9 August 2019

To SBLA

Stefan Ott

Dear Sirs,

Upon completion of the period of the internship though IASTE at your organization I would like to submit a report that I have prepared which includes information that might be useful.

With this opportunity I would like to thank the organization for the experienced and knowledge that I have gained during this period.

Stefan Ott

ΣΑΛΑ,
Να κοινοποιηθεί στο ΤΕΠΑΚ.

ΕΛΗΦΘΗ 9/8/19

ΓΕΝ. ΔΙ/ΝΤΗΣ ✓

Δ/ΝΤΗΣ ΤΕΧ. ΥΠΗΡ. ✓ 12/8/19

Δ/ΝΤΗΣ ΟΙΚ. ΥΠΗΡ.

Sewerage Board of Limassol - Amathus

LIMASSOL - LEMESOS MUNICIPALITY

Water management & infrastructure in Cyprus and Limassol

MONTAN UNIVERSITÄT LEOBEN

AVAW Abfallverwertungstechnik & Abfallwirtschaft

Stefan Ott, BSc.

DEPARTMENT FÜR Umwelt- & Energieverfahrenstechnik

IAESTE Cyprus

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About STEFAN OTT

- Stefan Ott
- From Vienna, Austria
- Bachelor of Science in Environmental Engineering/Process Technology from Montan-University of Leoben, Austria
- Summer trainee at Sewerage board of Limassol – Amathus in 2019

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This is NOT a scientific presentation. Pictures in this presentation were taken by me or handed to me by SBLA-staff. Description of treatment process was mostly conducted through interviewing engineering staff of SBLA or studying the operation manual of the plant. Minor errors possible.

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Structure

1. **Cyprus in Environmental Figures**
   - Overview, demand and sources, availability, consumption
2. **Domestic water supply of Cyprus**
   - Overview sources, pipes and plants
   - Water distribution losses
3. **Wastewater treatment in Cyprus**
4. **Wastewater treatment of Limassol**
   - Sewerage System
   - Wastewater Treatment Plants
5. **Water Reuse**

General Information

- Capital City: Nikosia
- EU-Member since 2004
  - €-Zone since 2008
- 1,17 million Inhabitants (2016)
- Area 9251km^2
  - ~6000km^2 under Governmental control
- Since 1974: Northern part occupied by Turkey
- Climate: semi arid
  - Water poor country

Environmental figures

Of Cyprus

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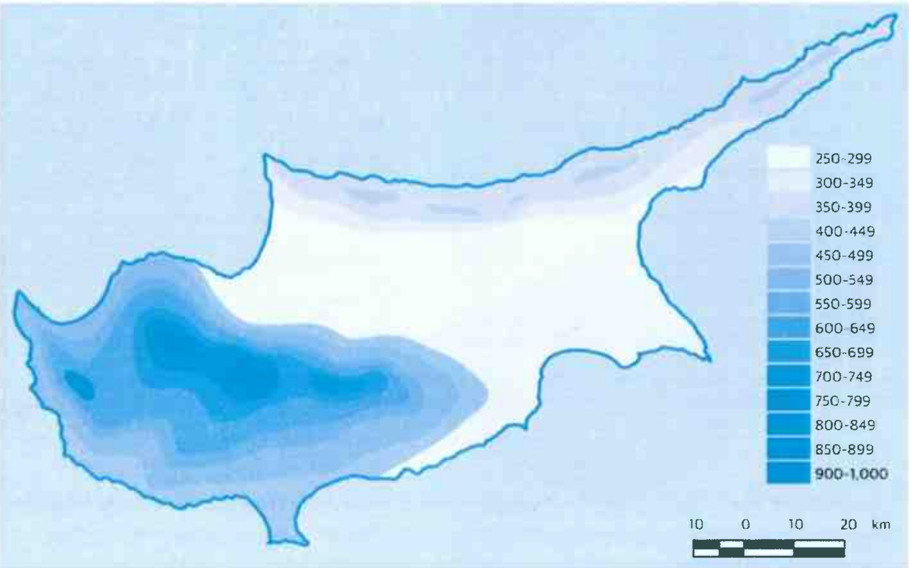
Average allocation of precipitation in Cyprus



Average yearly rainfall from 1971-2000 was **463mm**

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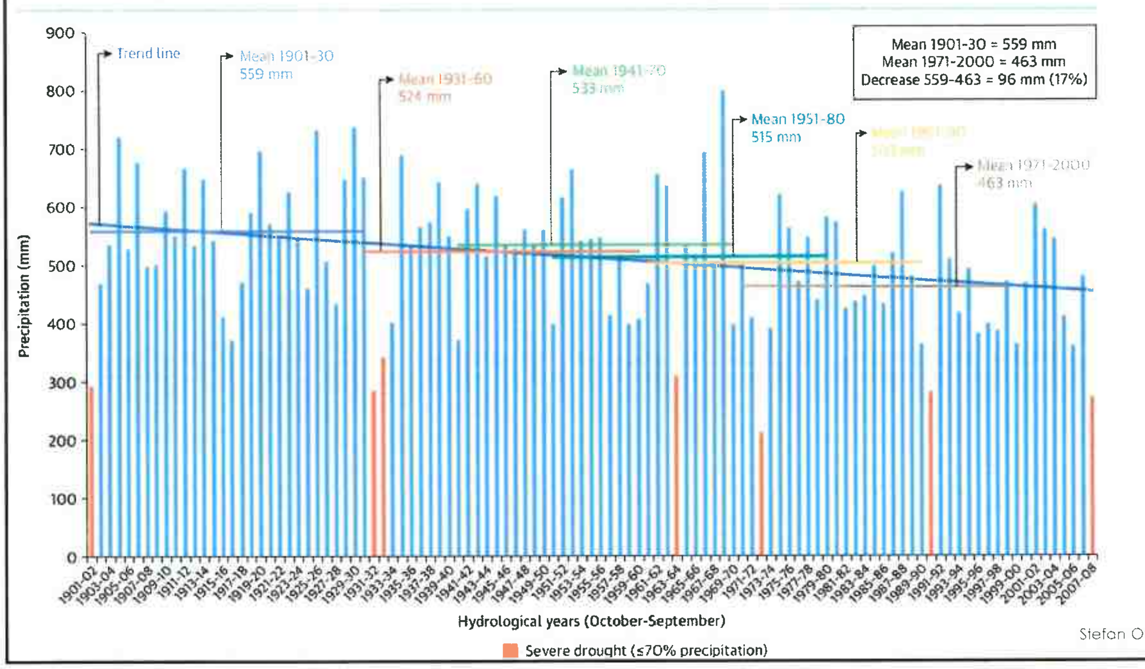
Average Precipitation Cyprus

FIGURE 1.1. Average Annual Precipitation in the Government-Controlled Areas of Cyprus, 1901-2008



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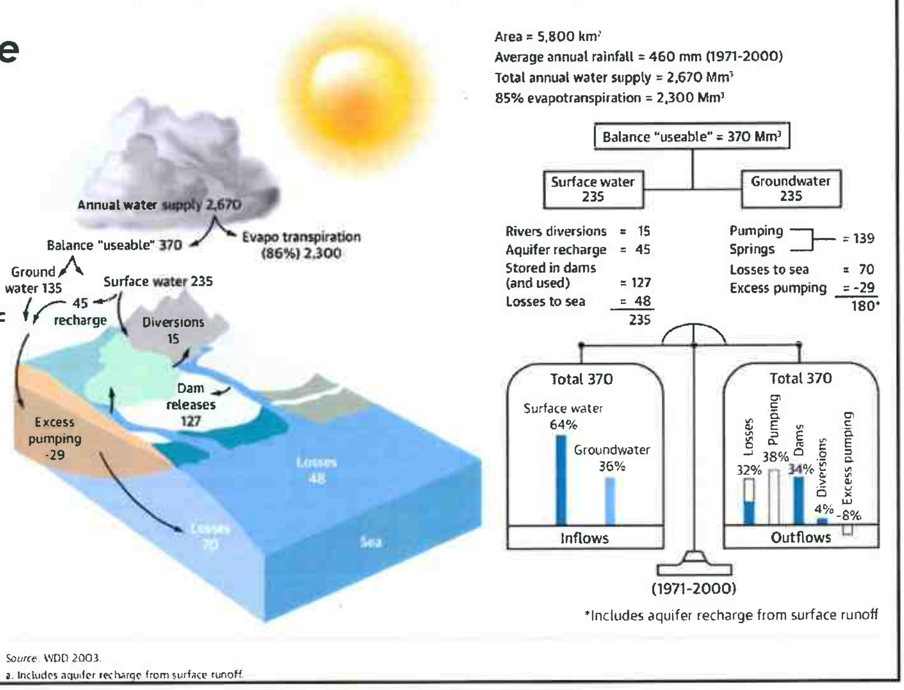
Water balance

- Rainfall average: 463mm
- Area under governmental control ~5800km^2 = 5,8*10^{9}m^2
- Total rain quantity on area = 0,463 m^3/m^2 * 6*10^{9}m^2 = 2778 Mm^3
- Useable rain quantity: ~10-25%

  180-370 Mm^3



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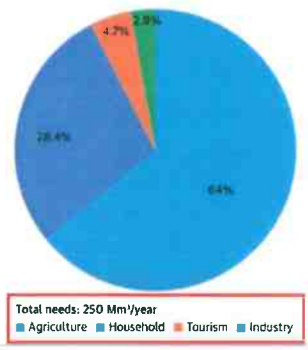
Water consumption by sector in Cyprus

FIGURE 1.4. Water Usage in Cyprus, by Sector



Source: WDD.
Note: Mm³ = million cubic meters.

