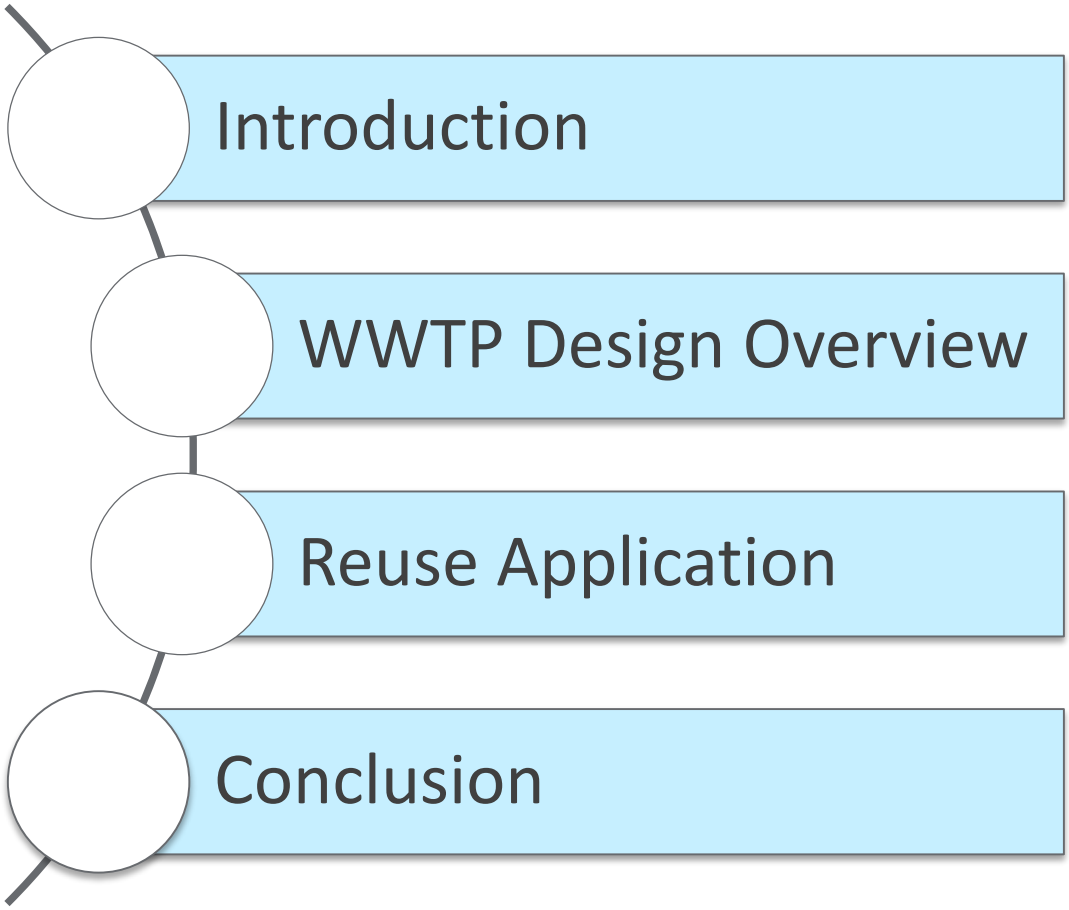
Jazan IGCC Wastewater System for Sustainable Reuse

