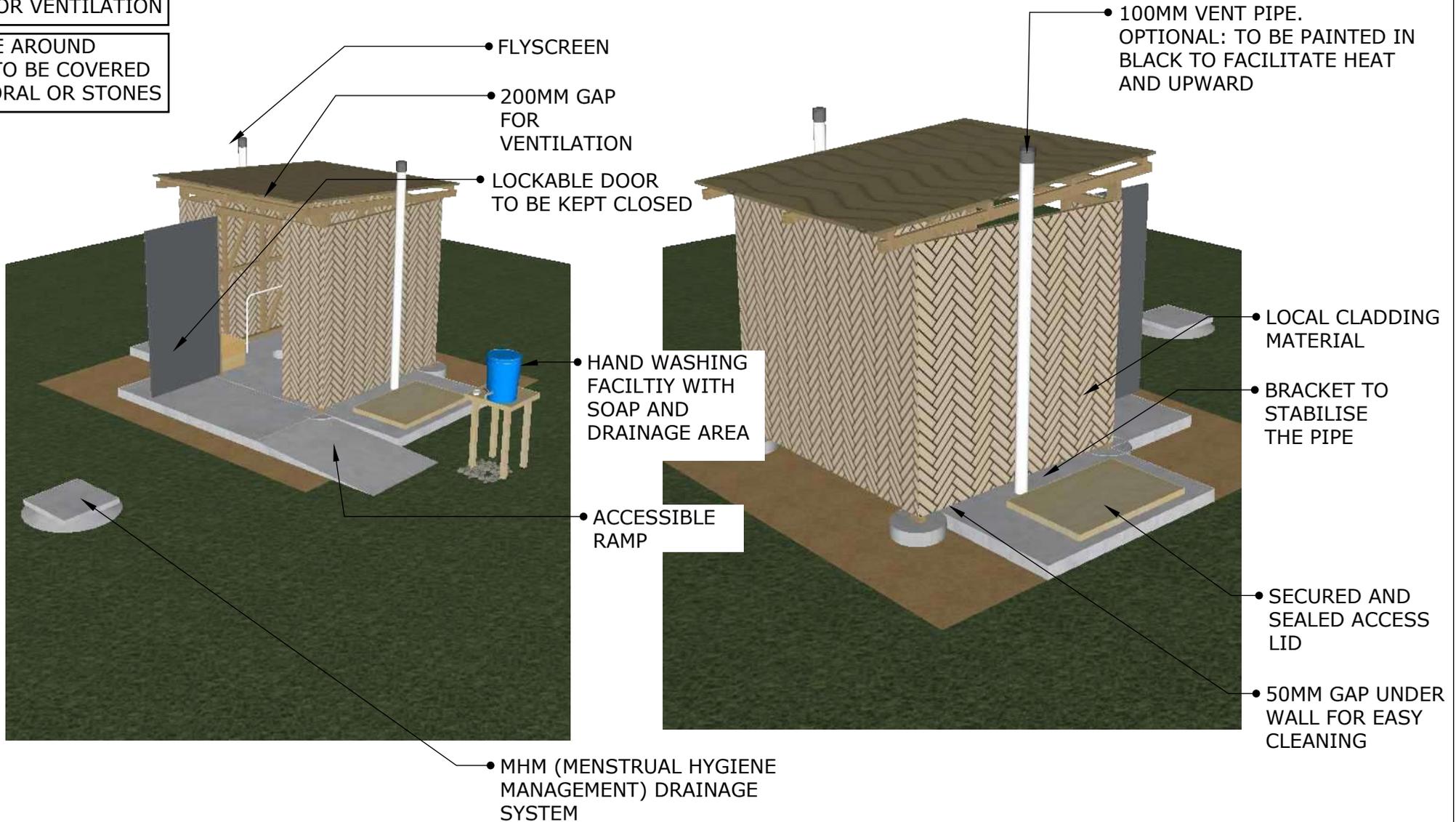
- It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used...

| Item                         | Specification                      | Quantity | Unit Cost | Total Cost    | Notes  |
|------------------------------|------------------------------------|----------|-----------|---------------|--|
| <b>Concrete</b>              |                                    |          |           |               |  |
| Blocks                       | 150mm x 400mm                      | 305      | 130       | 39650         |  |
| Flower Blocks                | 300mm x 300mm                      | 4        | 400       | 1600          |  |
| Cement                       | 40kg                               | 20       | 1000      | 20000         |  |
| Sand                         | m3                                 | 4        | 4200      | 16800         |  |
| Coral                        | m3                                 | 1        | 4500      | 4500          |  |
| Delivery                     | sand/coral                         | 2        | 1000      | 2000          |  |
| Steel rod                    | 6mm x 5.8m                         | 5        | 270       | 1350          |  |
|                              | 10mm x 5.8m                        | 5        | 610       | 3050          |  |
|                              | 12mm x 5.8m                        | 12       | 830       | 9960          |  |
| Floor mesh                   | 5mm x 2.3 x 5.8m                   | 1        | 3200      | 3200          |  |
| Tie wire                     | 1.6mm                              | 1        | 300       | 300           |  |
| <b>Sub-total</b>             |                                    |          |           | <b>102410</b> |  |
| <b>Timber</b>                |                                    |          |           |               |  |
| Rafter                       | 150mm x 50mm x 4.2m                | 2        | 3400      | 6800          |  |
| Purling                      | 75mm x 50mm x 5.4m                 | 2        | 1710      | 3420          |  |
| Door frame                   | 100mm x 50mm x 5.4mm               | 1        | 2230      | 2230          |  |
| Fascia board & Door          | 200mm x 25mm x 6m                  | 6        | 2760      | 16560         |  |
| <b>Sub-total</b>             |                                    |          |           | <b>29010</b>  |  |
| <b>Nails /bolts/Screws</b>   |                                    |          |           |               |  |
| Galv nails                   | 75mm                               | 1        | 410       | 410           |  |
|                              | 100mm                              | 1        | 410       | 410           |  |
|                              | 150mm                              | 1        | 410       | 410           |  |
|                              | 2.5mm                              | 1        | 630       | 630           |  |
| Concrete nail                | 75mm                               | 1        | 510       | 510           |  |
| Roofing nails                | 75mm                               | 1        | 470       | 470           |  |
| Cyclone straps               | 300mm                              | 6        | 150       | 900           |  |
| Entrance set bala            | SCP CD1                            | 1        | 2120      | 2120          |  |
| Door hinge                   | 100mm                              | 1        | 1420      | 1420          |  |
| Timber screws                | 15 x 25mm                          | 2        | 680       | 1360          |  |
| <b>Sub-total</b>             |                                    |          |           | <b>8640</b>   |  |
| <b>Roofing</b>               |                                    |          |           |               |  |
| Corrugated Iron              | 3m                                 | 2        | 2550      | 5100          |  |
| Flushing                     | 3m                                 | 2        | 2550      | 5100          |  |
|                              | 1.5m                               | 1        | 1250      | 1250          |  |
| <b>Sub-total</b>             |                                    |          |           | <b>11450</b>  |  |
| <b>Plumbing</b>              |                                    |          |           |               |  |
| PVC Pipe                     | 100mm x 5.4m                       | 1        | 3400      | 3400          |  |
|                              | 50mm x 5.4m                        | 1        | 1500      | 1500          |  |
| Junction                     | 100mm                              | 5        | 520       | 2600          |  |
|                              | 50mm                               | 1        | 130       | 130           |  |
| Bend Plain                   | 100mm x 88*                        | 2        | 380       | 760           |  |
|                              | 50mm x 88*                         | 3        | 80        | 240           |  |
| Toilet seat                  | Ceramic                            | 1        | 5000      | 5000          | Refer to alternative with cistern in options below |
| 50L drum / container         |                                    | 1        | 0         | 0             |  |
| Toilet roll holder           | 150mm                              | 1        | 1780      | 1780          |  |
| Pan colar                    | 100mm                              | 1        | 490       | 490           |  |
| Reducer                      | 100mm x 50mm                       | 1        | 100       | 100           |  |
| Vent Cap                     | 50mm                               | 1        | 50        | 50            |  |
| Pvc glue                     | 250ml                              | 1        | 490       | 490           |  |
| Flowpex                      | 16mm                               | 5        | 150       | 750           |  |
| Junction /Tee                | 16mm                               | 2        | 340       | 680           |  |
| Bend/Elpow                   | 16mm                               | 4        | 270       | 1080          |  |
| Adaptor /ML                  | 16mm x 1/2                         | 2        | 550       | 1100          |  |
| Adaptor /FM                  | 16mm x 3/4                         | 2        | 240       | 480           |  |
| Tape teff                    | 10m                                | 1        | 100       | 100           |  |
| Flexible                     | 600mm                              | 2        | 900       | 1800          |  |
| Handwashing                  | sink/Tap/S trap/D polts/waste trap | 1        | 13000     | 13000         |  |
| <b>Sub-total</b>             |                                    |          |           | <b>35530</b>  |  |
| <b>Options</b>               |                                    |          |           |               |  |
| Toilet set including cistern | ceramic                            | 1        | 20000     | 20000         |  |
| <b>Sub-total</b>             |                                    |          |           | <b>20000</b>  |  |
| <b>Total cost</b>            |                                    |          |           | <b>187040</b> |  |

| <b>MATERIAL LIST FOR CONCRETE SEPTIC TANK @ 1.3m x 2.5m</b> |                         |                   |                  |                   |
|---|-------------------------|-------------------|------------------|-------------------|
| <b>Item</b>   | <b>Specification</b>    | <b>Quantity</b>   | <b>Unit Cost</b> | <b>Total Cost</b> |
| <b>Concrete</b>   |                         |                   |                  |                   |
| <i>Blocks</i>   | <i>150mm</i>            | <i>180</i>        | <i>130</i>       | <i>23400</i>      |
| <i>Cement</i>   | <i>40kg</i>             | <i>8</i>          | <i>1000</i>      | <i>8000</i>       |
| <i>Sand</i>   | <i>m3</i>               | <i>2</i>          | <i>4200</i>      | <i>8400</i>       |
| <i>Coral</i>  | <i>m3</i>               | <i>1</i>          | <i>4500</i>      | <i>4500</i>       |
| <i>Delivery</i>   | <i>Sand &amp; Coral</i> | <i>1</i>          | <i>2000</i>      | <i>2000</i>       |
| <i>Steel Rod</i>  | <i>6mm</i>              | <i>2</i>          | <i>270</i>       | <i>540</i>        |
|   | <i>10mm</i>             | <i>2</i>          | <i>650</i>       | <i>1300</i>       |
|   | <i>12mm</i>             | <i>5</i>          | <i>880</i>       | <i>4400</i>       |
| <i>Tie wire</i>   | <i>1.6mm</i>            | <i>1</i>          | <i>300</i>       | <i>300</i>        |
| <i>Floor mesh</i>   | <i>5mm</i>              | <i>1</i>          | <i>3570</i>      | <i>3570</i>       |
| <i>Shade cloth</i>  |                         | <i>2</i>          | <i>290</i>       | <i>580</i>        |
| <i>PVC pipe</i>   | <i>100mm x 5.8</i>      | <i>1</i>          | <i>3400</i>      | <i>3400</i>       |
| <i>Tee joint</i>  | <i>100mm</i>            | <i>2</i>          | <i>380</i>       | <i>760</i>        |
| <i>Elpow</i>  | <i>100mm</i>            | <i>2</i>          | <i>350</i>       | <i>700</i>        |
|   |                         | <b>Total Cost</b> |                  | <b>61850</b>      |

TOILET INSIDE TO HAVE NO LID OR LID WITH MESH, FOR VENTILATION

SURFACE AROUND TOILET TO BE COVERED WITH CORAL OR STONES



FRONT PERSPECTIVE

BACK PERSPECTIVE

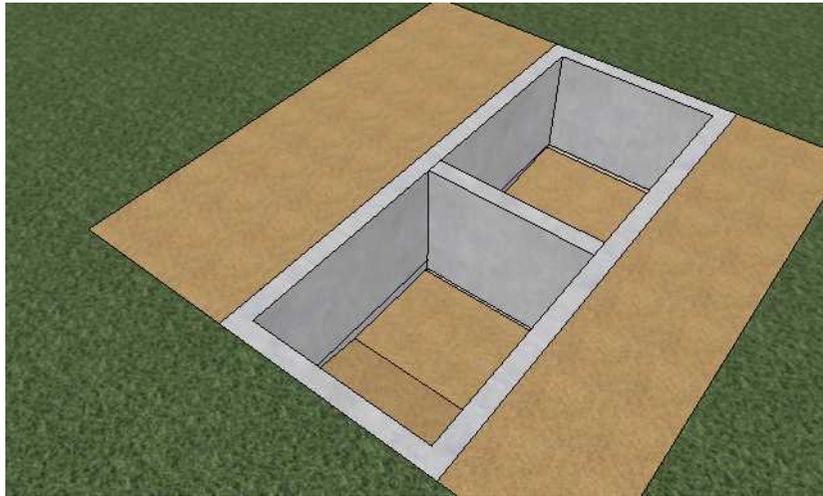


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|----------|----------------|------------|--------------|
| 04/07/19 | Naomi Shanahan | Revision 1 |              |

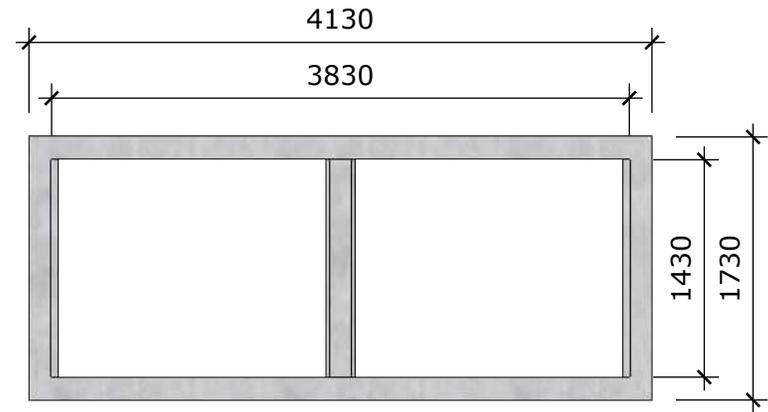
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|---------------|------------------------------------|
| Client:       | Ministry of Health                 |
| Project Name: | Inclusive VIP Toilet with Dual Pit |
| Drafted:      | November 28, 2019                  |

|               |              |
|---------------|--------------|
| Drawing name: | Key Features |
|---------------|--------------|

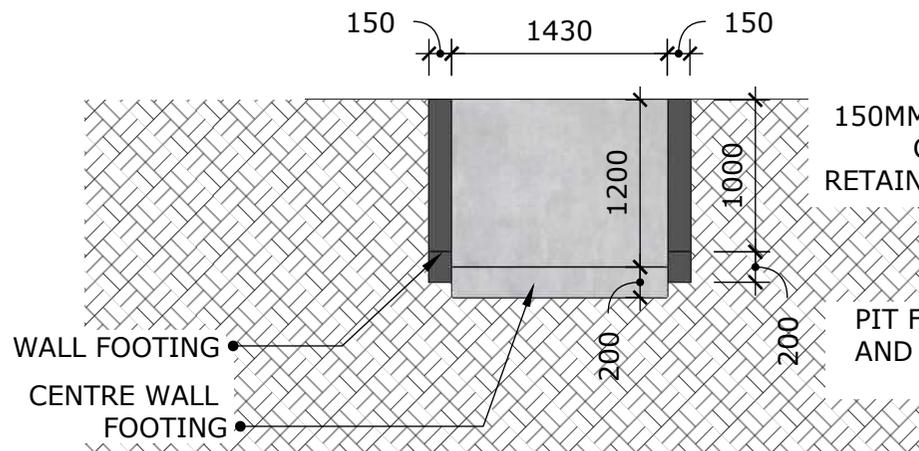
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|---------------------|---------|
| Drawing no.:        | SD 4.01 |
| Paper Size & Scale: | A4      |



**PERSPECTIVE VIEW**



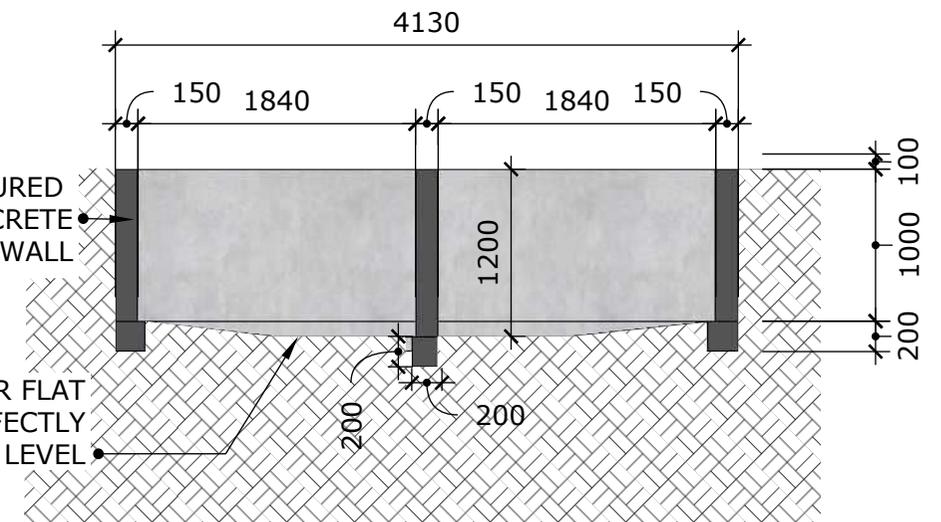
**PLAN VIEW**



**FRONT SECTION VIEW**

150MM POURED  
CONCRETE  
RETAINING WALL

PIT FLOOR FLAT  
AND PERFECTLY  
LEVEL



**SIDE SECTION VIEW**

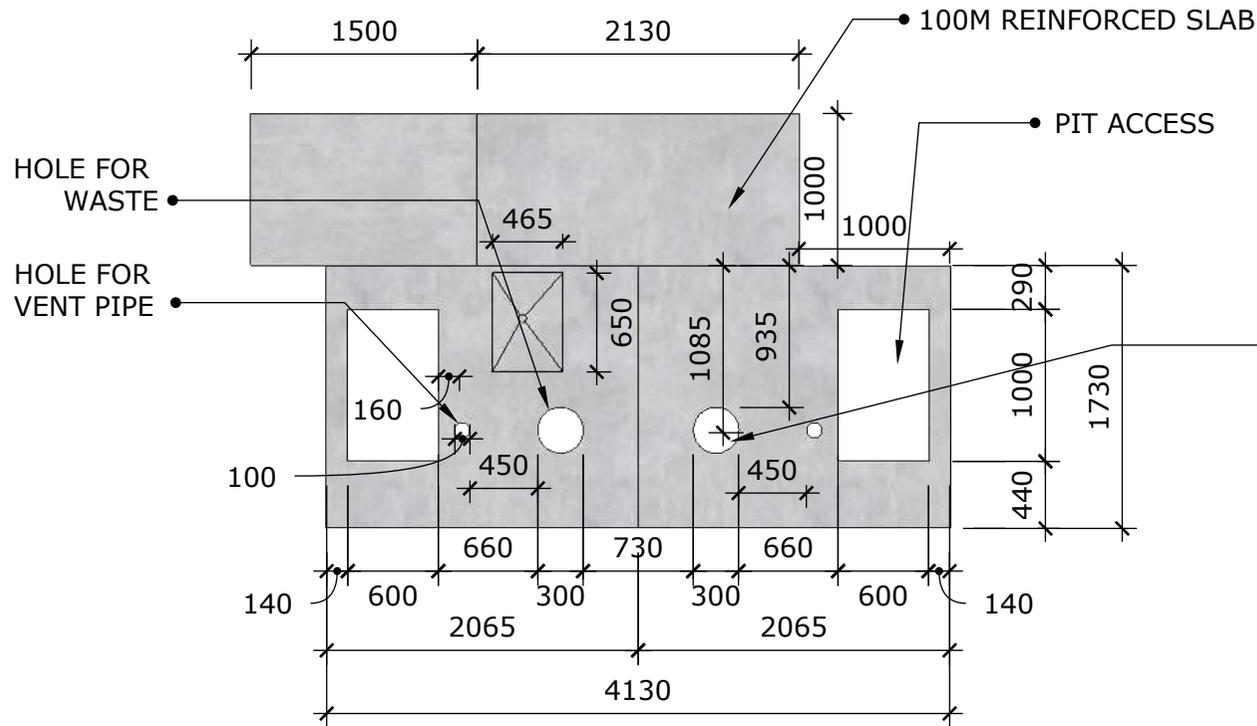


| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                                    |
|---------------|------------------------------------|
| Client:       | Ministry of Health                 |
| Project Name: | Inclusive VIP Toilet with Dual Pit |
| Drafted:      | November 28, 2019                  |
| Checked:      |                                    |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 4.02 |
| Paper Size & Scale: | A4 1:50 |

|               |          |
|---------------|----------|
| Drawing name: | Pit Plan |
|---------------|----------|



OPTIONAL: HANDLES PRECAST IN THE TOP SLAB TO ASSIST MOVING IT TO ANOTHER PIT.

