

**DRAFT ENVIRONMENTAL MANAGEMENT
PLAN (EMP):**

**THE IMPLEMENTATION OF THE COMMUNITY-
LED TOTAL SANITATION (CLTS) PROGRAMME
IN THE INFORMAL SETTLEMENTS OF
WINDHOEK, KHOMAS REGION, NAMIBIA**

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1 INTRODUCTION

1.1 Project Background and Location

To improve the sanitation situation in the informal settlements of Windhoek, the United Nations Children's Fund (UNICEF) has committed to assist the Windhoek Municipal Council (hereinafter referred to as WMC or "The Council" and the Proponent) to roll out a CLTS pilot programme (project) in the informal settlements of Windhoek five constituency councils and the Ministry of Health and Social Services. The CLTS project will be implemented following the successful piloting work in selected blocks in Moses II Garoëb and Samora Machel constituencies. The CLTS programme will allow households to construct their own pit latrines and other dry sanitation technology options in accordance with the standards approved by Council. The pilot programme is targeting about 3,000 informal houses (Project's Terms of Reference (ToR), 2021). The overall objective of the programme is to scale up to other unserved areas around the City of Windhoek.

Since the outbreak of Hepatitis E Virus (HEV) in 2017 and the Coronavirus (COVID-19) disease in 2019, the Council has been receiving donations of dry sanitation technologies from the private sector on a regular basis for installation in the informal settlement areas of Windhoek. The donated toilets are being installed at sites identified either by the Council or by the donor within informal settlements.

Waste management, treatment, handling and disposal facilities and associated activities is listed as an activity that may not be carried out without an Environmental Clearance Certificate (ECC), according to Section 27 of the Environmental Management Act (EMA), No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) regulations. The EIA to be undertaken should consider any impacts that may result from the proposed construction of household pit latrines and other dry sanitation technology options. The establishment of sanitation facilities (household pit latrines) is not clearly defined in the Regulations or listed directly as an "activity". However, given the fact that the associated activities of the proposed project (sanitation facility) fall under waste, this would relate these activities to the following listed activities in the Regulations:

- *2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.*
- *9.2 Any process or activity which requires a permit or license or other form of authorization, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, license or authorization or which requires a*

new permit, license or authorization in terms of a law governing the generation or release of emissions, pollution, effluent or waste.

Therefore, for the approval of the activities associated with the proposed CLTS programme, the Proponent is required to submit an Environmental Assessment Report (EAR) and draft Environmental Management Plan (EMP) to the Department of Environmental Affairs and Forestry (DEAF) at the Ministry of Environment, Forestry and Tourism (MEFT). Once the MEFT evaluates and approves the EAR and EMP, the ECC is then issued by the Environmental Commissioner to The Proponent and the activities associated with the CLTS programme can commence

The proposed CLTS programme targets the Khomasdal, Moses IlGaroëb, Samora Machel, Tobias Hainyeko and Windhoek Rural Constituencies, within the boundaries of the Windhoek Municipal Council (**Figure 1**). The Council's boundaries have been extended to areas as defined in Government Gazette No. 4801, Notice No. 184 of 2011 and it measures 5,142 km².

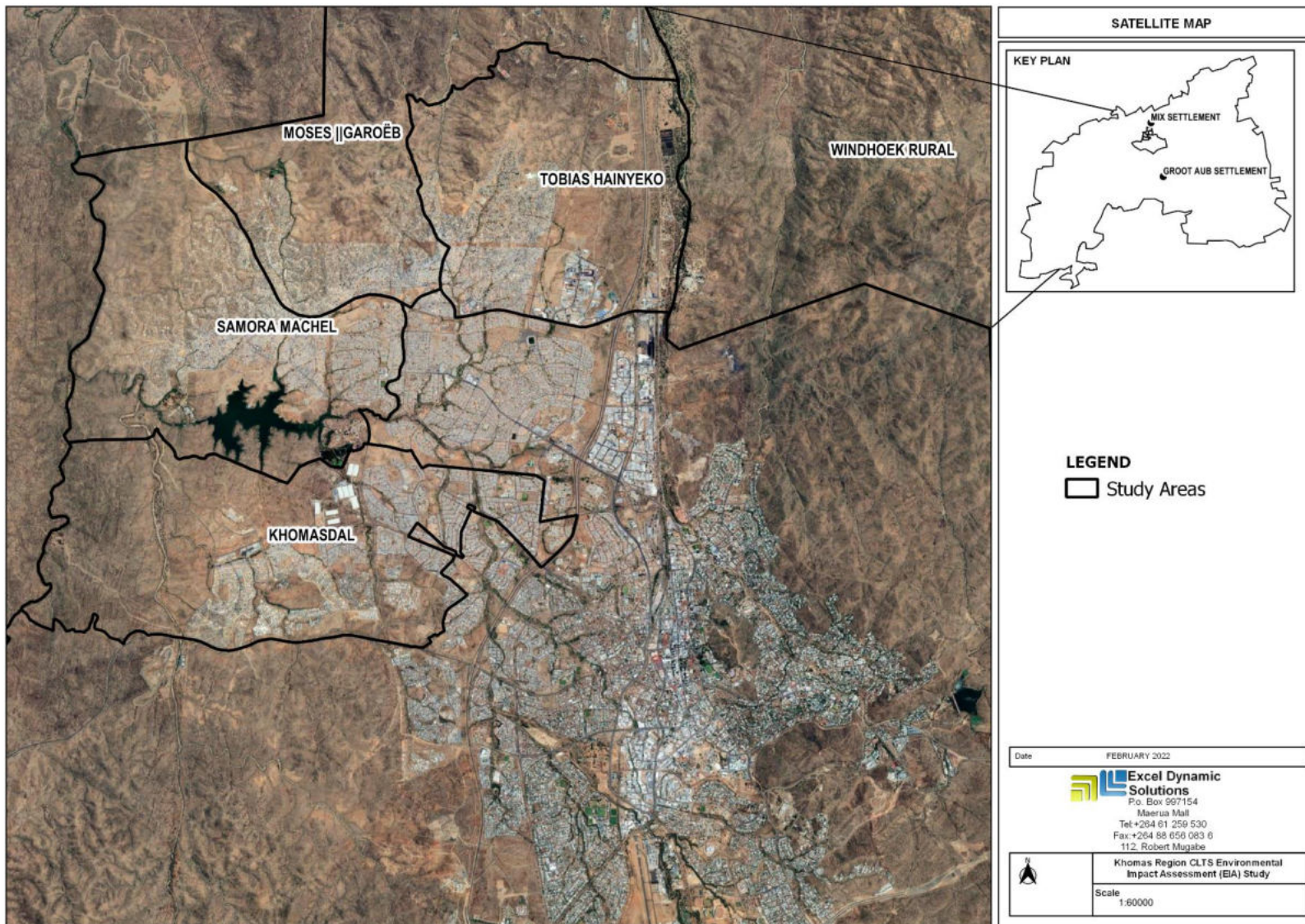


Figure 1: Location of the proposed implementation of the CLTS project in Windhoek's informal settlements, Khomas Region

2 BRIEF DESCRIPTION OF PROJECT ACTIVITIES

Upon issuance of an ECC, the Proponent will prepare and promote for the ground implementation of the CLTS programme and its associated activities. The planned project includes several activities and requirements as part of the process of setting up the sanitation centres for the households. The EIA project will include other sanitation technological alternatives and explore the potential social and environmental impacts of each to determine the types of technologies suitable for the environments in which the project is envisioned to take place.

