



Engineering Consultancy & Design

Wave Engineering Code Design

Excellence in Water Infrastructure Engineering

Capability Statement · August 2026



Wave Engineering Code Design (WENCOD)

Established 2026 · Cairo, Egypt

WENCOD is a specialist water engineering consultancy founded in 2026 by senior engineers drawn from top rated Consultancy Engineering firms.

The firm is new. Its engineers are not. Every project referenced in this document was delivered personally by a named member of our team, in a role we can identify and a client can verify.

We work across the full asset lifecycle feasibility and master planning through detailed design, tender documentation and construction support with a deliberate focus on water transmission, pumping stations, reservoirs, networks and treatment process design.



Regional focus: Kingdom of Saudi Arabia and Egypt as core markets, with project experience across the UAE, Oman and Iraq. Our engineers hold registration with the Saudi Council of Engineers and the Egyptian Syndicate of Engineers.

OUR MISSION & VISION



OUR MISSION

To deliver technically rigorous, buildable and sustainable water engineering solutions designed by engineers who have personally delivered work of the same scale before.

We support clients across the full asset lifecycle, from feasibility studies through detailed design, tender and construction support.



OUR VISION

To become the reference specialist consultancy for water transmission and treatment engineering in the Middle East , chosen for the depth of our engineers, the transparency of our calculations and the quality of our documentation.



Water Transmission Systems

Large-diameter pipelines, pumping stations and reservoir stations



Desalination Plants

RO and SWRO process design, specification and bid evaluation



Wastewater Treatment

Biological and tertiary process design, modelling and supervision



Water & Sewer Networks

Potable, fire-fighting, irrigation, sewer and storm drainage



Pumping Stations

Wet/dry well stations — hydraulic, process, mechanical and piping design



Master Planning & Feasibility

Regional master plans, gap analysis, technical and financial studies

All of the above combine with engineering support from Structural , Architectural ,Electrical and ICT engineering experts.



Scale delivered by our engineers

1,200,000 m³/d · 420 km twin main · DN2500 (100") · up to 900 m pumping head

Design capabilities

- High-pressure large-diameter steel transmission mains up to DN2500 (100")
- Long-distance systems — routes to 420 km, twin and triple pipeline configurations
- Pipe wall thickness design to ASME B31.4 / B31.8 and AWWA M11
- Buried pipeline structural analysis — ring deflection, wall buckling, pipe stiffness
- Road and utility crossing design and calculations
- Pipe material selection and comparative assessment (CS, DI, GRP, HDPE)
- Isolation, flow control, pressure control and pressure relief valve systems
- Air release and vacuum valve selection and location
- Hydraulic profile, route optimization and diameter optimization
- Technical specifications, tender documentation and bidder evaluation

Reverse osmosis & SWRO design

- Seawater and brackish water RO plant design
- Beach well and open sea intake systems
- Multi-media and cartridge pre-filtration design
- Membrane configuration selection — single-pass, two-pass and split-partial, driven by boron and TDS limits
- Membrane projection and system optimization
- Chemical pre-treatment and post-treatment
- Clean-in-place (CIP) systems
- Potabilization and remineralization
- Technical specifications, tender documents and bid evaluation
- O&M programme development and plant performance assessment



Capacity experience

500 m³/d to 70,000 m³/d per plant, plus a national desalination master plan for the Kingdom of Saudi Arabia



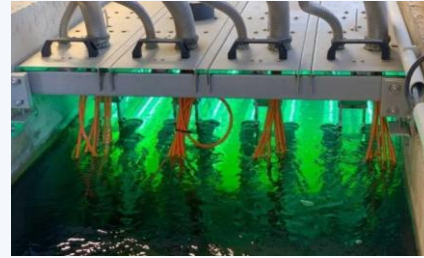
Preliminary

Screens, grit and grease removal chambers



Biological

Activated sludge, extended aeration, Bardenpho and Carousel processes; aeration and clarifiers



Tertiary

Filtration, chlorination and UV disinfection for TSE reuse compliance



Sludge

Thickening, dewatering by belt press or centrifuge, aerobic digestion and thermal drying

Design basis: loading and kinetic parameters, SRT / HRT / F:M selection, process modelling in BioWin, effluent compliance with MEWA and Saudi Water Authority requirements, odour control, and TSE reuse quality for irrigation and cooling. Plants delivered by our engineers range from 1,000 to 250,000 m³/d.



