

Faecal Sludge Treatment Plant (FSTP), Leh

BACKGROUND

Leh, a high altitude cold desert at 12,000 feet in Jammu & Kashmir, India, has rapidly become a popular tourist destination with 2,80,000 visitors annually. The city is building a sewerage system that in the near future will connect about 40% of the city, but today, house holds, hotels and guest houses use septic tanks and soak pits for on-site containment of sewage.

As most of the septic tanks are poorly designed and the underground water table is high (only 30 feet in some places), in 2017 there was early evidence of water contamination, possibly due to overflowing septic tanks. Borewells are extensively used for drinking water, therefore water pollution can have serious health and economic consequences.

Therefore, the Municipal Committee of Leh (MCL) ordered that septic tanks are to be made water tight and mandatorily desludged every year. The town needed a FSTP to safely treat and reuse the sludge.

The FSTP must handle both the challenges of high altitude and extreme climatic conditions, as well as highly variable sludge inflow as activities will be minimal in the winter.

This treatment plant is designed by BORDA and CDD Society and executed by MCL and Blue Water Company, a sanitation providing services company that is providing end-to-end Faecal Sludge Management Services to improve sanitation, health and the environment in Leh and serve as a model to other towns.

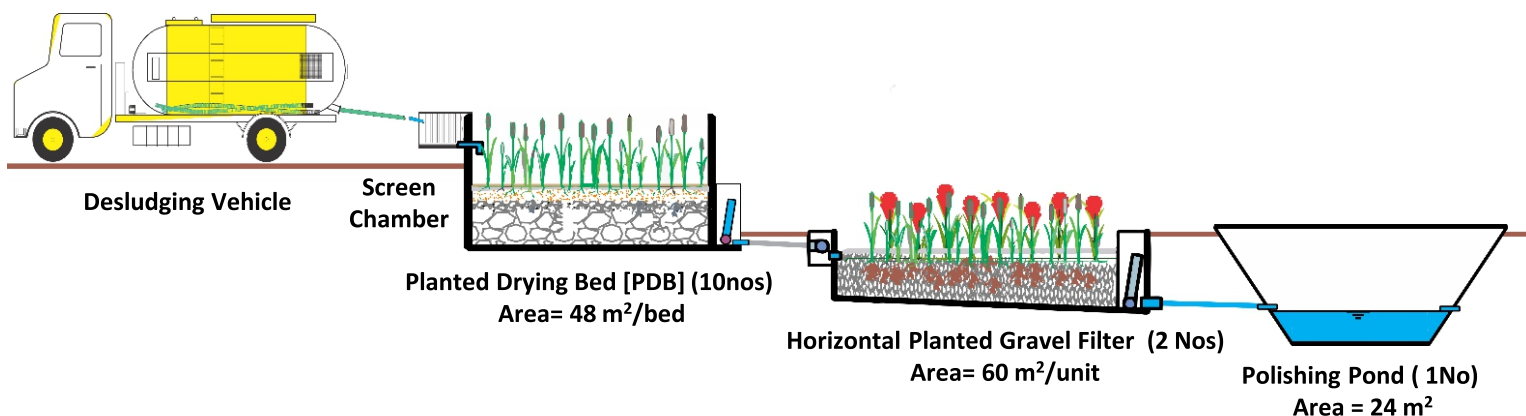
FEATURES AND BENEFITS

- Planted Drying Bed Technology used in India for first time - robust and flexible for extreme conditions
- No human contact with faecal sludge
- Minimal odour during entire process and aesthetically designed to locate it near habitation
- Gravity-based system, based on natural and biological treatment with no use of chemicals or electricity – green and ecofriendly system
- Minimal and simple operations with no skilled operator required – minimizing O&M costs
- Supporting greening of Leh as a nursery has been set-up and uses the treated water

FEATURES AND BENEFITS

Construction Period	7 weeks
Construction Cost	Rs. 52 lakhs (Rs. 4.33 lakhs/m ³)
Total Area	~ 60 m ² /m ³
Population served	~30,000
Design capacity	12 m ³ /day
Sludge Loading Rate	100 kgTS/m ² /Yr
Effluent quality	BOD < 30 mg/l

Commissioned in Aug-2017, the FSTP has treated over 2.2 Million liters of faecal sludge in under 10 months of operations.



PRIMARY MODULES

The system is designed for simple and robust O&M.

1. Planted Drying Bed (10 units)

Solid-liquid separation and digestion of solid fraction
Capacity: 12 m³/day/bed | Area: 48 m²/bed

2. Horizontal Planted Gravel Filter (2 units)

Treat liquid fraction using plants and controlled flow
Area: 60 m²/unit

3. Polishing Pond (1 unit)

Ultraviolet disinfection of water and storage
Area: 24 m²
Filter material: Graded Gravel, Sand
Plants: Phragmites karka, Canna indica

SUITABILITY & OPTIONS TO IMPROVE

- The FSTP is designed to operate optimally in Leh's climatic conditions-dry climate with strong sunshine. In winter, septic tanks freeze and cannot be desludged so the FSTP is shut for 4 months, but the treatment of old sludge continues under the sunlight.
- The capacity can be increased easily by building PDB modules.
- Greenhouses can be built on the PDBs to further improve and speed up the treatment process.

OPERATIONS & MAINTENANCE

Operations: Each day, 4-5 PDBs are filled with 3,500 liters of sludge each and allowed to dry. The excess water percolates and is treated as it flows through the HPGF, and is collected in the polishing pond where sunlight provides further disinfection. The plants and sunlight assist in digestion and disinfection. Once the sludge accumulates to a height of about 0.9m in the PDB (in 3-4 years), it is removed and can be used as an organic soil conditioner.

Maintenance: Daily and weekly maintenance involve checking pipes and clearing blockages, trimming plants and cleaning the screen chamber.

REUSE OPTIONS

A plant nursery and greenhouse have been developed on-site where the treated water is used to grow and sell plants to make Leh more green. The dried and treated compost will also be used as a soil conditioner for the nursery. Excess water can be used in a children's playground that is being developed near the plant.

Supporting Agencies :

NFFSM Alliance; Bill and Melinda Gates Foundation; Ladakh Autonomous Hill Development Council (LAHDC); Federal Ministry for Economic Cooperation and Development, Germany (BMZ); Tourism Development Authority, J&K Govt.; All Ladakh Hotel and Guest House Association; Public Works Department, Leh; J&K Bank; Ladakh Ecological Development Group; LhaRiSa Resorts

Executing Agencies :

Municipal Committee of Leh; Ladakh Development Authority; Blue Water Company; Ladakh Environment and Health Organisation; Dorje Tsering Construction Company; CDD Society; BORDA