- Above figures approximate water consumption per use
- Total water demand is higher than availability and needs particularly for irrigation are rarely satisfied
  - Since 1996, water demand for irrigated agriculture was satisfied only once, in 2004, when all dams were full

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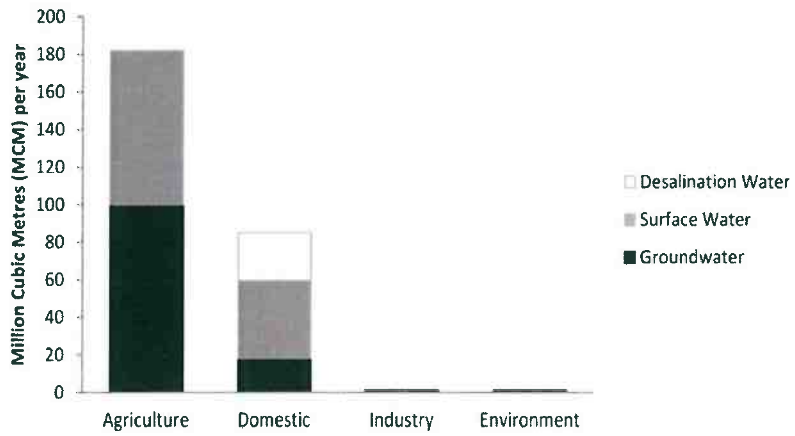
Water demand by sector and sources (2006)

Figure 5. Water Demand by sector and sources used for the year 2006 (Data: WDD statistics [32]).



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Water budget 2000-2011

Rainfall	476 mm
INFLOW (Surface storage)	82
INFLOW (Groundwater)	201
OUTFLOW (to the sea)	− 62
Available (Groundwater)	139
TOTAL Available (SW+ GW)	221
DEMAND	250
SW Releases	60
GW extraction (Pumping)	146
TOTAL Releases/ Extractions	206
RELEASES - DEMAND	-44 (+33*+8**)

= ~215 Mm^3
*avg. available rainfall 2010-17

= 221

*Desalinated
**Recycled

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Calculation of Annual Water Balance of Cyprus – Mm^3

Calculation of the Annual Water Balance for the free areas of Cyprus

Year	Water demand (MCM)	Available quantity of water from conventional sources				Enrichment of the water balance from unconventional sources		Total available quantity of water (MCM) [from rainfall) + (from rainfall) + desalinized + recycled	Water balance (MCM) [= Available quantity of water-water demand]	Quantity of water given for drinking (MCM)
		Rainfall (mm)	Volume of rain (MCM)	Available quantity of water from rainfall (MCM) [Note: Around 90% of rainfall is lost due to evapotranspiration and around 0.02% from run off to the sea]	Water balance (MCM) [= available quantity of water from rainfall-Water Demand]	Quantity of desalinized water (MCM)	Quantity of recycled water (MCM)			
2010	257	429	2570	197	-60	53	12	262	5	82
2011	258	558	3348	265	7	49	14	328	70	81
2012	259	790	4737	404	145	18	17	438	179	80
2013	260	295	1770	117	-143	11	17	145	-115	78
2014	261	393	2358	173	-88	33	17	222	-39	80
2015	262	484	2904	228	-34	38	17	284	23	82
2016	**263**	430	2580	198	-65	69	19	285	22	90
2017	264	326	1956	136	-128	69	20	224	-40	94

Area Cyprus without occupied part: **6000km²** (Used for calculation of rain quantity)

Total area: 9250km²

DEMAND 2017
264 Mm^3

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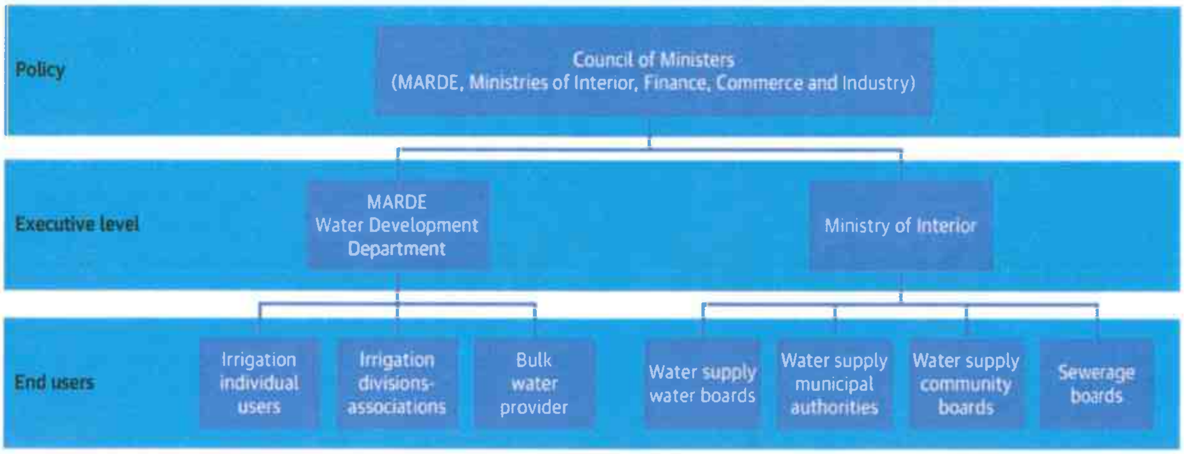
Institutional and administrative structure of water sector



Note: MARDE = Ministry of Agriculture, Rural Development and Environment.

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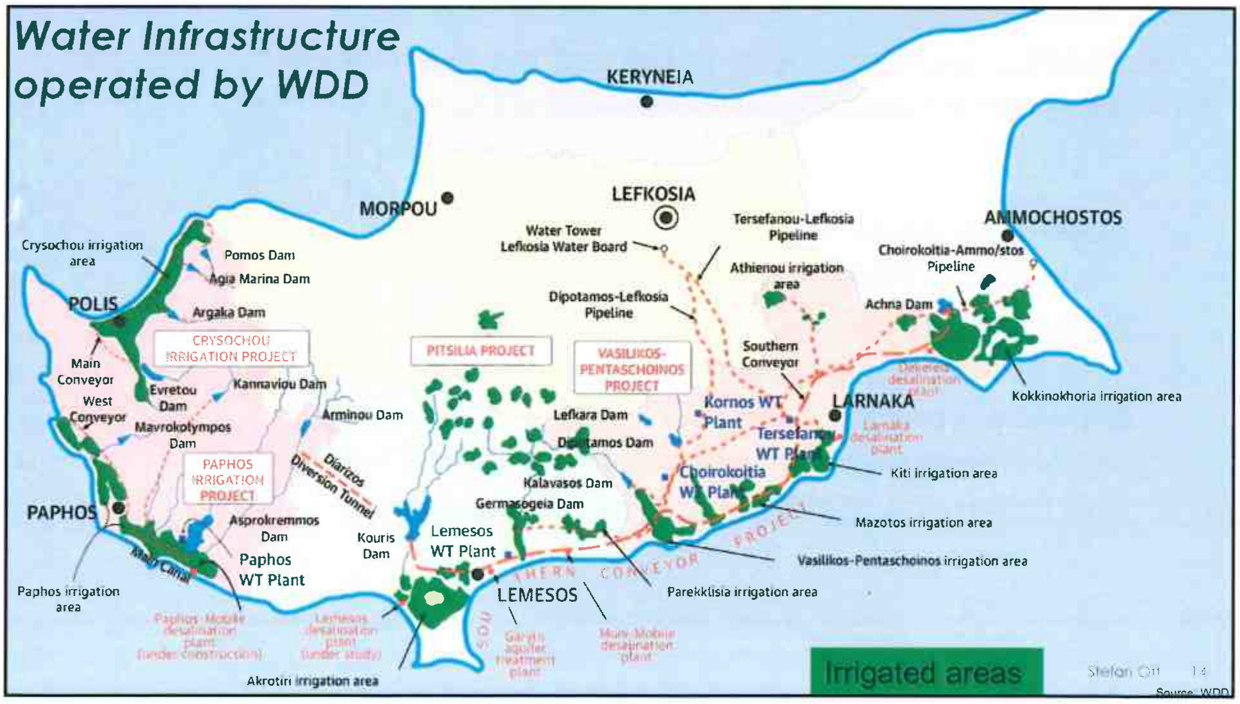
Water Infrastructure operated by WDD



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Source: WDD

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Domestic water supply of Cyprus

Overview

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Domestic water supply is based on the following sources

- **Water from dams**
  - Treated in Water Treatment Plants
- **Water from Desalination plants**
  - 4 Desalination plants in operation (only for domestic use)
- **Groundwater from Aquifers**
  - Decreasing over the last years due to overexploitation
- In extreme drought-situations: ***Water shipments***

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Daily consumption and water prices

TABLE 1.2. Key Characteristics of the Water Boards in Limassol, Larnaca, and Nicosia, 2013

Description	Unit	Water Board of Limassol	Water Board of Larnaca	Water Board of Nicosia
Population		**170,000**	**60,000**	**210,000**
Connections (water meters/customers)	No.	98,000	33,400	120,000
Average potable water tariff	**Euro/m³**	**1.00**	**1.70**	**1.30**
NRW	Percent	28.3	17.0	16.5
Total staff	**No.**	**110**	**50**	**140**
Staff/1,000 connections	No.	1.12	1.50	1.16
Per capita dotation (supplied into the system)	l/c/d	256	215	222
Per capita consumption	l/c/d	184	178	178
Per capita domestic consumption *	l/c/d	145	125	140
Total volume billed	Mm³	11.4	3.8	13.7
Total sales	**Million Euros**	**18.3**	**6.6**	**22.9**

Note: Mm³ = million cubic meters; No. = number; NRW = nonrevenue water.

