

# Nepal Sanitation Tour For Citywide Inclusive Sanitation Learning and Sharing

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Learning visit to explore the sanitation initiatives in Nepal for the achievements of Sustainable Development Goal 6.2



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## ABOUT ENPHO

Established on 4 November 1990, Environment and Public Health Organization in Nepal (ENPHO) is a service oriented, scientific, national non-governmental organization in Nepal and is constantly striving towards sustainable community development, demonstration and dissemination of eco-friendly technologies including drinking water treatment options and sustainable sanitation systems. ENPHO aims to foster eco-friendly societies by delivering high-quality services in Water, Sanitation, and Hygiene (WASH), as well as environmental and public health. Research, innovations and promotion of the WASH technologies and approaches have been the core priorities of ENPHO. ENPHO advocates for integrated community-based approaches, addressing safe water, sustainable sanitation, hygienic behavior, indoor air quality, and environmental monitoring for the creation of healthy and environmentally friendly communities.

As a national NGO with extensive knowledge and experience in sanitation, including Decentralized Wastewater Treatment Systems (DEWATS) and Faecal Sludge Management (FSM), ENPHO collaborates with the Nepal Government to achieve the SDG sanitation goal. Leveraging skilled personnel and professionals in sanitation, ENPHO aims to build local capacities through partnerships with relevant stakeholders. Utilizing its expertise, ENPHO is currently implementing the 'Citywide Inclusive Sanitation Scaling and Sanitation Innovation' project aiming to enhance the capabilities of stakeholders in promoting and implementing Citywide Inclusive Sanitation (CWIS) and FSM at different tiers of government.

## CWIS IN NEPAL

The sanitation target set by the Millennium Development Goal was missed by nearly 700 million people, leading to a shift in focus towards the entire sanitation service chain in the Sustainable Development Goal. The CWIS approach was introduced to address sanitation challenges caused by population growth and urbanization. CWIS approach is a new concept and a paradigm shift in the sanitation sector, which calls for a collaborative effort to bring about the desired sanitation change.

Currently, CWIS is being implemented in over 30 countries, with a notable emphasis on South Asia. Despite these efforts, many developing countries in Central, South, and East Asia still lack safely managed sanitation services. Moreover, only one-fifth of the countries practicing open defecation are on track to eliminate it globally, highlighting the ineffectiveness of traditional sanitation methods over the past decades. CWIS aims to provide sustainable and equitable solutions tailored to local needs, addressing long-standing sanitation issues in these regions. Moreover, the BMGF is scaling up CWIS in Nepal, India, and Bangladesh, focusing on capacity building right from sanitation workers at ground level to policy makers at decision making level.

In Nepal, the significance of CWIS cannot be overstated, given the country's unique socio-economic and environmental context. As a developing nation, Nepal grapples with substantial sanitation challenges that significantly impact public health, environmental integrity, and overall well-being. The urban sanitation crisis, fueled by rapid urbanization, strained infrastructure, and limited access to adequate facilities, presents a formidable obstacle to socio-economic progress. Implementing CWIS strategies is imperative in tackling these challenges. By embracing CWIS principles, Nepal can advance towards ensuring universal access to safe and inclusive sanitation services, thereby promoting public health, preserving the environment, and fostering sustainable urban development.

Since 2021, CWIS has been implemented in Nepal across three distinct thematic areas: 1) Policy and monitoring; 2) Advocacy, and 3) Capacity building. Several cities in Nepal have successfully adopted and executed CWIS principles, excelling in various sanitation components and earning recognition as "Mentor Cities". These cities serve as exemplary models where other peer cities can study and replicate successful sanitation initiatives thus contributing significantly to achieving SDG 6.2.

# CWIS FRAMEWORK

## SERVICE OUTCOME



Services reflect fairness in distribution and prioritization of service quality prices and deployment of public finance / subsidies.



Services safeguard customers, workers, and communities from safety and health risks by reaching everyone with safe sanitation



Services are reliably and continually delivered based on effective management of human, financial and natural resources

## SYSTEM FUNCTION

Service authorities have a clear public mandate to ensure safe, equitable, and sustainable sanitation for all.



Service authorities' performance against their mandate is monitored and managed with data, transparency, and incentives.



Resources—human, financial, natural, assets—are effectively managed at the national/ state level to support execution of mandate across time/space.



