

منتدى المياه السعودي
saudi water forum **SWF 2022**
Water Sustainability.. A Responsibility for All



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NEOM Desalination & Brine Processing

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ORGANIZING PARTNERS



EXECUTED BY



TECHNICAL ADVISOR



6-8 March 2022 • Hilton Riyadh Hotel & Residences



NEOM Desalination and Brine Processing

- 1) Requirements of NEOM's Desalination and Brine processing plants.
- 2) Technical and Commercial
 - Feasibility Study and Market Survey
 - Business Plan
 - Implementation Plan
- 3) First 500 MLD Desalination and Brine Processing Plant
 - Procurement approach
 - Request for Qualification
 - Business Structure
 - Timeframe



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NEOM PROJECT OBJECTIVES: SUSTAINABLE LOW-COST WATER

Produce water with minimum environmental impact.

Achieved through global leading water recovery rate, renewable energy use and **Zero Liquid Discharge (ZLD)**



World-leading sustainable water system

Lowest non-revenue water globally. Develop energy-neural wastewater system with **100% wastewater reuse**

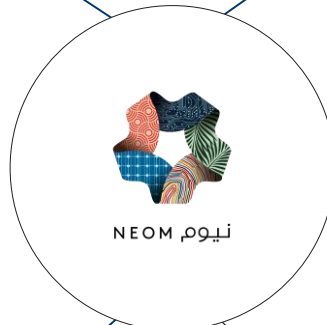
Competitive water costs

Produce water that is **cost-competitive** amongst peers **regionally** and **globally**



Production of 'Green' end-use and feedstock products

Supply of **Green Products** will Support customers and end-users to **meet ESG** commitments