* Per capita consumption reduced further since 2013 due to higher public consciousness

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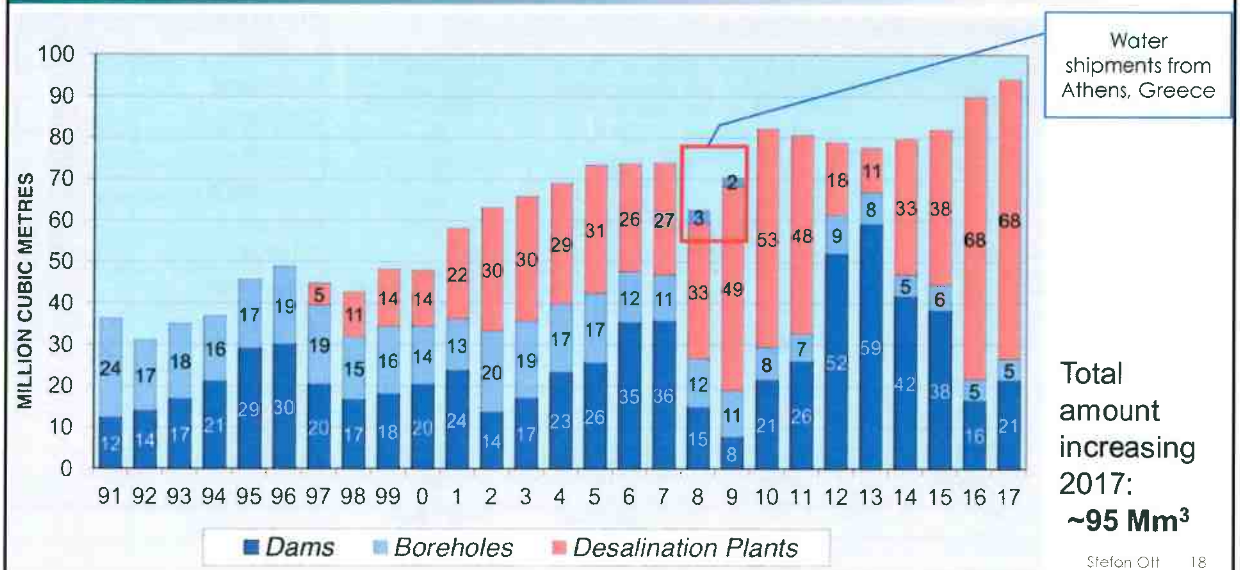
DOMESTIC annual water supply



Total amount increasing 2017: **~95 Mm³**

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Dams to retain water for drinking and irrigation purposes

a. Asprokremmos Dam

b. Kouris Dam

- Relying on sufficient precipitation to fill the dams every year during winter (almost no rainfall in summer)
- Strong dependency on rainfall – water shortage in case of drought
- Focus on desalination of seawater to reduce risks in water supply

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All water Dams in Cyprus ➡

⬇ *Dams used for domestic potable water*

TABLE 2.1. Potable Water Dams in Cyprus and Connections to the Southern Conveyor

Dam	Location of the dam (district)	First year of operation	Capacity (Mm³)	Connected to Southern Conveyor
Kannaviou	Paphos	2005	17.2	No
Evretou	Paphos	1986	24.0	No
Asprokremmos	Paphos	1982	52.4	No
Arminou[a]	Paphos	1998	4.3	Yes
Kouris	Limassol	1988	115.0	Yes
Germasogeia	Limassol	1968	13.5	Yes
Kalavasos	Larnaca	1985	17.1	Yes
Lefkara	Larnaca	1973	13.9	Yes
Dhipotamos	Larnaca	1985	15.5	Yes
Tamassos	Nicosia	2002	2.8	No
Klirou–Malounta	Nicosia	2007	2.0	No
Total water storage capacity			**253.7 Mm³**	**179.3 Mm³**

Note: Mm³ = million cubic meters.
a. Water is transferred to Kouris Dam.

Dam	Capacity (MCM)
Kouris	115.0
Asprokremnos	52.4
Evretou	24.0
Kalavasos	17.1
Dhypotamos	15.5
Lefkara	13.9
Yermasoyia	13.5
Ahna	6.8
Arminou	4.3
Polemidhia	3.4
Mavrokolymbos	2.2
Vyzakia	1.7
Xyliatos	1.4
Argaka	1.0
Pomos	0.9
Kalopanayiotis	0.4
Agia Marina	0.3
Total	**273.6**

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Link of Dams, Conveyors and Water Treatment plants

Source: WDD (only one desalination plant is represented).

Construction of Southern conveyor

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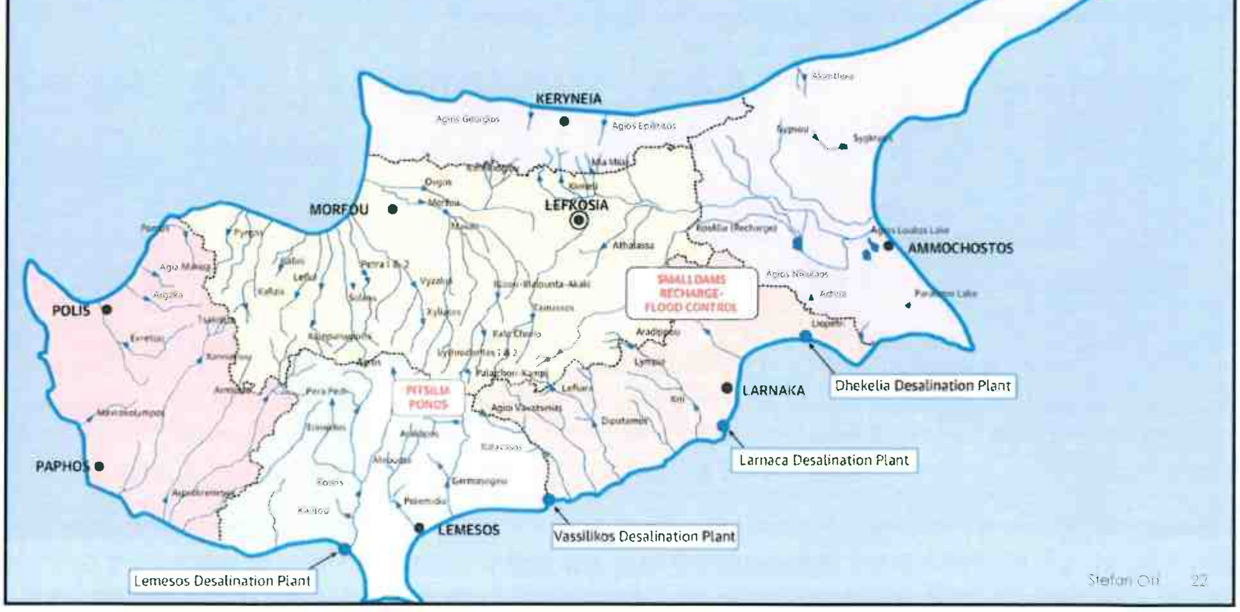
Location of Desalination Plants



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Nonrevenue water – Losses in distribution

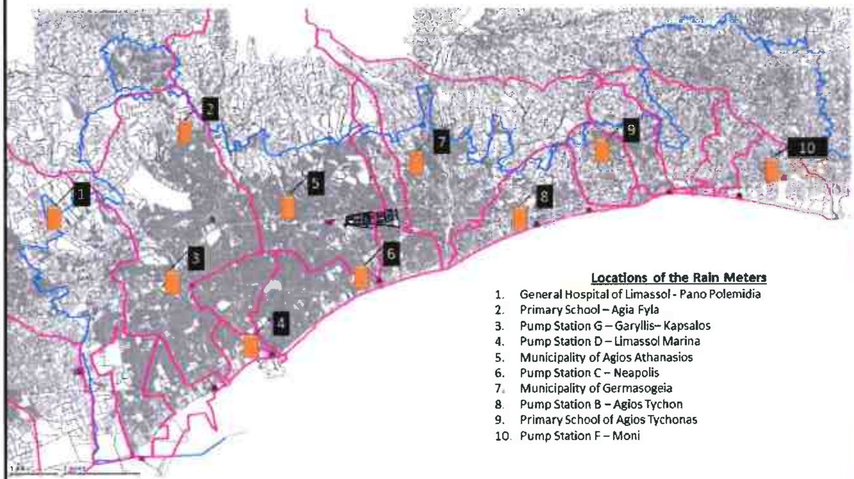
TABLE 2.7. **Nonrevenue Water for the Water Services Providers as a Percentage of System Input Volume, 2013**

Water service provider	System input volume	Nonrevenue water (NRW)			
	Mm^3	Mm^3	Percent	liter/con./day	ILI
Water Board of Nicosia	17.0	3.4	**20**	120	2.6
Water Board of Limassol	16.0	4.5	**28**	174	3.5
Water Board of Larnaca	4.4	0.8	**18**	66	1.3
Municipal water departments	18.3	6.4	**35**	–	–
Community boards	21.5	8.6	**40**	–	–
Overall NRW	**77.2**	**23.7**	**31**	–	–

Note: – = not available; ILI = Infrastructure Leakage Index; Mm^3 = million cubic meters; NRW = nonrevenue water.

- Average loss in grid: 31%, 23,7Mm^3
- Weak performance of Limassol with 28% losses

Rainmeters of SBLA to measure amount of precipitation



Measurement in mm/min

Wastewater Treatment (General)

in Cyprus

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Main Sewerage boards in CY

TABLE 2.13. Main Characteristics of the Five Urban Sewerage Boards, 2015

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Description	Unit	Sewerage board				
		Limassol	Larnaca	Nicosia (Republic only)	Paphos	Ayia Napa, Paralimni
Population covered ('000) (current/target)	Number	130/170	40/60	255/270	105/150	115/115
Service coverage	Percent of total population	76	60	94	70	100
Treated effluent volume (current/target)	Mm^3/year	7.8/19.0	2.5/6.5	12/13	3.8/5.0	3.3
Length of sewerage pipes (current/target)	km	600/650	142/325	1,430/1,440	370/400	260

Note: km = kilometers; Mm^3 = million cubic meters.

