



RHELGAN

DEVELOPMENT & HUMANITARIAN SYSTEMS

WATER STORAGE & SUPPLY SYSTEMS

Water infrastructure planned as one system.

Planning & specification guide for international housing, community, education, healthcare, recovery and remote-infrastructure projects.

01	02	03	04	05	06
SOURCE	RAW STORAGE	TREATMENT	CLEAN STORAGE	PUMPING	DISTRIBUTION

Start with demand, source water and site conditions - not with a tank size.

RHELGAN structures water projects from source through storage, treatment, pumping and distribution. The final package is selected from actual demand, water quality, required autonomy, destination conditions and operating responsibilities.

01	02	03	04	05	06
SOURCE WATER	RAW WATER STORAGE	PROJECT- SELECTED TREATMENT	CLEAN WATER STORAGE	PUMPING / PRESSURE	DISTRIBUTION

WHY THE SEQUENCE MATTERS

One technology does not suit every water source.

Rainwater, groundwater, surface water, municipal water, brackish water and seawater can require materially different treatment trains. RHELGAN does not automatically specify reverse osmosis.

PROJECT CONTROLS

Capacity is only one design input.

Storage must be coordinated with daily demand, source reliability, treatment output, desired autonomy, site footprint, tank material, environmental loads, pumping and distribution.

Scope principle. Standard configurations are planning starts, not fixed bills of materials. Final potable-water certification, structural design, foundation, treatment, pumping, electrical, pipework and local requirements are confirmed against the selected project package.

Fifteen repeatable starting points.

The configuration codes organise early procurement and technical review. Population references describe the intended planning class; final sizing remains project-specific.

RW-H01

Household Water System

Remote and off-grid housing.

5-20 m³ planning range

RW-H02

Housing Cluster Water System

Small housing and staff-accommodation clusters.

20-50 m³ planning range

RW-S01

School Water System

Schools and education facilities.

20-50 m³ planning range

RW-S02

Large School & Campus

Larger schools and training campuses.

50-150 m³ planning range

RW-M01

Clinic Water System

Clinics and primary healthcare facilities.

20-50 m³ planning range

RW-M02

Health Facility Water System

Larger healthcare facilities.

50-200+ m³ planning range

RW-C250

Community 250

Small community water supply.

20-50 m³ planning range

RW-C500

Community 500

Village and settlement water supply.

30-100 m³ planning range

RW-C1000

Community 1,000

Larger community infrastructure.

50-200 m³ planning range

Community, emergency and source-specific pathways.

RW-C2500

Community 2,500

Major community and development projects.

100-500+ m³ planning range

RW-E250

Emergency 250

Rapid-response and recovery operations.

5-10 m³ flexible storage range

RW-E500

Emergency 500

Camps and disaster-response projects.

10-30 m³ flexible storage range

RW-E1000

Emergency 1,000

Larger emergency-response projects.

30 m³+ flexible storage range

RW-RH

Rainwater Harvesting

Housing, schools, clinics and community facilities.

Project-sized

RW-SB

Solar Bore Water System

Remote communities and facilities.

Project-sized

Emergency systems and permanent community systems are treated as different procurement pathways. Short-duration minimum supply is not used as a long-term community design target.

Engineered transition. As project scale and consequence increase, RHELGAN moves from standard planning classes toward project-specific treatment, storage, pumping, redundancy and distribution engineering.

Storage classes for early-stage project definition.

CLASS	PUBLIC DESCRIPTION	PLANNING RANGE	TYPICAL USE
MWS-20	Compact Modular Storage	Up to approx. 20 m ³	Small facilities, housing clusters and local storage
MWS-50	Facility Modular Storage	Approx. 20-50 m ³	Schools, clinics, housing and small communities
MWS-100	Community Modular Storage	Approx. 50-100 m ³	Community and institutional water systems
MWS-200	Large Community Storage	Approx. 100-200 m ³	Larger community and development projects
MWS-500+	Infrastructure Modular Storage	Approx. 200-500+ m ³	Large developments and infrastructure programmes
ENGINEERED	Engineered Water Storage	Project-specific	Major storage requirements outside standard planning classes

PRIMARY MODULAR PATHWAY

GRP sectional storage

The primary modular-storage pathway for suitable projects. Sectional construction is well suited to containerised international logistics and site assembly, with final evidence and engineering confirmed for the selected configuration.