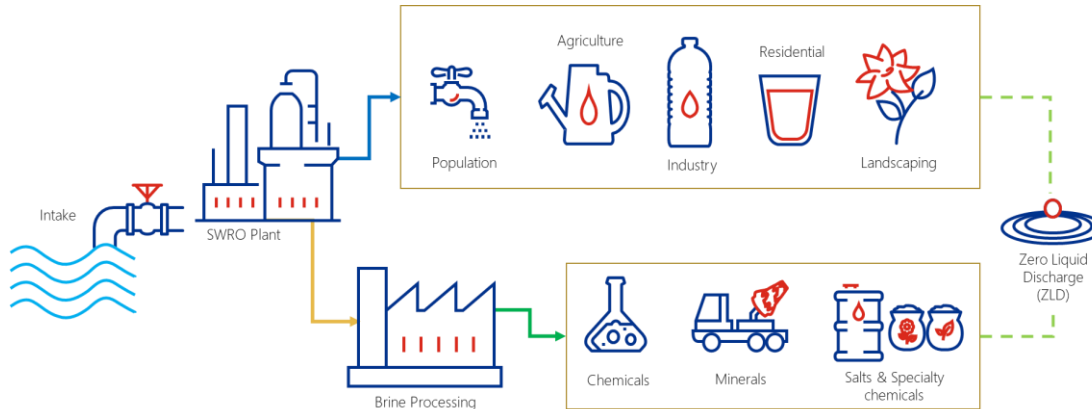




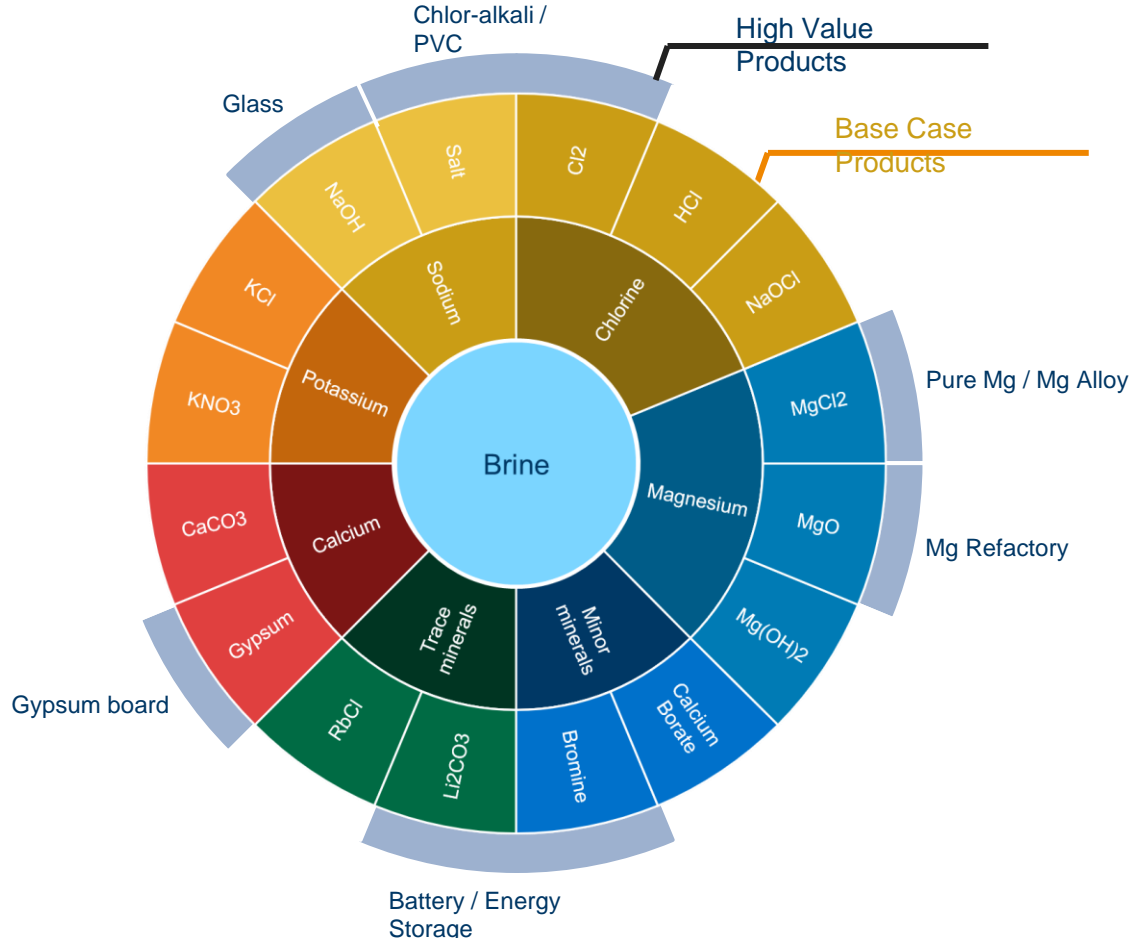
NEOM PROJECT OVERVIEW

● Project Overview

- NEOM is developing a **state-of-the-art Selective Desalination and Seawater Mining complex** (the Complex) just north of Duba, Saudi Arabia and 13km south of the planned NEOM Oxagon.
- The Complex will be **the largest facility of its kind** and will have the capacity **to produce up to 1.5 Mm³/d** of water daily by 2030. The Complex will also produce a suite of mineral and chemical products that will be sold in domestic and international markets and help offset the cost of water and minimise adverse environmental impacts.
- The First Desalination Project (FDP) represents the first stage of project development to develop the first two (2) selective desalination process (SDP) trains that will produce 500 MLD of desalinated water, including intake, emergency outfall and storage reservoir.