Pumping stations

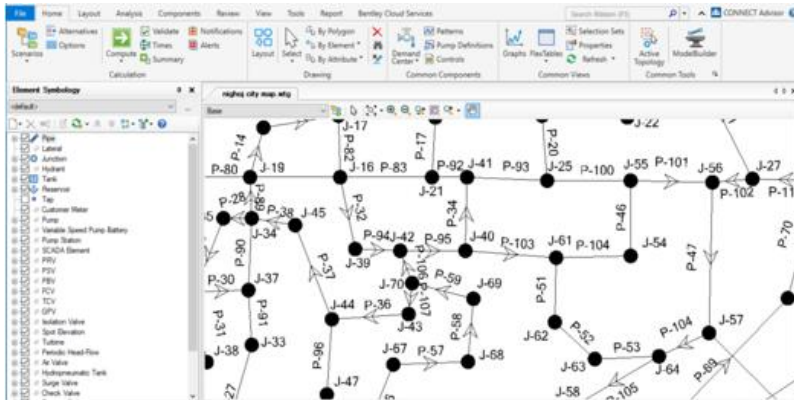
- Complete wet-well and dry-well station design
- Capacities delivered to 1,200,000 m³/d per system
- Pumping heads to 900 m; multi-pump parallel and series arrangements
- Pump selection, duty point and efficiency assessment
- Surge and water hammer protection systems
- Site layout and building arrangements
- Process, mechanical and piping design; equipment schedules
- Operation, maintenance and control philosophy reports
- Auxiliaries buildings , security requirements and control.

Reservoirs & storage tanks

- Concrete , Steel bolted and welded reservoir design
- Capacities from 2,500 m³ to 170,000 m³ per tank
- Tank farm configuration and layout — schemes to 15 tanks
- Strategic reservoir stations and terminal station design
- Foundation and civil works coordination
- Inlet / outlet hydraulics, level control and instrumentation
- Standards: AWWA, API and ASME

Network engineering

- Potable water distribution networks
- Fire-fighting water networks
- Irrigation, TSE and greywater reuse networks
- Sewer collection networks
- Storm water drainage systems
- Water tanker filling stations
- Plumbing and internal fire protection systems



Hydraulic & surge studies

Standalone hydraulic and transient studies for existing and proposed systems

Feasibility & master planning

Technical, financial and risk analysis; life-cycle cost and tariff assessment

Standards & specifications

Development of client technical standards, typical drawings and data sheets

Design review & verification

Independent third-party review of design packages and calculations

Tender documentation

Specifications, BOQs, tender packages and bidder evaluation

BIM & clash resolution

Civil 3D and Navisworks coordination and clash resolution

Steady-state & network modelling

- Steady-state and extended-period simulation of transmission systems and networks
- Demand forecasting, pressure zoning and system staging
- Hydraulic profile development and pipeline route optimization
- Diameter optimization against capital and pumping-energy cost
- Water quality and water-age modelling
- Sewer and storm drainage network modelling

Transient (water hammer) analysis

- Pump trip, start-up, shutdown and valve closure scenarios
- Surge protection selection and sizing — air vessels, surge tanks, one-way tanks
- Air valve sizing and location against column separation
- Pressure relief and control valve settings
- Operational and emergency control philosophy

Design standards applied

AWWA M11 · M45 · M23 · M55 · C150 | ASME B31.4 / B31.8 | BS EN 1295 | ANSI · ASTM · API · ISO | Saudi Water Authority and NWC technical standards

Design governs lifetime impact

The great majority of a water transmission system's whole-life carbon and energy is committed at the design stage in the diameter, the route, the pumping head and the material. WENCOD applies a documented sustainability framework at that stage, aligned to GRI and SASB reporting structures and to Saudi Water Authority ESG guidance.