SPECIALIST MATERIAL PATHWAY

Stainless modular storage

Retained for healthcare, hygiene-sensitive or project-specified applications. Grade and construction are selected against the actual water chemistry and environment.

Evidence gate. Do not assume a material is potable-water approved merely because it is commonly used for water storage. Exact certificates, seals, liners, coatings, penetrations and finished-system scope must be confirmed for the selected package.

Five decisions shape the first technical recommendation.

01

Define the users and application.

Household, school, clinic, community, emergency, rainwater or solar-bore projects start from different operating requirements.

02

Establish source and water quality.

Rainwater, bore, surface, municipal, brackish and seawater sources require different treatment investigations.

03

Size daily demand and autonomy.

Known daily demand, source reliability and desired days of storage define the initial storage envelope.

04

Define site and energy conditions.

Footprint, elevation, coastal/tropical exposure, wind/seismic inputs and available power influence tank, pump and control selection.

05

Close treatment and distribution interfaces.

Gravity, boosted pressure, bore pumping, solar pumping, treatment, controls and monitoring are integrated around the project rather than appended later.

The information that makes an early water-system review useful.

Project country + site Country, region, access and destination conditions.	Project type Housing, school, clinic, community, emergency, remote or other.
People / users Population, students, staff, beds or peak users.	Intended water use Drinking, domestic, WASH, healthcare, fire, irrigation or mixed.
Water source Bore, rainwater, surface, municipal, delivered, brackish, seawater or mixed.	Water analysis Laboratory report, field data, testing planned or not yet available.
Daily demand Known L/day or m ³ /day, or request calculation support.	Storage autonomy Target days of supply and source reliability.
Footprint + installation Ground, indoor, elevated, available plan area and maximum height.	Environment + hazards Tropical, coastal, high UV, high wind, seismic, flood, altitude or cold.
Power Grid, weak grid, generator, solar, hybrid or no available power.	Distribution Gravity, pumped pressure, combined or tank filling only.
Treatment position Storage only, treatment required, existing treatment or source-led evaluation.	Monitoring Local controls, remote level/alarm monitoring or full system monitoring.
Programme timing Tender, procurement phase, production and required delivery.	Documents RFP, site plan, water test, bore data, hydraulic brief, drawings or specifications.

A complete project design is not required to start. Unknown information can stay unknown; the purpose of the brief is to expose the next technical questions before procurement is locked.

Water infrastructure is divided into clear project pathways.

The standard configurations describe who the system serves. The capability pathways below describe the technical part of the water system that needs to be resolved.

COMMUNITY

Community Water Systems

Source-to-distribution infrastructure for villages, settlements and complete communities.

HOUSING

Housing Water Systems

Individual, cluster and programme-scale residential water pathways.

EDUCATION

School Water Systems

Drinking, WASH, cleaning and campus supply planned together.

HEALTH

Healthcare Water Systems

Higher-reliability storage, treatment, pressure and monitoring for health facilities.

EMERGENCY

Emergency Water Systems

Rapid treatment, flexible storage and controlled distribution for response and recovery.

RAINWATER

Rainwater Harvesting

Catchment, screening, first flush, storage, treatment and controlled distribution.

GROUNDWATER

Bore & Groundwater

Yield, pump duty, chemistry, treatment and storage planned from the source.

SOLAR

Solar Water Pumping

Off-grid pumping sized from daily volume, source yield, head and seasonal solar resource.

DISTRIBUTION

Water Distribution Networks

Trunk mains, pressure zones, branches, isolation and future expansion.

Selection principle. Start with the user and source, then move into the technical pathway. A project may use several of these sections at once.

Storage, treatment, pumping and controls remain connected.

TREATMENT

Water Treatment Systems

Source-specific process selection for rainwater, bore, surface, municipal, brackish and seawater.