NEOM WILL BE A MAJOR PRODUCER OF GREEN PRODUCTS



Preliminary Coproduct Production Estimates

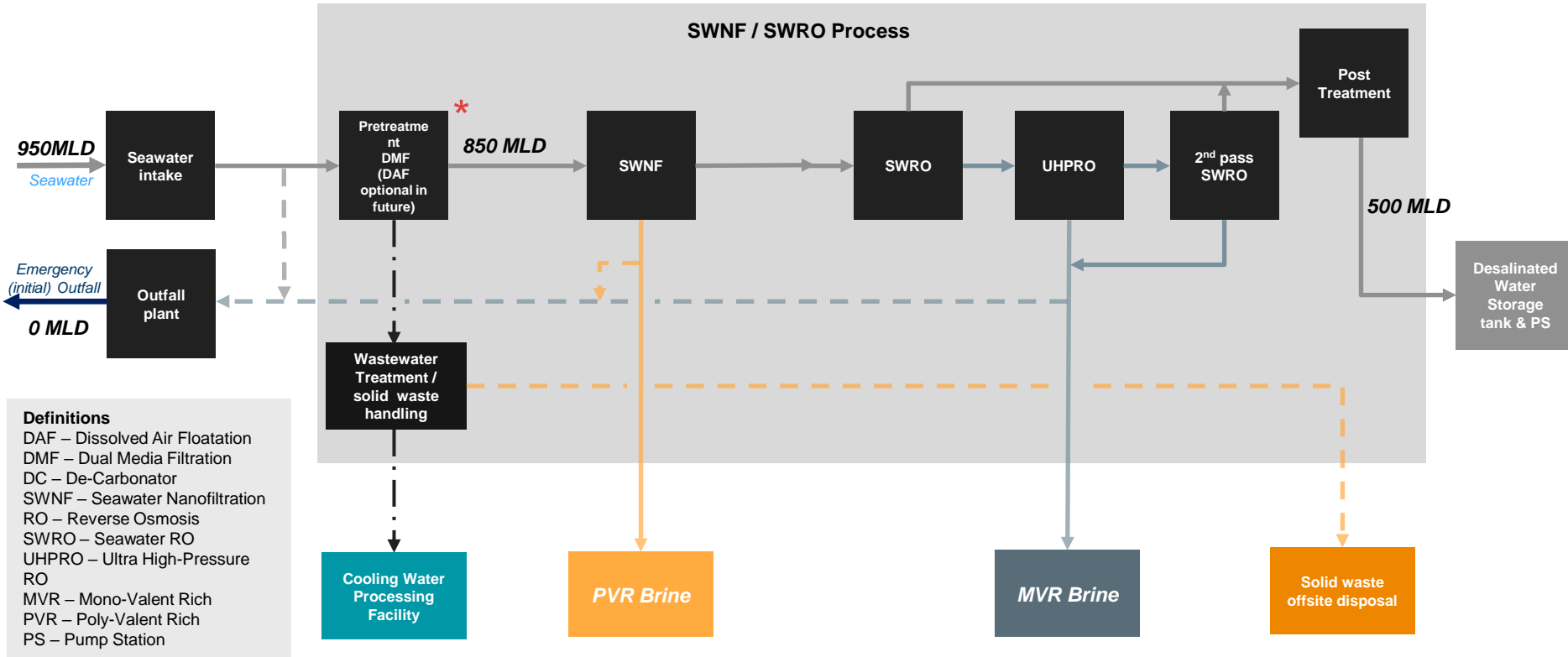
Mineral and Chemical Coproducts	Estimated Total Production (ktpa)	Estimated Saleable Volume (ktpa)
Salt	11,295	10,279
Caustic Soda (aqueous @~50%)	1,392	1,392
Chlorine	1,293	1,151*
Hydrochloric Acid	380	380
Magnesium Chloride	735	-
Magnesium Metal	188	188
Magnesium Hydroxide	778	39
Magnesium Oxide	511	511
Potassium Chloride	270	-
Potassium Nitrate	367	367
Gypsum	1,786	1,786
Calcium Carbonate	123	123
Calcium Borate	8	8
Bromine (elemental)	21	21
Lithium Carbonate	0.2	0.2
Rubidium Chloride	0.002	0.002

NOTE:

- This assumes production of 0.5Mm3 of water per day
- 9% of the salt produced is used in Chlor-Alkali production
- *Chlorine assumed to be sold to PVC facility