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Implementation EU-WWT-DIRECTIVE 2008
KERYNEIA
AMMOCOSTOS
PARALIMNI
AGIA NAPA
LARNACA
LIMASSOL
PAPHOS
Polis
Platres
Kakopetria
Astromeritis
Peristerona
Kokkinotrimithia
Akaki
Paliometocho
Lefkosia
Athienou
Livadia
Pyla
Xylotymvou
Achna
Frenaros
Deryneia
Avgorou
Sotira
Liopetri
Xylofagou
Ormidea
Lympia
Aradippou
Dromolaxia
Meneou
Kiti
Pervolia
Lythrodontas
Agros
Kyperounda
Pelendri
Pegeia
Tala
Empa
Chlorakas
Kissonerga
Episkopi
Kolossi
Trachoni
Ypsonas
Agios Tychonas
Parekklisia
Pyrgos
Moutayiaka
Pissouri
Tseri
Dali
Nisou
Yeri
RURAL AREAS (50 AGGLOMERATIONS)
50 communities with population equivalent >200
6 existing rural wastewater treatment plants
Smaller communities with population equivalent <2,000 that have swerage problem and will be served by common treatment plant constructed under the implementation program
New suggested sewerage schemes with commontreatment plant
URBAN AREAS (7 AGGLOMERATIONS)
6 existing treatment plants and 1 under construction
Municipalities/communities that will be served by the treatment plants of the corresponding urban areas
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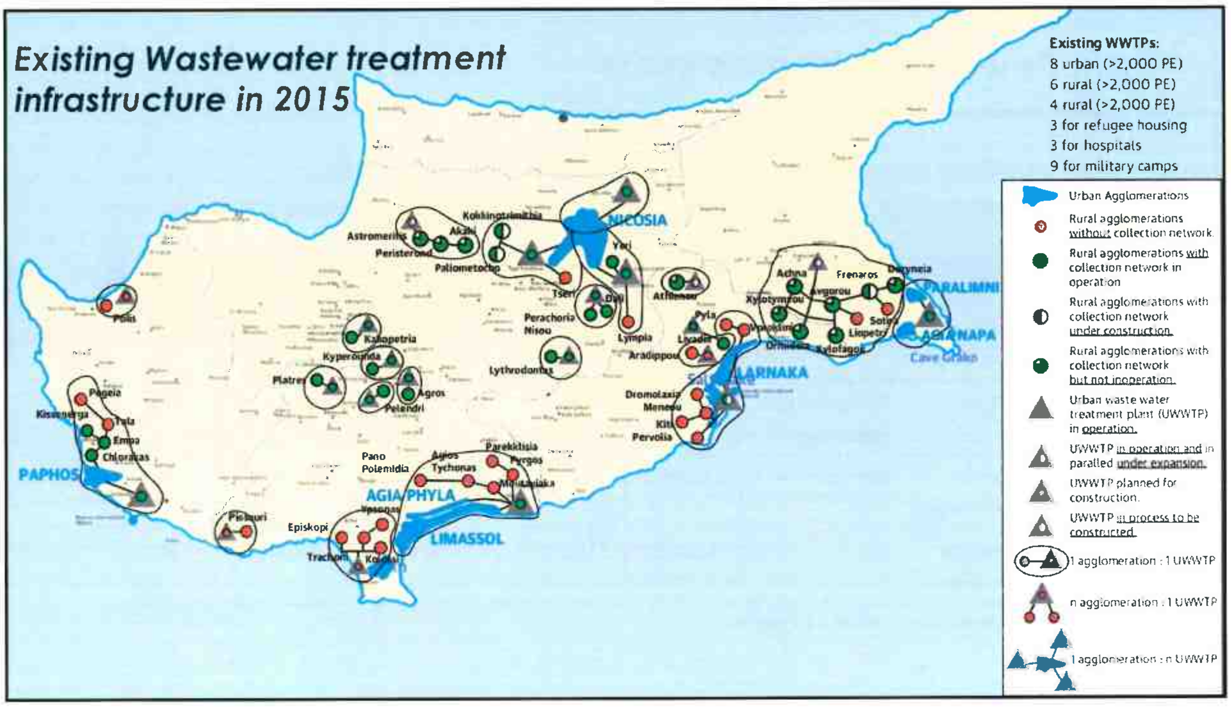
Existing Wastewater treatment infrastructure in 2015
Existing WWTPs:
8 urban (>2,000 PE)
6 rural (>2,000 PE)
4 rural (>2,000 PE)
3 for refugee housing
3 for hospitals
9 for military camps
Urban Agglomerations
Rural agglomerations without collection network
Rural agglomerations with collection network in operation
Rural agglomerations with collection network under construction
Rural agglomerations with collection network but not inoperation
Urban waste water treatment plant (UWWTP) in operation
UWWTP in operation and in paralled under expansion
UWWTP planned for construction
UWWTP in process to be constructed
1 agglomeration : 1 UWWTP
n agglomeration : 1 UWWTP
1 agglomeration : n UWWTP
NICOSIA
PARALIMNI
AGIA NAPA
Cave Greko
LARNAKA
AGIA PHYLA
LIMASSOL
PAPHOS
Polis
Kakopetria
Kyperounda
Platres
Agros
Pelendri
Astromeritis
Peristerona
Kokkinotrimithia
Akaki
Paliometocho
Yeri
Tseri
Dali
Perachoria
Nisou
Lympia
Athienou
Pyla
Livadia
Aradippou
Lythrodontas
Xylotymvou
Achna
Frenaros
Deryneia
Avgorou
Sotira
Liopetri
Xylofagou
Ormidea
Dromolaxia
Meneou
Kiti
Pervolia
Pegeia
Tala
Empa
Chlorakas
Kissonerga
Pissouri
Episkopi
Trachoni
Kolossi
Ypsonas
Pano Polemidia
Agios Tychonas
Parekklisia
Pyrgos
Moniatiaka

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Existing large WWTP in CY

TABLE 2.14. Existing Large Wastewater Treatment Plants in Cyprus

WWTP	Area/city(ies) served	Capacity m³/day	Agglomeration served PE	Year of operation	Contract type	Duration of O&M years	Name of private contractor
Anthoupoli	Anthoupoli	13.000	50.000	2008	DBO	10	WWT, Germany
Mia Milia	Part of Nicosia	30.000	110.000	2013	DBO	10	WWT, Germany
Vathia Gonia	Nicosia city	22.000	75.000	2010	DBO	10	Iacovou, Cyprus Saur, France Stereau, France
Vathia Gonia - Septage and industrial waste	Nicosia Larnaca	2.200	–	Feb 1998	DBO	98*-03 03-08 08-13** 13-18**	Biwater, UK Iacovou/Saur/Stereau
Limassol	Limassol city and environs	20.000 40.000	230.000	1995* 2008**	DBO	5+5	*Kruger, Denmark Zachariades, Cyprus Kruger, Denmark Cybarco, Cyprus
Larnaca	Larnaca city and touristic strip to the east	8.000 18.000	80.000	1995 2015	Utility run	–	–
Paphos	Paphos and Geroskipos towns	19.500	100.000	2008	DBO	10	Envitec, Greece
Ayia Napa Paralimni	Ayia Napa and Paralimni towns	21.000	91.000	2006	DBO	5	Michaniki Perivallontos, Greece

Source: WDD.
Note: – = not available; * = name of private operator; ** = name of private operator; DBO = design-build-operate; O&M = operation and maintenance; PE = population equivalent.

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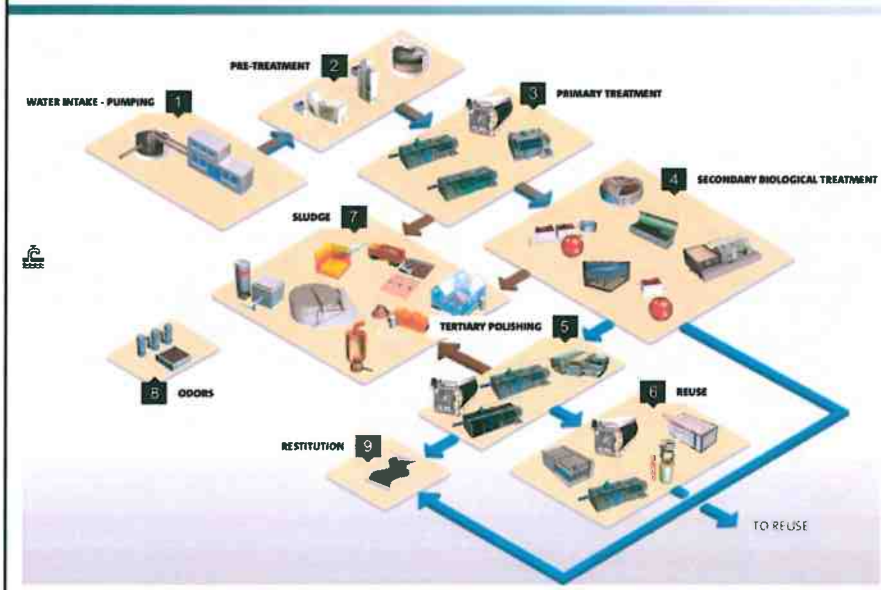
Wastewater Treatment – Treatment steps and options



- Graphic shows all possible steps of treatment
- Tertiary treatment is common in Cyprus in order to reuse the water in irrigation of agriculture
- Sludge in Cyprus is mostly used for fertilisation

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Wastewater Treatment (Limassol)

1. Sewerage system of Limassol
2. Waste Water Treatment Plants of Limassol

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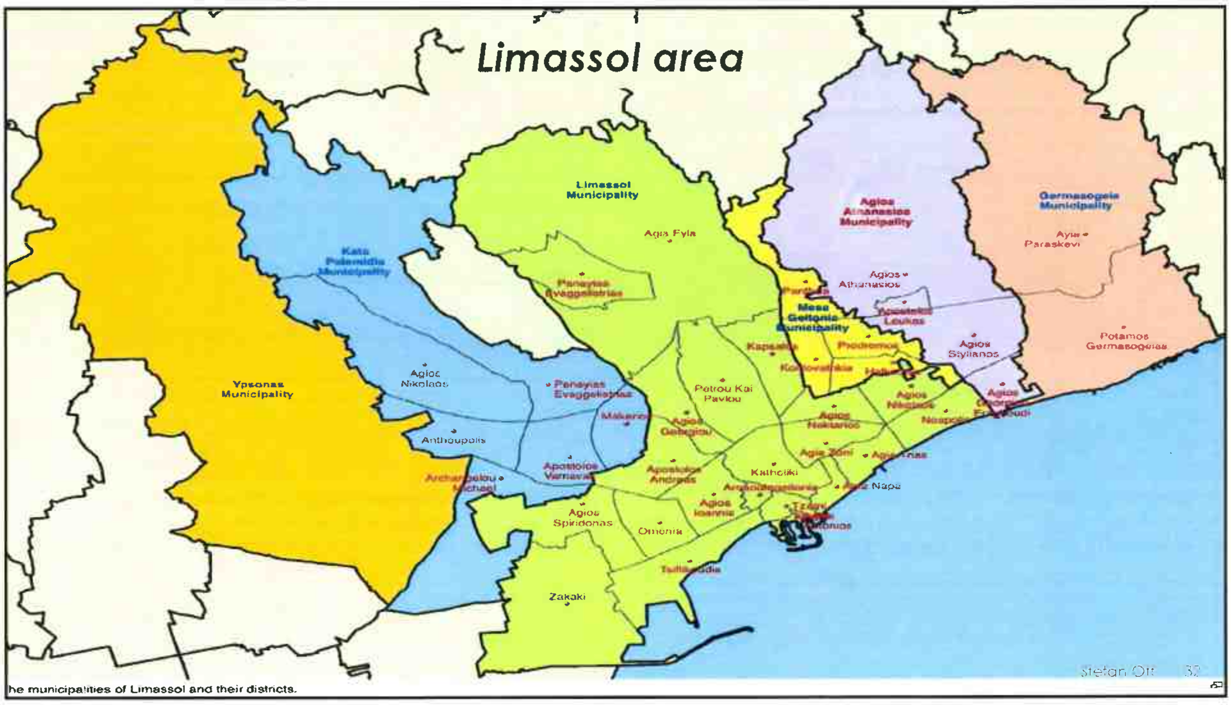
Limassol area



he municipalities of Limassol and their districts.

