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Technical guide for handwashing facilities in public places and institutions

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WaterAid

Contents

Introduction

Purpose

Hand hygiene is a key line of defence for many diseases, including diarrhoea and cholera. It follows that to maintain hand hygiene across the board, and get more people into the habit of regularly washing their hands, public handwashing facilities (HWF) with soap and water are essential.

For many years WaterAid, UNICEF and other organisations have been working with governments to install handwashing facilities in a wide range of public places and buildings. Locations include markets, public transport hubs, public and communal toilets, and buildings such as healthcare facilities, schools, restaurants, places of worship, and commercial and public offices. To support this WaterAid designed its first *Technical guide for handwashing facilities in public places and buildings* in August 2020.

The initial guide was partly in response to the COVID-19 pandemic. COVID-19 and other disease outbreaks have accelerated the provision of HWF in public places, but many were temporary and there is still a need for more permanent and semi-permanent facilities.[i]

COVID-19 also resulted in hands-free innovations in many facilities, but many of these designs were not robust and broke easily, and there is also limited evidence of disease transmission through touching taps. The emphasis now is on designing more long-term, sustainable HWFs for public places rather than ones that can be operated without using your hands.

WaterAid/Ernest Randriarimalala

◀ Right to left: Rojotiana, ten, and her best friends and classmates, Fochine and Rosa, at the newly built handwashing facility for their school in Tsarafaninjo village, Madagascar.

i. Permanent = static fixed HWF connected to a piped water supply. Semi-permanent = move-able and/or non-piped (i.e. contains a tank which needs filling manually).

The purpose of this revised version (second edition, September 2024) is to include additional technical guidance on installing permanent and semi-permanent handwashing facilities – sharing designs, bills of quantities, construction notes, and management, operations and maintenance guidance.

We also run through each technology's advantages and disadvantages in order to support informed decision making on reproducing the designs. The guide also includes safety and accessibility checklists to make these facilities more inclusive. Finally there are monitoring checklists to ensure good operation and timely maintenance and repair.

Scope

A comprehensive hygiene behaviour change programme needs to: motivate people to practise good behaviours; put in place inclusive facilities in settings where behaviours need to happen (with visual cues and nudges as reminders); embed good habits and make them a social norm.

This technical guide, however, focuses mainly on the hardware – the design, construction and functionality of the handwashing facility – as one element of a hand hygiene behaviour change programme.

These technical designs are based on WaterAid's and UNICEF's experiences of implementing handwashing facilities[ii] in public places. Access to handwashing facilities in the home is equally important, but this has not been included here, since the types of design tend to be different, and the responsibility for installing and maintaining them belongs to household members.

Sustainability

During the COVID-19 pandemic, many public handwashing facilities were temporary and risked becoming redundant after the pandemic. Yet handwashing is not just a pandemic response but important for lifetime to stop the transmission of disease.

Moreover, the risk of a resurgence COVID-19 and other diseases means that, while a quick response is critical, plans should also be made for the long-term. If facilities are designed as temporary structures or for a specific timeframe, there should be plans to disassemble, remove and replace them with permanent or semi-permanent facilities as soon as possible. Ideally, aim to design for the long-term to be cost effective and enable handwashing behaviour transformation in order to strengthen public health.

Handwashing with soap and water is one of the most cost effective public health interventions:[2,3]

- 16%–23% reduction in acute respiratory infection
- 50% reduction in pneumonia
- Substantial reductions in neonatal infections
- Up to 48% reduction in endemic diarrhoea
- Reduces seasonal corona virus up to 36%

ii. Sometimes referred to as handwashing or hand-hygiene stations, devices or units. The focus of this document is on designing facilities that use soap and water for handwashing, as opposed to those using alcohol-based hand rubs, though the latter may be preferred in certain settings such as healthcare facilities.

Recommendations for sustainability of handwashing facilities in public places

- Ensure only permanent or semi-permanent handwashing facilities are built in all settings. Where temporary facilities are built, they should have their own daily operation plan and when temporary needs are met, they should be removed or relocated to appropriate places.
- When building new designs, involve Disabled People's Organisation (DPO) and other marginalised user groups to ensure suitability and adherence to their specific needs where possible, and **conduct a safety and accessibility audit**.
- Convert any temporary handwashing facilities built in an emergency response into semi-permanent or permanent facilities.
- Make sure you are not building handwashing facilities in places that don't have volunteers or dedicated human resources who can maintain it to ensure long term sustainability.
- Ensure an O&M plan is in place.
- Ensure ongoing monitoring systems to ensure functionality.
- Work with local fabricators to ensure spare parts are locally available and affordable.
- Each facility should have visual cues/nudges to reinforce/encourage use.

Common challenges for sustaining handwashing facilities in public places:

- Lack of an institutional mechanism for ownership and maintenance.
- Weak supply of soap and water for daily operation. Lack of cleanliness.
- Weak/no mechanism for waste water management.
- Lack of skills to repair, weak design.
- Location of facilities and inclusivity.
- Lack of inclusiveness.
- Lack of visual cues/nudges.

Structure of this technical guide

This guide is in four sections. Part A provides best practice guidelines covering the design, installation, construction, operation and maintenance of handwashing facilities, with a separate section highlighting adaptations made during the COVID-19 response. We are keeping this as a reference for rapid response in the future but sustainability of those facilities should be at their heart.

Part B provides a sample of different designs including more robust permanent and semi-permanent facilities from WaterAid country programmes and UNICEF.

Part C contains further technical details and protocols for cleaning and monitoring checklists, and safety and inclusivity audits.

A final note

This technical guide has been revised to help WaterAid, UNICEF and other partners install public handwashing facilities through their regular programmes and in response to public health emergencies. It can also be used by other organisations. Other excellent resources can be found at the Sanitation Learning Hub,[25] and the **Hygiene Hub**.

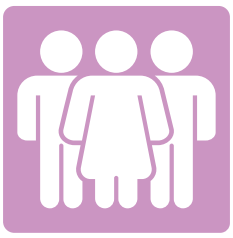
PART A: Guidelines

1. Initial considerations

Before rushing into design and implementation, some preliminary work needs to be done to understand the context and requirements for handwashing in that public place or building.

This should include:

- **Visiting the proposed location** and finding out about the water supply, the infrastructure network if it's an urban area, or the source of water if there is no piped water.
- **Consulting with a diversity of users** (including women, children, older people, people with disabilities, community leaders/ user committee coordinators and water supply service providers/engineers) to inform the design and location of the handwashing facility. It may be helpful to present a range of ideas for discussion, based on existing designs or those already available in the market, or use this technical guide or one produced by other agencies. This community engagement should also reinforce the need for correct handwashing practices and help ensure accountability.
- **Coordinating with other stakeholders** to align efforts. Coordination with government and relevant stakeholders is necessary at the initial stage to avoid any duplicated efforts, as well as to identify the right institution/group/community to own and lead the local process.
- **Discussing with the future owner** roles and responsibilities for O&M. These must be clear and agreed before handwashing facilities are constructed. An indication of the likely technical requirements and budget for this including facilities, soap, water and operations, should be provided so the owner has realistic expectations and can plan accordingly.
- **Location, safety and accessibility:** it is important to select safe and convenient locations for the handwashing facilities which are accessible for various people's needs. Key locations include the entrance to public facilities, near toilets, near food serving areas, areas where the public gathers, and border points.



A sample checklist is provided below:

Pre-design questions	
1	What are the particular design requirements for that location? Designs for a health facility, school, religious places, bus/rail stands, cross-border entry points and markets are all likely to be different. One size does not fit all.
2	Where can/should handwashing facilities be sited to encourage use and allow for the placing of visual nudges to reinforce handwashing practice?
3	How many users are expected? Plan accordingly to make sure that handwashing facilities don't become crowded and that they have enough taps.
4	Is space limited? This may require a quick assessment of each building/location.
5	Can existing handwashing facilities be repaired or modified to be permanent or semi-permanent?
6	Do suitable handwashing units already exist that can be procured locally?
7	Does the local market supply materials for building and repairing the handwashing facility?
8	Is a piped water supply available? Or what alternative sources can be used with the required size of pipe and water pressure to ensure appropriate handwashing?
9	Is soap available or can it be easily produced to ensure proper handwashing? Is an alcohol-based hand rub preferred and available (or able to be easily produced)?
10	Is it clear who will be responsible for management, operations and maintenance?
11	Is there a connection to a local water supply, or is piping or refilling possible? Is the disposal of waste water possible and convenient?
12	What other practices would handwashing facilities, if present, be used to support?

2. Design

2.1 Design principles

The design of the handwashing facility will depend on the context and needs of the area so it is not possible to present a single solution. However the table below sets out key issues for the designer to consider.

In public emergencies such as disease outbreaks, pandemics and natural disasters, it might be very difficult, if not impossible, to meet the full list of design requirements. However, any handwashing facility with soap and water is better than nothing at all.

Principles for the design of the handwashing facility		
	Key features	**Factors to consider**
Attractive, convenient and easy-to-use		
1	**Attractive and pleasurable to use**[iii]	This includes painting the facility in bright colours; use of high-quality materials and fittings; use of decent-quality soap; and adding accessories such as a mirror (a mirror above the handwashing place may encourage people to spend longer washing their hands).
2	**Easy-to-use**	The tap, soap and water should all be easy and intuitive to use taking into account the targeted users.
3	**Accessible to all users; see also the Accessibility and Safety Audit (Part C) for further details.**	The height and design of the basin and tap need to be adjusted for children and people with disabilities.[iv] For children the height should be 500–700mm and for wheelchair users less than 850mm.[4] In practice, this will require either two handwashing facilities set at different heights, or a single unit with two taps and basins. For wheelchair users, older people who might be unsteady on their feet and other people with disabilities that affect their mobility, check that they don't need to lean too far forward to reach the tap/soap/basin or push too hard to access the soap or turn the tap on. The area around the basin should be flat with a non-slip surface.

iii. For more information on user-centred design and behavioural nudges – see references 5, 6 and 7.
iv. Considering the needs of wheelchair users is not the same as considering the needs of all people with disabilities. While it is outside the scope of this document to design a facility which is universally accessible for all needs, WASH accessibility and safety audits[8] can be used to guide this process.

4	**Sufficient taps**	The maximum number of users during peak demand should be taken into account when deciding how many taps are needed. One handwashing facility with many taps or multiple separate units may be required to prevent queues (people's willingness to queue for handwashing will be much less than for a waterpoint or communal toilet for example). For example: in schools settings, bus stands, border settings and religious periods, many people would need to wash hands together.
5	**Appropriate size/shape**	Where space is limited (typically inside buildings) the handwashing facility design may need to be adapted accordingly, ensuring it accommodates diverse users – mainly people using wheelchairs, caregivers supporting them and children. Consultation with a wide range of users when developing designs/ prototypes is important.
Facilitates effective hand hygiene		
6	**Reliable water supply**	Unless there is a reliable 24/7 piped water connection available, a local water storage container will be required. This could be part of the handwashing facility, or in the case of a building a central storage tank may be sited on a roof or an elevated stand to supply multiple handwashing facilities. The water storage container should be: • Large enough to avoid regular refilling (assume average of 1 litre/person/per wash.[v] • Easy to refill – the larger and higher-up a container is, the harder it will be to refill (steps may be needed). • Covered to avoid contamination. • Secured, so it cannot be easily knocked over or blown away by winds when empty, or stolen. • Transparent, if possible, so water levels are easy to check (or install a low-cost water gauge). If directly connected to the water supply, a float valve is recommended for the tank.
7	**Allowing both hands to be washed at the same time and rubbed together, but avoiding unnecessary waste of water**	A high flow rate is not required for effective handwashing,[9] so selection of taps with a low flow rate can reduce water consumption (though the flow rate will vary with water pressure). Some taps are also self-closing to avoid wastage. Depending on funds, the taps should require minimal touching for opening and closing in order to reduce pathogen transmission.

v. WHO (2020) COVID-19 WASH Guidance cites a figure of 0.5–2 l/person. This is based on research by Hoque, B.A.[11] which found that 'an increased volume of water showed a lower faecal coliform count and the difference was found to be statistically significant when rinsing was performed using between 0.5 and 2 litres of water'. UNICEF[4] notes that water conscious usage or water-saving taps can bring consumption down to 0.3–0.6 l/person. In this document, 1.0 l/person is assumed as an average to allow sufficient but not excessive use of water, while noting there will be variation according to the type of tap installed, water pressure and user behaviour. The best guide is to monitor consumption in a particular setting.

8	**Soap available at all times**	There are various options with advantages and disadvantages to consider: • Liquid soap is generally preferred. However, it is expensive so may be a desirable item to steal, and may require frequent refilling (to avoid this we recommend selecting larger containers than normal household dispensers). Also, consider installing the soap in a lockable container. • Soapy water can be made-up as a low-cost alternative, and is equally effective for good hand hygiene,[10] but may be seen as less attractive by users. • Bar soap may be the easiest option, but is highly likely to go missing in a public facility. This risk can be reduced by fitting the soap on a string. For efficiency, in a school setting for example, a big bar of soap can be cut into multiple pieces and placed next to each tap, rather than having to open many bars of soap. Alcohol-based hand rubs are equally effective if they are available. They can be used as an alternative to soap and water when soap and water are not practical/available. The host institution (school, healthcare facility or public building) is responsible for providing soap for handwashing. The amount of soap needed is determined by the number, and frequency, of people using the handwashing facility. To calculate the amount of soap you'll need, first estimate the average number of people visiting the facility, then use the following formulas: **How much soap do you need?** If an institution serves 100 users per day, the amount of soap estimated for a month (solid bar or powdered soap) will be: $$\frac{\left(100\frac{users}{day}\times\frac{8.3g}{user}\right)\times 30days}{1month}=\frac{24{,}900g/month}{\square}$$ this is equivalent to 24.9kg per month. Similarly for estimating liquid soap: $$\frac{\left(100\frac{users}{day}\times\frac{12.5ml}{user}\right)\times 30days}{1month}=37{,}500ml/month$$ this is equivalent to 37.5 litres per month. Source: WaterAid technical handwashing facility guide.
9	**Avoid splashing and provide good drainage**	The basin should be large enough to avoid splashing. The waste pipe should be large enough to avoid getting blocked with dirt and scum (32mm or 40mm pipe should be sufficient) and have quality fittings to prevent leaks. Connection to a soak-pit or drain will depend on the location and existing drainage system if available (see Section 3).

10	**Hand drying**	In most cases, air-drying is likely to be the most practical option. However, shaking wet hands does pose a risk of re-contamination in some settings, such as healthcare facilities, so a means of drying will be required – such as disposable paper towels.[vi]
Sustainable		
11	**Selection of materials**	For handwashing facilities installed in an outside area, appropriate materials should be selected that do not corrode quickly (e.g. stainless steel) or degrade in sunlight (plastics must be UV-resistant). Ceramic basins may be seen as desirable by users, but are brittle and easily damaged, so less suitable in some areas such as a marketplace. The components most likely to fail are the tap, the fitting between the tap and tank, or (for hands-free designs) the mechanism for operating the tap. In order to reduce future maintenance, it is worth doing some research on taps to find high-quality brands. However, this must be balanced by assessing the risk of the tap later being stolen and the availability of materials locally for quick replacement when required.
12	**Durable and reliable**	Designs must be robust to provide a long-term facility for hand hygiene that needs minimal maintenance. Given that public facilities are likely to be used intensely, appropriate materials should be selected (see point 11) and a high quality of craftsmanship ensured. The stand for the water tank must be strong enough for the maximum weight of water, and stable to prevent it being easily knocked over (or blown over in the case of facilities outside). For large water tanks, a separate valve (stopcock) is recommended to avoid wasting water when a tap breaks or is being changed.
13	**Easy to repair**	Facilities should be simple to repair with materials, spare parts and relevant technical skills available locally. Sometimes capacity and supply chains may need to be actively built.
14	**Affordable and provides value for money**	A long-lasting facility will cost more but will be better value in the long run. So, when evaluating different design options consider both the capital cost (including transport and onsite assembly work) and the ongoing O&M over the design life (lifecycle costs). Affordability will also be influenced by who is funding the facility – something that is affordable for a non-governmental organisation (NGO) or private company, may not be affordable for the local government or a community-based organisation, thus limiting future replication and scale-up.

vi. The WHO Guidelines[12] recommend for drying hands that 'paper towels and a bin are provided; if not encourage air drying for several seconds'. A paper reviewing the hygienic efficacy of different hand-drying methods found that 'most studies suggest that paper towels can dry hands efficiently, remove bacteria effectively, and cause less contamination of the washroom environment. From a hygiene viewpoint, paper towels are superior to electric air dryers. Paper towels should be recommended in locations where hygiene is paramount, such as hospitals and clinics.'[13]

2.2 Technological adoption during COVID-19 and for similar disease outbreaks/pandemics

During the COVID-19 pandemic, the design of handwashing facilities (especially in public places) was revisited to ensure that the facilities did not pose a risk for transmission of the virus between users. Initially, contactless handwashing facilities were installed to reduce possible contamination from the station but when it became clear that public handwashing facilities were not the major source of disease transmission, those facilities had normal taps added with the future in mind. While hands-free mechanisms may be the gold standard in public settings, they should only be installed where they are likely to be durable, affordable and maintainable. Adaptation during COVID-19 can have lessons for handwashing facility design today.

How handwashing technology was adapted during COVID-19		
1	**Hands-free tap**	Hands-free mechanisms are desirable in general to prevent cross-contamination, and the majority of these were installed at the beginning of the COVID-19 response. There are three main design options: (a) **Contactless**, i.e. an automatic sensor. These are expensive, not easily available in many countries, and also need a power supply. It may require less frequent maintenance, but is more likely to be difficult to fix locally. (b) **Taps which can be operated using the forearm**, e.g. taps with a long-lever arm. This is a good option for quickly and cheaply adapting existing handwashing facilities; though it may not be intuitive and some users may continue to use their hands. Long-lever taps are also useful for people in wheelchairs, and people who use crutches or who have impaired mobility or strength. (c) **Foot operated**, either using a pedal with a mechanical lever arrangement or a foot pump. Designs adopted by WaterAid are provided in Part B, and more details on the lever mechanisms in Part C. Our experience shows that foot-operated handwashing facilities are often easily breakable, and difficult to operate and maintain. Also note that foot-operated designs may be harder to use for people who use crutches or wheelchairs or are unsteady on their feet. Note that where liquid soap is being used this can also be converted to hands-free operation, though this is less critical than the tap since hands are washed after touching the soap dispenser. Where a soap bar is used, a total hands-free experience is not possible; however, studies have shown that even when bar soap contaminated with micro-organisms is used there are no traces of these pathogens on the hands afterwards and hands are equally as clean as using a brand new bar.[14]

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2	**Physical distancing (during COVID-19 period)**	Guidance on minimum physical distancing to be observed vary from 1m to 2m; with 1m as the global WHO minimum recommendation. Physical distancing was maintained both when queuing and when using the facility. (a) **Queuing** – guidelines painted or otherwise marked on the ground. (b) **In use** – where there are multiple units or taps, these need to be spaced in line with physical distancing guidelines. If this is difficult to achieve, partition walls could be installed (these only need to cover the top of the body, hip to head, but a width of at least 0.8m must be allowed for wheelchair users).[4]
3	**Greywater management**	The water draining from handwashing stations (known as greywater or sullage) is usually not very polluted and current evidence is that the risk of COVID-19 transmission associated with this greywater is low. Existing best practice for drainage should be followed to avoid causing the area to become swampy, thus breeding mosquitoes and causing nuisance on the surface – see Section 3.
4	**More regular cleaning and disinfecting of the facility**	Handwashing facilities should be cleaned regularly and thoroughly in order to reduce risk of cross-contamination, as well as to ensure that facilities are appealing to users (blocked sinks, wet or unclean floors etc are likely to discourage users or even make the facilities impossible to use). In healthcare facilities the IPC (infection, prevention and control) guide can be used to determine the required frequency of cleaning. Cleaning involves using soap and water and then disinfecting with chlorine solution. A procedure for this is provided in Part C. The frequency will vary according to location and use. Note that if the water supply is lightly chlorinated (i.e. in line with normal requirements for potable water with a free residual chlorine of 0.2-0.5mg/l), this can help reduce the risk of contamination of the basin/sink. Highly chlorinated water (for example 0.05% used for hand hygiene in a cholera treatment centre) is not recommended for long-term hand hygiene because it can have a detrimental effect on the skin.