This section covers the dry sanitation for both CLTS programme and donated toilets to be constructed by the individuals (toilet users), and WMC and respectively.

Dry sanitation is defined as the disposal of human waste without the use of water as a carrier (Scott, 2002)

2.1 Design and planning phase

The planning and design phase which also include the EIA is aimed at presenting some key concepts of the project alongside a general overview of the study areas, the legal landscape to be considered, and a preliminary assessment of the main aspects that might affect the feasibility of the facilities. Thereafter, the environmental, technical, and financial aspects of the programme/project is assessed by identifying potential risks and proposing mitigation measures where possible. This would also include highlighting 'fatal flaws' wherever mitigation measures are unavailable or impractical with regards to the available finances and other resources.

2.1.1 The Distinction between the CLTS and Donated Toilets

To ensure that the two sanitation components covered by this EIA Study are set apart, the differences between two toilets (CLTS and donated ones) are presented under **Table 1** below. The toilets will be required to meet the WMC standards to ensures the selected technologies are healthful, safe, technically adequate, environmentally sound and sustainable.

Table 1: The difference between CLTS and Donated toilets in terms of construction and operation

Features	CLTS Toilets	Donated Toilets
Dry sanitation type	Pit latrine (no prior structure)	Pit latrine (prefabricated structure)
Responsibilities		
Design and Approval	-Windhoek Municipal Council	-Windhoek Municipal Council (even donated toilets)
Construction works	-Individual resident (owner) or may appoint a private construction contractor. -WMC will advise on the exact positions of the toilets, provide awareness on the approach, and educate communities on the benefits of OD free.	-Windhoek Municipal Council or an appointed contractor
Construction Costs	Individual / toilet owner	-Windhoek Municipal Council
Criteria of Toilet Provision	-None from the Windhoek Municipal Council -Individual's own preference, but the toilet specifications should adhere to the approved design.	-The criteria to be used to identify the beneficiaries of these toilets would depend among other factors. These factors may include vulnerable persons such as disabled or elderly persons who may not afford or be able to construct their own toilets through the CLTS programme, etc
Construction Materials	-Locally available and environment friendly materials that are approved for urban areas	-Approved prefabricated structures
Operation and Maintenance	-Entirely the toilet owner's responsibility.	-Entirely the toilet owner (beneficiary)'s responsibility.

Features	CLTS Toilets	Donated Toilets
Decommissioning	-Not clear as the toilet owner may decide to just pack up and relocate elsewhere.	-Not clear as the toilet owner may decide to just pack up and relocate elsewhere.
Use and Lifespan		
Capacity of use	-On average 3 to 6 people (dependent on the number of people in the household)	-On average 3 to 6 people (dependent on the number of people in the household)
Type of waste	-Strictly human waste only	-Strictly human waste only
Estimated Lifespan	-5 to 10 years but depends on the number of people utilizing the toilet over the given period.	-5 to 10 years but depends on the number of people utilizing the toilet over the given period.

2.1.2 Approved Designs, Standards and Materials

The approved toilet categories (options) for implementation by households as part of for the CLTS programme and in future they are provided below. The approved toilets will be required to meet the WMC standards to ensures the selected technologies are healthy, safe, technically adequate, environmentally friendly and sustainable.

The dry sanitation technology option (in blue fonts below) has been tested or piloted in the past.

- **Pit latrine systems:** simple dry pit latrines, [Ventilated Improved Pit \(VIP\) latrines](#), [Double vault pit latrines \(with two pits\)](#), Wet pit latrines, and pour flush pit latrines.
- **Urine Diversion Dry Toilet (UDDT) systems:** Alternative to pit latrines and flush toilets that function on a waterless operation, [UDDT toilet bowls \(e.g., Otji Toilet\)](#), [UDDT through evaporation \(e.g., Enviroloo\)](#), [Double vaults or bucket based \(e.g., Ecosan\)](#)
- **Water borne sewage (flush toilets / pour flush toilets):** Private or communal flush toilets linked to sewerage reticulation system, conservancy tank or septic tank
- **Eco-toilets:** both waterborne and [dry ventilated improved pit](#) (e.g., Amalooloo), and does not require water to function but water recommend it for health hygiene reasons.

According to the WMC Standard Pit Latrine Design and Material (**Figure 2** and **Figure 3**) the above toilet types will need to meet the requirements/standards and pit latrine parameters provided and approved for the CLTS programme, respectively:

- **Structure:** Latrine structure designed and built with appropriate local materials. In general, pit latrines should be considered a viable alternative to open defecation. Under almost any circumstances, any kind of pit latrine is an improvement if compared to the negative consequences of open defecation. Secondly, more than any other sanitation system, pit latrines are often owner built and therefore truly affordable for the poor.
- **Ventilation:** At least a 100mm wide plastic or metal ventilation pipe, painted black with a fly screen on top. Ventilation systems can be used to minimize the smell in pit latrines. Such pit latrines are then often called 'VIP latrines', standing for 'Ventilated Improved Pit latrines. The ventilation works better with a big black pipe. The black colour increases heating by the sun and the larger pipe allows larger volumes of air to be heated and to circulate. As the air in the pipe is heated, it rises and sucks more cold air through the toilet seat. This way, the smell inside the toilet structure is reduced even more.
- **Pit parameters:** should be 1.9m deep and 1m to 1.5m round or square,
- Hand washing: all toilet facilities should have hand-washing facilities with soap, with a soak away pit outside the latrine structure, and
- The toilet pot must have a cover, kept closed always and child proof (the connection from the pot to the pit must be no more than 25cm in diameter).

Pit Latrine Design

There is a wide variety of pit latrine designs, depending how the different components of the latrine are designed and built. The main components of a latrine are:

- **Toilet seat:** The drop hole can be connected to a toilet seat or squatting pan for user comfort. Pit latrines usually designed as dry toilets without water for flushing. Dry toilets are the focus for this study.
- **Pit:** The pit must be reinforced, except under conditions of reasonably hard soils where a slab on top may be sufficient. The most common pit reinforcement is construction with bricks. The space (size) of the pit influences the time it takes to be filled. To avoid the cleaning of the pit and moving of top structure, some pit latrines are built with two chambers ('double vault' pit latrine). Once the first one fills up, the drop whole is sealed,

and a second drop hole (in the same superstructure) used to start filling up the second one. As the second one fills, the solid matter in the first one degenerates further.

The associated approved drawings and layouts of the pit latrines shown in **Figure 2** and **Figure 3**.