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1. Sewerage and drainage system

Of Limassol

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Collection of wastewater in Limassol

- Limassol has a **separated sewerage system**
  - Domestic waste water → Treatment plant
  - Drainage system for rain and superficial water
- Construction: Phase 1 began in May 1992
- Approx. 90% of system is gravity forced, 10% pressure pipes

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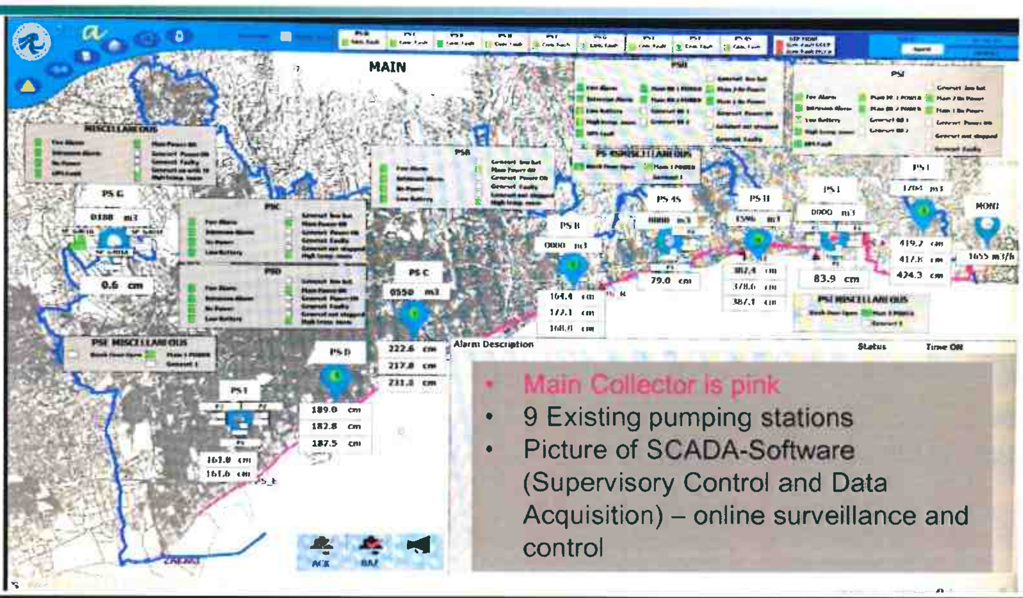
Limassol's Sewerage System and Pumping Stations



- Main Collector is pink
- 9 Existing pumping stations
- Picture of SCADA-Software (Supervisory Control and Data Acquisition) – online surveillance and control

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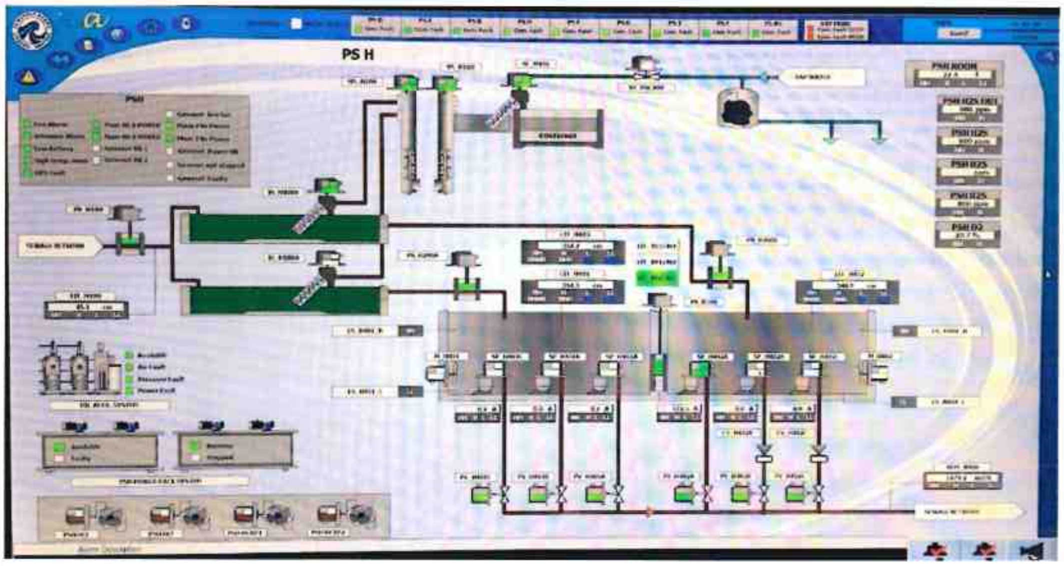
Example: Pumping Station H



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Pictures from Pumping Station C

1. Screening >50mm

2. Flow towards pumps

3. Valves in pressure pipes

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Generators at every pumping station for independent power supply and guaranteed function of sewerage system

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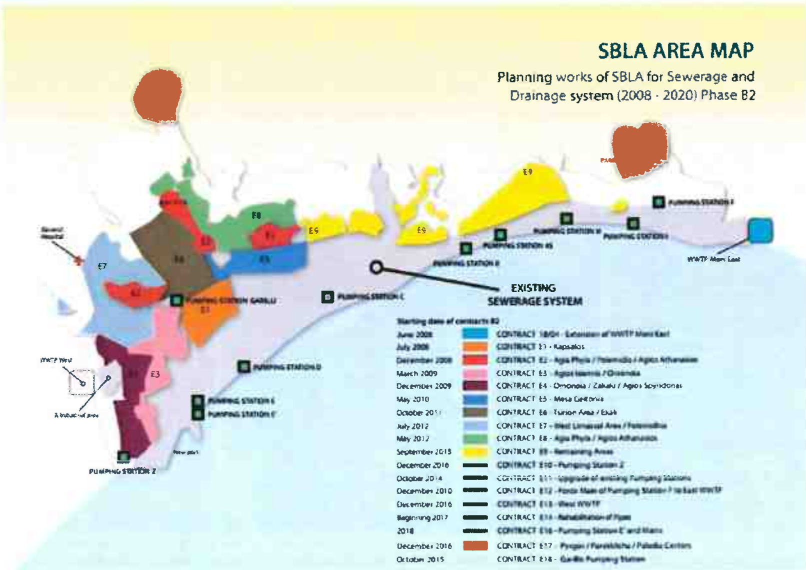
Extension of Sewerage and Drainage system of SBLA



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2. *Waste Water Treatment Plants*

Of Limassol

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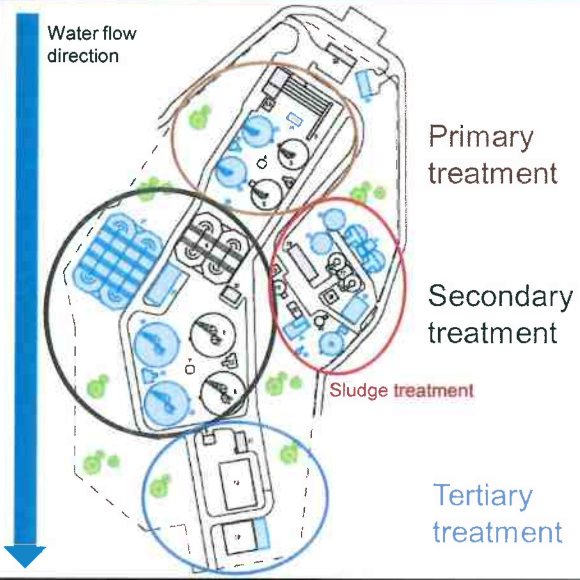
Wastewater Treatment Plant Moni



- Limassol's main WWTP in 2019
- Design daily inflow 40.000m^3
- Extension in 2006
  - Blue parts in left image
  - Plant capacity was doubled to meet new demands
- All water is tertiary treated and reused
- Designed and built by Krüger, Denmark (now part of Veolia)

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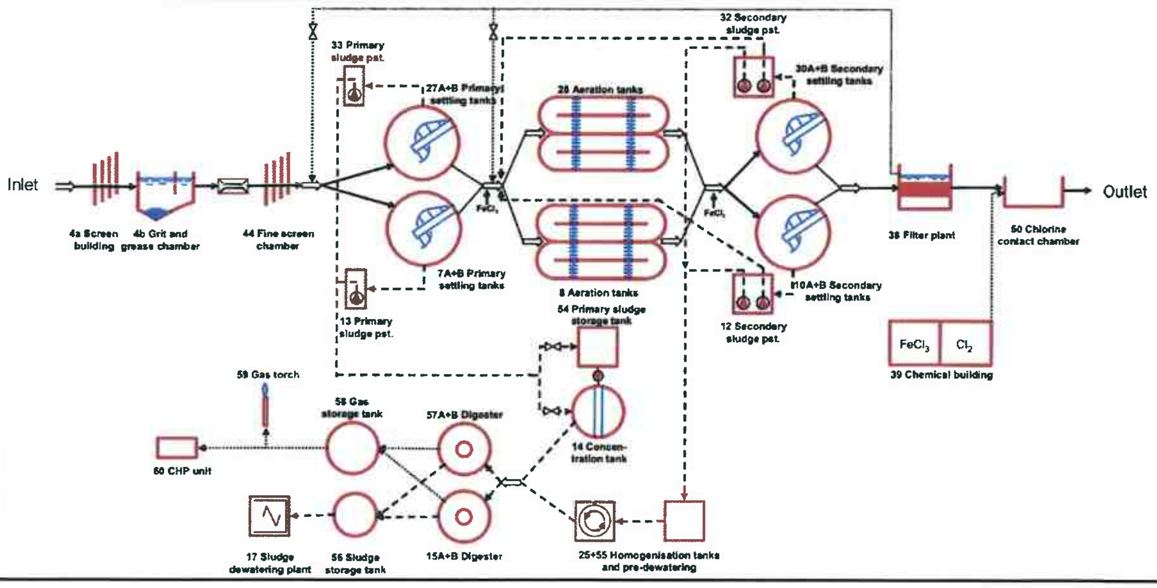
Fundamental design WWTP Moni, Limassol