CONCRETE FLOOR SLABS ARE 100MM THICK. WITH REINFORCING BARS, D10, AT 250X250mm, 30mm FROM BASE

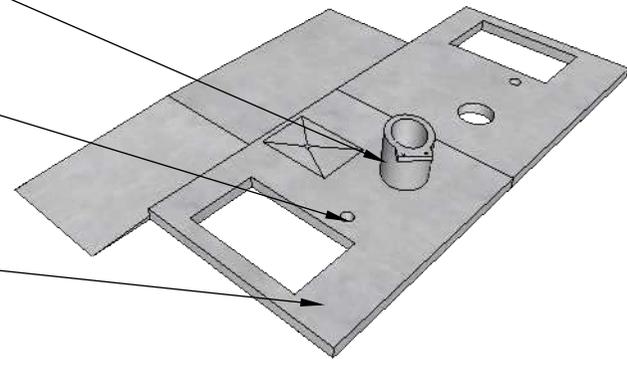
HOLE TO THE 'PASSIVE' PIT TO BE SEALED UNTIL IT BECOMES THE ACTIVE PIT

**TOP SLAB**

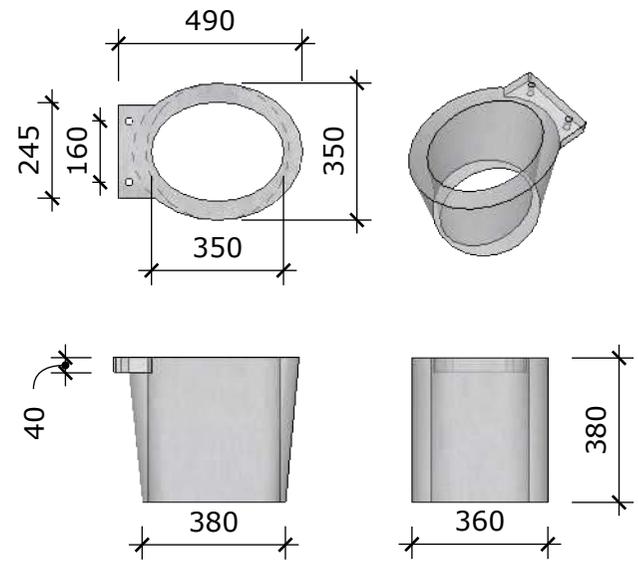
RISER SEALED TO TOP SLAB WITH MORTAR

HOLE FOR VENT PIPE

100MM THICK CONCRETE SLAB



**SLAB PERSPECTIVE**



**CONCRETE RISER SCALE 1:20**



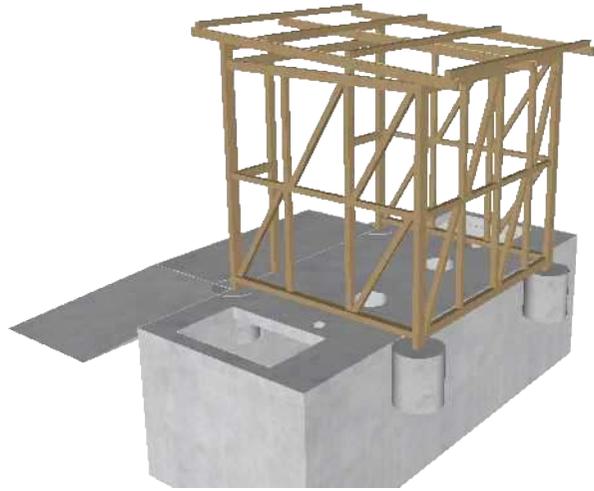
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|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                                    |
|---------------|------------------------------------|
| Client:       | Ministry of Health                 |
| Project Name: | Inclusive VIP Toilet with Dual Pit |
| Drafted:      | November 28, 2019                  |

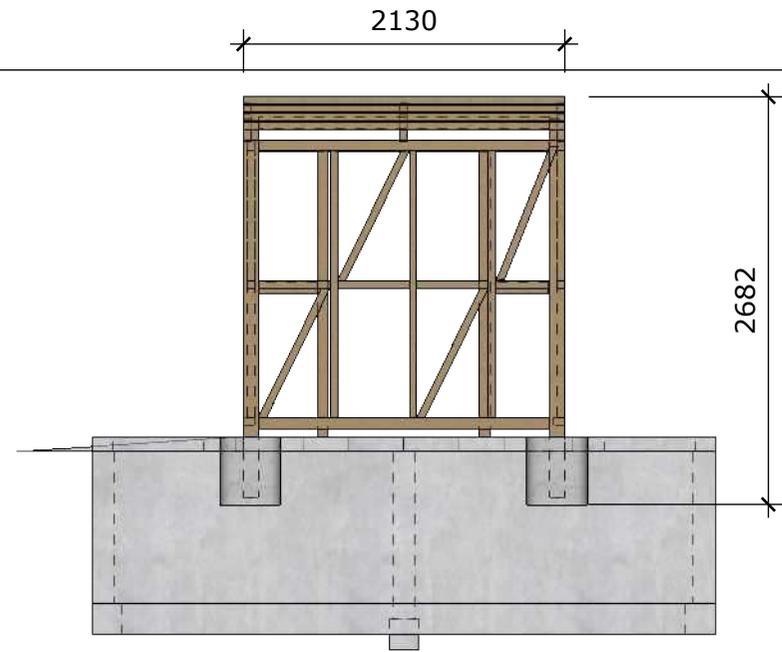
|               |           |
|---------------|-----------|
| Drawing name: | Slab Plan |
|---------------|-----------|

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| Paper Size & Scale: | A4 1:50 |

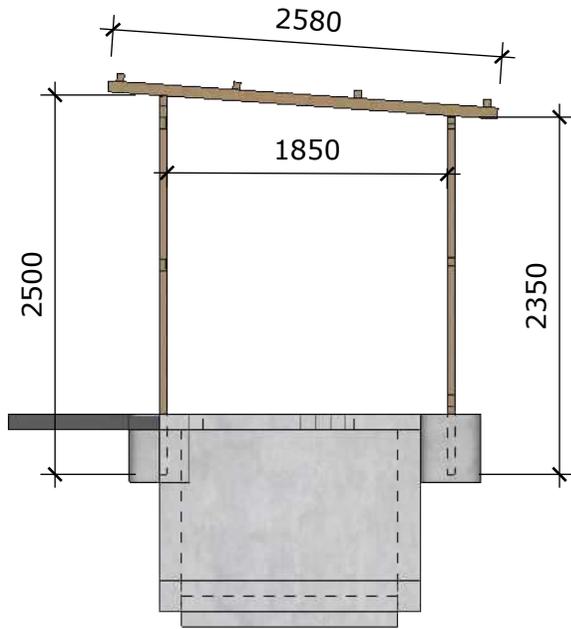




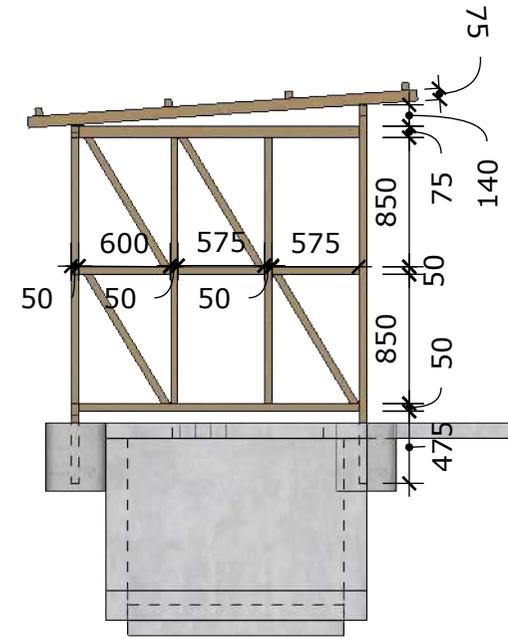
**PERSPECTIVE**



**SIDE FRAME**



**FRONT FRAME**



**REAR FRAME**

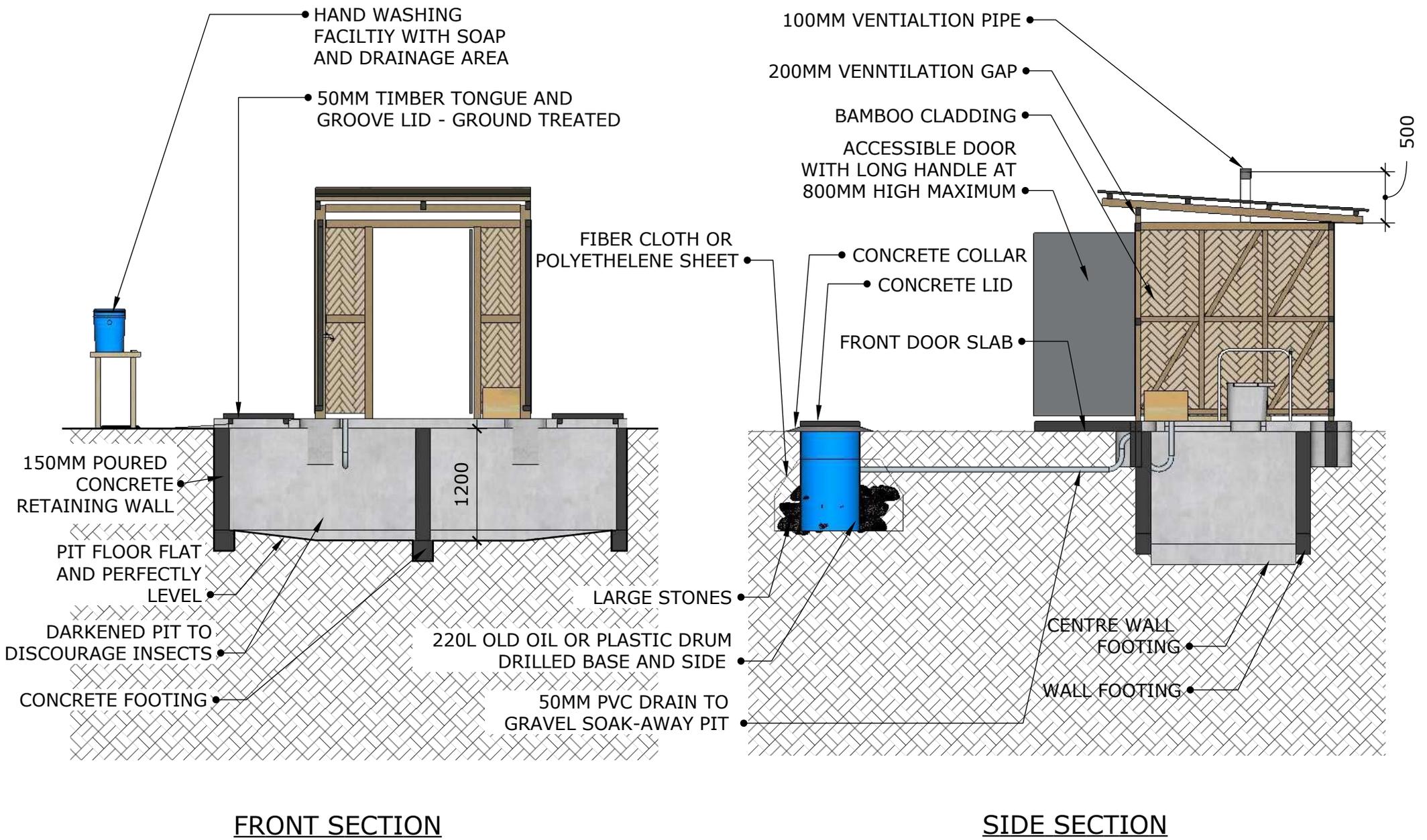


| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                                    |
|---------------|------------------------------------|
| Client:       | Ministry of Health                 |
| Project Name: | Inclusive VIP Toilet with Dual Pit |
| Drafted:      | November 28, 2019                  |

|               |              |
|---------------|--------------|
| Drawing name: | Framing Plan |
|---------------|--------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 4.05 |
| Paper Size & Scale: | A4 1:50 |



| REVISION | Date:    | Name:          | Description: |
|----------|----------|----------------|--------------|
|          |          |                |              |
|          |          |                |              |
|          | 04/07/19 | Naomi Shanahan | Revision 1   |

|               |                                    |
|---------------|------------------------------------|
| Client:       | Ministry of Health                 |
| Project Name: | Inclusive VIP Toilet with Dual Pit |
| Drafted:      | November 28, 2019                  |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 4.06 |
| Paper Size & Scale: | A4 1:50 |

|               |          |
|---------------|----------|
| Drawing name: | Sections |
|---------------|----------|

| INCLUSIVE VIP WITH DUAL PIT MATERIAL LIST AND COSTS<br>(PIT SIZE: 4.13MX1.73M ) |                 |      |           |               |  |
|---|-----------------|------|-----------|---------------|--|
| ITEM  | SPECIFICATION   | UNIT | UNIT COST | TOTAL COST    | Notes :  |
| <b>Concrete</b>   |                 |      |           |               | - Costing for Efate Province   |
| Blocks  | 150mm           | 375  | 130       | 48750         | - It is recommended to add a 5 to 20% contingency factor and review the BoQ to take into account variation in supply situation, location, brands used... |
| Flower blocks   | 300mmx300mm     | 3    | 200       | 600           | - This list of material can be reduced further if the house is to use local material.  |
| Seat riser  | concrete        | 1    | 5000      | 5000          |  |
| Cement  | 40kg            | 20   | 1000      | 20000         |  |
| Sand  | m3              | 5    | 3900      | 19500         |  |
| Coral   | m3              | 1    | 4000      | 4000          |  |
| Steel Rods  | 6mm             | 5    | 270       | 1350          |  |
|   | 10mm            | 5    | 610       | 3050          |  |
|   | 12mm            | 16   | 830       | 13280         |  |
| Floor mesh  | 5mm             | 2    | 3200      | 6400          |  |
| Tie wire  | 1.6mm           | 1    | 300       | 300           |  |
| Sub-total   |                 |      |           | <b>122230</b> |  |
| <b>Timber</b>   |                 |      |           |               |  |
| Rafter  | 150mmx50mmx3.2m | 3    | 2590      | 7770          |  |
| Purling   | 75mmx50mmx3.2m  | 3    | 1015      | 3045          |  |
| Door frame  | 100x50mmx5.4m   | 1    | 2230      | 2230          |  |
| Fascia board/door   | 200mmx25mmx6m   | 4    | 2760      | 11040         |  |
| Sub-total   |                 |      |           | <b>24085</b>  |  |
| <b>Nails/Screws/Polts</b>   |                 |      |           |               |  |
| Galvanised nails  | 150mm           | 1    | 410       | 410           |  |
|   | 100mm           | 1    | 410       | 410           |  |
|   | 75mm            | 1    | 410       | 410           |  |
| Concrete nail   | 75mm            | 1    | 510       | 510           |  |
| Roofing   | 75mm            | 2    | 470       | 940           |  |
| Door lock   | SCP CD1         | 1    | 2120      | 2120          |  |
| Door hinge  | 100mm           | 1    | 1420      | 1420          |  |
| Timber screws   | 15x25mm         | 2    | 680       | 1360          |  |
| Cyclone straps  | 300mm           | 6    | 150       | 900           |  |
| Sub-total   |                 |      |           | <b>8480</b>   |  |
| <b>Roofing</b>  |                 |      |           |               |  |
| Corrugated iron sheet   | 2.85m           | 4    | 2430      | 9720          |  |
| Sub-total   |                 |      |           | <b>9720</b>   |  |
| <b>Options</b>  |                 |      |           |               |  |
| Fascia board/door   | 200mmx25mmx6m   | 2    | 2760      | 5520          |  |
| Flushing  | 2.85m           | 2    | 2430      | 4860          |  |
|   | 2.93m           | 1    | 2490      | 2490          |  |
| Sub-total   |                 |      |           | <b>12870</b>  |  |
| <b>Total Cost</b>   |                 |      |           | <b>164515</b> |  |

**VIP DUAL PIT MATERIAL LIST AND COSTS****PIT SIZE: 4.13mx1.73m**

| Item              | Specification     | Unit       | Unit Cost   | Total Cost   |
|-------------------|-------------------|------------|-------------|--------------|
| <i>Blocks</i>     | <i>150mm</i>      | <i>202</i> | <i>130</i>  | <i>26260</i> |
| <i>Seat riser</i> | <i>concret</i>    | <i>1</i>   | <i>5000</i> | <i>5000</i>  |
| <i>cement</i>     | <i>40kg</i>       | <i>12</i>  | <i>1000</i> | <i>12000</i> |
| <i>Sand</i>       | <i>m3</i>         | <i>3</i>   | <i>3900</i> | <i>11700</i> |
| <i>coral</i>      | <i>m3</i>         | <i>1</i>   | <i>4000</i> | <i>4000</i>  |
| Steel rods        | 6mm               | 3          | 270         | 810          |
|                   | 10mm              | 3          | 610         | 1830         |
|                   | 12mm              | 8          | 830         | 6640         |
| Floor mesh        | 5mm               | 1          | 3200        | 3200         |
| Tie wire          | 1.6mm             | 1          | 300         | 300          |
| <i>Pvc Pipe</i>   | <i>100mmx5.8m</i> | <i>1</i>   | <i>3400</i> | <i>3400</i>  |
| <i>Vent Cap</i>   | <i>100mm</i>      | <i>2</i>   | <i>100</i>  | <i>200</i>   |
| <b>Total Cost</b> |                   |            |             | <b>75340</b> |

# Inclusive Pour Flush Toilet



Overall image

| DRAWING LIST          | PAGE NO. |
|-----------------------|----------|
| Cover Page            | SD 5.01  |
| Key Features          | SD 5.02  |
| Floor Plan            | SD 5.03  |
| Framing Plan          | SD 5.04  |
| Pit Plan              | SD 5.05  |
| Sections              | SD 5.06  |
| Construction Sequence | SD 5.07  |

## GENERAL NOTES

These drawings are Concept Design only and need to be further developed and designed as required for each site specific application of the various septic systems as required.

All dimensions relevant to setting out and offsite work shall be verified before construction and fabrication is commenced.

Workmanship should be in accordance with the requirements of the local statutory authorities.

The structural engineer should inspect foundations prior to concreting, concrete works, masonry walls prior to core filling and structural framing associated with the shelters.

During construction the Contractor will responsible for maintaining the structure in a stable condition and ensuring no part shall be over stressed under construction activities.

Any substitution of elements to be approved by the design engineer/superintendent.

Generally live loads of 4.0kPa and 0.25 kPa for the ground floor slab and roof should be adopted respectively.

Sites should be cleared to remove all top soil.

Filling, where required, shall consist of suitable material and placed in compacted layers.

Generally bearing capacity below all footings should be a minimum of 100 kPa.

Structural concrete should be a minimum of 25MPa.

Grout fill to blockwork should be a minimum of 17.5 MPa.

Concrete placement should adopt suitable techniques to ensure well compacted concrete in place.

All structural concrete should be adequately cured by keeping wet and covering with plastic for a minimum of 7 days.

All concrete floor slabs are 100mm thick with reinforcing bars D10, at 250mm centres both ways, and 30mm bottom cover

Concrete finish generally should be a smooth steel trowel finish.

All reinforcing steel should comply with AS/NZ 4671.

All structural timber should be minimum grade SG6.

All timber stored on site should be off the ground and protected from the weather.

All bolts, coach screws, nails, washers, fixing plates shall be hot dip galvanised.

All timber fixed against concrete or block work shall be isolated from direct contact with a suitable damp proof membrane.



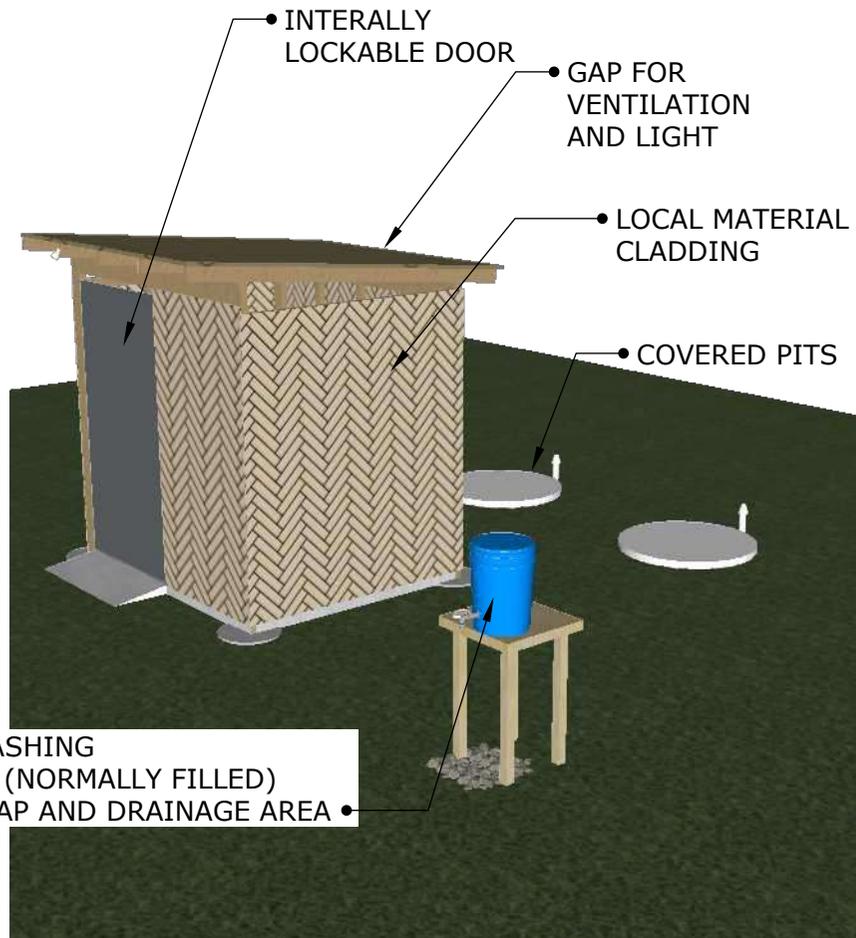
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|----------|----------|--------------|--------------|
|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                             |
|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

|               |            |
|---------------|------------|
| Drawing name: | Cover Page |
|---------------|------------|

