Separation like the cosmic moving

Airport Water

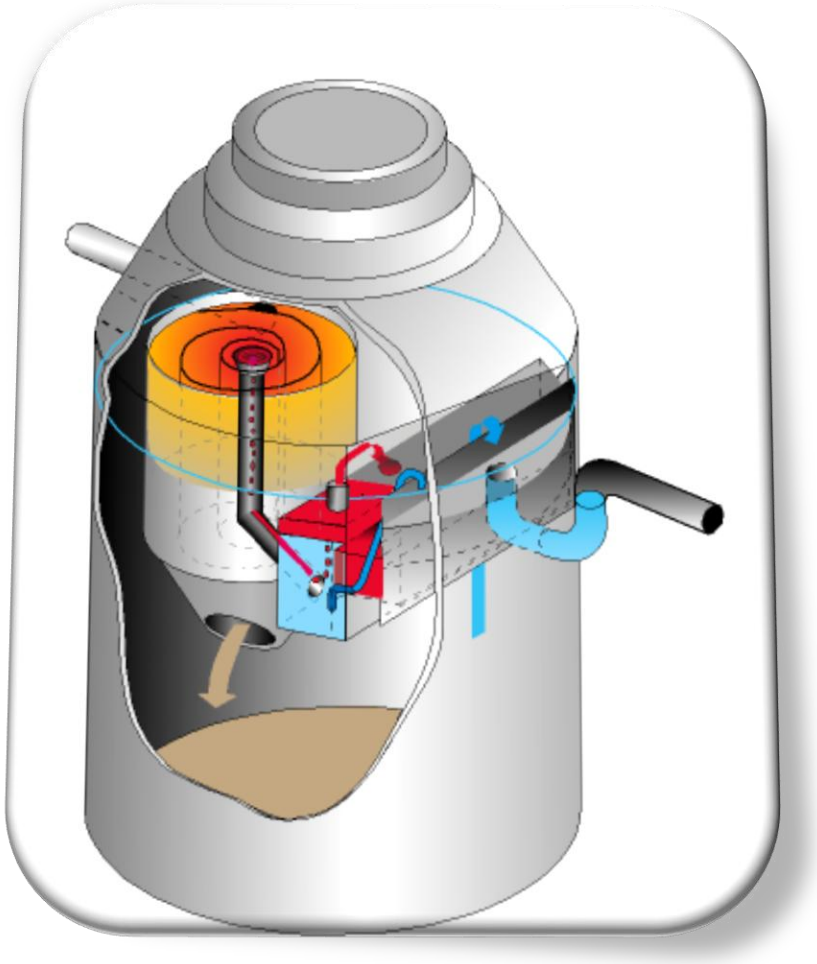
Produced Water

Refinerys

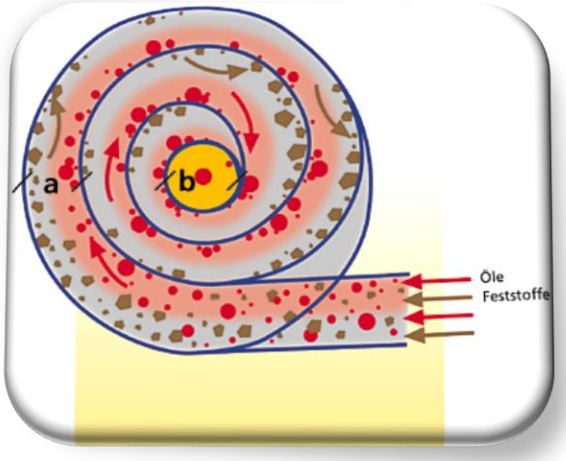
Treatment Solutions with : Galaxie-System

