هيئة الأشغال العامة
Public Works Authority

Ashghal – Managing the Reuse of Wastewater and the initiative(s)

قطر تستحق الأفضل
Qatar Deserves The Best

Agenda

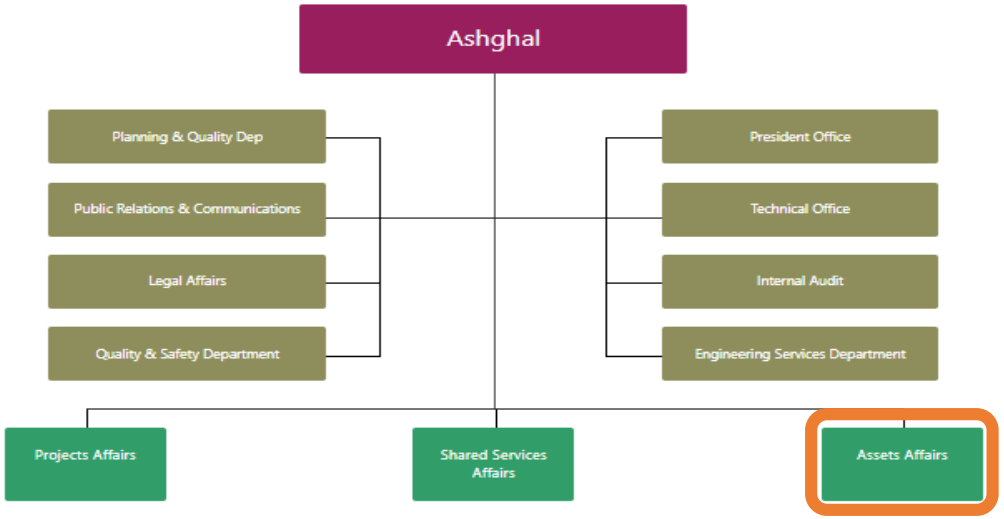
The management of wastewater in Qatar towards possible reuse in agriculture and the initiative(s) that the Public Works Authority (Ashghal)

1. Qatar's Public Works Authority – Ashghal
2. Ashghal Vision, Mission, Value and Corporate Objective
   - ❖ Assets Affairs – DNOM (Drainage Operation & Maintenance Department)
   - ❖ Drainage Assets Growth 2014 to 2023

3. Introduction to Wastewater Management in Qatar/Ashghal
   - ❖ DNOM Operations & Maintenance - Catchments Zone Contracts
   - ❖ Operation Supports - Acquire, Operate, Maintain, Dispose
   - ❖ DNMC Supports
   - ❖ Quality Standards and Regulations
   - ❖ Wastewater Reuse Potential Customers
   - ❖ Takamul Current TSE Distribution and KPI Achievements
   - ❖ Demand
4. Ashghal Initiative

Qatar's Public Works Authority - Ashghal

The Public Works Authority 'Ashghal' was established in 2004 to be responsible for the planning, design, procurement, construction, delivery, and asset management of all infrastructure projects including roads, drainage, and all public buildings such as schools and hospitals in Qatar.



Adhering to the Qatar National Vision 2030, the Authority's purpose is to contribute to the economic and social development of the State of Qatar, with projects valued at over QR 100 billion to be delivered within the next five to seven years.

Ashghal Vision, Mission, Value and Corporate Objective

OUR VISION

"Excellence in delivering and managing efficient sustainable infrastructure"

OUR MISSION

"Continuously enhancing customer satisfaction through leading project and asset management services & solutions"

OUR STRATEGIC THEMES

- Health and Safety
- Deliver Excellence
- Develop Capabilities
- Customers and Stakeholders

OUR COROPORATE OBJECTIVES

Health and Safety

- C1 Enhance our health and safety performance

Deliver Excellence

- C2 Ensure on time delivery with quality
- C3 Effectively integrate new assets
- C4 Optimise and manage cost
- C5 Improve quality management performance
- C6 Improved sustainability and recycling

Develop Capabilities

- C7 Increase Qatarisation and develop our staff
- C8 Increase Qatari involvement in our supply chain
- C9 Embed leading practices across Ashghal

Customers and Stakeholders

- C10 Enhance customer and stakeholder satisfaction

OUR VALUES

ACCOUNTABILITY
We are all accountable for delivering operational excellence.

SERVICE ORIENTED
We continuously focus on the value of our services.

HEALTH & SAFETY
The Health and Safety of our customers,employees and contractors is our top priority.

GROUTH FOCUSED
We work together to grow the capabilities of our organisation.

HONESTY
We are honest with others and deliver on commitments made.

ADAPTABILITY
We accept new challenges and quickly adapt to changes in our environment.

LEARNING CONTINUOUSLY
We share the experience,knowledge and lessons we have learned.

Assets Affairs – DNOM (Drainage Operation & Maintenance Department)

Assets Affairs(DNOM) is responsible for the operation and maintenance of all handed over drainage networks across Qatar. It supervises the operation, maintenance and minor modifications of sewage networks through approved contractors to improve drainage condition and connectivity. We continue to meet our Objectives and provide highly structured development opportunities for everyone AA will focus on excellence in delivering and managing efficient sustainable infrastructure, contributing to the fulfilment of the 2030 National Vision.

- We will have clear asset management policies and standards, aligned with Ashghal' s Strategy.
- AA will be an intelligent operator with high calibre people continuously enhancing customer satisfaction through leading project and asset management services and solutions.
- We will be an intelligent client with high calibre people managing critical operations and maintenance works and delivering value for the citizens and residents of Qatar.