# SANITATION TOUR



**5 DAYS**

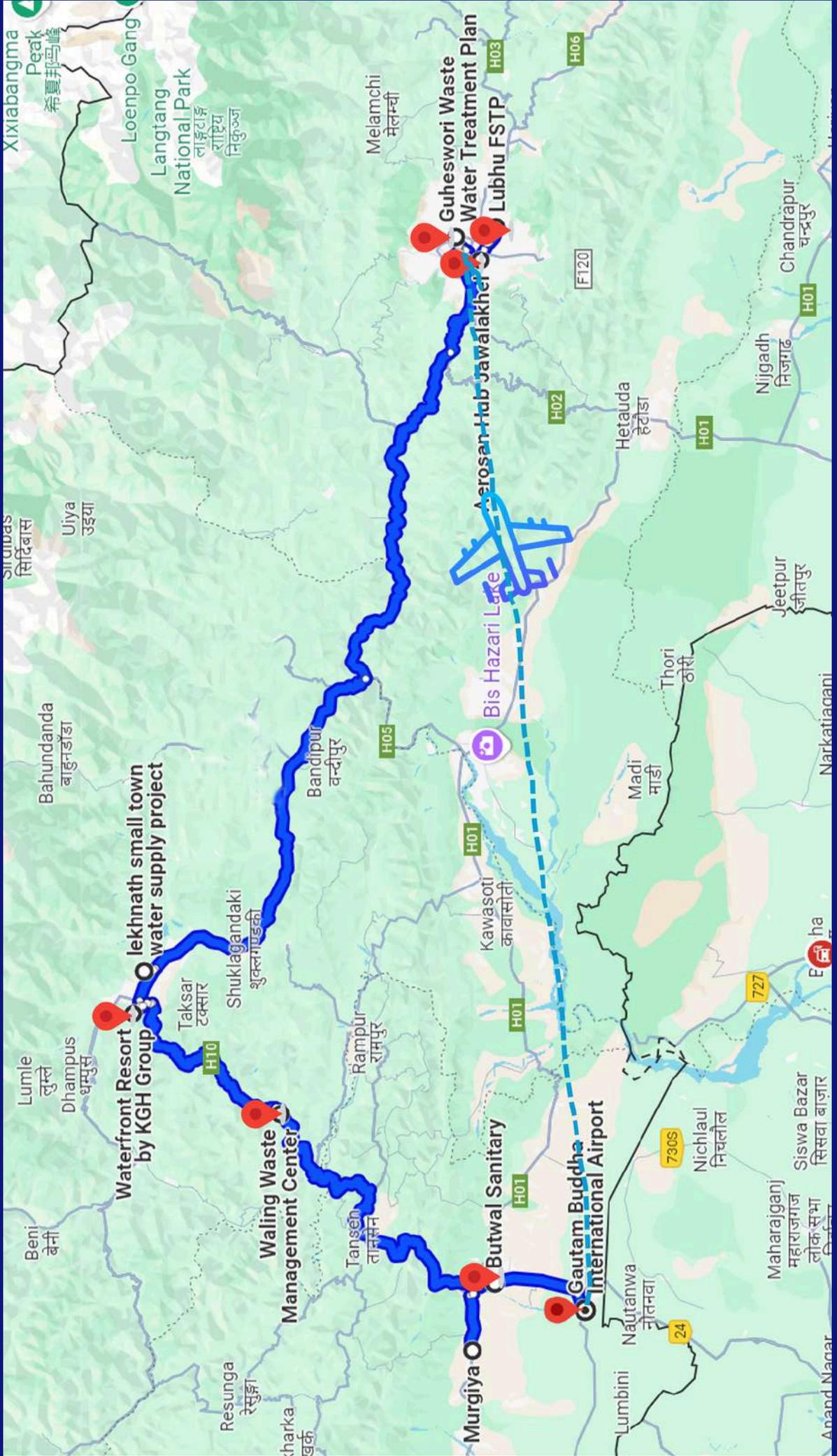
**3 PROVINCES**

**6 CITIES**

**6 SIGHTS**



# Route Map Nepal Sanitation Tour



# NEPAL SANITATION TOUR

The Nepal Sanitation Tour is a strategic initiative designed to highlight successful sanitation initiatives implemented across Nepal. This unique opportunity offers international participants an in-depth exploration of diverse technologies and practices while enabling interaction with stakeholders for a rich exchange of ideas and experiences. The tour aims to provide comprehensive insights into effective sanitation strategies through site visits, demonstrations, and interaction, thereby enriching their theoretical understanding and empowering them to implement relevant strategies in diverse contexts. Besides, the participants get a chance to foster collaboration and connect with experts, practitioners, and organizations dedicated to transformative change.