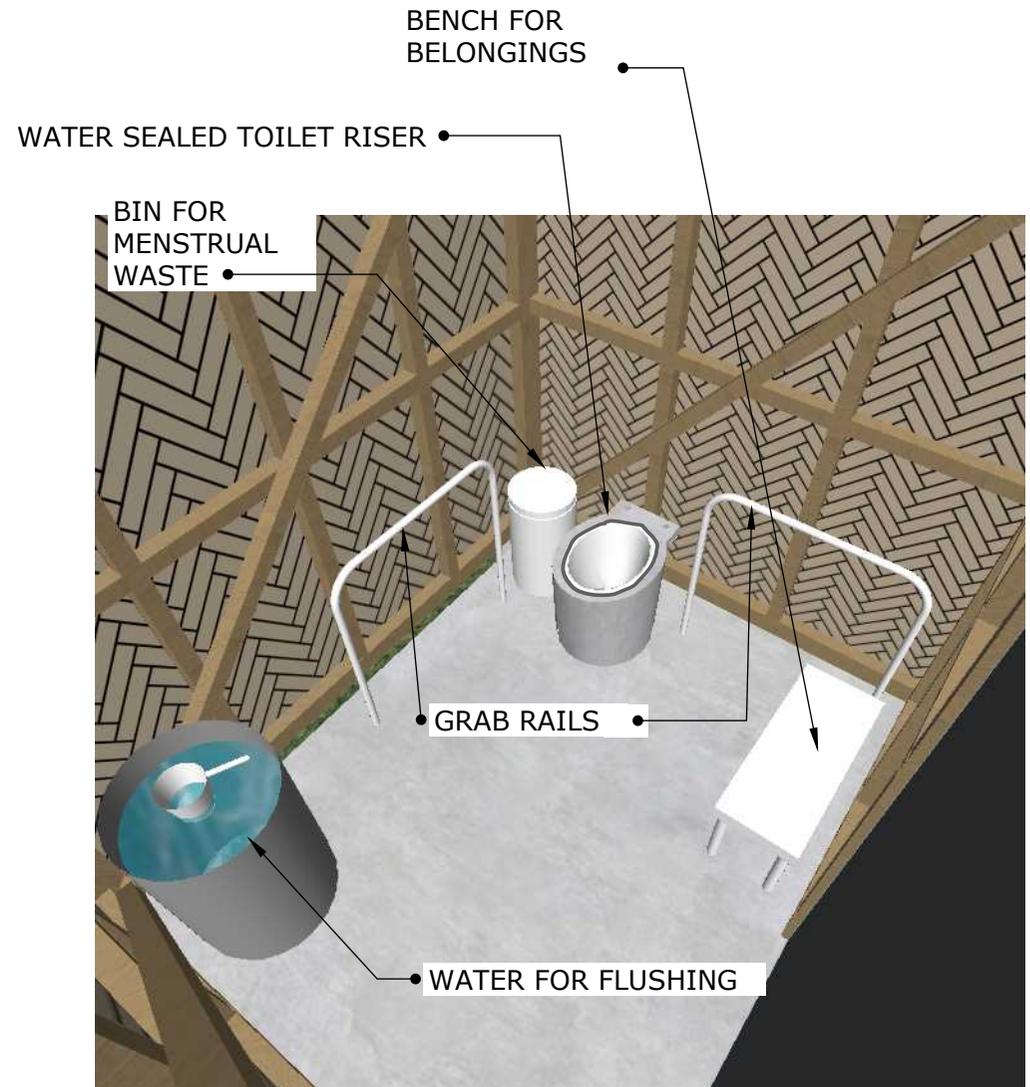
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|---------------------|---------|
| Drawing no.:        | SD 5 01 |
| Paper Size & Scale: | A4      |

HANDWASHING  
STATION TO BE  
PROVIDED



HAND WASHING  
FACILITY (NORMALLY FILLED)  
WITH SOAP AND DRAINAGE AREA

FRONT PERSPECTIVE



INTERNAL PERSPECTIVE

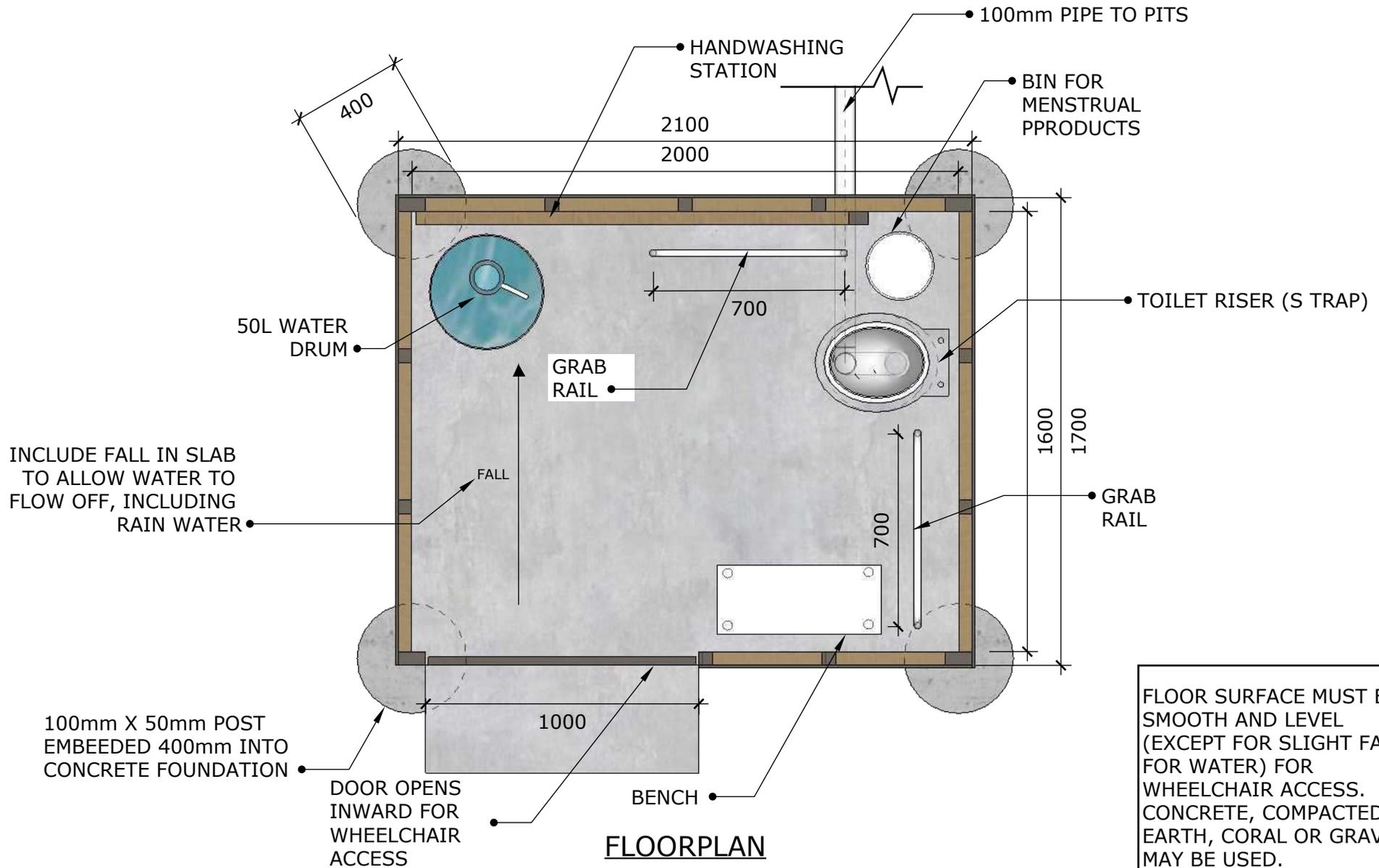


| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          |          |              |              |
|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                             |
|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 5 02 |
| Paper Size & Scale: | A4      |

|               |              |
|---------------|--------------|
| Drawing name: | Key Features |
|---------------|--------------|



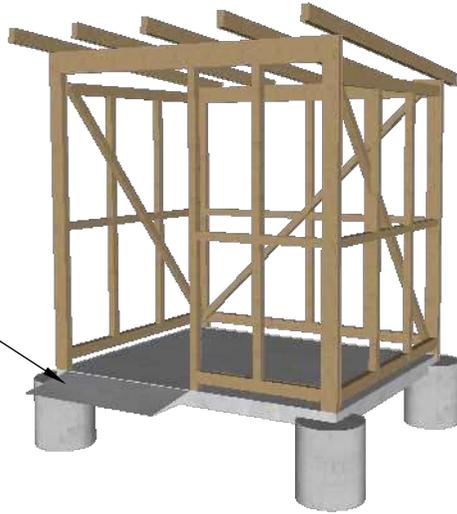
| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                             |
|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

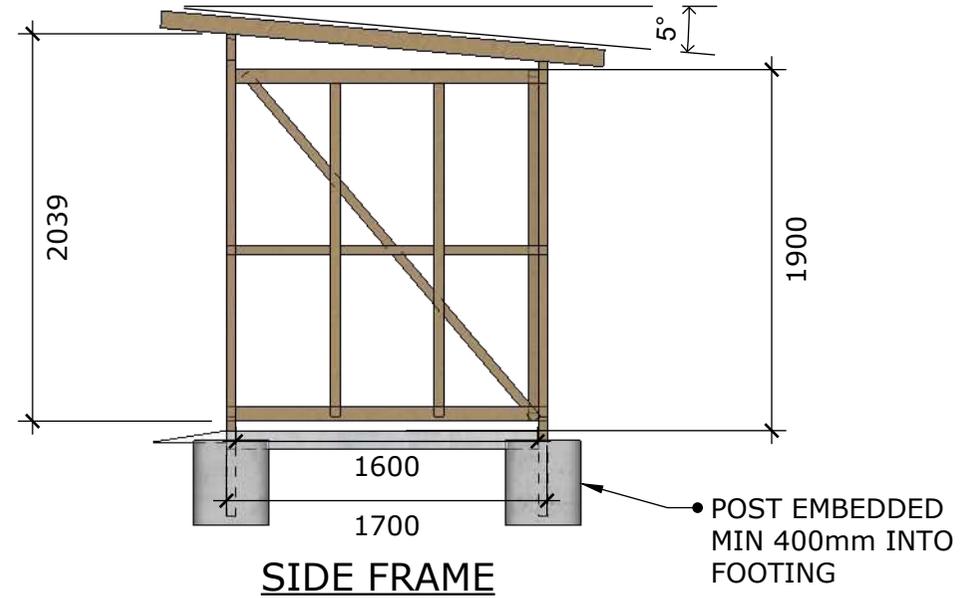
|               |            |
|---------------|------------|
| Drawing name: | Floor Plan |
|---------------|------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 5 03 |
| Paper Size & Scale: | A4 1:20 |

WHEELCHAIR RAMP

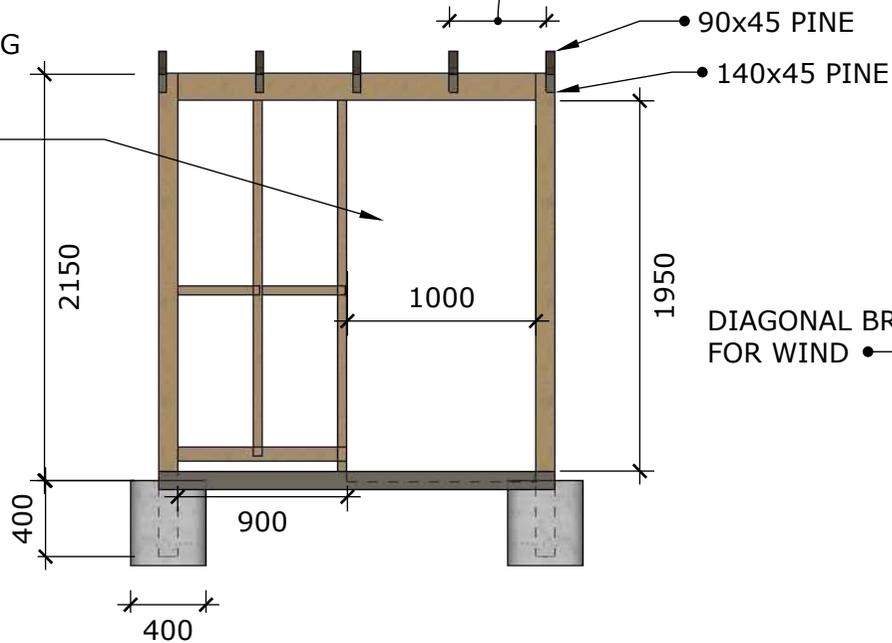


**PERSPECTIVE** 600 MAX



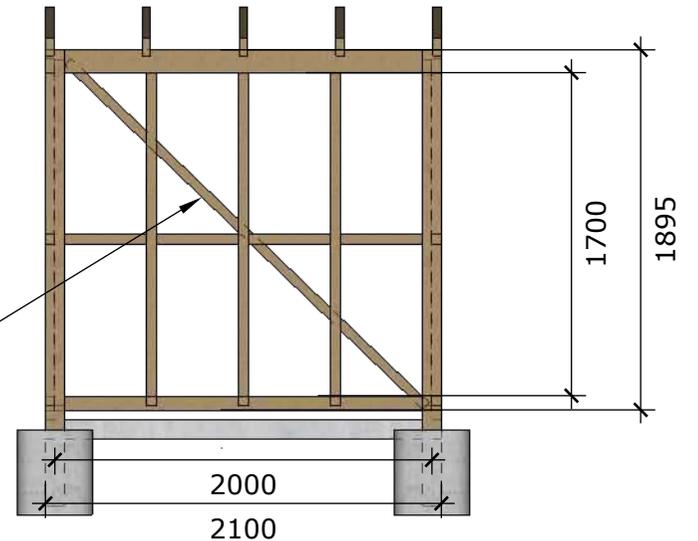
**SIDE FRAME**

DOOR OPENING 1000mm FOR WHEELCHAIR ACCESS



**FRONT FRAME**

DIAGONAL BRACE FOR WIND



**REAR FRAME**

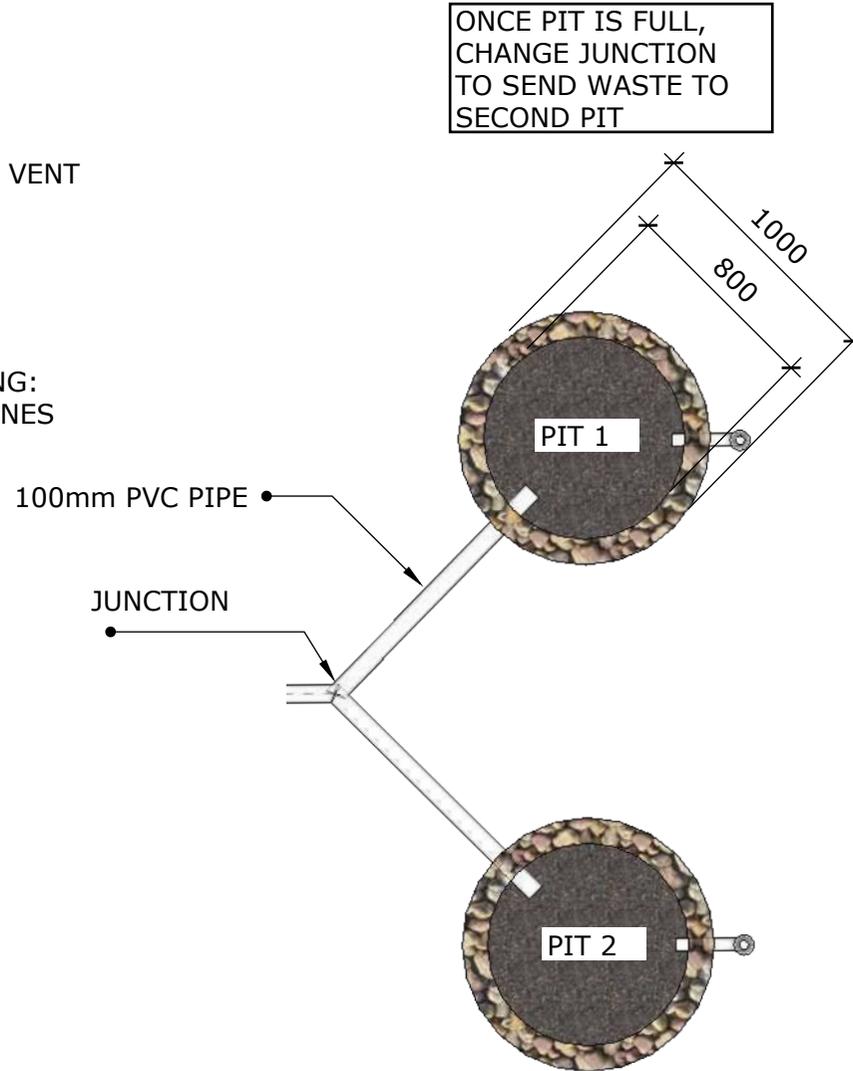
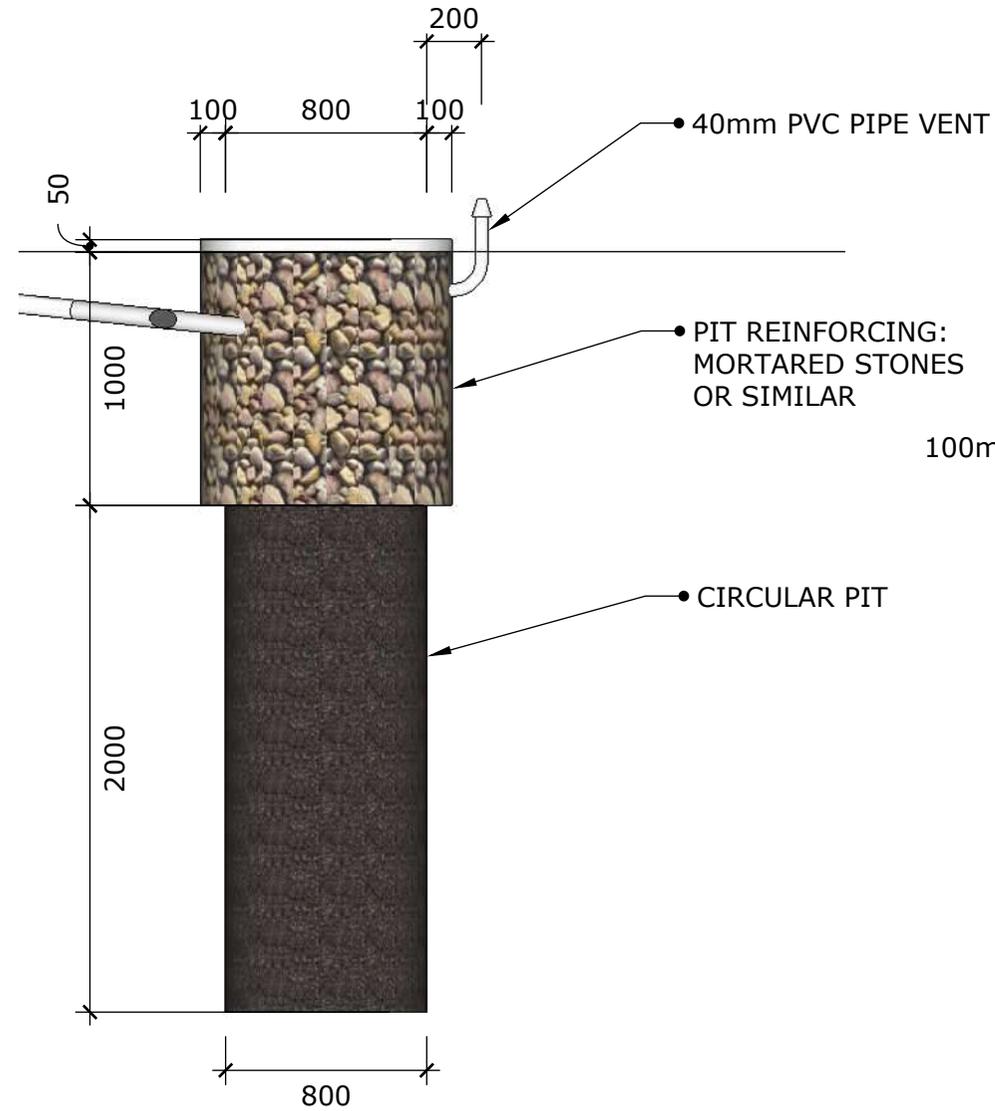


| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                             |
|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

|               |              |
|---------------|--------------|
| Drawing name: | Framing Plan |
|---------------|--------------|

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|---------------------|---------|
| Drawing no.:        | SD 5 04 |
| Paper Size & Scale: | A4 1:40 |



SECTION VIEW

PLAN VIEW

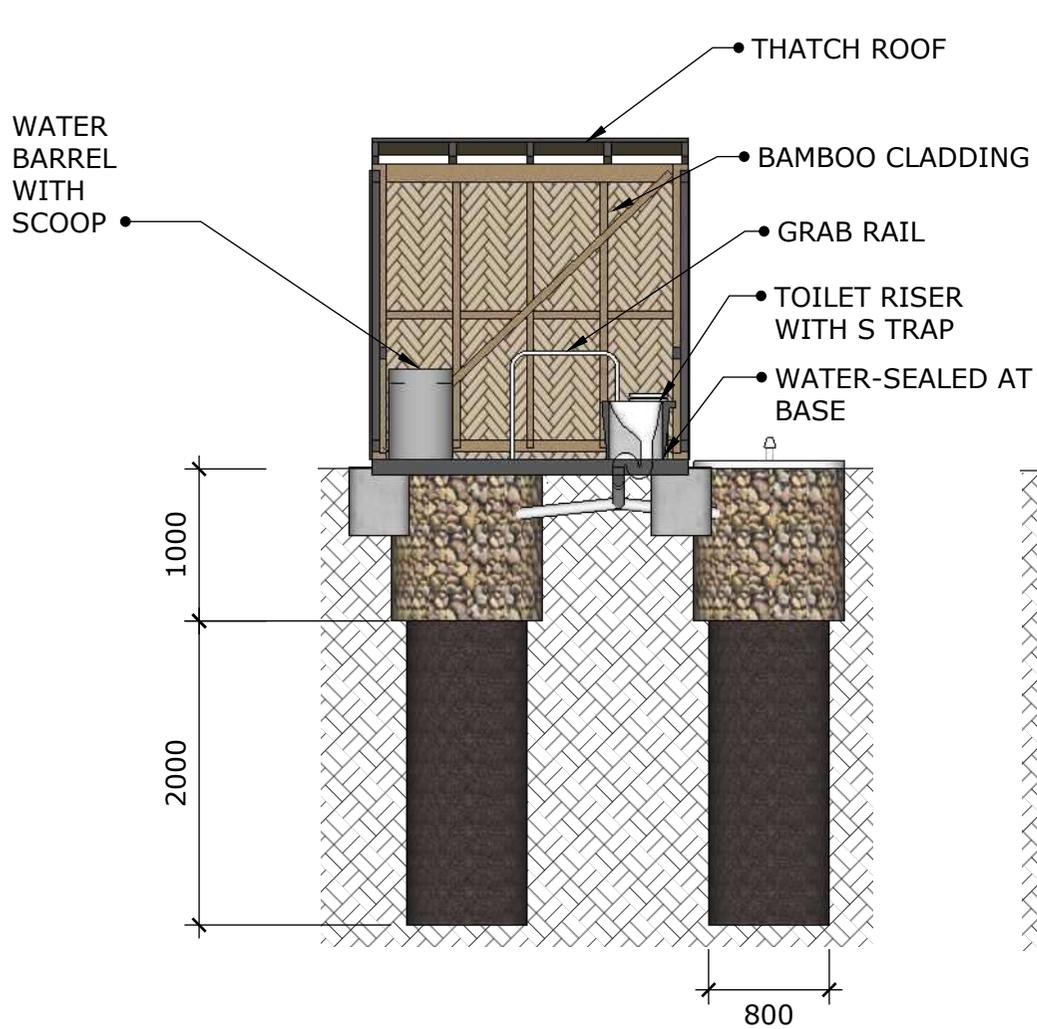


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|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