Framework structure

- Materiality screening and GHG boundary definition
- Carbon reduction hierarchy applied to design options
- Resilience and emergency preparedness
- Procurement and supply chain
- Digital, asset data and OT cyber security
- Metrics with target basis, owner and disclosure reference

Energy

Pump selection at best efficiency point, variable speed drives, and system curve optimization to reduce specific energy consumption in kWh/m³

Materials & carbon

Whole-life carbon comparison of pipe material and diameter options; embodied carbon considered alongside capital cost

Corridor & route

Route selection to minimise pumping head, land take and construction disturbance

Water losses

Pressure management and network configuration to reduce non-revenue water

Reuse

TSE and greywater reuse schemes — delivered at 180,000 to 380,000 m³/d scale

01

Design basis frozen first

No production drawing or calculation is started before the design basis and criteria are documented and approved by the client — covering standards, loadings, demand, materials and design life.

02

Design check

Every calculation and drawing is checked by a reviewer engineer against the design basis. Checking is recorded on the deliverable, not assumed.

03

Cross-departments review

Hydraulic, process, mechanical, electrical and civil outputs are cross-reviewed for consistency and clash before any package is issued.

04

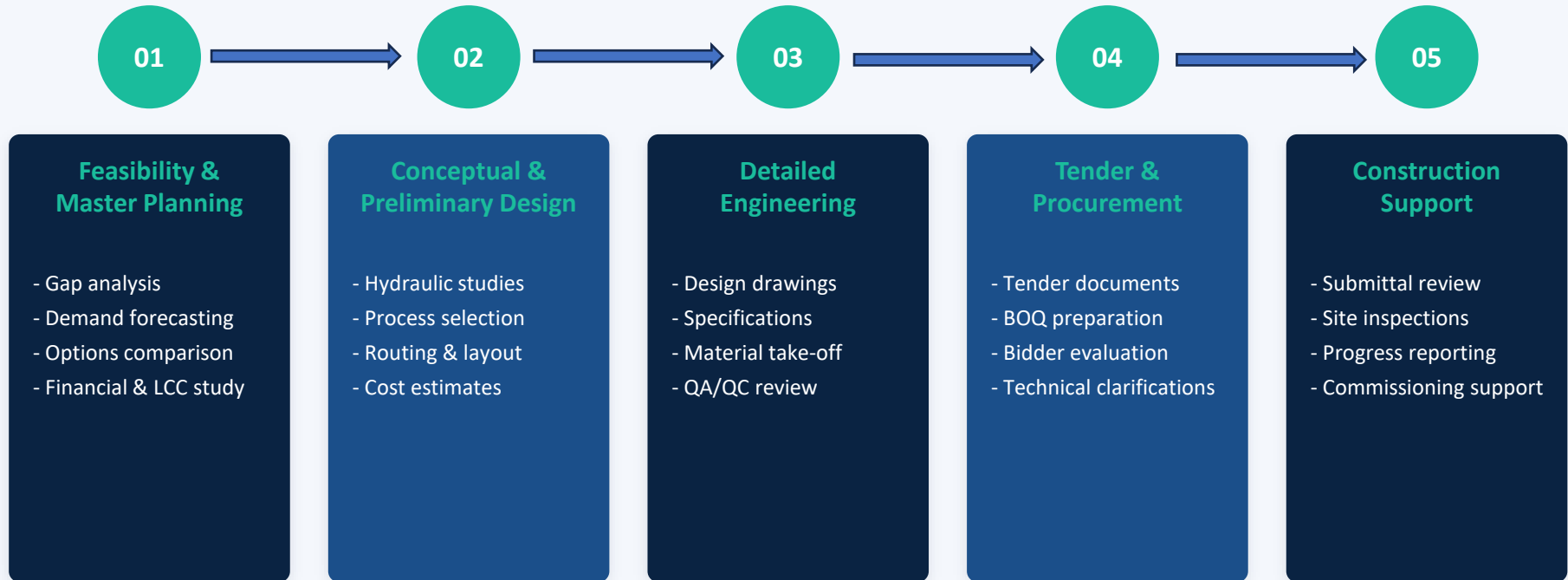
Design manager approval

The Design Manager signs off every deliverable prior to submission. Nothing leaves the office unchecked.