The 5-day itinerary provides an opportunity for the participants to explore key sanitation initiatives led by various stakeholders. Highlights include visits to mentor cities Mahalaxmi and Waling, a private faecal sludge treatment plant, an inclusive sustainable public toilet, a small scale demonstration FSTP, and a hotel model managing its own wastewater, each sight showcasing innovative and responsible sanitation solutions. The itinerary includes visits to:

- Faecal Sludge Treatment Plant, Lubhu of Mahalaxmi Municipality
- Aerosan Public Toilet, Patan
- Guheswori Wastewater Treatment Plant, Kathmandu
- Waterfront Resort, Pokhara
- Faecal Sludge Treatment Plant, Waling Municipality
- Butwal Sanitary Pvt. Ltd, Tillotama, Rupandehi

## WHAT DOES THE VISIT COVER?

- **Local Government Regulatory Efforts to Strengthen Sanitation Governance**
- **Public-Private Partnerships for Sustainable Sanitation Services**
- **Centralized and Decentralized System for Wastewater and Faecal Sludge Treatment**
- **Recycling, Reuse and Resource Recovery**
- **Viability of Private Sector Sanitation Business Ventures**



# SCHEDULE OF TOUR

Time	Schedule
DAY 1	
09.00 -10.00	Welcome and briefing about Sani Tour
10.30 -11.30	Meet & Greet with Mahalaxmi Executive Board
11.30-01.00	Insights into FSTP Lubhu
01.00-02.00	Lunch -Patan (30 minute travel)
02.00 -02.30	Visit to Aerosan Public Toilet, Patan
02.30-04.30	Patan Heritage Tour
04.30 -05.00	Hi-Tea and return back to hotel
DAY 2	
10.00-12.00	Insights into Guheswori Wastewater Treatment Plant
12.00-01.00	Lunch
01.00-02.00	Fly to Pokhara
03:00-04:00	Waterfront Resort - 4 star hotel treating wastewater
04:00-05:00	Hi-Tea and leisure time
DAY 3	
09.00-11.30	Travel to Waling (By Bus)
11.30-12.30	Meet & Greet with Waling Executive Board
12.30-01.30	Lunch
01.30 02.30	Insights into Faecal Sludge Treatment Plant, Waling
02.30 06.30	Travel to Palpa
DAY 4	
10.00 -12.00	Travel to Butuwal
12.00-01.00	Lunch
01.00-02.00	Insights into Butwal Sanitary Pvt. Ltd
02.00-04.00	Murgiya Dhal
04.00-04.30	Hi-Tea
04.30 -06.00	Travel to Lumbini (By Bus)
DAY 5	
10.00 -12.00	Reflection session
12.00 -01.30	Lumbini to Bhairawa Airport (By Bus)
02.00 -02.30	Back to KTM (By Air)

# INSIGHTS INTO FSTP LUBHU

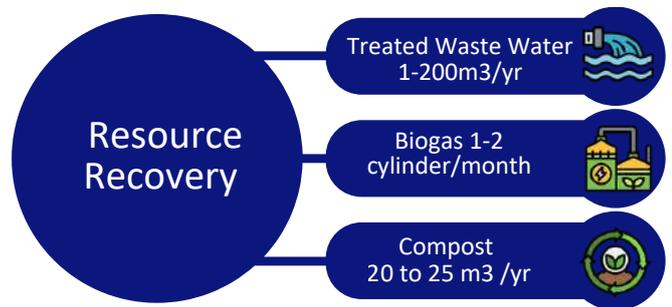
The Faecal Sludge Treatment Plant (FSTP) in Lubhu was established in 2016 following the April 2015 earthquake, primarily to manage the resulting faecal sludge from temporary settlers in the Kathmandu Valley. The FSTP was installed by ENPHO with technical collaboration of BORDA and CDD Society with the land provided by Help for Children Beilngries kathmandu in coordination with Mahalaxmi Municipality. Operating on a gravity flow system, the refurbished FSTP has served as a demonstration site and a learning hub for various stakeholders, including planners, researchers, and students, providing practical insights into sustainable faecal sludge management and resource recovery.