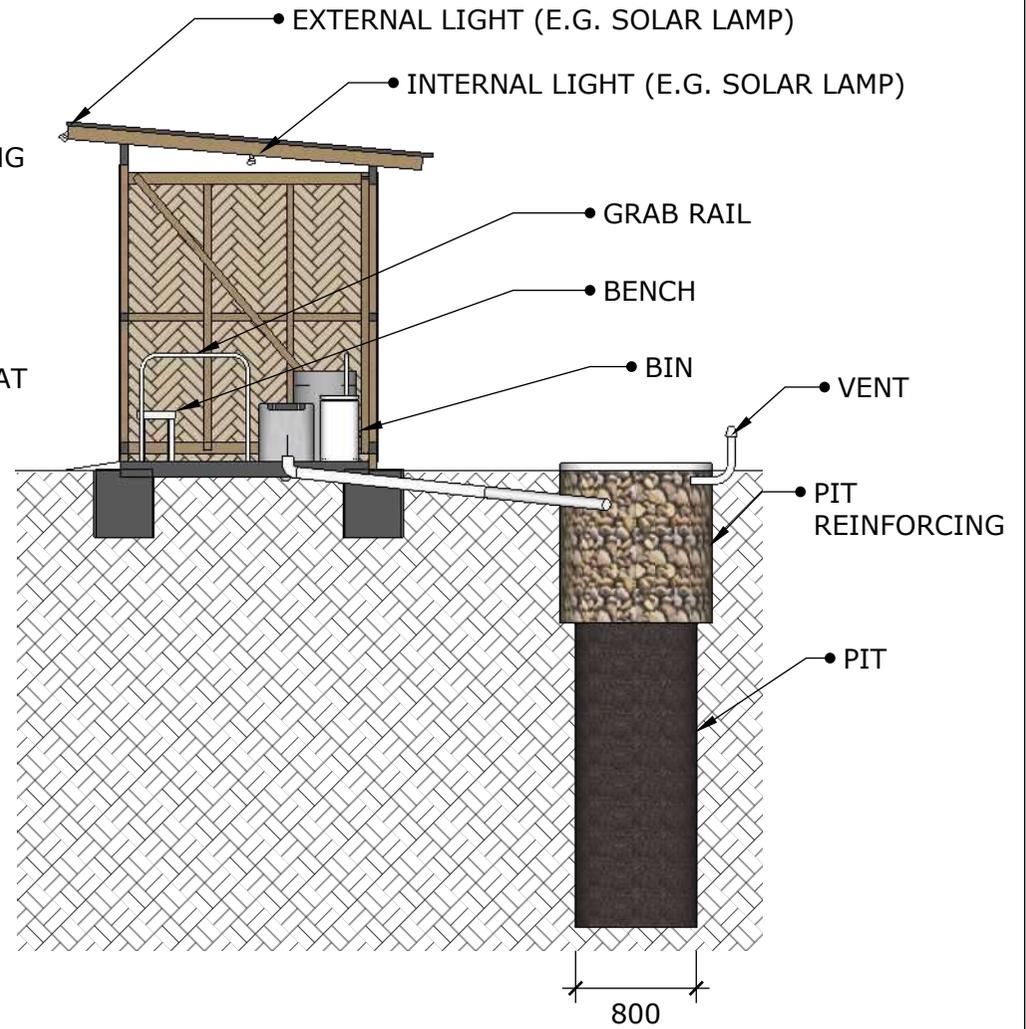
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|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

|               |          |
|---------------|----------|
| Drawing name: | Pit Plan |
|---------------|----------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 5 05 |
| Paper Size & Scale: | A4 1:30 |



**FRONT SECTION**



**SIDE SECTION**



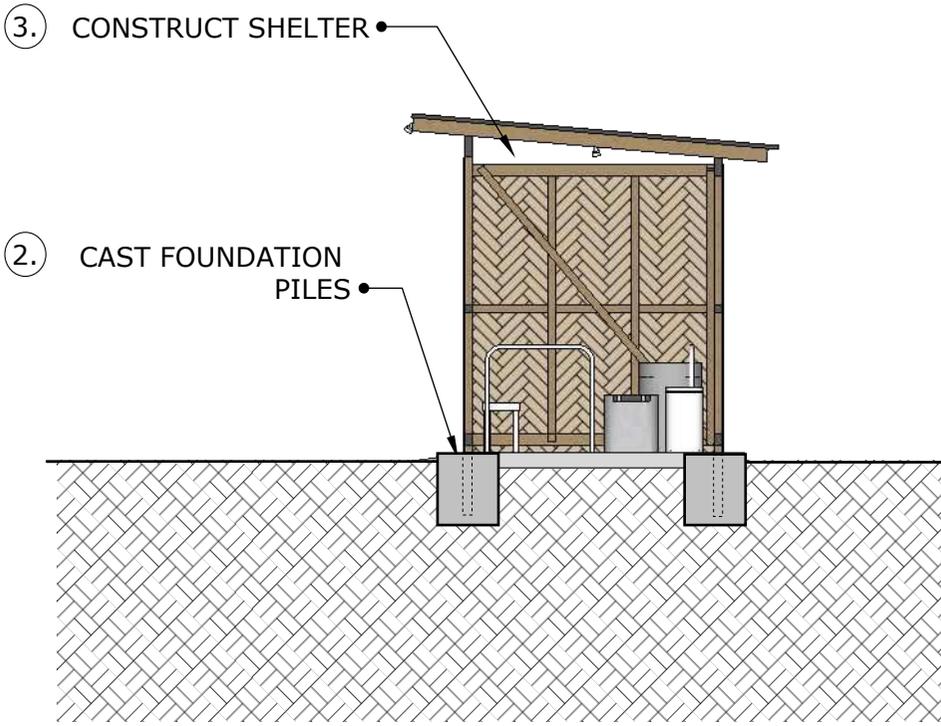
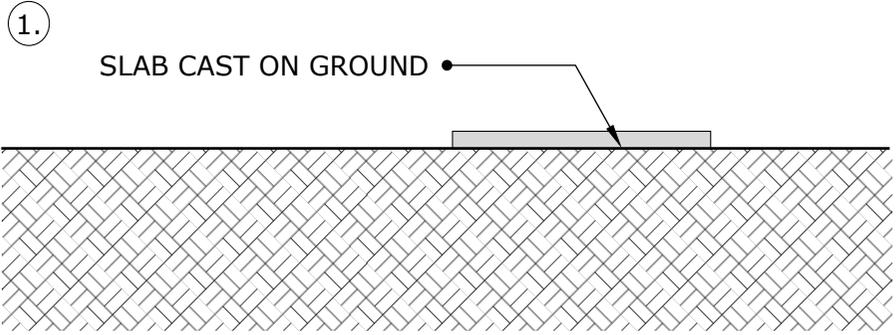
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|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                             |
|---------------|-----------------------------|
| Client:       | Ministry of Health          |
| Project Name: | Inclusive Pour Flush Toilet |
| Drafted:      | January 29, 2022            |
| Checked:      | RD (Arup)                   |

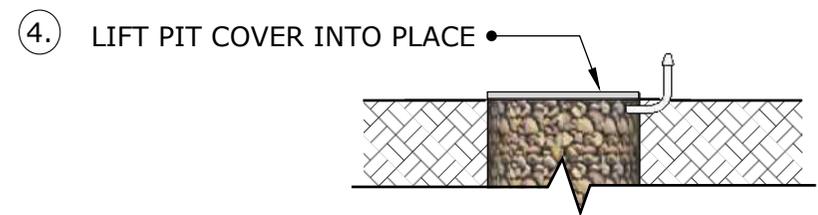
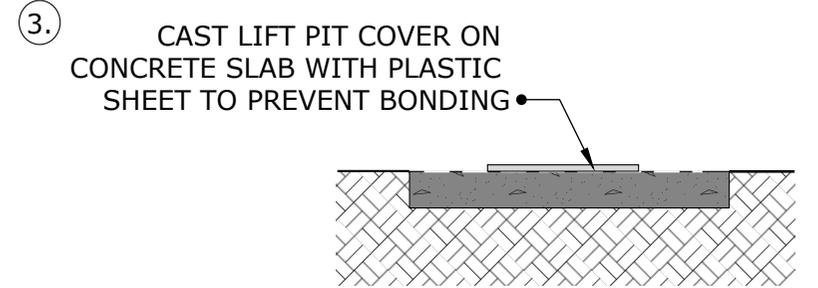
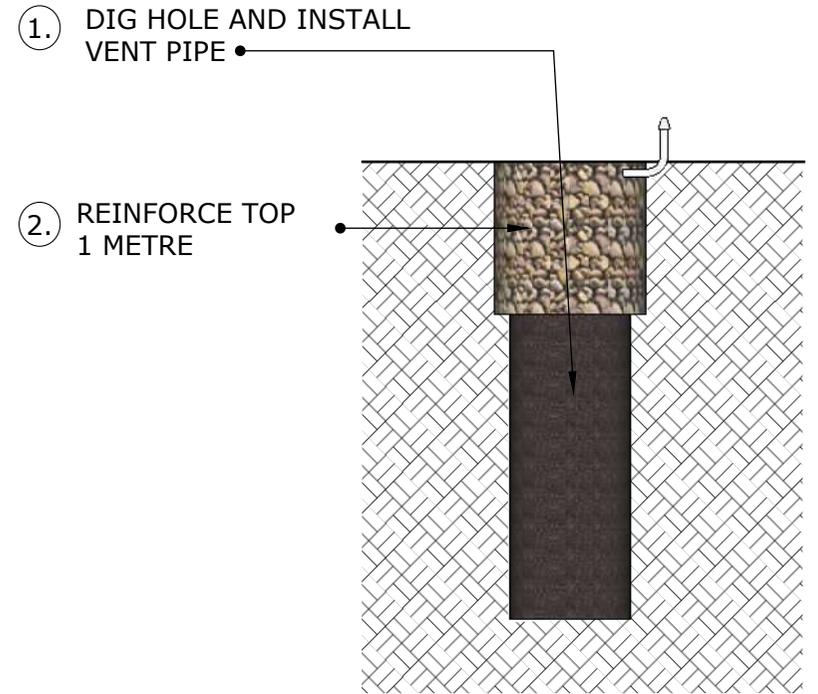
|               |          |
|---------------|----------|
| Drawing name: | Sections |
|---------------|----------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 5 06 |
| Paper Size & Scale: | A4 1:50 |

## SHELTER CONSTRUCTION SEQUENCE



## POUR FLUSH PIT CONSTRUCTION SEQUENCE



| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 23/01/22 | William Hope | Revision 2   |
|          | 09/08/21 | NRS          | Revision 1   |

|               |                                     |
|---------------|-------------------------------------|
| Client:       | Ministry of Health                  |
| Project Name: | Inclusive Pour Flush Toilet         |
| Drafted:      | January 29, 2022 Checked: RD (Arup) |

|               |                       |
|---------------|-----------------------|
| Drawing name: | Construction Sequence |
|---------------|-----------------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 5 07 |
| Paper Size & Scale: | A4      |

# VIP Toilet 'Gold Standard Accessibility'



Overall image

| DRAWING LIST          | PAGE NO. |
|-----------------------|----------|
| Cover Page            | SD 1.01  |
| Key Features          | SD 1.02  |
| Pit Plan              | SD 1.03  |
| Slab Plan             | SD 1.04  |
| Floor Plan            | SD 1.05  |
| Framing Plan          | SD 1.06  |
| Sections              | SD 1.07  |
| Construction Sequence | SD 1.08  |

## GENERAL NOTES

These drawings are Concept Design only and need to be further developed and designed as required for each site specific application of the various septic systems as required.

All dimensions relevant to setting out and offsite work shall be verified before construction and fabrication is commenced.

Workmanship should be in accordance with the requirements of the local statutory authorities.

The structural engineer should inspect foundations prior to concreting, concrete works, masonry walls prior to core filling and structural framing associated with the shelters.

During construction the Contractor will responsible for maintaining the structure in a stable condition and ensuring no part shall be over stressed under construction activities.

Any substitution of elements to be approved by the design engineer/superintendent.

Generally live loads of 4.0kPa and 0.25 kPa for the ground floor slab and roof should be adopted respectively.

Sites should be cleared to remove all top soil.

Filling, where required, shall consist of suitable material and placed in compacted layers.

Generally bearing capacity below all footings should be a minimum of 100 kPa.

Structural concrete should be a minimum of 25MPa.

Grout fill to blockwork should be a minimum of 17.5 MPa.

Concrete placement should adopt suitable techniques to ensure well compacted concrete in place.

All structural concrete should be adequately cured by keeping wet and covering with plastic for a minimum of 7 days.

All concrete floor slabs are 100mm thick with reinforcing bars D10, at 250mm centres both ways, and 30mm bottom cover

Concrete finish generally should be a smooth steel trowel finish.

All reinforcing steel should comply with AS/NZ 4671.

All structural timber should be minimum grade SG6.

All timber stored on site should be off the ground and protected from the weather.

All bolts, coach screws, nails, washers, fixing plates shall be hot dip galvanised.

All timber fixed against concrete or block work shall be isolated from direct contact with a suitable damp proof membrane.



| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

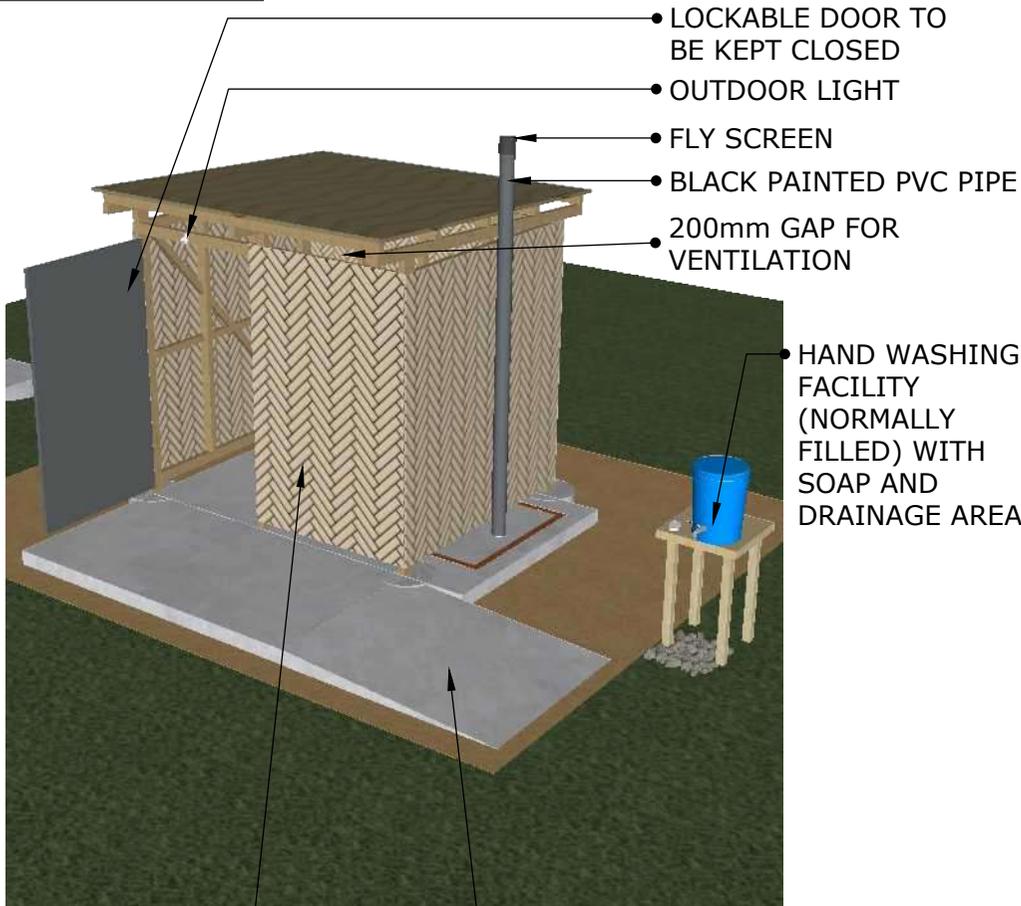
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|---------------|-----------------------------------|
| Client:       | Ministry of Health                |
| Project Name: | VIP 'Gold Standard Accessibility' |
| Drafted:      | January 29, 2022                  |
| Checked:      | RD (Arup)                         |

|               |            |
|---------------|------------|
| Drawing name: | Cover Page |
|---------------|------------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.01 |
| Paper Size & Scale: | A4      |

TOILET INSIDE TO HAVE NO LID, FOR VENTILATION

SURFACE AROUND TOILET TO BE COVERED WITH CORAL OR STONES



LOCAL MATERIAL CLADDING

- LOCKABLE DOOR TO BE KEPT CLOSED
- OUTDOOR LIGHT
- FLY SCREEN
- BLACK PAINTED PVC PIPE
- 200mm GAP FOR VENTILATION

HAND WASHING FACILITY (NORMALLY FILLED) WITH SOAP AND DRAINAGE AREA

ACCESSIBLE RAMP (MAY BE CONCRETE OR COMPACTED EARTH OR CORAL)

FRONT PERSPECTIVE



LIGHT (EG. SOLAR LAMP)

BIN WITH LID FOR MENSTRUAL PRODUCTS

BENCH

ACCESSIBLE HANDRAIL (MADE FROM TIMBER OR METAL)

INTERIOR PERSPECTIVE

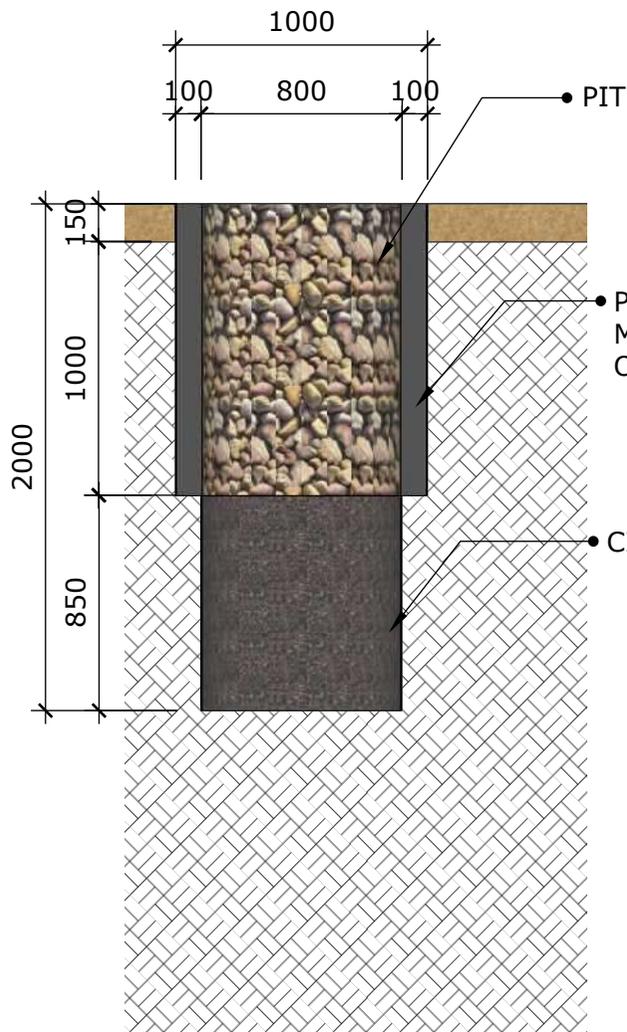


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|          | 23/01/22 | William Hope | Revision 3   |

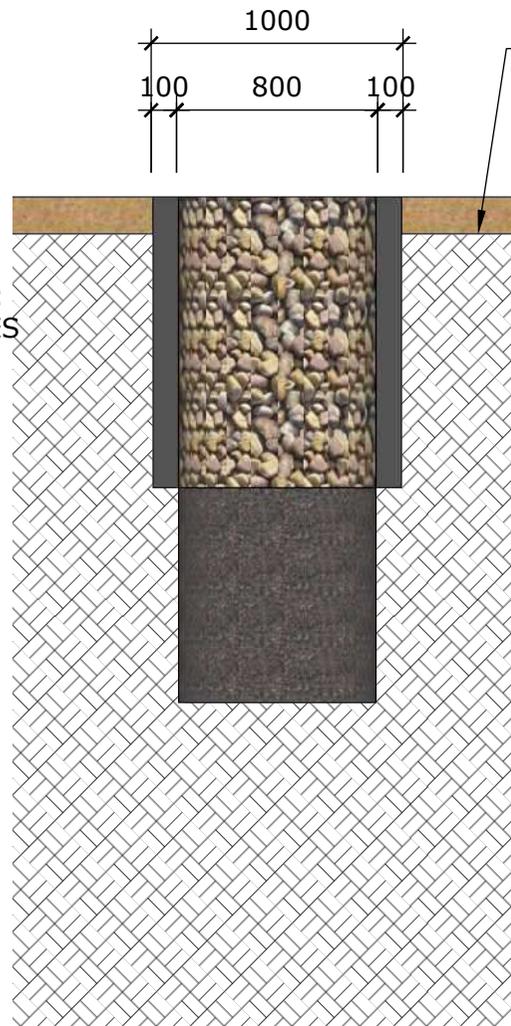
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| Client:       | Ministry of Health                |
| Project Name: | VIP 'Gold Standard Accessibility' |
| Drafted:      | January 29, 2022                  |
| Checked:      | RD (Arup)                         |

|               |              |
|---------------|--------------|
| Drawing name: | Key Features |
|---------------|--------------|

|                     |         |
|---------------------|---------|
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| Paper Size & Scale: | A4      |