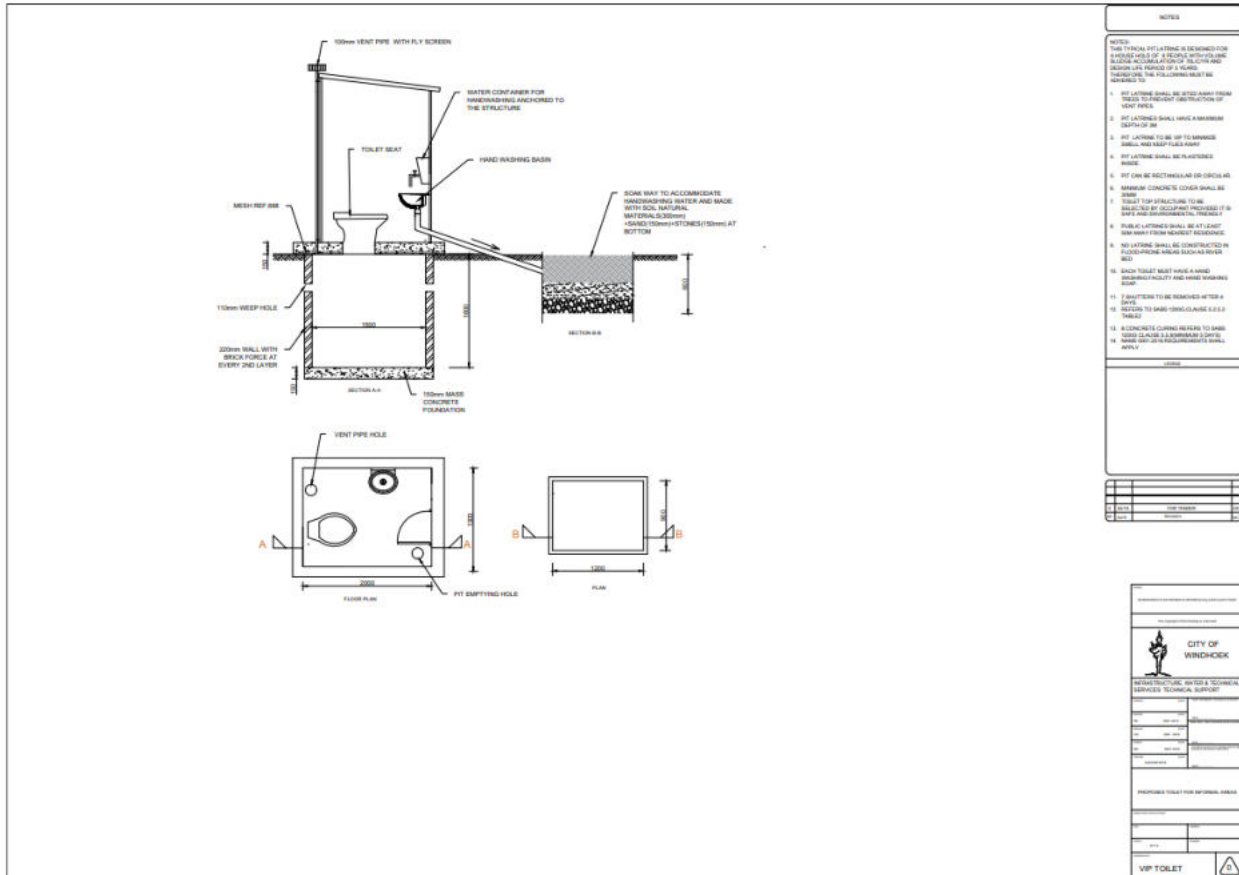


Figure 2: Dry toilet (pit latrine) layout by WMC - A

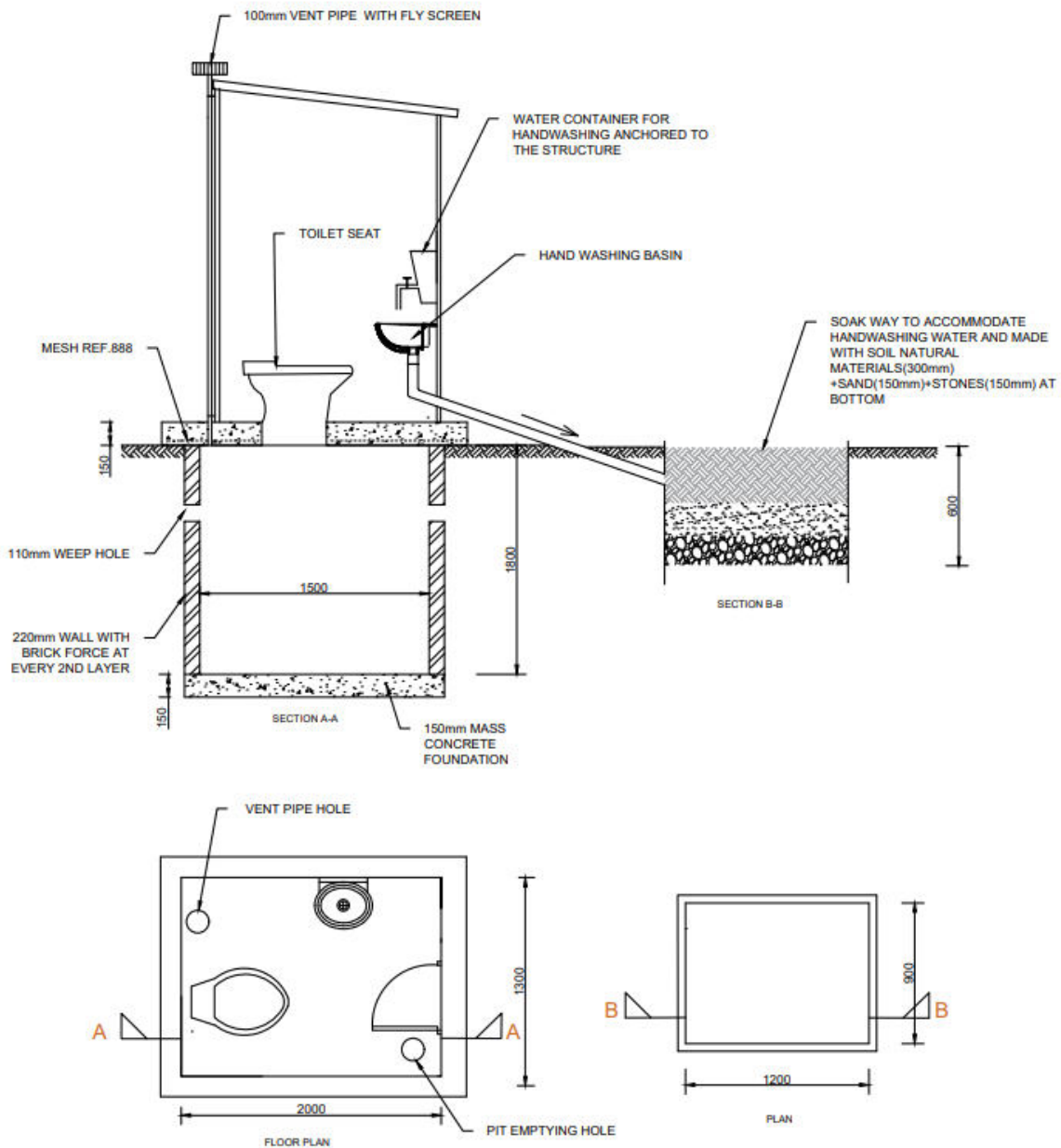


Figure 3: Dry toilet (pit latrine) layout by WMC - B (continued)