awas
water- and wastewater-systems

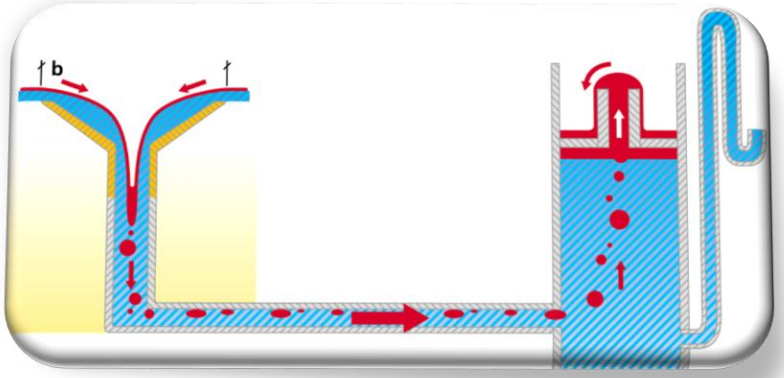
AWAS the System Galaxie



AWAS Galaxie 2002 oil separator

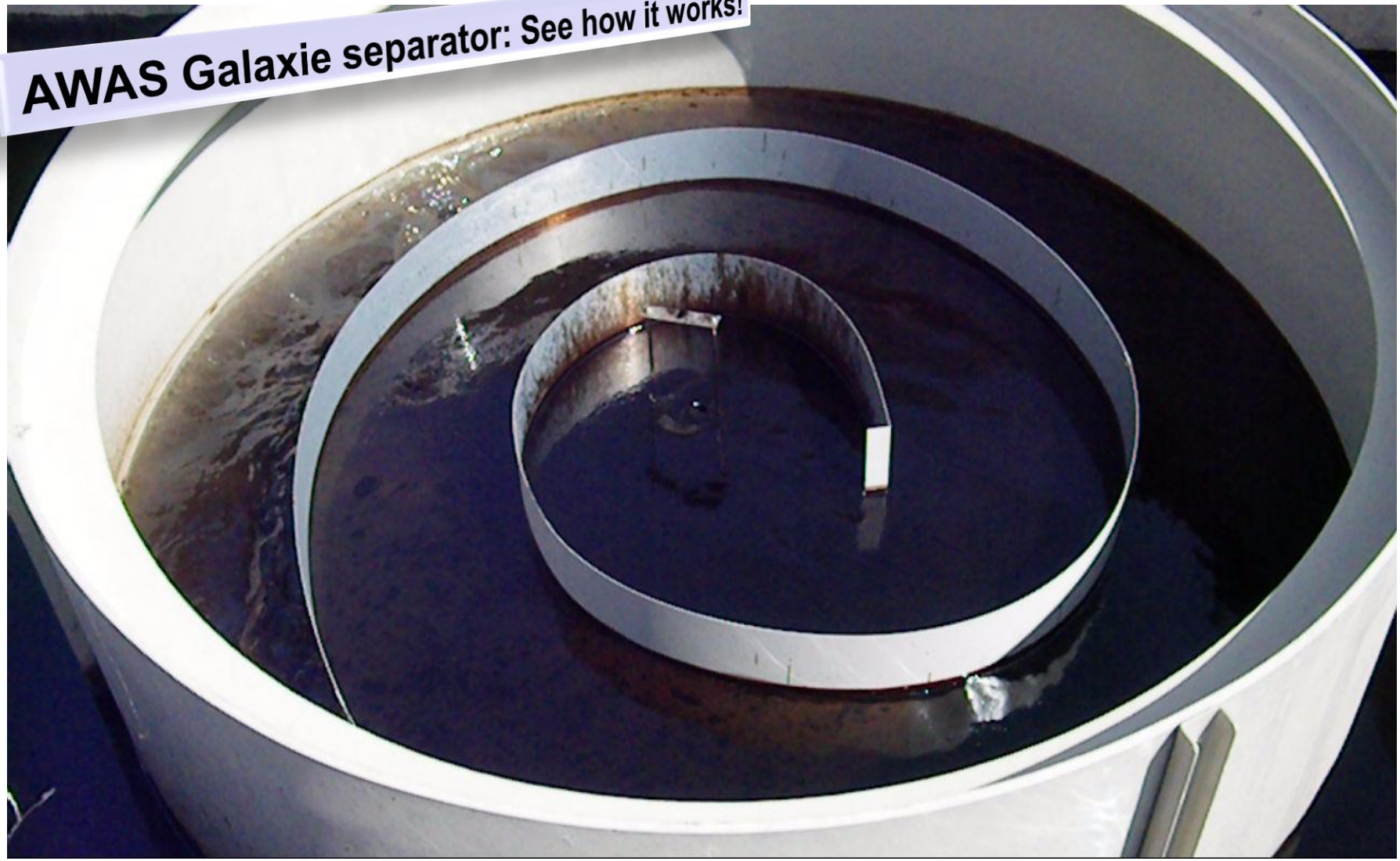


Simultaneous separation of oil and particles!



Constant oil removal from the surface!

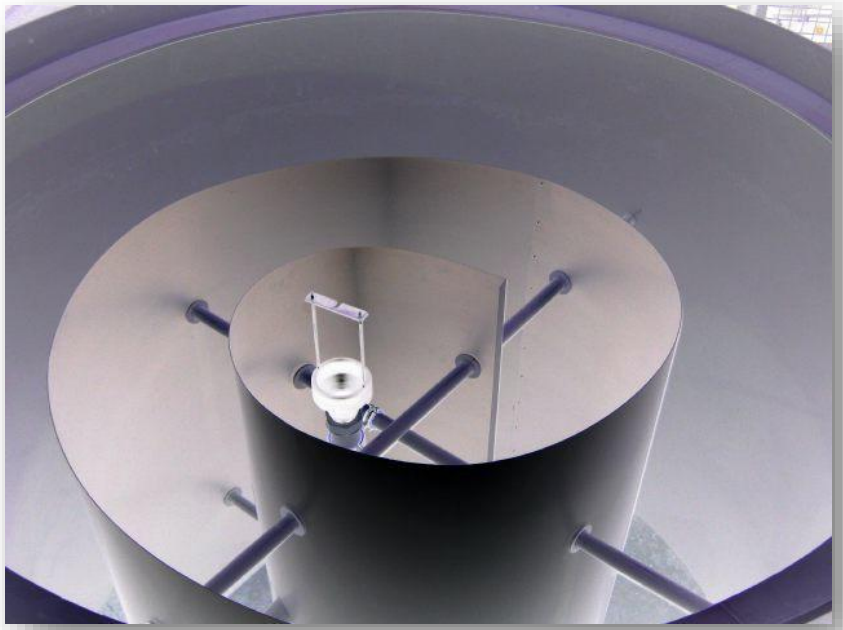
AWAS Technology



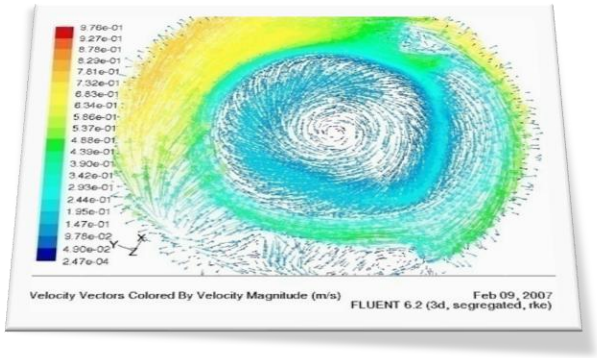
AWAS Galaxie fuel separators

AWAS Galaxie 2002

- A filter free separation process
  - ⇨ accident-proof no kerosene overflow
  - ⇨ low – maintenance and operation costs
- Compact plant engineering
  - ⇨ reduction of installation size
- Compact separator surface
  - ⇨ no degasification minimal environmental contamination
  - ⇨ reduced oil-water-cut surface reduction of naturally built emulsions



