

INDEPENDENT ADVISORY

RAEF KOBEISSI CEng, FIMechE

Water Infrastructure Performance & Investment Advisory

Confident decisions for complex water infrastructure.

Independent strategic and technical advice combining infrastructure strategy, advanced modelling, asset analytics and practical delivery experience.

PORTFOLIO / JULY 2026



Complex evidence. Confident action.

The value is in knowing what should be tested, what the evidence means and what should happen next.

Raef advises water utilities, developers and engineering organisations on investment, performance and asset decisions. The work brings strategic judgement together with the modelling, asset and operational evidence needed to make a recommendation defensible.

18

YEARS IN INFRASTRUCTURE LEADERSHIP

UK + MENA

INTERNATIONAL WATER-SECTOR
EXPERIENCE

CEng, FIMechE

CHARTERED ENGINEERING JUDGEMENT

THE OPERATING IDEA

Strategy, diagnostics and assurance are connected parts of the same decision process.

Advanced methods provide the evidence; the client receives a clear investment, operational or governance recommendation.

The situations that call for independent advice.

01 *Which assets should receive investment first?*

Prioritise capital where risk, performance and lifecycle value converge.

02 *Can the current evidence support this decision?*

Challenge assumptions, uncertainty and the strength of the model or data.

03 *Why is the network or asset underperforming?*

Diagnose the physical and operational causes before prescribing an intervention.

04 *Which option provides the best long-term value?*

Compare performance, delivery risk, cost and resilience as one decision.

05 *Is the proposed strategy technically defensible?*

Provide independent assurance before a commitment is made.

Advisory that moves from evidence to a decision.

01

Water infrastructure strategy and investment

Set resilient, value-led investment pathways for networks, assets and major developments.

Typical outputs: option assessments, investment pathways, lifecycle cases, asset priorities.

02

Performance diagnostics and optimisation

Find the causes of underperformance and define practical operating, retrofit or reinforcement actions.

Typical outputs: hydraulic and CFD diagnostics, leakage priorities, pressure-control strategies.

03

Independent technical assurance

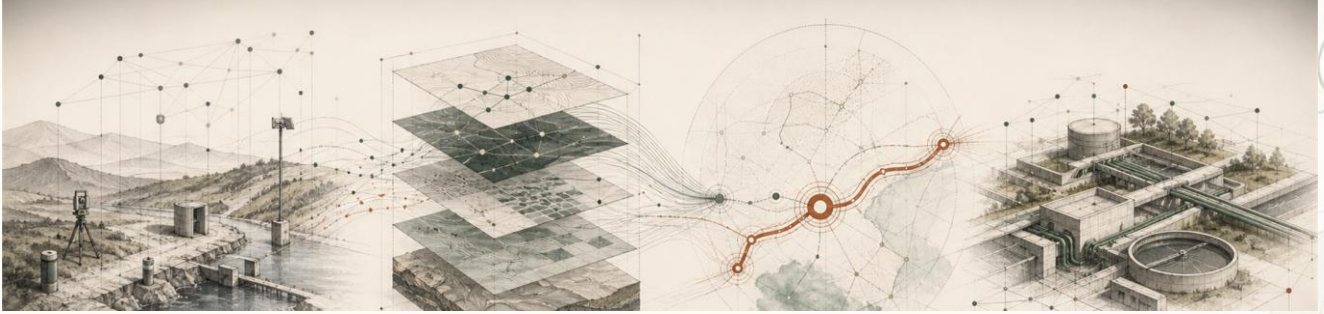
Provide confident challenge where the client needs to test the integrity of a strategy, model, design or investment case.

Typical outputs: model audits, design-basis reviews, option assurance, technical due diligence.

WORKING APPROACH

One disciplined path from diagnosis to delivery confidence.

Assignments are designed to make the next decision clearer. The sequence is deliberately simple: establish the evidence, test the choices, state the recommendation and assure the implementation response.



A repeatable advisory sequence that connects technical evidence to a client decision.

WHAT THE CLIENT RECEIVES

A decision note that is evidence-led, proportionate to the risk and practical to implement.

The format may be a strategy, a diagnostic, an options review or a technical assurance report; the purpose remains the same.

3,600 km

TRUNK-MAIN NETWORK

600 km

HIGHEST-RISK MAINS TARGETED

£150m

REGULATORY CASE CO-AUTHORED

Risk-led trunk-main strategy shaped a resilient London investment case.

A complex urban transmission network needed a defensible way to balance burst risk, customer consequence, affordability and long-term resilience. The decision was not simply which mains to renew; it was how to create a credible investment pathway for the highest-risk assets.