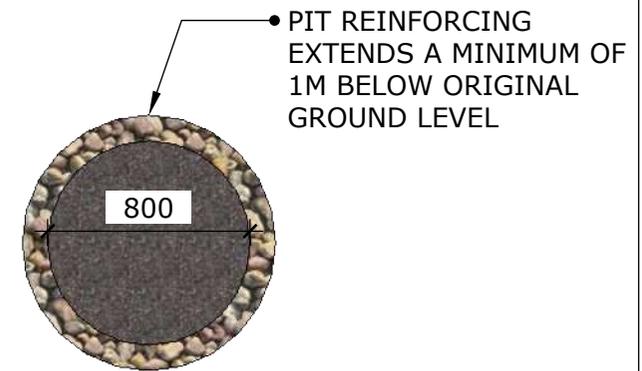
FRONT SECTION VIEW



SIDE SECTION VIEW



PERSPECTIVE VIEW



PLAN VIEW

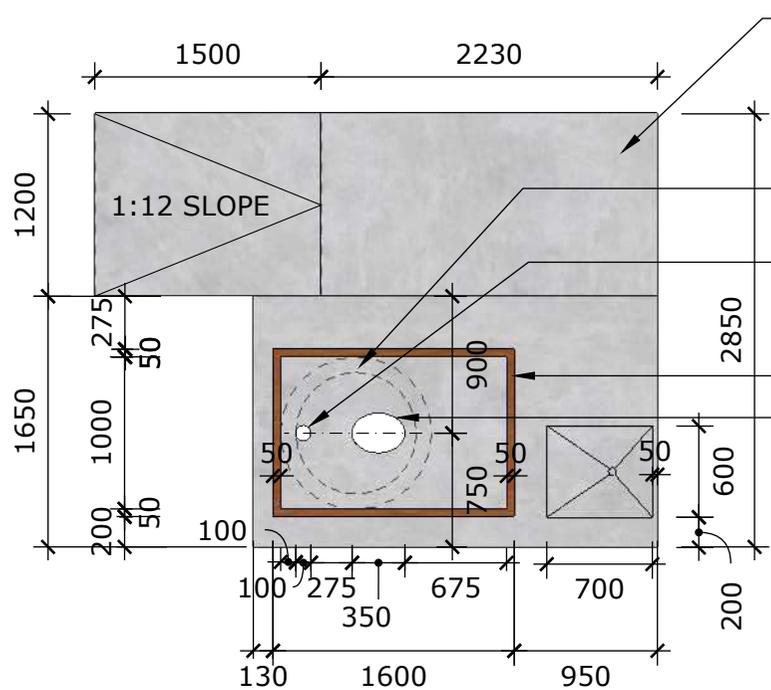


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|----------|----------|--------------|--------------|
|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

|               |                                     |
|---------------|-------------------------------------|
| Client:       | Ministry of Health                  |
| Project Name: | VIP 'Gold Standard Accessibility'   |
| Drafted:      | January 29, 2022 Checked: RD (Arup) |

|               |          |
|---------------|----------|
| Drawing name: | Pit Plan |
|---------------|----------|

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.03 |
| Paper Size & Scale: | A4 1:30 |

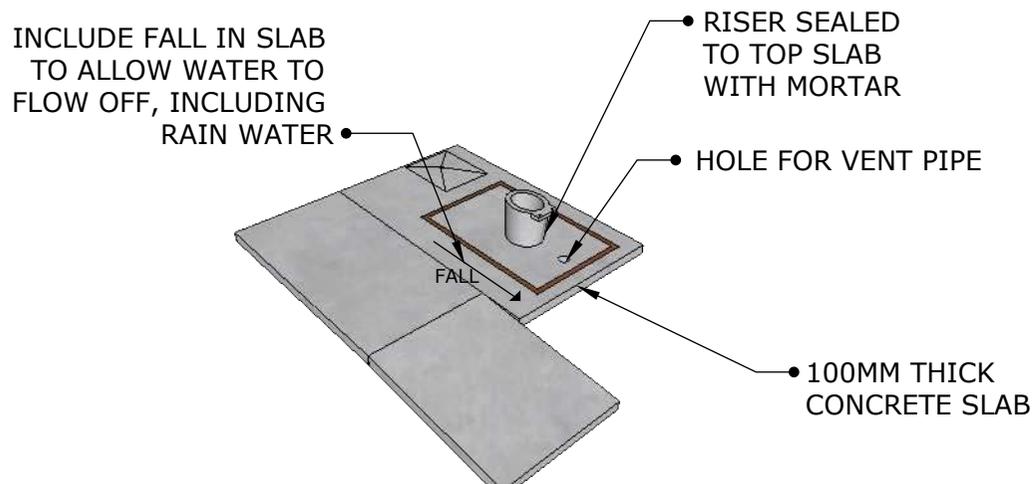


**FOUNDATION SLAB PLAN**

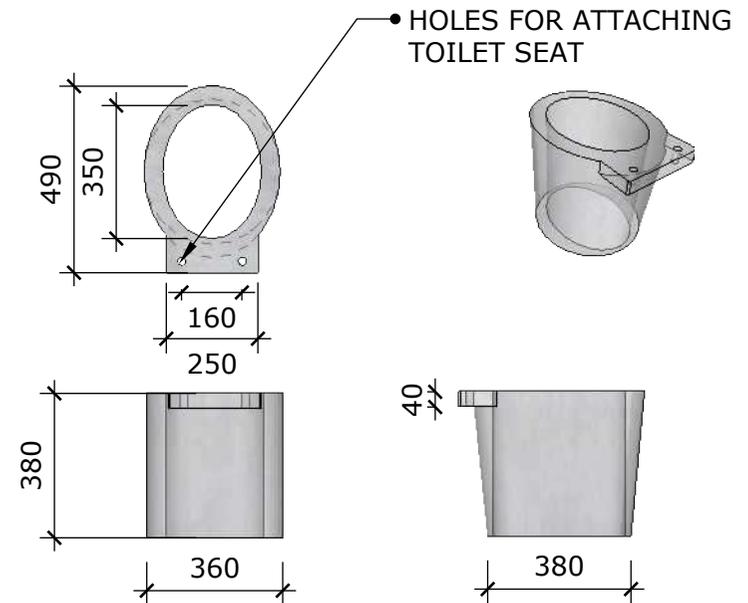
- 100mm REINFORCED SLAB (OPTION TO MAKE FROM RAMMED EARTH/CORAL AS CHEAPER ALTERNATIVE)
- PIT SHOWN BELOW
- HOLE FOR VENT PIPE
- TIMBER FRAME TO SLAB
- HOLE FOR WASTE

**OPTIONAL:** HANDLES PRECAST IN THE TOP SLAB TO ASSIST MOVING IT TO ANOTHER PIT. IF USING, MAKE FLUSH TO PREVENT TRIP HAZARD.

**NOTE:** WEIGHT OF SLABS SHOULD ENSURE THAT THEY WILL SIT ON TOP OF THE REINFORCED PIT WALLS BELOW UNDER SELF WEIGHT. IF PIT WALLS ARE NOT COMPLETELY LEVEL OR SETTLE DIFFERENTIALLY OVER TIME, COVER MAY SLIDE



**SLAB PERSPECTIVE**



**CONCRETE RISER**

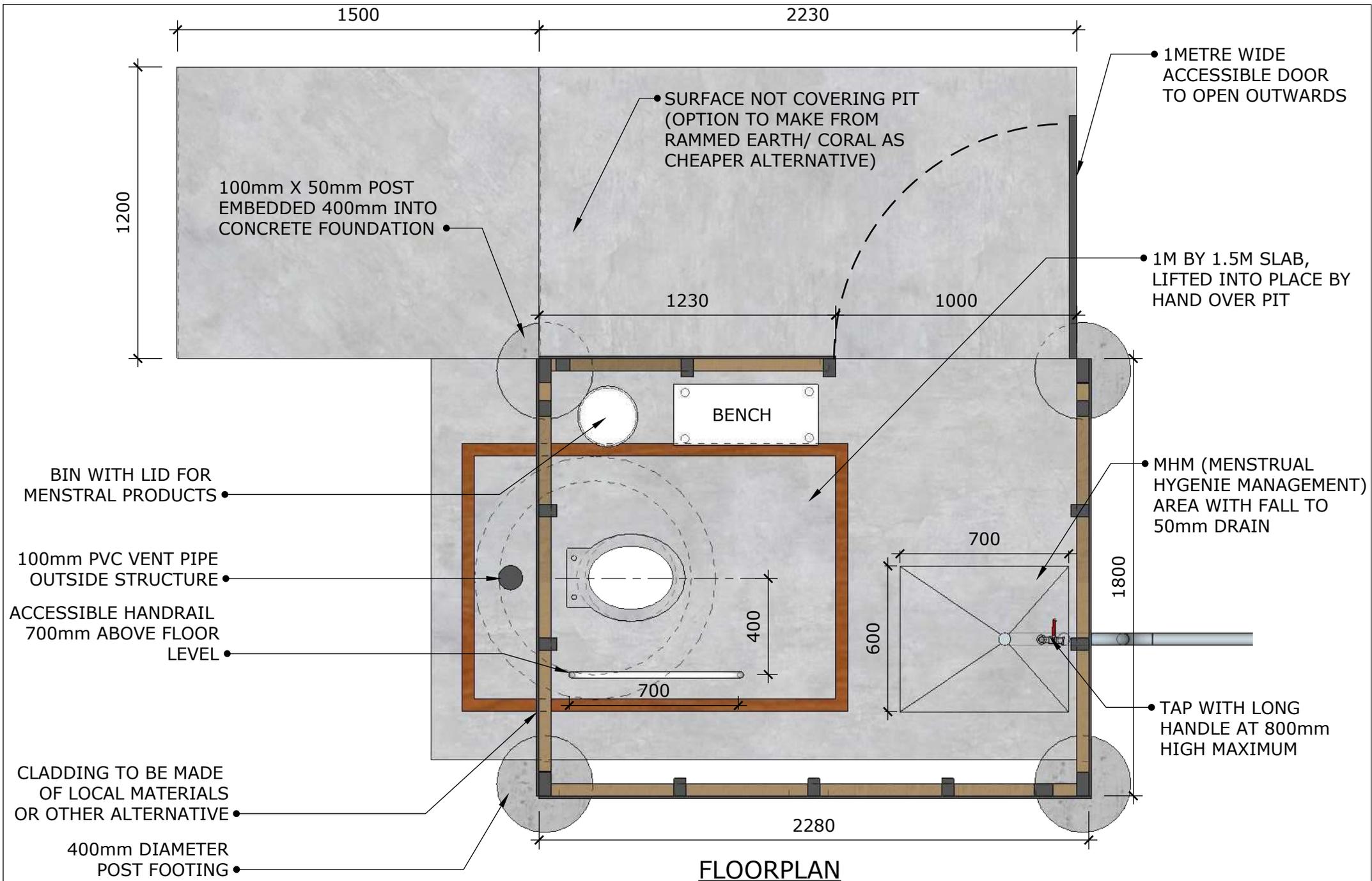


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|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

|               |                                   |
|---------------|-----------------------------------|
| Client:       | Ministry of Health                |
| Project Name: | VIP 'Gold Standard Accessibility' |
| Drafted:      | January 29, 2022                  |
| Checked:      | RD (Arup)                         |

|               |           |
|---------------|-----------|
| Drawing no.:  | SD 1.04   |
| Drawing name: | Slab Plan |

|                     |         |
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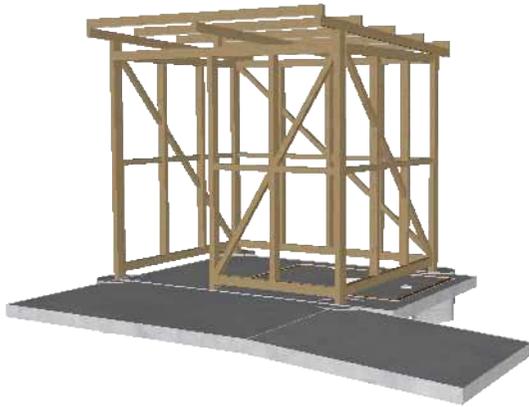


| REVISION | Date:    | Name:        | Description: |
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|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

|               |                                   |
|---------------|-----------------------------------|
| Client:       | Ministry of Health                |
| Project Name: | VIP 'Gold Standard Accessibility' |
| Drafted:      | January 29, 2022                  |
| Checked:      | RD (Arup)                         |

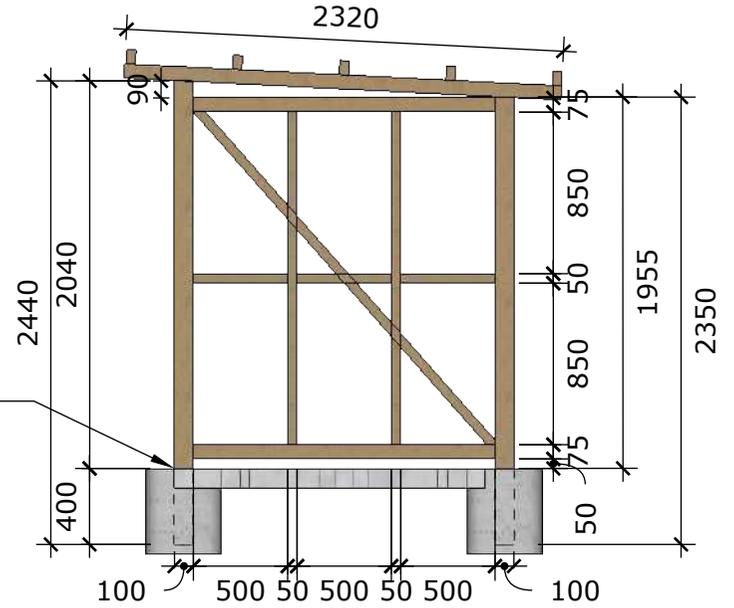
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|---------------|------------|
| Drawing name: | Floor Plan |
|---------------|------------|

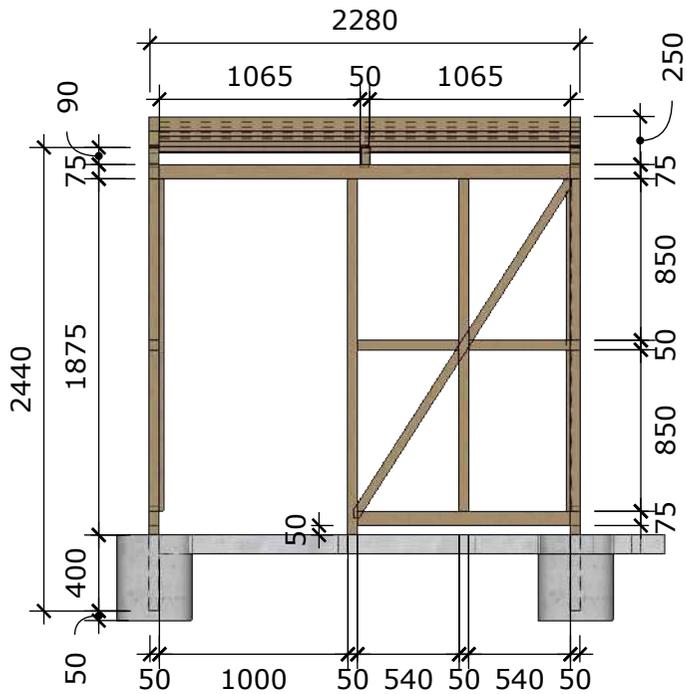


**PERSPECTIVE**

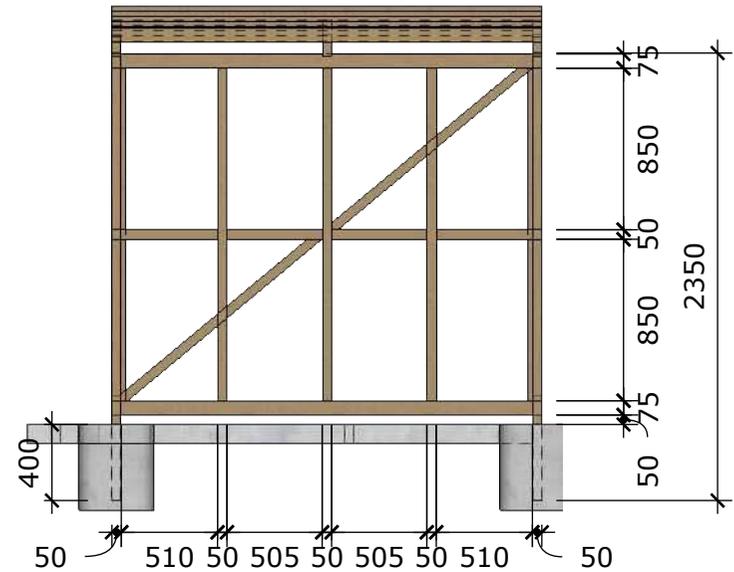
OPTIONAL: BOLTED CONNECTION BETWEEN FRAME AND SLAB SO STRUCTURE CAN BE MOVED TO A NEW PIT ONCE FULL



**SIDE FRAME**



**FRONT FRAME**



**REAR FRAME**

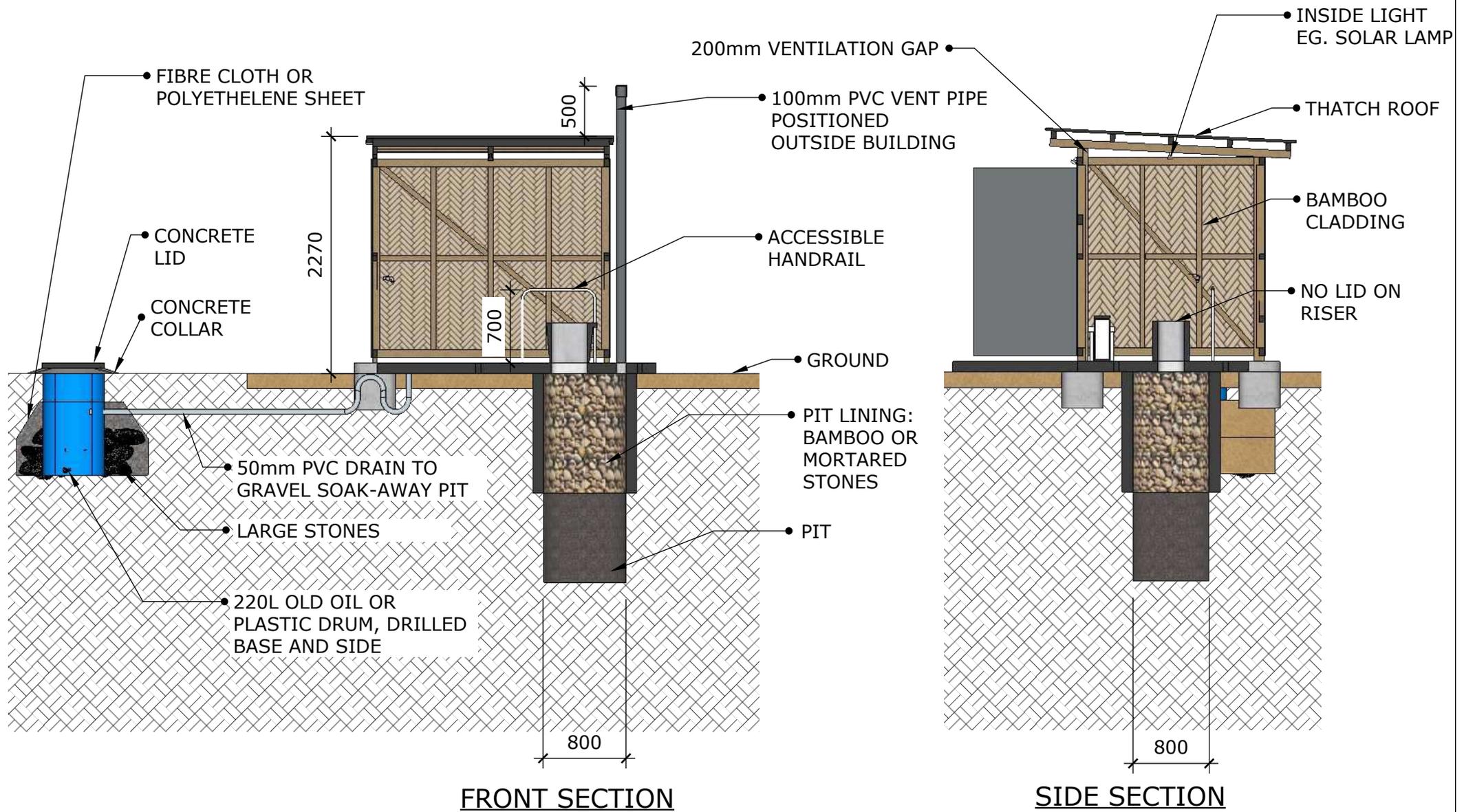


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|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

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|---------------|-------------------------------------|
| Client:       | Ministry of Health                  |
| Project Name: | VIP 'Gold Standard Accessibility'   |
| Drafted:      | January 29, 2022 Checked: RD (Arup) |

|                     |         |
|---------------------|---------|
| Drawing no.:        | SD 1.06 |
| Paper Size & Scale: | A4 1:40 |

|               |              |
|---------------|--------------|
| Drawing name: | Framing Plan |
|---------------|--------------|



**FRONT SECTION**

**SIDE SECTION**



| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

|               |                                   |
|---------------|-----------------------------------|
| Client:       | Ministry of Health                |
| Project Name: | VIP 'Gold Standard Accessibility' |
| Drafted:      | January 29, 2022                  |
| Checked:      | RD (Arup)                         |

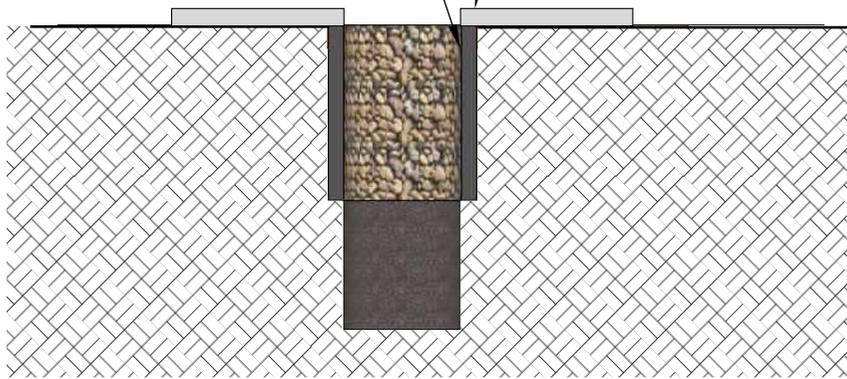
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| Drawing name: | Sections |
|---------------|----------|

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|---------------------|---------|
| Drawing no.:        | SD 1.07 |
| Paper Size & Scale: | A4 1:50 |

1.