3. Installation

This section addresses site-specific issues relating to where the handwashing facility is to be installed. Note that the appropriate authorities, facility management, business owners and local community members must be consulted in deciding where handwashing facilities are placed, bearing in mind the requirements below. General requirements are presented first, followed by a dedicated section (3.2) on healthcare facilities where handwashing needs to be of a higher standard.

3.1 Installation – general requirements

Principles for the installation of the handwashing facility		
	Key features	**Factors to consider**
Location and access		
1	**Visible and convenient**	Located in a place which is close to where it is needed and easily visible. WHO recommends 'that hand hygiene facilities should be provided in front of all public buildings and transport hubs – such as markets, shops, places of worship, schools and train or bus stations. In addition, functioning handwashing facilities with water and soap should be available within 5m of all toilets, both public and private'.[1] Specific guidance for healthcare facilities is set out below (Section 3.2). For handwashing facilities installed outside, a roof cover/awning is preferable, where possible, as people are unlikely to remain outside for 20 seconds to wash their hands when it is raining. It may also prevent accidental damage to the facility.
2	**Safely accessible**	Located in a place which is: • Safe for all users, including children and women (consider lighting for places open at night-time).[15] • Accessible to users with disabilities (check paths leading to the facility are flat and clear from obstructions and any ramps have appropriate gradient with sturdy handrails). • Avoid flood-prone areas (if installed outside). Note: the Accessibility and Safety Audit checklist in Part C provides a comprehensive method for assessing this.
3	**Minimise risk of theft/vandalism**	For external handwashing facilities, consider whether to bring them inside for safe storage at night-time if they are mobile/ movable. Otherwise for permanent installations ensure the handwashing facility is securely fixed.

Connections to water supply and drainage		
4	**Water availability**	A location with a reliable piped water supply is preferred. In some cases, the existing plumbing may need extending to the handwashing facility (for long extensions, check that the pressure is sufficient) or improving to prevent wastage of water through leaks. Where a piped water supply is not available management arrangements must be in place to ensure water tanks are regularly refilled. Rainwater harvesting can also be used to provide water for part of the year (see Part C for further details). The quantity of water should be sufficient (approximately 1 litre/person) to enable rigorous handwashing for sufficient time to fully produce lather and wash (20 seconds is a starting point) yet avoid unnecessary waste. A float valve is necessary for big tanks connected to piped water supplies to help avoid water wastage.
5	**Water quality**	The quality of water for handwashing does not need to be of drinking water standard but should be from an improved source[12] without any undesirable smell or colour. If quality is unknown, handwashing with soap is still recommended.
6	**Greywater management**	Wastewater can be channelled into a soak-pit near the handwashing facility – see Part C for more details on soak-pits. Or it could be directed to a sewer if available.
Messages and behavioural nudges		
7	**Signposting**	Behavioural nudges to remind people to wash their hands include footsteps or arrows painted on the path, waterproof finger pointing stickers for handwashing and other visual cues to attract attention.[16]
8	**Illustrations to promote handwashing (at handwashing facilities and other key locations) and hygiene behaviour change**	Visual stickers or painted illustrations on the tank or above the sink, to promote key messages, such as: • Motivation – why washing both hands is important. • Instructions about use (especially if an unfamiliar design). • Correct hand-washing procedure. • Physical distancing while queuing. • Water is for handwashing only, not for drinking. • Stickers for handwashing. Note, if there are too many messages users are likely to ignore them, so you will need to be selective. It can be useful to rotate cues/props/illustrations to keep them interesting.[17]

9	**Branding and labelling**	It is common for NGOs and private supporters to display their logo on facilities they have installed; however, this can have a negative effect because it creates the impression that the facility then belongs to the NGO or a particular agency, and they will be responsible for ongoing O&M. It is recommended that any branding should primarily reflect the local government or a branded campaign logo. If the NGO's logo is required for donor accountability this should be relatively small and clearly state 'supported or funded by...'. Instead, a clear label should be included on who can be contacted if the facility needs repairs or to be refilled with soap and/or water. If a large number of handwashing stations are to be maintained by a single authority/organisation, consider numbering them to facilitate easy referencing for monitoring and location maps for the public, government and other actors.

In addition to the above, a hygiene behaviour change campaign needs to be conducted to motivate people to thoroughly wash both hands regularly and in relevant settings. Behaviour change campaigns should be surprising, attractive, rewarding, emotional and motivating for people.

Any promotional activities should use 'do no harm' principles, such as maintaining physical distancing if diseases like COVID-19 are spreading, and use non-contact methods for promotion, such as digital media, to avoid any chance of cross-contamination.

Any public communication/promotional session should use the standard behaviour-change package. People should be exposed to a campaign message many times to reinforce the behaviour change. Behaviour change sessions should also emphasise that hygiene is the responsibility of everyone, not (as is often the case) just women.

▼ Workers at a ready-made garment factory in Narayangani, Bangladesh, wash their hands after learning about the importance of handwashing through hygiene behaviour change training.

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3.2 Specific considerations for healthcare facilities

In most cases, installation of hand hygiene facilities in healthcare facilities (HCFs) will be part of a much larger project to improve all WASH facilities and infection prevention and control (IPC) procedures. This is the ideal. Where partners are only focusing on hand hygiene improvements, however, attention must still be paid to the following:

Additional hand hygiene requirements for healthcare facilities		
1	**Location of hand hygiene stations**	Hand hygiene stations are required at all of the following:[18] 1. Entrance and exit. 2. Toilets (within 5m). 3. Each point of care (as per IPC protocols in-country) such as in each service provision room in HCFs. 4. Where PPE is being put on and taken off. 5. Waiting rooms, public areas and dining/food preparation (and other service) areas. 6. Where healthcare waste is handled. Assess the individual facility and the workflow of staff, clients/patients and family members/visitors to improve hand hygiene at all of these locations.
2	**Design**	Consider appropriate designs: ● A group handwashing facility at the entrance of the HCFs and close to the toilet. A handwashing sink with water connection in each of the points of care (as above). ● Sinks may exist in the clinic but could be modified, e.g. installing lever-arm taps to facilitate hands-free use. ● Consider how patients who are sick or immobile can access handwashing facilities. ● If alcohol-based hand rubs are available,[vii] they may be preferred by clinic staff who need to wash their hands very frequently, and dispenser units can be installed accordingly. Handwashing facilities will still be needed with soap and water for when hands are clinically and visibly dirty. ● When installing multiple hand hygiene units it may be more effective to have a central water storage tank with internal plumbing to supply water to all the required locations. See Part B for specific designs.

vii. Alcohol-based hand-rubs (containing at least 60% alcohol) are also effective in removing the virus that causes COVID-19.[13] Such products should be certified and where supplies are limited or prohibitively expensive, can be produced locally according to WHO-recommended formulations.[20]

3	**Training**	Provide regular training for healthcare and maintenance staff on how and when to wash hands. This should include the WHO's 'five moments for hand hygiene',[20] and additional critical moments for health workers, such as before putting on PPE and after removing it; when changing gloves; and after any contact with a patient with suspected or confirmed COVID-19, their waste or the immediate environment, and respiratory secretions.[12] The training should also include motivational and promotional activities with visual cues/nudges to remind and reinforce handwashing; as well as cleaning and disinfection of the hand hygiene facilities.
4	**O&M**	Discuss and plan with health facility staff for a refill (water, soap) O&M plan. Healthcare facility policies and standard operating procedures (SOPs) will also need to outline what's needed to ensure hand hygiene and support of WASH and IPC in the facility.
5	**Monitoring and feedback**	Ensure the right procedures are in place to monitor hand hygiene and how well it is understood, and to get feedback to support improvements. Monitoring of resources and supplies is also important. **Tools** are available for this through **WASH FIT** and the **Hand Hygiene Self-Assessment Framework**.[21] For ongoing monitoring of the functionality of the handwashing facilities, see Part C.
6	**Collaboration**	Seek to collaborate with other health institutions and ministries. Also collaborate with other organisations or local government departments that have the capacity and resources to conduct a full assessment. WaterAid developed a **WASH in HCF rapid assessment tool** in mWater (based on WASHFIT) for this purpose.[22]

◀ Students washing hands in improved handwashing facilities in Siraha, Nepal.

4. Management, operation and maintenance

It is critical that all handwashing facilities are kept fully operational and clean. Poorly maintained or unclean facilities will deter people from washing their hands, and can become an epicentre for transmitting diseases.

Service providers should co-develop the operation and maintenance (O&M) plan in coordination with user groups and the body responsible for managing the facilities.

Proper training on maintaining the facilities for the long term should be given to user groups, communities, management committees, WASH committees and healthcare workers.

Management[viii]

The management of HWFs is often the responsibility of the governing body of relevant institutions or public buildings. In schools, for example, the school administration would typically assume the management upon completion of works (assuming funds to do this have been provided by an external organisation).

In public places, including religious places, bus terminals and marketplaces, local government is typically responsible, or the management of organisations contracted to take care of the HWF.

Management committees formed from local communities and users can also take on responsibility.

Management arrangements for the handwashing facility must be clear and agreed before the unit is installed.

WaterAid/Eliza Powell

WaterAid/Madagascar/SK

◀ Midwife Fostina Sedjoah washes her hands at a health centre in Ghana.

viii. The management, operations and maintenance of handwashing facilities is very important for their sustainability and for reinforcing handwashing practice in users.

The management model used by the various host facilities or institutions vary. In some there are already existing management committees such as a school management committee, HCFs management committee, bus management committee, religious places management committee etc. Where there is no committee, use the following steps to identify and involve the community:

Step 1

Raise awareness on the importance of HWFs in the community.

Step 2

Form WASH committees and provide basic training on operation and maintenance.

Step 3

Members of the WASH committee/management committee will come from the people who are benefitting from the HWF. Make sure that the committee has a gender balance and also includes people with disabilities.

This guide proposes daily and weekly activities for the committees, to include:

- Supervising the construction of HWFs.
- Ensuring that the HWFs are kept clean and are in use all the time.
- Producing a cleaning rota and ensuring it is followed.
- Maintaining a budget for operation and maintenance and keeping spares of soap and supplies (such as taps) that frequently get damaged.
- Regular monitoring of HWFs to ensure they are always maintained, keeping them free from leaks and vandalism.
- Replacing worn-out components and maintaining records of spares.
- Periodically assessing HWFs using checklists (see Part C) to ensure sustainability of the installed facilities and seeking professional support in cases of routine repairs and a major breakdown.
- Keeping a record of finances.


WaterAid/Anindito Mukherjee

Operation

The day-to-day running of the HWF in different institutions is mainly the responsibility of a designated person or people. In HCFs these are the cleaners, in schools a teacher is often nominated to supervise pupils who clean daily, in public markets there tends to be dedicated staff, and in local government institutions, a member of staff will typically be responsible for the HWF.

Maintenance

This means activities required to sustain HWFs in proper working condition (including preventive, corrective and crisis maintenance). The designated person should have basic maintenance training in case of breakages.

Regular preventative maintenance checks need to be conducted by a technician, who should investigate the condition of water tanks, water supply pipes, taps and drainage.

It is recommended that this regular maintenance is carried out every three-to-six months depending on how many people are using the HWFs.

Management, operation and maintenance guide		
	Key features	**Factors to consider**
Management arrangements		
1	**Organisational responsibilities**	The handover document should clearly identify which organisation is responsible for providing water, soap, cleaning and maintenance of the facility.
2	**Individual responsibilities**	More detailed operating procedures may be needed (particularly in a large institution such as a hospital and schools): • Who will provide/refill the soap and water? • Who will clean and disinfect the facility? • How often will this person check? • What happens if this person is on leave/sick? • Who are they accountable to? • Do they know who to contact if something is broken?
3	**Budget**	The monthly or annual operating cost must be estimated so the owner can budget accordingly. Costs may include the water supply, consumables (soap, cleaning products, PPE for cleaners), staff costs, monitoring, repairs and eventually replacement of the handwashing unit.
Cleaning and disinfecting procedures		
4	**Cleaning and disinfecting**	Guidance/training should cover: • Timing and frequency of cleaning required. • Correct use of and provision of PPE for cleaners. • Correct use of cleaning products. See Part C for further details.
Monitoring		
5	**Post-installation survey**	A survey of a sample of handwashing facilities, post-installation (e.g. three months after), is recommended to collect information on functionality, cleanliness and (if possible) hand hygiene practice. This may also be a donor requirement and should be done in conjunction with the owner, who will be responsible for future monitoring. A sample template for monitoring is included in Part C.
6	**Learning**	User feedback should be collected to help inform future improvements to the design, accessibility and usability. Document key learnings – successes as well as challenges/failures.

PART B1: Examples of permanent and semi-permanent handwashing facilities from WaterAid and UNICEF programmes

1. Introduction

This section includes examples from work supported by WaterAid and UNICEF in the following countries: Bangladesh, India, Nepal, Tanzania, Malawi, Ghana, Rwanda, Eswatini, Zambia, Madagascar, Nigeria and Pakistan.

They are mostly group handwashing facilities (HWFs) and mostly permanent and semi-permanent facilities. They also support some level of physical distancing, are inclusive and can be constructed in various public places like schools, markets, bus stops and healthcare facilities. Many also have visual cues to encourage washing your hands with soap.

Most of them are hand operated though some are pedal operated. The majority of them are connected to big water storage tanks but some are directly connected to water sources.

Permanent group handwashing facility in school, Tanzania.

2. Handwashing facilities designs and costs

2.1 Mozambique: Design 1

General description

The HWF is concrete-based, consisting of two taps and one drain for wastewater. It is hand operated by an open/close tap. The drain is underground and consists of concrete blocks and slabs.

Water for this HWF can be supplied either from a piped source, connecting pipes to a number of taps, or from an elevated tank which then distributes the water to the various taps.

WaterAid Mozambique

A HWF constructed in a public place in Mozambique.

Strengths and weaknesses

Strengths:

- It is strong and permanent.
- There is no need for frequent technical intervention – it just needs daily cleaning.
- Several people can wash their hands at the same time.

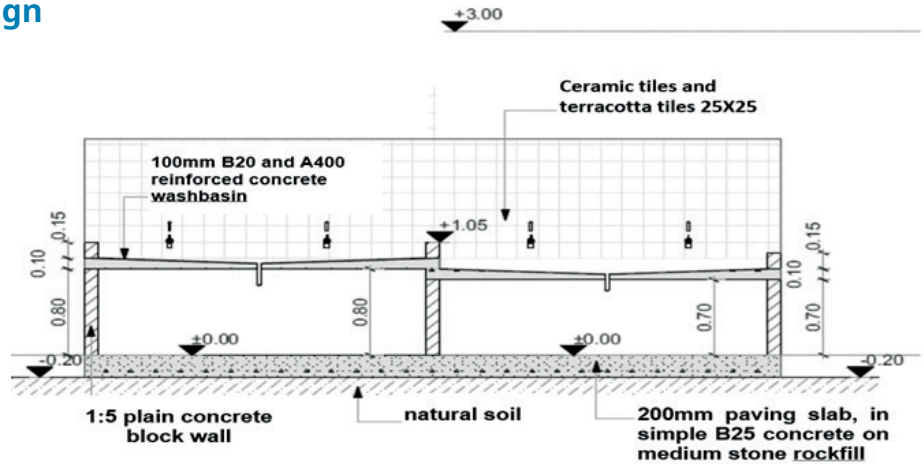
Weaknesses:

- It's static so can't be moved.
- It's easy to steal soap, so you'll have to devise some means of preventing this.
- In some schools, children use it for drinking water, so it's important to put up a sign saying 'this is for handwashing only'.

Bill of quantities

	Description	Cost
1	Preliminaries	153,745
2	Superstructure/cover	45,000
3	Plumbing	56,000
4	Finishing	63,200
Total	**Mozambique metical US $**	**317,945 4,978**

Design



WaterAid Mozambique

Construction costs

US $4,978. Renovate every five years to ensure it continues to work well.

Mozambique: Design 2

▼ HWF constructed in a market place in Mozambique.

General description

This an inclusive, permanent/semi-permanent multi-user HWF with hand- as well as foot-operated handwashing. It can be used by three people at the same time. It is made of steel and mounted on a concrete slab.

Water can be piped into the water tank from the mains or the tank refilled by hand. Wastewater drains into a sewer pipe or you can build a soak-pit nearby.

Strengths and weaknesses

Strengths:

- This HWF is inclusive.
- It needs less human intervention as the water is connected directly to the tank which will automatically refill.

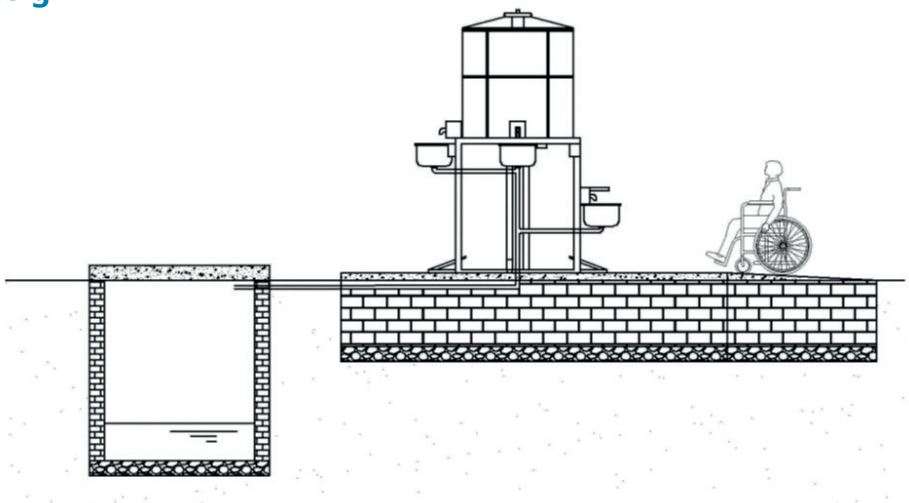
Weaknesses:

- The steel frame is less durable than, say, concrete, so will need more frequent replacement – depending on how many people use it.
- Risk of theft is an issue: hand basins may be disconnected from steel frames.

Bill of quantities

	Description	Cost
1	Earthworks and excavation	14,297
2	Plumbing and accessories	10,793
3	Painting and finishing	3,766
4	Water tank and stand	4,828
5	Handbasins and accessories	2,917
Total	**Mozambique metical US $**	**36,601 572**

Design



WaterAid Mozambique

Construction costs

US $572. It needs renovating every two years since the handbasins are not steel or ceramic and exposed to sun and rain.

2.2 Zambia: Design 1

General description

This permanent multi-user handwashing facility serves two users at once. It is sited on level ground achieved by using 100mm of compacted laterite. The base comprises a concrete slab. The slab has an accessibility ramp with a 1:10 slope. The HWF comprises concrete wash troughs mounted on 150mm blocks. The wash trough is attached to a wall made of 150mm blocks reinforced with wire, and wall and floor are finished with ceramic tiles. The wash troughs are at two different heights, 600mm and 750mm, and supplied by bib taps. The facility is fitted with steel soap holders (can add this) and includes visual nudges to encourage handwashing.

Strengths and weaknesses

Strengths:

- The HWF is permanent.
- It is easy to operate, easy to maintain and clean.
- It is easily accessible and inclusive

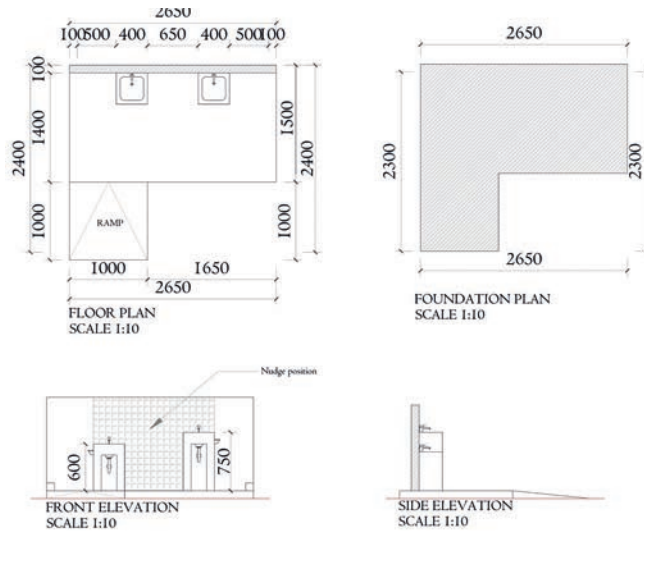
Weaknesses:

- Can be easily vandalised.
- It is prone to theft and misuse (the sink can be used for washing clothes or other things).
- It cannot be used without a water network with running water.