DECISION FACED

How should a major water utility protect customers and reduce failure exposure without committing capital to the wrong assets?

PERSONAL ROLE Led the infrastructure strategy work and co-authored the £150m PR24 enhancement case within a wider multi-disciplinary programme.

WHY IT MATTERED The highest-risk 600 km sat within a 3,600 km system experiencing more than 300 bursts annually, including failures on large-diameter assets.

PREFERRED ACTION

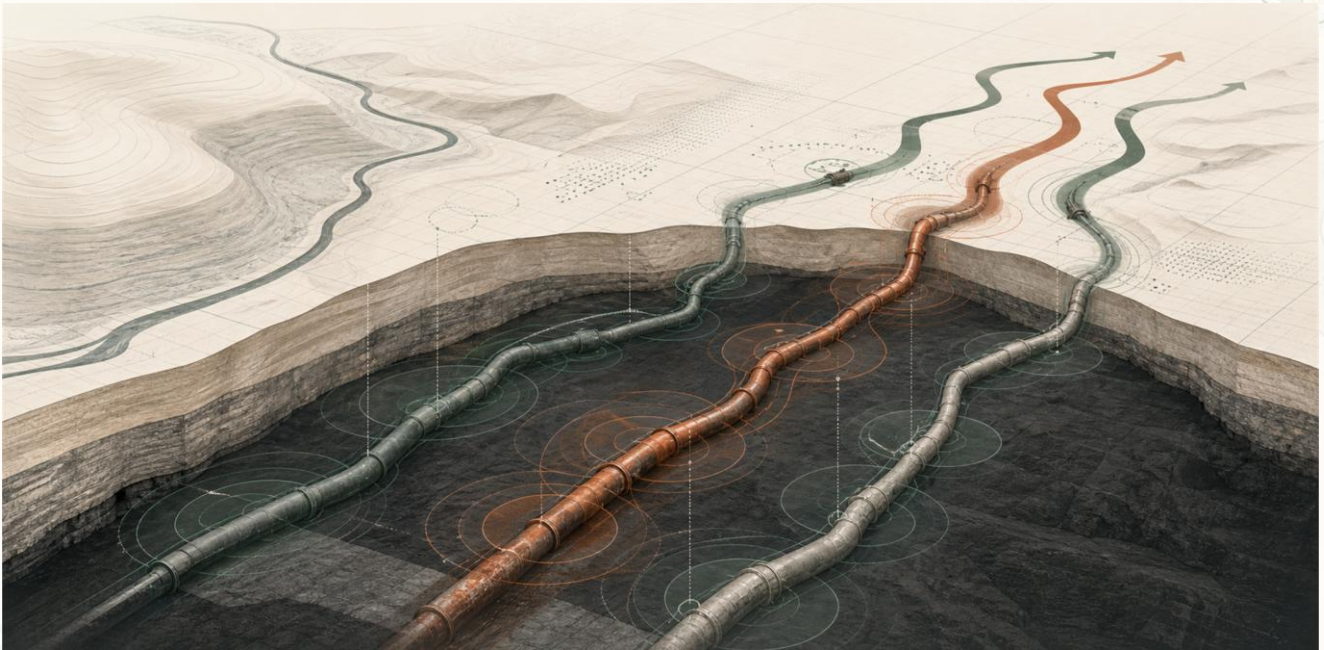
Adopt an adaptive, multi-period trunk-main strategy rather than a single, undifferentiated renewal programme.

OUTCOME Co-authored a £150m regulatory enhancement case and strengthened investment governance for long-term London resilience.

Programme contribution within a wider client and consultant team; client name is intentionally generalised.

Evidence: a clear risk pathway made selective renewal more defensible than blanket replacement.

Risk was assembled from asset condition, consequence, operational behaviour and network criticality. It supported adaptive pathways combining targeted renewal with pressure management and digital assessment.



EVIDENCE DEVELOPED Risk segmentation, failure exposure and investment pathways informed by condition, consequence and network resilience.

IMPLEMENTATION IMPLICATION Use the strategy to govern investigation, targeted intervention and future regulatory investment planning.

~12 MLD/yr

LEAKAGE SAVINGS SUPPORTED

~120

PROACTIVE REPAIRS PER YEAR

£1.2m

ANNUAL PROGRAMME BUDGET

Probabilistic analysis focused intervention on the highest-value leakage opportunities.

The programme needed to move beyond a reactive search for leaks on ageing trunk mains. The central question was where to deploy investigation and repair resources when the water balance itself was uncertain.