Drainage Assets Growth 2014 to 2023

Sewage Treatment Works

918,070 m³/d Capacity; 7 STWs

Package Treatment Plants

53,545 m³/d Capacity; 19 PTPs

Pumping Stations (PS)

122 Foul Sewer, 9 TWN
34 Surface Ground Water

Treated Water Network

1,402 km TWN Pipe

Gravity Network

3,036 km FS & 1,203 km SGW

Rising Mains

418 km FS & 27 km SGW

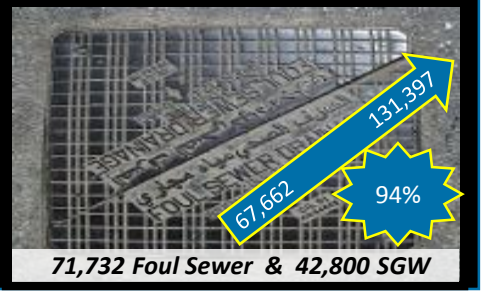
FS House Connections

70,026 Connection Pipes

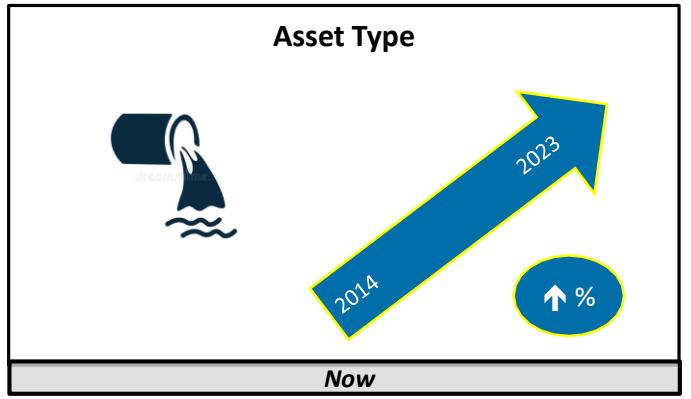
SGW Gullies

116,543 Gullies

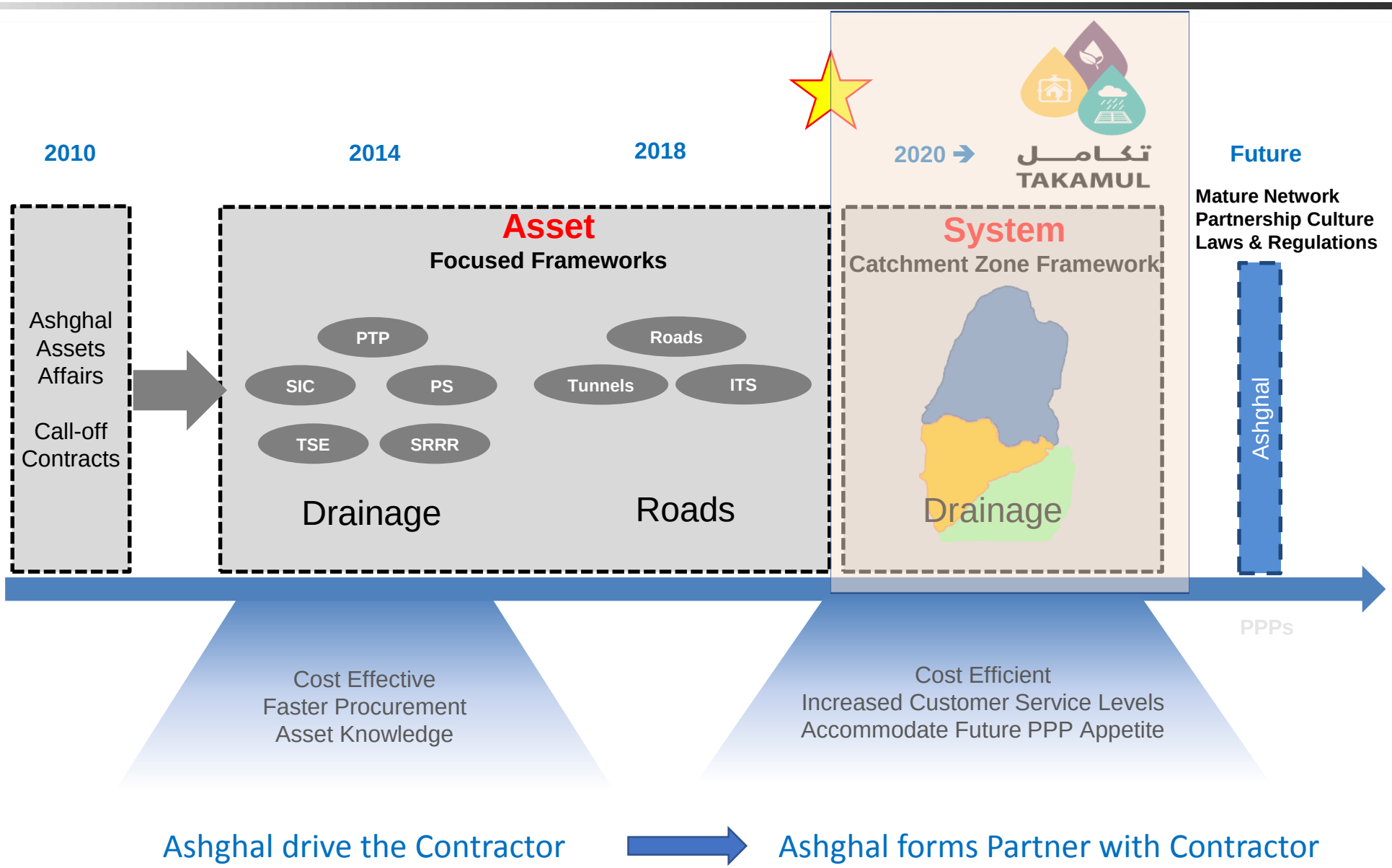
Manholes



71,732 Foul Sewer & 42,800 SGW



DNOM Operation &Maintenance - Catchments Zone Contract



Ashghal - Asset Management System

"The Asset Management describes the data, processes, tools and resources which are required to effectively satisfy Asset Management's Strategic Objectives"

- ❑ **Asset Management maturity based PAS55 assessment methodology**
- ❑ **Asset Management Plan**
- ❑ **Completion of Pilot Survey of above ground assets**
- ❑ **GIS Mapping services, Enhancements and deployment of GIS strategy**
- ❑ **Network Condition Assessment based on Ashghal' s GIS and Master Plan model data**
- ❑ **EAMS support, enhancements and staff development with the long-term Enterprise Asset Management System (EAMS)**
- ❑ **Develop Asset Management Policy and development of high priority strategies.**

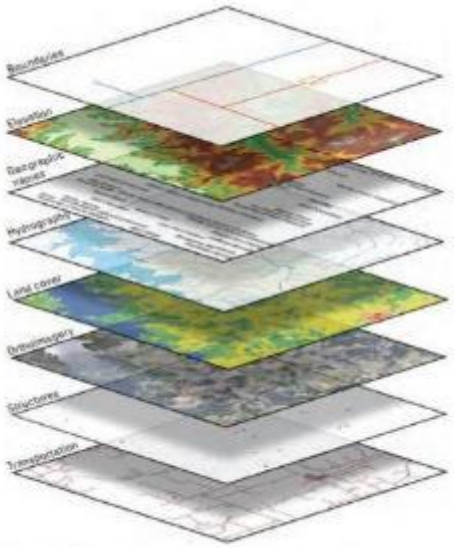


Figure 1. Eight base layers of *The National Map*.