EN858 / DIN 1999 class I separator with less 5mg/ oil



AWAS FEE GmbH

Activity

Innovative treatment of effluent water
Planning and construction of treatment plants

Data

Heinz E. Ihne
More than 30 years of experience

Sectors

Galaxie-Separator for Airports
for Oil-Exploration:
for Producedwater

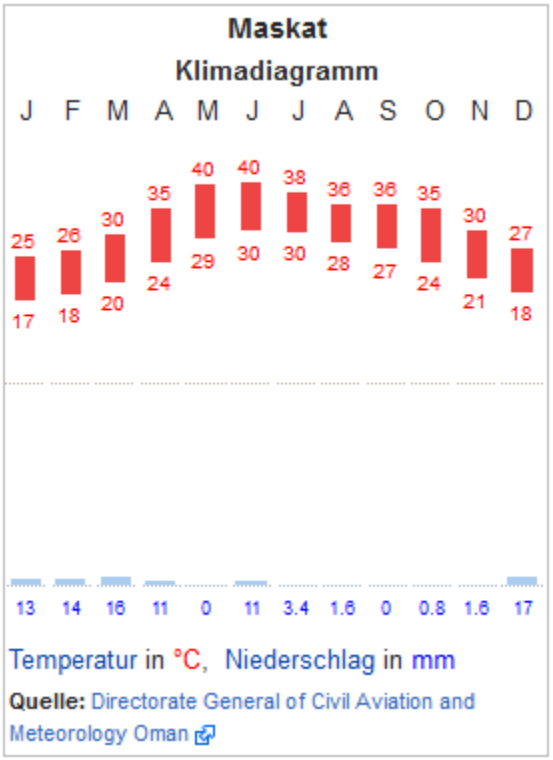
Offices

Germany: Wilnsdorf + Tribsees
Russia: Moscow
Poland: Warsaw
Switzerland: Salenstein

3. Airport Rainwater – Project report

Case 1 – hot and dry
(i.e. Muscat / Sultanate of Oman)