Ali S. Al-Wadani

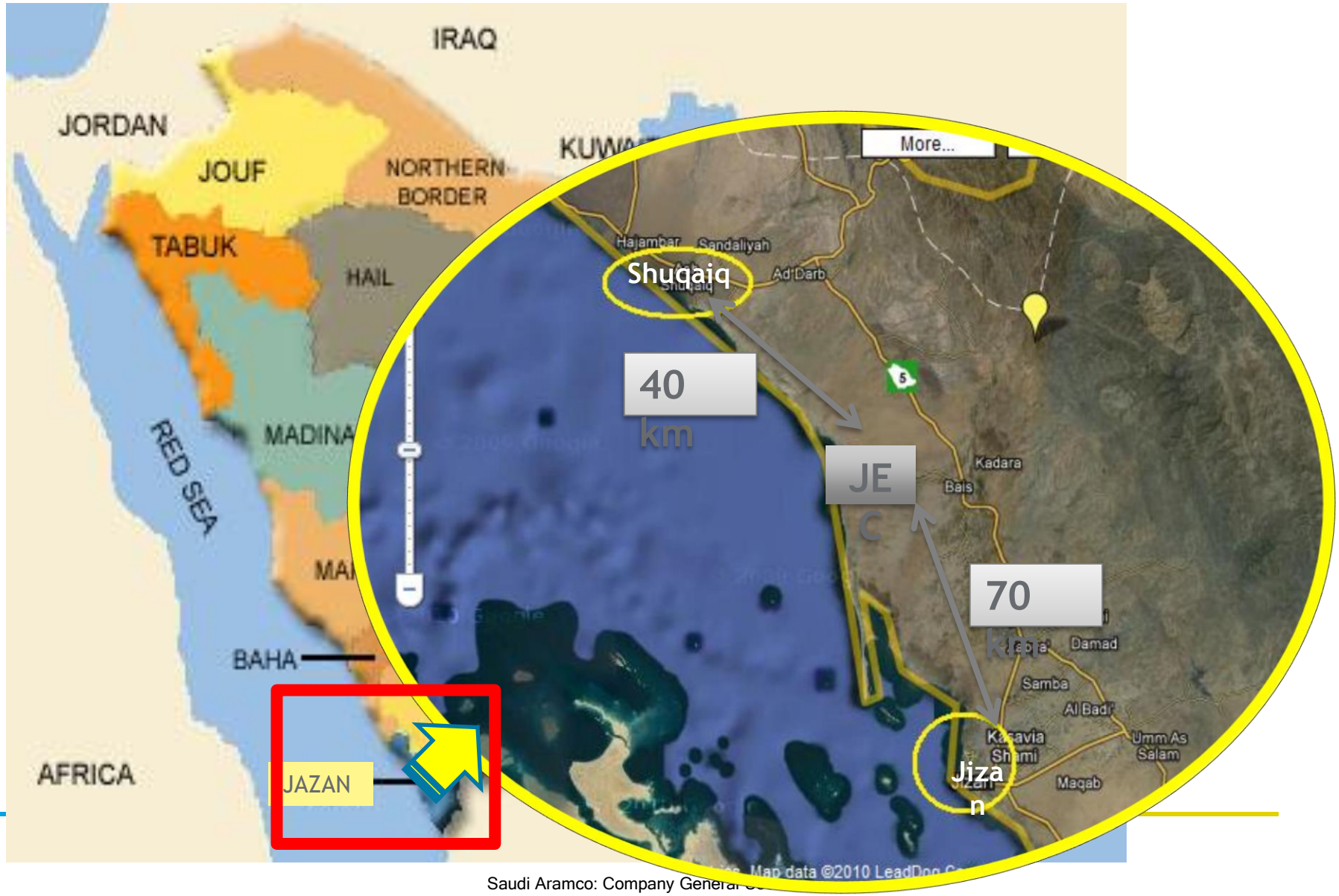
10/18/2017

OUTLINE



Introduction

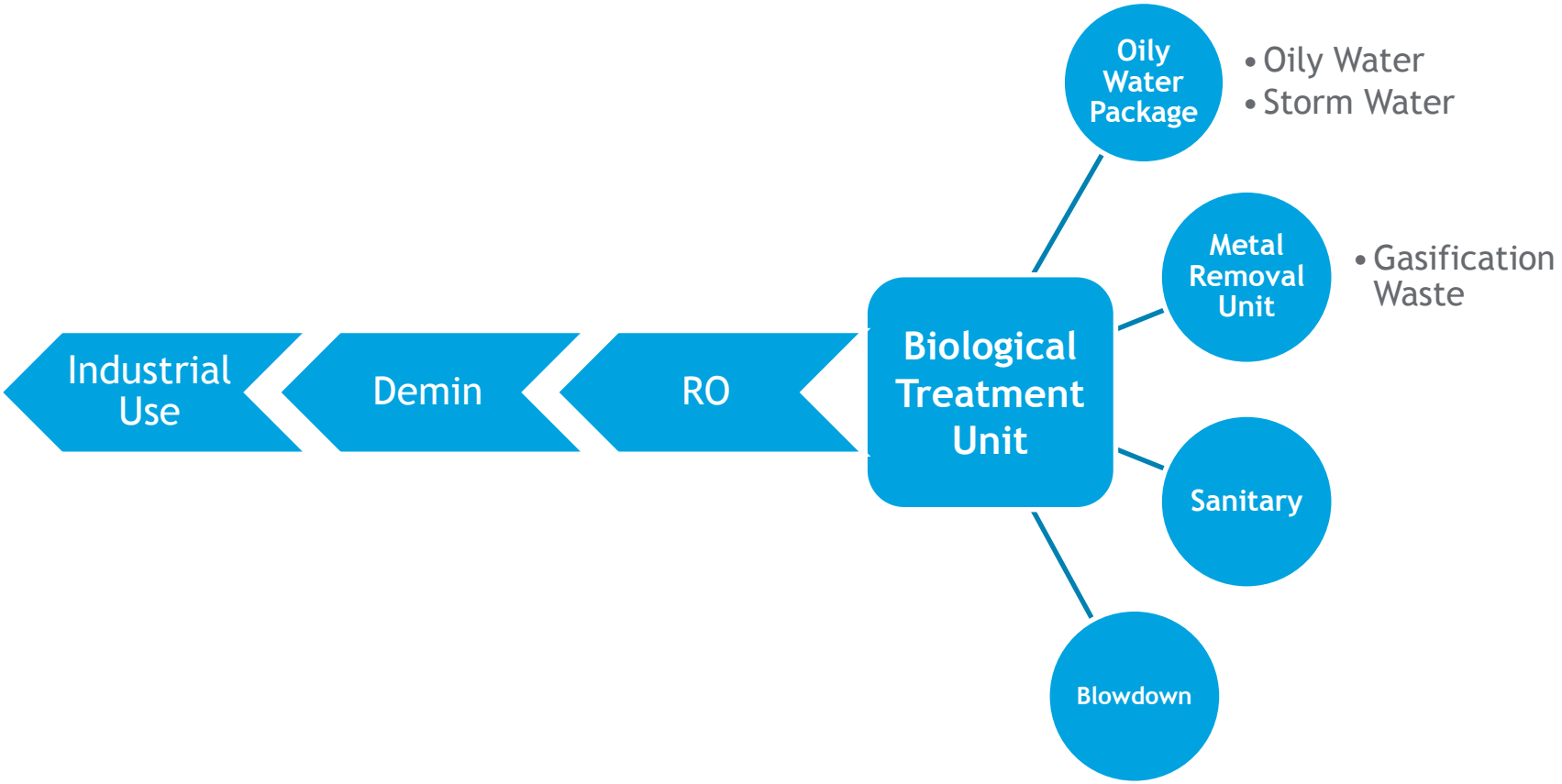
SOUTH WESTERN REGION



Introduction