Bill of quantities

	Description	Cost
1	Sub structure	4,760
2	Sub structure (steel mesh)	5,470
3	Superstructure (masonry)	3,900
4	Plumbing (including water tank and stands)	7,500
5	Soakaway	3,640
Total	**Zambian kwacha US $**	**25,270 969**

Design



WaterAid Zambia

Construction costs

US $969. This excludes labour, taxes and other associated costs such as transport for materials. To ensure it works well in the future, refit every three-to-five years.

WaterAid Zambia

HWF constructed in public place in Zambia.

Zambia: Design 2

General description

This is a permanent hand-operated handwashing facility that allows two users at once. It is similar to Design 1 in that it comprises concrete wash troughs of the same grade mounted on 150mm blocks.

Here, though, the wash troughs are placed at the same height of 600mm meaning children can easily use it. It is fitted to an existing wastewater pipe.

Strengths and weaknesses

Strengths:

- This HWF is durable, easy to use, easy to clean and cheap to maintain.
- It can be adapted for more users and other needs, such as fitting in a ramp if the 600mm height does not suit.

Weaknesses:

- It cannot be relocated elsewhere.
- It does not have a dedicated soap holder/ dispenser (although one can be fitted).
- It has no ramp (although one could be constructed).

Construction costs

US $654. Renovate every three-to-five years.

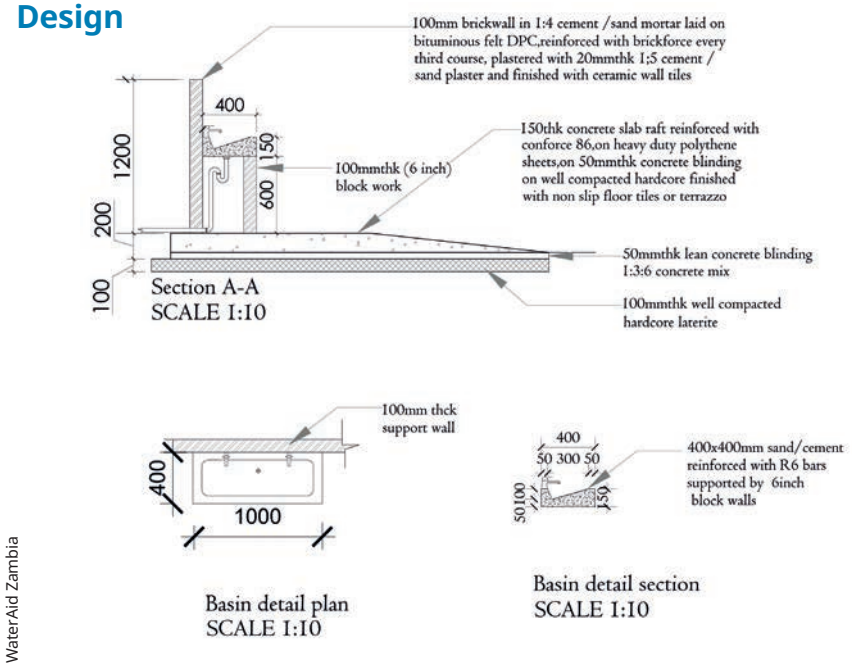
Bill of quantities

	Description	Cost
1	Sub structure	3,550
2	Sub structure (steel mesh)	5,470
3	Superstructure (masonry)	3,900
4	Plumbing (including water tank and stands)	500
5	Soakaway (if needed)	3,640
Total	**Zambian kwacha US $**	**17,060 654**

WaterAid Zambia

▲ HWF constructed in HCF in Zambia.

Design



WaterAid Zambia

Zambia: Design 3

General description

The Jumbo group handwashing facility serves four users at once. It is sited on level ground and is made of steel angle bars and square tubes welded together to form the steel frame.

The frame is sunk into 300mm deep, 200mm x 100mm concrete pads. The 220-litre water tank is raised 1m above the ground and supported by a 150mm strip foundation.

Water comes from CPVC pipes and a hand-operated bib tap. Steps need to be added under the tank so that it can be refilled manually if a central water supply is unavailable.

Jumbo handwashing facility in a school.

WaterAid Zambia

Strengths and weaknesses

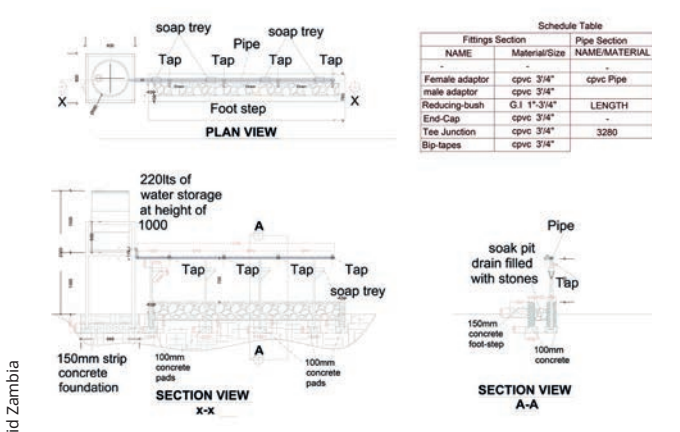
Strengths:

- It is easy to clean, easy to install, easy to operate and easy to maintain.
- It is easily accessible/inclusive.
- It can be used by many people simultaneously.

Weaknesses:

- It is easily vandalised.
- In the absence of piped water to the water tank, it would be heavy work refilling the water on a daily basis.

Design



WaterAid Zambia

Bill of quantities

	Description	Cost
1	Steel work	2,497.50
2	Permanent drain/ soak-pit	1,490
3	Plumbing	1,255
Total	**Zambian kwacha US $**	**5,242.50 200**

Construction costs

US $200. Renovate after two years.

Zambia: Design 4

General description

This is a permanent handwashing facility for four users sited on level ground. The ground is levelled using 100mm thick laterite compacted to 95% modified AASHTO.

The base comprises a concrete slab, which has an accessibility ramp with a slope of 1:10.

The handwashing basins with bib taps are mounted on blocks. The wall and floor are fitted with ceramic tiles (600mm x 300mm). The facility is also fitted with soap dispensers at different heights and steel rails along the ramp.

The wastewater drains into a 1m soak-pit through a 110mm diameter PVC pipe with a gulley trap.

Bill of quantities

	Description	Cost
1	Excavations and earthworks	1,965.46
2	Blockwork	6,216.25
3	Concrete work	38,825.80
4	Finishing	32,173.41
5	Plumbing	16,450
6	General fittings	21,040
7	Site work	11,745
Total	**Zambian kwacha US $**	**128,415.92 4,907**

Strengths and weaknesses

Strengths:

- It is easy to operate, maintain and clean.
- It is easily accessible/inclusive.
- It can be used by several people simultaneously so is ideal for a big population.
- It can be converted to hand-operated taps.

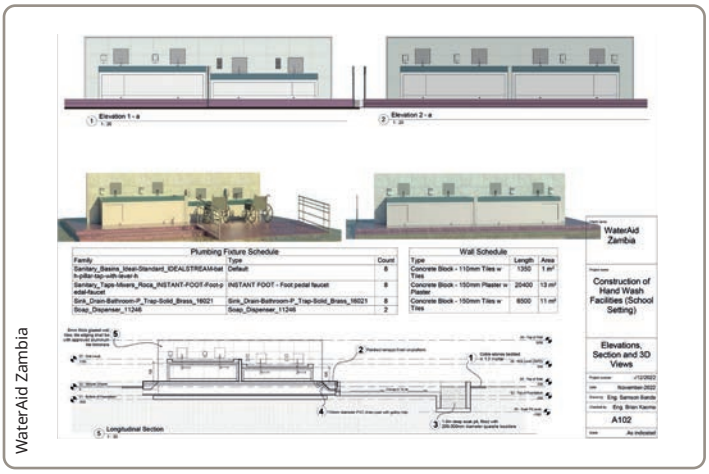
Weaknesses:

- It ideally operates effectively with water pumped from pipes rather than manually refilled tanks.
- The rails require frequent replacement – depending on the size of the population.

Construction costs

US $4,907. Renovate every five years.

Design



WaterAid Zambia

WaterAid Zambia

▶ Four-user permanent handwashing facility, Zambia.

2.3 South Africa

General description

This is designed for four people to use at once. It is pedal and hand operated – lever taps mean that elbows or the back of hands can be used.

In recent iterations, the facility can only be operated by hand using a lockable lever tap, which has been fitted to deter vandalism. In such cases, the user must lift the lever prior to rotating it.

Strengths and weaknesses

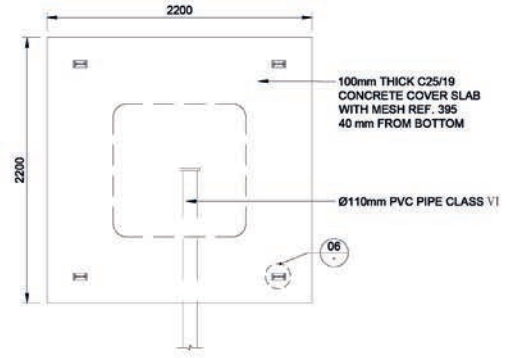
Strengths:

- It is popular with users as people recognise the facilities in many different places.
- O&M costs are low as the exposed components are made of concrete or masonry.

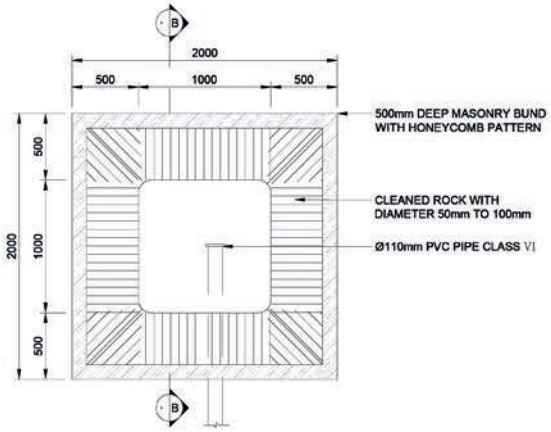
Weaknesses:

- In the long term pipework replacement will be expensive as it is beneath concrete.

Design



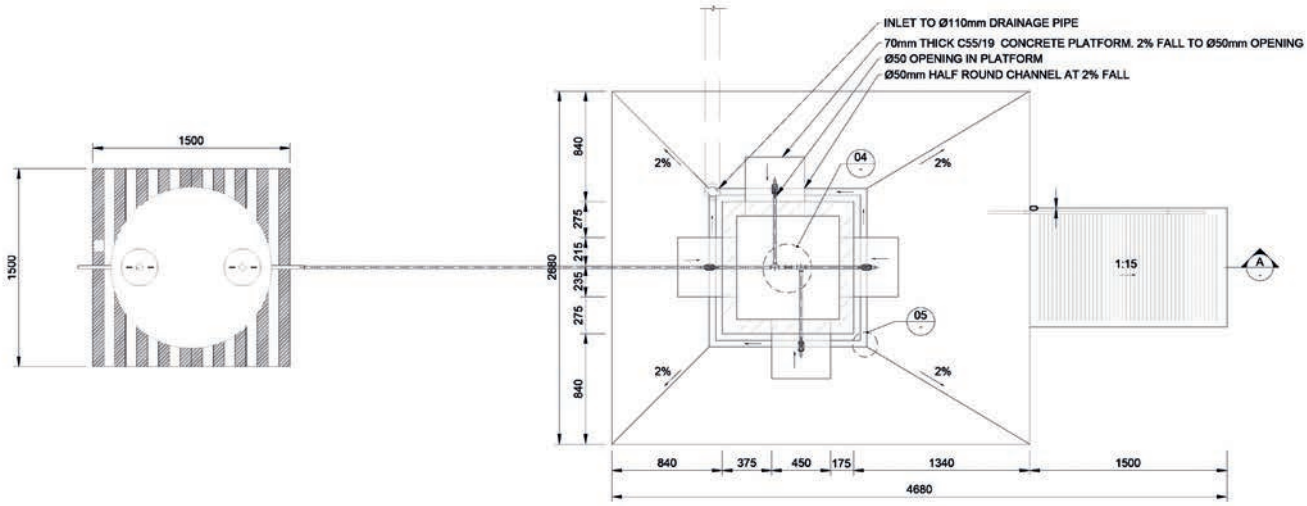
SOAK-AWAY COVER SLAB PLAN VIEW
SCALE 1:25



SOAK-AWAY PLAN VIEW
SCALE 1:25

WaterAid South Africa

Design



WATER STORAGE TANK AND HANDWASH STATION PLAN VIEW
SCALE 1:25

WaterAid South Africa

Bill of quantities

	Description	Cost
1	Earthworks	2,230
2	Concrete slab	8,419.77
3	Plumbing and drainage	22,437
4	Brickwork	3,232.50
5	Painting	5,500
Total	**ZAR** **US $**	**41,819.27** **2,517**

Construction costs

US $2,517, excluding labour and VAT. It has a five-year lifespan, after which it will need a refit.

◀▲ Permanent four-user handwashing facility, South Africa.

2.4 Malawi

General description

This is a multi-user, inclusive and permanent handwashing facility. It can be used by up to five people at the same time and is operated by hand or elbows.

One of the basins is at a low height so children and people with disabilities can use it. The facility has concrete pathways for ease of access.

Strengths and weaknesses

Strengths:

- It is user-friendly with a simple design and affordable maintenance costs.
- A 2,500-litre storage tank also serves as a back-up for an intermittent water supply.
- Can be used by several people at once.

Weaknesses:

- It is dependent on mains water supply.

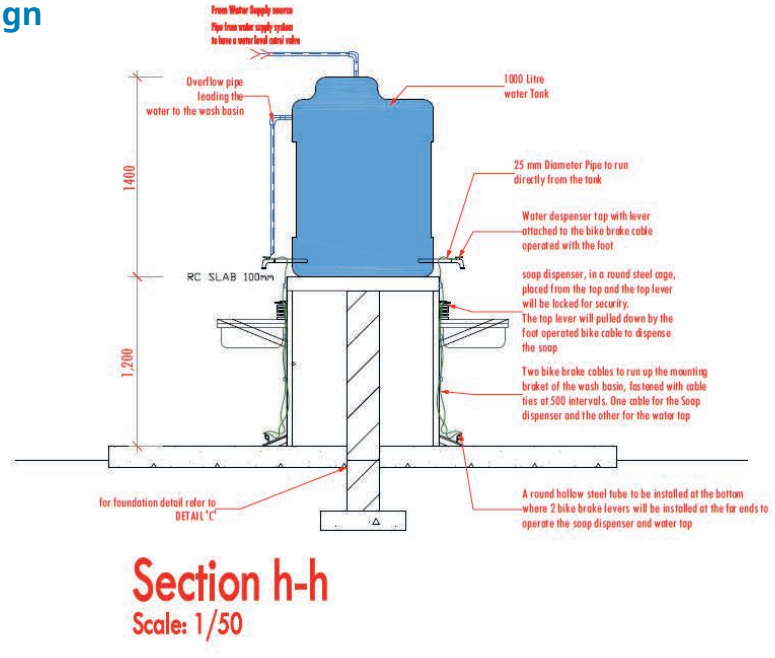
Construction costs

US $1,949. Renovate every five years.

Bill of quantities

	Description	Cost
1	Excavation and filling	81,300
2	Concrete and block works	624,950
3	Water tank and stand works	200,720
4	Hand washbasins and steel braces	203,600
5	Plumbing	500,000
6	Supply and fix stainless steel washbasin	390,000
7	Pipes and accessories	527,900
8	Construct soakaway	850,000
Total	**Malawian kwacha US $**	**3,378,470 1,949**

Design



WaterAid Malawi

▼ HWF in a healthcare setting, Malawi.

WaterAid Malawi

2.5 Tanzania

General description

This is a permanent multi-user handwashing facility operated by normal taps. It should be constructed with durable materials (cement bricks and wall tiles or concrete finish allow easy cleaning).

The facility has eight taps, allowing eight people to use it at the same time. The taps are at a low level so that children and wheelchair users can use with ease.

Strengths and weaknesses

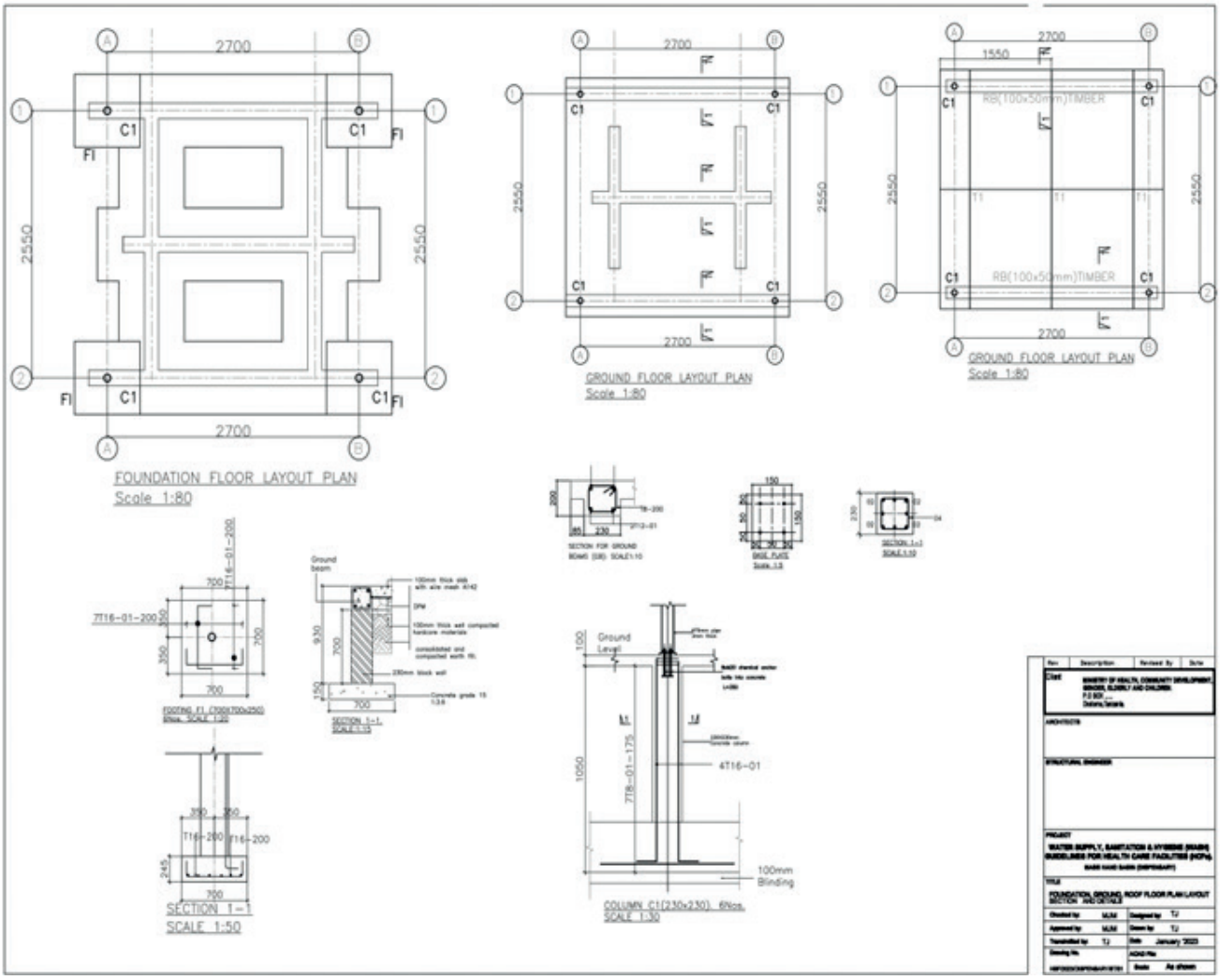
Strengths:

- It is permanent and durable.
- It is easy to clean.
- It is inclusive and user-friendly.
- It is affordable – all materials for constructing are locally available.
- It has provision for handwashing nudges.

Weaknesses:

- It cannot be relocated.

Design



WaterAid Tanzania

Bill of quantities

	Description	Cost
1	Foundation and earth works	619,035
2	Top slab	308,100
3	Plumbing	512,800
4	Plastering	54,000
Total	**Tanzanian shillings US $**	**1,493,935 553**

Eight-user HWF in a Tanzania school.