Prior to commencement of any site work, all personnel need to be inducted on the Environmental, Health and Safety Policy as well as procedures and processes to follow while conducting the work under the next section (construction phase)

2.2 Construction and Establishment of Pit Latrines

The proposed project will involve the construction of pit latrines for households in the Moses IlGaroëb, Tobias Hainyeko, Windhoek Rural, Khomasdal and Samora Machel constituencies. The programme targets three thousand (3,000) households. The construction period of the latrines at all the targeted household is not yet known. However, it is anticipated that it would take days to set up a single facility. There could also be other factors that would influence the duration of construction, and these may include facility parameters (depth, and width), location and site conditions (soil, topography, geology, etc.), number of users (families to be served by the facility) as well as technical aspects.

According to the approved pit latrines are expected to be 1.9m deep and 1m to 1.5m round or square.

As it is with general construction work, the anticipated associated activities will include:

- Site clearance (where necessary),
- Transportation of appropriate and approved local materials to sites,
- Earthworks, and concrete works,
- Lining to prevent direct leaching of waste into the ground during the operational phase of the pit latrines (resulting in groundwater resources pollution),
- Temporary fencing during construction,
- Installation of services infrastructure such as sewage pipelines, tanks, ablutions pipeline systems, etc., and
- Eventual permanent sanitation facility demarcation (wall structures around individual latrines) by the appointed reputable and experienced construction contractors.

2.3 Project input and resources

The project inputs and resources required for the implementation will include but not limited to the following:

2.3.1 Vehicles

Construction Contractors: The vehicles to be used during the project implementation will include light, and medium vehicles to be used for the toilet construction activities. The medium vehicles such as small trucks would be needed to transport construction materials and equipment to and from site (as needed) or for waste removal during the operation phase. These light vehicles may also be used to transport or move certain project materials and substances on site. Medium vehicles such as excavators will be used to carry out earthworks and other related activities.

2.3.2 Tools and Equipment

The following tools and equipment will be required for the construction of the pit latrines (according to UNICEF's Latrine Technology Manual):

- Rope and shovel
- Shovel
- Ladder and Saw
- Bucket
- Hammer
- Carpenter's square/level
- Measuring tape
- Trowel, Plumb line, wheelbarrow, etc.

2.3.3 Human resources

The number of people required to carry out construction of a single toilet or more in each informal settlement is not yet known but can range from 3 to 4 people.

For individual toilet owner's construction: they may not require any outside help, as the toilet owner may opt to construct their toilet themselves.

Construction contractor: Casual work may be created if the toilet owner hires a private construction contractor to construct the toilet on their behalf (for CLTS).

Similarly, this would apply for the donated if the WMC subcontract the construction of donated toilets to a contractor, i.e., few people (3 to 4 or more) may be hired by the contractor to help with the toilet digging.

2.3.4 Accommodation for Toilet Construction Team

Given that the project is in an urban area (Windhoek City), it is anticipated that the construction personnel (for a hired contractor) will be from Windhoek too, therefore, there will be no need for onsite accommodation. The households (individuals) who would not external help (contractors) to build their toilets will also not require additional accommodation as they already live there.

2.3.5 Fuel and Water Supply

There is normally no need for power supply for construction dry sanitation toilets. However, should the need arise particularly for equipment powering, construction works will be supplied by diesel powered generators.

A certain amount of water will be required for concrete works and other related project activities as well as for human consumption (drinking water) on site. However, the exact volume of water required is not known at this stage. It is anticipated that water for drinking will be self-supplied from homes for local workers and the construction contractors who may be from outside the constituencies' households will bring their own water (bottled drinking water or containers).

2.3.6 Site access (Roads)

The existing informal access roads will be used to access individual households by the appointed contractors with construction vehicles transporting machinery and equipment to work sites. The same existing road will be used during the operational stage of the pit latrines throughout their life cycle (to carry out maintenance and sewage removal).

2.3.7 Health and safety

All construction and maintenance workers will be supplied with appropriate and adequate health and safety tips while carrying out construction works. Households and contractors will be advised to get equipped with first aid kits and wear appropriate personnel protective equipment (PPE) while digging and constructing the toilets.

2.3.8 Waste management (Solid waste, hazardous and sewage/wastewater)

Solid waste: All solid waste generated from the construction activities will be sorted, stored on site in designated waste containers and carted to one of the nearest approved Windhoek solid waste management landfill sites such as Havana, Pioneerspark, Klein Kuppe, Otjomuise, Eros, Klein Windhoek, Khomasdal, Okuryangava and BrakWater.

For hazardous waste such as fuel used to power equipment during toilet construction that may be produced from the construction will be handled with care, stored in appropriate containers and transported to the approved and relevant waste management facility in Windhoek (the Kupferberg Landfill site located about 11 km southwest of Windhoek's Central Business District).

Human waste/sanitation: in the case of an appointed contractor, the sites manager will ensure that the construction sites are equipped with portable chemical toilets for the workers while onsite.

2.4 Operational waste management and Decommissioning

2.4.1 Waste/sludge accumulation management

The maintenance of the pit latrines and managing the waste/sludge accumulation (transporting the waste to the sewage management facilities in Windhoek by the toilet owners / beneficiaries.

3 LEGAL OBLIGATION: PERMITTING AND LICENSING

This section covers information on the legal obligations (legislations, policies, and guidelines) that governs certain activities of the CLTS programme, where permitting and/or licensing may be required from different applicable regulatory authorities - refer to **Table 2** below. The full list and description of the legal framework (where permits are required or not) is presented in the EIA Report.