OVERALL BFD AND MASS BALANCE

First Desalination Plant 500 MLD



Definitions

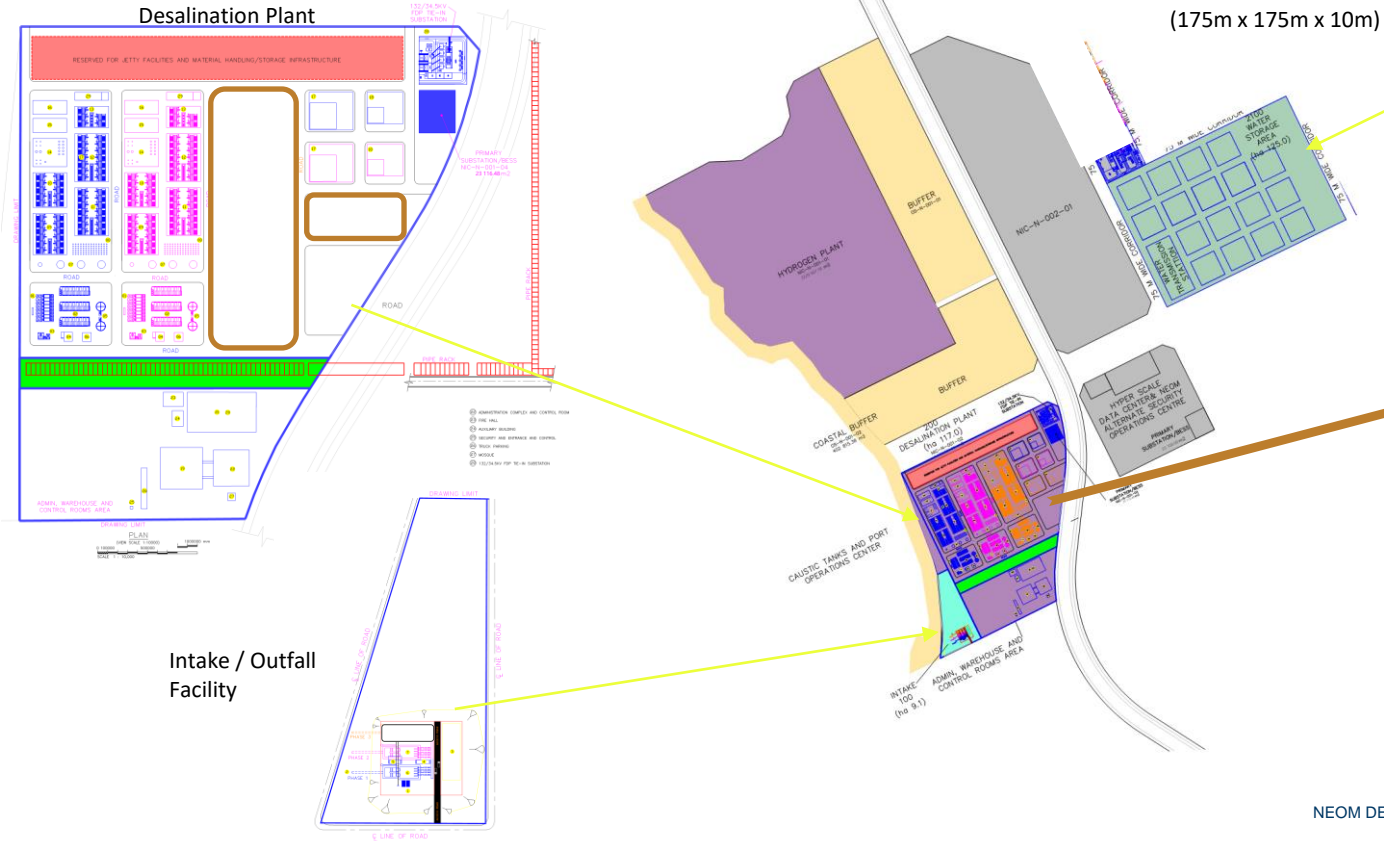
- DAF – Dissolved Air Flootation
- DMF – Dual Media Filtration
- DC – De-Carbonator
- SWNF – Seawater Nanofiltration
- RO – Reverse Osmosis
- SWRO – Seawater RO
- UHPRO – Ultra High-Pressure RO
- MVR – Mono-Valent Rich
- PVR – Poly-Valent Rich
- PS – Pump Station

* Minor treatment losses that are captured and recycled in the process are not accounted for here