05

Review gates & comment control

Formal reviews at concept, preliminary and detailed stages; every client comment tracked to a written response and a revision entry.



Software & analysis tools

OpenFlows WaterGEMS	Water distribution and transmission modelling
OpenFlows HAMMER	Water hammer and transient analysis
OpenFlows SewerGEMS	Sewer and storm network modelling
HEC-RAS / HEC-HMS	Open channel and hydrologic modelling
BioWin	Wastewater biological process modelling
WAVE / ROSA	RO membrane projection and optimization
AutoCAD / Civil 3D	Design drawings, corridors and profiles
Navisworks	BIM coordination and clash resolution
ArcGIS / QGIS / Global Mapper	Route mapping and spatial analysis
Primavera P6 / MS Project	Programme and resource management
MATLAB / Python	Custom analysis and optimization
FLOWLINE	WENCOD in-house design and calculation suite

Standards & codes applied

AWWA	M11, M45, M23, M55, C150 — steel, GRP and ductile iron pipe design
ASME	B31.4 / B31.8 — pressure pipeline wall thickness
BS EN 1295	Structural design of buried pipelines
ANSI / ASTM	Component and materials specification and testing
API	Pipeline and storage tank standards
ISO 9001	Quality management system principles
SWA / NWC	Saudi Water Authority and National Water Company standards
MEWA	Effluent quality and reuse requirements

MOHAMED HESHAM

Engineering Manager

Water Transmission Systems

Pipeline Stress & Wall Thickness

Desalination & STP Process

Department Leadership

A PMP-certified Engineering Manager with 30 years of experience delivering large-scale water, wastewater and desalination infrastructure across Saudi Arabia, the UAE, Oman, Iraq and Egypt. He has led the engineering of some of the region's most demanding water transmission systems — including the 1,200,000 m³/day Jubail–Riyadh and Ras Al Khair–Riyadh schemes, the 130 km Riyadh Southern Ring triple-pipeline system and the completion of the Assir WTSS — together with high-head pumping stations, strategic reservoir farms, seawater RO desalination plants and tertiary sewage treatment facilities up to 250,000 m³/day. His technical strength lies in pipeline structural and mechanical design to ASME B31.4/B31.8 and AWWA M11, hydraulic and surge analysis, and process design, applied through a management approach that combines ownership of the design basis, rigorous QA/QC, and firm control of budget, schedule and inter-discipline coordination from concept through tender. Alongside project delivery he builds and leads engineering departments, develops national standards and specifications for the Saudi water sector, and mentors design teams to sustain technical excellence.

01

Three decades on major water schemes

Our engineers carry 20 to 30 years each across KSA, the UAE, Oman, Iraq and Egypt — transmission systems to 1,200,000 m³/d and 420 km, pumping heads to 900 m, treatment plants to 250,000 m³/d.

02

Our own engineering software

FLOWLINE is built in-house by our own design engineers, for engineering purposes — not licensed commercial software that we adapt our design basis to fit.

03

Full integrated design suite

Every calculation regenerates from the current design basis. A late change in demand, route or material propagates through the whole package instead of being patched by hand (No copy-paste design).

04

Iteration by machine, judgement by engineer

The suite carries the thousands of iterations, the optimisation runs and the repetitive checks — our engineers spend their time on decisions, trade-offs and design intent.

05

Optimised to sustainability, not only to cost

Technical, financial and sustainability objectives are optimised together, so energy, carbon and whole-life cost are design outputs — not a report written afterwards.



Engineering Consultancy & Design

Your Trusted Partner for Water Infrastructure Excellence

Technical Excellence

Proven Experience

Regional Expertise

www.wencod.com

Mohamed Hesham — Engineering Manager · mohamed.hesham@wencod.com

Doaa Mansour — Design Manager · doaa.mansour@wencod.com

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