DESALINATION

Desalination & Brackish Water

Pretreatment, membrane process, recovery, reject management, remineralisation and energy.

MODULAR PLANT

Containerised Water Treatment

Transportable skid and containerised plant for remote and repeatable project delivery.

PUMPING

Pump & Pressure Systems

Bore, transfer, booster and distribution duties selected from actual flow and head.

GRAVITY

Elevated & Gravity Systems

Use terrain or elevated storage to create useful head and reduce pumping dependence.

CONTROLS

Controls & Monitoring

Levels, pressure, pump logic, process alarms and remote visibility where useful.

RAPID STORAGE

Flexible Water Storage

Collapsible pillow, bladder and self-supporting storage for response and temporary use.

BULK STORAGE

Large Water Storage

Engineered modular or bolted storage for larger communities and infrastructure projects.

FIRE WATER

Fire Water Storage

Dedicated reserve storage coordinated with the responsible project fire design.

No isolated equipment logic. A tank, pump or treatment skid only becomes useful when source conditions, demand, controls, distribution and long-term operation are defined around it.

Institutional water systems are sized around what the facility actually does.

HOUSING

Residential programmes

Household and cluster systems can combine rainwater, bore, bulk or municipal sources with shared or distributed storage.

Occupancy · autonomy · pressure · maintenance

SCHOOLS

Education water

Drinking water, toilets, showers, cleaning, kitchens and boarding can create different daily and short-duration peak demands.

Students · staff · WASH · campus spread

HEALTH

Healthcare water

Critical water uses, storage reserve, treatment, pressure and redundancy are linked to the actual clinical service model.

Quality · continuity · monitoring · backup power

COMMON ARCHITECTURE

01	02	03	04	05	06
Source	Storage / buffer	Treatment	Clean storage	Pressure	Facility use

PROJECT	DEMAND QUESTIONS	RELIABILITY QUESTIONS	CONNECTED RHELGAN SCOPE
Housing	Homes, occupancy, indoor/outdoor use, growth	Source reliability, autonomy, pressure, local maintenance	Housing + rainwater + community water
School	Students, staff, WASH fixtures, kitchens, boarding	Break-time peaks, cleaning, dry-season supply, campus elevation	Education + WASH + school water + power
Health	Clinical services, patients, staff, hygiene, laundry	Reserve volume, treatment continuity, duty/standby, critical alarms	Health + WASH + healthcare water + backup power

Simple population multipliers are not treated as final design values. The operating brief, source and destination requirements remain the basis of the project calculation.

The distribution network becomes part of the water system, not an afterthought.

As communities grow, storage volume alone tells less of the story. Source resilience, pressure zones, trunk mains, pumps, isolation and future growth increasingly control performance.

01	02	03	04	05	06
Source	Treatment	Bulk storage	Pump / gravity	Zones	Users

COMMUNITY 250 / 500 Compact community architecture Prioritise robust treatment, manageable storage, simple controls and distribution that local operators can isolate and maintain. Small settlements · housing clusters · shared facilities	COMMUNITY 1000 / 2500+ Engineered network architecture Multiple demand zones, duty/standby pumping, future extensions, telemetry and hydraulic review become progressively more important. Larger settlements · phased developments · complete communities
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Hydraulic duty Peak flow, static head, friction loss and residual pressure.	Pressure zones Topography may require boosters, break tanks or pressure control.
Isolation Valves and branch strategy should allow maintenance without unnecessary loss of service.	Future growth Reserve routes, connection points and plant capacity for staged expansion.
Critical facilities Clinics, schools and community services may need prioritised supply or reserve.	Operations Monitoring and controls must match local capability and communications.

Rapid water systems are deployable operating kits, not just collapsible tanks.

01	02	03	04	05	06
Source	Rapid treatment	Flexible storage	Transfer	Tap points	Operations

RW-E250

Compact response

Rapid storage and controlled distribution for a smaller response site.

5-10 m³ planning range

RW-E500

Camp / recovery

Multiple taps, treatment and transfer pumping where deployment geometry requires it.