- Average rain days per year: 8



Source: Wikipedia

AWAS Solution

- Bypass separator system with AWAS Galaxie

3. Muscat Airport / Oman

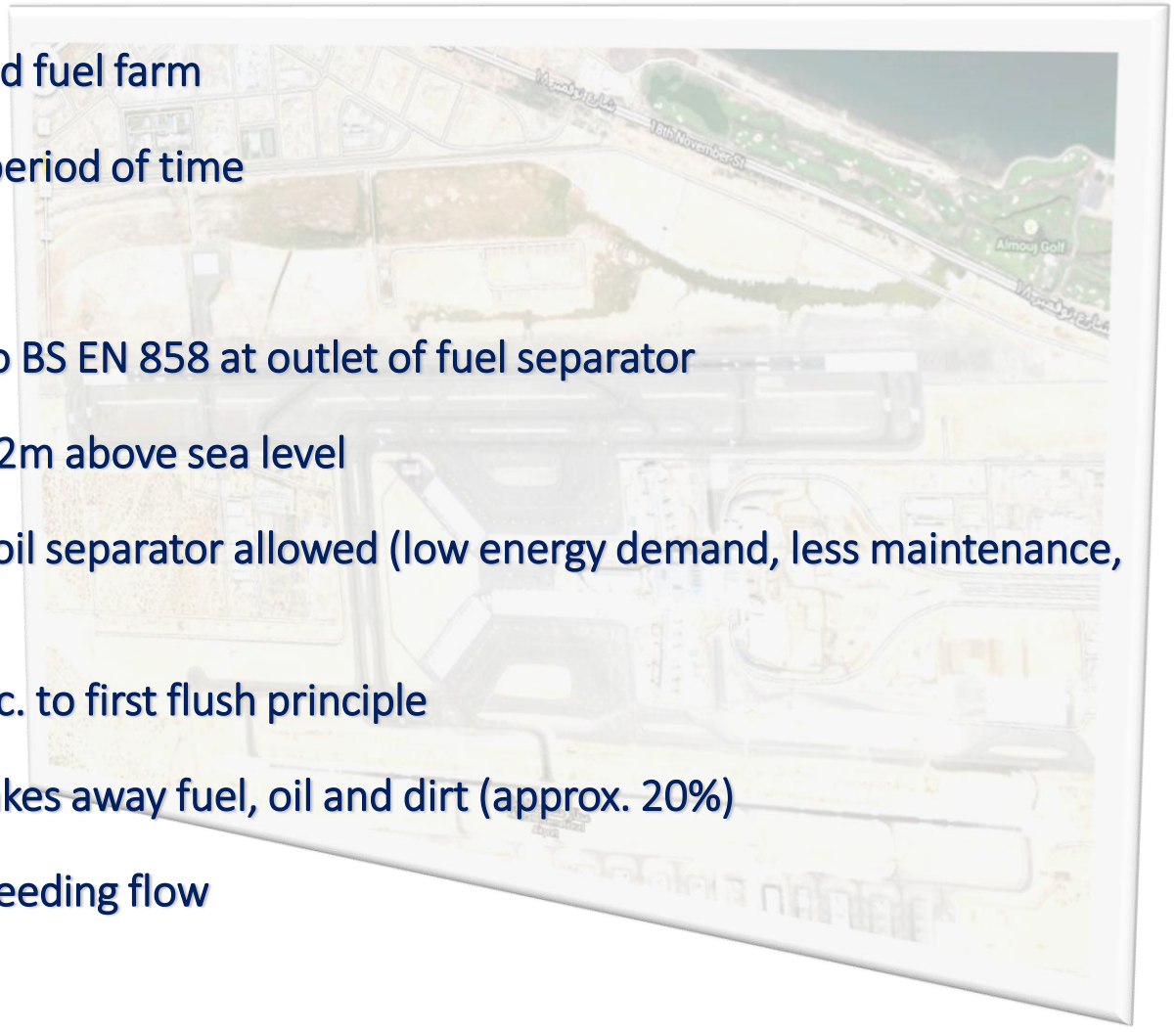
Muscat International Airport

Project name:	Development of Muscat International Airport
Spot:	Muscat, Oman
Industrial Sector:	Airport
Effluent:	Stormwater
Effluent quantity:	6x 560 l/s (2.000 m³/h) 2x 240 l/s (860 m³/h) 4x 160 l/s (580 m³/h) Total: 4.480 l/s (16.000 m³/h)
Treatment:	Mechanical and physical
AWAS Delivery:	Big space separator Galaxie 2002
Consultant:	COWI Larsen

Source: Google Earth

3. Muscat Airport / Oman

Basic requirements for drainage at Muscat Airport

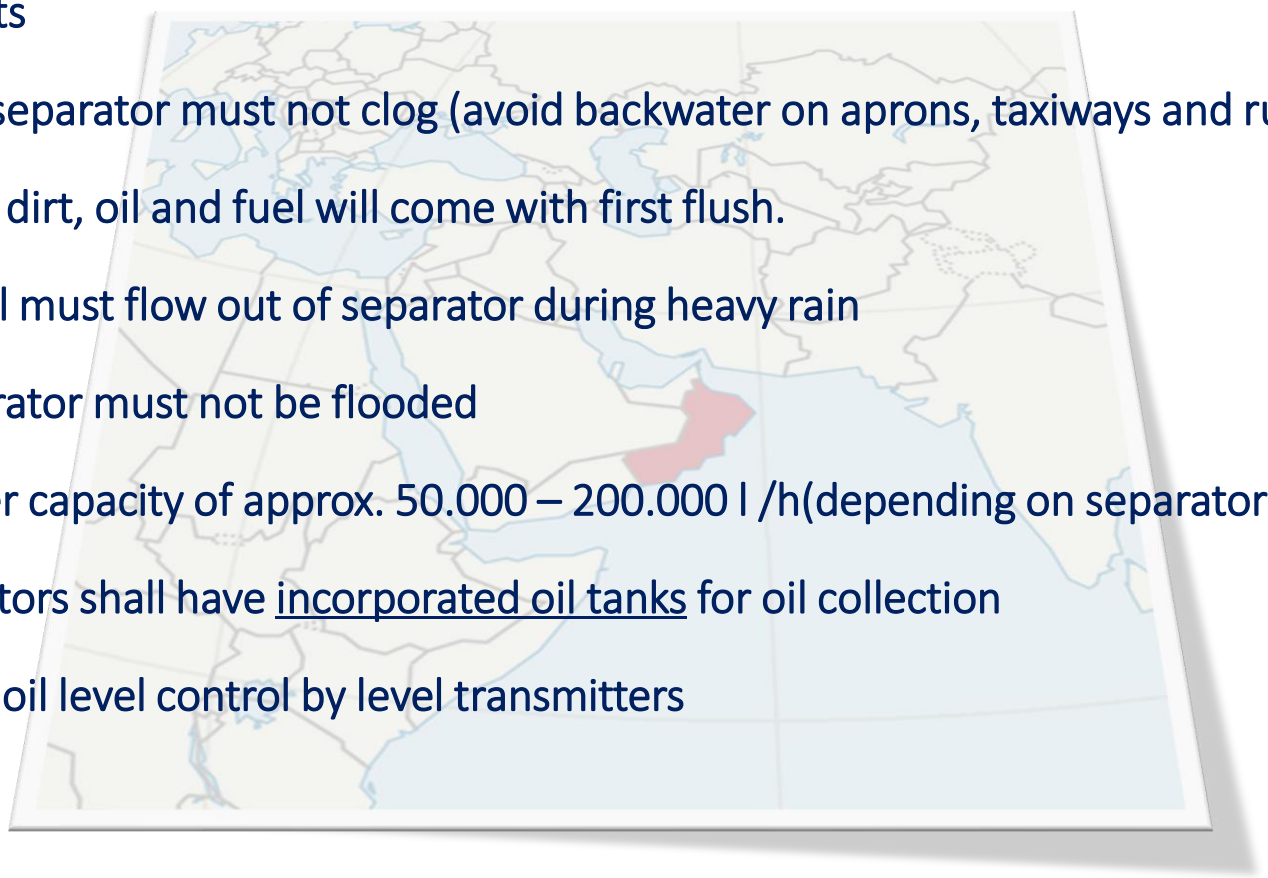


- Large paved areas: aprons and fuel farm
- Heavy rainfall for only short period of time
- Stormwater discharge to sea
- max. 5mg/l oil content acc. to BS EN 858 at outlet of fuel separator
- Outlet of fuel separator only 2m above sea level
- No pumping downstream of oil separator allowed (low energy demand, less maintenance, higher availability)
- Fuel separation shall work acc. to first flush principle
    - Flow of first minutes takes away fuel, oil and dirt (approx. 20%)
    - Bypass channel for exceeding flow