Source: ENPHO

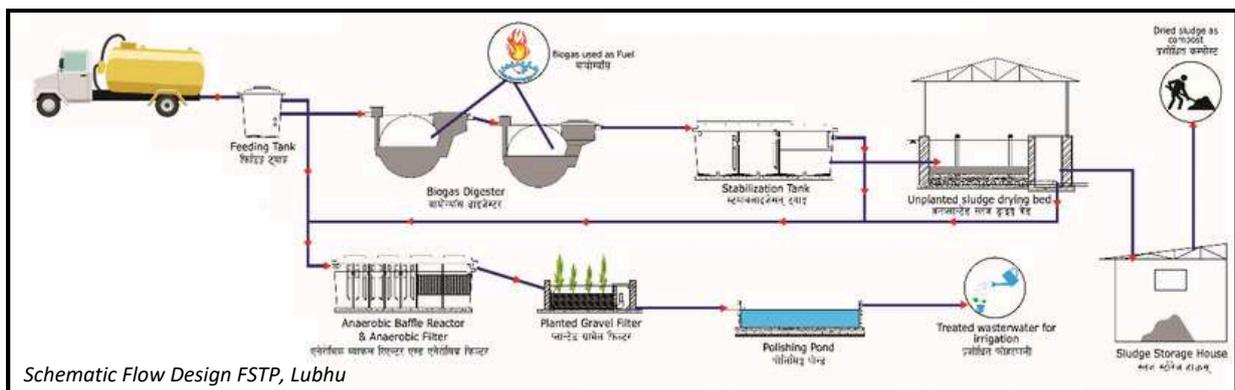
### Resource Recovery

FSTP serves as a demonstration site for effective faecal sludge treatment with resource recovery, processing 6m<sup>3</sup> of faecal sludge per week, producing 1-200 m<sup>3</sup> of treated wastewater annually, 20-25 m<sup>3</sup> of dried sludge annually, and yielding 2 cylinders of biogas each month.



COMPONENTS	CAPACITY
Feeding Tank	4m <sup>3</sup>
Biogas Digester	12m <sup>3</sup>
Stabilization Tank	10m <sup>3</sup>
Unplanted SDB	60m <sup>2</sup>

COMPONENTS	CAPACITY
Settler, ABR & AF	10m <sup>3</sup>
Planted Gravel Filter	15m <sup>3</sup>
Polishing Pond	10m <sup>3</sup>
Sludge Storage House	11m <sup>2</sup>



## KEY FEATURES

Based on gravity system



Adhering to strict OHS guidelines



Providing services beyond the municipal area.



Enhancing capacity of operator and managers.



Selling extra compost for revenue and waste reduction.



Collection of tipping charge NRP 500 and reinvesting it on O&M.



Conducting quarterly effluent tests and yearly dry sludge tests.



Providing regular medical checkups and medical insurance for operator.



Offering gloves, masks, and handwashing stations with soap and water.



Written agreements between desludgers and municipality for sludge disposal.



Operating under a 3-year agreement with ENPHO, the Municipality, and Help for Children.



Recovery of resources such as compost, effluent water, and biogas and their reuse.



Offering variable visiting fees based on group size along with discounted rates for students.



Minimizing waste and generating annual savings of around NRP 43,000 through (tipping fees, visitor charges, and sales of vegetables and compost)



The Municipality allocating annual budget for O & M, ENPHO providing technical support and Help for Children appointing dedicated staff to oversee FSTP operations, ensuring proper functionality, and record-keeping.



# VISIT TO AEROSAN PUBLIC TOILET

Aerosan is an organization focused on providing innovative sanitation solutions, particularly in regions affected by natural disasters. In the aftermath of the 2015 earthquake in Nepal, Aerosan partnered with local NGOs to address critical sanitation needs. Operating through a public-private partnership with local municipalities, Aerosan has expanded its network of Public Toilet HUBs in the Kathmandu Valley. To date, they have constructed and managed 10 public toilets across different locations in the Kathmandu Valley.