DECISION FACED

How can a leakage programme use imperfect data to target field resources where the chance and consequence of loss are greatest?

PERSONAL ROLE Led the programme's analytical framework, combining probabilistic water-balance analysis with condition and operational risk scoring.

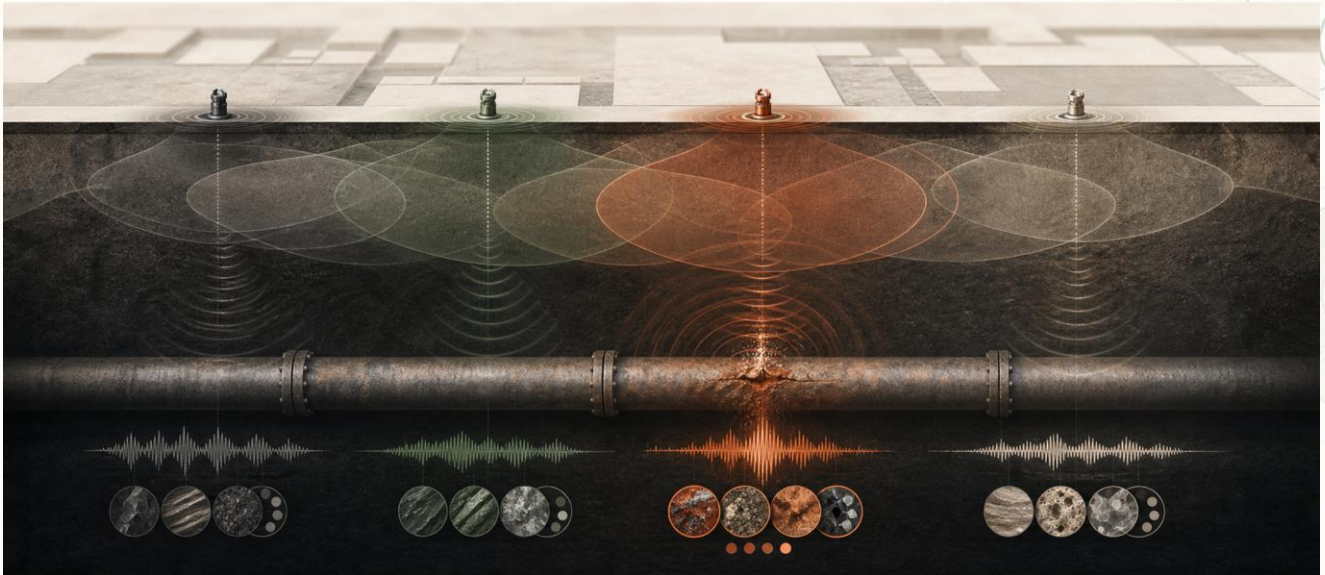
PREFERRED ACTION

Operate a risk-weighted detection programme that integrates field technologies with probabilistic network evidence.

OUTCOME The programme contributed to approximately 12 MLD of leakage savings and supported proactive control of around 120 major trunk-main repairs each year.

Uncertainty became a basis for prioritisation, not a reason to delay action.

Monte Carlo techniques quantified a range of plausible leakage conditions. The programme combined this with flow and hydraulic evidence, acoustic correlation, satellite sensing and thermal aerial information to direct investigation.



KEY DIAGNOSTIC RESULT A risk-weighted score made it possible to compare the value of further investigation across a large, complex trunk-main estate.

8+

SPECIALIST CFD COMMISSIONS

4

UTILITY CLIENTS SUPPORTED

1

COMMERCIAL SERVICE ESTABLISHED

CFD diagnostics turned water-asset behaviour into practical investment and operating decisions.

For reservoirs, contact tanks and dosing systems, geometry alone rarely explains performance. The challenge is to understand mixing, residence time, dead zones and hydraulic short-circuiting well enough to choose between an operational change, a retrofit or a capital intervention.

DECISION FACED

What does the flow behaviour mean for water quality, compliance risk and the case for investment?

PERSONAL ROLE Established and led a specialist CFD consultancy capability, from scoping and model development through interpretation and recommendation.