Ashghal Public Works Authority	Policy	Asset Management Policy
	Reference	AM01
	Issue Date	06 December 2021
	Version Number	4.0

2. Asset Management Policy

The Public Works Authority is committed to managing and operating its assets to ensure it provides secure and reliable services as expected by its customers, stakeholders and the government in line with Ashghal's mission, vision, values and strategy.

Ashghal recognizes that effective integration and optimization of Asset Management (AM) is an integral part of responsible management and is committed to the following:

- Alignment with global and regional best practices, in particular ISO 55001:2014, providing the interpretation on overview, principles and terminology, requirements, and guidelines for implementation of the asset management system;
- Provision of holistic decision making, with a comprehensive and consistent approach to Asset Management and its alignment with Ashghal governance practices and AM Strategy;
- Continuous improvement of Ashghal asset management capabilities, systems and organizational

...above, we shall aim to:

- ...l growth and additional demand
- ...eliable service from our assets
- ...eneration;
- ... the agreed service and ...ustomers stakeholders and
- ...vernment obligations to the ... our governing bodies.
- ... is communicated within the ... stakeholders.

.2 سياسة إدارة الأصول

تلتزم هيئة الأشغال العامة بإدارة وتشغيل الأصول على نحو يضمن تقديم خدمات آمنة ويعتمد عليها وتلبي توقعات العملاء والشركاء والحكومة بما يتوافق مع رؤية ورسالة وقيم واستراتيجية الهيئة

تقر هيئة الأشغال العامة أن التكامل والتطبيق الفعال لإدارة الأصول يعتبر جزء لا يتجزأ من الإدارة المسؤولة كما أن الهيئة تلتزم بما يلي:

- التوافق مع أفضل الممارسات الدولية والإقليمية وخاصة شهادة ISO 55001:2014 وتوضيح النظرة العامة والمبادئ والمصطلحات والمتطلبات والإرشادات اللازمة لتطبيق نظام إدارة الأصول
- اتباع نظام شمولي في اتخاذ القرارات بالإضافة إلى وجود نهج شامل ومتوافق فيما يتعلق بإدارة الأصول وتماشيها مع ممارسات الإدارة المتبعة في الهيئة واستراتيجية إدارة الأصول
- التطوير المستمر لقدرات وأنظمة إدارة الأصول والنمو التنظيمي

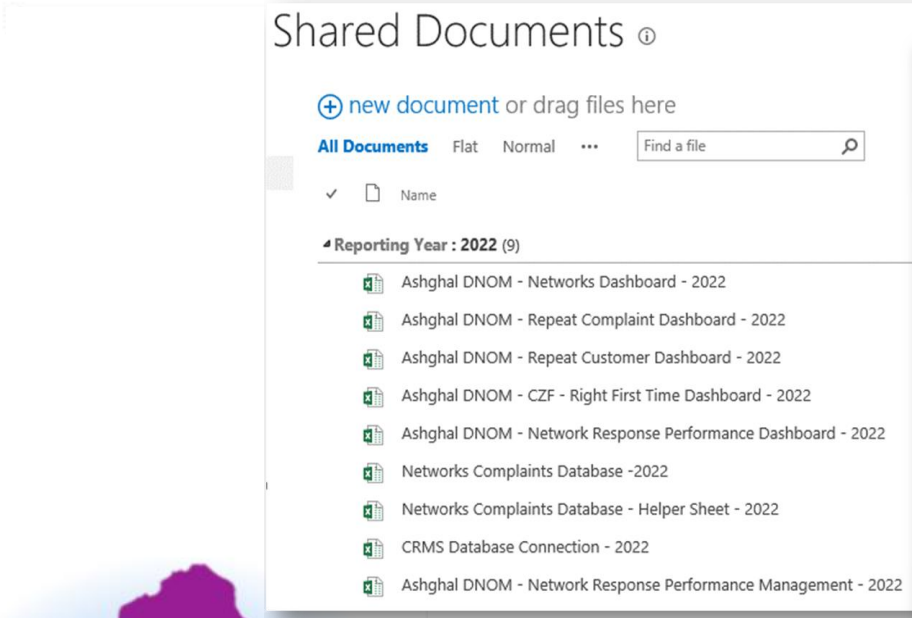
وحتى نتمكن من تحقيق ذلك فنحن نسعى إلى ما يلي:

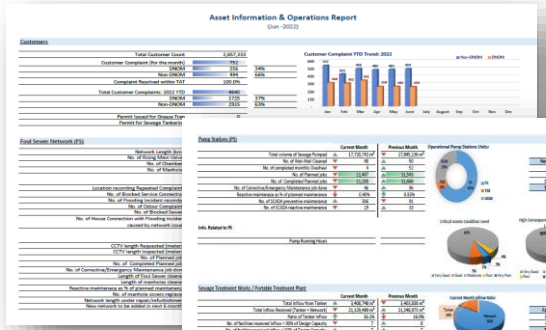
- فهم النمو الإقليمي والمتطلبات الإضافية
- توفير خدمات آمنة يمكن الاعتماد عليها للأجيال الحالية والقادمة
- تقديم مستوى الخدمات المتفق عليه للعملاء والشركاء والبيئة والتفوق على هذا المستوى
- تنفيذ الالتزامات القانونية والحكومية فيما يتعلق بالجداول الزمنية المتفق عليها مع الهيئات الإدارية
- التأكد من مشاركة سياسة إدارة الأصول داخل الهيئة ومع الشركاء

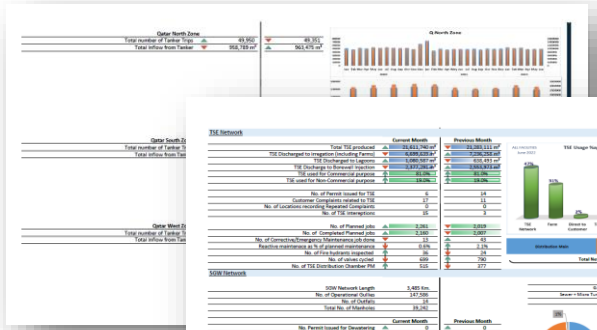
.....