Overall Configuration System of IGCC WWTP

Overall Block Flow Diagram



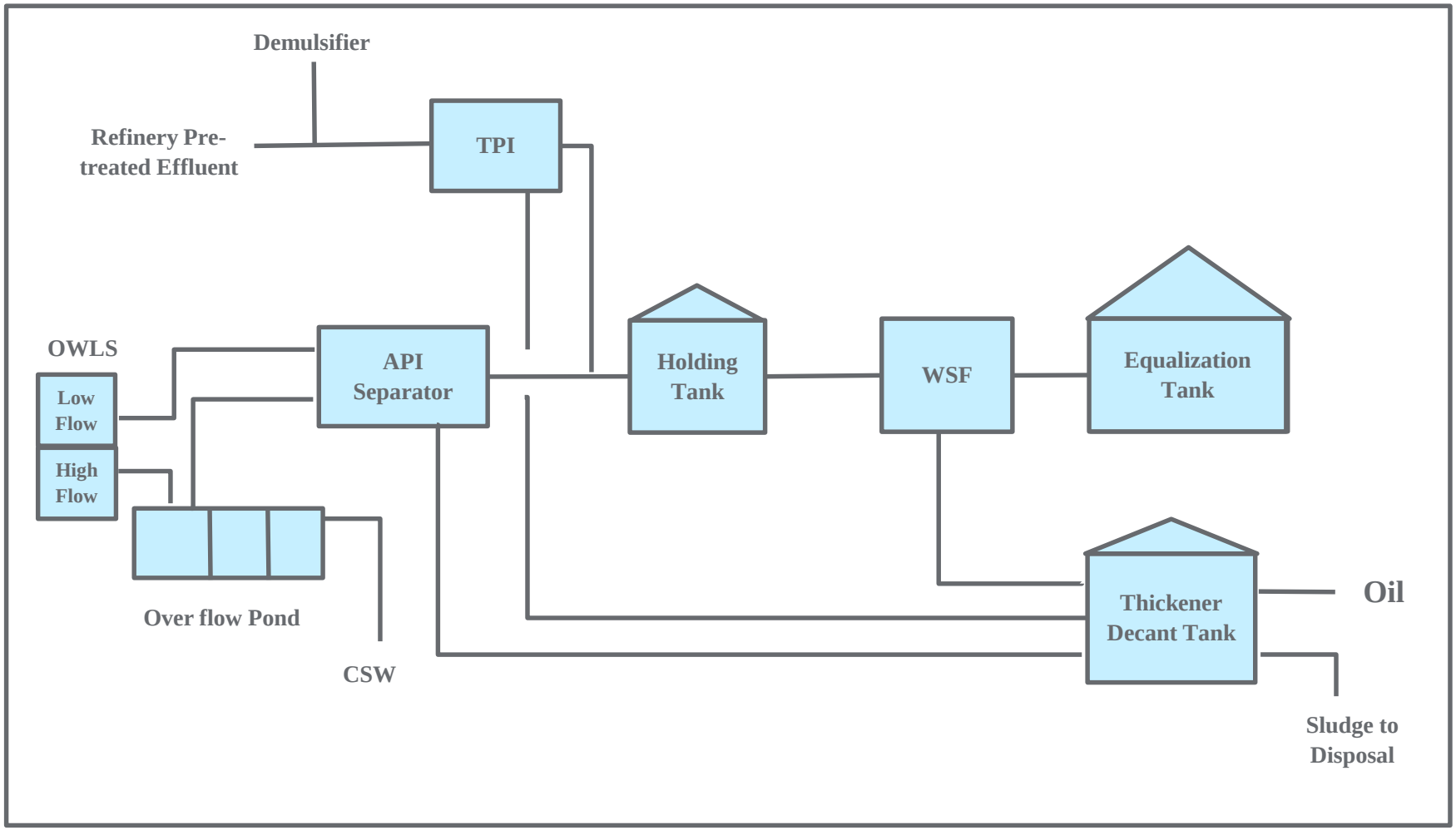
IGCC WWTP

IGCC WWTP consists of three main packages:

1. Oily Water Package
2. Metal Removal Unit
3. Biological Treatment Unit

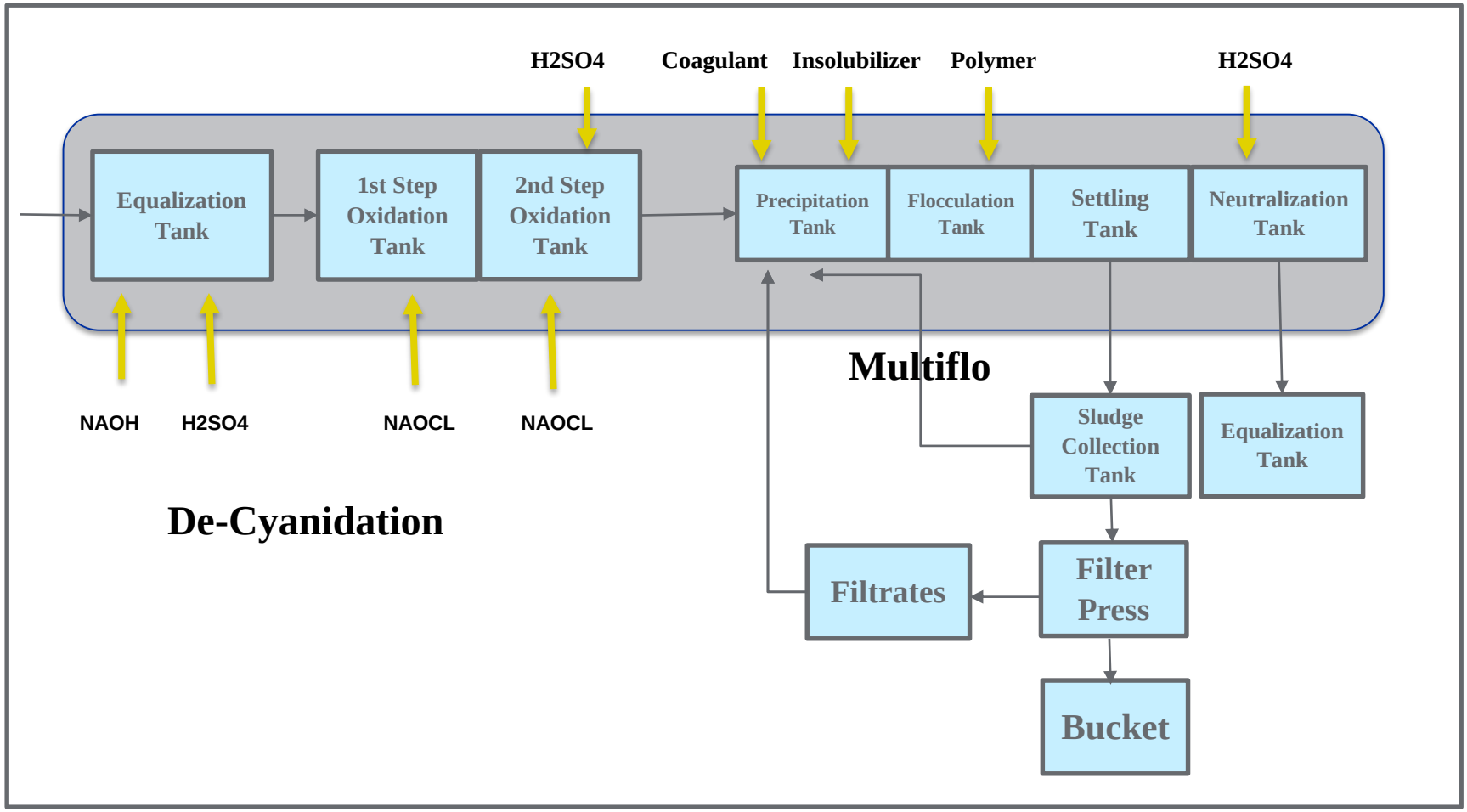
Oily Water Package

Oily Water Package



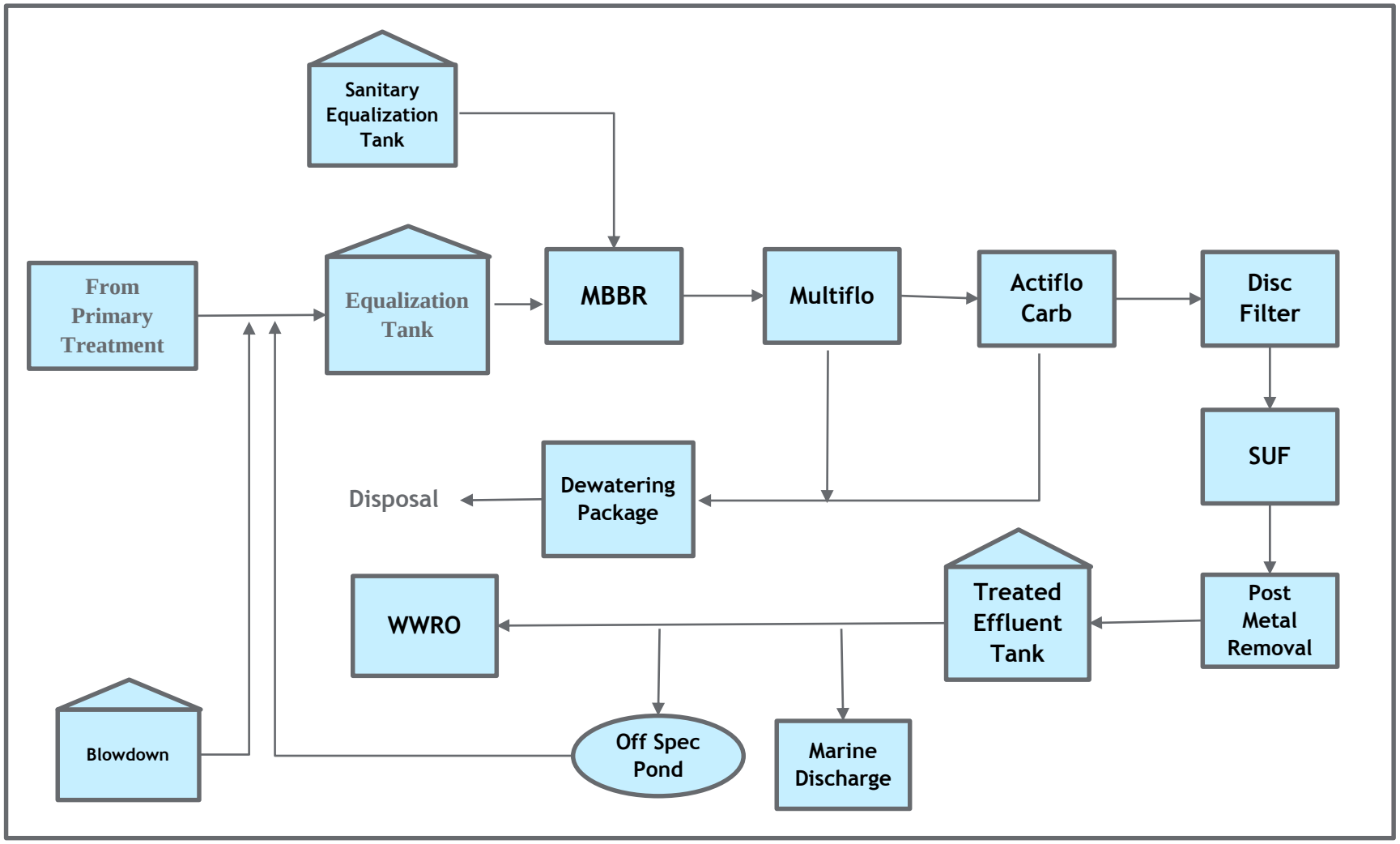
Metal Removal Package

Metal Removal Package



