

CASE STUDY

Total Water Management at

PRANNATH HOSPITAL

SARDARSHEHAR

Project by
Enhanced Wapp Systems India Pvt. Ltd.

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PROJECT OVERVIEW



Project Name: Prannath Hospital, Sardarshehar

Project Type: Greenfield Development

Water Treatment Plant (WTP) : 150 KLD

Drinking Water System : 4 m³/hr

Grey Water Treatment : 90 KLD

Black Water Treatment : 60 KLD

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PROJECT OBJECTIVE

The Prannath Hospital project was designed with a holistic Total Water Management (TWM) approach, aiming to ensure sustainability, operational efficiency, and regulatory compliance.



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KEY OBJECTIVES

- ◀ Water Treatment Plant (WTP)
- ◀ Drinking Water System
- ◀ Grey Water Treatment
- ◀ Black Water Treatment
- ◀ Total Water Management (TWM) Goals

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WATER TREATMENT PLANT (WTP)

- ◀ To treat raw water and make it suitable for utility and further purification
- ◀ To remove turbidity, suspended solids.
- ◀ To ensure consistent feed quality for downstream RO systems



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DRINKING WATER SYSTEM

- ◀ To produce safe, potable water meeting drinking standards
- ◀ To ensure removal of dissolved salts, pathogens, and contaminants via RO
- ◀ To provide continuous supply for hospital consumption

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GREY WATER TREATMENT

- ◀ To treat wastewater from bathrooms, wash basins, and laundries
- ◀ To enable reuse of treated water for flushing, reducing freshwater demand
- ◀ To minimize discharge and improve water circularity

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BLACK WATER TREATMENT

- ◀ To treat high-strength sewage from toilets
- ◀ To ensure efficient organic load reduction using anaerobic processes
- ◀ To reduce sludge generation and energy consumption

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TOTAL WATER MANAGEMENT (TWM) GOALS

- ◀ To treat wastewater from bathrooms, wash basins, and laundries
- ◀ To enable reuse of treated water for flushing, reducing freshwater demand
- ◀ To minimize discharge and improve water circularity



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SCOPE OF WORK

The project execution included end-to-end implementation

- ◀ Engineering & Design
- ◀ Supply & Installation
- ◀ Testing & Commissioning

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ENGINEERING & DESIGN

- ⌚ Process design and hydraulic calculations
- ⌚ Preparation of PFDs (Process Flow Diagrams) and layout drawings
- ⌚ Equipment sizing and selection
- ⌚ Integration of all treatment systems under TWM framework

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SUPPLY & INSTALLATION

- ◀ Supply of all mechanical and electrical equipment
- ◀ Installation of treatment units, piping, pumps, and instrumentation
- ◀ Integration of automation systems

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TESTING & COMMISSIONING

- ◀ Trial runs of all systems
- ◀ Performance validation against design parameters
- ◀ Operator training and handover



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TECHNOLOGY SELECTION

WTP : Multi Grade Filter (MGF) + Activated Carbon Filter (ACF)

Drinking Water : Reverse Osmosis (RO)

Grey Water : Advanced Oxidation Process (AOP)

Black Water : Vortex + Anaerobic Treatment



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TREATMENT PROCESS DESCRIPTION

- ◀ Water Treatment Plant (WTP)
- ◀ Grey Water Treatment System
- ◀ Black Water Treatment System

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WATER TREATMENT PLANT (WTP)

Process Flow

Raw Water → MGF → ACF → RO

Description

- MGF: Removes suspended solids and turbidity
- ACF: Removes organic matter, color, and odor
- RO: Ensures removal of dissolved salts for high-quality applications

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GREY WATER TREATMENT SYSTEM (90 KLD)

Reuse Application: Flushing

Process Flow

Collection → Coagulation → Flocculation → Tube Settler → MGF → UF → Reuse Tank

Description

- ◀ **Coagulation & Flocculation:** Aggregation of fine particles
- ◀ **Tube Settler:** Efficient solid-liquid separation
- ◀ **MGF:** Removal of residual turbidity
- ◀ **UF (Ultrafiltration):** Ensures pathogen-free water
- ◀ **Outcome:** Treated water reused for flushing, reducing freshwater demand significantly

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BLACK WATER TREATMENT SYSTEM (60 KLD)