Source: ENPHO



Source: ENPHO



Source: <https://www.aerosantoilets.ca/model>

<p><b>User-friendly</b> User-centered design includes female friendly and disabled friendly facilities that are both attractive and hygienic</p>	<p><b>Revenue-Generating</b> Revenue generating business model that creates local job opportunities</p>
<p><b>Hygienic</b> Hygienic facilities using internationally developed cleaning protocol to protect the health of our customers</p>	<p><b>Highly trained staff</b> Highly trained toilet operators that work in dignified working conditions</p>
<p><b>Waste-to-Value</b> Environmentally sustainable waste to value system that produces renewable energy</p>	<p><b>IT-monitored</b> IT-enabled remote monitoring and management system</p>

Source: <https://www.aerosantoilets.ca/model>



Source: ENPHO

## SCALING OUR MODEL

The AEROSAN HUB model is designed to scale in order to improve reliable sanitation access to underserved communities.

Remote Monitoring	Cross-Subsidization	Local Capacity Building

Source: <https://www.aerosantoilets.ca/model>

## KEY FEATURES

Environmentally sustainable.



Strategic partnerships to scale solutions.



Develop solutions for economic sustainability.



Waste to value system that produces renewable energy.



IT-enabled remote monitoring and management system.



Policy advocacy and campaigns to support scalable solutions.



Women participate in the design and management of toilet facilities.



Highly trained toilet operators that work in dignified working conditions.



Revenue generating business model that creates local job opportunities.



Ensure marginalized communities capture value from sanitation market opportunities.



Bottom-up approach to design & implementation of technological and business solutions.



Hygienic facilities using internationally developed cleaning protocol to protect the health of our customers.



User-centered design includes female friendly and disabled friendly facilities that are both attractive and hygienic



# INSIGHTS INTO GUHESHWORI WASTEWATER TREATMENT PLANT

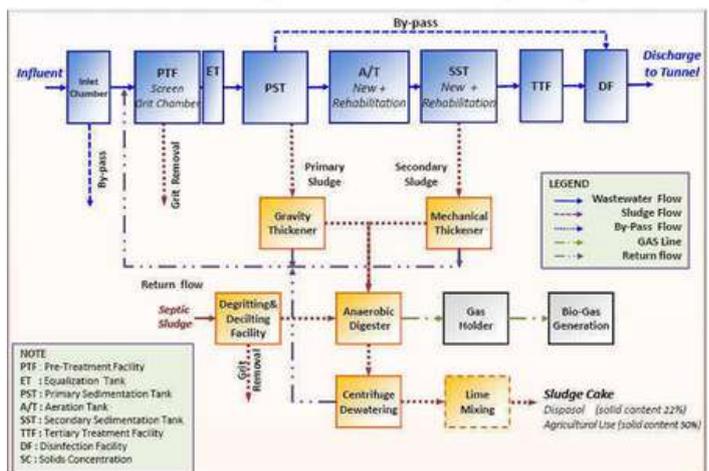


The Guheshwori Wastewater Treatment Plant, located in Kathmandu Metropolitan City, is co-financed by the Asian Development Bank (ADB) and operates under the Project Implementation Directorate (PID) of Kathmandu Upatyaka Khanepani Limited (KUKL) with the objective of restoring the Bagmati River by treating its wastewater. Operational since February 2002 the plant has a capacity to process 32.4 million liters of wastewater daily, although it currently operates below its full capacity. Presently, households connected to the sewer system do not pay a fee, but plans are in place to introduce a usage fee after the contract period concludes, aiming to sustain the plant's operations and maintenance efforts in the long term.

## Guheshwori WWTP Details

Type	Centralize Concept
Land used	2.86 Hectares
Service Area	995 Hectares
Commencement Date	2001 First Phase/2020 Second Phase
Design Period	25 first Phase expected /20 Years second phase.
Designed-Build-Operate	Cost of Design and Build Rs.2,04,29,26,328.00 and Operation for 10 Yrs Rs 37, 22,79,789.00 incl. VAT
Base Year Population (2020)	300000
Domestic Wastewater	80 lpcd
Industrial Wastewater	14 L/s
Wastewater characteristic	Combine wastewater (Domestic and Industrial Storm)
Contract Agreement	19 May 2016
Design Wastewater flow	32.4 MLD/0.375 Cumec

Process Flow Diagram of Guheshwori WWTP (32.4MLD)



Source: Asian Development Bank

## KEY FEATURES

Adhering to stringent safety protocol.



Closing the loop on waste management.



Serving neighborhoods like Mitrapark, Chabahil, Bouddha, and Jorpati.



Ensuring equitable access to sanitation services across these areas.



Minimizing health risks and ensuring a safe working environment for staff.



Maintaining anaerobic conditions for optimal sludge treatment temperatures.