Construction costs

US $553, excluding labour. To keep it functioning properly, it should be renovated every three to five years (depending on the number of people using it).

Eight-user HWF in a Tanzania school.

Group HWF at the entrance to a healthcare facility, Tanzania.

Group HWF at the entrance to a healthcare facility, Tanzania.

2.6 Nepal

General description

This is a permanent multi-user handwashing facility operated by normal taps. It should be constructed with durable materials (cement bricks and wall tiles or concrete finish allow easy cleaning). The facility has four taps allowing four people to use it at the same time. The taps are fixed at different heights to make it easier to use by wheelchair users, children and people with other special needs.

Strengths and weaknesses

Strengths:

- It is permanent and durable.
- It is easy to clean.
- It is inclusive and user friendly.
- It is affordable – all materials for constructing are locally available.
- It has provision for handwashing nudges.

Weaknesses:

- In the event the host facility being relocated, it cannot be moved.

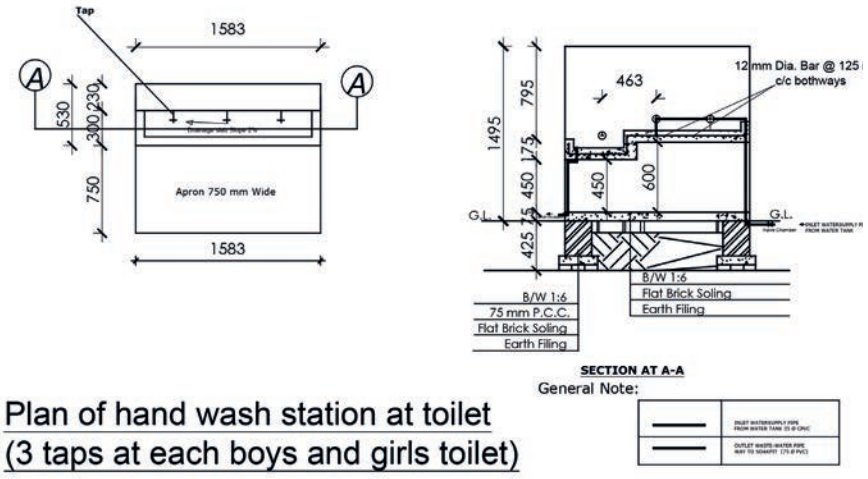
Bill of quantities

	Description	Cost
1	Local materials	42,896.80
2	Concrete, bricks	19,977.12
3	Wood	1,336.48
4	Cement, plumbing, pipes and accessories	69,178.49
Total	**Nepalese rupee US $**	**133,388.89 1,010**

WaterAid Nepal

▲ Group HWF next to school toilets, Nepal.

Design



Plan of hand wash station at toilet (3 taps at each boys and girls toilet)

WaterAid Nepal

Construction costs

US $1,010. It will need renovating after five years.


WaterAid Nepal

2.7 Bangladesh: Design 1

General description

This is a wall-mounted, multi-user, permanent handwashing facility. It is manually operated and allows four people to use it simultaneously.

The taps are fixed at height levels so that people using wheelchairs and children can use it easily. It uses plastic basins and is connected to a running water supply or water tank.

Strengths and weaknesses

Strengths:

- It is affordable and low cost as it is built on an existing wall, either of a toilet or any suitable wall in an open area.
- It provides space for nudges/cues that reinforce handwashing.
- The washbasins are easy to clean.
- Low maintenance costs.

Weaknesses:

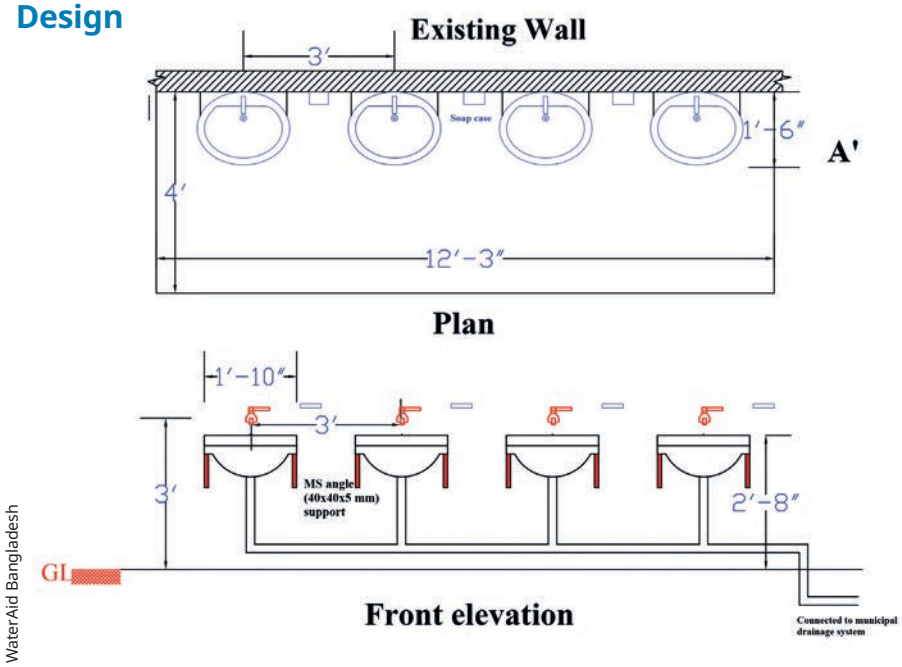
- It does not have soap dispensers or holders, but these can be fitted – the design is flexible to suit needs.

Bill of quantities

	Description	Cost
1	Handwashing basins and fittings	4,000
2	Water storage (500 litres) and plumbing materials	13,000
3	Signage	3,000
4	Labour	2,000
Total	**Bangladeshi taka US $**	**22,000 210**

▲ HWF in a school in Bangladesh.

Design



WaterAid Bangladesh

Construction costs

US $210 excluding VAT and tax. Expect to renovate every two to three years.

▼ HWF at the entrance, and close to the toilet, of an HCF in Bangladesh.

Bangladesh: Design 2

General description

This is a fixed-base concrete-built handwashing facility which can be used by four people at the same time. It is manually operated with the taps fitted at a low level to allow ease of use by children and people with special needs.

Water is supplied via a water tank from a water supply system within the host facility.

Strengths and weaknesses

Strengths:

- It is cheap to build; materials are locally available.
- It allows several users at the same time.
- It is permanent, thus promoting handwashing practice.

Weaknesses:

- The water tank may be stolen/vandalised if the location is not secure.

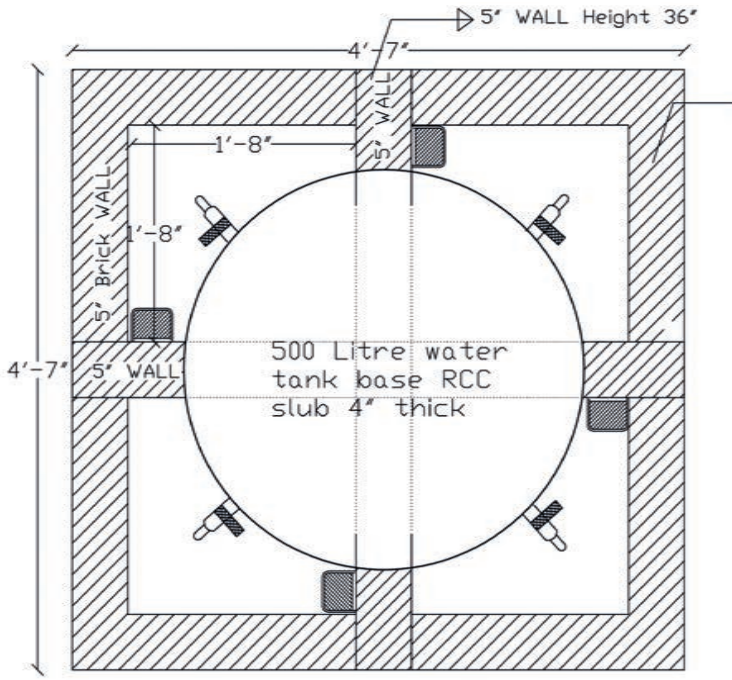
Bill of quantities

	Description	Cost
1	Construction materials (brick, cement, sand, aggregates)	14,000
2	Water storage (500 litres) and plumbing materials	15,000
3	Signage	3,000
4	Labour	8,000
Total	**Bangladeshi taka** **US $**	**40,000** **381**

Construction costs

US $381 excluding VAT and tax. Expect to renovate every two to three years.

Design



Drawing Name: Plan of Brick Type Handwashing Device

▼ Four-user HWF design, Bangladesh.

WaterAid Bangladesh

Bangladesh: Design 3

General description

This is a permanent, concrete-built handwashing facility which can be used by three people at the same time.

One of the basins is fitted at a low-level to accommodate children, people using wheelchairs, and others with special needs. The taps are manually operated. Water comes from a water supply system within the host facility.

Strengths and weaknesses

Strengths:

- It's cheap to build; materials are locally available.
- It allows multiple users at the same time.
- It is permanent thus more sustainable.

Weaknesses:

- Refilling tank is labour intensive.

Construction costs

US $343 excluding VAT and tax. Expect to renovate every three to five years.

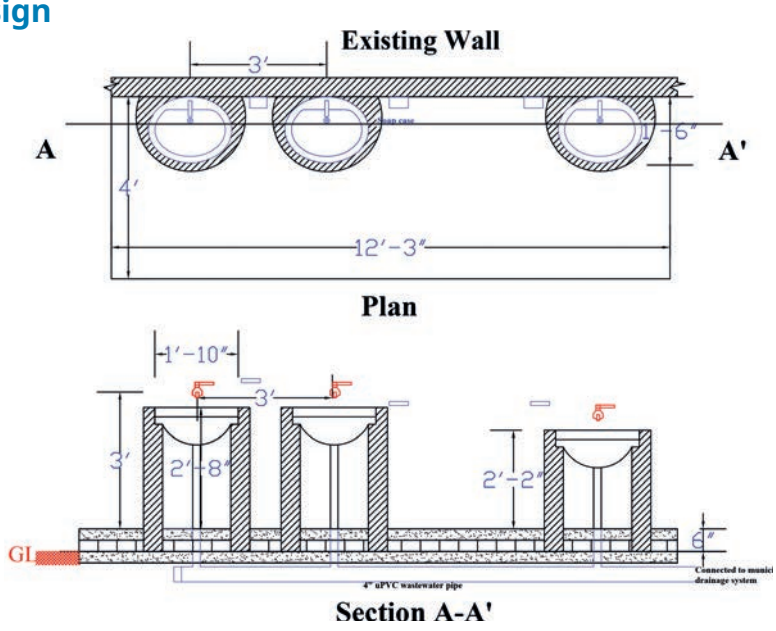
Bill of quantities

	Description	Cost
1	Construction materials (brick, cement, sand, aggregates)	10,000
2	Handwashing basins with fittings	3,000
3	Water storage (500 litres) and plumbing materials	13,000
4	Signage	3,000
5	Labour	7,000
Total	**Bangladeshi taka** **US $**	**36,000** **343**

WaterAid Bangladesh

WaterAid Bangladesh

Design



WaterAid Bangladesh

2.8 Eswatini: Design 1

General description

This is a multi-user (four people) pedal- and hand-operated facility. The HWF is built with concrete blocks and has a ramp and rails for use by people with special needs such as elderly people, pregnant women, children or people with disabilities.

Strengths and weaknesses

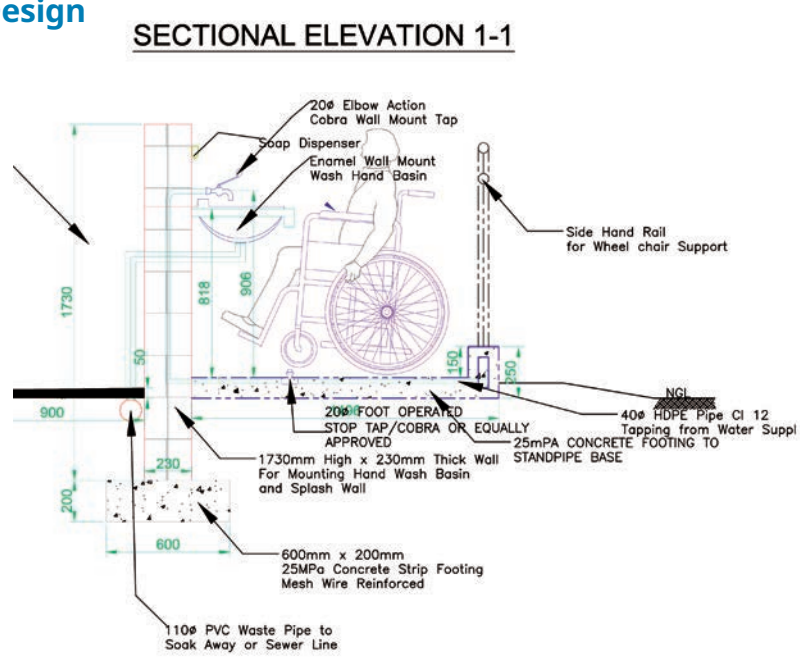
Strengths:

- It is permanent.
- It is inclusive.
- It uses easy-to-maintain parts and products available in local markets.
- It is easy to clean the ramp, basins and rails.
- It allows many people to wash hands at the same time.

Weaknesses:

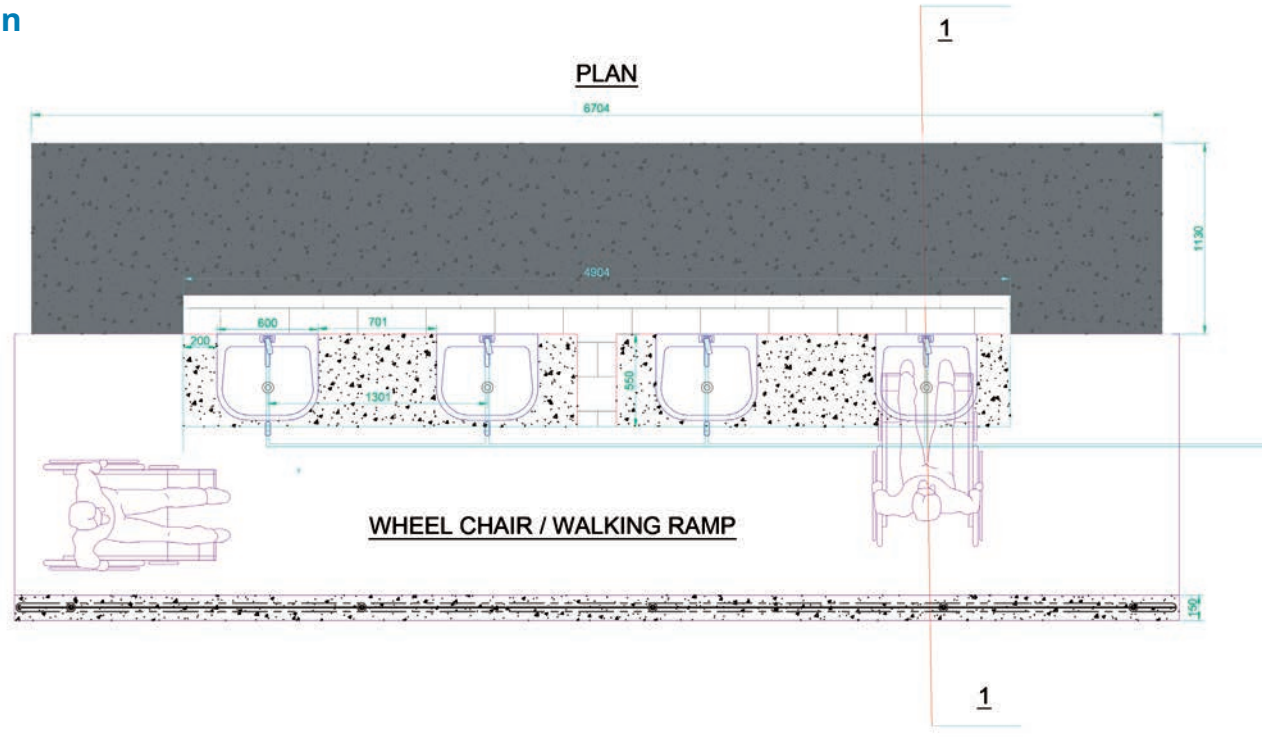
- Soap dispensers can be easily broken.
- The total cost is comparatively expensive.

Design



WaterAid Eswatini

Design



WaterAid Eswatini

Bill of quantities

	Description	Cost
1	Main water supply line (pipe connecting)	4,175
2	Plumbing, fittings and drainage	9,336
3	Wall structure materials	26,165
Total	**Swazi lilangeni US $**	**39,676.00 2,225**

▲ Four-user HWF at a healthcare facility in Eswatini.

Construction costs

US $2,225, excluding labour and taxes. Renovation required after three to five years.

▼ Four-user HWF at a healthcare facility in Eswatini.

Eswatini: Design 2

General description

This multi-user (four people) pedal- and hand-operated HWF is inclusive and suitable for heavy use such as in schools, healthcare facilities and bus terminals.

Strengths and weaknesses

Strengths:

- It is durable.
- It is user friendly and easy to clean.
- It allows more than one user at once.
- It is suitable for a piped water supply and manually-filled water tank.
- The number of taps can be increased or decreased.

Weaknesses:

- It only has one soap dispenser on one side but more could be installed above the taps.

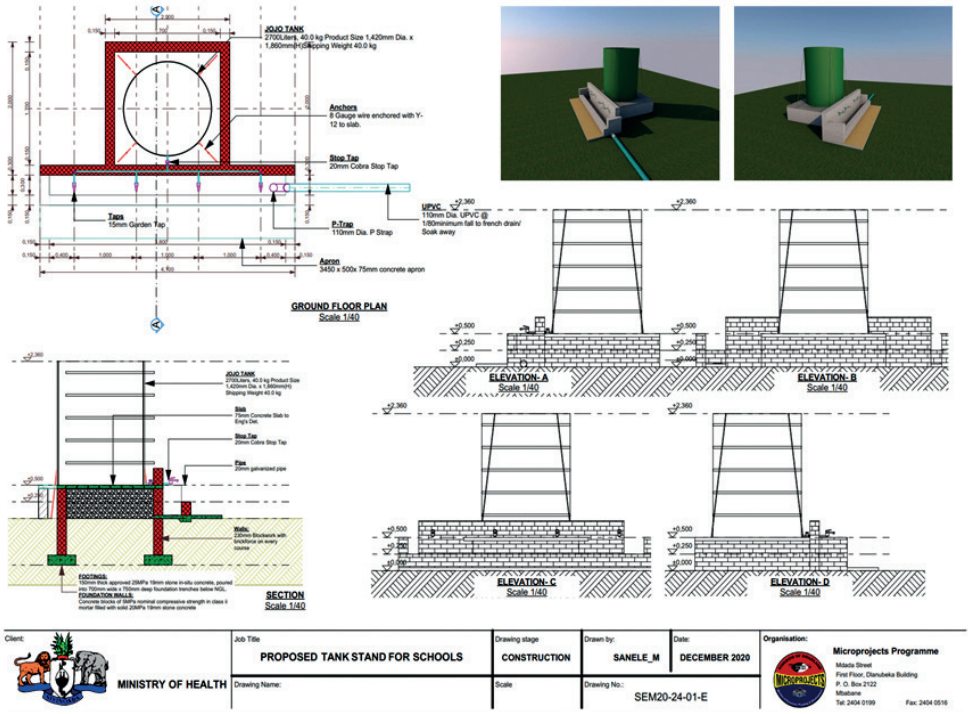
Bill of quantities

	Description	Cost
1	Concrete and earthworks	3,270
2	Plumbing and accessories	11,864
3	Water tank and storage	3,700
Total	**Swazi lilangeni US $**	**18,834 1,038**

Construction costs

US $1,038. Renovation recommended after three to five years.

Design



WaterAid Eswatini

2.9 Madagascar

General description

This is a permanent, manually operated multi-user handwashing facility with 16 taps. It includes concrete ramps to make it more accessible. Water is supplied by a water pipe within the host facility. These facilities can be installed in schools and the number of taps changed to fit the number of students.