Process Flow

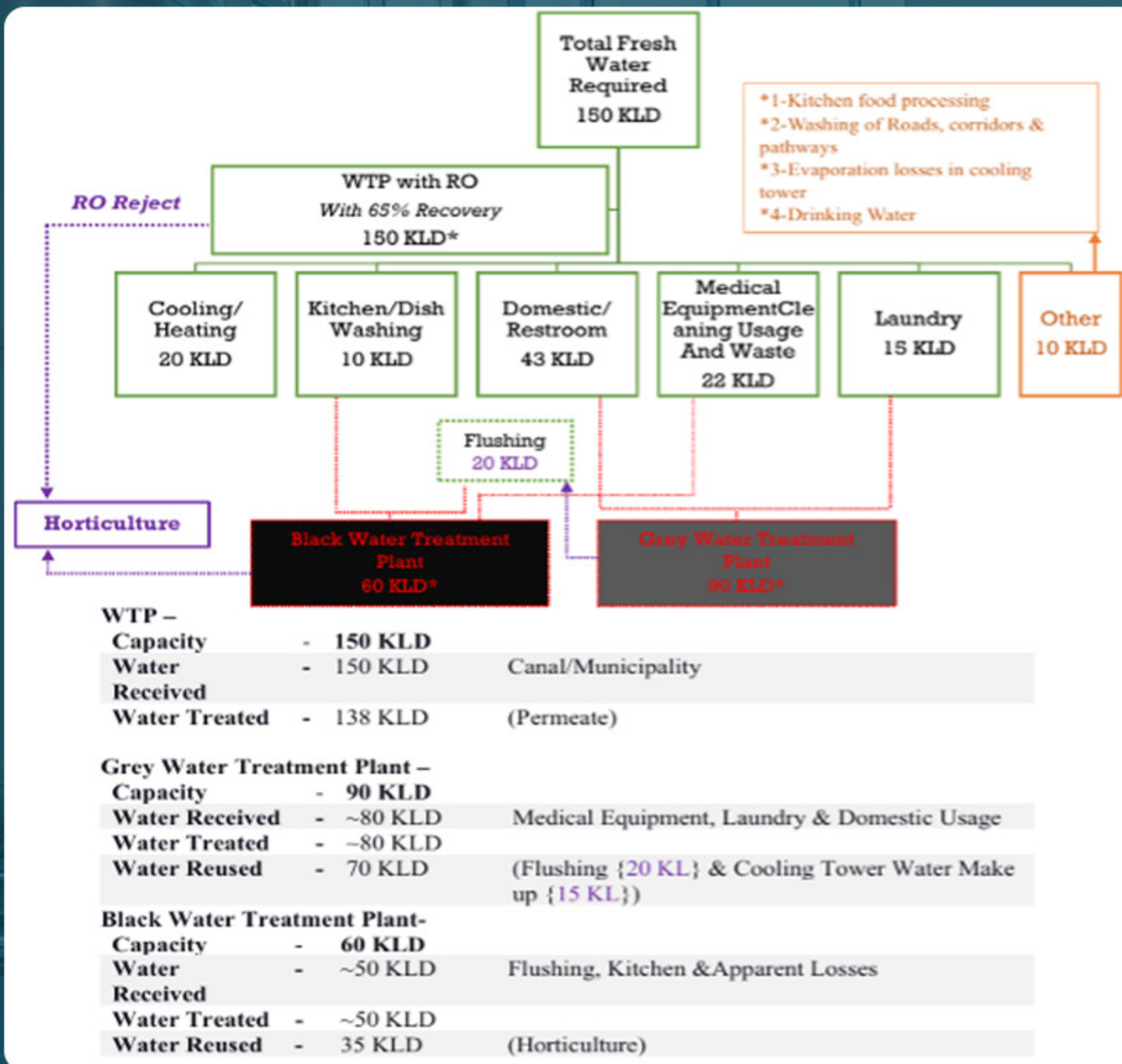
Collection → Settler → Anaerobic Chamber → Vortex System → Glass Media Filter → Discharge/Reuse

Description

- ⏪ Settler: Primary removal of solids
- ⏪ Anaerobic Chamber: Biological degradation of organic matter
- ⏪ Vortex Technology: Enhances treatment efficiency with low energy input
- ⏪ Glass Media Filter: Final polishing and suspended solids removal

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Water Balance (Water Data and Water Equations)



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KEY OUTCOMES & BENEFITS

- ◀ **Freshwater Reduction:** Significant reduction through grey water reuse & Black water reuse
- ◀ **Operational Efficiency:** Low energy systems like anaerobic and vortex reduce OPEX
- ◀ **Compact Design:** Suitable for hospital infrastructure
- ◀ **Sustainability:** Supports green building and environmental compliance
- ◀ **Water Circularity:** Integration of WTP, STP, and reuse systems

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CONCLUSION

The Prannath Hospital project demonstrates a comprehensive **Total Water Management solution** for health-care infrastructure. By integrating **advanced treatment technologies with reuse strategies**, the system ensures

Reliable water supply | Reduced environmental impact | Long-term sustainability