3. Muscat Airport / Oman

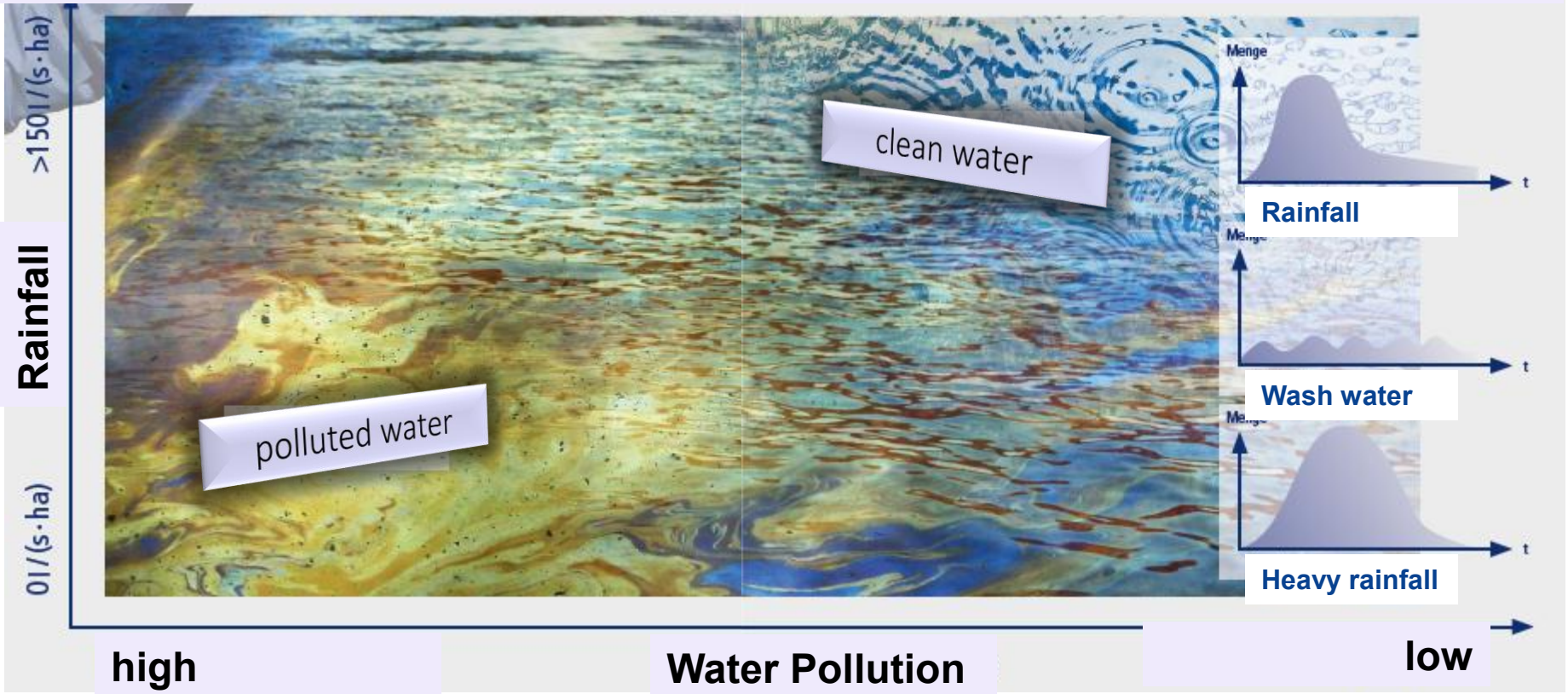
Fuel separator challenges at Muscat International Airport

- Fuel separator system shall work reliable during extreme storm events
    - Fuel separator must not clog (avoid backwater on aprons, taxiways and runways)
    - Dust, dirt, oil and fuel will come with first flush.
    - No oil must flow out of separator during heavy rain
    - Separator must not be flooded
- Fuel disaster capacity of approx. 50.000 – 200.000 l /h(depending on separator size)
- Fuel separators shall have incorporated oil tanks for oil collection
- Water- and oil level control by level transmitters