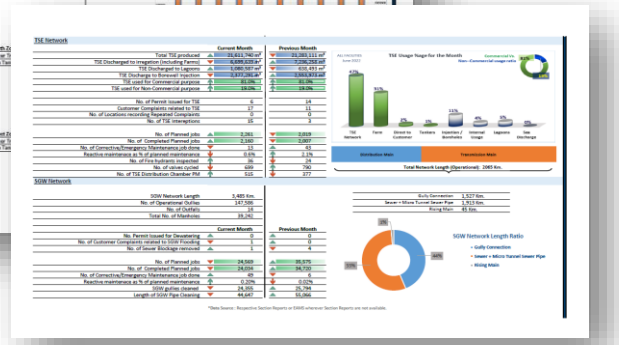
President of Ashghal رئيس هيئة الأشغال العامة

Operation Supports - Acquire, Operate, Maintain, Dispose





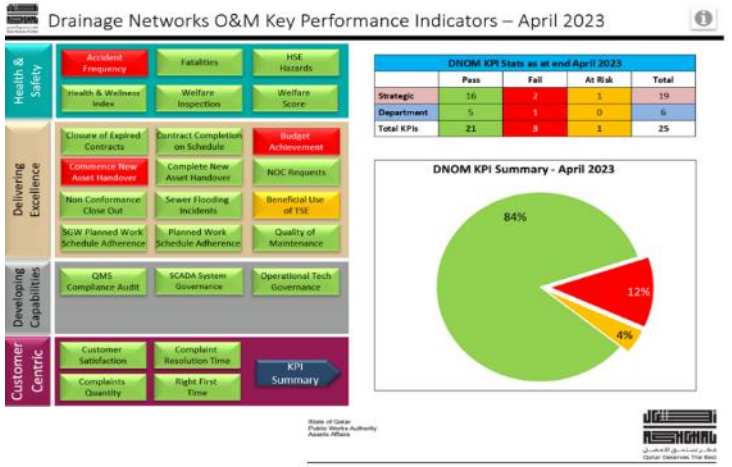


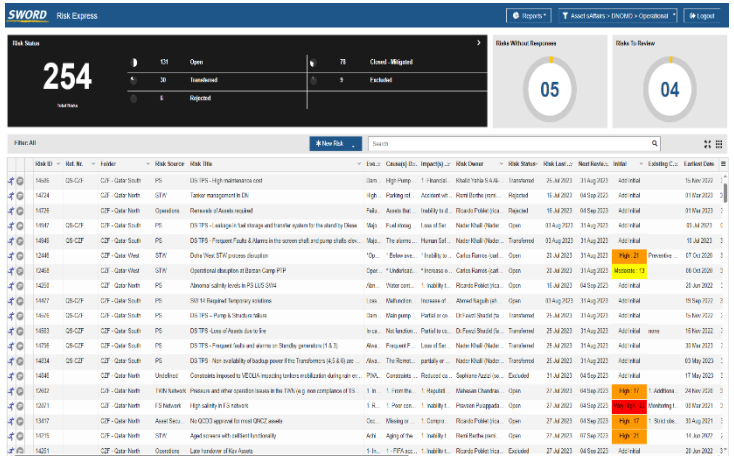


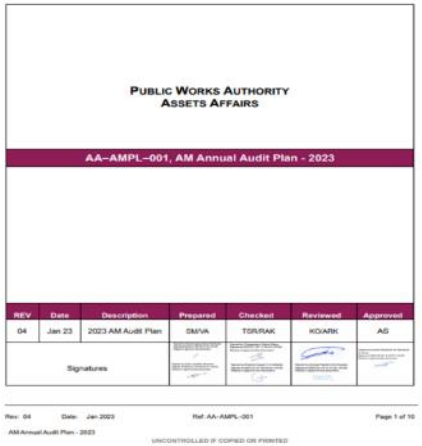
AA – Drainage Network Operation & Maintenance

Advanced Wastewater Treatment Technologies:

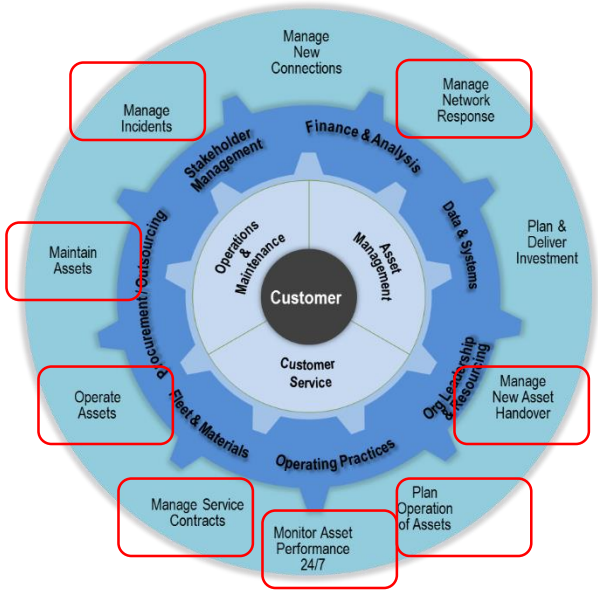
- Developed Reliability Centered Maintenance RCM
- Asset Management internal awareness Campaign
- Key Performance Indicators
- OPPM (Investment Progress)
- PDLM (Project Document Lifecycle Management)
- ARM (Active Risk Manager)
- ISO 55001 Internal Audit