Biological Treatment Unit

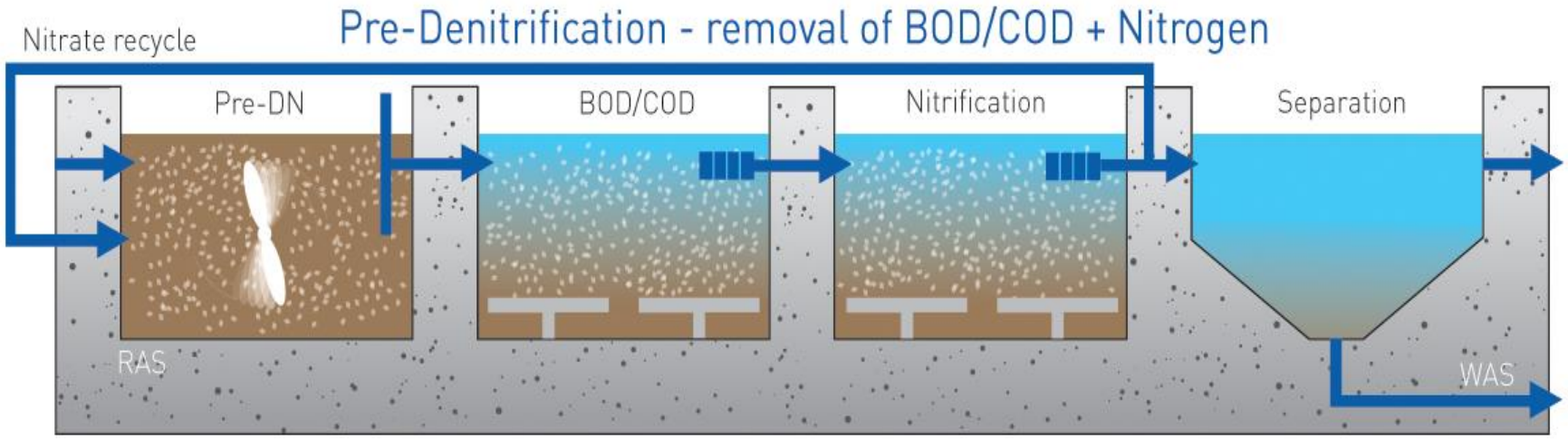
Biological Treatment Unit



Biological Treatment Unit

1. MBBR:

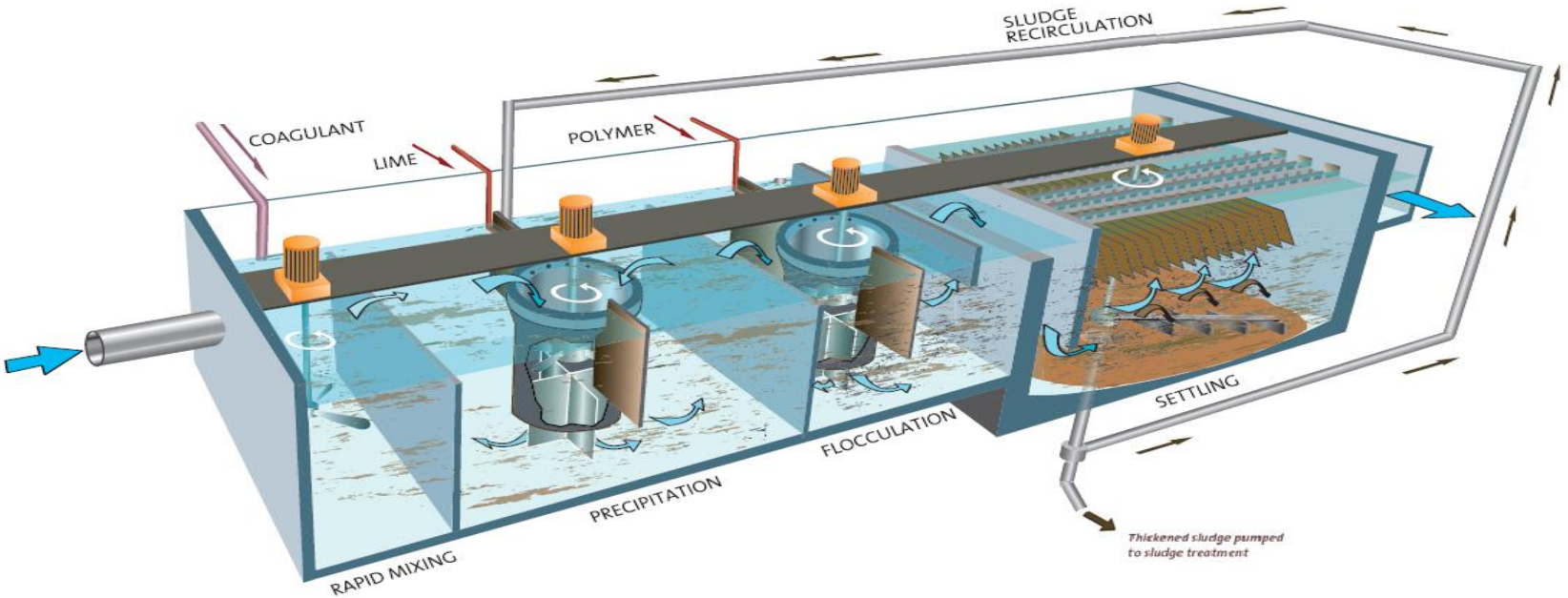
The moving Bed Biofilm Reactor will be used for biodegradable COD removal, nitrification