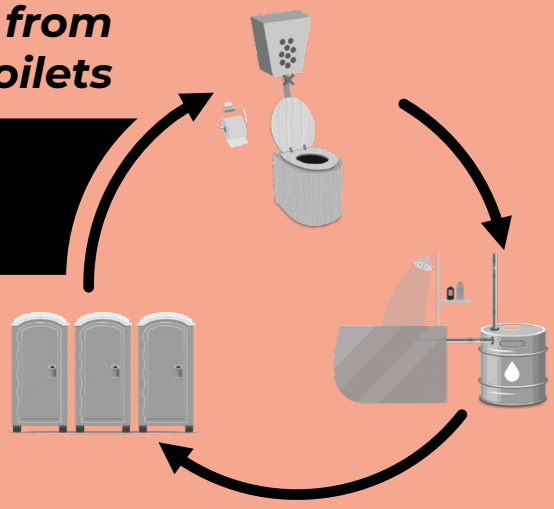
LABOR TEMPELHOF

Recirculating nutrients from 80% of all toilets

Sustainable Sanitation Concept



Tempelhof Lab's sustainable sanitation concept focused on two components:

1) the recovery of valuable nutrients and
2) the recycling of water.

Three different solutions were implemented - dry toilets, water-flushed toilets and chemical mobile toilets.

1 Dry toilets

By using composting toilets, valuable nutrients can be obtained from human feces. With the help of these innovative solutions, both urine and solids are recirculated and valuable raw materials such as **phosphorus and nutrient-rich humus** are obtained. At Tempelhof Lab, **~ 10.5 m³** of solids and **~ 115m³** of urine were collected and composted.

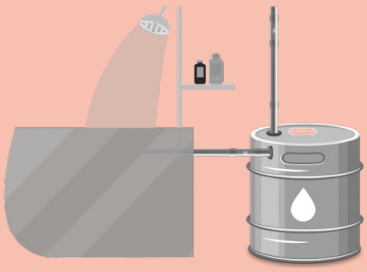
Conventional concept:
Only chemical toilets onsite. No recovery of nutrients like phosphorus.

Tempelhof Lab:
According to the service provider, **8,000 kilograms of humus** were extracted from human feces and **30,000 liters of liquid fertilizer** from urine.

Ideal concept:
The overall sanitation concept focuses on the use of innovative and nutrient-extracting toilets.

2 Water flushed toilets

The reuse of handwashing/grey water in washroom containers can save around **200 liters of drinking water per hour**. In the Tempelhof Lab, an osmosis system* was used to filter gray water from the sinks and treat it for its reuse as toilet flush water, thus circulating the water. The goal was to measure the quantity and quality of the water and provide information on, among other things, foam formation in the process. This information will help the company Greenlife to further develop and improve the technologies.



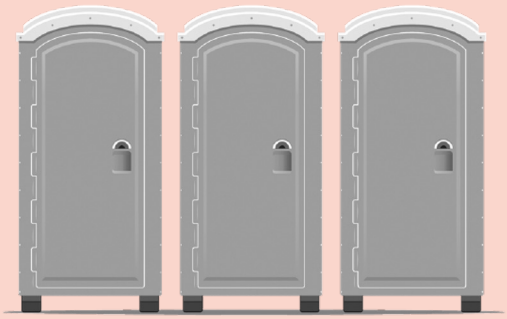
~ 200 l/h

Conventional concept:
No use of innovative technologies to conserve and recycle water.

Tempelhof Lab: Use of an osmosis system as a pilot project. However, due to insufficient water flow from the sinks into the tanks, unfortunately no water was circulated.

Ideal concept:
Extend innovative filter systems to other areas such as catering and showers to realize full potential.

3 Mobile toilets



In conventional mobile toilets, urine and feces are not collected separately. Chemical substances are generally used to reduce putrefaction (odor) and disinfect the excreta - but the liquids are often harmful to the environment. Alternatively, an environmentally compatible agent can be used. Disposal in wastewater treatment plants, which have technologies to recover nutrients (phosphorus) from sewage sludge, enabled closed nutrient cycles in the Tempelhof Lab.

Conventional concept:
Event service providers rely on chemical portable toilets, driven by price and lack of available alternatives.

Tempelhof Lab: use of mobile toilets with biodegradable agent and disposal in wastewater treatment plant that recovers phosphorus from sewage sludge.

Ideal concept:
Focus on composting toilets. In water-flushed toilets, graywater is kept in circulation. Recovery of nutrients also from portable toilets and urinals.

*The osmosis system was in use, but not enough water was flowing at the hand wash basin in question to activate it.