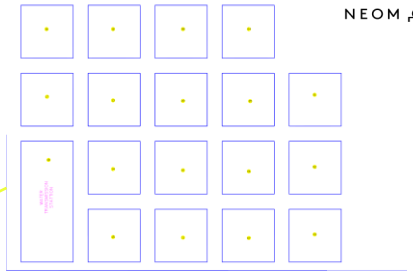
OVERALL FDP CONCEPT SITE LAYOUT

First Desalination Plant 500 MLD



Desalinated Water Storage Tanks

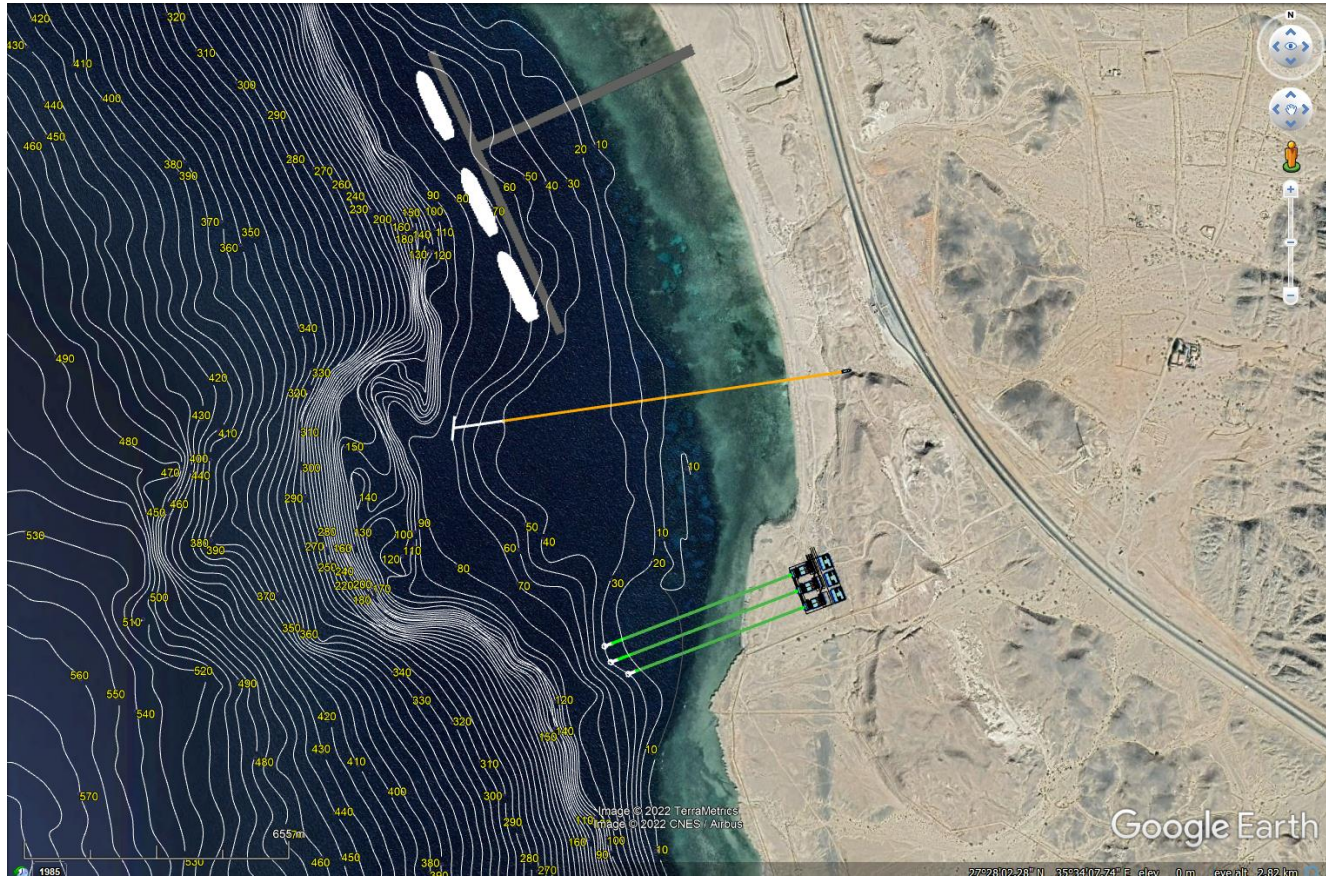
3 days storage capacity, concrete tank (175m x 175m x 10m)





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INTAKE AND OUTFALL AND PUMP STATION