and de-nitrification process.



Biological Treatment Unit

Multiflo:

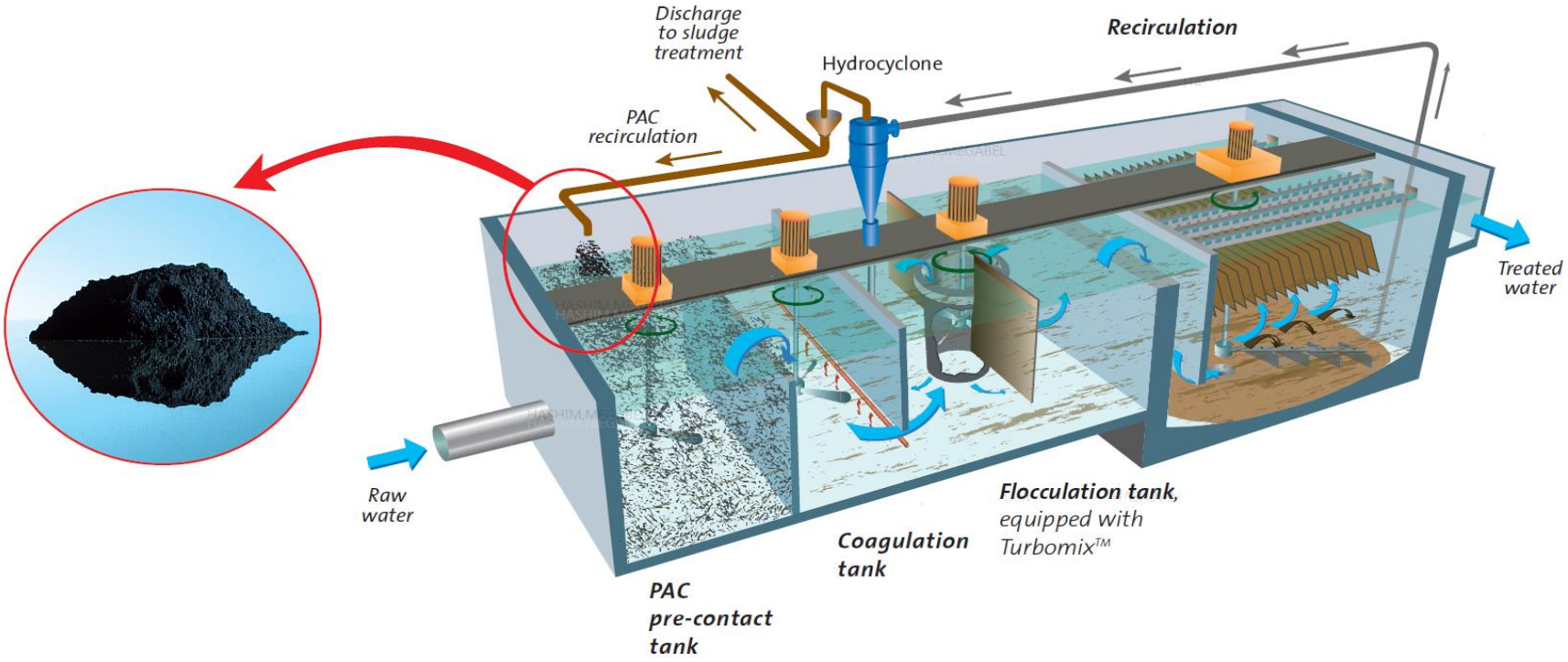
It will be used for phosphate removal were lime, coagulant and polymer are added to participate the phosphate as $Ca_3(PO_4)_2$.