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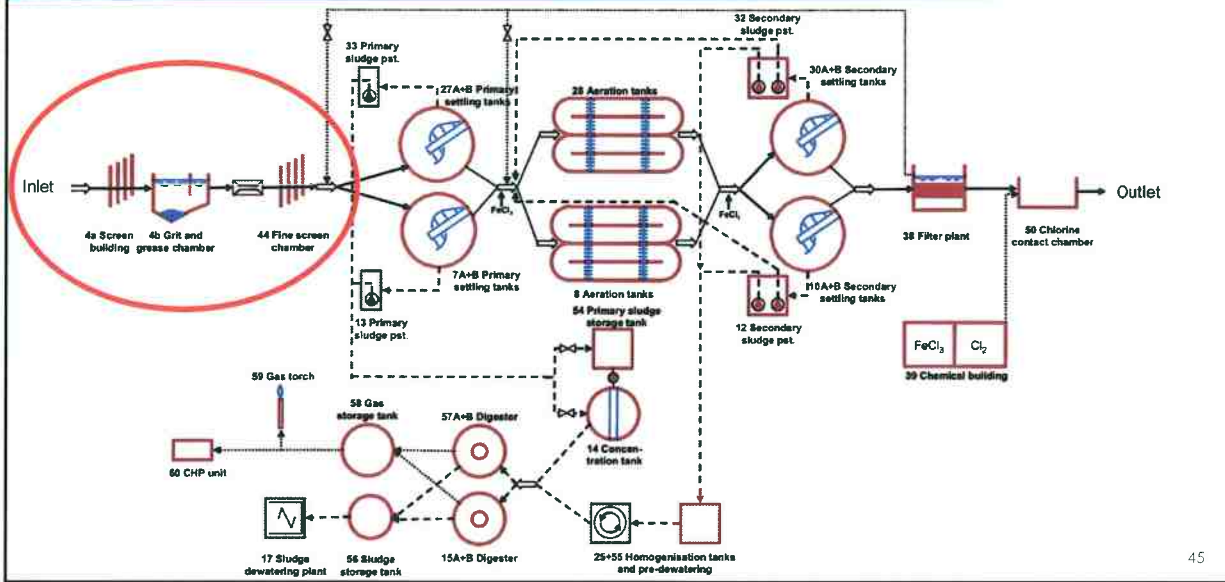
Design data of WWTP Moni

Total population ~ PE		272,000
Sewage flow		
Mean flow rate, q_{mean}	m³/d	40,000
Peak flow rate, p_{max}	m³/h	3,580
Load		
Specific BOD_5	g/PE	60
Daily BOD_5 load	kg/d	16,320
Daily COD load	kg/d	31,920
Daily SS	kg/d	21,600
Daily nitrogen load	kg/d	2,200
Daily phosphorus load	kg/d	560
Temperature, sewage, min	°C	20
Temperature, sewage, max.	°C	32

Primary Treatment

Screening, Fat&Grit removal, Fine screening

Fundamental design WWTP Moni – SCREENING, FAT&GRIT



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1.1 Inlet Screening – Automatic screens

Main collector enters STP

Primary screening

Screening residue

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1.2 Fat and grit removal

- Fat
  - Brought to surface by aeration with bubbles
  - Removed from surface with skimmer
  - Stored in 12m² fat-tank
- Grit
  - Removed through sedimentation
  - Collected through a collection unit on the bottom

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1.2 Fat and grit removal

Grit sedimentation

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1.2 Fat and grit removal

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1.3 Fine screening – Fine grit removal

Flow through fine screen

Screw conveyor

Residue from fine screening

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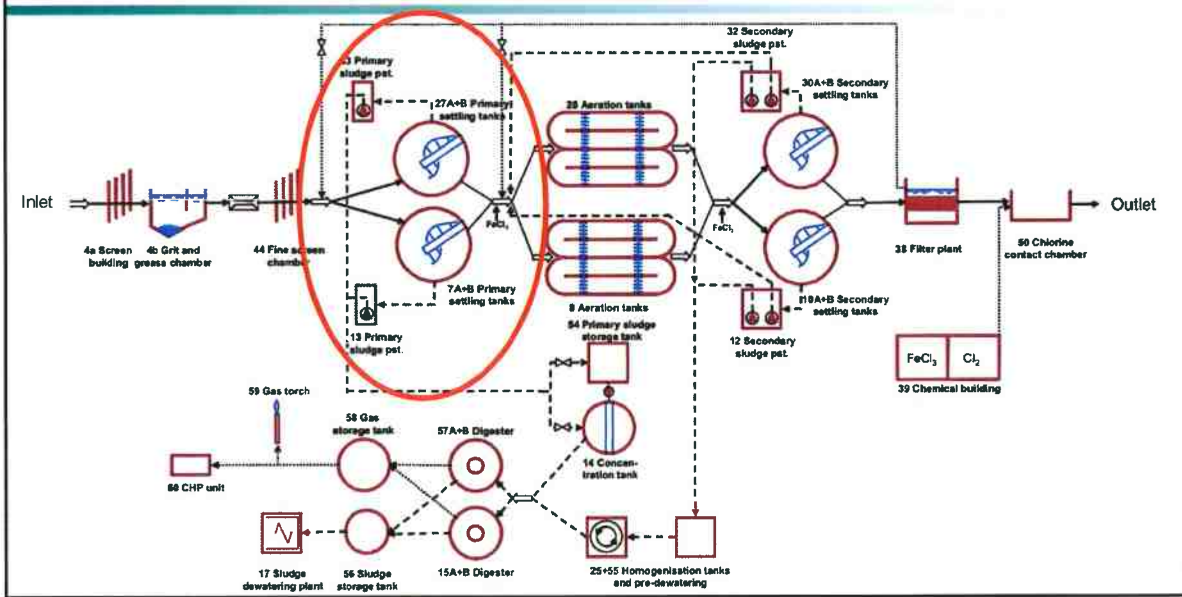
Fundamental design WWTP Moni – PRIMARY SETTLEMENT



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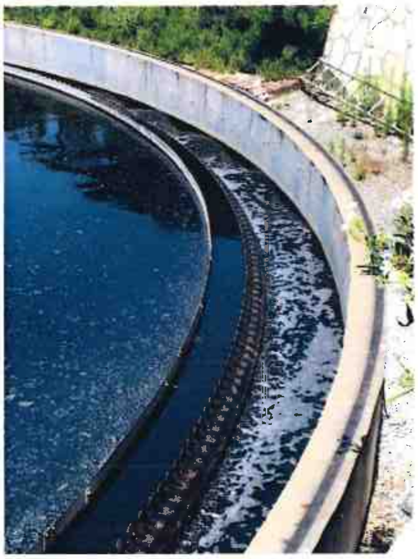
1.4 Primary settling in Primary Clarifiers – in operation



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1.4 Primary settling in Primary Clarifiers - empty

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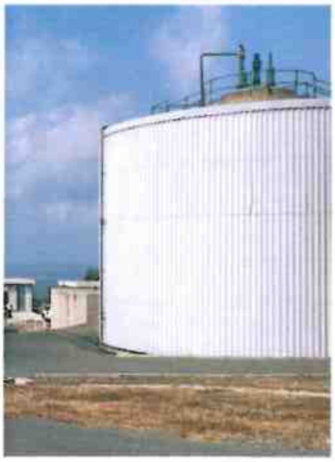
1.4 Primary Sludge → Digestors

Primary sludge is pumped directly to Digestors



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Secondary Treatment

Aeration (BOD-Reduction, Nitrification, Denitrification), Secondary Settlement, Sludge-Return

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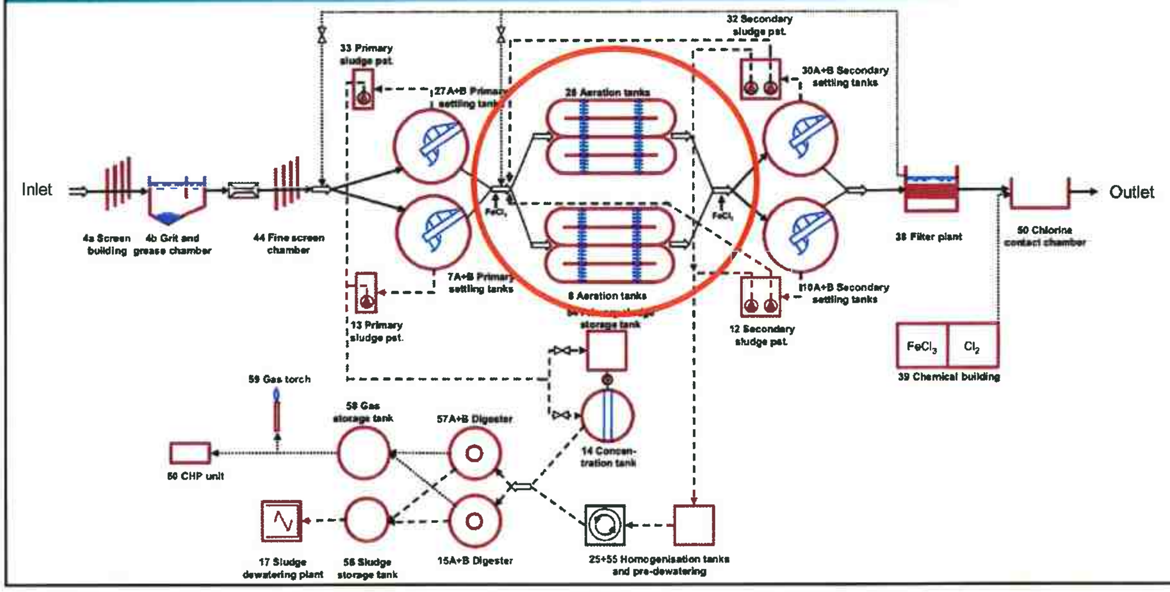
Fundamental design WWTP Moni – AERATION



