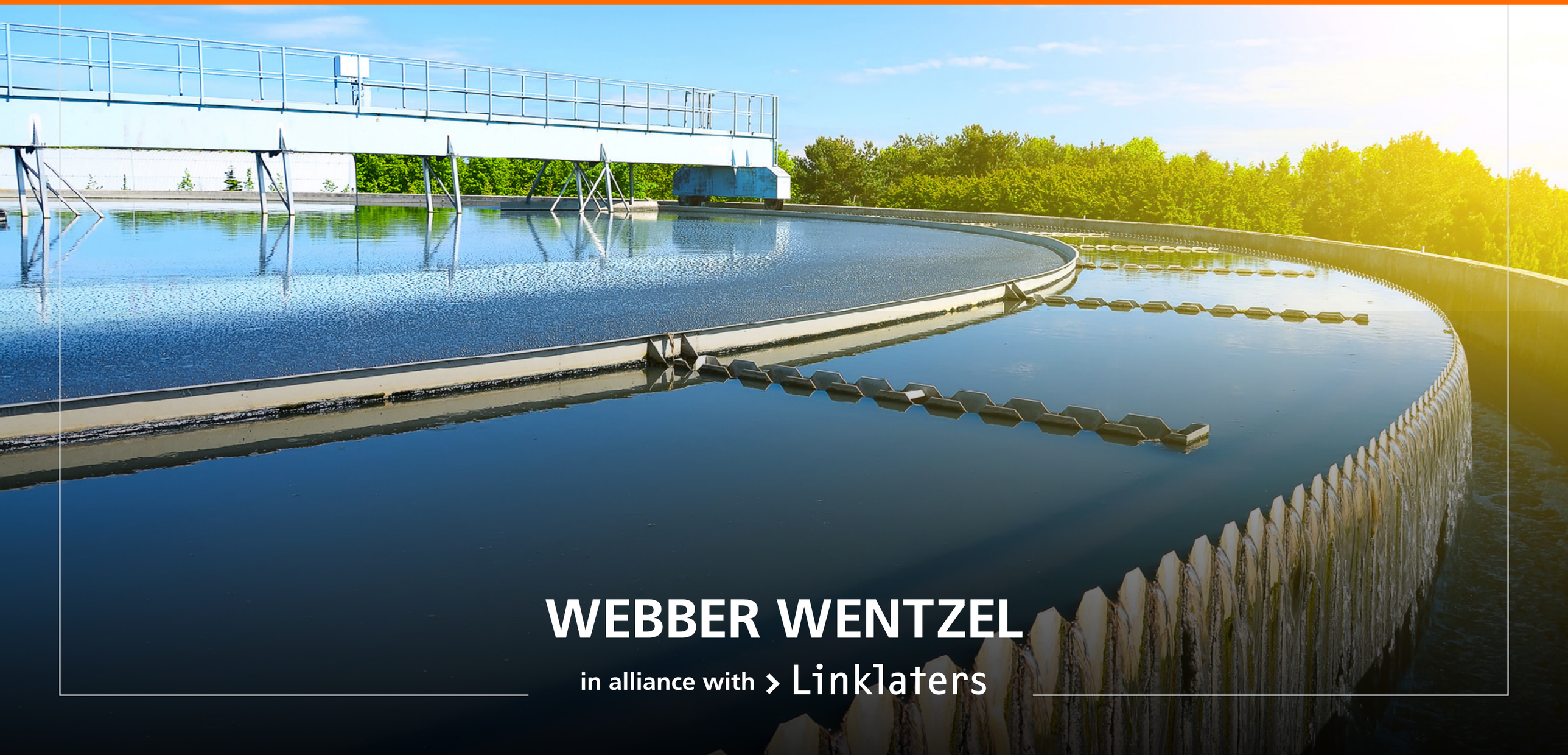
WATER INFRASTRUCTURE PROJECTS
OPTIONS AND SOLUTIONS



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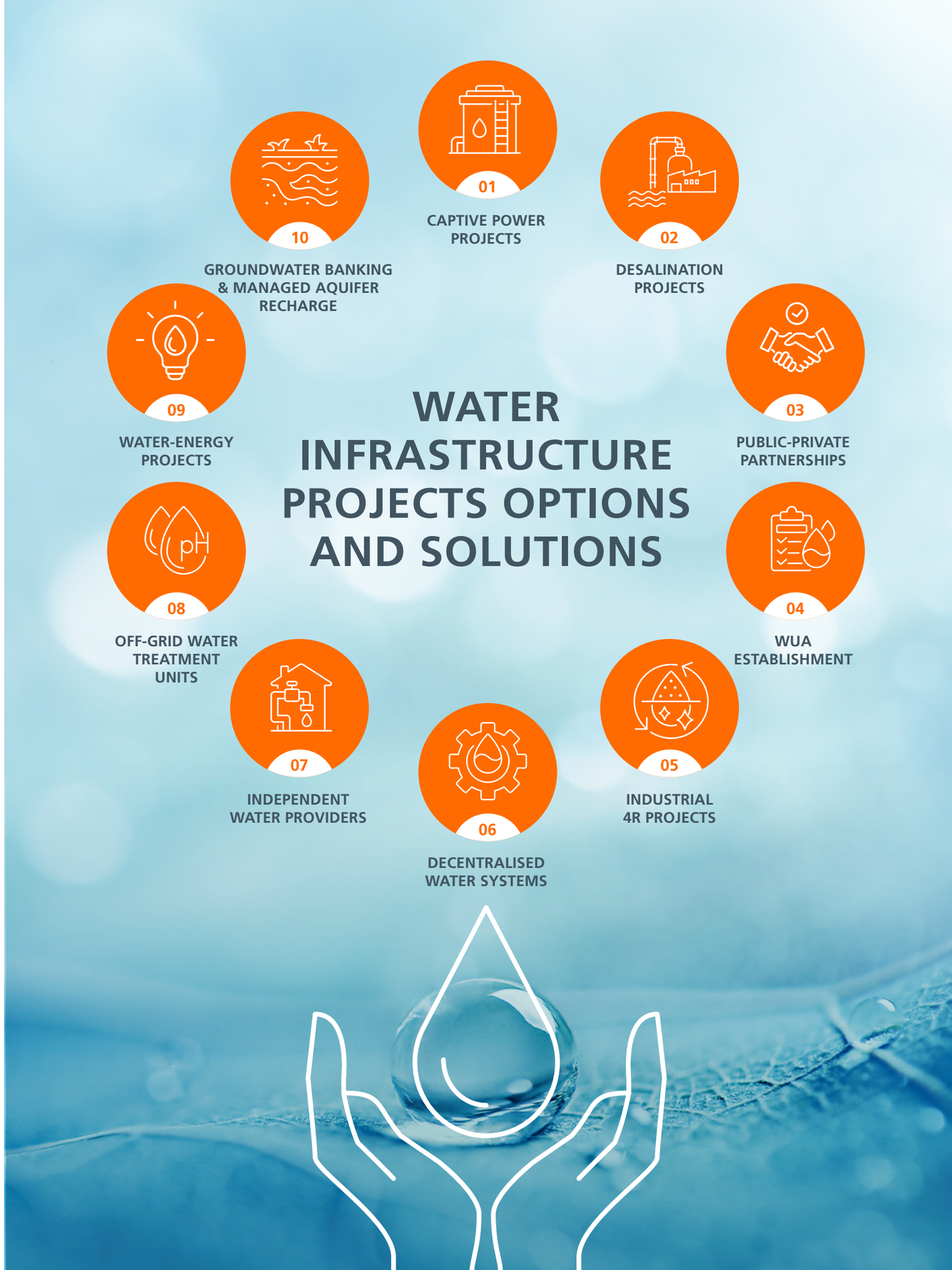
South Africa faces significant water challenges that impact the economy, environment, and society. These challenges are from a combination of natural factors, infrastructure limitations, and socio-economic dynamics.