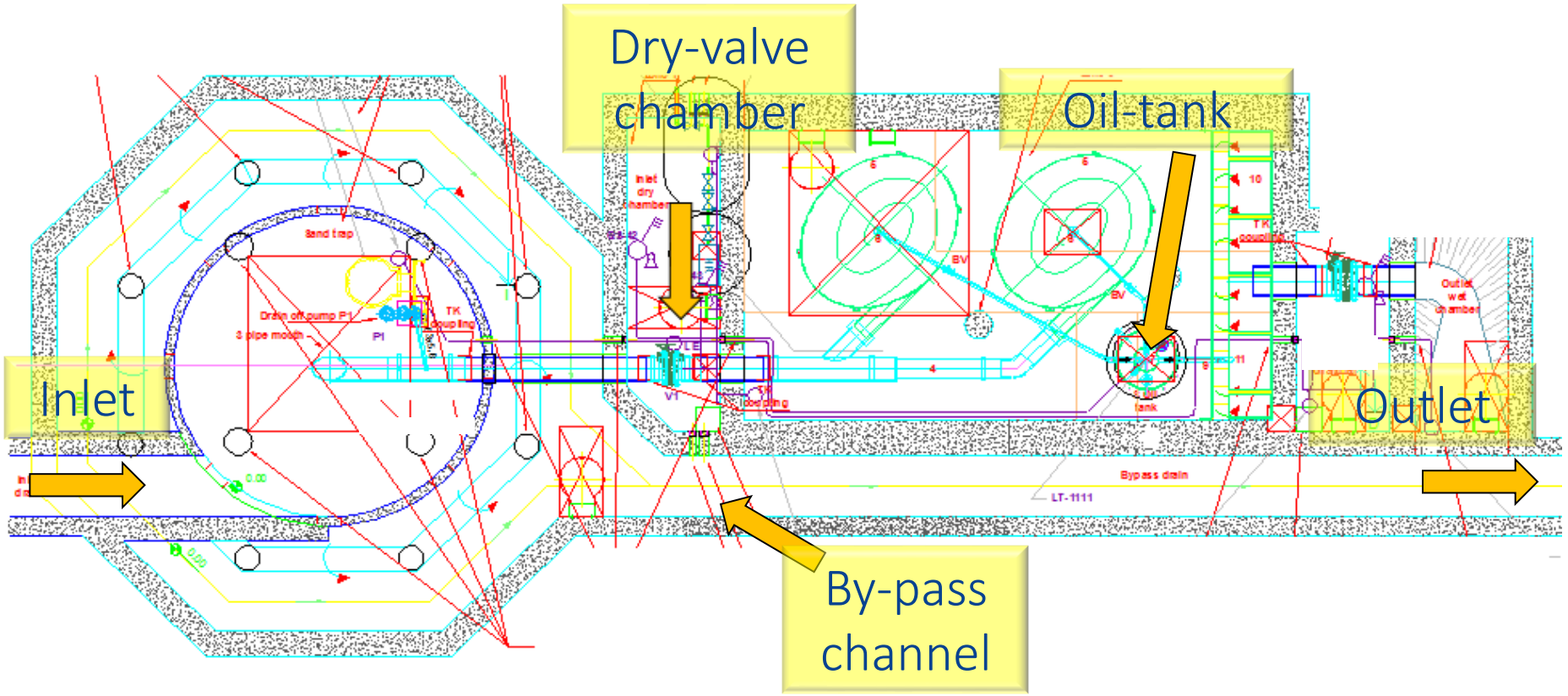
3. First flush principle

Amount of rainfall – Oil and dirt



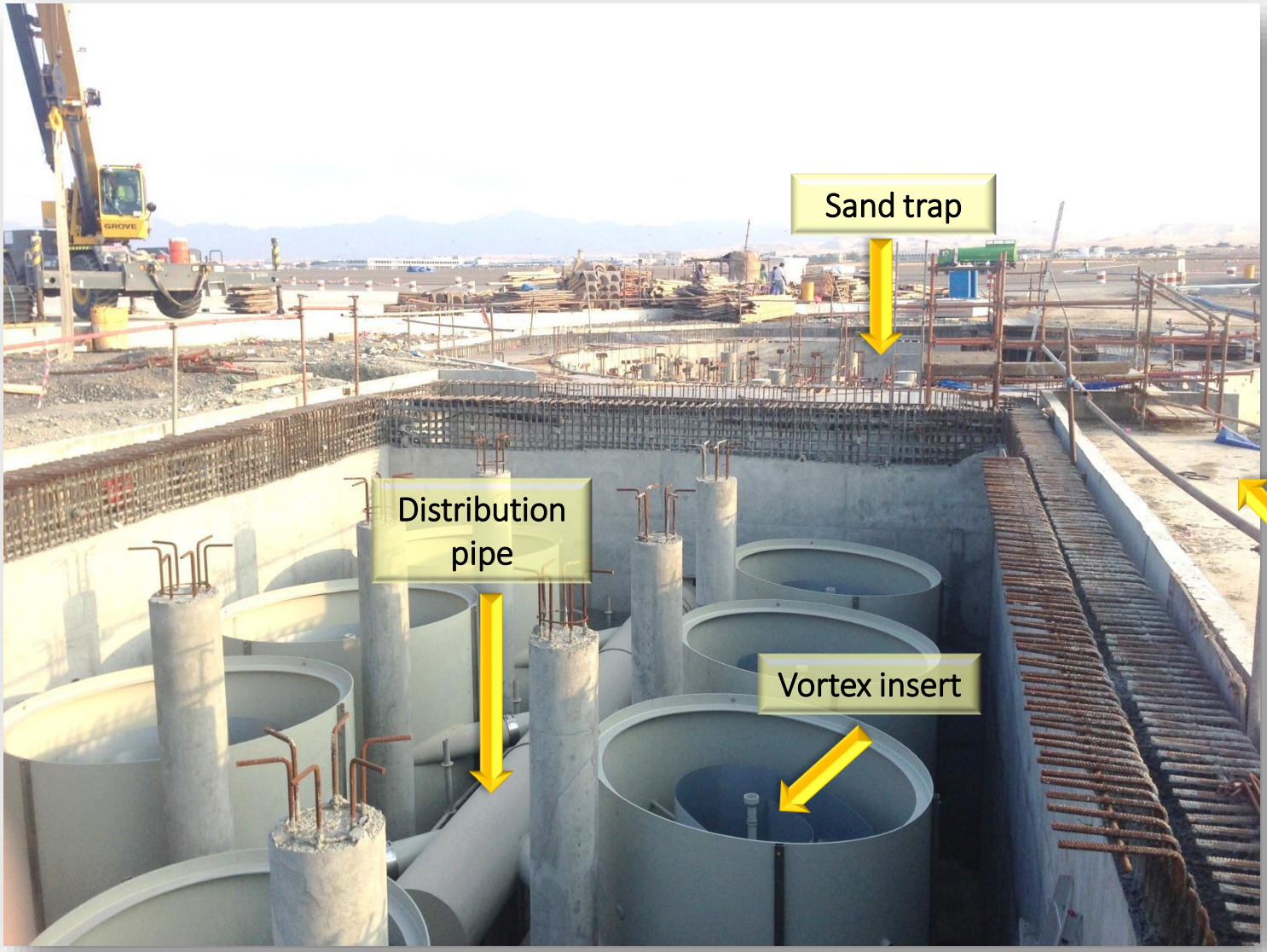
3. Muscat Airport / Oman

Function principle of Galaxie 2002 separator NS160 (160 l/s)