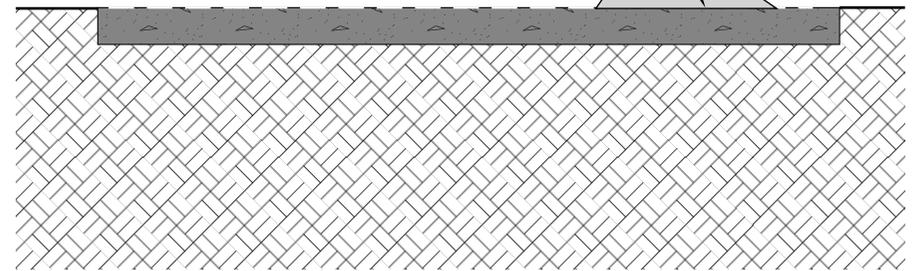
CONSTRUCT PIT WALLS

FOUNDATION SLAB CAST IN PLACE



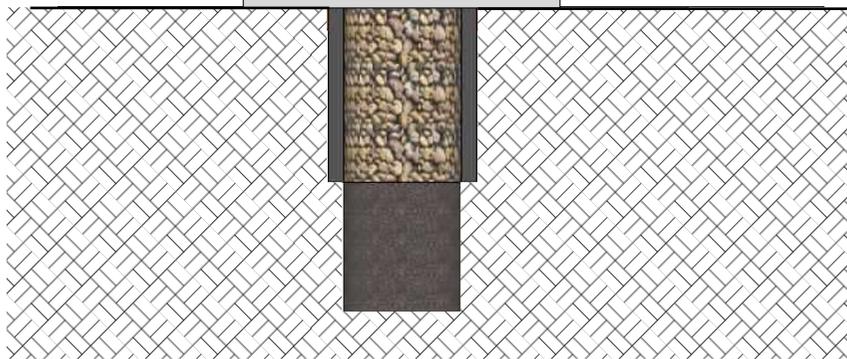
2.

TOP SLAB CAST ON CONCRETE SLAB WITH PLASTIC SHEET TO PREVENT BONDING



3.

LIFT TOP SLAB INTO PLACE

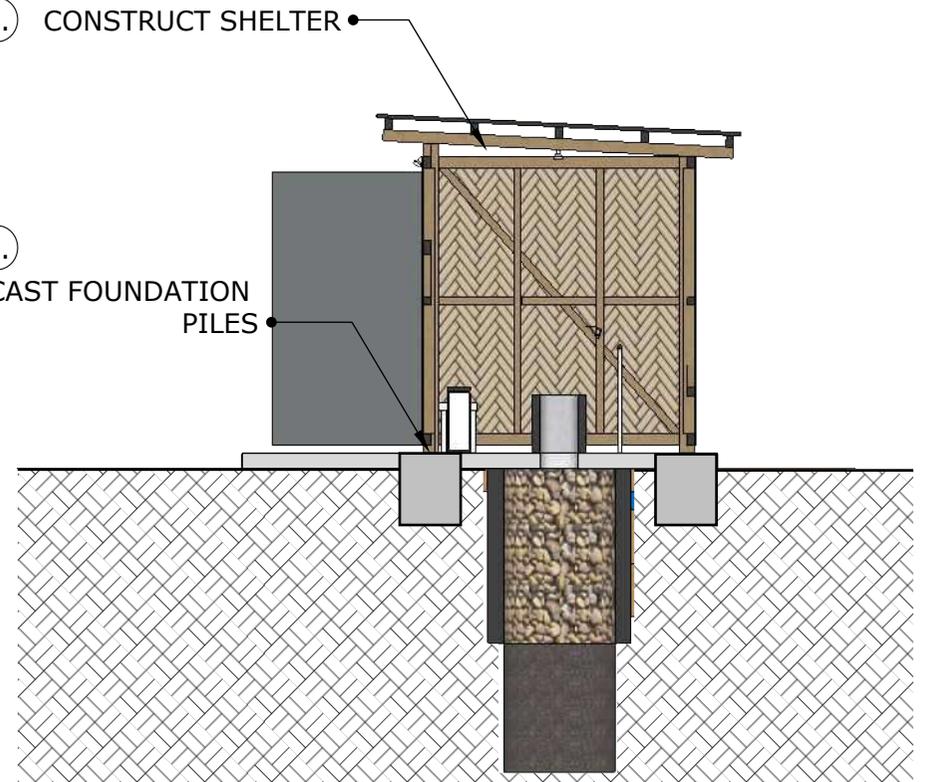


5.

CONSTRUCT SHELTER

4.

CAST FOUNDATION PILES



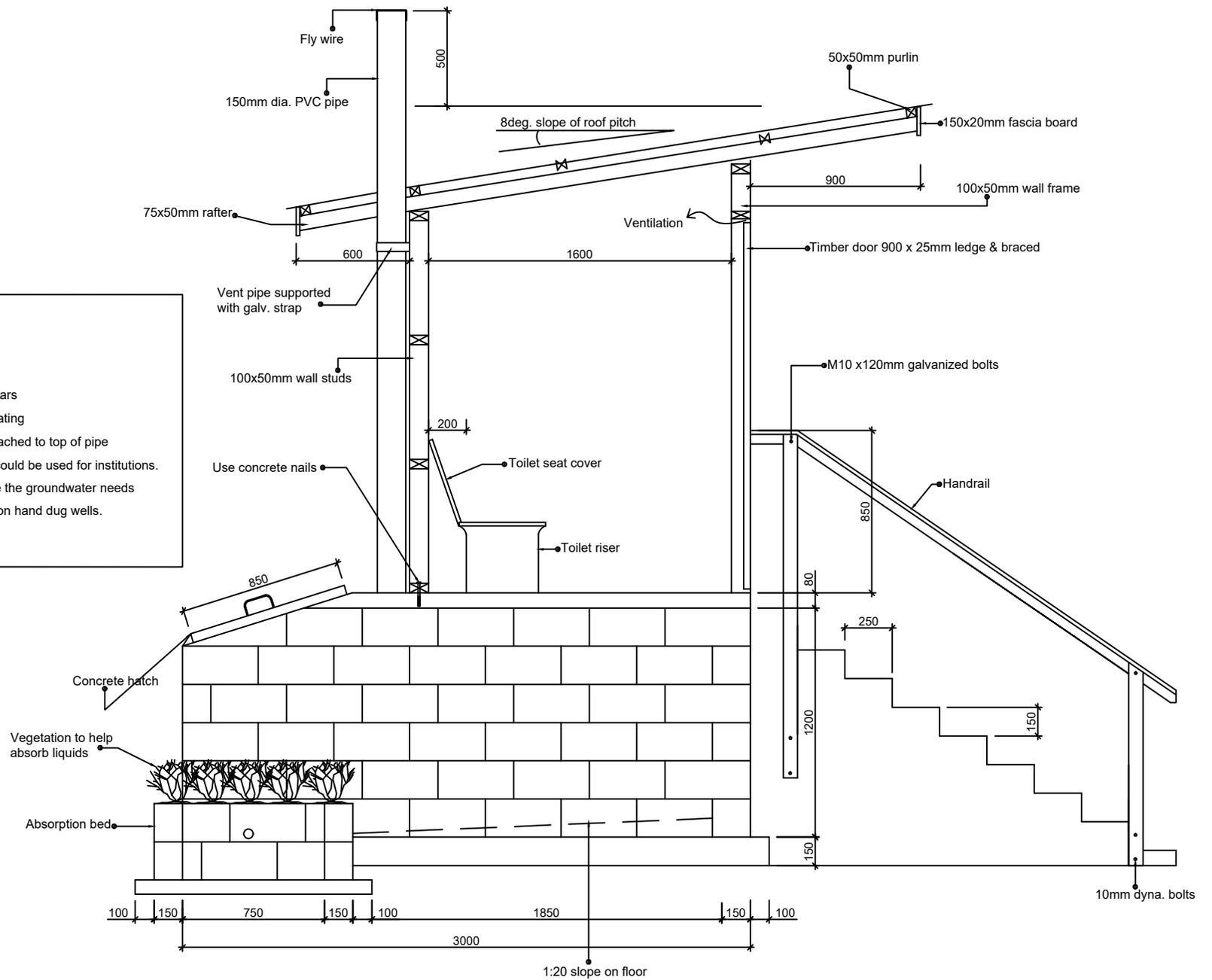
| REVISION | Date:    | Name:        | Description: |
|----------|----------|--------------|--------------|
|          | 22/07/21 | William Hope | Revision 1   |
|          | 01/11/21 | William Hope | Revision 2   |
|          | 23/01/22 | William Hope | Revision 3   |

|               |                                     |
|---------------|-------------------------------------|
| Client:       | Ministry of Health                  |
| Project Name: | VIP 'Gold Standard Accessibility'   |
| Drafted:      | January 29, 2022 Checked: RD (Arup) |

|               |                       |
|---------------|-----------------------|
| Drawing no.:  | SD 1.08               |
| Drawing name: | Construction Sequence |

|                     |    |
|---------------------|----|
| Paper Size & Scale: | A4 |
|---------------------|----|

- NOTES:**
- Inside of concrete vault to be plastered for water sealing
  - Concrete slabs to be reinforced with D12 deformed bars
  - Concrete blocks to be reinforced with 12mm deformed bars
  - Hatch to be orientated north where possible for solar heating
  - Vent pipe & hatch to be painted black with fly-screen attached to top of pipe
  - This toilet has been designed for up to 20 persons and could be used for institutions.
  - The absorption bed is recommended for locations where the groundwater needs to be protected, such as atolls where communities rely on hand dug wells.



SOLOMON ISLANDS RURAL  
WATER SUPPLY AND  
HYGIENE PROGRAM

TYPE OF  
STRUCTURE

COMPOSTING TOILET  
- SUITABLE FOR UP TO 20 PERSONS

DESIGNED BY: P.M.Wopereis

DRAWN BY: A. Bale

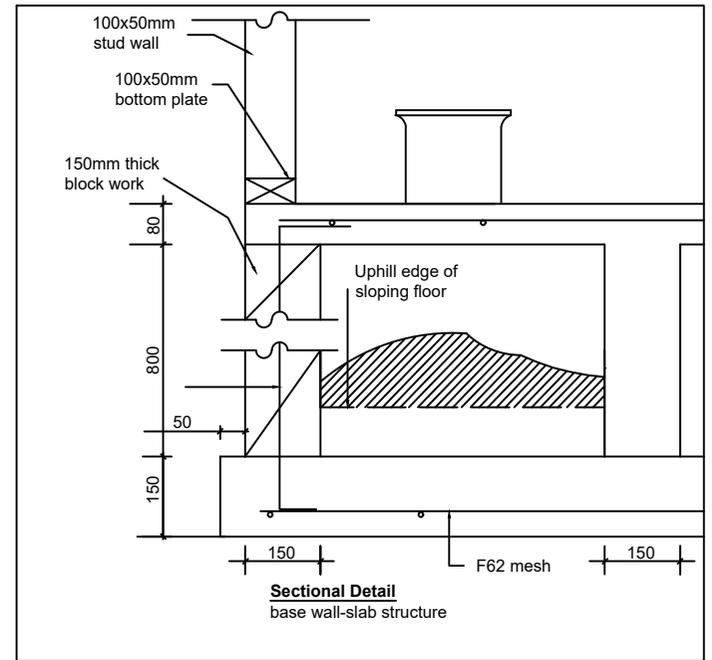
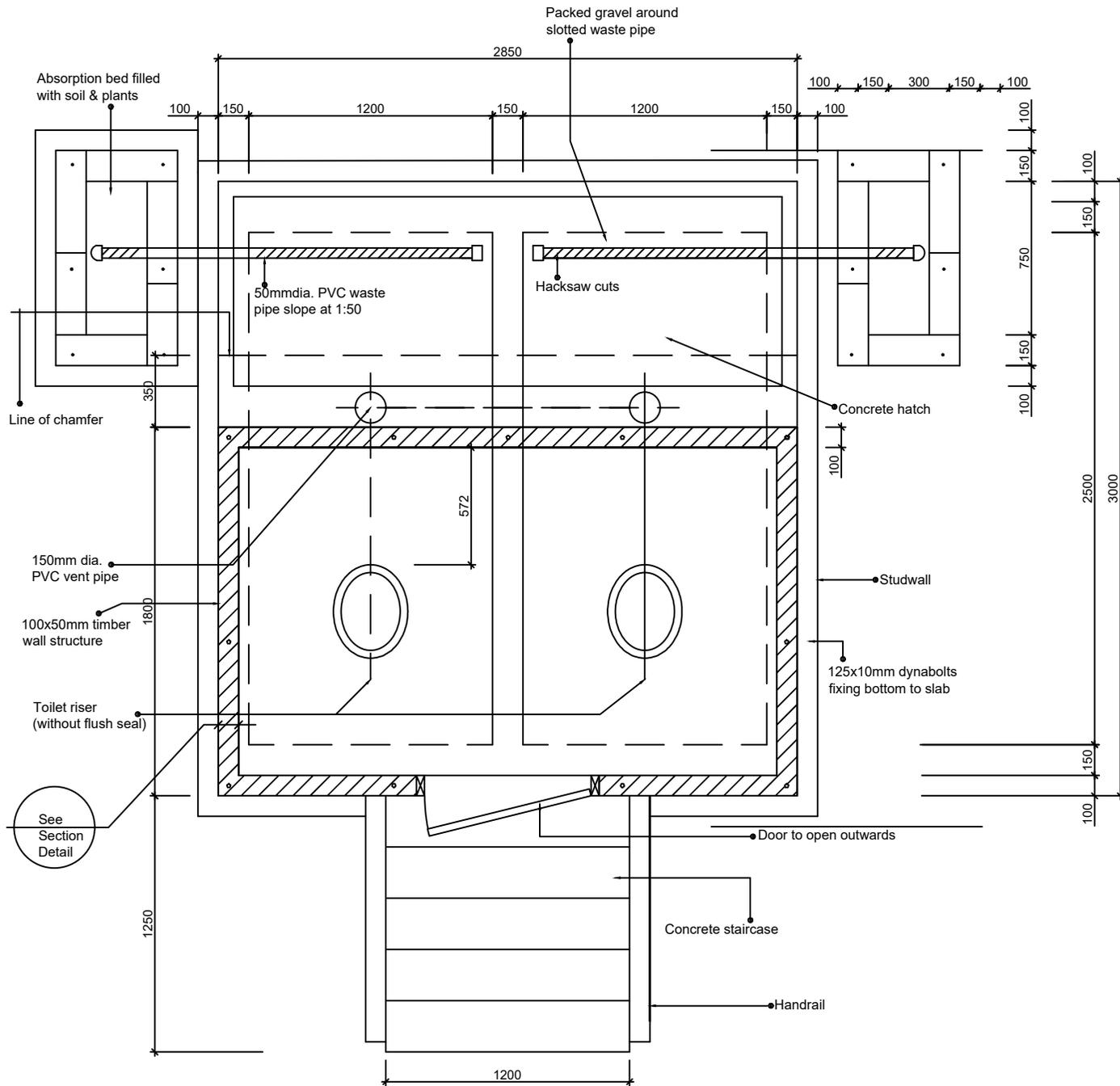
CHECKED BY: F. Saverio

REVISION DATE: 01/03/2018

SCALE: Not to scale

SHEET NO: 1 of 2

SHEET SIZE: A4



SOLOMON ISLANDS RURAL  
WATER SUPPLY AND  
HYGIENE PROGRAM

TYPE OF  
STRUCTURE

COMPOSTING TOILET  
- SUITABLE FOR UP TO 20 PERSONS

DESIGNED BY: P.M.Wopereis

DRAWN BY: A. Bale

CHECKED BY: F. Saverio

REVISION DATE: 01/03/2018

SCALE: Not to scale

SHEET NO: 2 of 2

SHEET SIZE: A4

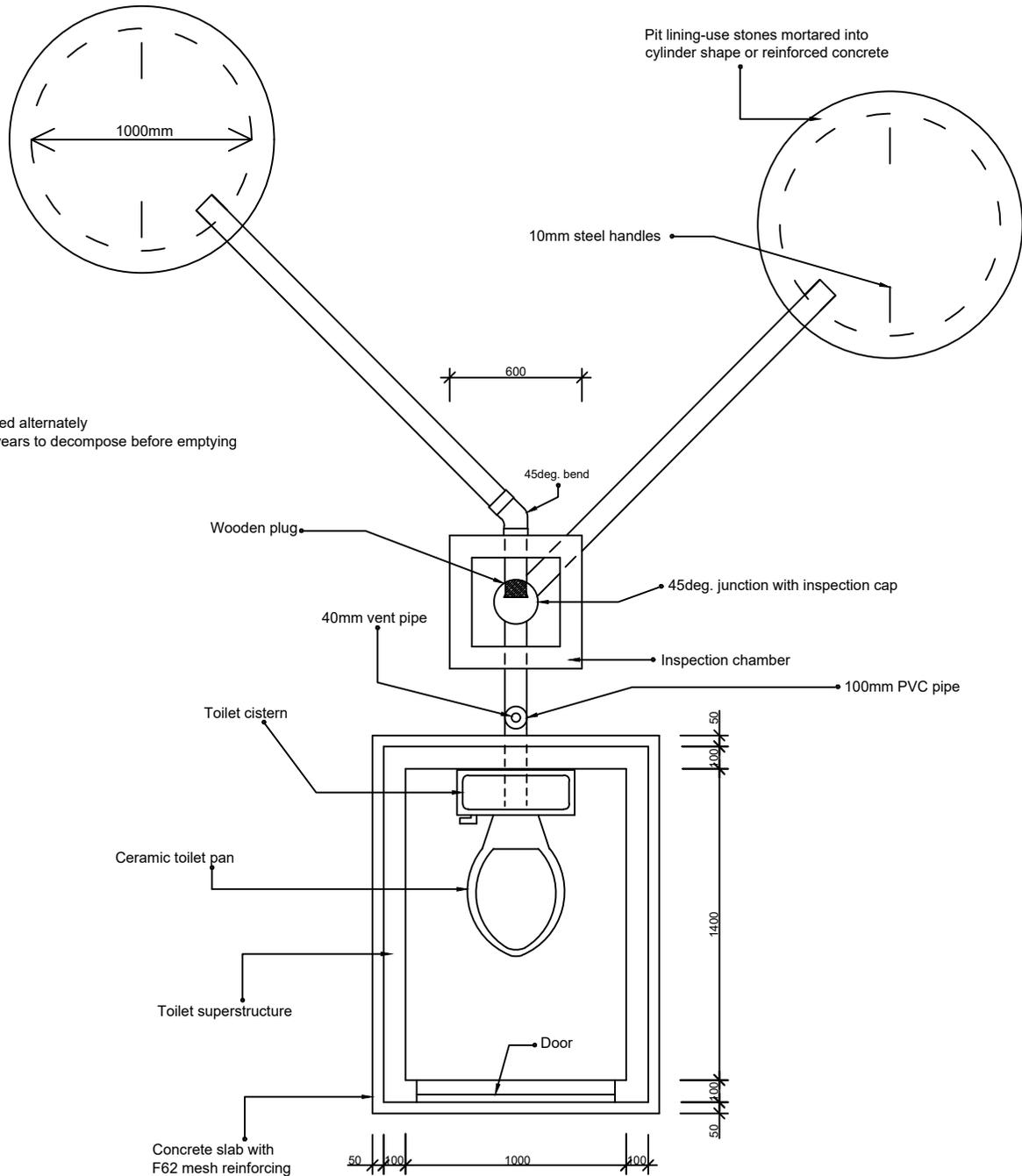
## Composting Toilet - for 20 persons

**Notes:**

1. For structure as per attached drawings
2. Price does not include labour and transportation costs

| <b>Description</b>                                  | <b>Unit</b>    | <b>Quantity</b> | <b>Rate</b> | <b>Amount</b>   |
|---|----------------|-----------------|-------------|-----------------|
| cement  | bags           | 45              | \$100       | \$4,500         |
| 6 inch concrete blocks                              | pcs            | 240             | \$16        | \$3,840         |
| mixed gravel  | m <sup>3</sup> | 4               | \$290       | \$1,160         |
| sand  | m <sup>3</sup> | 1               | \$290       | \$290           |
| 10mm deformed steel bars                            | lengths        | 11              | \$50        | \$550           |
| F62 mesh wire at 5.8m x 2.2m                        | sheets         | 2               | \$520       | \$1,040         |
| 150mm PVC waste pipe                                | lengths        | 2               | \$900       | \$1,800         |
| 50mm PVC waste pipe                                 | lengths        | 1               | \$270       | \$270           |
| 50mm PVC waste pipe end caps                        | pcs            | 2               | \$20        | \$40            |
| 100 x 50mm x 2.4m timber studs (rough sawn)         | lengths        | 11              | \$250       | \$2,750         |
| 100 x 50mm x 3.7m timber bottom plates (rough sawn) | lengths        | 2               | \$380       | \$760           |
| 100 x 50mm x 3.7m timber top plates (rough sawn)    | lengths        | 2               | \$380       | \$760           |
| 100 x 50mm x 3.7m timber noggings (rough sawn)      | lengths        | 3               | \$380       | \$1,140         |
| 75 x 50mm x 3.0m timberrafter (rough sawn)          | lengths        | 3               | \$300       | \$900           |
| 50 x 50mm x 4.6m timber purlins (rough sawn)        | lengths        | 5               | \$250       | \$1,250         |
| 100 x 50mm x 3.7m timber for hand rail (dressed)    | lengths        | 2               | \$470       | \$940           |
| 50 x 50mm x 3.5m timber for door frame (dressed)    | lengths        | 1               | \$480       | \$480           |
| Corrugated roofing iron 24g at 3.1m                 | lengths        | 5               | \$190       | \$950           |
| Colour bond steel 24g at 2.3m for cladding          | lengths        | 9               | \$180       | \$1,620         |
| 26g flat iron at 3ft width (for door)               | ft             | 8               | \$20        | \$160           |
| roofing nails                                       | kg             | 2               | \$40        | \$80            |
| 100mm jolt head nails                               | kg             | 3               | \$25        | \$75            |
| 75mm jolt head nails                                | kg             | 1               | \$25        | \$25            |
| 50mm jolt head nails                                | kg             | 1               | \$25        | \$25            |
| 100mm concrete nails                                | kg             | 1               | \$40        | \$40            |
| 20mm galvanized flat head nails                     | kg             | 0.5             | \$40        | \$20            |
| 100mm brass butt hinges with screws                 | pair           | 1               | \$30        | \$30            |
| 100mm galvanized padbolt with screws                | pcs            | 1               | \$22        | \$22            |
| 50mm steel bolt for inside of door                  | pcs            | 1               | \$15        | \$15            |
| toilet riser (without pour flush seal)              | pcs            | 2               | \$400       | \$800           |
| plastic toilet seat cover                           | pcs            | 2               | \$128       | \$256           |
| fly wire 400mm x 400mm section                      | pcs            | 2               | \$10        | \$20            |
| Tie wire  | kg             | 1               | \$30        | \$30            |
| M12 x 120mm galvanized bolts with nuts & washers    | kg             | 4               | \$30        | \$120           |
| Black enamel paint, 1 litre                         | tin            | 1               | \$200       | \$200           |
| <b>Total</b>  |                |                 |             | <b>\$26,958</b> |