DNMC Supports



We Care

Ensuring Serviceability, Reliability and Customer Satisfaction

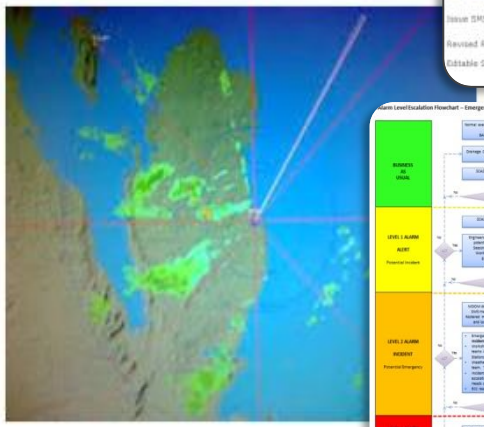
1. All customers are satisfied with the services they experience
2. Assets Affairs operates, manages and plans investment on assets to ensure they achieve service standards
3. Service is effective and efficient, and serviceability is maintained and enhanced where required
4. There is rapid response to correcting defects using a right first time approach

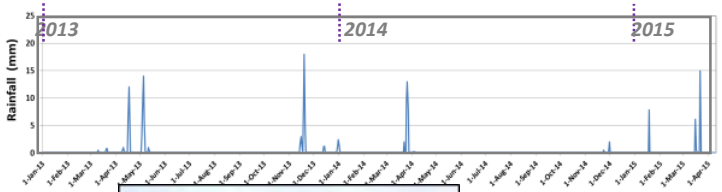
5 Incidents are managed to minimize levels of disruption and return Assets to normal use as soon as possible

SCADA

Microsoft Dynamics CRM

IBM maximo®





- Best Practices
- Lessons Learned

Decision Support Tools

We Deliver

P3A. Promoting Occupational Health & Safety
P3B. Demonstrating Efficiency & Value
P3C. Engagement during change to build sustainable workforce capability

We Lead

L1A: Technology: Meets the business needs and performance requirements of Ashghal
L2A: People: Learning and Development
L3ABC: Processes are reengineered and transformed, streamlined and fit-for-purpose, properly mapped and documented

Managing the Reuse of Wastewater in Ashghal

Ashghal has established rigorous design standards for the treated water generated from primary treatment plants. These standards encompass a series of processing stages aimed at achieving advanced tertiary treatment levels. This is accomplished through the utilization of cutting-edge microfiltration membrane technologies, surpassing the efficiency of traditional sand filters.

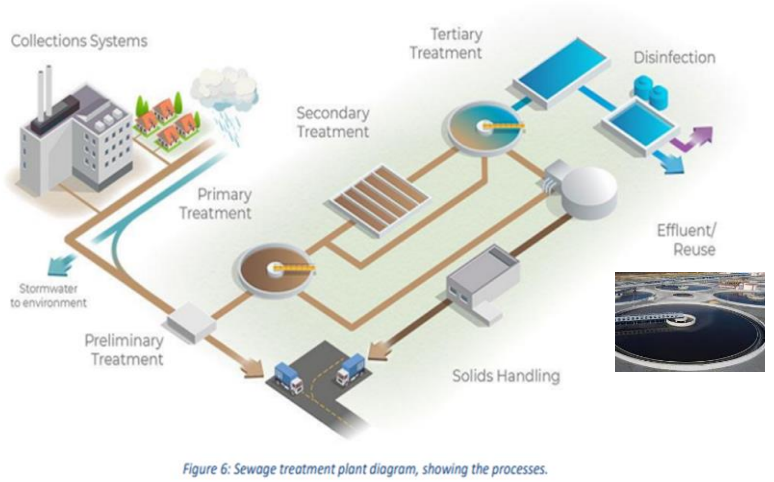


Figure 6: Sewage treatment plant diagram, showing the processes.

The Public Works Authority, since the time it assumed its tasks in 2004, managed the design, construction, and operation processes for the wastewater treatment plants not only to achieve environmental protection goals, but also to increase the water resources in the country.

Major production of Treated water from various plants, the West Doha plant, the South Doha plant, the Industrial Area plant, and the Doha North treatment plant, and Al Dhakira treatment plant.

*For the past 15 years, the authority's production of high-quality treated sewage water has immensely increased from 55 million cubic meters in 2005 to **283 million** cubic meters in 2023.*

Quality Standards and Regulations:

- Under Qatar Environmental Law, the standards and criteria for wastewater quality are given in Annex(3/2nd), of the Executive Bylaws of Environmental Protection Law issued under Ordinance Law No. (30) of 2002 (Environmental Bylaws). The Environmental Bylaws are issued under Law No. (4) Of 2005.

Definition	Compliance Measure	Unit	STW – TSE quality requirements
TSE	BOD	mg/L	≤ 5
	COD	mg/L	≤ 50
	TSS	mg/L	≤ 5
	pH	mg/L	6 – 9
	Ammonia	mg/L	≤ 1
	TN	mg/L	≤ 10
	TP	mg/L	≤ 2
	Turbidity	NTU	≤ 2
	FRC*	mg/L	1-2
	DO	mg/L	>2
	Total Coliform	MPN/100 mL	<2.2
	Fecal Coliform	Mpn/100 Ml	ND
	Nematodes	Count/1L	<1
	Giardia	Count/40L	<1
	Enteric Viruses	Count/40L	<1
	TDS	mg/L	< 1000 mg/L to < 800 mg/L (Continual improvements)

Contractual requirements: The Frameworks partners shall be responsible for the ongoing measurement and reporting of the following compliance measures ensuring adherence to the specified standards set in the tables below

Wastewater Reuse Potential Customers

Wastewater Reuse Customers:

Cooling: Customers that use RW for cooling purposes

Farms: Customers that use RW for agriculture of fodder farms

Private Irrigation: Private customers that use RW for irrigation purposes

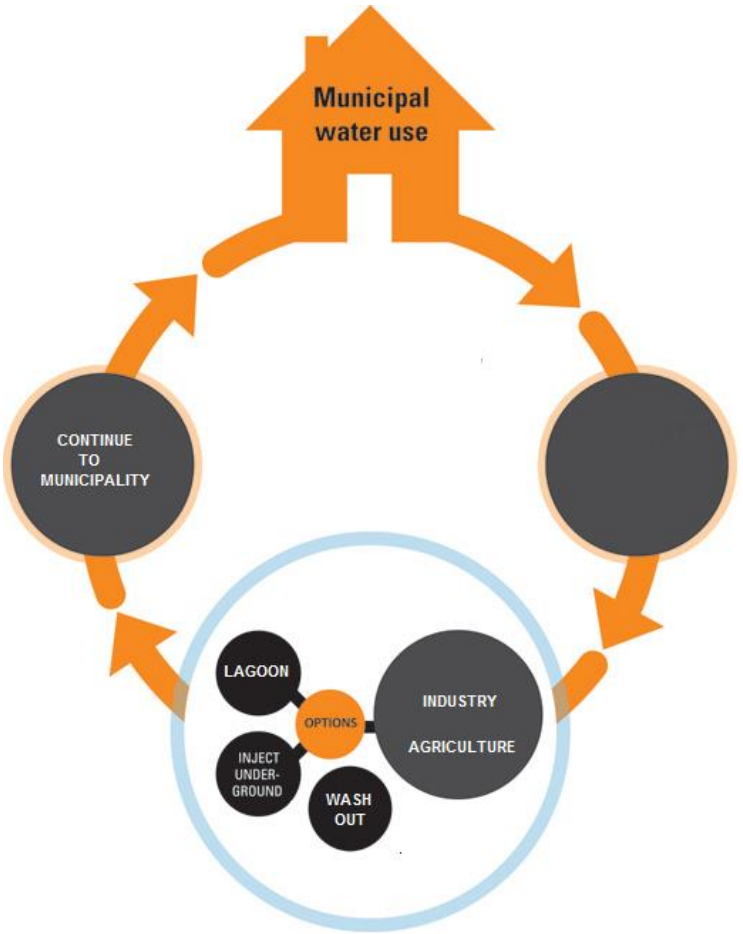
Landscape Irrigation: Includes the landscape irrigations of parks\open spaces\green areas\buffer\plazas, schools, educational institutional, commercial and government plots

Road Irrigation: Includes the irrigation demands for the roads' medians, sides, interchanges and roundabouts

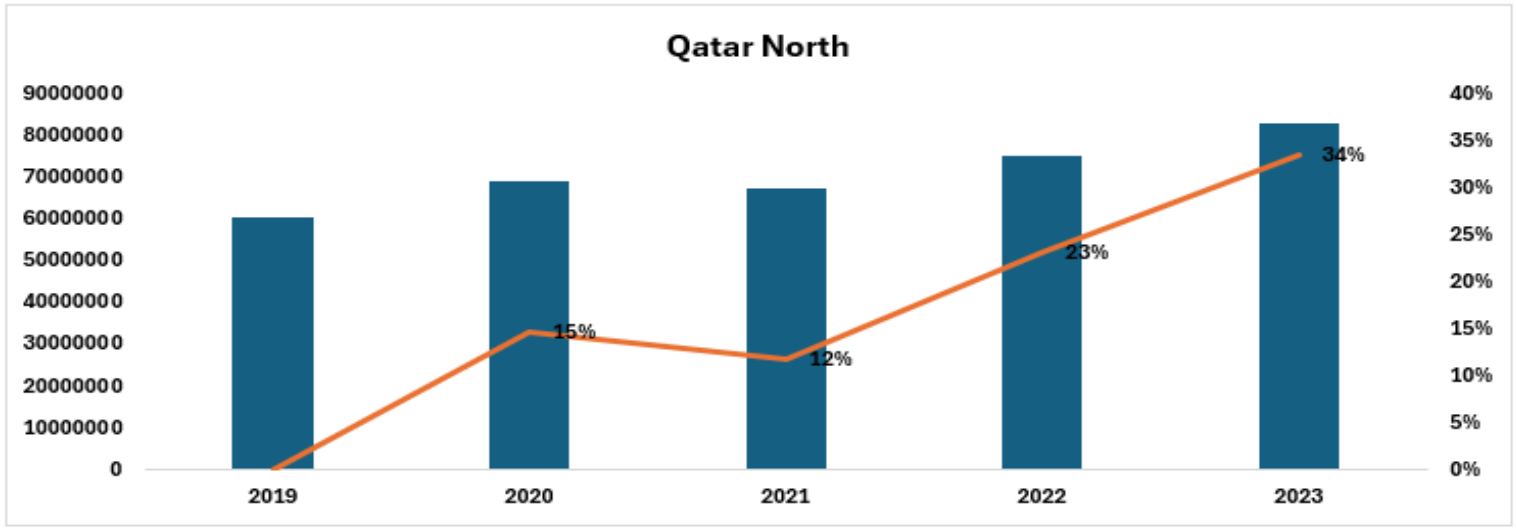
Industrial: Customers that use RW for industrial purposes

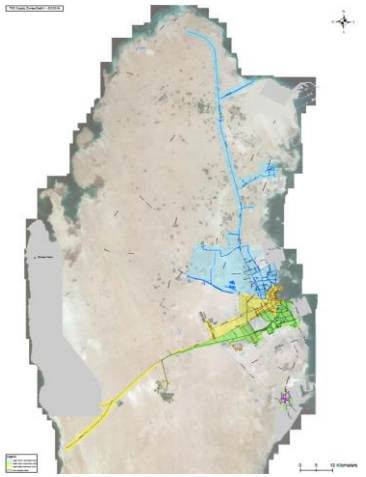
Mixed: This category is allocated only for Tanker Filling Stations (TFS) within treatment works as the type of use is difficult to be tracked