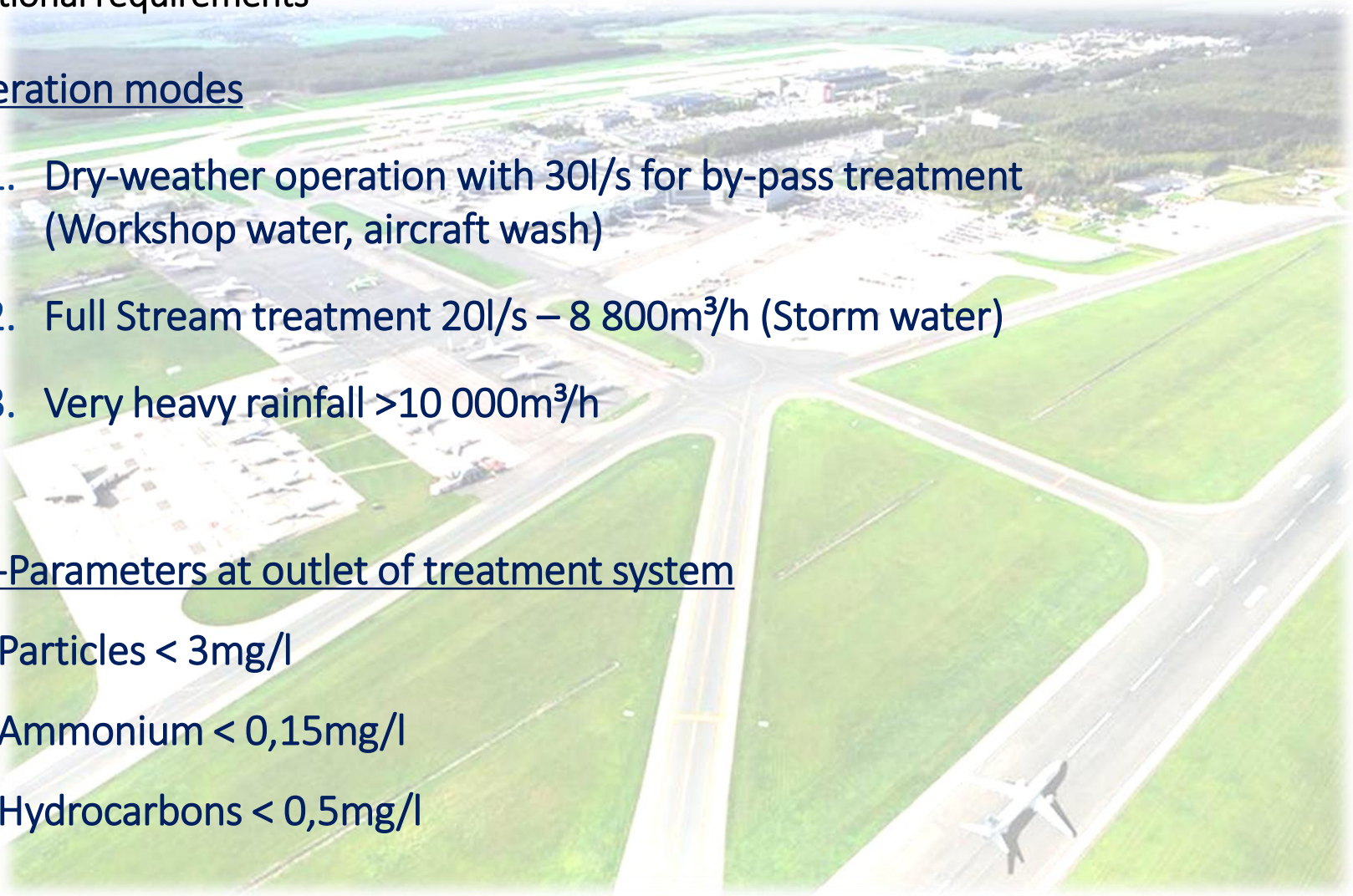
3. Muscat Airport / Oman

Construction of fuel separator NS560 (560 l/s)



4. Moscow Domodedovo Airport / Russia

Operational requirements



3 Operation modes

1. Dry-weather operation with 30l/s for by-pass treatment (Workshop water, aircraft wash)
2. Full Stream treatment 20l/s – 8 800m³/h (Storm water)
3. Very heavy rainfall >10 000m³/h