Table 2: Applicable legislations in terms of permits or licenses for the proposed CLTS programme activities

Legislation	Provisions	Contact Details
Environmental Management Act 2007 Environmental Impact Assessment (EIA)	Activities listed in Government Notice (GN) No. 29 of GG No. 4878 require an Environmental Clearance Certificate (ECC). The amendment, transfer, or renewal of the ECC (EMA S39-42; EIAR Regs19 & 20).	The Environmental Commissioner: (Department of Environmental Affairs and Forestry (DEAF))

Legislation	Provisions	Contact Details
Regulations (EIAR) (GG No. 4878)	Amendments to this EMP will require an amendment of the ECC. <u>The ECC needs to be renewed every 3 years.</u>	Ministry of Environment, Forestry and Tourism Tel: (061) 284 2701
The Water Act 54 of 1956 The Water Resources Management Act No. 11 of 2013 (unpromulgated)	Since there will be no Groundwater abstraction and Use, the permit for commercial use is therefore not applicable. However, should there be a need to discharge wastewater into the environment, a <u>Treated Wastewater/effluent Discharge Permit should be applied</u> from the Department of Water Affairs (DWA): Directorate of Water Resources Management (Water Environment Division). When issued, Proponent, the Permit should be renewed as required (as stipulated in therein).	Mr Franciskus Witbooi (Deputy Director: Water Policy and Water Law Administration. Tel: (061) 208 7158 OR Ms. Elise Mbandeka (Chief Hydrologist): Water Environment Tel: (061) 208 7167
Forestry Act (No. 12 of 2001)	Permits are required for the removal of protected plants species.	The nearest Forestry Division Office (Ministry of Environment, Forestry and Tourism)
Nature Conservation Ordinance No. 4 of 1975 (as amended)		
National Heritage Act (Act No. 27 of 2004)	Should any objects of heritage significance be identified during the construction of the toilets, the work must cease immediately in the affected sites and the necessary steps taken to seek authorisation from the Council.	Ms. Erica Ndalikokule (Head: Acting Director) – National Heritage Council of Namibia Tel: (06) 301 903
Other permits and approvals		
CLTS Design Approvals	The WMC will need issue approvals and permits to the residents who will construct own toilets. The permits will be accompanied by the conditions and tariffs aimed at enforcing compliance to the EMP requirements and ensure environmental protection.	The WMC relevant department to develop the CLTS toilet construction approvals and permits or certificate.
CLTS construction consent (from neighbouring households)	Application for permission to construct a CLTS toilet should be accompanied by a consent form from neighbors. This is aimed at eliminating possible conflict among neighbors in the future.	WMC to clearly educate the residents on this matter and outline the required form information before submission.

4 EMP IMPLEMENTATION ROLES AND RESPONSIBILITIES

This Draft EMP has identified the Proponent (Windhoek Municipal Council (WMC)), appointed Construction Contractor(s) and individual toilet owners Technical Staff (as deemed necessary) as important roles to guide the environmental management of the proposed programme' activities.

4.1 Windhoek Municipal Council (The Proponent)

The Proponent will be responsible for ensuring that the EMP is implemented by their appointed contractors and individual toilet owners during planning, construction, and operational phase:

- Approve the designs of the CLTS toilets and ensuring design compliance with standards,
- Managing/overseeing the implementation of this EMP and updating and maintaining it when necessary.
- Environmental Awareness and Training of the CLTS beneficiaries on the EMP implementation.
- Issuing fines to individuals who contravene EMP provisions and if necessary, removing such individuals from site.
- Ensuring compliance with relevant environmental and related authorisations and license conditions.
- Setting up and managing the schedule for the day-to-day activities.
- Liaison with all relevant interested and affected parties/stakeholders.
- Ensuring all incidents are recorded and documented.
- Undertaking an annual review of the EMP and amending the document when necessary.

4.2 WMC Design Engineers

The responsibilities of the WMC Designer Engineers will be to:

- Ensure that the designs and technology for the dry toilets are up to standard and complies with the WMC requirements (in terms of standards and parameters), and
- Advise the WMC on matters pertaining to the CLTS technology prior to construction.
- Ensuring compliance with relevant environmental and related authorisations and license conditions.

4.3 Construction Contractor

All contractors or site supervisors (as appropriate) will:

- Ensure the relevant commitments contained in the EMP Action Plans are adhered to.
- Compile relevant procedures and method statements for approval by the applicable phase site manager prior to initiation of activities.
- Ensure relevant staff are trained in procedures; and
- Maintain records of all relevant environmental documentation.

4.4 Individual Toilet Owners (Toilet Beneficiaries)

The communities in the five constituencies will be the beneficiaries of the CLTS programme and will also be responsible for the following from construction throughout the operational and maintenance:

- Monitor implementation of the EMP and notify the project Proponent of any issues,
- Actively participate in stakeholder forums,
- Make use of the grievances mechanisms to communicate issues to the Proponent,
- Monitor legal compliance,
- Review performance reports, and
- Sanction poor performance and non-compliance where appropriate through directives, and penalties.

4.5 Technical Staff and Consultants

The technical experts and consultants that may be required for the programme will be responsible for:

- Safely and effectively monitoring various technical parameters related to:
 - ✓ mechanical designs of the dry sanitation system (toilets) and associated facilities
 - ✓ waste management
 - ✓ water resources management
 - ✓ Soil preservation/ protection
 - ✓ Dry toilets (sanitation) operations and maintenance
 - ✓ employee/ contractor health.

5 ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURES

The environmental and social mitigations measures (management plan actions) with associated legal requirements in terms of permitting and licensing for certain programme activities are presented under this chapter.

The management and mitigation measures provided under this chapter are mainly for the adverse (negative) impacts. The aim of the plan actions is therefore to avoid these potential impacts where possible, and where impacts cannot be avoided, measures are provided to reduce the impacts' significance.

The key potential negative impact for which the management and mitigation measures are provided are as follows:

- Physical soil/land disturbance through earthworks,
- Potential contamination of soil and water resources,
- Potential health and safety risks associated with mishandling of equipment (materials),
- Potential dust generation from construction works due to increased traffic (construction),
- Potential impact on vehicular traffic safety in the site areas during construction due to increased traffic and presence of medium to heavy vehicles,
- Habitat destruction during site clearing and excavation (loss of biodiversity),
- Noise impact to locals from vehicles and machinery (during excavations),
- Potential impact on archaeological/heritage resources via inadvertent unearthing, and
- General environmental pollution through littering (general waste generated on the sites).

5.1 The Mitigation of Potential Adverse Environmental and Social Impacts

The management plan actions for the mitigation of potential adverse impacts are presented in **Table 3** – for the planning, construction of CLTS toilets and subsequent operational and maintenance phase.

The required management plan actions have been presented together with key performance indicators, responsible person(s), resources or proof and the timeline of such management actions. The five forms the headings **Table 3** and they are briefly explained as follows:

- Environmental aspect and issues for which management actions are required.

- Proposed impact mitigation measures.
- Key performance indicator (KPI) for monitoring success levels of management actions.
- Responsible person(s) for implementing the proposed management actions.
- Resources required for implementing management actions and monitoring; and
- Implementation timeframes for the proposed management actions.