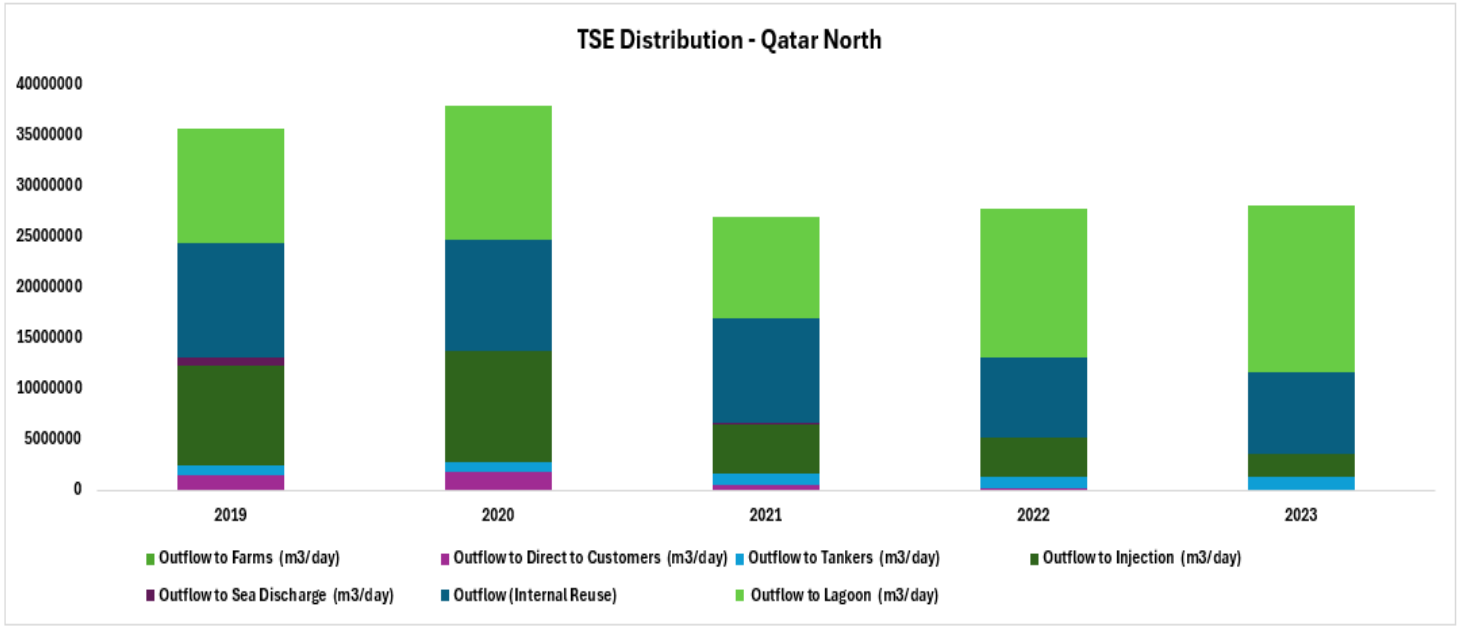
Usage Category	Usage Sub-Category	Description
Cooling	Cooling	District cooling facilities (e.g. Qatar Cool) as well as cooling of large private developments (e.g. Qatar University).
Farm	Commercial Farms	Commercial Farms for non-human consumption agricultural end uses such as: • Fodder crops; • Non-food crops; • Commercial nurseries; and • Livestock.
	Qatar National Food Security Programme	For irrigation of forage and livestock grain crops proposed in the Qatar National Food Security Programme Master Plan.
Industrial	Industrial (General)	Industrial end uses such as: • Construction water; • Vehicle washing; • Wash-down water; and • Oil well injection.
	Sand Washing	Sand production operators who use specialized plant to wash quarried sand on an industrial scale in the order of thousands of Tonnes per day (e.g. the QPMC Sand Washing Plant)
Landscape	Landscape	Landscaping irrigation for: • Parks; • Mosques; • Schools; • STW landscaping; and • Other community/public demands included in the Local Roads and Drainage Programme (excluding roads irrigation).
Private Irrigation	Private Irrigation	Landscaping irrigation for: • Major developments (e.g. Education City, Aerospace City and Lusail); • Private developments (e.g. Sidra Housing Complex and Shemoukh Twin Towers); • Sports fields and venues (e.g. Qatar Foundation Golf Course and FIFA World Cup venues); • Commercial/mixed-use (e.g. North Gate Mall); • Government (e.g. Supreme Education Council Headquarters);
	Converted Potable Irrigation	Conversion of end users currently using potable water for irrigation, excluding any customers Ashghal is already committed to providing recycled water to
Roadside Irrigation	Roadside Irrigation	• Local Roads (including Local Roads and Drainage Programme Demands); • Interchanges; and • Expressways.

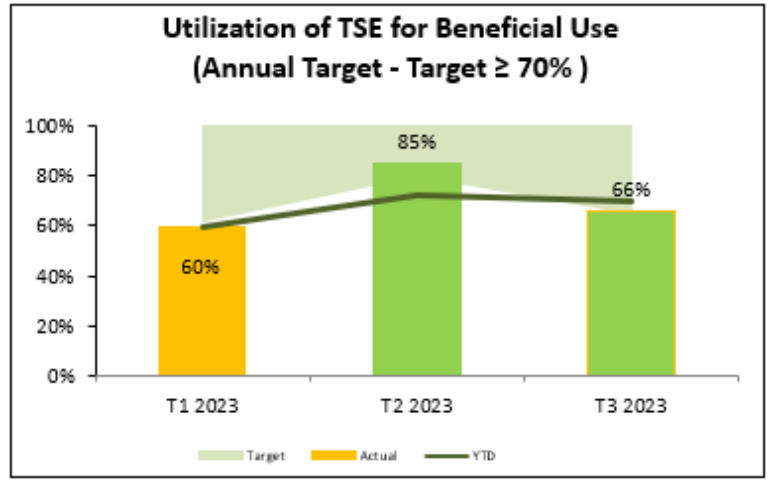


Catchment Zone - Current TSE Distribution and KPI









Ashghal Initiatives

Capital Projects:

- TSE Seasonal Storage Lagoons
- Treated Sewage Effluent (TSE) expansion network
- Biggest man-made forest, Tree Planting Entire Qatar
  (i.e. Doha North - 95,000 trees planted in the entire area)

The ministry revealed several tree-planting initiatives in Qatar: during 2019-2022 it planted 1mn tree seedlings, while in the 10mn-tree initiative (2023/2030), it has planted 320,000 seedlings so far.