Main-Parameters at outlet of treatment system

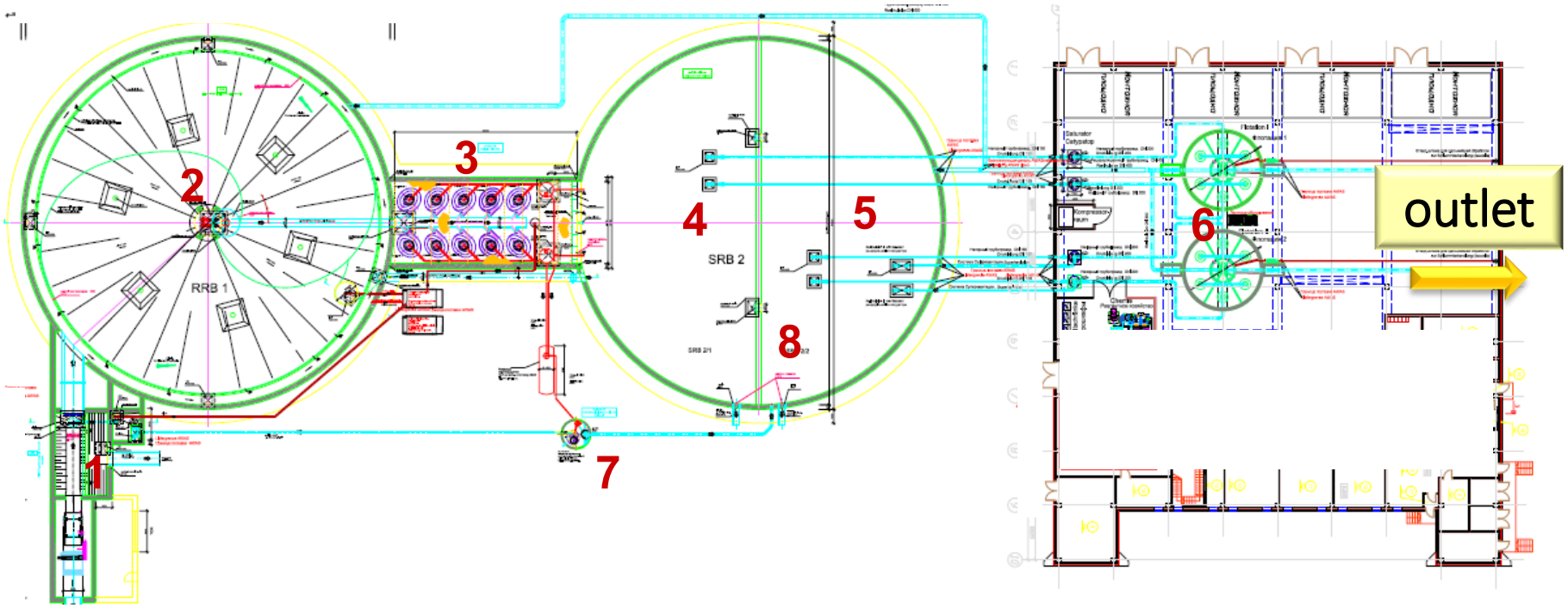
Particles < 3mg/l

Ammonium < 0,15mg/l

Hydrocarbons < 0,5mg/l

4. Moscow Domodedovo Airport / Russia

Sample layout drawing water treatment plant

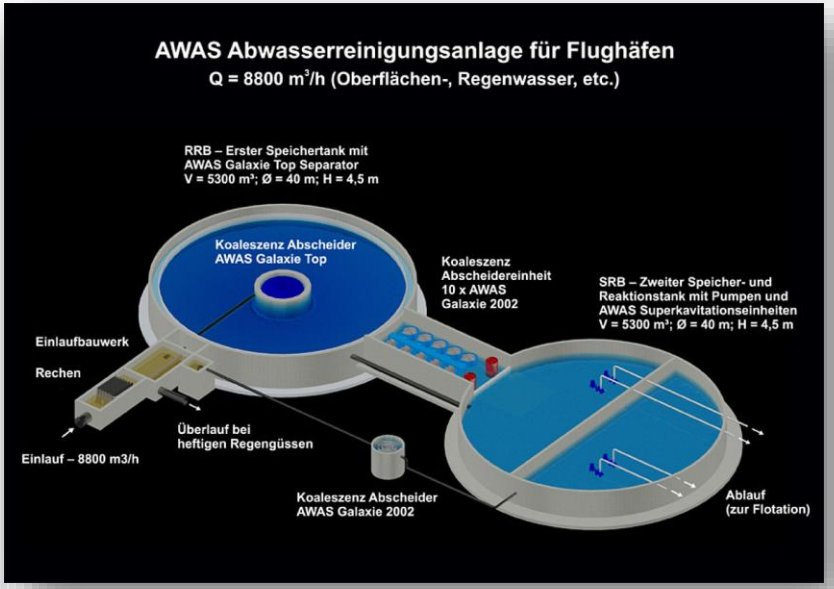


1 Screen
2 RRB (Retention tank)
3 Fuel separator
4 Reaction tank 1/2
5 Reaktion tank 2/2
6 Flotation plant 2x250m³/h
7 Dry-weather oil separator
8 Oloid circulation system

4. Moscow Domodedovo Airport / Russia

Moscow Domodedovo

Source: Google Earth



5. Selected References

Salalah Airport

Project name:	Development of Salalah International Airport
Spot:	Salalah, Oman
Industrial Sector:	Airport
Effluent:	Surface water
Effluent quantity:	2x 560 l/s (2.000 m³/h) 2x 160 l/s (580 m³/h) Total: 1.440 l/s (5.200 m³/h)
Treatment:	Mechanical and physical
AWAS Service:	Consulting and projecting
AWAS Delivery:	Big space separator Galaxie 2002
	oil separation and outlet
	oil spills protection technology
	1st ,2nd , 3rd flush rain management
	sludge management
	minimal maintenance

5. Selected References

Sotchi Airport

Project name:	International Olympic Games Airport Sotchi
Spot:	Sotchi, Russia
Industrial Sector:	Airport
Effluent:	Surface water
Effluent quantity:	Sotchi I = 4.000 m³/h Sotchi II = 2.000 m³/h Sotchi III = 6.000 m³/h
Treatment:	Mechanical and physical
AWAS Service:	Consulting and projecting
AWAS Delivery:	Big space separator Galaxie tower and Galaxie 2002, pump station

5. Selected References

Irkutsk Airport

Project name:	International Airport Irkutsk
Spot:	Irkutsk – Lake Baikal, Russia
Industrial Sector:	Airport
Effluent:	Surface water
Effluent quantity:	570 m³/h
Treatment:	Mechanical and physical
AWAS Service:	Consulting and projecting
AWAS Delivery:	Big space separator Galaxie 2002

AWAS Airport References

Civil Airports

- Düsseldorf International, Germany
- München International, Germany
- Athen International, Greece
- Münster Osnabrück, Germany
- Hongkong International, Hongkong
- Muscat International, Oman
- Salalah International, Oman
- Sotchi International, Russia
- Irkutsk International, Russia
- Moscow Domodedovo, Russia

Airbases

- US Air Force, Germany
- Deutsche Luftwaffe, Germany
- NATO Airbases, Germany
- Swedish Air Force, Sweden
- Royal Air Force, Great Britain

AWAS Airport References

Over 300 installed AWAS Galaxie separation systems for airport water treatment

Photo: Google Maps

20

AWAS Technology for Produced water

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