Table 3: Management Plan Actions for the Planning & Design, Construction and Operational & Maintenance Phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
PLANNING & DESIGN PHASE						
EMP implementation and training	Lack of EMP awareness and implications thereof	<p>-The necessary health, safety, and environmental (HSE) considerations should be included in the CLTS construction approvals / permit letters.</p> <p>-An EMP non-compliance penalty system should be implemented in the form of a tariff incorporated in the construction approval / permit letters. This to promote self-regulation among toilet owners.</p>	-The HSE guidelines are incorporated into the approval letters	-Proponent	<p>-Toilet construction approvals</p> <p>-Consent form signed by the neighbouring household(s)</p>	Pre-construction
Dry toilets design and Technology	Mechanical and design failures	<p>-The toilets and associated equipment should be designed in such a way mechanical failure are minimal to none.</p> <p>-The dry toilet system' design should make provision for groundwater protection (appropriate lining at the pit bases to prevent infiltration from the pit base)</p> <p>-The sewer storage tanks system should be properly designed to ensure that they have the capacity to hold the sewage until it can be safely transported to the waste treatment facilities.</p> <p>-In terms of odour control, the ventilation systems should be well designed and used more to minimize the smell in pit latrines. The ventilation works better with a big black pipe. The black colour increases heating by the sun and the larger pipe allows larger volumes of air to</p>	<p>-Approved design according to international standards</p> <p>-Sufficiently designed toilet systems</p>	-WMC Design Engineers	-Technical Expert (Design Engineer)	Pre-construction

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		be heated and to circulate. As the air in the pipe is heated, it rises and sucks more cold air through the toilet seat. This way, the smell inside the toilet structure is reduced even more. Therefore, a black-piped ventilation system should be employed during the CLTS implementation.				
Toilets Location	Location and settings	<p>-The toilets should be designed and constructed at least 40m away from to land drains or surface watercourses as per the Namibia Standard on Dry Sanitation (NAMS0001:2016),</p> <p>-The location of toilets in the communities should be discussed with the community leaders and WMC to aid in selecting sites for toilets in the areas.</p>	-The site layout and designs are revised and finalized upon ground truthing.	-WMC Design Engineers -Proponent's relevant department (to site toilets)	N/A	Pre-construction
Public Awareness	Community education	-Awareness should be raised to educate the communities on CLTS and dry sanitation.	-The communities have good understanding of the CLTS and objectives	-WMC: Public Participation Division	-Simplified Pamphlets / posters and flyers -Grievance logbook	Pre-construction
Authorizations	Lack of Permits/ Licenses	<p>-All the required agreements and licenses or permits should be applied for and obtained</p> <p>The permits referred to herein include:</p> <p>-CLTS toilet construction permit / approval</p> <p>-Consent form signed by the neighbouring household</p>	-Applicable permits are obtained prior to construction	-WMC -Individual toilet owner	-Record of permits and authorizations obtained	Pre-construction

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Stormwater (runoff) management	Runoff of polluted water into the environment	-Stormwater management plans (discharge points) should be designed.	-Effort to manage stormwater discharge	-WMC Design Engineers	-N/A	Pre-construction
CONSTRUCTION AND OPERATIONAL PHASE						
EMP implementation and training	Lack of EMP awareness and implications thereof	-EMP trainings should be provided to everyone involved in the construction. -All site personnel should be aware of necessary health, safety, and environmental considerations applicable to their respective work. -An EMP non-compliance penalty system should be implemented on site.	-Compliance monitoring conducted daily during construction -Bi-annual compliance for operations -Timely renewal of the ECC every 3 years if construction is not completed within the first 3 years of ECC validity.	-Proponent -ECO	-ECC renewed on time -Records of EMP training conducted	Throughout the construction and operation phases
Water resources	Water quality	-With regards to toilet location, according to the Namibia Standard on Dry Sanitation (NAMS0001:2016), the pit latrines and urine diversion soakaways (where applicable) shall be located at least 40m away from any groundwater source and the base of the substructure shall be at least 2m above the water table measured at the highest level after the rainy season. -Given the high flow of surface water during rainy seasons and topography in Windhoek, the construction of toilets should be undertaken during the dry (no-rain) months of the year (i.e., between April and October) to reduce the risk of surface run-off carrying waste from construction sites into riverbeds and	-Sewage contained and stored in designated containers -The toilet pit bases are properly lined	-Individual toilet owner -Construction Contractor	-Non-permeable material to cover the ground surface at areas where hydrocarbons and potential pollutants are utilized. -Designated waste storage containers	-Throughout the project phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		<p>eventually into the already vulnerable groundwater systems.</p> <p>-Where percolation and infiltration capacities are unfavourable, artificial barriers made of unsaturated or loamy sand shall be created around pits to minimise groundwater pollution (according to the NAMS0001:2016).</p> <p>-Areas specific stormwater management plans (discharge points) should be designed and implemented for toilets in high-lying areas to prevent the potentially contaminated run-off from reaching riverbed and pollute groundwater resources.</p> <p>-During the emptying of sewage tanks (when required) and transporting of sewage to the handling facilities should be properly handled to ensure that it does not spill on the surrounding soils and eventually groundwater systems.</p> <p>-The toilet pit bases should be properly lined to prevent seepage into groundwater systems.</p> <p>-The communities (toilet users) should be educated on the impacts of disposing of sewage in the environment, especially in riverbeds, therefore, this practice should be prohibited.</p> <p>-Hazardous used substance such as oils and that may be used during the construction of toilets should be properly stored temporarily in appropriate containers should be properly disposed</p>				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		<p>of in waste containers and at the hazardous disposal facilities in Windhoek, respectively.</p> <p>-Toilets should not be constructed or erected in riverbeds.</p> <p>-Individual toilets should not be located close to land drains or surface watercourses.</p> <p>-As part of the permits to construct own toilets, the WMC should educate the communities on spill control preventive measures during the construction of individual toilets</p> <p>-The sewage tanks should be emptied frequently, and toilets inspected frequently to prevent overflowing of sewage into the environment, specifically groundwater systems.</p>				
Soils	<p>Site soils (land) disturbance</p> <p>Soil erosion</p>	<p>-The topsoil that was stripped from certain site areas and stockpiled to enable construction works should be returned to its initial position to avoid unnecessary stockpiling of site soils which would leave them prone to erosion.</p> <p>-All construction pits excavated on site should be rehabilitated and returned to their pre-excavation state as possible.</p> <p>-Soils that are not within the intended footprints of the toilet areas should be left undisturbed.</p>	-Record evidence of new erosion gullies (photographs)	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-N/A	Throughout construction phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
	Soil pollution	<ul style="list-style-type: none"> -The site areas where a significant amount of fuel is utilized, the surface should be covered with an impermeable plastic liner (e.g., an HDPE liner). -Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated. -Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility (Kupferberg Landfill site). 	<ul style="list-style-type: none"> -No complaints of pollutants on the soils -No visible oil spills on the ground or contaminated/pollution spots owing to construction activities. 	<ul style="list-style-type: none"> -Construction contractor -Individual toilet owner 	<ul style="list-style-type: none"> -Drip trays 	Throughout the construction phase
Biodiversity	Loss of Fauna and Flora	<ul style="list-style-type: none"> -Vegetation found on the site, but not within the toilet footprint should not be removed nor disturbed in any way, and thus, should be left to preserve biodiversity on the sites. -Community members and contractors should refrain from killing or snaring any animals (small or big). -Illegal hunting (poaching) of wildlife in the areas close to areas with roaming wildlife is strictly prohibited. -Environmental awareness on biodiversity preservation should be provided to toilet owners and contractors. 	<ul style="list-style-type: none"> -Keep record of names of all protected plant species identified prior to clearing any site where vegetation is present -No complaints of livestock theft, snaring or killing related to the project personnel in farm near Windhoek Rural Constituency. 	<ul style="list-style-type: none"> -Construction contractor -Individual toilet owner 	-N/A	-Throughout the phases
Air Quality	Dust and odour	<p><u>Dust / Air quality control</u></p> <ul style="list-style-type: none"> -All access roads leading to the site should have speed limits of not more than 40km/h to minimise the amount of 	<ul style="list-style-type: none"> -Dust suppression measures implemented -Visible efforts to curb dust 	<ul style="list-style-type: none"> -Construction contractor -Individual toilet owner 	<ul style="list-style-type: none"> -Grievance logbook -Dust suppression water tanks 	Throughout the phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		<p>dust generated by the vehicles, which will in turn minimise air quality concerns to any potential receptors, particularly the residents south of the site.</p> <p>-Dust masks, eye protective glasses and other respiratory personal protective equipment (PPE) such as face masks should be provided to the workers constructing the toilets, where they may be exposed to dust. The WMC should educate the communities on maintaining health and safety measures during construction works.</p> <p>-Project vehicles and machines should not be left idling when not in use, such that they emit air polluting gases.</p>	-The ventilation system is installed according to the requirements.			
	Odour	<p>-The sewage should be treated with appropriate and biodegradable chemicals to suppress the odour, i.e., chemicals used in the toilets should not contribute to bursting or degradation of the lining or building material.</p> <p>-A black-piped ventilation system should be employed during the CLTS implementation. Ventilation systems should be used more to minimize the smell in pit latrines. The black colour pipe increases heating by the sun and the larger pipe allows larger volumes of air to be heated and to circulate. As the air in the pipe is heated, it rises and sucks more cold air through the toilet seat. This way, the smell inside the toilet structure is reduced even more.</p>	<p>-Bi-annual odour interviews with residents /communities</p> <p>-Records of odour related grievances</p>	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-Grievance logbook	Throughout the operational phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Noise	Noise	<p>-Noise from vehicles and equipment on site should be reduced to acceptable levels.</p> <p>-No construction activity should be carried out during the night or very early in the mornings (before 08am).</p> <p>-Construction hours should be restricted to between 08h00 and 17h00 to avoid noise generated by equipment.</p> <p>-When operating noise equipment or working in noisy environments on site, community members and contractors should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure.</p>	<p>-Weekdays activities during construction</p> <p>-PPE provided to workers operating noisy equipment and in noisy site areas.</p> <p>-No complaints of excessive noise from residents</p>	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-N/A	During construction
Health, and Safety	General health and safety associated with project activities	<p>-Keep a comprehensive first aid kit onsite.</p> <p>-Emergency procedures for accidents shall be communicated to all workers and are all appropriately trained.</p> <p>-As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs.</p>	-The Health and Safety Plan is drafted and explained to workers involved in the construction	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-Health and Safety Policies	Prior to site setup activities and throughout the phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
	Occupational Health and Safety	<p>-As part of their induction, the construction workers and individual toilet owners should be made aware of the risks of mishandling equipment and materials during toilet construction.</p> <p>-During toilet construction, the community members (individual toilet owners) and contractors should be properly equipped with appropriate and adequate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, safety glasses, etc where and when possible.</p> <p>-Each site should be equipped with at least one first aid kit and at least 2 people trained on how to administer first aid.</p> <p>-Drinking of alcohol prior and during construction hours should be prohibited. This may lead to mishandling of equipment which may lead to injuries and other health and safety risks.</p>	-All personnel involved in the construction of the toilets are equipped with appropriate PPE	-Construction contractor -Individual toilet owner	-First Aid training for at least 2 workers	Throughout the project phases and when required
Health and safety	Accidental fire outbreak	<p>-No open fires to be created onsite by personnel.</p> <p>-Potential flammable areas and structures such as fuel storage tanks for construction equipment should be marked as such with clearly visible signage.</p>	-No wildfires recorded (due to presence of workers)	-Construction contractor -Individual toilet owner	-Fire extinguisher	Throughout the construction phase
Archaeology and heritage	Accidental disturbance and destruction of archaeological or	-Caution should be exercised when carrying out excavations associated with the toilet construction activities if	-Preservation of all artefacts that are discovered around project area	-Construction contractor -Individual toilet owner	-Salvage equipment -Flag tapes -GPS (site marking)	As and when required, prior to site setup activities and upon encounter