Strengths and weaknesses

Strengths:

- It is permanent.
- It is inclusive.
- It is easy to maintain – parts such as taps are available in local markets.
- It is easy to clean the ramp, basins and rails.
- It allows many people to wash hands at the same time.

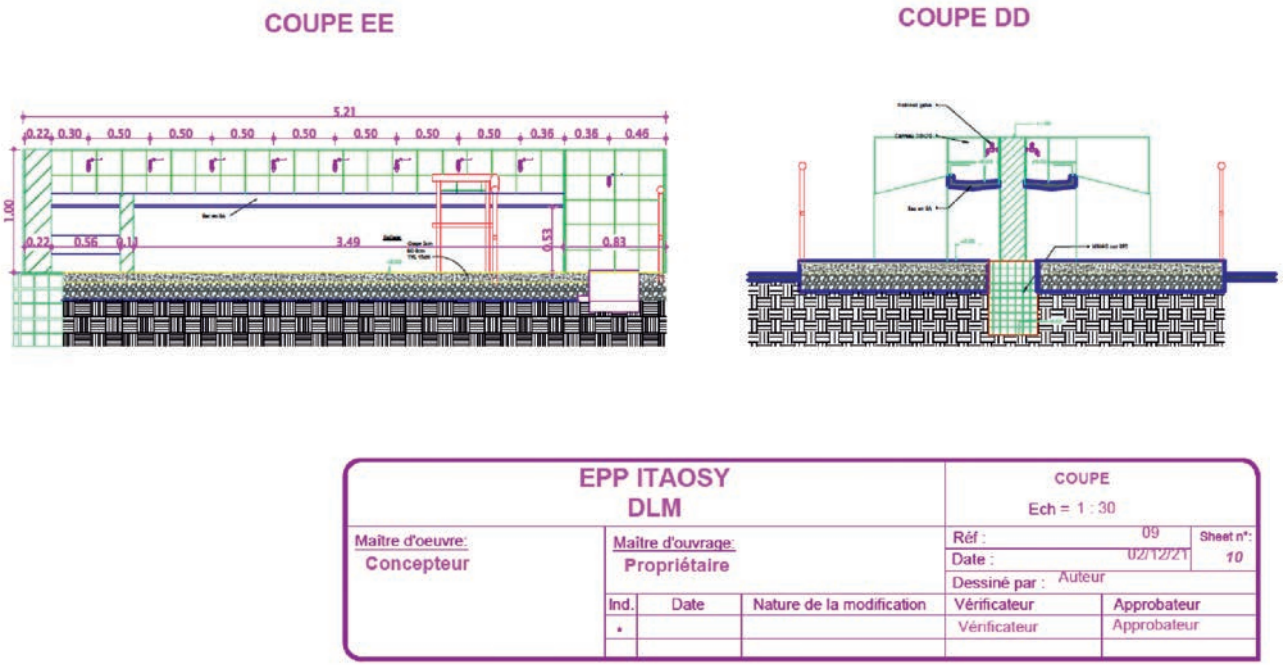
Weaknesses:

- The total cost can be comparatively expensive. However such facilities mean large groups such as school students can wash their hands at the same time.

◀ Eight-user group HWF in a school in Madagascar.

● Group HWF positioned near toilets.

Design



WaterAid Madagascar

Bill of quantities

	Description	Cost
1	Earthworks	55,946.45
2	Masonry and concrete	3,379,612.89
3	Painting and tiling	1,172,750
4	Supply and installation of galvanised guard rails, plus accessories	451,584
5	Supply and installation of pipes	323,750
6	Supply of plumbing fixtures	918,169.75
7	Installation of water tank and stand	5,263,341.26
Total	**Malagasy ariary US $**	**11,565,154.40 2,532**

Construction costs

US $2,532 excluding labour costs.
To ensure it remains fully effective, renovate every five years.

WaterAid Madagascar

Group handwashing facility in front of school toilets, Madagascar.

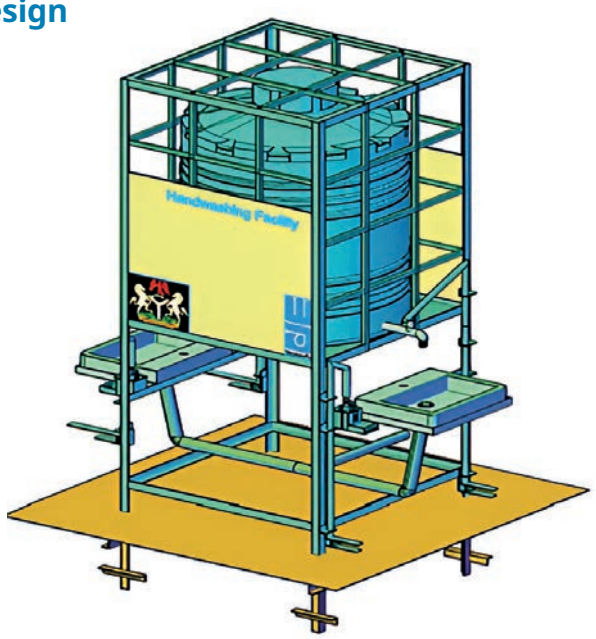
2.10 Nigeria

General description

This permanent HWF can be mounted on a concrete slab and is made of a metal frame with foot-operated pedals for dispensing soap and water.

There are also hand-operated taps, while a pipe connected to the basin takes wastewater into the public drain.

Design



WaterAid Nigeria

Strengths and weaknesses

Strengths:

- Simple to use.
- Non-contact and supports physical distancing (one-at-a-time use).
- It includes hand-operated taps making it easy for users and for quick maintenance and repair.
- Simple construction and fabrication means local technical know-how to support with repairs and maintenance.
- It is attractive to the users.

Weaknesses:

- There may be challenges with water supply in institutions that experience seasonal water shortages.
- Not all people with special needs can use the pedals (especially people who cannot walk and use wheelchairs). However, there is a hand-operated tap.

Bill of quantities

	Description	Cost
1	Steel frames	179,456
2	Plumbing and handbasins	54,850
3	Water tank and support accessories	53,000
Total	**SZL** **US $**	**287,306** **182**

WaterAid Nigeria

◀ HWF in a market place in Nigeria.

Construction costs

US $182, excluding labour and transport costs. Renovate every two-three years to keep it in good condition.

2.11 India: Design 1

General description

A hands-free, foot-operated handwashing station that is ideal for areas with a small population.

If demand increases, units/handbasins can be added.

Strengths and weaknesses

Strengths:

- It is low-cost technology.
- It is easy to build, maintain and operate.
- It can be adapted to suit demand.
- The tank can be refilled by a piped supply or by hand.

Weaknesses:

- Foot pedals need frequent repair.
- Unable to withstand harsh weather conditions.

Bill of quantities

	Description	Cost
1	Staging and paddle pumps	5,000
2	500-litre water tank on staging	5,000
3	Steel sinks	2,500
4	Carriage and other sundries such as liquid soap	1,000
Total	**Indian rupees** **US $**	**13,500** **178**

Source: UNICEF Compendium of indicative layouts, designs and cost estimates

Construction costs

US $178, excluding labour costs. It should be renovated every two-three years to ensure all components are in good order.

Design

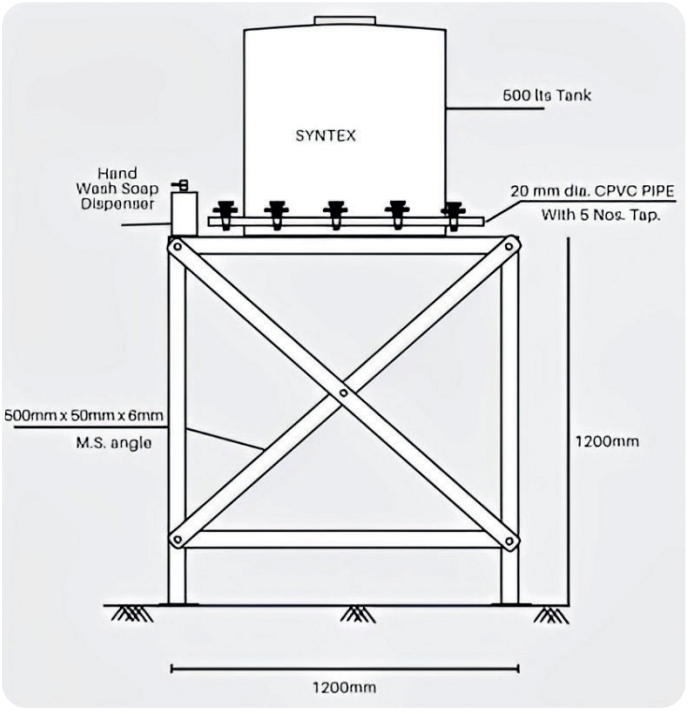


Image and data source: UNICEF Compendium of indicative layouts, designs and cost estimates

India: Design 2

General description

This handwashing facility is hand operated and allows four users at the same time. It is designed for places where there will be many users, for example in schools, places of worship and healthcare facilities. The number of taps can be increased or decreased. A skilled fabricator can erect this unit in one day.

Strengths and weaknesses

Strengths:

- It is easy to build and operate.
- It can serve high-population places.
- It is low cost and uses locally available materials.
- It is flexible – more taps can be added if needed.

Weaknesses:

- It does not have a very long lifespan (two-three years)
- It requires frequent maintenance.
- It is easy to vandalise and steal parts from it.
- It is only suitable for places where water supply is piped in.

Bill of quantities

	Description	Cost
1	Plastic drum	500
2	Taps	520
3	Pipe	100
4	Frame (structure)	1,500
5	Fabrication	500
6	Painting	100
Total	**Indian rupees** **US $**	**3,220** **42**

Source: UNICEF Compendium of indicative layouts, designs and cost estimates

Construction costs

US $42, excluding labour and taxes. After two-three years it will need renovating. Anticipate having to replace the taps frequently if it is getting a lot of use.

Design

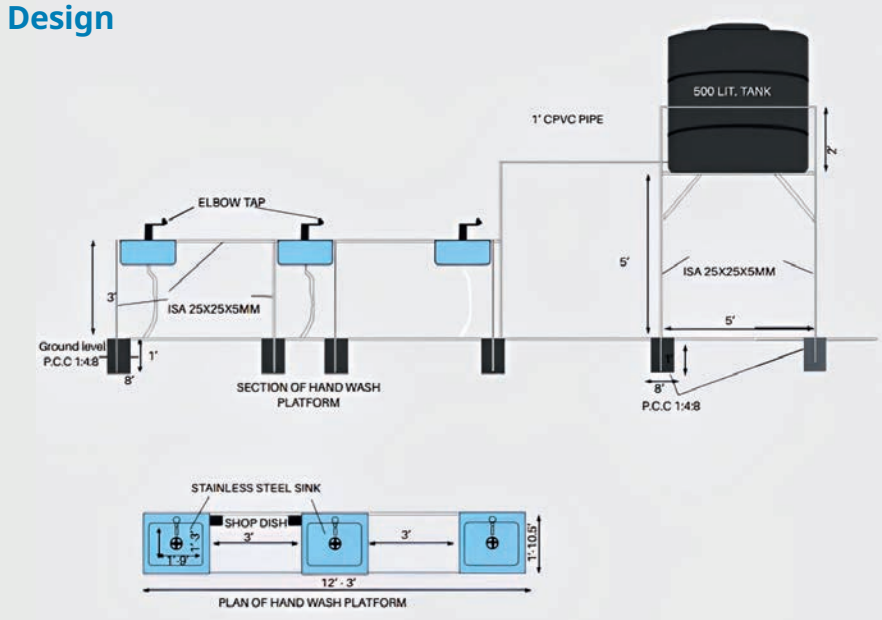


Image and data source: UNICEF Compendium of indicative layouts, designs and cost estimates.[26]

▲ Group HWF built in a school, India.

India: Design 3

General description

This is a foot-operated handwashing facility suitable for institutions such as schools.

An electronically operated version is also available. The number of taps can be increased or decreased. It connects to running water/piped water.

Strengths and weaknesses

2.1 Strengths:

- It is low-cost and easy to operate.
- It is flexible so can be adapted to meet demand.
- It is durable.

Weaknesses:

- It requires maintenance to keep the steel in good condition and free from rust.
- You might need to replace the foot pedals frequently.

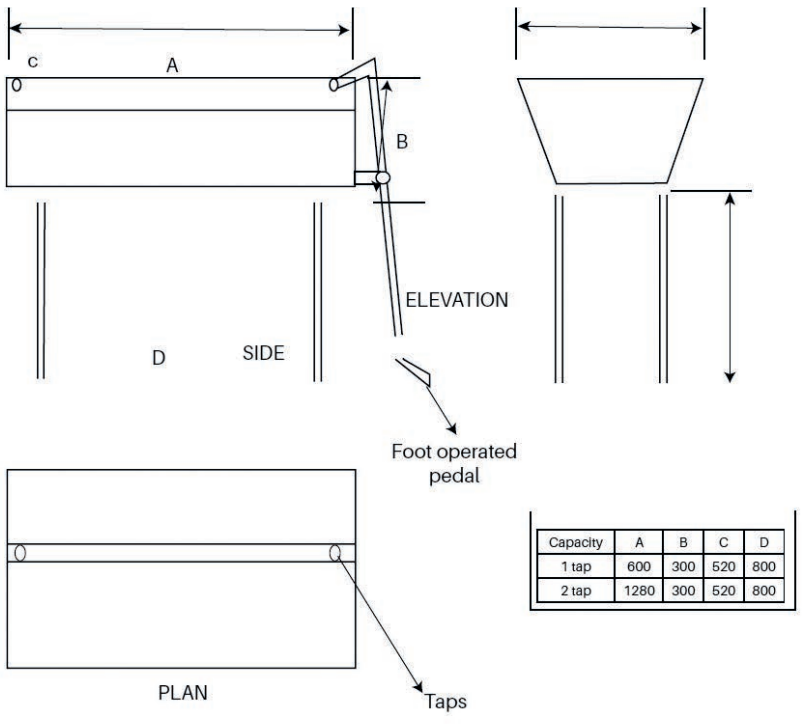
Construction costs

US $90 for one user (US $103 for electronically operated) and US $116 for two users (US $142 for electronically operated). All options require renovation after two-three years of consistent use.

Bill of quantities

	Description	Cost – pedal operated	Cost – electronically operated
1	One-tap version with stainless steel water tray and mild steel structure	6,800 Indian rupees US $90	7,800 Indian rupees US $103
2	Two-tap version with stainless steel water tray and mild steel structure	8,800 Indian rupees US $116	10,800 Indian rupees US $142

Design



Capacity	A	B	C	D
1 tap	600	300	520	800
2 tap	1280	300	520	800

UNICEF Compendium of indicative layouts, designs and cost estimates.

PART B2: Examples from COVID-19 response programmes

1. Handwashing facility – foot-operated for one or two users

Summary

This section includes examples from WaterAid Bangladesh, Madagascar, Nepal, Burkina Faso, Nigeria, Pakistan, Malawi, Zambia, Eswatini, Mozambique, Rwanda, Ghana and Sierra Leone.

The handwashing facility is designed with (normally) a single water tank with a capacity of 50–500 litres, with one or two taps connected to the tank and operated with a pedal. Being hands-free, the facility reduces cross-contamination.

These handwashing facilities also support physical distancing and can be easily installed in various locations. Facilities are accessible for all ages, genders and people with disabilities. Facilities are branded with visual cues/reminders with context-specific messages to encourage handwashing with soap. Please note, facilities installed at the beginning of COVID-19 later also added hand-operated taps so that they can be used in different ways.

General description

A container filled with water, fitted with a push tap. The tap connects to a foot pedal so that when the pedal is pressed, the tap opens and water flows out.

Bar soap or liquid soap is stored next to the container. Liquid soap bottles can be attached to one of the foot pedals which releases soap. Different hand hygiene visual cues in the form of illustrations are installed on the facilities which remind the users to wash hands, and how proper hand hygiene is done.

Target locations

Community centres, bus and railway stations, markets, healthcare facilities, motor parks, quarantine centres, schools, government offices, religious centres and public places.

Note: in foot-operated handwashing facilities, a normal tap can also be added to make it more flexible.

▲ A man washes his hands in Hyderabad, Sindh (Pakistan), after the installation of new hands-free handwashing facilities.

▲ People washing hands with soap and water in Madagascar using newly installed foot-operated facility.

Bangladesh

Description

Two steel sinks attached to a mild steel frame, a 100–300 litre water storage tank set on top of the frame, a soapy water bottle holder and four pedals to operate the bib tap and soap dispenser. Total frame height is 1.5 metres and sinks are attached at 910mm and 610mm height. A wastewater disposal pipe connects sinks to a soak-pit/drainage.

The handwashing water supply is from a rainwater harvesting system. Once the frame is built, the sink, tank, pedals and plumbing accessories are added. It can then be branded as required and allows two people to use it at one time.

▲ Community members washing their hands at a dual-user inclusive pedal-operated station.

Advantages	Disadvantages
● Accessible to people with disabilities and children. ● Connects to rainwater harvesting system to help continuous supply. ● Safe disposal of wastewater.	● Ensuring a continuous water supply by refilling the tanks when running water is not available. ● Risk of theft.

Figure 1: Mild steel (MS) angle frame and other components.

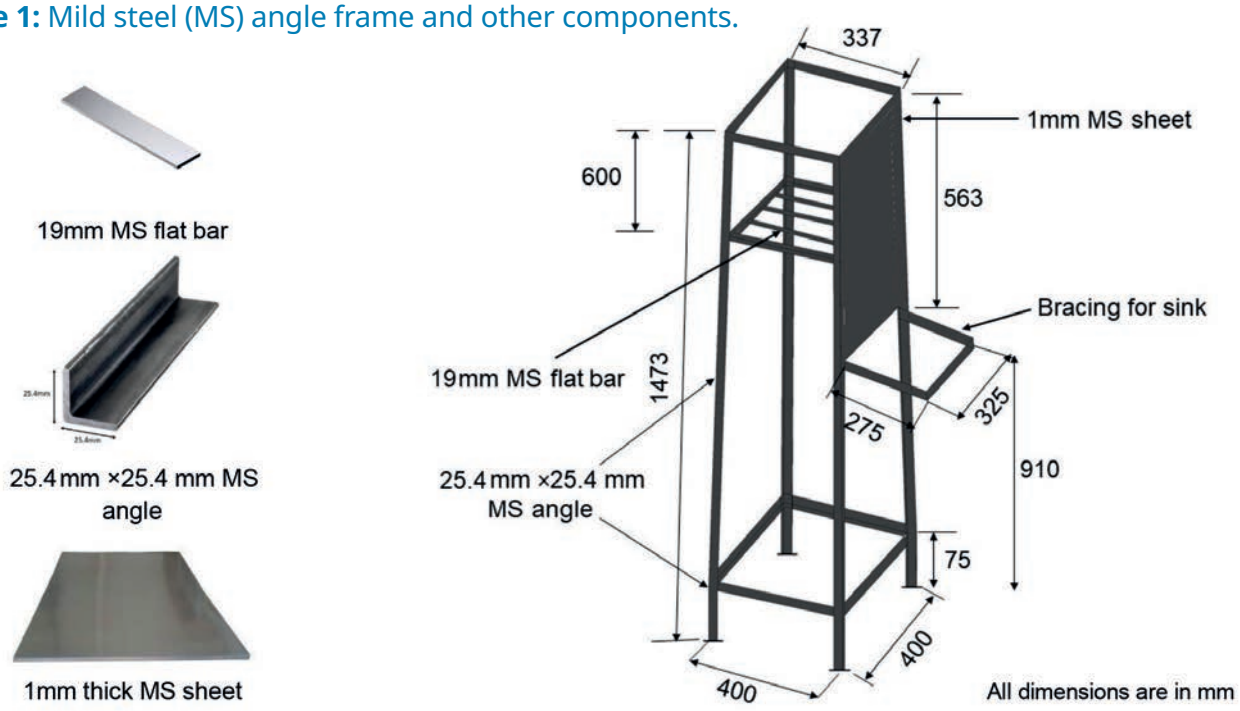
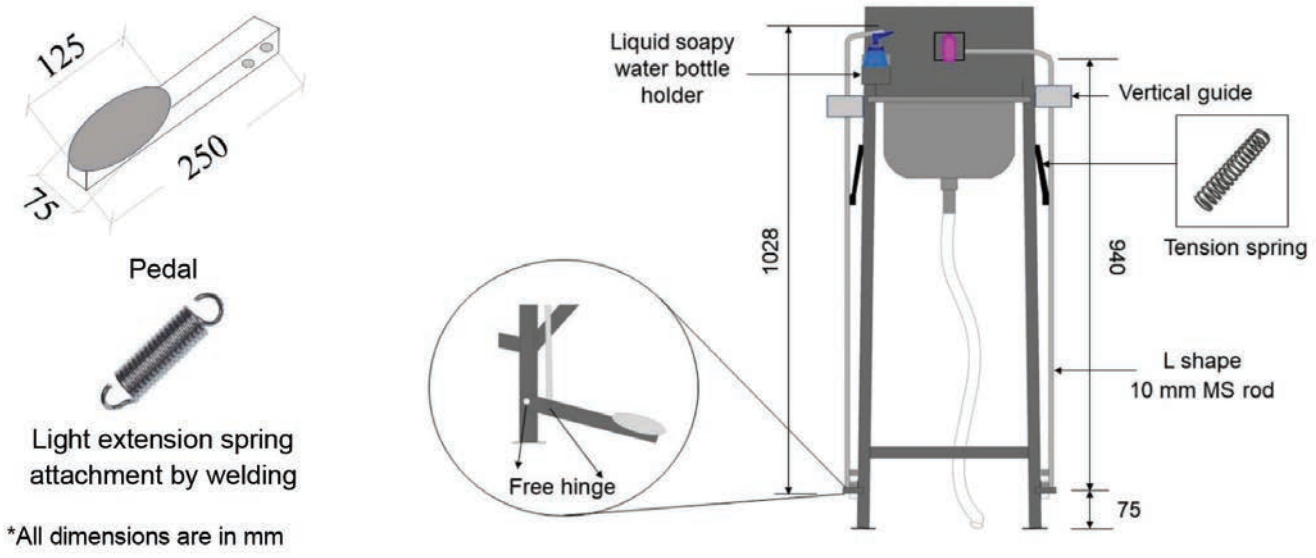


Figure 2: Pedal-operated arrangement.