10-30 m³ planning range

RW-E1000

Large response

Multiple tanks, larger treatment throughput and several distribution points.

30 m³+ planning range

Ground protection Groundsheet and site preparation protect flexible tanks and fittings.	Connection kit Valves, hoses, manifolds and adapters travel with the storage equipment.
Repair kit Field repair materials and spare fittings remain with the deployment package.	Raw / treated separation Clearly separate services where untreated and treated water coexist.
Cleaning Inspection, sanitation and cleaning are part of redeployment readiness.	Drainage + access High-use tap points need safe queuing, drainage and hygiene management.

Planning population labels do not establish a universal emergency quantity. Response phase, programme standard, climate, refill interval and source quality control the actual system.

Remote water resilience starts by understanding the source.

RAINWATER HARVESTING

Catchment is part of the water calculation.

01 **Roof + rainfall**
Catchment area, roof material, rainfall distribution and dry periods establish available supply.

02 **Pre-treatment**
Debris screening and first-flush strategy are coordinated with the roof and environment.

03 **Storage + use**
Useful storage follows catchment, demand and acceptable shortage risk.

BORE + GROUNDWATER

Depth alone does not select the pump.

01 **Yield**
Sustainable source yield and dynamic water level define the volume that can actually be abstracted.

02 **Water chemistry**
Representative analysis determines whether treatment is needed before use.

03 **Head + storage**
Total dynamic head, pipe losses, daily volume and storage define the pumping duty.

SOLAR BORE ARCHITECTURE

01	02	03	04	05	06
Bore	Solar pump	Storage	Treatment	Gravity / boost	Users

Energy strategy. For many solar-pumping projects, stored water can provide the primary resilience instead of a large battery bank. The final arrangement still depends on source yield, daily volume, head and operating pattern.

Treatment technology follows measured water quality.

RHELGAN does not default every project to reverse osmosis. The process train is selected from the source-water analysis, intended use, required output and operating capability.

01	02	03	04	05	06
Source test	Pretreatment	Primary process	Disinfection	Clean storage	Verify

SOURCE / ISSUE	WHAT NEEDS REVIEW	POSSIBLE PROCESS FAMILIES
Rainwater	Debris, sediment, microbiology, roof/source risk	Screening · sediment · carbon where useful · disinfection
Bore / groundwater	Iron, manganese, hardness, salinity, microbiology	Oxidation / filtration · softening where required · membranes only where justified
Surface water	Turbidity, organics, microbiology, seasonal change	Coarse screening · clarification / filtration · UF or other process · disinfection
Brackish water	TDS, scaling, fouling, recovery, reject disposal	Pretreatment · membrane desalination · remineralisation · disinfection
Seawater	Salinity, intake, fouling, energy, reject stream	Dedicated desalination process with source-specific pretreatment

CONTAINERISED

Transportable treatment plant

Skid and containerised systems can simplify logistics and integration, but still require source, drain/reject, clean-water, power and civil interfaces.

OPERATIONS

Consumables + cleaning

Filters, membranes, lamps, dosing, cleaning chemicals, waste streams, spares and operator routines are planned before handover.

Bulk storage is selected from use, environment and structural requirements.

MODULAR

GRP sectional

Primary modular pathway for suitable community, institutional and development projects.

Flat-pack · configurable geometry

SPECIALIST

Stainless sectional

Project-selected where hygiene, material or environmental requirements call for stainless construction.

Grade + wetted parts project-specific

LARGE

Bolted bulk storage

Engineered large-capacity storage for communities and infrastructure where sectional or bolted systems are appropriate.

Foundation + loads + coating

ELEVATED + GRAVITY

Use stored elevation as hydraulic energy.

Tank elevation and terrain can reduce dependence on continuous pumping, but static head, pipe losses, pressure variation, support structure and safe access must be checked together.

FIRE WATER RESERVE

Separate the fire-design basis.

Fire-water reserve, pump duty, hydrants, sprinklers and fire mains follow the responsible project fire design and destination requirements rather than domestic-water demand.