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Water conditions and types of bacteria

- **Anoxic** – no dissolved, no molecular oxygen present (f.e. only NH_4^+)
- **Aerobic** – dissolved oxygen (O_2) and molecular O present or produced (f.e. $NH_4^+ \rightarrow NO_3^-$)
- **Anaerobic** – no dissolved O_2 but molecular O present (f.e. NO_3^-)

- **Important types of bacteria:**
  - Heterotrophic – organic matter as carbon source (Denitrifiers)
  - Autotrophic – CO_2 as carbon source (Nitrifiers)

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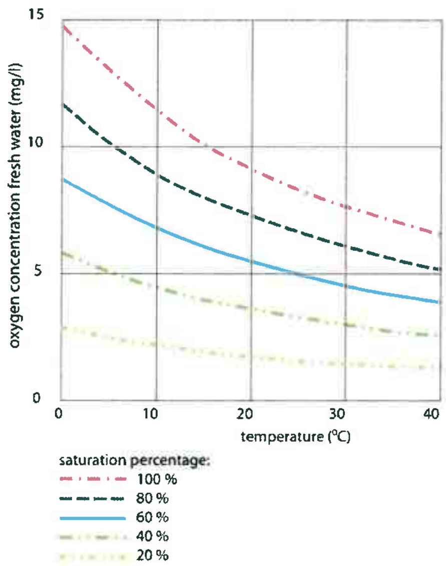
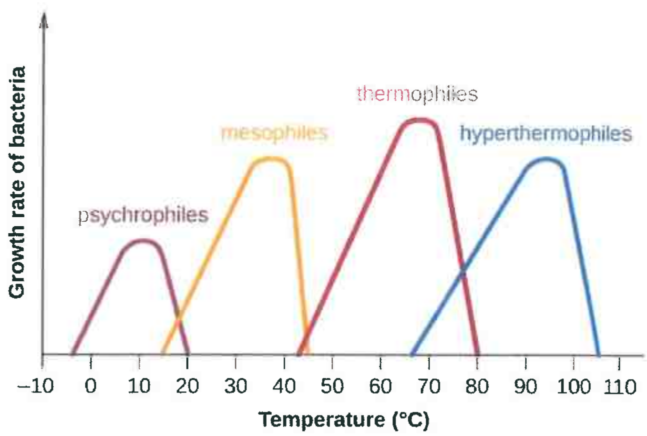
The link of temperature and growth rate of MO/oxygen content in water





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2 Biological Treatment – Aeration Tanks

- After mechanical treatment
- Important dissolved contaminants in waste water
  - COD
  - BOD
  - Suspended solids
  - NH_4-N
  - Tot-N
  - Tot-P
- BOD is reduced during aerobic phase through microorganisms
- Suspended solids settle through flocculation
- NH_4-N and tot-N, tot-P decrease in Nitrification/Denitrification
- Contaminants are not totally removed but reduced to meet effluent criteria

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2 Process in Aeration Tanks – Nitrogen Removal

Nitrification (N)

$$2NH_4^+ + 3O_2 \rightarrow 2NO_2^- + 2H_2O + 4H^+$$
$$2NO_2^- + O_2 \rightarrow 2NO_3^-$$

$$2NH_4^+ + 4O_2 \rightarrow 2NO_3^- + 2H_2O + 4H^+$$

- Aerobic, **autotrophic**, mesophilic bacteria
  - CO_2 is carbon source
  - Dissolved oxygen necessary
- Resulting acidic conditions
- Aerated conditions

Denitrification (DN)

$$NO_3^- \rightarrow NO_2^- \rightarrow NO \rightarrow N_2O \rightarrow N_2$$

$$4NO_3^- + 5C + 4H_2CO_3 \rightarrow 2N_2 + 5CO_2 + 2H_2O + 4HCO_3^-$$

- Anaerobic, mostly **heterotrophic**, mesophilic bacteria
  - MO need certain BOD (C) for DN
- Use of NO_3^- as oxygen source and reduction to N_2 (g)
  - NO dissolved Oxygen necessary
- Resulting in alkaline conditions
- No aeration - Anoxic conditions

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2 Process in Aeration Tanks – "BIO-DENITRO" Process

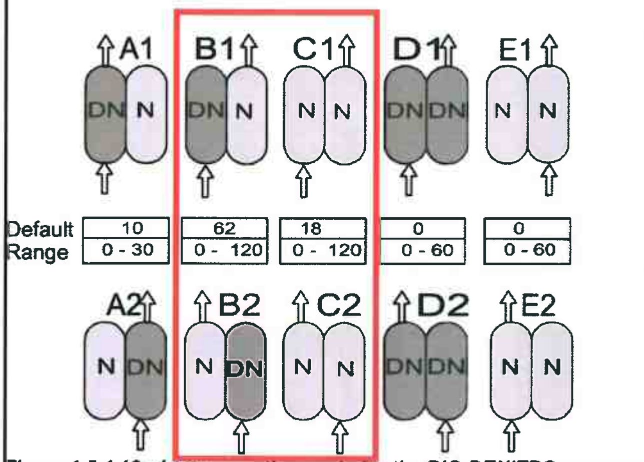

Figure 1.5.4 10-phase operation cycle for the BIO-DENITRO process.

Example from structure 28

- Slightly different processes in the 2 separated aeration tanks (08, 28)
- Hydraulic retention time in aeration basin depends on the flow (HRT = V_{AT}/Q_{in})
  - With normal inflow **~8h in AT**
- Normally only the phases B and C are operated
  - Depends on inflow BOD loading, general inflow volume
- **Operation phase changes multiple times during hydraulic retention**
- Mixers keep water moving in DN

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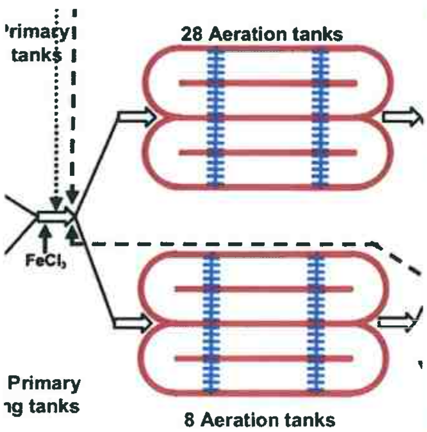
2 Biological Treatment - Aerations tanks

Aeration phase: Dissolved O_2 present
Reduction BOD, Nitrification $NH_4 \rightarrow NO_3$

Anaerobic phase: O only in NO_3^-
Denitrification: $NO_3 \rightarrow N_2$



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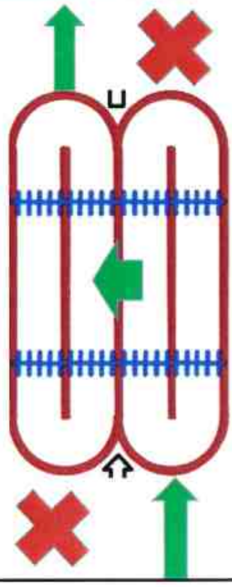
2 Process in Aeration Tanks – "BIO-DENITRO" Process

Outlet of Aeration in operation
Alternating phases of N, DN in basin



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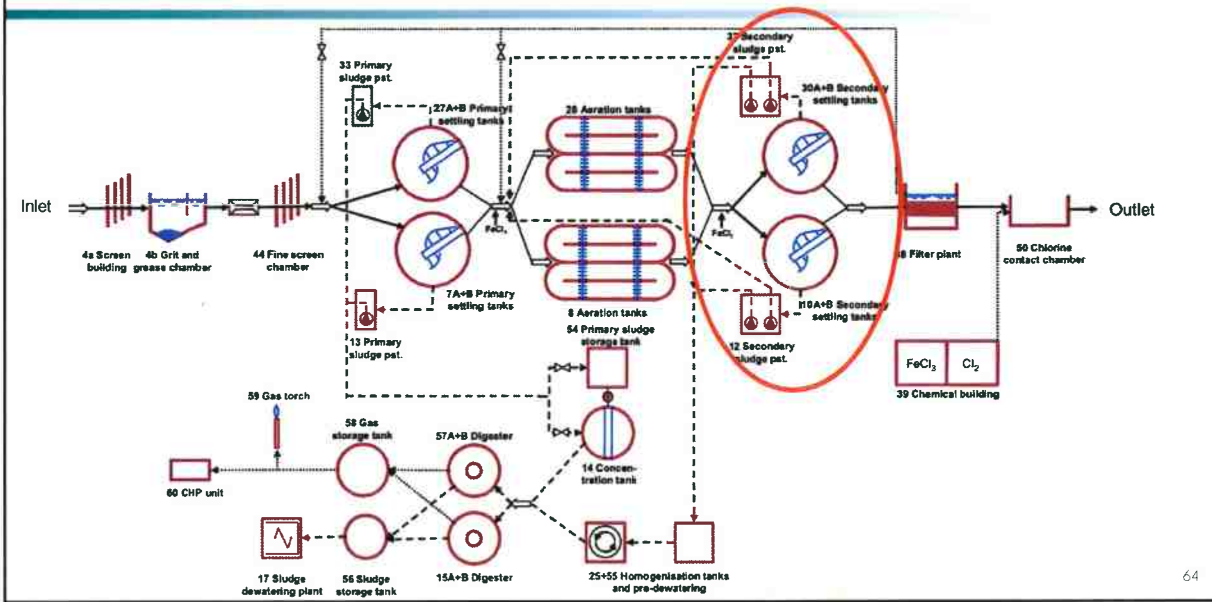
Fundamental design WWTP Moni – Secondary sludge settling