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
	heritage objects and sites	<p>archaeological/heritage remains are discovered.</p> <p>-Identification of any archaeological significant objects on the site should not be disturbed but are to be reported to the WMC who then reports it to National Heritage Council (NHC) offices for further instructions and actions.</p> <p>-The CLTS programme educators and coordinators should familiarize themselves with the NHC's Chance Find Procedure (please refer to Appendix 1 of the Draft EMP) and if uncertain about the procedure should receive training by a suitably qualified archaeologist with respect to the identification of archaeological/heritage remains and the procedures to follow if such remains are discovered during pit digging.</p>	-Cessation of work upon discovery/unearthing of unknown objects			
Social conflicts	Utilization of CLTS toilets	<p>-The hired construction contractors should be sensitized on the importance of respecting the local values and norms and maintain respect during their work in the areas.</p> <p>-The contractors should be educated on the importance of respecting the locals' values and properties by not intruding or damage their households while working in the informal settlements,</p> <p>-The WMC should invest time and resources in raising sanitation and sewage management awareness with the communities in informal settlements, especially on dry sanitation systems.</p>	-The WMC educating the communities on the utilization of the toilets and set clear responsibilities of toilet maintenance and waste management	-Construction contractor -Individual toilet owner WMC: Public Participation Division on raising awareness	-Grievance logbook	Throughout The project phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		<p>-There should be clear communication or grievances channels regarding the utilization of CLTS toilets in communities.</p> <p>-The responsibilities of toilets' maintenance, cleaning, and waste management (removal) frequency should be clearly indicated to the communities through the relevant constituency offices.</p>				
Community Health	Health risks during construction and operations	<p>-During the operational phase, the toilets should be inspected on a regular basis (weekly) during the rainy seasons and monthly when there is no rain (dry months) in the year to ensure that any leaks and burst is detected and fixed on time to avoid overflowing of sewage into the environment.</p> <p>-The sewer containment tanks should be frequently emptied, and waste disposed of at the Windhoek sewage treatment facility to prevent potential overflows and leaks once capacity is reached.</p> <p>-The community, especially those with own toilet or those who are planning to construct their own toilets should be sensitized against disposing sewage into the environment, especially riverbeds.</p>	<p>-Sex and health education / awareness to construction workers</p> <p>-Distribution of condoms to workers</p> <p>-Sex Education awareness placards and posters onsite during construction</p> <p>-frequent monitoring of sewer storage tanks</p>	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-Simplified pamphlets and posters on sanitation	Throughout The project phases
Waste management	Solid and general waste	-The site should be always kept tidy for during construction.	-A register of all waste generated on site is kept on site	<p>-Construction contractor</p> <p>-Individual toilet owner</p>	-Waste storage containers	Throughout the phases.