Structure Tank geometry, bracing, roof, supports and connection loads.	Foundation Bearing, level, slab/support arrangement and drainage around the tank.
Environment Wind, seismic, coastal corrosion, high UV, heat, flood and other site inputs.	Water contact Exact material, coating, liner, gasket, seal and fitting evidence where required.

Large tanks and elevated systems are engineered project items. Published planning bands are useful for early procurement structure, not a substitute for structural and civil design.

A water system is only complete when it can be received, started, verified and maintained.

01

Evidence

Drawings, materials, potable evidence, pump curves, treatment data, manuals and warranties.

02

Logistics

Packing, freight, site receiving, unloading, storage and protection before assembly.

03

Site readiness

Foundation, power, drainage, pipe interfaces, access and local works complete before commissioning.

04

Commissioning

Cleaning, filling, functional testing, controls, leaks, pressures, treatment and water-quality verification.

05

Training

Operators understand startup, normal operation, alarms, shutdown and basic troubleshooting.

06

Spares

Filters, seals, valves, pump parts, treatment consumables and critical controls planned for remoteness.

07

Monitoring

Level, pressure, pump, process and alarm monitoring matched to actual operational risk and connectivity.

08

Ownership

Cleaning, testing, maintenance, consumables, records and long-term responsibility are assigned.

PROJECT TOOLS

Source-Water Review Source, yield, analysis and seasonal reliability.	Demand & Storage Planner Daily demand, autonomy and initial storage envelope.
System Matrix Compare the fifteen standard configurations.	Specification Template Controlled technical and commercial schedule.
Responsibility Matrix Supplier, Apollo, local contractor and professional interfaces.	Project Brief One structured handoff for the complete water requirement.

Complete the system at the intake, public water point and verification stage.

Three smaller-looking interfaces can determine whether the overall water system performs safely in operation: getting raw water into the system, delivering it to users, and verifying water quality.

SOURCE INTAKE

Source-Water Intake & Transfer

Screening, source protection, intake pumping and raw-water transfer from bore, surface, delivered or bulk sources.

Source level · yield · suction · transfer head

WATER POINTS

Community Water Points & Tap Stands

High-use public collection points planned around pressure, outlet count, drainage, access, cleaning and replacement parts.

Peak use · drainage · access · maintainability

VERIFICATION

Water Quality Testing & Verification

Source sampling, treatment verification, commissioning tests and operating records aligned with intended use and destination requirements.

Source data · commissioning · records

WHY THESE INTERFACES MATTER

Source-side reality Variable source level, debris, solids and access can change pump and treatment design.	Transfer duty Flow, head, suction conditions and transfer distance are established before pump selection.
User interface Public water points need safe access, practical outlet spacing and durable fixtures.	Drainage Standing water around tap stands can undermine hygiene and site usability.
Commissioning evidence Equipment operation and finished-water quality are both verified before handover.	Ongoing records Sampling, alarms, cleaning and maintenance records support long-term system management.

End-to-end principle. RHELGAN treats the source, storage, treatment, pumping, distribution, user interface and operating evidence as one connected water-supply pathway.



RHELGAN

DEVELOPMENT & HUMANITARIAN SYSTEMS

SPECIFICATION CONTROL

What remains project-specific.

RHELGAN provides a structured commercial supply pathway. It does not convert provisional catalogue information into universal engineering claims.

01

Water quality

Source-water testing and required finished-water standard.

02

Potable evidence

Exact material, seals, liner/coating and system certification.

03

Structure

Tank geometry, foundation, wind, seismic and site loads.

04

Treatment

Process design, output, consumables, residuals and operating regime.

05

Pumping

Flow, head, redundancy, controls, dry-run protection and power.

06

Distribution

Gravity/pressure strategy, pipework, valves and local network design.

07

Installation

Site works, assembly, supervision, commissioning and local approvals.

08

Operations

Spares, manuals, training, monitoring and long-term maintenance.

Plan the community as a system, then make every technical interface visible.

HOUSING

EDUCATION

HEALTH

WASH

RECOVERY

REMOTE & FIELD

COMPLETE COMMUNITIES