How to build

Making the MS angle frame

- Make a frame with 25.4mm x 25.4mm MS angle.
- Add 19mm MS flat bar to support water tank as shown in Figure 1.
- Attach 1mm MS sheet at one side of the frame which can be used for attaching a mirror or hygiene messages.
- Add two bracing structures at height of 910mm and 610mm on two opposite sides of the frame using 25.4mm x 25.4mm MS angle to support sink as shown in Figure 1.

Making soapy water bottle holder

- Use a 3mm MS sheet and fix the liquid soap holder at the right side of the frame so people can have the soap holder at their left as shown in Figure 2.

Arrangement of pedal-operated system

- Take a 250mm long MS box section and attach an oval-shaped footrest made of MS sheet at one end. Attach the other end of the pedal to the frame using a hinge.
- Fix one vertical guide to the frame to keep the MS rod in vertical position as shown in Figure 2.
- Make an L-shape 10mm MS rod with a vertical dimension of 1,028mm for soap dispenser and 940mm for water tap. The length of the horizontal part of the L-shape rod needs to be cut at the actual dimension required for the soap dispenser or tap.
- Place the bar through the vertical guide and attach the lower end to the pedal with the free hinge.
- Connect a light extension spring to the rod and frame so that it carries the weight of the rod and the spring can bring back the pedal system to operational mode after every use.
- Make two pedal sets, one for soapy water and another for water dispensing. The horizontal part of the bar is to be placed just above the soap dispenser and push shower.
- The user will use the left pedal for soapy water and the right one for the water dispenser. The total pedal system will push downward to activate the soapy water and water supply.

Fixing tank, sink and plumbing accessories

- After painting the frame and pedal set, two 305mm x 355mm steel sinks are fixed at a height of 910mm and 610mm on the frame.
- Two fixed push taps are attached with the necessary plumbing accessories for water dispensing.
- Add a tank of 100 to 300 litres and connect to a rainwater harvesting system.
- A hosepipe and clamps will be needed for drainage connection to soak-pit/drains.
- Finally, after fixing all the plumbing accessories for water supply connection and drainage, the handwashing facility is ready for use.

Installation/repair

Various materials can be selected (mild steel/ stainless steel, plastic/steel/ceramic basins, plastic/steel bibcock valve, etc). An approximate total cost for the facility is 104GBP. Once the pedal-operated system is fabricated it can be easily reproduced.

Handwashing facilities are fixed to the ground and managed by the community, and volunteers with minimum mechanical experience are appointed as caretakers. Initial maintenance and repairs are covered by manufacturers for a certain period (six months to one year) and then regular maintenance and minor repairs can be done by the volunteers.

O&M

The caretaker cleans and disinfects the station twice a day and checks the water and soap supply. A lump sum budget for maintenance of the facility is secured to continue operation.

▲ People washing their hands with the new hands-free facilities in Madagascar.

WaterAid Madagascar

Description

This handwashing facility has two taps activated by a pedal and is equipped with two 60 litre containers which rest on a welded metal stand. Unit cost 57GBP.

O&M

The facilities easily accommodate soap and the design allows for easy regular cleaning/ disinfecting of taps, basins, soap dispensers and frequently touched surfaces. Refilling of soap and water is easy and safe.

The use and maintenance of the hands-free handwashing station will be managed by the local technician at either the municipal, school or healthcare facility level.

Wastewater is discharged into the public sewer and is managed by the WASH committee.

Nepal

Description

This type of handwashing facility can use a storage container of 200 or 500 litres. The refilling of the water and liquid soap depends on the number of users and the capacity of the tank and soap dispenser. A metal lift cock type tap (brass) is most suitable as it reduces maintenance issues.

This simple unit can be easily fabricated at the local engineering workshop with readily available materials such as steel for the frame, a PVC tank, brass taps, and plastic or metal basin and pipes. A durable soap container needs to be fashioned from a 150mm diameter metal tube about 300mm long so that it can hold 4-5 litres of liquid soap (enough for 800-1,000 hand washes).

General design features

For comfortable handwashing and to collect greywater safely, a 300mm depth and 500mm diameter basin is fixed to one side of the facility, with a pipe connected to the drainage system.

The pipe diameter can be the same as is generally used for a bathroom washbasin or sink (40mm). If a drainage facility is not available, a container has to be placed at the lowest level to collect greywater from the basin, which can then be disposed of safely. If possible, it is advisable to connect the basin drainage pipe directly to the city drainage or sewer system, otherwise a soakpit will need to be dug.

WaterAid/Nepal

Installation/repair

The steel parts are either welded in the metal workshop and installed or can be supplied with nut and bolt parts for easy assembly at the installation site. The unit weighs around 70-80kg.

A metal soap dispenser and brass tap with heavy duty materials should be used. After installation, the unit should be handed over to a management committee, local community or youth group for O&M.

The facility itself should last for at least two years due to the steel and heavy-duty fabrication. Training local caretakers from management committees for general repairs is reliable and cost effective. From time to time the water tank will need to be washed and taps changed; these are readily available in local markets.

Advantages	Disadvantages
• Accessible to some people with disabilities and children when height of basin is adjusted. • Hands-free – reduces chances of spreading virus and other diseases.	• If a water source is not available nearby, the tank will have to be hand-filled. • Risk of theft. • If there is no drainage, the basin with wastewater needs to be regularly emptied.

For more, refer to WaterAid Nepal *Technical brief on contactless handwashing stations*.[27]

Burkina Faso

Description

This two-pedal handwashing facility is composed of a metal structure with two tanks/containers. Additionally, there is a metal holder for single-use paper towels and a waste bin to collect solid waste.

Design features

The storage tank is made of plastic with a lid and has a capacity of 50-100 litres. This is supplied with water collected in jerrycans from the local handpump, as most health centres are not connected to a water supply network.

The tank is equipped with a metal tap. Another plastic container with a volume of 15 litres and metal tap contains the soap. An additional 15-20 litre container collects the water from handwashing, which is then regularly poured into a drain. A final plastic basket is used to collect solid waste (such as used paper towels). All of these contents are placed on a 1.2 metre painted metal frame.

▲ Hands-free handwashing facility in Burkina Faso.

Advantages	Disadvantages
● Accessibility of materials and tools. ● Maintenance by local workers. ● Option for tissues to dry hands and bin.	● Regular refilling of water tank. ● Basin with wastewater needs to be regularly emptied.

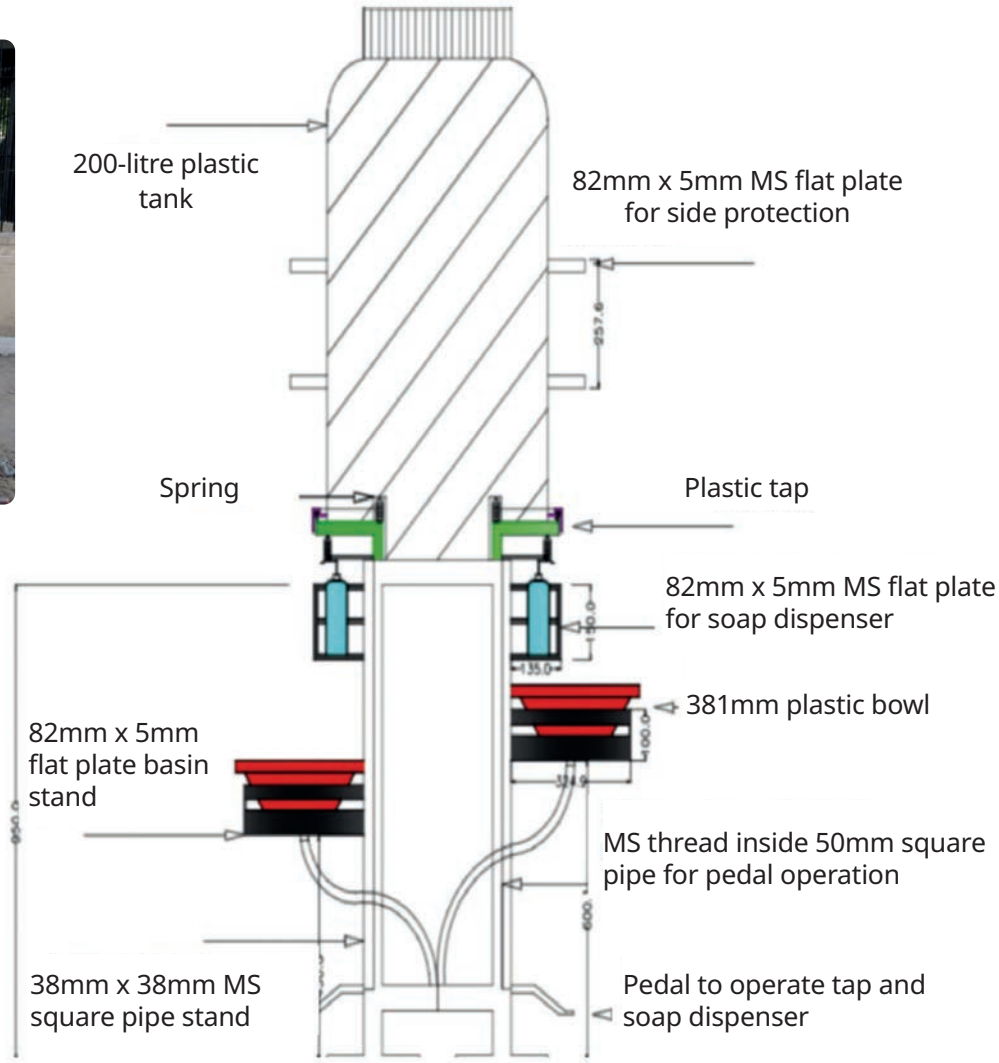
Sierra Leone

WaterAid/Sierra Leone

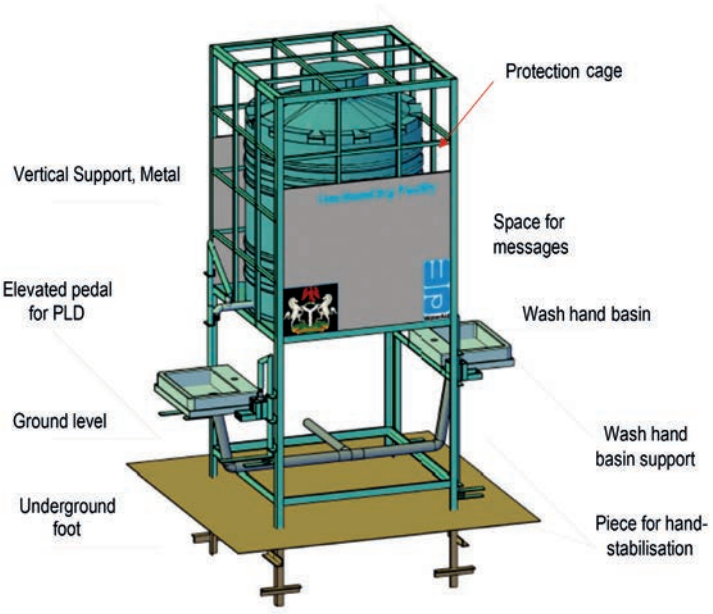
▶ Hands-free design with 500 litre plastic tank and tap.

Pakistan

WaterAid/Pakistan



Nigeria



Malawi

▼ A nursing and midwife officer washes her hands at a healthcare facility in Malawi.

▼ Handwashing facility in Malawi.

2. Handwashing facility – foot-operated for two or more users

Summary

This section includes examples from Pakistan, Liberia and Bangladesh.

General description

A water tank with pipe connects to multiple basins/sinks.

Target locations

Community centres, healthcare facilities, quarantine centres, schools, government offices, religious centres and public places.

◀ Group of men washing their hands in Pakistan at the Mardan medical complex.

Pakistan

Description

This facility consists of two steel frames welded together, one supporting a metal sheet with sinks sunk into it, one to hold a water tank. Soap dispensers can sit next to the sinks. Pipes are then installed from the water tank to the taps and the 200 litre water tank can then be filled either manually or connected to the mains water supply.

A drainage pipe is connected to all sinks to drain out greywater to a nearby drain. If no drain is available, then a soak-pit is recommended. As these handwashing facilities were installed very early in the response to COVID-19, normal taps were used, therefore this is not a hands-free facility.

General design feature

The metal frames for sinks and the water tank are fabricated from square pipe (25 x 25mm). The sink stand is 4.9 metres long and 609mm wide. Sinks are spaced to allow a 1 metre distance between users.

A metal sheet of thickness 16 standard wire gauge (SWG) is installed on top of the metal frame and the sink sizes (500 x 430mm) are cut so the sinks can be fitted into the metal sheet. It is then welded on to a frame with six legs, bringing it to 914–1,219mm in height.

◀ Handwashing facility being fabricated.

Advantages	Disadvantages
● Can be easily disassembled and moved to another place. ● Simple design and can be easily fabricated.	● Needs periodic O&M.

Liberia

Description

This is a metal frame foot paddle handwashing facility produced by WaterAid Liberia and our partner Community Development Services. The single tap and double tap cost around 320GBP and 400GBP to produce locally. To wash your hands, you step on a foot paddle and the pedal faucet opens to allow water to flow.

▲▼ Double basin handwashing facility with foot paddle.

O&M

The water supply part of the facility is made of a barrel and unplasticised polyvinyl chloride (uPVC) pipes and has a joint couple to allow for easy assembly and dismantling of the facility.

The wastewater pipe is connected to a soak-away that drains water directly into the ground. Where wastewater pipes cannot be connected to a soak-away due to a concrete floor, it is connected to another 75 litre container that's removed when it is full. This is the same size as the water supply tank, which means when the water supply runs out the wastewater container is full.

Maintenance is minimal and consists of cleaning the water supply and wastewater containers daily with soap/detergents. The water supply is then filled with water or chlorinated water. If handled well, the barrel, uPVC pipes and springs can last up to two years before replacement, while the metal frame foot paddle handwashing facility has an estimated five- to ten-year lifespan.

Advantages	Disadvantages
● Easy maintenance. ● Easy assembly and dismantling. ● Long life span.	● Where a 90-litre wastewater container must be used due to concrete ground, it is heavy to carry away.

3. Handwashing facility with large overhead tank feeding multiple taps

Summary

This section includes examples from Eswatini and Rwanda.

General description

A large overhead tank (1,000 litres plus) which then feeds into multiple taps. This is a higher-cost, permanent installation.

Target locations

Community centres, healthcare facilities, quarantine centres, schools, government offices, religious centres and public places.

Installation/repairs

All materials used to construct this handwashing facility are procured locally, therefore spare parts are readily available. The stand is steel and the taps are standard household taps, often made of brass.

This concrete facility is incredibly durable and also eliminates the risk of theft of the plumbing materials as these are located inside the concrete tank. Soap is added to the container so that soapy water comes out of the taps; this means the water is less likely to be taken for personal use. The cost of the unit is 2,796GBP. The cost of refilling the 5,000 litre water tanks is 18GBP.

Eswatini

Description

This hands-free facility allows up to four people to wash their hands at once, with a reasonable distance between users. The water flows from the 5,000-litre tank into the small concrete storage tank that then feeds four taps.

The storage tank is closed to avoid dust and debris getting into it. This design also regulates water pressure, reducing wastage. This is especially important in the rural areas where the stations are being used. Since there is no local water source the stations use tanks, mounted on three-metre metal stands. These are refilled by the project owner every three months.

▶ A group of people washing their hands at a newly installed handwashing facility in Eswatini.

Advantages	Disadvantages
● Can be used in rural areas where there is no water source. ● Cost effective, low pressure option for handwashing under running water. ● Durable and affordable.	● Chance of cross-contamination through touching the tap (the team is currently working to design a hands-free option).

Rwanda

Description

This handwashing facility is constructed with durable materials to ensure sustainability. Each facility has six water taps allowing six people to wash their hands at the same time.

These are inclusive and can easily be used by children as taps are fixed at different levels and an additional tap design has been developed for people with disabilities.

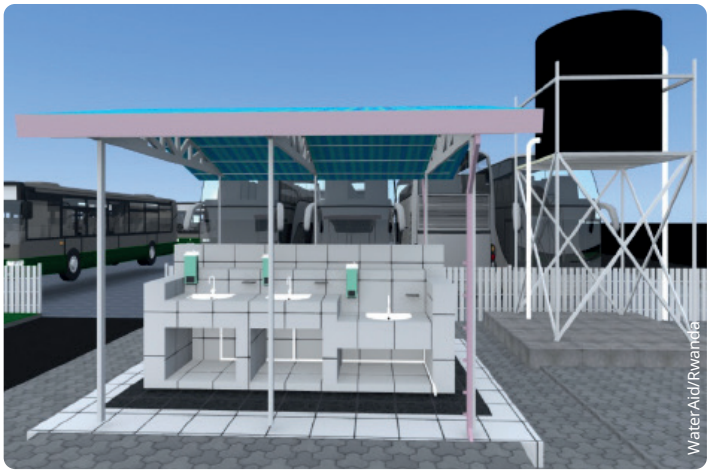
General design features

These facilities use water piped via a storage tank or from a rainwater harvesting system, to ensure a reliable supply.

The stand design has taps one metre apart to allow for physical distancing.

The facilities are fitted with liquid soap dispensers and a sensor tap, using electricity to ensure a hands-free mechanism, or lever-arm taps for those facilities where users do not have electric power. Basins are made of tiles for easy cleaning, and greywater is drained to well-protected soak-pits.

▲ Rainwater harvesting is being used for a handwashing facility for a school in Rusekera.



▲ Design of a handwashing facility to be installed at bus stops.

Advantages	Disadvantages
● Facilities are permanent and sustainable. ● Six people can wash their hands at once, which saves time queueing. ● Facilities are connected to a water scheme, which ensures reliable water supply. ● Made of locally available and affordable materials. ● Design for bus station includes a roof, which will encourage people to wash hands even when raining.	● Designs with sensor (electric) taps are not feasible in areas without electricity. ● Needs to be properly managed to prevent damage to facilities.

4. Handwashing facility connected to piped water supply

Summary

This section includes examples from Pakistan and Bangladesh.

General description

These handwashing facilities include multiple basins or sinks that are connected to an existing (or extended) piped water supply.

Target locations

Community centres, healthcare facilities, quarantine centres, schools, government offices, religious centres and public places.

Pakistan

▲ Ceramic basin handwashing facility in Pakistan.

Bangladesh

▲ Wall-mounted pipe system – unit cost 77GBP.