INTAKE MICRO BORE TUNNEL (MTB) PROFILE



- Exit (center) at EL -27.0 m LAT
- Velocity cap
- ID 2600 mm



OUTFALL MICRO BORE TUNNEL (MTB) PROFILE

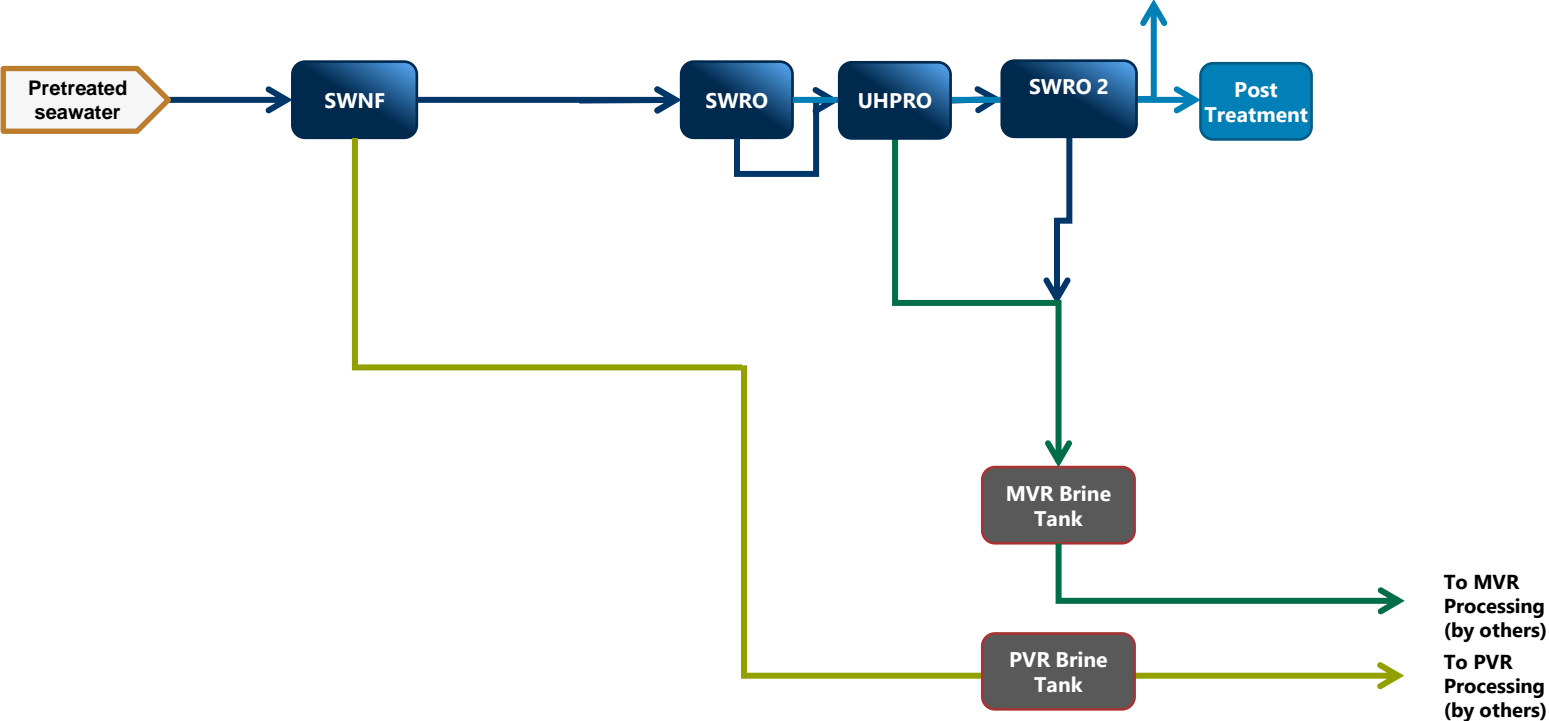


➤ HDPE to El -70.0 m LAT & diffuser

➤ ID 2268 mm

NEOM SELECTIVE DESALINATION PROCESS

SWNF-SWRO-UHPRO-SWRO2 Desalination Process 500 MLD



Summary of key water quality criteria

Parameter	Unit	Seawater	Desal Water	MVR	PVR
TDS	Mg/L	46,000	< 500	112,000	108,000
Sodium	Mg/L	14,400	< 150	41,000	15,000
Chloride	Mg/L	25,500	< 250	68,000	43,000
Potassium	Mg/L	750	<5	2,200	800
Calcium	Mg/L	510	<5	500	3,200
Magnesium	Mg/L	1,525	<5	400	13,000
Sulfate	Mg/L	3,550	<5	50	32,000

Procurement and Development Process

Project is Technical Complex First of a Kind facility

Conventional bidding with Minimum Technical Requirements and Lowest offer will not achieve NEOM goals.