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		<p>-No waste may be buried or burned on site or anywhere else.</p> <p>-Waste containers (bins) should be emptied after the construction and removed from site to approved waste sites.</p> <p>-Separate waste containers for hazardous and domestic / general waste must be provided on sites.</p> <p>-Construction labourers should be sensitised to dispose of waste in a responsible manner (no littering).</p> <p>-No waste may remain on site after the completion of construction works.</p> <p>-The CLTS Programme coordinators should encourage waste recycling and reduction initiative in communities in order compliment city initiative on waste recycling, reduce and reuse as per Solid Waste Management regulations and policy. (e.g., setting up waste recycling collection point next to the toilets).</p> <p>-All waste generated should be disposed of at Council approved disposal sites.</p> <p>-Building rubbles should be disposed of at various nearby satellite sites around Windhoek (Havana, Pioneerspark, Klein Kuppe, Otjomuise, Eros, Klien Windhoek, Khomasdal, Okuryangava and BrakWater).</p> <p>-Hazardous and general waste shall disposed at Kupferberg landfill site.</p>	-No littering on and around the project sites			

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		-All forms of illegal dumping are strictly prohibited.				
	Wastewater generated by contractors (sanitation)	-Provision of mobile chemical toilet facilities for project workers and visitors. -Emptying of chemical toilets as per the manufacturer's specifications. Treating latrine waste to render non-polluting.	-Adequate toilet facilities on site.	-Construction contractor	-Chemical toilets	At site setup and throughout the phases
Vehicular Traffic	Traffic safety	-The transportation of project materials, equipment and machinery should be limited to once off collective delivery. -Drivers of materials' vehicles should be in possession of valid and appropriate driving licenses. -Vehicle drivers should adhere to the road safety rules. -Drivers should drive at the speed of 40km/hour, and be on the lookout for children, especially. -Vehicles should be in a road worthy condition and serviced regularly to avoid accidents because of mechanical faults of vehicles. -Vehicle drivers should not be allowed to operate vehicles while under the influence of alcohol. -The deliveries of construction materials should be done between the hours of 8am and 5pm only.	-No complaints from members of the public regarding vehicular traffic issues related to the project -All personnel operating the project vehicles and machinery are appropriately licensed and possession of valid driving licenses.	-Construction contractor -Individual toilet owner	-N/A	Throughout the phases.

5.2 Rehabilitation of Construction Sites

Decommissioning referred to herein is for the decommissioning and rehabilitation of the construction works and sites at the end of the construction phase (upon completion of pit latrines construction). These will entail the following:

The decommissioning of toilet construction works will entail the following:

- Removal of all project related vehicles, machinery, and equipment from site to designated storage area.
- Carrying away the construction waste storage containers and disposal of waste to designated and approved waste management site (Kupferberg Landfill).
- Levelling of stockpiled topsoil and where possible, backfilling of all construction excavated pits and trenches that will no longer serve purpose for operations.

5.3 Decommissioning of Toilets (Holding Pits)

Given that the pit latrines are a temporary sewage management solution (awaiting the finalization of the WMC plans on upgrading and formalization of the informal settlements), these toilets' holding pits will be decommissioned to pave the way for the betterment of the informal areas.


In the case that capacity is reached (within +/-10 years) before the upgrading and formalization of the informal settlement is implemented, the holding pits will be demolished or decommissioned by applying the following measures, as adopted from WATSAN Cluster guidelines shown in Figure 4. It is recommended that decommissioning of holding pits should be done during the dry months of the year (to allow seepage to dry out and reduce the risk of stormwater issues/wastewater run-off), i.e., between June and September when it is not raining in Windhoek:









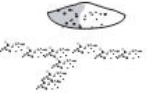
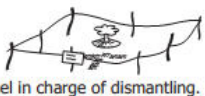
- **Step 1:** Remove the structures from above the pits (ensure that the person demolishing the toilet is wearing protective clothing (PPE) and there are areas for disinfecting slabs and superstructures, away from water sources such as riverbeds or streams).
- **Step 2:** Dig an "overflow" trench from the top of the pit or tank to absorb displaced fluids. The trench should be large enough to allow a large quantity of material to be displaced from the toilet pit. The bacteria and other soil organisms would quickly breakdown and absorb the nutrients and contaminants in the fluids.
- **Step 3:** Smash or rack the lining that are accessible.
- **Step 4:** Fill the pit with rubble and organic matter until the pit is nearly full.
- **Step 5:** Backfill the trench that was dug under Step 1 with soil and rubble.

- **Step 6:** The pit must be capped with a large mound of soil and rubble to allow for further settling of contents. Trees may also be planted, or concrete caps added in built-up areas.

5.3.1 Closure of the Toilets

Some of the measures that can be used to close the CLTS toilets when they reach capacity or upon the decision to upgrade and formalize the informal settlements are shown on the next page (as per the WATSAN Cluster guidelines - https://www.cmtoolkit.org/sites/default/files/2021-10/redr_latrine_decommissioning_training_notes_south_asia_ea.pdf).

 **latrine decommissioning training notes**
South Asia Earthquake
 (based on WATSAN cluster guidelines)

<p>1. Carry out latrine closure during 'dry' periods.</p>  <p>This allows the septage to dry out, and reduces risk of storm water problems.</p>	<p>2. Remove all structures from above pits.</p>  <p>Take care of potential health hazards; - Wear protective clothing.</p>  <p>- set aside specific areas for disinfecting slabs and superstructures. (away from water sources)</p>
<p>3. Dig an 'overflow' trench from top of pit or tank to absorb displaced fluids. This should be large enough to allow a large quantity of material to be displaced from the pit. Bacteria and other soil fauna will quickly breakdown and absorb nutrients and contaminants.</p>  <p>line drain / leach field - uses more space but allows dispersment of materials through a greater area of ground.</p>  <p>curtain drain - trench dug around the latrine - use where space is confined. - access to the latrine can be difficult</p>	
<p>4. Smash or crack the linings that are accessible</p> 	<p>5. Fill the pit with rubble and organic matter until the pit is nearly full.</p>  <p>Allow displaced fluid to drain into the surrounding soil</p>
<p>6. Backfill trench with soil and rubble.</p> 	<p>7. 'Cap' the pit with a large mound of soil and rubble to allow for further settling of contents. Trees may also be planted, or concrete caps added in built up areas.</p> 
<p>HEALTH AND SAFETY DO NOT allow the IDPs to remove the slabs or superstructures. Fence off the area to prevent it from being disturbed. Place signs in Urdu/Pashtu explaining health risks around the site. Ensure that NO RISKS ARE TAKEN by the beneficiaries nor by the personnel in charge of dismantling.</p> 	

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Figure 4: Some steps and measures to be taken when closing pit latrines (holding pits)