Operational Projects (Effective usage of TSE Networks) :

- New TSE Filling Unit at Doha West Sewage Treatment Plant
- Flood Management and Networks Monitoring (FMNM)
- South/West/North Catchment - TSE Network Flow Flexibility
- Operation Analysis and Monitoring (TWN All Qatar)
- DNMC Enhancement Platform
- New Asset Connection to Scada
- Operation, Maintenance and Rehabilitation Programme Unplanned Works - Qatar TSE
- Connection to Customer - Intelligent Irrigation

The goal of these initiatives is to improve the quality of life in Qatar obtaining the title of healthy city from the World Health Organisation

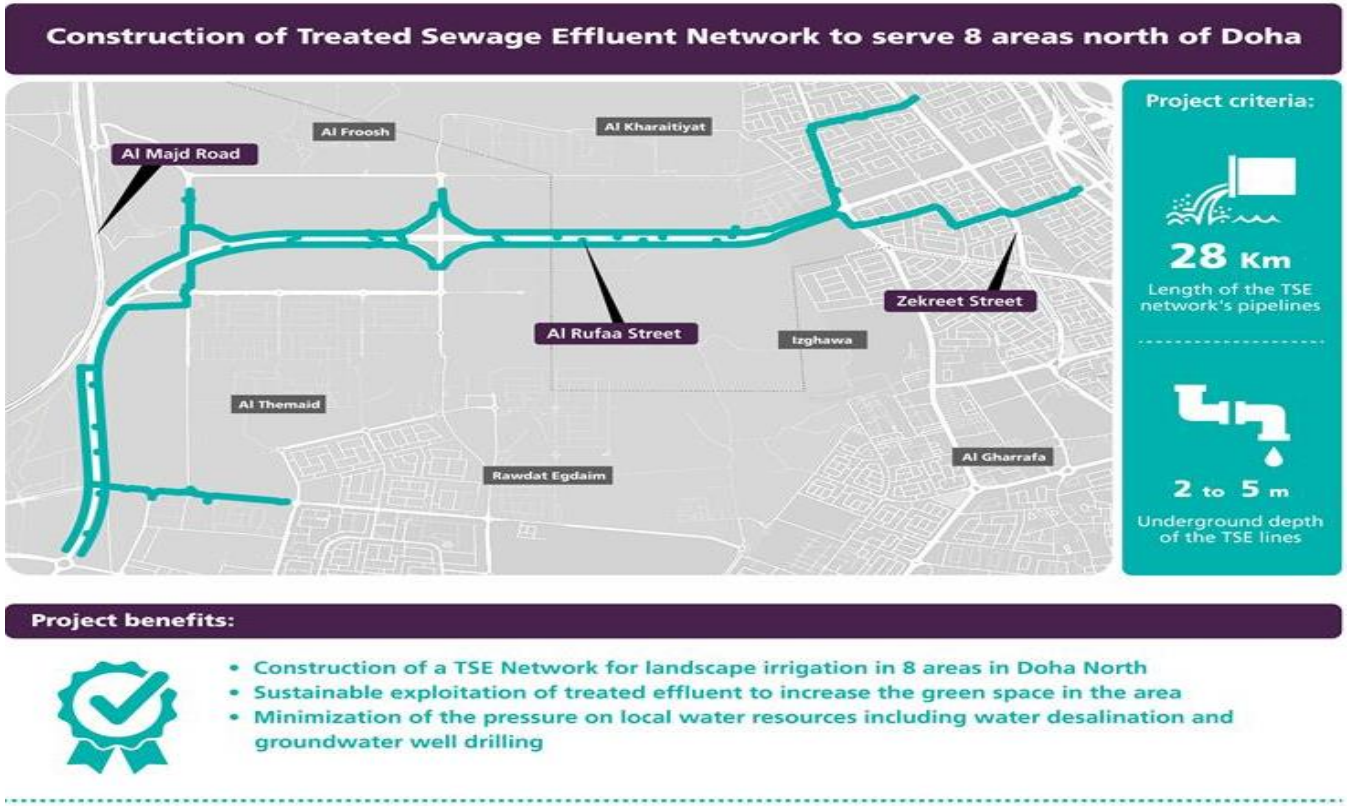
CAPEX Projects: Wastewater Reuse

Constructing 28-km-long Treated Sewage Effluent (TSE) network, which aims to irrigate green areas in Al Kharaitiyat and its surrounding areas. Besides Al Kharaitiyat, this TSE network covers areas like Rawdat Egdaim, Rawdat Al Jahhaniya, Jeryan Al Saham, Rawdat Al Thamid, Jarry Al Dhabi, Izghawa and Al Froush.

The project serves several areas witnessing a significant urban growth as it provides and connects TSE lines of other existing projects in the area. It also minimizes the pressure on local water resources including water desalination and groundwater well drilling.

The construction of the Design and Build Project for the TSE Seasonal Storage Lagoons maximizing the utilization of renewable water resources, and the optimal use of treated wastewater

- ***the project would balance the deficit and surplus of treated wastewater (TSE) by storing the surplus during winter months, to be used in the summer when the demand for treated water is high.***



OPEX Projects: Wastewater Reuse

New TSE Filling Unit at Doha West Sewage Treatment Plant:

The project includes design, supply, installation, construction and operation of the TSE tanker filling station at the Doha West Sewage Treatment Plant, which is strategically located at the crossroads between Salwa Road and Al Majd Road.
The Doha West plant can fill up to 20 tankers simultaneously with a capacity of 20 cubic meters of treated water. The plant contributes towards increasing the total filling rates of tankers

Flood Management and Networks Monitoring (FMNM)

Integration the scope of works include:

1. Data collection review, Initial Planning Study & Data Gap
2. Hydraulic Model Build, verification and calibration
3. Procurement, installation and integration of monitoring instrumentation
4. Systems Operational Plan, Network Performance Assessment, Model Maintenance

All Project comes as part of Ashghal's commitment to encourage sustainability and recycling to reuse the treated sewage effluent and vision 2030 and Alignment to UNEP Sustainable development Goal (6).


THANK YOU