Converting excess sludge into biofertilizer and manure to support agriculture.



Processing up to 32.4 million liters of wastewater daily from multiple neighborhoods.



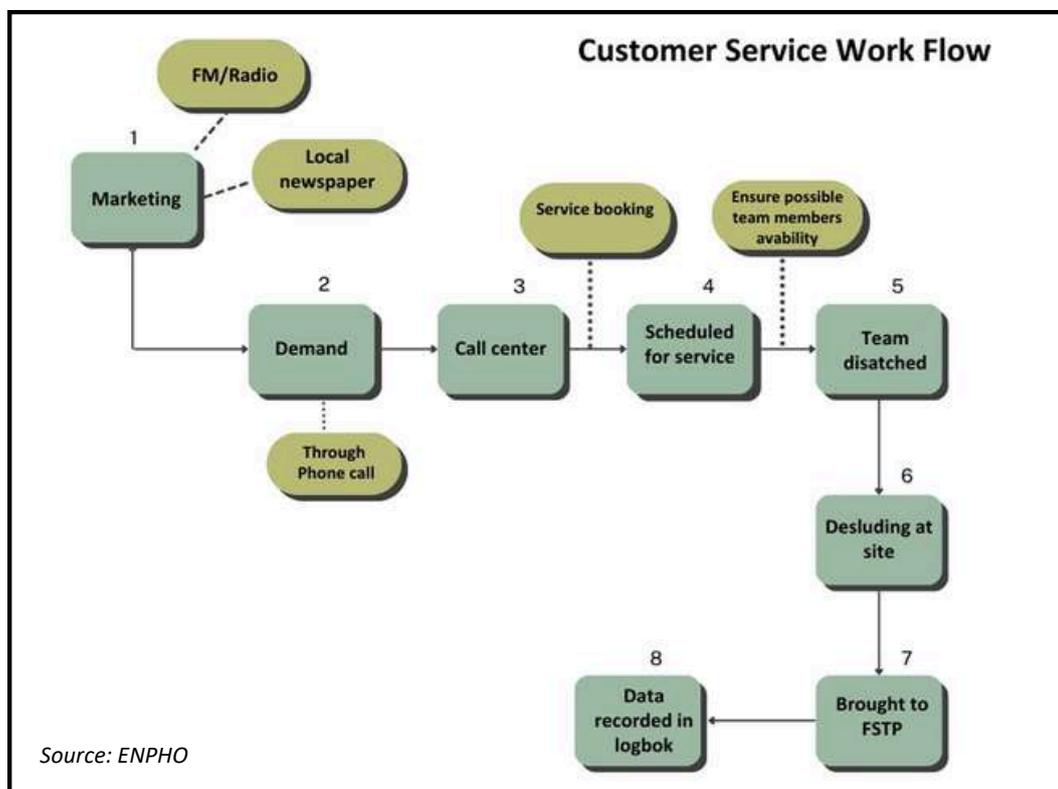
Generating biogas from sewage sludge to produce electricity, reducing external energy dependency.



## INSIGHTS INTO BUTWAL SANITARY



Butwal Sanitary Pvt. Ltd., founded through the collaboration of seven private desludging companies, not only provides essential desludging services but also operates its own Faecal Sludge Treatment Plant (FSTP). Beginning with basic drying beds and expanding to include advanced facilities like a thickening tank and a dewatering machine, the plant now has the capacity to treat 12,000 liters of faecal sludge daily and produce 800 kg of organic fertilizer, the company efficiently manages administrative tasks through a centralized call center, ensuring seamless service delivery for its clients.



## KEY FEATURES

Owned by 7 private investors.



Producing 800 kg of organic fertilizer.



Transparent management practices.



Reducing reliance on chemical fertilizers.



Treating 12,000 liters of faecal sludge daily.



Regular testing of effluent & fertilizers.



Strict adherence to health and safety protocols.



Establishing an office within the city ward for local convenience.



Implementing a call center to streamline desludging service requests.



Maintenance of comprehensive records and documentation of sanitation service chain.



Providing accessible and efficient sanitation services to residents of Butwal Sub-Metropolitan City.



Prioritizing safety to maintain a secure environment for employees and visitors by providing mask, gloves.