PREFERRED ACTION

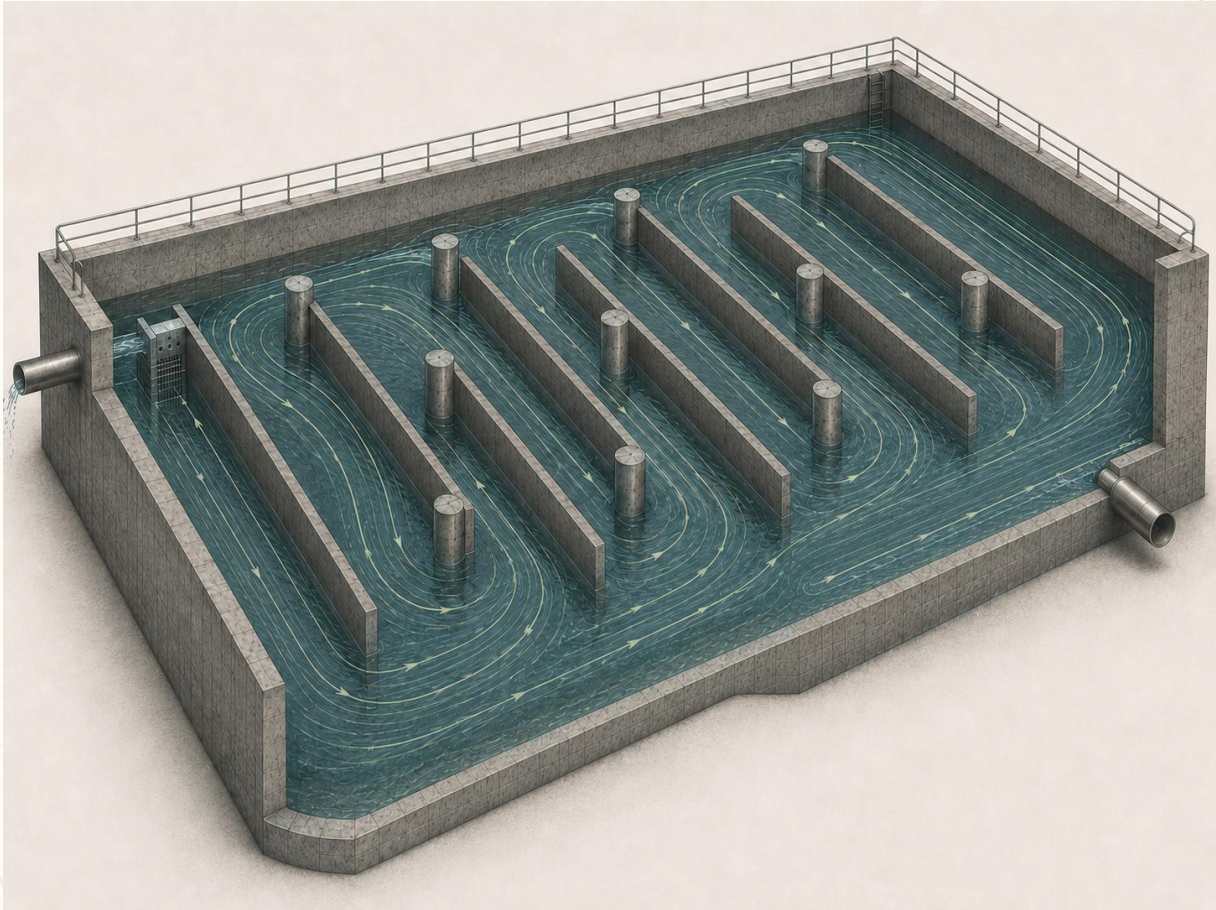
Select interventions only after testing how they change the flow paths that matter to water quality and asset performance.

OUTCOME Delivered more than eight specialist commissions and established a commercially viable capability supporting investment justification, compliance assurance and performance optimisation.

Clients and assets are omitted; all graphic content is conceptual and generalised.

Evidence: high-fidelity modelling made the decision-relevant flow paths visible.

The work translated computational outputs into engineering implications: where short-circuiting could undermine residence time, where mixing might be ineffective and which interventions warranted further design or operational testing.



Conceptual evidence graphic. It is intentionally not a client CFD output or software screenshot.

EVIDENCE DEVELOPED Residence-time, mixing-efficiency, dead-zone and hydraulic-short-circuiting assessments tailored to the asset decision.

64 MIGD

AGGREGATE PUMP-STATION CAPACITY

5 MIG

RESERVOIR STORAGE

>50 km

DN1200/DN1000 MAINS

Independent assurance protected live-system interfaces on a major transmission upgrade.

The supervision-stage review needed to give the asset owner confidence that contractor design, pumping-station works, storage and large-diameter transmission interfaces could be integrated into a live water system safely and constructibly.

DECISION FACED

Can the proposed transmission works be relied upon to provide capacity and resilience without compromising live-network operation?

