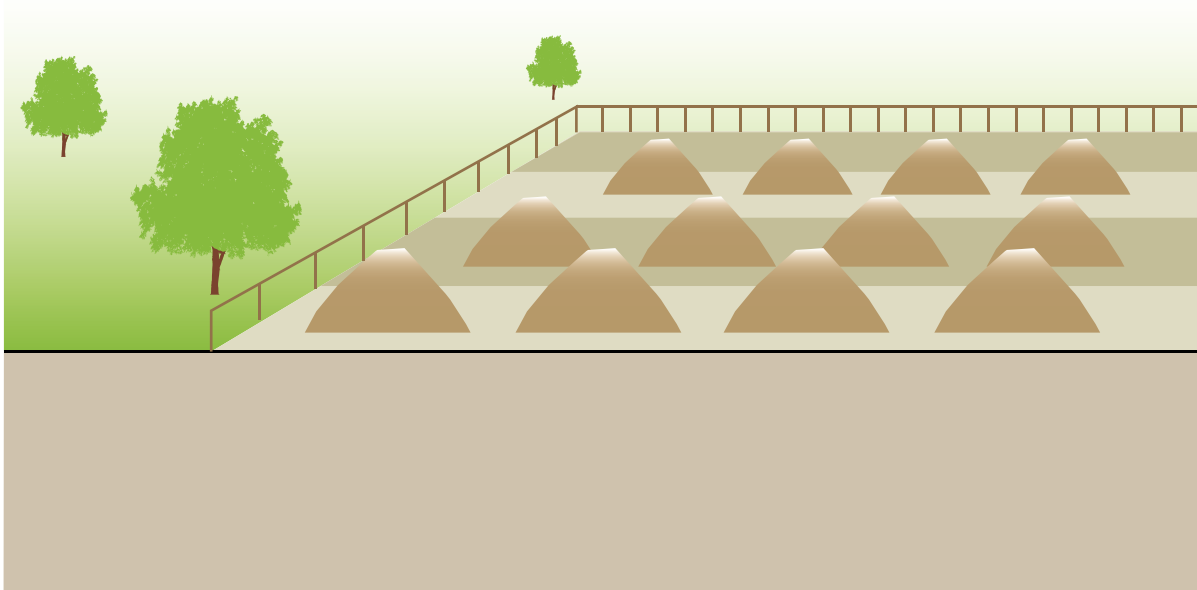


# Surface Disposal and Sanitary Landfill

Phase of Emergency	Application Level / Scale	Management Level	Objectives / Key Features
** Acute Response * Stabilisation * Recovery	* Household * Neighbourhood ** City	* Household ** Shared ** Public	Safe disposal
Space Required	Technical Complexity	Inputs	Outputs
*** High	** Medium	● Sludge, ● Pit Humus, ● Compost, ● Dried Faeces, ● Dry Cleansing Material, ● Pre-Treatment Products	



Surface Disposal refers to the storage of sludge, faeces or other materials that cannot be used elsewhere. Sanitary Landfills are land disposal sites, designed to protect the environment from pollution. Once the material has been taken to a Surface Disposal site or a Sanitary Landfill, it is not used later.

Sanitary Landfills are designed for solid waste as well as sludge and other materials. Surface Disposal is the disposal primarily of sludge, but can also include dry cleansing materials. As cleansing materials cannot always be disposed of with water-based products, they are at times separated and must be disposed of separately. When there is no demand for the use of sludge, it can be placed in monofills (sludge-only Sanitary Landfills) or heaped into permanent piles. Temporary storage before Surface Disposal contributes to further dehydration of the product and the die-off of pathogens before final disposal.

**Design Considerations:** Landfilling sludge together with municipal solid waste (MSW) is not recommended as it reduces the life of a landfill, which are generally designed for noxious materials. As opposed to more centralised MSW landfills, Surface Disposal sites can be situated close to where sludge is generated and treated, limiting the need for long transport distances. With Surface Disposal there is generally no limit to the quantity of sludge that can be applied to the surface since nutrient loads or agronomic rates are not a concern. However, the likelihood and danger of groundwater contamination must be considered. More advanced Surface Disposal systems may incorporate a liner and leachate collection system, with subsequent treatment of the leachate, to prevent nutrients and contaminants from entering the groundwater. In a Sanitary Landfill, the gas produced can be collected and used for combustion or energy production. Sites for temporary storage facilities should be covered to avoid rewetting by rain-water and the generation of additional leachate.

**Materials:** For more advanced systems, leachate piping and liner materials are needed and possibly piping to collect the gas produced. For some landfill uses it is advised to cover the waste and therefore a waterproof cover is needed.

**Applicability:** Where sludge use is not possible, its contained and controlled storage is preferable to uncontrolled dumping. Sludge storage may, in some cases, be a good intermediate step to further dry and sanitise sludge and generate a safe, acceptable product. Surface Disposal and storage can be used in almost every climate and environment, although they may not be feasible where there is frequent flooding or where the groundwater table is high. Surface Disposal and Sanitary Landfills can be suitable options for sludge disposal during an acute response phase, if there is land available away from human contact and waterbodies. Immediate Surface Disposal sites can later be upgraded to more advanced Sanitary Landfills by retrofitting leachate piping and lining materials for groundwater protection. An engineered Sanitary Landfill needs expert technical design. A simple Surface Disposal site will have a negative long-term effect on the environment, but can be a suitable short-term intervention during a crisis.

**Operation and Maintenance:** Staff should ensure that only appropriate materials are disposed of at the site and must maintain control over the traffic and hours of operation. Workers should wear appropriate personal protective equipment.

**Health and Safety:** If a Surface Disposal and storage site is protected (e.g. by a robust fence) and located far from the public, there should be no risk of contact or nuisance. Adequate siting and design should prevent the

contamination of groundwater resources by leachate. Vermin and pooling water can exacerbate odour and vector problems and should be prevented at disposal or storage sites.

**Costs:** As land requirements are substantial for Sanitary Landfills and Surface Disposal, the associated costs can be substantial. Additional costs for operating and maintaining the facility need to be considered.

**Social Considerations:** Sanitary Landfills and Surface Disposal sites can be constructed and managed with the help of local communities. However, these sites should be located away from population centres for protection of public health. Where informal economies are built around scavenging landfills, the participants in the informal economy should be effectively informed of the dangers that infectious landfill wastes, including human waste, can pose to their health.

#### **Strengths and Weaknesses:**

- ⊕ May prevent uncontrolled disposal
- ⊕ Storage may render the product more hygienic
- ⊕ Can make use of vacant or abandoned land
- ⊕ Low technical skills required for operation and maintenance
- ⊖ Requires large land area
- ⊖ Potential leaching of nutrients and contaminants into groundwater
- ⊖ Odours may be noticeable, depending on prior treatment
- ⊖ May require special spreading equipment

→ **References and further reading material for this technology can be found on page 195**