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2 Secondary settlement tanks

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2 Secondary sludge – Return-sludge

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Tertiary Treatment

Sand filters, chlorination

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3.1 Sand filters

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3.1 Empty filter

Filter Backwash

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3.1 Sand filter underground pipes and backwash pumps

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3.2 Effluent from sand filter to chlorine contact chamber

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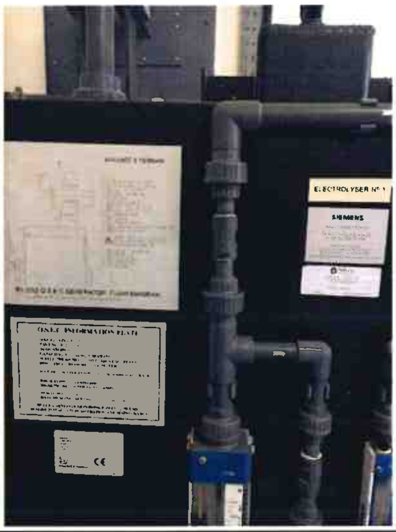
Electrolytic chlorination on site (NaCl → Cl-)

Salt saturation tank

Electrolyser to produce Cl^-



Dosing pumps for chamber

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Design effluent data WWTP Moni

	Effluent to sensi-tive areas	Reuse for irrigation
BOD_5 average/day	10 mg/l	10 mg/l
COD average/day	70 mg/l	70 mg/l
Suspended solids average/day	10 mg/l	10 mg/l
NH_4-N average/day	2 mg/l	2 mg/l
N-total average/day	< 10 mg/l	< 15 mg/l
P-total average/day	< 2 mg/l	< 10 mg/l

Sludge treatment

Thickeners, Dewatering, Digestors,

Sludge handling in plant

- Primary sludge goes directly to digestors
- Secondary sludge goes through thickener to digestor
- Alternating decanters are used to dewater the digestors output
- Produce biogas is burnt in on site engine with generator
- On site gas storage as shown on picture

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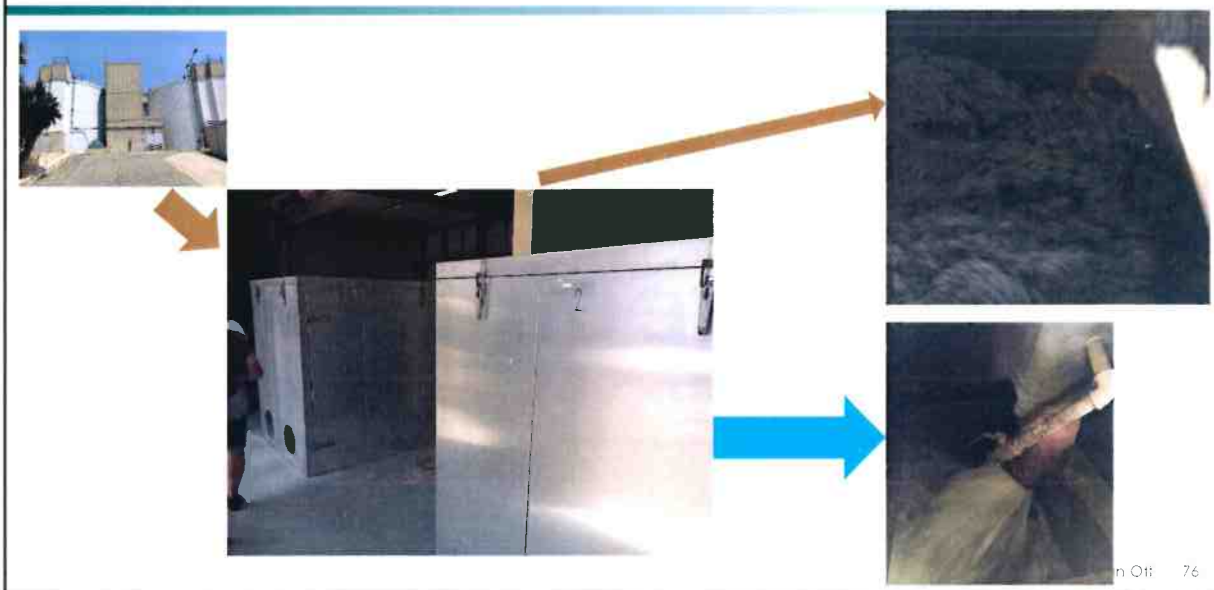
Dewatering of sludge in decanter – products



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Dewatered sludge is dried in the sun and loaded to trucks

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Operation of WWTP

Mass balance, Effluent, Experience

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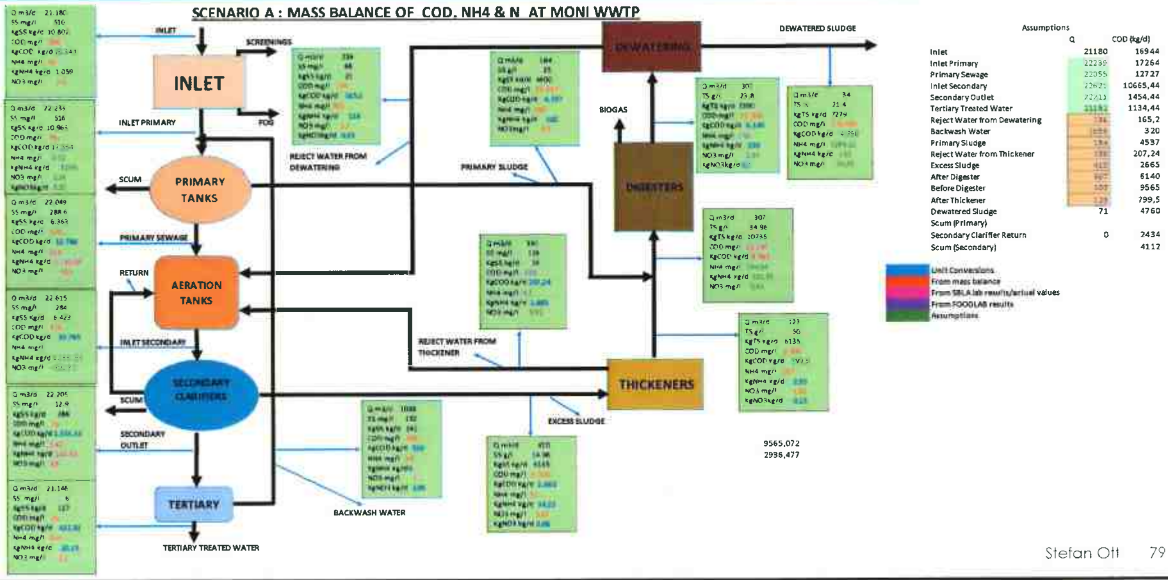
Mass balance of WWTP Moni



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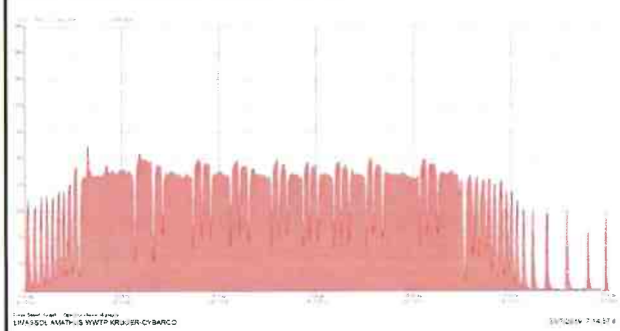
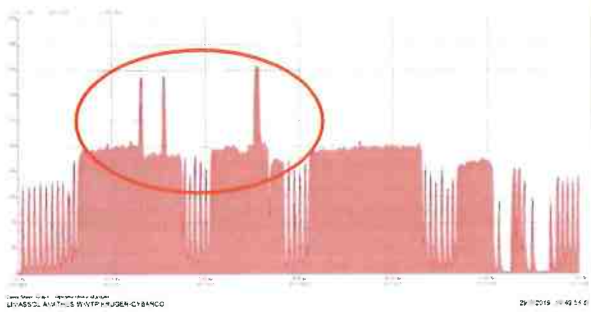
Operation Experience of WWTP Moni - Problems

- Non steady inflow
  - Hydraulic overload causes problems in settling, HRT too short – overflow of MO that block filters in tertiary treatment

Normal inflow within 24h



Inflow peaks within 24h



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*Operation Experience of **WWTP Moni** - Problems*

- Toxic substances
  - Recovery time depends on capacity of the plant
  - Wine festival causes problems in nitrification – NH_4^+ doesn't get reduced to NO_3^- → exceeding design effluent values
- Operator has important role – operation and problemsolving

Light overflow of non settled secondary sludge mostly due to high inflow

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*Operation Experience of **WWTP Moni***

- Foaming due to excessive use of NitroCal $Ca(NO_3)_2$ for odour removal → reduced quantity of NitroCal

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Water Reuse

of Limassol's treated waste water

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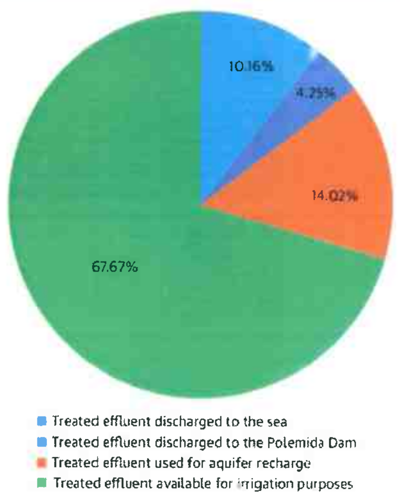
Reuse of treated wastewater by category, 2015

FIGURE 2.7. Reuse of Treated Wastewater in Cyprus, by Category of Usage, 2015



Source: WDD.

- About 90% of Cyprus treated wastewater is now reused
- Mostly for irrigation purposes

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Sewerage Board of Limassol - Amathus

LIMASSOL - LEMESOS MUNICIPALITY

Water management & infrastructure in Cyprus and Limassol

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AVAW Abfallverwertungstechnik & Abfallwirtschaft

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IAESTE Cyprus

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