Advantages	Disadvantages
● Facilities are permanent and sustainable. ● Facilities are connected to a water scheme, which ensures reliable water supply. ● Made of locally available and affordable materials. ● Safe disposal of wastewater.	● Materials might not be suitable for outside conditions. ● Not accessible to people with disabilities and small children.

For details, refer to WaterAid Bangladesh *Technological options for handwashing station*.[28]

5. Adaptation for users with disabilities

Summary

This section includes an example from Zambia.

General description

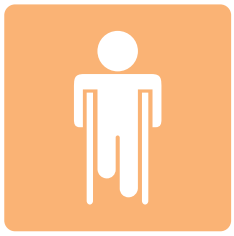
A hands-free device which is adjustable in height and can include a ramp, which allows for easy access by people using wheelchairs.

Target locations

Community centres, care homes, healthcare facilities, quarantine centres, schools, government offices, religious centres and public places.

Considerations for inclusivity

The path to the handwashing facility should be accessible, obstacle free, non-slip and include markings (see **WaterAid's Compendium of accessible technologies**, page 3).



Zambia

Description

This hands-free facility is pedal-operated by either plates for the knees or pedals for the foot, which dispense water, soap and sanitiser. Tissues are then dispensed for drying hands. The facility comes with two 20-litre waste buckets for used tissues and greywater.

The facility is equipped with an 80-litre supply tank and the water supply is manually topped up, although it can have a permanent connection. The stand is designed using 20mm steel tubes welded together and can accommodate most 500ml bottles of handwashing soap.

▶ Handwashing facilities being launched at Home of Happiness – a children's care home for children with disabilities.

Installation/repair

This facility is easily maintained, although it is recommended to be moved into a lockable room at the end of the day to prevent theft.

The material is very durable and the bolts and nuts for connection are available in most hardware stores, even in rural districts, while buckets are easily found in most communities.

It is quite simple to repair: those who repair bicycles and oxcarts will be able to fix the equipment easily and additional training will also be provided to locals on how to repair the facilities. The cost of this facility is around 110GBP.

Accessibility

The design can be partially or fully inclusive and can be used by people using wheelchairs and people with physical disabilities. It comes with signage/instructions on how to use the facility.

The model for children is adjustable to allow for different heights. Another model includes a ramp to assist those who need it.

▲ Accessible handwashing facilities at Home of Happiness.

▶ Former President of Zambia, Dr Kenneth Kaunda, washing his hands.

Advantages	Disadvantages
• Inclusive and universal. • Can be used for both handwashing with soap and sanitising. • Easy to maintain. • Can be installed in various areas because it is mobile. • Easy to refill with water.	• Not suitable for mass handwashing. • Since manual refilling of the water tank is needed, this can result in the facility not having water.

PART C: Technical details, protocols, and monitoring tools

1. Details of hands-free mechanisms

The COVID-19 response triggered renewed interest and innovation in designing handwashing facilities that can be operated without using hands in order to prevent cross-contamination.

Part B shows photos of some of the pedal-operated designs that have been installed by WaterAid. The purpose of this section is to provide further technical details for designers detailing how the mechanisms work.

A brief description is also provided of two alternatives: taps with a long-lever arm (which can be opened/closed using the forearm) and contactless taps using an automatic sensor.

1.1 Foot-operated pedals

The pedal-operating mechanism will depend on which type of taps are installed. Taps may be opened and closed using a pull, push or rotational motion as shown in these images.

Four examples are presented on the following pages. Figure 3 is for push taps; Figures 4 and 5 for pull-up taps and Figure 6 for rotating taps. In each case the designer should consider:

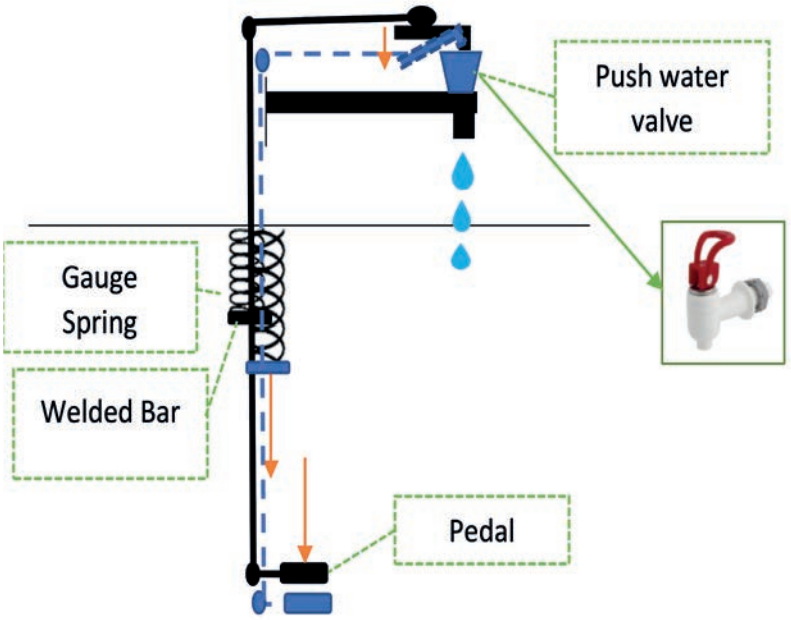
- Ensuring the tap closes when the pedal is released (this is more difficult to achieve for rotational taps).
- Minimising maintenance requirements. The spring is likely to be the weakest component, so high-quality springs should be used. An alternative is to use a steel cable rather than a rigid lever mechanism (Figure 7).
- Ensuring the appropriate range of movement because a large force may be accidentally exerted with the foot, so a limiting bar, rubber pad or spot weld should be used to restrict the motion of the tap.

Pull-up taps

Rotational lever/handle

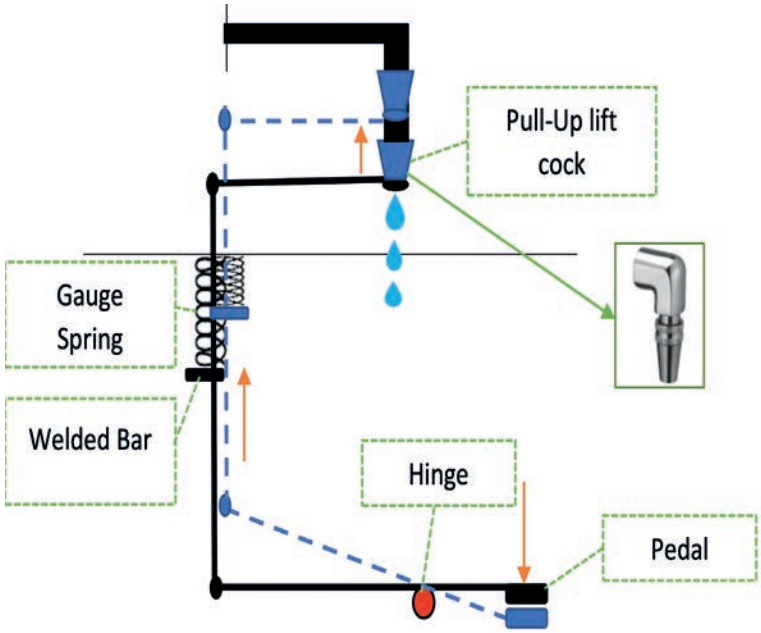
Push taps

Figure 3: Pedal arrangement to operate push taps and soap dispenser.



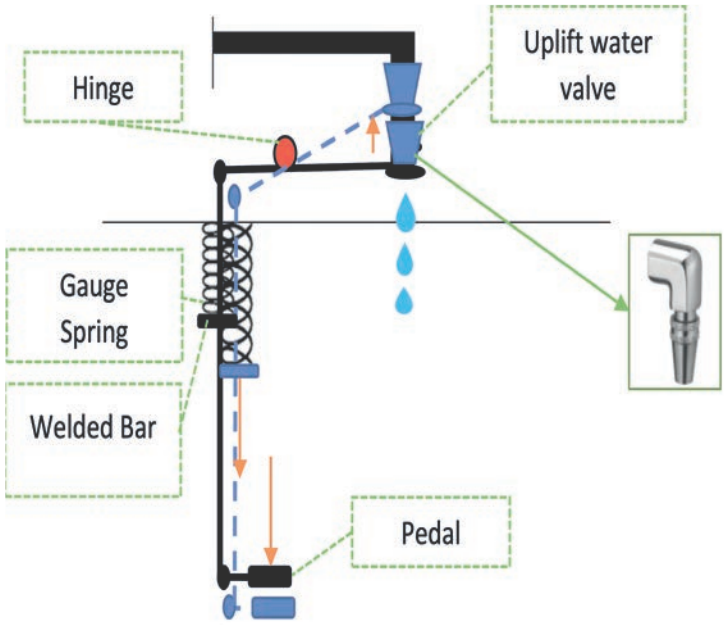
▲ Direct action pedal arrangement for soap and water dispenser.

Figure 4: Pedal arrangement for pull-up taps.



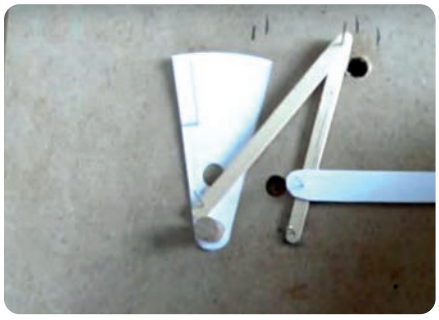
▲ A pedal arrangement working in an upward direction. Note the lift cock is getting a direct upward push in order to dispense water.

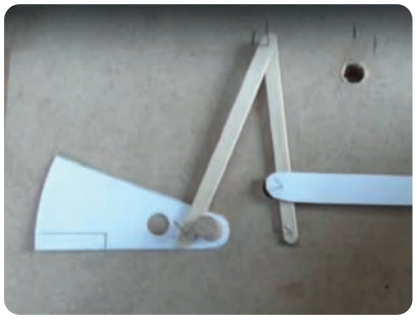
Figure 5: Pedal arrangement for pull-up taps to operate lift cock by lever action.



▲ A pedal working in a downward direction, but the lift cock is receiving an upward push through the lever action.

Figure 6: Pedal arrangement for rotation to operate lever type bib cock.



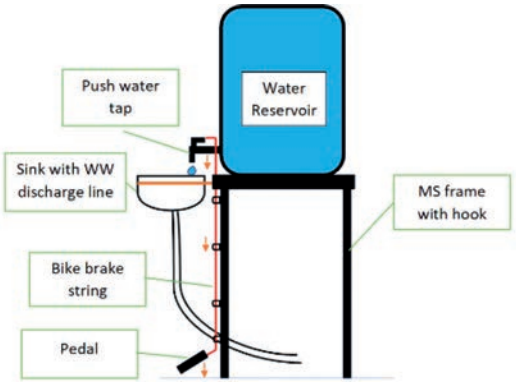


▲ Transition mechanism to translate linear movement to rotation (see this video for more details: youtube.com/watch?v=09jZsBDHalE).

▶ A pedal working in a downward direction, but the lever type tap is rotated using a transition mechanism.

Another option for a foot-operated pedal, is to operate the tap or soap dispenser using a small steel cable (e.g. bike brake cable) rather than using a rigid lever mechanism. This may require less maintenance if the cable is of good quality and protected against corrosion. This is illustrated in Figure 7.

Figure 7: Pedal arrangement using bike brake cable to dispense water and soap (WaterAid Malawi).



▶ Pedals which operate soap and water dispensers.

Note: most of these pedal-operated handwashing facilities broke quickly. Hence, after few months, these facilities also added lever-arm taps to continue functioning.

1.2 Lever-arm taps

One of the popular hands-free mechanisms that already exists, particularly in healthcare facilities, is the long lever-arm tap. These can be operated by the elbow or forearm without using fingers. In this way, existing handwashing facilities can easily be upgraded to hands-free by changing the tap rather than installing a completely new (and more complex) device (Figure 8).

Figure 8: Different types of lever-arm sink taps.

1.3 Sensor-based technology

Sensor-based taps contain an LED (light-emitting diode) which continuously emits an infrared signal. When a solid object, such as a hand, enters the LED's range, it reflects the infrared signal back to a receiving diode which then opens a solenoid valve and allows water to flow through the tap. As soon as the object (hand) is removed, the solenoid valve closes and the tap is turned off (or alternatively it can be set to open for a set period of time). Similarly, such a sensor can also be used to operate a soap dispenser.

While sensor-based taps are normally associated with high-income settings because of the cost, they could be appropriate in some high-use handwashing facilities, such as public toilets in cities. They provide true contactless operation, reduce wastage of water and require less maintenance than mechanically-operated taps. One disadvantage is that they require a continual power supply, so it is recommended that they are installed with rechargeable batteries to ensure they continue to function during any power failures. Another disadvantage is that they can occasionally be triggered by false signals, and will be much harder to repair locally.

2. Handwashing facilities linked to rainwater harvesting

Rainwater harvesting can be used in some locations to provide a water supply for the handwashing facility for part of the year.

Advantages	Disadvantages
• Reduces cost and effort of regularly refilling the container. • Reduces water consumption in water-scarce areas. • A larger system can provide water for other uses.	• Increases cost of the handwashing facility. • Not suitable where a handwashing facility is installed a long distance from a building. • Not suitable in locations with a very short rainy season.

The design of a rainwater harvesting system for handwashing is shown in the figure below. Galvanised iron sheets (GI), aluminium, clay tiles or concrete can be used for roofing. Waterproof plastic sheeting may be added for thatch roofs.

A gutter is provided along the edge of the roof for collection of water. It should be fixed with a gentle slope towards the down pipe, which helps a free flow of water to the storage tank. The gutter may be made up of PVC pipe, GI sheet, wood, bamboo or any other locally available material.

The down pipe should be at least 100mm diameter and be provided with a wire screen at the inlet to prevent large particles, dry leaves and other debris from entering. Add a lock valve to control water collection. Connect a 300 to 500-litre or higher (demand specific) water storage tank to the system to collect rainwater. Make a steel frame and set the tank on top of it. Finally connect the tank to the taps.

▼ An example of a rainwater harvesting system for handwashing from Bangladesh.

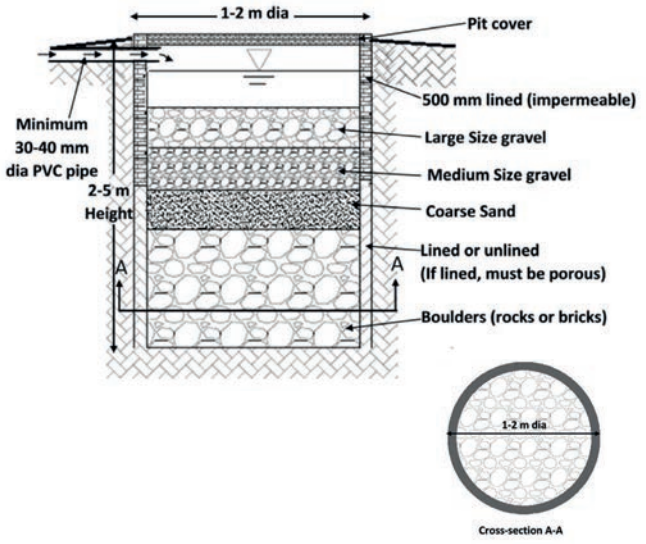
3. Soak-pit design

Greywater from a handwashing facility should be safely disposed of by connecting the facility to a nearby drainage system or a covered soak-pit in order to prevent direct human contact (though it is considered low risk) and avoid stagnant water around the facility – which would make it unpleasant for users and could act as a breeding ground for mosquitoes and other vectors. A soak-pit is an excavation in the ground that is back-filled with porous materials that allows the greywater to filter into the ground. It is a relatively quick and cheap solution, but is not suitable in all conditions.

Design considerations

- Availability of space: usually the size of the soak-pit varies from 2m to 5m in depth and 1m to 2m in diameter.
- Distance from the handwashing facility: a drainage connection with appropriate slope from the handwashing facility is required.
- Amount of greywater: amount of greywater for handwashing stations depends on the number of users – assume one litre per person per use.
- Soil type, infiltration and absorption capacity: functionality of a soak-pit depends primarily on the permeability of the soil. Coarse and medium sand and soil have the highest permeability for wastewater (50mm/day): clay soil is not suitable for a soak-pit. The wastewater permeability is reduced to 33mm/day, 24mm/day, 18mm/day and 8mm/day for fine and loamy sand; sandy loam and loam; loam, porous silt loam; silty clay loam and clay loam respectively.[23]
- Moreover, the soil pores may become clogged with time and this can reduce the infiltration capacity of a particular soak-pit. Seasonal variations in the water table can also affect the performance greatly, and a soak-pit which works perfectly in the dry season may overflow at other times of year.

Figure 9



Advantages	Disadvantages
• Low cost. • Easy and relatively quick to construct. • Uses local materials.	• Not suitable in the following situations: - Surfaced urban areas. - Areas prone to flooding or with a high-water table. The base of the soak-pit should be at least 1.5m above the water table. - Close to waterpoints, with a minimum distance required of 30m. - Clay soils. • May become clogged and eventually saturated, depending on greywater quality.

Construction procedure

The size of a soak-pit depends on the volume of liquid to be disposed of and the type of soil in which the pit is excavated. The size and depth of the soak-pit can be fixed depending on the available space.

It may be calculated using the following process:

1. Required pit area = daily wastewater flow/soil infiltration rate.
2. Choose the diameter of the soak-pit.
3. Calculate depth of pit required to dispose of all greywater = all pit surface area (m2)/(π x diameter).
4. Add 0.5m for lined depth.

Once the depth is fixed, choose a clear space as near as possible to the handwashing facility and dig a pit. Put a layer of large-sized gravel or brick at the bottom of the pit. Fill other layers with a mixture of large-sized gravel and sand up to the brim of the pit so that water can easily flow.

Connect a PVC pipe from the handwashing facility outlet. The pipe should be on a slope so that the wastewater flows easily. Finally, cover the pit and pipe with sand or soil. The top 0.5m of any pit must have a sealed lining in order to prevent the infiltration of rainwater.

Maintenance

The soak-pit should be checked periodically to ensure there is no overflow or damage.

Eventually it will be necessary to dig out the soak-pit, remove materials, wash them and refill the pit. This can be avoided, or the frequency of having to do it reduced, by fitting a filter or a simple grease trap at the inlet to the soak-pit, which is much easier to clean and change rather than needing to dig out the pit itself (see the WEDC sanitation report[23] for further details).

▲ Margaret, a resident of Kandeke Community, Ndola City, Zambia, shows the soak-pit for on-site sanitation at her house.

▲ Example of a soak-pit.

4. Cleaning and disinfection protocol

Public handwashing facilities should be cleaned and disinfected regularly to reduce the risk of cross-contamination, ensure safety, and ensure that facilities remain accessible and pleasurable to use. During the COVID-19 pandemic WHO issued specific guidance for cleaning and disinfecting surfaces.[24] In healthcare facilities, additional IPC procedures will apply and should be followed as per national protocols.

Frequency of cleaning

The basin and tap should be cleaned and disinfected at least once a day and for handwashing facilities in high-use, this should be increased to two or more times per day. The surrounding environment should be checked each time and cleaned as needed. The water tank will also need periodically emptying and cleaning depending on the sediment load in the water.

Procedure for cleaning and disinfection

Both cleaning and disinfection are required. Cleaning involves using water, soap/soapy water/detergent and some form of mechanical action (e.g. brushing or scrubbing) to remove and reduce dirt. This helps to significantly reduce pathogen load on contaminated and highly touched surfaces and is an essential first step in any disinfection process.

Disinfection involves applying chemical disinfectants such as chlorine or ethanol to kill any remaining pathogens. The disinfectant concentration and contact time are both critical for effective surface disinfection. WHO recommends[24] using ethanol (at least 70% concentration) or a 0.1% (1,000ppm) chlorine solution and a minimum contact time of one minute.

Note that 0.1% is a conservative concentration that will inactivate the vast majority of pathogens. While higher concentrations can be used (and may be required in healthcare settings), care should be taken, as high concentrations of chlorine can lead to metal corrosion and irritate the skin.

Safety precautions

Cleaners should wear appropriate PPE and be trained to use it safely.