As a water-scarce country, South Africa is especially vulnerable to the effects of climate change, which is expected to further strain water availability by altering rainfall patterns, increasing evaporation, and exacerbating the frequency and severity of droughts. In addition, many of South Africa's water treatment plants, pipelines, and dams are old and poorly maintained, leading to frequent leaks, water losses, and supply disruptions. A significant portion of water is also lost through leaks, theft, and inefficient billing, resulting in 'non-revenue water'. These challenges are further exacerbated by pollution of water sources and water quality issues, as well as over-exploitation of groundwater and surface water.

Finally, inequality in water distribution, service delivery failures, poor governance and capacity constraints have adversely impacted the ability of the government to deliver on its duties to ensure access to water and sanitation. Together, these challenges highlight the need for urgent and co-ordinated efforts to improve water management, invest in infrastructure, enhance governance, and promote sustainable and equitable water use in South Africa. Several project models exist to further these objectives, each of which requires careful planning, investment, and management to ensure the success and sustainability of alternative water supply/access models.



CAPTIVE POWER PROJECTS

Involve the extraction, treatment, and utilisation of water resources by a private entity for its exclusive use, independent of municipal water systems. These projects are tailored to meet specific water needs and are typically characterised by:

- Private control of the water source.
- Dedicated use of water.
- Independent management of the project.

Such projects can be implemented either as self-build models or outsourced to third-party providers.

KEY CONSIDERATIONS:

- Securing initial capital investment for infrastructure.
- Regulatory permitting and compliance (abstraction, treatment, contamination).
- Managing environmental and community impacts, particularly regarding excessive water abstraction, resource depletion and conflicts over water rights.

DESALINATION PROJECTS

Refers to the process of removing salts and other impurities from seawater or brackish water to produce fresh, potable water for human consumption, agriculture, or industrial use.

KEY FEATURES:

- Technology-intensive process.
- High infrastructure demand.
- Need for brine management.

KEY CONSIDERATIONS:

- High energy consumption.
- Regulatory permitting and compliance.
- Management of environmental impacts, particularly regarding brine disposal and marine life impact.
- Large-scale infrastructure requirements.

PUBLIC-PRIVATE PARTNERSHIPS

A PPP is a contractual and procurement agreement between a government entity and a private sector company to develop, finance, build, operate, and maintain water infrastructure and services (water treatment, re-use and reclamation). This model leverages the strengths of both sectors, with shared risks and benefits.

KEY CONSIDERATIONS:

- Clearly defined responsibilities:
  Public sector: Oversight, standard-setting and performance monitoring.
  Private sector: Investment, technical expertise and operational efficiency.
- Appropriate risk sharing (construction delays, cost overruns).
- Access to private funding.
- Public sector capacity building.
- Complex contract management.
- Navigating regulatory frameworks governing the procurement process.

WUA ESTABLISHMENT

Water User Associations (WUAs) are co-operative organisations formed by water users under the National Water Act to manage water resources and infrastructure at a local level.

KEY FEATURES:

- Community-driven management.
- Joint ownership and operation.
- Legal and institutional governance framework.
- Funding and financial management model.
- Local infrastructure management and equitable water distribution.

KEY CONSIDERATIONS:

- Local control and accountability, with inclusive distribution or decision-making.
- Structured platforms for dispute resolution.
- Dependence on government support.
- Permitting requirements and exemptions.
- Funding approach.

INDUSTRIAL 4R PROJECTS

These projects focus on reducing water usage and recycling wastewater for non-potable industrial purposes such as cooling, processing, or irrigation. Examples of this include zero-liquid discharge systems and closed-loop water recycling and processing systems.