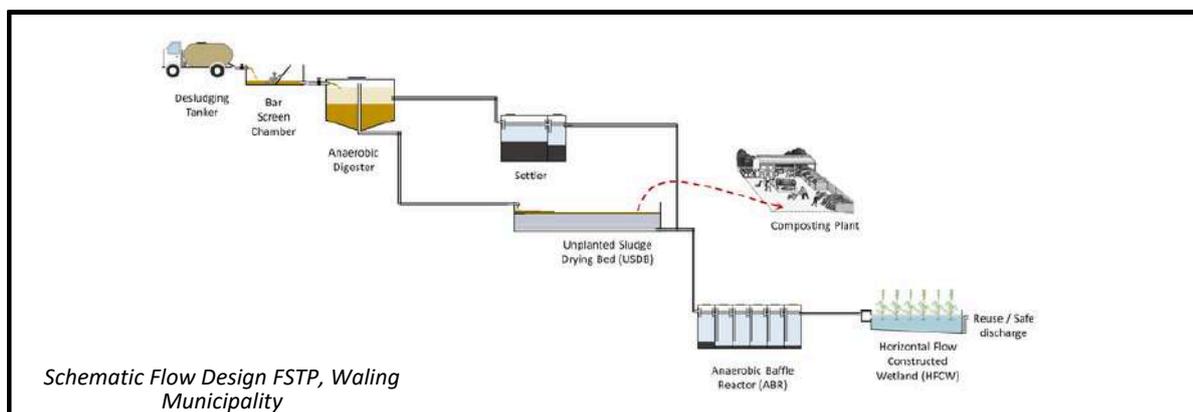


# INSIGHTS INTO FAECAL SLUDGE TREATMENT PLANT, WALING



Waling Municipality is the first municipality to completely fund and operate a Faecal Sludge Treatment Plant, with technical support from ENPHO in designing the plant's DPR. Operating on a gravity system, the plant can treat 6 cubic meters of fecal sludge daily, producing treated water suitable for gardening. The facility also features a park area serving as both a picnic spot and a research center.

COMPONENTS	CAPACITY
BAR SCREEN	1.7 X 1 X 0.6 M
THICKENING TANK	2.3 X 2.3 X 1.2 M
SETTLER	3.0 X 1.5 X 1.5 M
ANAEROBIC DIGESTER	3.5*2.5*1.2 M WITH 2 CHAMBER
SLUDGE DRYING BED	15 BEDS – 11 X 1.5 X 0.85 M
ANAEROBIC BAFFLE REACTOR	12 CHAMBERS – 1 X 1.5 X 1.8 M
CONSTRUCTED WETLAND	3 X 10 X 0.5 M



## KEY FEATURES

Ensuring safety for visitors to the facility.



Treated water used for gardening of FSTP.



Maintaining a safe working environment for plant operators.



Using sludge cake as fertilizer to support local agricultural practices.



Utilizing a nature-based system to treat 6 cubic meters of faecal sludge daily.



Enhancing sanitation services accessible to all residents of Waling Municipality.



Supporting local agriculture and enhancing sanitation services in the municipality.



Establishment of the Waling Municipal Sanitation Centre with access to essential sanitation facilities and services for the entire community.



Conceptualizing the FSTP as a "Resource Center" to maximize by-product utilization such as sludge cake and treated water.



## WATERFRONT RESORT- A 4 STAR HOTEL TREATING ITS WASTEWATER



Waterfront resort, lying on the shore of Phewa Lake is one of the renowned 4-star hotels in Pokhara. The resort overlooking Phewa Lake has a remarkable lake view and is arguably one of the best sites to watch the splendor of this serene water body. However, the contamination of this water body by the wastewater generated from the hotel also remains a concern for stakeholders. Yet, the hotel has succeeded in pioneering the management of wastewater generated.

When the concern for the contamination of Phewa Lake was raised, the hotel management decided to manage their wastewater themselves, as it was located on the banks of the lake. In this regard, with technical support from UN-HABITAT and a financial investment of 1.5 million, a wastewater treatment plant was constructed. The system came into operation in 2012. Till date, the hotel has been managing both grey water and black water within their premises through the treatment plant.

## KEY FEATURES

Implementing transparent management practices.



Meticulous planning for safety in design and operation.



Regular testing of treated water assures safety for guests.



Treatment plant regenerates more than 90% of reusable water.



Manages financial and human resources to ensure efficient plant operation



Treated water stored & used for property maintenance, significantly reducing water costs.



Emphasizing long-term planning and sustainability for wastewater treatment services.





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