Date: 27.4.2018



**Note:**

- Waste pits to be used alternately
- Leave full pit for 2 years to decompose before emptying



SOLOMON ISLANDS RURAL  
WATER SUPPLY AND  
HYGIENE PROGRAM

TYPE OF  
STRUCTURE

TWIN-PIT FLUSH OFF-SET LATRINE  
- FOR HOUSEHOLD

DESIGNED BY:

P.M.Wopereis

DRAWN BY:

A. Bale

CHECKED BY:

F. Saverio

REVISION DATE:

1/03/2018

SCALE:

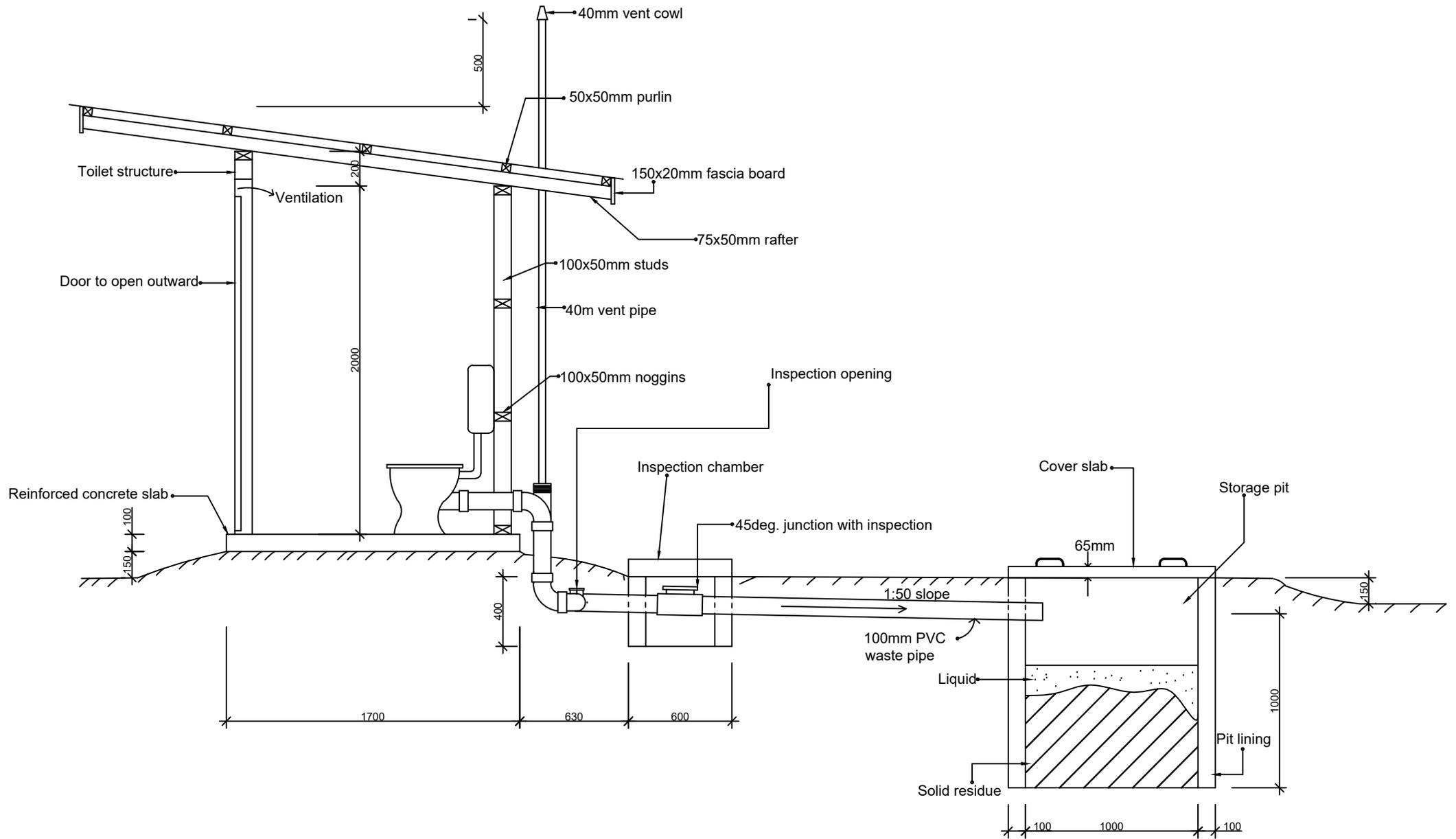
Not to scale

SHEET NO:

1 of 2

SHEET SIZE:

A4



SOLOMON ISLANDS RURAL  
WATER SUPPLY AND  
HYGIENE PROGRAM

TYPE OF  
STRUCTURE

TWIN-PIT FLUSH OFF-SET LATRINE  
- FOR HOUSEHOLD

|                |              |             |              |
|----------------|--------------|-------------|--------------|
| DESIGNED BY:   | P.M.Wopereis | SCALE:      | Not to scale |
| DRAWN BY:      | A. Bale      | SHEET NO:   | 2 of 2       |
| CHECKED BY:    | F. Saverio   | SHEET SIZE: | A4           |
| REVISION DATE: | 1/03/2018    |             |              |

## Twin-pit off-set flush toilet

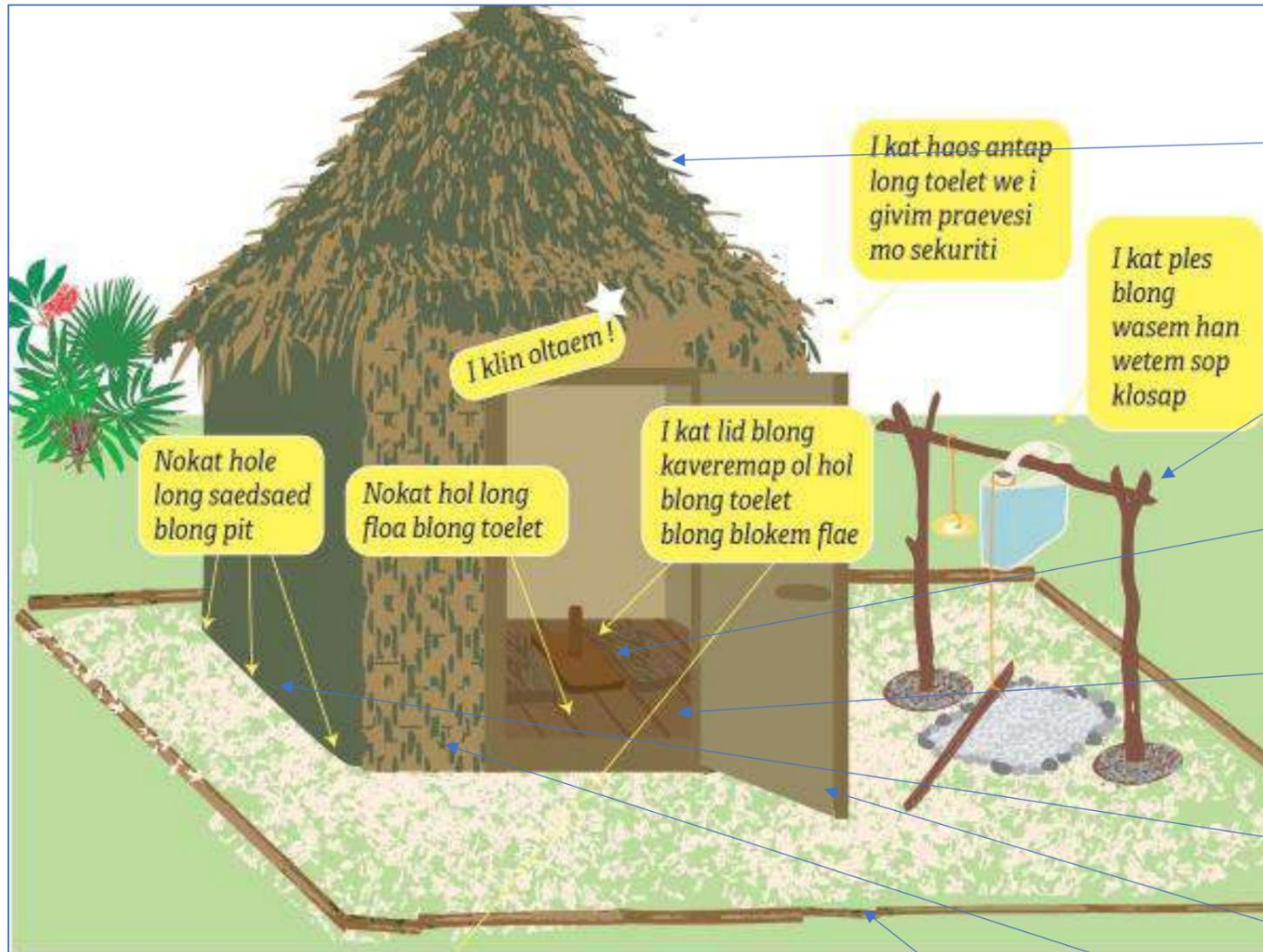
**Notes:**

1. Refer to attached drawings for details
2. Plumbing connections to the toilet cistern are not included
3. Price does not include tools, labour and transportation costs

| <b>Description</b>                                       | <b>Units</b>   | <b>Qty</b> | <b>Rate</b> | <b>Amount</b>   |
|--|----------------|------------|-------------|-----------------|
| courrugated roofing iron 24 gauge at 3.6m                | Lengths        | 3          | \$213       | \$638           |
| 100x50x2400 timber studs (rough sawn)                    | Lengths        | 12         | \$80        | \$960           |
| 100x50x3600 timber bottom plates (rough sawn)            | Lengths        | 2          | \$110       | \$220           |
| 100x50x3600 timber top plates (rough sawn)               | Lengths        | 2          | \$120       | \$240           |
| 100x50x3600 timber noggings (rough sawn)                 | Lengths        | 9          | \$80        | \$720           |
| 75x50x3500 timber rafters (rough sawn)                   | Lengths        | 4          | \$80        | \$320           |
| 50x50x2400 timber purlins (rough sawn)                   | Lengths        | 5          | \$40        | \$200           |
| panel door   | Ea             | 1          | \$300       | \$300           |
| 100mm brass butt hinges                                  | pair           | 1          | \$80        | \$80            |
| entrance lock  | Ea             | 1          | \$300       | \$300           |
| 24 gauge colourbond roofing iron at 2.3m                 | Lengths        | 6          | \$181       | \$1,086         |
| 10mm deformed steel bars                                 | Lengths        | 1          | \$50        | \$50            |
| F62 mesh wire at 5.8m x 2.2m                             | Sheets         | 1          | \$520       | \$520           |
| cement 40kg  | bags           | 8          | \$100       | \$800           |
| Gravel   | m <sup>3</sup> | 0.7        | \$290       | \$203           |
| Sand   | m <sup>3</sup> | 0.3        | \$290       | \$87            |
| 100mm PVC waste pipe                                     | Lengths        | 2          | \$420       | \$840           |
| 40mm PVC waste pipe                                      | Lengths        | 1          | \$130       | \$130           |
| 100mm PVC waste elbow (90 degree)                        | Ea             | 1          | \$50        | \$50            |
| 100mm PVC waste elbow (45 degree)                        | Ea             | 1          | \$50        | \$50            |
| 100mm PVC waste (45 degree) junction with inspection cap | Ea             | 1          | \$200       | \$200           |
| 100mm to 40mm PVC waste reduce bush                      | Ea             | 1          | \$60        | \$60            |
| 100mm pan collar   | Ea             | 1          | \$100       | \$100           |
| 40mm PVC waste cowl                                      | Ea             | 1          | \$150       | \$150           |
| ceramic toilet pan "P" trap                              | Ea             | 1          | \$680       | \$680           |
| toilet cistern   | Ea             | 1          | \$580       | \$580           |
| supply tube for toilet cistern                           | Ea             | 1          | \$200       | \$200           |
| toilet seat cover  | Ea             | 1          | \$150       | \$150           |
| roofing nails  | kg             | 1          | \$35        | \$35            |
| 100mm jolt head nails                                    | kg             | 3          | \$25        | \$75            |
| 75mm jolt head nails                                     | kg             | 1          | \$25        | \$25            |
| 50mm jolt head nails                                     | kg             | 1          | \$25        | \$25            |
| 100mm concrete nails                                     | Ea             | 12         | \$2         | \$24            |
| Tie wire   | kg             | 1          | \$30        | \$30            |
| Priming Fluid 250ml                                      | tin            | 1          | \$170       | \$170           |
| Solvent cement 125ml                                     | tin            | 1          | \$170       | \$170           |
| <b>Total</b>   |                |            |             | <b>\$10,128</b> |

**Date:** 27.4.2018

# IMPROVEM BUSH TOELET



POITEM AOT LONG OL DIFREN KAEN FLOA:



"BLOKEM OL FASIN BLONG TOTI INO KASEM YU!"

## IMPROVEM BUSH TOELET BLONG YU:

- Mekem sua se **ruf** i nokat lik;
- Putim ples blong **wasem han** nekis long toelet.
- Putim **lid** long skwat hol or long sitraesa;
- Kaveremap **ol hol long floa** witim soil, koral, stone, plastic or narafela samting;
- Kaveremap **ol hol long saedsaed** blong pit;
- Mekem sua se **ol wol** i nokat hol mo toelet i kat wan gudfela **doa** – mas kat privasi mo sekuriti taem yu yusim toelet!
- Blokem **stormwota** hemi go insaed long pit;
- **Klerem eria** mo rod i go long toelet;

# IMPROVEM BUSH TOELET

## HAO BLONG USIM WAN DRAE TOELET:

### KIPIM SITSIT I DRAE!

1. NO SAKEM WOTA LONG PIT  
Swipim floa, no usim wota

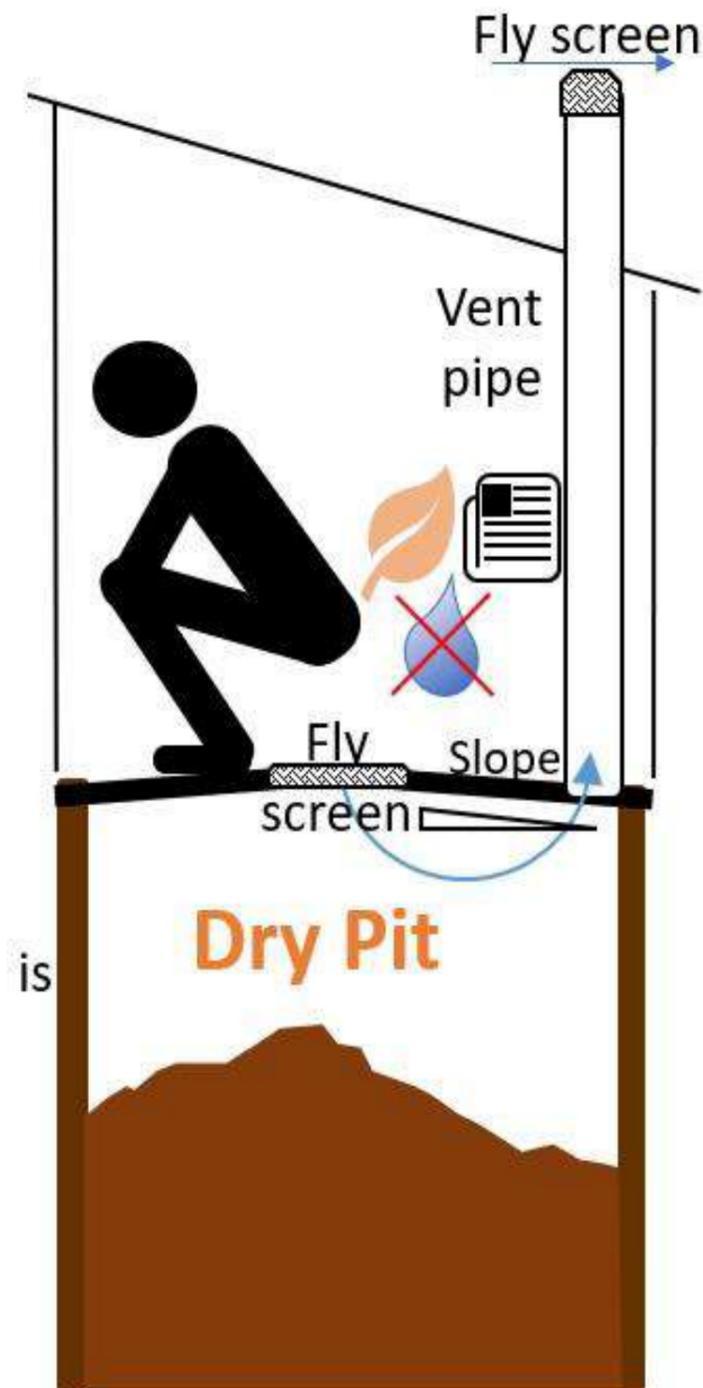
2. PUTIM WAN VENT-PAEP BLONG  
IMPROVEM FLO BLONG EA

3. SAKEM OL DRAE LIF, ASHES  
BLONG FAIA, OA SOWDAS INSAED  
BLONG MEKEM SITSIT I DRAE  
KWIKTAEM

4. BLOKEM OL FLAE, RAT MO  
KOKRAS BLONG GO INSAED LONG  
PIT:

- no hol long floa,
- no hol long saedsaed blong pit,
- ikat lid long skwat hol oa sitraesa
- Putim moskitonet long end blong ventilesen paep

5. DIGIM NIUFELA PIT MO  
KAVERAMP OLFELA WAN TAEM  
HEMI FULAP



**NOTE: OL PIKSA STAP SHOEM SKWAT TOELET, BE YU SAVE USIM SITRAESA TU. SITRAESA HEMI NIDIM LID OA FLAE-SKRIN TU!**

### KONSTRAKSEN

Digim wan pit blong 1m diameta. Ol raon pit oli moa stabol be sipos graon hemi strong yu save digim wan rectangular pit tu. 1m x 0.8m hemi wan gudfela saes. Ol saes ia save last wan family long taem sipos yu digim 1.5m or moa dip:

| Dip blong pit | Hamas yia bifo hemi fulap: |
|---------------|----------------------------|
| 1.5m          | 10 yia                     |
| 2m            | 13 yia                     |

SIPOS GRAON I SOPSOP O SANDBIJ?..YU MAS MEKEM WAN PIT LAENIN



Bamboo



Perforated drum

# POA-FLAS TOELET

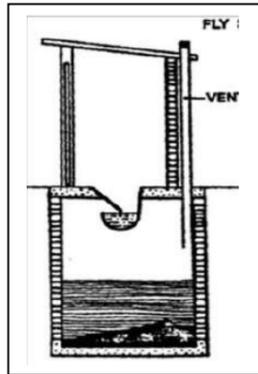
## 1 OL POA-FLAS TOELET– Direk Pit or Offset Pit

## 2 WANEM STRET PLES BLONG BILDIM WAN POA-FLAS TOELET

## 4 BILDIM WAN POUR FLUSH TOELET WETEM WAN DIREK PIT

Ikat trifala kaen poa-flas toelet :

- Pit andanit toelet haos:

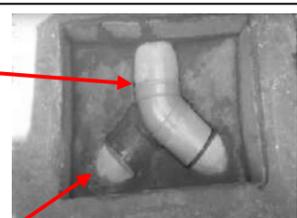
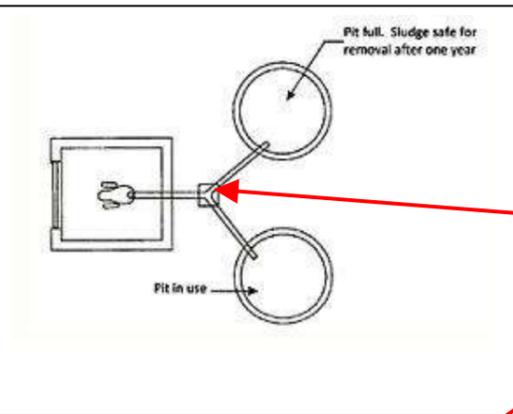


Bae yu nidim wan S-trap:



- Wanfela pit long saed blong toelet haos:

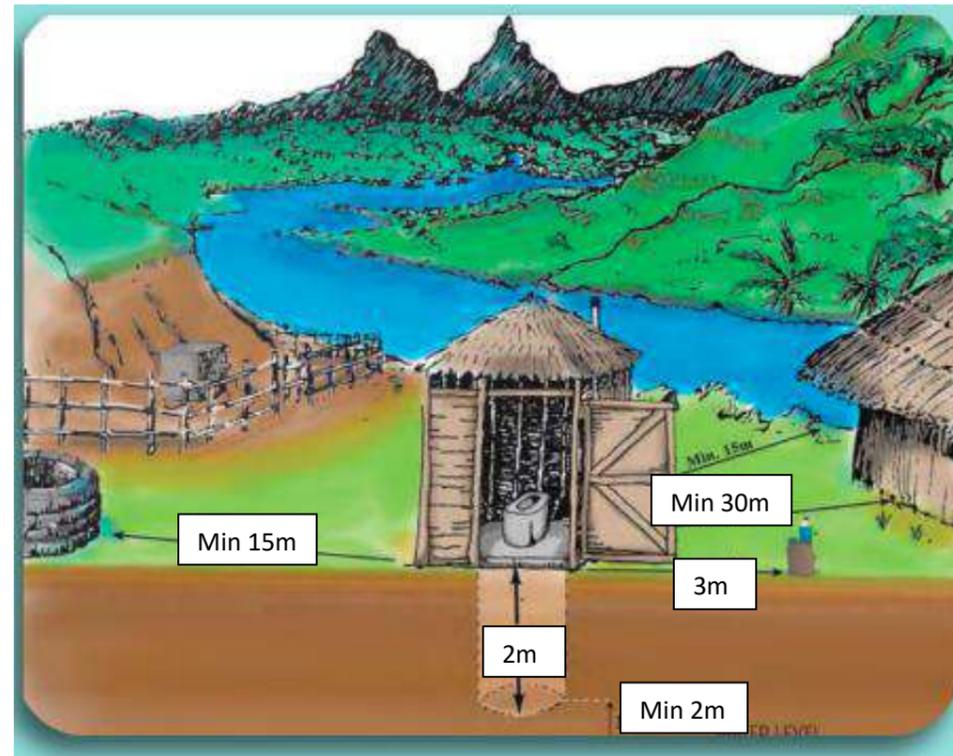
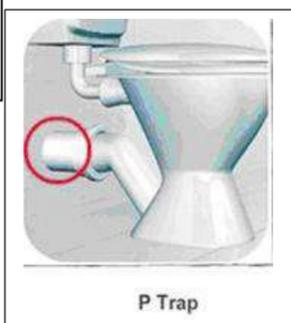
- Tufela pit behaen lo toelet haos (dual-ofset) – taem wan I fulap, bae yu usim narafala wan:



*Daevesen tjemba lo dual-ofset pit. Taem wan pit I fulap, tanem elbo igo lo narafala paep.*

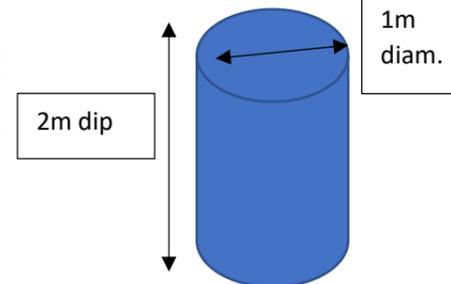
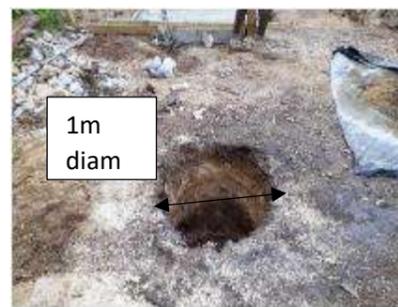


Bae yu nidim wan P-trap:



## 3 WANEM STRET PIT BLONG FAMILY BLONG MI

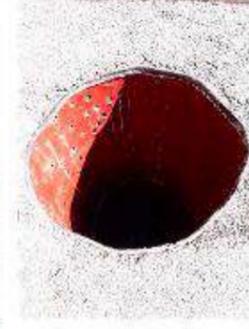
Raon pit hemi best – 1m diameta, oa skwea 1mx0.8m. Digim klosap 2m hemi gud.



**SIPOS PIT HEMI WAN DIREKT WAN, I MAS GAT WAN FOUNDESEN RI!**



**SIPOS GRAON HEMI SAND, YU NIDIM BLONG BILDIM WAN**



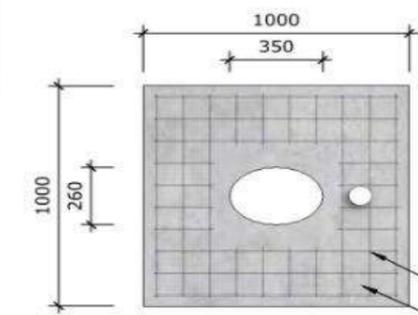
### STEP 1:

Digim wan hol blong 0,8mx1,0m mo 1,5m kasem 2m longwan iko daon. Mo tu mekem laening blong hol (SIPOS kraon hemi fulap wetem sanblj) blong 1m longwan iko daon yusum bamboo, timba o aean dram.



### STEP 2:

Bildim wan slab blong holem taet toelet (reinforsemn slab) (1m x 1.5m x 15cm thick)



### STEP 3:

Bildim wan slab antap wetem ol mesemen: 1m x 1m, mo 50mm tiknes blong stap seif. Slab antap yu save yusum long nekis pour flush toelet.



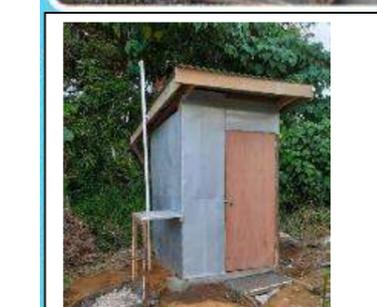
### STEP 4:

Instalem flush riser wetem wan S-Bend we I finishem insaid lo top slab.



### STEP 5:

Yusum 5: long joenem mo silim ol slab. Putum sit raesa mo paep blong win I pas long hem bifo yu statem blong bildim toelet strakja.



### STEP 6:

Yusum 6: materiel we yu pem blong kavremap, livim 20cm speis antap long hem. Meke wet blong yusum.

# POA-FLAS TOELET

**5** WANEM NAO YU NIDIM BLONG BILDIM WAN POUR FLUSH TOELET BLONG WAN DIREK PIT

|   |     |              |
|---|-----|--------------|
| Simen 40kg bags   | 4   | Bags 40kg    |
| Fomwok timba lo faondesen slab:<br>1.2m x 25mm x 175mm (tufela)<br>1.6m x 25mm x 175mm (tufela) | 1.6 | 4.8 m length |
| Fomwok timba lo toalet slab:<br>1m x 1m. Timba hemi: 50mm x 50mm.                               | 1.5 | 4.8 m length |
| N0. 6 Rod waea long slab reinfosmen   | 3   | 6m length    |
| Tae waea  | 1   | kg           |
| Plastik toalet sit witim kova   | 1   | Pcs          |
| PVC Paep - 50mm x 2.9Mtr DWV AS/NZS 1260  | 0.5 | 5.8m length  |
| PVC Ben - 50mmx88* F&F IPLEX  | 1   | Pcs          |
| Flae skrin - 40cm x 40cm square only  | 1   | Pcs.         |
| Wota sil pan (inner skin) – OA komplit toalet sit (seramik)witim S-Bend                         | 1   | Pcs          |

## RAET SEMEN MIX

Table 3: Concrete mix with **WHITE SAND**

| USE              | CEMENT | SAND | AGGREGATE |
|------------------|--------|------|-----------|
| Slab (on ground) | 1      | 2    | 4         |
| Toilet riser     | 1      | 2.5  |           |
| Walls and Posts  | 1      | 2    | 3         |
| Block/brick      | 1      | 4    |           |
| Mortar           | 1      | 4    |           |

**6** WANEM NAO I MAKEM WAN GUDFALA PLES BLONG WASEM HAN

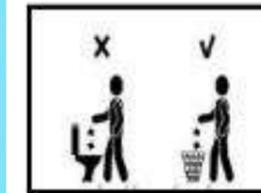
WAN PLES BLONG WASEM HAN, WETEM SOP MO WAN GUD DRENEJ

**SAMFALA EXAMPOL LO PLES BLO WASEM HAN**

Kontena wetem tap      Bamboo tipi tap  
Tap long olfala dram      Wan paep blong wota we i stanap.

**7** HAO BLONG LUKAOTEM GUD POUR FLUSH TOELET BLONG YU

SIT on the toilet, do NOT stand!



Do not throw rubbish in the toilet, burn instead!



Keep your toilet clean every day!

Ensure water & soap are available at all times!



In a (pour) flush toilet, only use TOILET PAPER!

Daevesen tjemba lo dual-ofset pit. Taem wan pit i fulap, tanem elbo igo lo narafala paep.



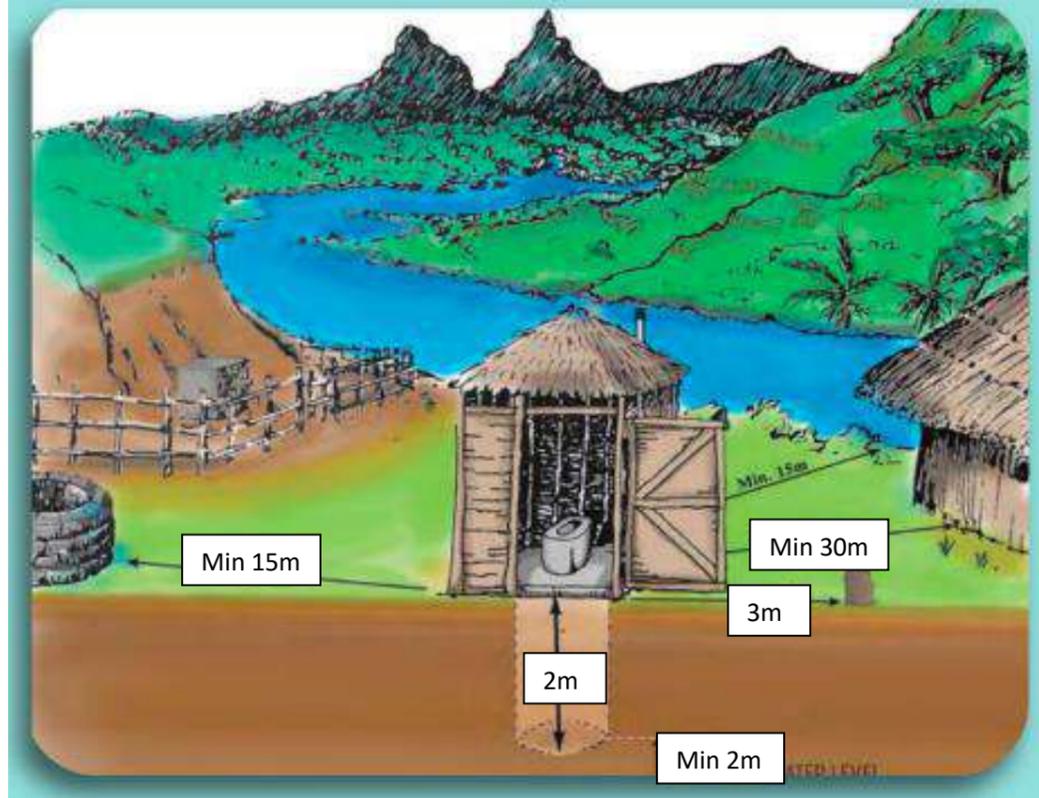
Diversion chamber for dual pit toilet

# V.I.P TOELET

## 1 "Ol 8 bigfala tingting blong wan seif Ventilated Improved Pit (VIP) Toelet"

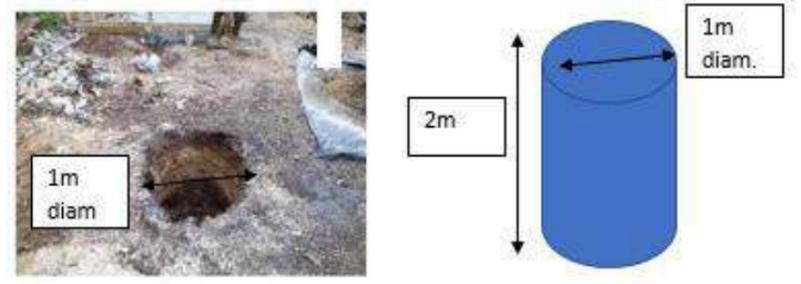
- 1 INOGAT MAN O FLAE I GAT KONTAK WETEM TOTI BLONG TOELET.
- 2 PROTEKTEM WOTA SOS.
- 3 AKSES ROD I MAS ALAWEM OL IUSA - DISABILITI, PIKININI MO WOMAN WE E KAT BEL - BLONG USUM TOELET.
- 4 I GAT GUD EA FLO.
- 5 GUDFALA PLES BLONG WASEM HAN.
- 6 WAN SLAB WE I STRONG MO ISI BLONG KLINIM.
- 7 WAN TOELET WE I SEIF MO STRONG.
- 8 GUDFALA PLES BLONG SAKEM TOTI.

## 2 WANEM WAN STRET PLES BLONG BILDIM WAN VIP TOELET



## 3 WANEM RAIT SAIS BLONG PIT BLONG TOILET BLONG FAMILI BLONG MI

Raon pit hemi best – 1m diameta, oa skwea 1mx0.8m. Digim klosap 2m hemi gud.



## SIPOS GRAON HEMI SAND, YU NIDIM BLONG BUILDIM WAN PIT LININ



## 4 OLSEM WANEM BLONG BILDIM WAN VIP TOELET

**STEP 1:**  
Digim wan hol blong 0,8mx1,0m mo 1,5m kasem 2m longwan iko daon. Mo tu mekem laening blong hol (SIPOS kraon hemi fulap wetem sanbij) blong 1m longwan iko daon yusum bamboo, timba o aean dram.

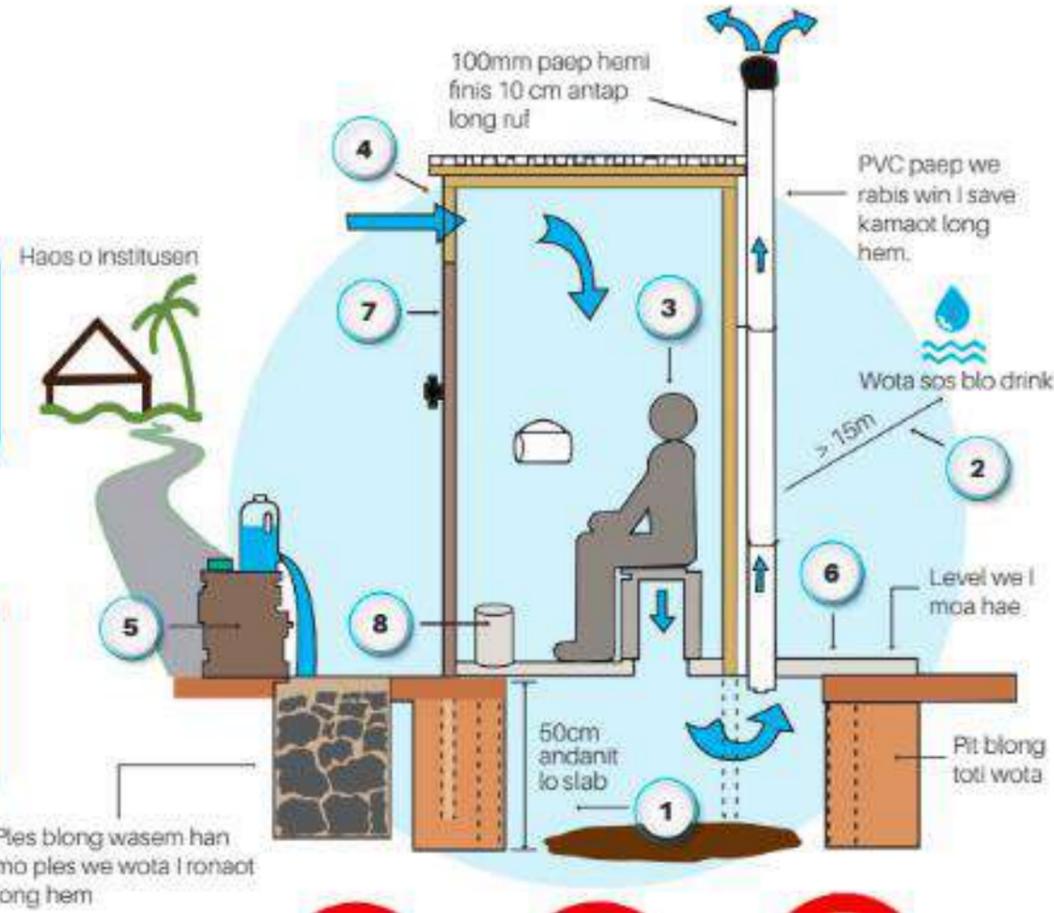
**STEP 2:**  
Bildim wan slab blong holem taet toelet (reinfosmen slab)

**STEP 3:**  
Bildim wan slab antap wetem ol mesemen we oli givim mo 50mm tiknes blong stap seif. Slab antap yu save yusum long nekis VIP toelet.

**STEP 4:**  
Porem konkrit long risa mold; Remuvim lid blo toelet mo replasem witim flae mes kova blo alaowem flo blo ea. Sipos yu nokat mold, yu save usim raes bag blo mekem raesa. (ikat moa ditel lo nekis pej).

**STEP 5:**  
Yusum simen blong joenem mo silim ol slab. Putum sit raesa mo paep blong win l pas long hem bifo yu statem blong bildim toelet strakja.

**STEP 6:**  
Yusum lokol o materiel we yu pem blong kavremap, livim 20cm speis antap long hem. Mekem sua se toelet hemi seif mo praevet blong yusum.



Ples blong wase m han mo ples we wota l ronact long hem

## 5 Wanem nao yu nidim blong bildim wan VIP we I seif?

Materiel list blong VIP wetem simen slab

|  |     |              |
|--|-----|--------------|
| Simen 40kg bags  | 3   | Bags         |
| Fomwok timba lo faondesem slab:<br>1.2m x 25mm x 175mm (tufela)      |     | 4.8 m        |
| 1.6m x 25mm x 175mm (tufela)   | 1.5 | length       |
| Fomwok timba lo toilet slab:<br>1m x 1m. Timba hemi: 50mm x 50mm.    | 1.5 | length       |
| NO. 6 Rod waea long slab reinfosmen                                  | 3   | 6m length    |
| Tae waea   | 1   | kg           |
| Chicken wire for the toilet riser - 50cm width.<br>Holes size: 10mm. | 1   | 1.8m length  |
| Plastik toilet sit   | 1   | Pcs.         |
| PVC Paep - 100mm x 2.9m length required                              | 0.5 | 5.8 m length |
| Flae skrin - 40cm x 40cm square only                                 | 2   | Pcs.         |

### RAET SEMEN MIX

Table 3: Concrete mix with WHITE SAND

| USE              | CEMENT | SAND | AGGREGATE |
|------------------|--------|------|-----------|
| Slab (on ground) | 1      | 2    | 4         |
| Toilet riser     | 1      | 2.5  |           |
| Walls and Posts  | 1      | 2    | 3         |
| Block/brick      | 1      | 4    |           |
| Mortar           | 1      | 4    |           |

## V.I.P TOELET

### 6 HAO NAO YU SAVE BUILDIM WAN SIT RISER SIPOSE I NO GAT MOULD



- Katem timba shit long sem saes olsem toilet sit;
- Putim smol pis timba or narfela samting blo markem ol ples blo screw blo toilet sit;
- Fulamap 25kg bag raes withim san – mekem I round gud mo smut lo saedsaed blo hem;



- Raonem bag witim tjiken mes waea, mo putim plaster long timae frem mo saed blo raesa;



- Afta yu finisem plasta, raonem bakagen witim wan moa tjiken waea;
- Plasterem bakagen;



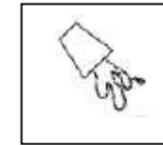
- Smutem ol konkrit gud blo mekem se hemi luk naes mo doti I no save stap long hem tumas;
- Kaveramap smol mo letem konkrit hemi kam strong (YU NO DRAEM LO SUN!)



- fasem toilet sit lo konkrit raesa witim ol bold we oli kam witim sit;
- Smutim insaed blo toilet raesa – nokut sitsit I fas lon insaed blong raesa!

### 7 BESIK WEI BLONG KIPIM MO MENTENEM WAN VIP TOILET

#### AFTA WE YU YUSUM



- Wan VIP toilet i no save smel sipos i stap drae oltaem: no adem tumas wetwet i kam long olgeta wetwet lif!



- Karemaot lid blong toilet sit o yusum wan lid wetem wan net blong letem win i flo i go aotsaed mo daon long toilet mo i go aot tru long paep



- (woman) Sakem olgeta stefri we oli yusum mo olgeta prodak i go long bin

#### Evridei



- Mekem sua se ples blong wasem han i gat sop mo wota oltaem



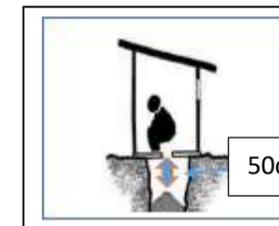
- Kipim toilet sit mo haos blong toilet i klin mo karemaot toti long toilet bin mo berem o bonem



- Eni disinfekten prodak hemi stret blong yusum blong klinim toilet wetem olsem wan sponj/kaliko be mekem sua blong no sakem tumas wota mo prodak blong klinim toilet i go long toilet.

- Kipim rod i go long toilet i klia mo klin oltaem

#### TAEM HOL BLONG TOILET I FULAP



- Taem toti insaed long hol i kasem kolosap 50cm long top blong slab, karemaot haos mo muvum aot slab antap long hol blong toilet

- Berem haf blong hol we oli no yusum long graon.



- Sipos slab hemi stap yet long gudfala kondisen, muvum i go long wan niufala hol blong toilet mo bildim haos raon long hem bakegen.