KEY CONSIDERATIONS:

- High installation and operational costs.
- Technical complexity, requiring specialised knowledge and technologies.
- Managing public perception and potential resistance to the re-use of treated wastewater.
- Regulatory permitting and compliance in respect of activities and facilities.

DECENTRALISED WATER SYSTEMS

These are small-scale water supply systems that serve specific communities, neighbourhoods, or developments independently of municipal networks. Examples include community wells, small-scale treatment plants, and rainwater harvesting systems.

KEY CONSIDERATIONS:

- High initial infrastructure costs.
- Ensuring consistent water quality and compliance with health and water quality standards.
- Limited scale of application.

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INDEPENDENT WATER PROVIDERS

These are private companies or non-governmental organisations that provide water services in areas where municipal supply is inadequate. These entities often operate small-scale water treatment plants or distribution networks. Examples include bottled water providers, and piped water systems managed by private entities.

KEY CONSIDERATIONS:

- Regulatory and permitting requirements.
- Tarriff and pricing structures.
- Ensuring compliant water quality.
- Managing sustainability issues, particularly over-extraction of local water resources.

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OFF-GRID WATER TREATMENT UNITS

These are portable or modular treatment systems designed to purify water from local sources (such as rivers, lakes, or boreholes) in remote or off-grid locations. Examples include solar-powered desalination units, reverse osmosis systems, UV and ozone treatment units.

KEY CONSIDERATIONS:

- No need for extensive infrastructure.
- High capital and operational costs for the purchase, installation and maintenance of units.
- Dependence on reliable energy supply for energy-intensive units.
- Ensuring a steady supply of spare parts and skilled personnel for maintenance.
- Limited capacity (small-scale use).

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WATER-ENERGY PROJECTS

These projects combine water treatment with energy generation, such as wastewater to generate biogas or implementing solar desalination systems. Examples include anaerobic digesters that treat wastewater and generate energy, solar-powered water purification.

KEY CONSIDERATIONS:

- Technical complexity.
- High upfront capital investment.
- Regulatory compliance, including navigation of permitting and exemption requirements.
- Operational reliability risks, including technical failures that affect both water supply and energy generation.
- Skilled personnel required for system operations and maintenance.
- Appropriate contracting arrangements.

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GROUNDWATER BANKING AND MANAGED AQUIFER RECHARGE

These are projects that store excess surface water in aquifers during wet periods for later use in dry periods, enhancing groundwater availability. Examples include infiltration basins, recharge wells, and aquifer storage and recovery (ASR) systems.

KEY CONSIDERATIONS:

- High implementation costs to develop infrastructure.
- Managing land use conflicts in finding suitable land for recharge projects.
- Ongoing monitoring and regulatory oversight to prevent negative impacts on groundwater quality and availability.
- Hydrological uncertainty and variability.

The need to address water security and South Africa's infrastructure deficit requires innovative thinking, industry expertise and in-depth regulatory and legal knowledge. We are able to assist with:

- producing a regulatory roadmap to identify all permitting requirements and statutory obligations relating to the project, including opportunities for permitting exemptions or permitting integration;
- conducting legal feasibility studies (including institutional capacity and competency, land and environmental due diligence reports) and procurement processes for the implementation of water projects;
- advising on procurement structuring and implementation;
- advising on the institutional and contracting arrangements for the optimal model/project structure, and drafting the necessary procurement documents and commercial agreements for project development and delivery;
- advising on investment and project financing options, as well as providing tax structuring advice;
- assisting with specialist appointments and regulator engagements;
- producing stakeholder maps and governance controls to ensure (i) effective stakeholder engagement throughout the project lifecycle; and (ii) adequate identification and management of impacts, including grievance management, dispute resolution and access to remedy.

For more information about how our team can assist you with water infrastructure projects, contact Megan Jarvis and Calvin Nchabeleng.

ABOUT WEBBER WENTZEL

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