PERSONAL ROLE Led construction-stage design review and technical assurance across design submissions, interfaces and stakeholder coordination.

PREFERRED ACTION

Maintain independent review through the detailed, construction and commissioning interfaces of a live transmission-system upgrade.

OUTCOME Provided design governance supporting construction readiness, regulatory coordination and resilient integration of pumping, storage and major transmission assets.

Contribution formed part of a wider supervision and delivery team; project identifiers are generalised.

Evidence: capacity, constructability and operational resilience were reviewed as one system question.

Assurance focused on how the new and upgraded pump stations, reservoir and transmission mains would perform at their interfaces, not solely on whether individual components met their design requirements.



Generalised system schematic.

EVIDENCE DEVELOPED Design-submission review, pumping and surge-mitigation checks, constructability assessment and live-network interface assurance.

Methods are selected for the decision, not presented as separate products.

The methods below create evidence across strategy, diagnostics and assurance. The output is always framed around the intervention, investment or governance choice in front of the client.

Hydraulic modelling

Test capacity, pressure, resilience and reinforcement options.

Probabilistic analysis

Make uncertainty visible in risk and leakage prioritisation.

GIS & operational analytics

Connect spatial, SCADA, monitoring and field evidence.

1D Modelling & Computational fluid dynamics

Understand mixing, residence time and decision-relevant flow behaviour.

Asset risk modelling

Link condition, consequence and operational exposure to investment choices.

Digital decision tools

Create transparent, repeatable pathways from evidence to action.

Advanced methods support the three service pillars; they are not marketed as isolated software activities.

SPECIALIST PERSPECTIVE

The most useful technical work is technically rigorous and commercially legible at the same time.

Selected experience that demonstrates range without diluting the water focus.

The portfolio centres on water-system decisions. The wider leadership record shows the scale at which those decisions have been made, reviewed and delivered.

18 years International leadership across water and infrastructure programmes in the UK and Middle East.	£150m Regulatory investment case co-authored for trunk-main resilience in London.
USD 350m+ Potential lifecycle savings identified through confidential water and energy infrastructure strategy.	~12 MLD Leakage savings supported through risk-led, probabilistic trunk-main analysis.
60+ DMAs District-metered areas led through restructuring and optimisation strategies.	8+ commissions Specialist water-asset CFD assignments delivered through an established consultancy capability.

Figures represent selected professional experience. USD 350m+ refers to potential lifecycle savings identified, not realised savings.

Defined offers that make a first conversation easier to start.

The scope of an engagement can be scaled to the decision and the client team. The following offers provide clear entry points without reducing the work to software support or routine production.

01 Independent water-system decision review

Review a model, strategy, concept design or investment proposal; identify material risks and issue an executive decision note.

02 Advanced Modelling performance diagnostic

Diagnoses an underperforming network, pressure zone, pumping system, reservoir or treatment asset; test interventions and implementation priorities.

Assess mixing, residence time, dead zones and short-circuiting to compare operational, retrofit and capital options using state-of-the-art CFD-based modelling techniques.

03 Asset investment and prioritisation framework

Integrate risk, performance and uncertainty into an evidence-led asset or intervention pathway.

Senior engineering judgement with the technical depth to interrogate the evidence.

Raef Kobeissi is a Chartered Engineer and infrastructure leader with more than 17 years of experience across water, energy and transport programmes in the UK and Middle East. His water-sector work combines long-term network strategy, performance diagnostics, modelling, asset analytics and delivery assurance.

CREDENTIALS

CEng, FIMechE

MSc Advanced Mechanical Engineering, University of Leicester / UAE licensed engineer / English and Arabic native; French professional.

Leadership context

EXECUTIVE LEADERSHIP Led multi-disciplinary teams of up to 40 specialists across complex infrastructure programmes.

WATER-NETWORK LEADERSHIP Directed water-network disciplines and delivery teams across UK and UAE assignments.

COMMERCIAL JUDGEMENT Shaped investment cases, lifecycle optimisation and commercially viable specialist services.

DELIVERY ASSURANCE Established governance, QA/QC and technical review frameworks that support confident implementation.

START WITH THE DECISION

Make the next water infrastructure decision more defensible.

Independent strategic and technical advice for investment, performance and assurance decisions.

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Detailed evidence and project references available for due diligence under NDA.

Project descriptions reflect Raef Kobeissi's personal professional experience. Client and project identifiers are generalised where appropriate. All diagrams in this portfolio are anonymised conceptual graphics, not project data or client drawings.