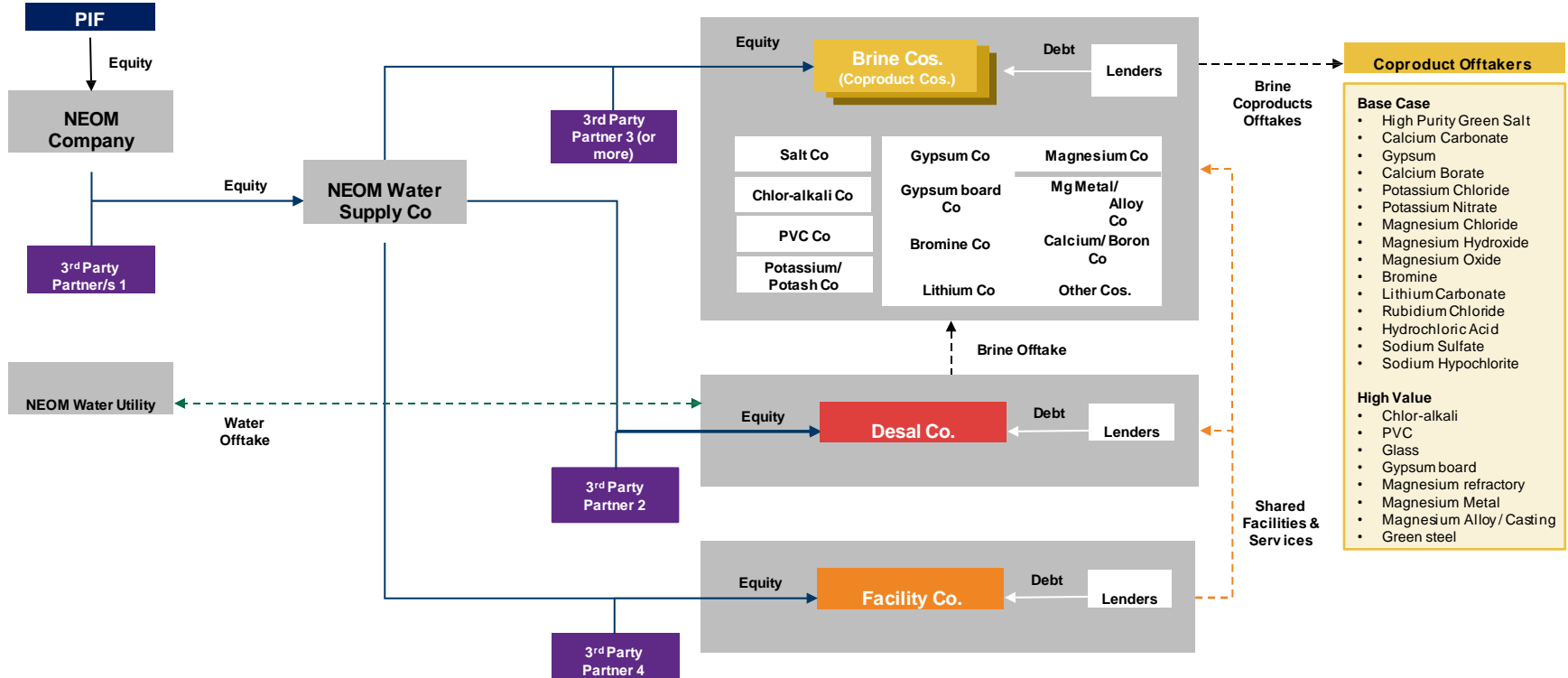
Request for Qualifications released in December 2021

Development of Joint Venture Alliance comprising Development Member, Technical Member and NEOM



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DESAL-ZLD COMPLEX – CORPORATE STRUCTURE



Under the Patronage of **HRH Prince Faisal bin Bandar bin Abdulaziz**
Governor of Riyadh Region

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture



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2030
التحول الرقمي
Khashanah of Saudi Arabia

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THANK YOU



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الهيئة العامة للغذاء والدواء
Saudi Food & Drug Authority (SFDA)



شركة المياه الوطنية
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