Biological Treatment Unit

Actiflo Carb:

It will be used for solid separation and non biodegradable (refractory) COD removal where micro-sand, PAC, coagulant and polymer are added.



Biological Treatment Unit

Drum Filter:

It will be used for suspended solid polishing for SUF protection.

Submerged Ultra Filtration:

It will be used to extract and filter the clarified water through the membranes which is used For the TSS final removal.

Biological Treatment Unit

Post Metal Removal

Two type of filter:

- First filter is removing Iron: Fe^{3+} is oxidized into Fe_2O_3.
- Second filter is removing Manganese: Mn^{2+} is oxidized into MnO_2

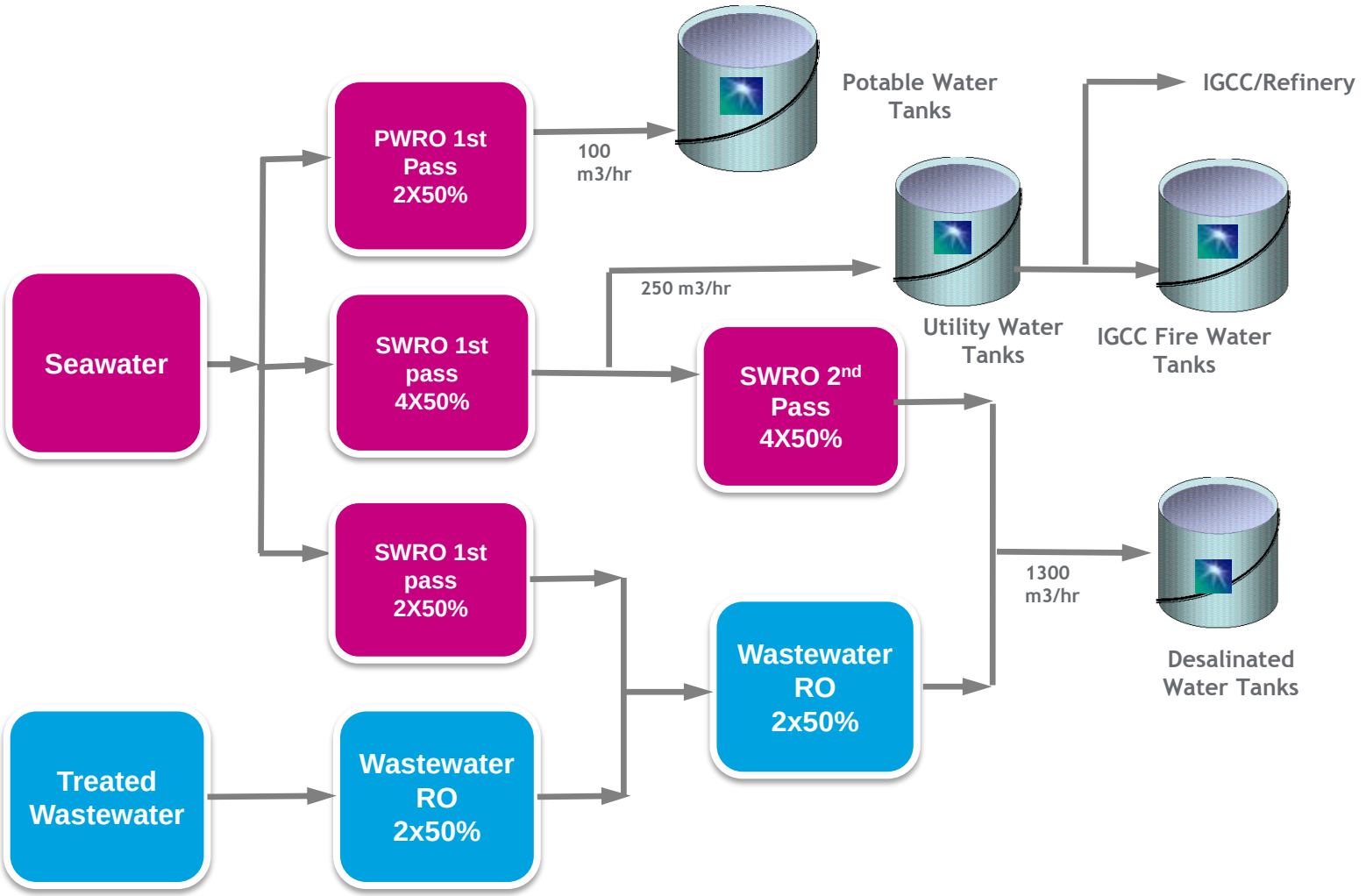
Treated Effluent Specification

Parameter		Unit
TDS	<2500 ppm	Mg/l
TSS	<1	Mg/l
Oil & Grease	Not Detectable	
Turbidity	<1	NTU
SDI	<3	
COD	<40	Mg/l
BOD	<3	Mg/l
TOC	<10	Mg/l
Phosphate	<1	Mg/l
Iron	0.05	Mg/l
Manganese	0.05	Mg/l