- Chlorine is very corrosive, so contact with the skin and eyes must be prevented. In non-healthcare settings where disinfectants are being prepared and used, the minimum recommended PPE is rubber gloves, impermeable aprons and closed shoes. Eye protection may also be needed to protect against chemicals or if there is a risk of splashing.
- Chlorine is also a strong oxidising agent, so avoid inhaling the vapour and dust when opening a container, and never use a damp spoon to take chlorine powder from a container.
- Chlorine is unstable when exposed to air, heat, light or metal and should be stored in sealed containers in well-ventilated areas out of direct sunlight. Non-metal containers must be used for both storage and dilution.
- Chlorine products must be stored in locations out of the reach of children.
- Spraying disinfectants in any circumstances is not recommended by WHO.

Preparing chlorine solutions

Apart from health and safety precautions, additional considerations when preparing chlorine solutions are:

- A chlorine solution should be well-mixed using a non-metallic stirrer.
- A fresh chlorine solution should be prepared each day, since the concentration of chlorine will degrade with time.
- Adjustments should be made where locally available chlorine products have been stored in the shop for a long time and may have a lower concentration than stated by the manufacturer at time of purchase

WaterAid/Basile Ouedraogo

Guidelines for preparation of 0.1% (1,000ppm) of disinfectant using commonly found chlorine products are shown in the table below.

Product	Available chlorine	0.1% solution
High-test calcium hypochlorite (HTH)	70%	1.4g (1/3tsp) to 1 litre water
NaDCC (sodium dichloroisocyanurate) powder	60%	1.7g (1 tablet = 1.5g) to 1 litre water
Calcium hypochlorite 'bleaching powder'	35%	2.8g (2/3tsp) to 1 litre water
Sodium hypochlorite (liquid bleach)	5%	1-part bleach to 49 parts water (e.g. mix 10ml of bleach to 490ml of water and stir for 10 seconds and cover the lid)

5. General assessment and routine monitoring checklists – handwashing facilities

Following installation, all HWFs should be monitored regularly for accessibility, functionality and use, and to see if they need maintenance or repair.

These checklists, below, are adapted from WaterAid's standard checklists and are intended to assess public handwashing facilities installed by any partners. Checks should be conducted at the installation stage and then every three-four months where possible.

The initial monitoring may be done by whoever sets up the project but ultimately it becomes the responsibility of the institution or service provider responsible for the facility. These checks may need to be done more frequently depending on the location. For example, in a HCF and schools the functionality of a handwashing facility should be checked daily or weekly.

Most questions are answered based on observation only, however a few will need to be asked. This is noted in the question itself. The answers are important not only for monitoring data but to highlight where any follow-up is needed. Completing these checklists should take about 25 minutes.

5.1 General information checklist: Visit the handwashing facility (HWF) and fill in the required information about the site, below:

Handwashing facility – general information checklist	
Name (name of HWF/brief description)	
Setting	☐ Public ☐ Communal ☐ Institutional
Type of HWF: Permanent = static, concrete-based, connected to direct water supply Semi-permanent = movable, large refillable tanks Temporary = mobile, could be using a bucket or kettle, for example	☐ Fixed – permanent ☐ Fixed – semi-permanent ☐ Mobile – temporary ☐ Other
Is the facility temporary?	☐ Yes ☐ No
Location (where is it?)	
Photo	
Link with location (e.g. community, school, healthcare facility, workplace, public place)	

Handwashing facility – general information checklist *(continued)*	
Country, district, community/town/city	
Project code	
Date of original installation	
New or renovated HWF?	☐ New ☐ Renovated
Have you conducted a safety and accessibility audit (mWater)?	☐ Yes ☐ No
Is HWF accessible to those with limited mobility or vision?	☐ Yes ☐ No (if No, please answer the question below)
Why is this HWF not accessible to people with disabilities?	☐ There is no clear path to the handwashing facility ☐ There is no age-appropriate handrail ☐ The tap and soap are not reachable from a seated position ☐ The tap cannot be operated with a closed fist or minimal effort ☐ Other (please specify)
Who is managing the HWF?	
Date of removal (only applies to temporary HWF)	

5.2 A service level checklist: Use this for routine monitoring

Service level checklist	
1. General details	
Date of monitoring visit	DD/MM/YYYY
Link this survey with handwashing facility site	mWater ID of site
2. Functionality	
Is handwashing facility functional?	☐ Fully functional (facility in operation, all taps have water and soap) ☐ Partially functional (some taps have water and soap), some taps not working (no water, no soap, broken) ☐ Not functional (no taps have water and soap), taps broken, or other parts of the facility broken).

Service level checklist *(continued)*	
1. General details	
Date of monitoring visit	DD/MM/YYYY
Link survey with handwashing facility site	mWater ID of site
2. Functionality	
Is handwashing facility functional?	☐ Fully functional (facility in operation, all taps have water and soap) ☐ Partially functional (some taps have water and soap), some taps not working (no water, no soap, broken) ☐ Not functional (no taps have water and soap), taps broken, or other parts of the facility broken).
General condition of the facility	☐ Good – no repairs needed ☐ Fair – facility is usable but minor repairs are needed ☐ Poor – major repairs needed to make facility usable ☐ Don't know – could not observe or determine condition ☐ Abandoned/not found – facility is no longer in use or could not be found at the expected location
Does the handwashing facility need any repair and maintenance?	☐ Yes ☐ No
If repairs are needed, please select all that apply	☐ Water storage tank: replace/repair ☐ Tank stand: replace/repair ☐ Plumbing (clean water): replace/repair ☐ Tap: replace/repair ☐ Soap dispenser: replace/repair ☐ Basin/sink: replace/repair ☐ Pedal mechanism: replace/repair ☐ Plumbing (greywater): replace/repair ☐ Waste bucket/drain/soak-pit: replace/repair ☐ Pathway to facility: replace/repair
Please add detailed descriptions of any repairs needed	
Is water available?	☐ Yes ☐ No
If yes, is water available from all taps?	☐ All taps ☐ Most taps ☐ Some taps
If yes, is the water supply reliable (e.g. 24-hour piped water connection or local water storage container)? Please ask.	☐ Yes ☐ No

Service level checklist *(continued)*	
Are there sufficient taps to accommodate users during peak demand? Peak demand means busy hours in institutions; compare population to number of taps	☐ Yes ☐ No
Is wastewater going on to the floor or managed?	☐ Piped (off-premises) ☐ Connected to local soak-pit ☐ Connected to open drain ☐ Goes into waste bucket ☐ No provision for wastewater
Is soap or an alternative cleaner available?	☐ Soap ☐ Alcohol rub ☐ Ash ☐ No cleaning agent ☐ Don't know
If soap or cleaner is available, is it available for all taps?	☐ All taps have soap ☐ All taps have an alternative cleaner ☐ Most taps have soap or cleaner
3. Accessibility	
Select all options that are true	☐ Is the path to the facility clear? ☐ Is the ramp at the right angle and is the handrail functional? ☐ Are the accessibility features (e.g. low basin, accessible taps) functional? ☐ Is it accessible and safe for children, people with disabilities and elderly people?
4. Operation and maintenance	
Are long-term operations and maintenance plans in place? Please ask	☐ Yes ☐ No
Are there daily maintenance mechanisms in place (such as refilling water and soap)? Please ask	☐ Yes ☐ No
Ask if there is a dedicated body which maintains and operates the HWF?	☐ Yes ☐ No
If yes, who? Please ask.	☐ Committee ☐ User network ☐ School ☐ Healthcare facility ☐ Workplace ☐ Other (specify)
Is there a regular cleaning plan or rota? Please ask.	☐ Yes ☐ No

Service level checklist *(continued)*	
5. Cleanliness and appearance	
Do the handwashing facilities appear clean and attractive?	☐ Clean ☐ Somewhat clean ☐ Somewhat messy ☐ Dirty/messy ☐ Other
Is the basin or tap obviously dirty?	☐ Yes ☐ No
Is there stagnant water around the base?	☐ Yes ☐ No
Is the water quality acceptable? Check for obvious smells or high turbidity	☐ Yes ☐ No
Are there any visual cues, reminders and attractive nudges in the facilities?	☐ Yes ☐ No
Take a photo of the handwashing facility. Capture the full handwashing facility along with soap and water (if available) and visual cues/nudges (if available)	
6. Actions	
If this is a follow-up assessment, have the actions from the previous monitoring visit been addressed?	☐ Yes ☐ No ☐ N/A
If no, what actions are required?	**Action 1:** **Action 2:** **Action 3:** **Action 4:**

6. Accessibility and safety audit checklists for handwashing facilities

Adapted from WaterAid, Water Engineering and Development Centre (WEDC) and Christian Blind Mission (CBM)

The purpose of these checklists is to:

- Examine how user-friendly, inclusive and accessible handwashing facilities are, with a focus on people with disabilities, older users, younger users, caregivers, and considering gender requirements and the needs of women and girls.
- Identify which features make handwashing easy and which features make it difficult for different people.
- Identify any safety concerns around the location or use of the facility.
- Make suggestions for changes/ improvements based on any difficulties or safety issues identified.
- Assess existing infrastructure (temporary or permanent) to understand what adaptations can be made to overcome any barriers and ensure greater access.
- Involve users in the design/improvement of facilities.

Before you start

- Consult national guidelines for handwashing facilities, as well as the accessibility and safety standards of your location, where available. Compare these to WaterAid's or other standards and work from the one which provides the best accessibility and quality.
- Read WaterAid's Accessibility and safety audit of water and sanitation facilities.

Building your audit team

Accessibility and safety audits are most effective when carried out by a team that includes users – including people with disabilities, older people, women and caregivers – alongside designers and planners or decision makers, so that the usability can be jointly understood and solutions discussed.

Your user team should be diverse. Make sure you include a variety of ages, genders and people with different lived experiences of disability. Include people who rely on carers for support and their carers.

As you put together your mixed group to do this audit, also think about the stakeholders that will help to ensure the audit is detailed and its outcomes are able to be actioned. This includes local government or utility stakeholders, local contractors responsible for construction or adaptation and maintenance officials. Be prepared to break into smaller audit teams (or do the audit at different times with different groups) so that all people can participate.

Consider what you need to make users more able to participate – for example, a chair for those who cannot stand for long, a women-only audit .

Also be mindful that some people may feel more able to speak up in smaller groups or prefer to feedback one-to-one rather than in a group setting.

While existing standards are designed to be comprehensive and inclusive, this process will promote greater representation, better reflect user experience, and help identify potential gaps in the design, implementation or delivery. The questions below are to help you ensure that people with different disabilities are included in the audit team.[ix]

Ask the question below and then read out the four answer categories for each question	No, no difficulty	Yes, some difficulty	Yes, a lot of difficulty	Cannot do it at all
Do you have difficulty seeing, even if wearing glasses?				
Do you have difficulty hearing, even if using a hearing aid?				
Do you have difficulty walking or climbing steps?				
Do you have difficulty remembering or concentrating?				
Do you have difficulty with self-care such as washing all over or dressing?				
Using your usual language, do you have difficulty communicating, for example understanding or being understood by others?				

Make up of the audit team and site information

Armed with the above information, note down the general details of your team and site information.

1. Gender balance of assessment group: _____
2. Ages of assessment group: _____
3. Roles, health status and impairment types represented in assessment group:

   _____
4. Location/address of facility: _____
5. Service area (i.e. market place, bus station, healthcare facility, school etc):[x]

   _____

ix. Please note, those who experience a lot of difficulty or cannot do something at all can be classified as having a disability using these Washington Group Questions. People who experience some difficulty aren't classified as having a disability but it is still important to capture their experiences. Please be sensitive in your language and avoid labelling anyone.

x. Note that audit information for a school latrine, market centre latrine and waterpoint assessments are available separately. More details at https://washmatters.wateraid.org/publications/accessibility-and-safety-audits.

Make up of the audit team and site information *(continued)*

6. Name of constructing organisation: _____

7. Ownership and management details. Private or public? Who owns the facility and assets? Who is responsible for daily maintenance? Who is responsible for major repair or changes?

   _____

   _____

8. Geographic location – rural, urban, peri-urban, village, farm, flat, hilly:

   _____

9. Type of handwashing facility plus general description: number of taps, materials used, nature of facility (i.e. permanent, semi-permanent, piped water or tank), soap (liquid dispenser or bar soap), drainage (into sewer, soak-pit or on to street):

   _____

Allocating roles in the audit team

It is helpful to appoint a coordinator and then assign volunteers from your assessment group to perform specific tasks. However not all people will be in a position to take on a task by themselves, so ensure that in allocating roles you do not take away people's ability to participate in the audit. The tasks are:

Task	Equipment needed
Coordinator	Notebook and pen
Interviewer and note-taker	Notebook and pen, or visual or recording materials as appropriate
Drawer of diagrams (if there is an engineer on the team, this role can be performed by them)	Notebook and pen
Measurer	Tape measure
Photographer	Camera (phone or otherwise)

Beginning your accessibility and safety audit for handwashing facilities

Different users now attempt to get to and use the handwashing stations. This is broken down into an assessment of different points on the handwashing journey. The 'checklists' below provide details of the kind of features to look for and aspects to focus on. Please add things that are missing and relevant for context, or delete those that do not apply.

The coordinator or interviewer should read out the questions and then allow each of the group members to consider and express their view about the features/issue in question. Make a note of any features that are difficult to use, any measurements that are different to national or suggested standards, and any points the participants observe to be an obstacle that needs addressing.

Avoid generalised descriptions such as 'inaccessible' or 'not user friendly'. Instead be specific about the exact problem: e.g. 'Door is too narrow', 'path is uneven', 'inside is too dark'.

Note down any solutions being proposed or immediate changes that are discussed.

Now complete the following checklists which together make up your accessibility and safety audit.

Checklist 1: Getting there

Record your observations and findings based on the following questions:

- Distance from a common point – i.e. marketplace, bus stand, village or town square
- Is there visible and easy-to-understand signage to point users to handwashing facilities? Are notices in pictorial form for non-readers and people who speak a different language? Are directions simple to follow?
- Is the path wide enough for the primary user to travel along, including those needing assistance (recommended minimum width is 90cm)?
- Is the path level and firm, and free from trip hazards? Are there any drops, trenches or other safety hazards next to the path that are potentially dangerous to those with visual or other impairments?
- Is the path surface slippery when either dry or wet?
- Are there obstacles that block the path, especially for visually impaired people?
- Is there any tactile paving, contrasting colour lines or such to help guide the way?
- Are slopes too steep for wheelchair users? 1:20 is the ideal gradient for independent use; 1:15 can be acceptable in some circumstances.
- Are there any handrails, especially where there is a gradient?
- Is the path well lit, especially if being used at night? Note: people with hearing impairment need lights in the evening so they can see people coming towards them.
- Are there any parts of the path which make people feel unsafe when using? If so why?

Record observations and findings here (draw, note or take photos to support observations):

What solutions does the group recommend for the challenges identified above?

Checklist 2: At and around the handwashing station

Record your observations and findings based on the following questions:

If there are steps to the handwashing station:

- Are any steps a manageable height (recommended maximum is 15-17cm each step)?
- Are the steps even or uneven, firm or broken, non-slip or slippery?
- Is there a handrail for support (this should be approximately 900mm to 1m high)?
- Is there a ramp? If so, is the gradient minimum 1:20 (ideal) or 1:15 (acceptable)? Are there supporting handrails (approximately 900mm to 1m high)
- Are there contrasting colour lines or other guides to help guide the way?

If the facility is inside an entrance:

- Is it wide enough for the users to enter independently (recommended minimum width is 80cm)
- Is the door easy to open, even by someone lacking strength due to age or impairment?
- Is there a flat platform in front of the door?
- Does the door open inwards or outwards? Doors opening outwards allow more space inside the facility for navigation, but the platform outside must allow for safe opening outwards.
- Is the facility well lit, especially when being used at night?
- Is there enough room for someone using a wheelchair to turn around and exit?
- Is there space for a companion/support person to enter with the primary user?

Around the handwashing station:

- Is the area immediately around the handwashing station even or uneven, firm or broken, non-slip or slippery?
- Are there any drops, trenches or other safety hazards adjacent to the handwashing station?
- Do all users feel safe when using the facility (inside and outside)?
- Are there any particular times of day or night when users feel less safe?

Signage:

- Are there any nationally (or internationally) recognised accessibility signs that indicate the station is usable by people with disabilities (for example, https://hhot.cbm.org/en/card/access-symbols)?
- Is there visible and easy-to-understand signage to point users to the handwashing facilities?
- Are notices in picture form? Picture form is especially useful for people who do not read at all, and those who do not read the local language.
- Is the information easy to follow? If a font is being used, is it of a suitable font size? For all users, is it clear that a) the water is not for drinking and b) how to wash hands?
- Consider how all users might interact with the facility: e.g. if a mirror is used, can those in wheelchairs view?

Checklist 2: At and around the handwashing stations *(continued)*

Record observations and findings here:

What solutions does the group recommend for the challenges identified above?

Checklist 3: Using the handwashing station

Record your observations and findings based on the following questions:

Operation:

- What type of operation is used:
  a. Foot operated
  b. Operated using arm and a lever
  c. Other non-contact
  d. Using traditional taps (with contact)
  e. Other – specify and draw if needed
- Is there sufficient signage demonstrating how to use the tap, especially if it is non-traditional in nature?
- Can the water and soap operating mechanism be easily operated by people with limited strength or manual dexterity (for example, using a closed fist)?
- If it is foot-operated, is there a lever option for people with reduced mobility in the lower body or who are unsteady on their feet?
- Is there a station or basin accessible to those using a wheelchair? Is there a station or basin accessible to children? If so, is the height between the recommended 50-70cm?
- Can everyone reach the tap and operate it independently? What are the functions that help people with visual impairment find and operate the tap/lever?
- What is the height of the soap? Can all reach it independently? For it to be wheelchair accessible, soap or hand sanitiser should be provided at a maximum height of 110cm.
- For older people and others who might be unsteady on their feet, check that they don't need to lean too far forward to reach the tap/soap/basin or push too hard to access the soap or turn the tap on.
- Are there any vertical grab bars around any washbasin? If so, are they strong enough to support a heavy adult? Are they easy to hold (i.e. diameter of 4cm) and suitable height (approximately 80cm off the ground; lower for children)?
- Can all users manoeuvre up to and then away from the basin safely without having to touch uncleaned surfaces (150cm x 150cm space is needed to manoeuvre a wheelchair, for example)?

Checklist 3: Using the handwashing station *(continued)*

Safety:

- Is the floor at the handwashing station well-drained, non-slip and free from obstacles?
- If electricity is used, are all wires, plugs and switches safely installed? Are there any loose wires hanging around?
- If hot and cold water is available, are they clearly marked (including tactile markers)?

Record observations and findings here:

What solutions does the group recommend for the challenges identified above?

The answers to the following checklist should be obtained through focus group discussions or one-to-one interviews with key people such as the facility operator, managers, local authority staff and O&M staff.

Checklist 4: Planning and coordination

Record your observations and findings based on the following questions:

- Who was involved in the initial design and construction of the handwashing station?
- Were people from disability rights, inclusion organisations and other user groups involved in the design (specify the names of groups and who they represent)?
- Is training provided for all personnel, including security and management, on accessibility and safety, including orientation and mobility?
- Do cleaning protocols consider how different users are affected? For example, are all surfaces cleaned including guiding ropes and handrails?
- Are there any concerns from user groups about the current facility in terms of its location, condition, cleanliness or other factors that might hinder its use?

Checklist 4: Planning and coordination *(continued)*

Record observations and findings here:

What solutions does the group recommend for the challenges identified above?

Next steps: prioritise actions

Thinking about the actions identified in all the accessibility and safety audit checklists, can your group solutions be turned into short-term (immediately doable), medium term (require some planning) and long-term (require consultation, planning and resources)? Note them down, below:

Any additional information or comments?

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Acknowledgements

WaterAid and UNICEF are pleased to produce this second edition of the *Technical guide for handwashing facilities in public places and buildings* as a key resource for installing and maintaining public handwashing facilities, and to encourage handwashing in those locations.

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After years of implementing handwashing facilities in public places, WaterAid and UNICEF jointly decided to update the existing guide and produce this second edition. We apologise that there is only space to include a selection of the designs from countries. The second edition was finalised in September 2024.

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We hope this technical guide will be a key reference document for WaterAid, UNICEF and key partners, including governments, to help them decide on the types of handwashing facilities they need for public locations – and the processes to be followed before, during and after installation to ensure their quality and sustainability.

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WaterAid is an international not-for-profit, determined to make clean water, decent toilets and good hygiene normal for everyone, everywhere within a generation. Only by tackling these three essentials in ways that last can people change their lives for good.

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