Parameter	Design	Unit
Cadmium	0.02	Mg/l
Copper	<0.2	Mg/l
Lead	<0.1	Mg/l
Mercury	0.001	Mg/l
Nickel	<0.2	Mg/l
Nitrate	10	Mg/l
Phenol	0.1	Mg/l
Zinc	<1	Mg/l
Manganese	0.05	Mg/l

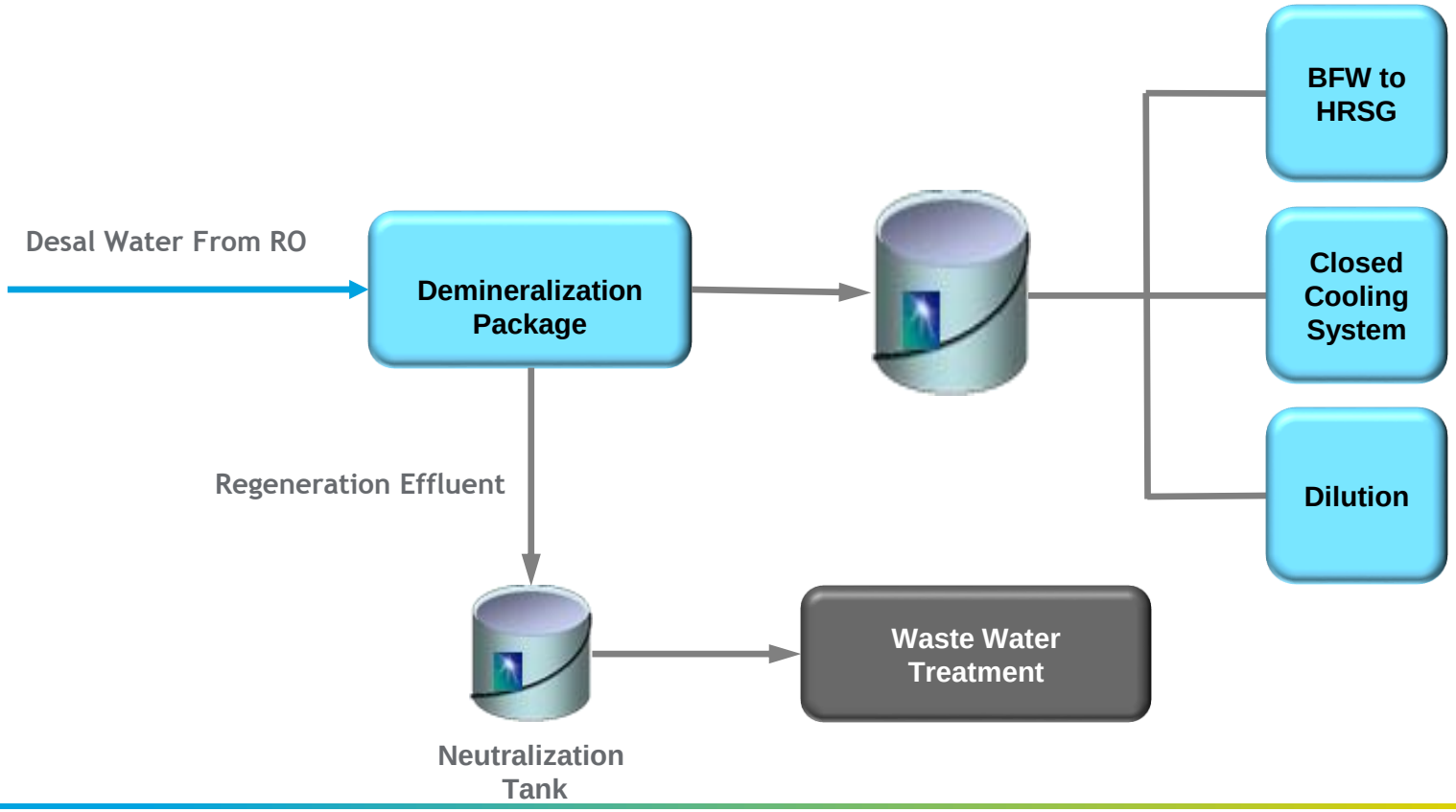
Treated Effluent Reuse Application

Integrated Desalination Plant with Treated Waste Water



Industrial Reuse

- The Desal Water (2nd pass quality) will be treated through Mixed Bed Vessel to produce demin water for industrial reuse.



Conclusion

Conclusion

By having this design, the Jazan Complex, as part of Saudi Aramco, will be able to have sustainable reuse to achieve best in class organization, by promoting the sense of environmental protection, and complying with the Saudi Aramco and Government regulations.

THANK YOU