

Piotr Miakoto
Szczecin
13.05.2025

Modernising WWTP Pomorzany Post-EMPEREST plans and strategies

Interreg Baltic Sea Region
Co-funded by the European Union
SUSTAINABLE WATERS
EMPEREST

WATER-SMART SOCIETIES



Technical parameters of WWTP Pomorzany



Equivalent inhabitants: 418 000 RLM

Dry period:
Q average / d **66 000 m^3/d**

Rain period:
Q max / d **155 000 m^3/d**

- The catchment area of the WWTP Pomorzany mainly consists of municipal and rain wastewater with only slight addition of industial wastewater.
- Taking into account the combined network of the WWTP catchment, the amount of rain water causes the total inflow to triple in comparison with the normal flow.

New Urban Wastewater Treatment Directive of EU vs WWTP Pomorzany plans – actions we took so far:



- April 2024 – published preliminary version of the Urban wastewater treatment Directive
- May 2024 – construction of mobile pilot plant in Gdańsk and tests at local WWTP
- June 2024 – commision of the Study of development of WWTP Pomorzany vs EU Directive
- September 2024 – start of micropollutants and PFAS removal tests on WWTP Pomorzany
- Directive (EU) 2024/3019 of the European Parliament and of the Council of 27 November 2024 concerning urban wastewater treatment
- December 2024 – completion of mobile plant tests and sending to Kaunas WWTP for further tests
- February 2025 – completion of the Study

Installation of the pilot station:







Piloting period:

September – December 2024



- **List of micropolutants measured as per EU Directive concerning urban wastewater treatment:**

AMI	Amisulprid
CAR	Carbamazepine
CIT	Citalopram
CLA	Clarithromycin
DIC	Diclofenac
HYD	Hydrochlorothiazide
MET	Metoprolol
VEN	Venlafaxine
BEN	Benzotriazole
CAN	Candesartan
IRB	Irbesartan
MBT	Mixture of 4-methylbenzotriazole and 6 -methylbenzotriazole

- **Tests schedule and setups for each serie**

Activated carbon	Data		dose O3	CT O3	CT GAC
WG 12	27.09.2024	1 sample	6	20	30
	04.10.2024	2 sample	5	30	40
	11.10.2024	3 sample	6	40	20
	18.10.2024	4 sample	8	40	20
	25.10.2024	5 sample	10	40	20
	30.10.2024	6 sample	6	30	30
	08.11.2024	7 sample	8	30	20
WG 90	22.11.2024	8 sample	10	30	20
	27.11.2024	9 sample	8	30	20
	29.11.2024	extra sample	-	-	20
	04.12.2024	extra sample	3	30	20

Pilot station:

Drum filter –> Ozone –> GAC



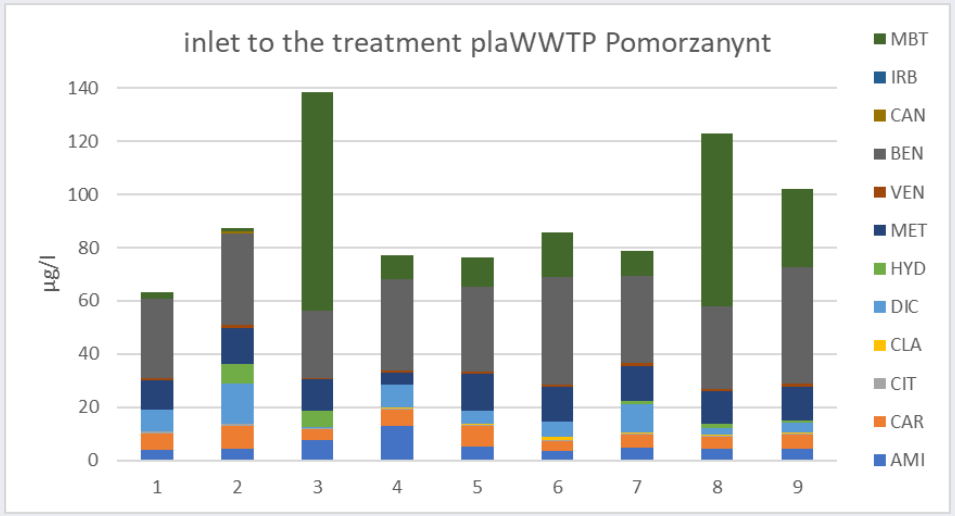


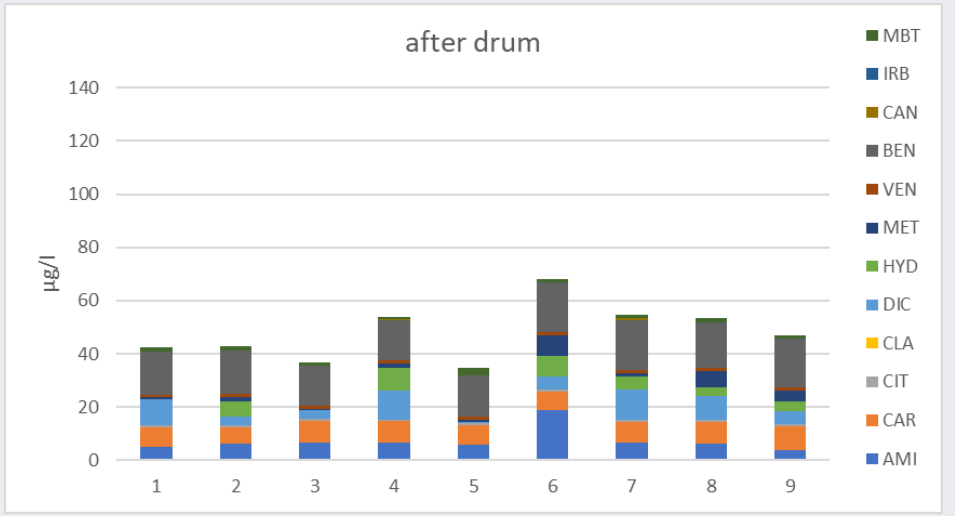


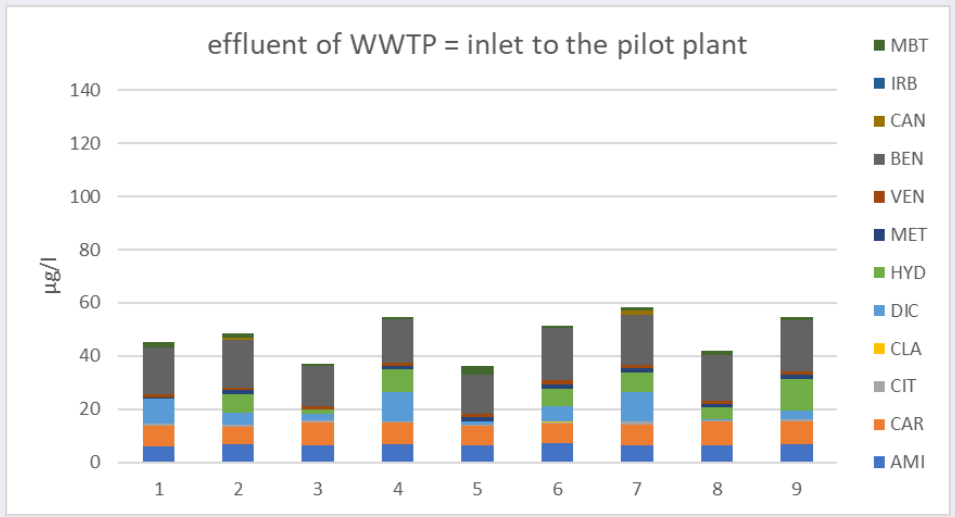
Results:

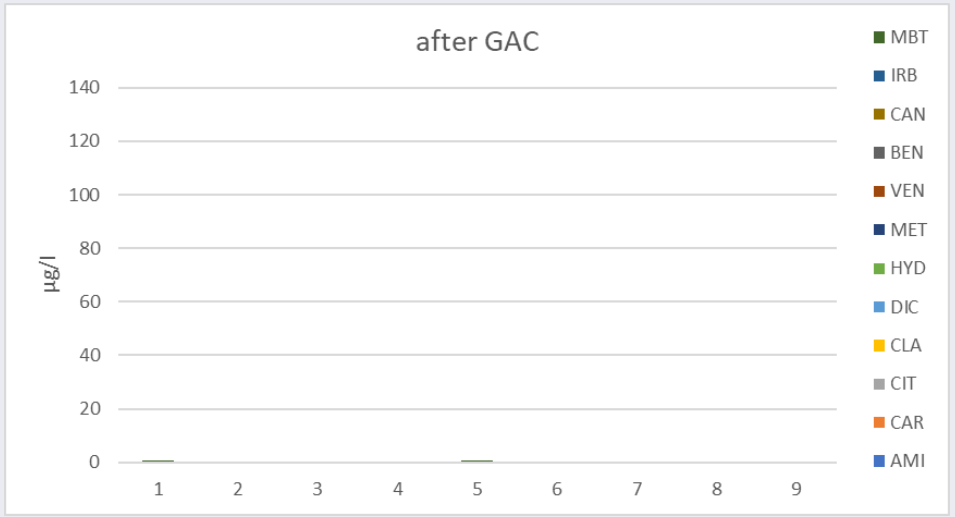
Micropollutants/pharmaceuticals

Raw sewage –> Treated = inlet to the pilot –> after pilot



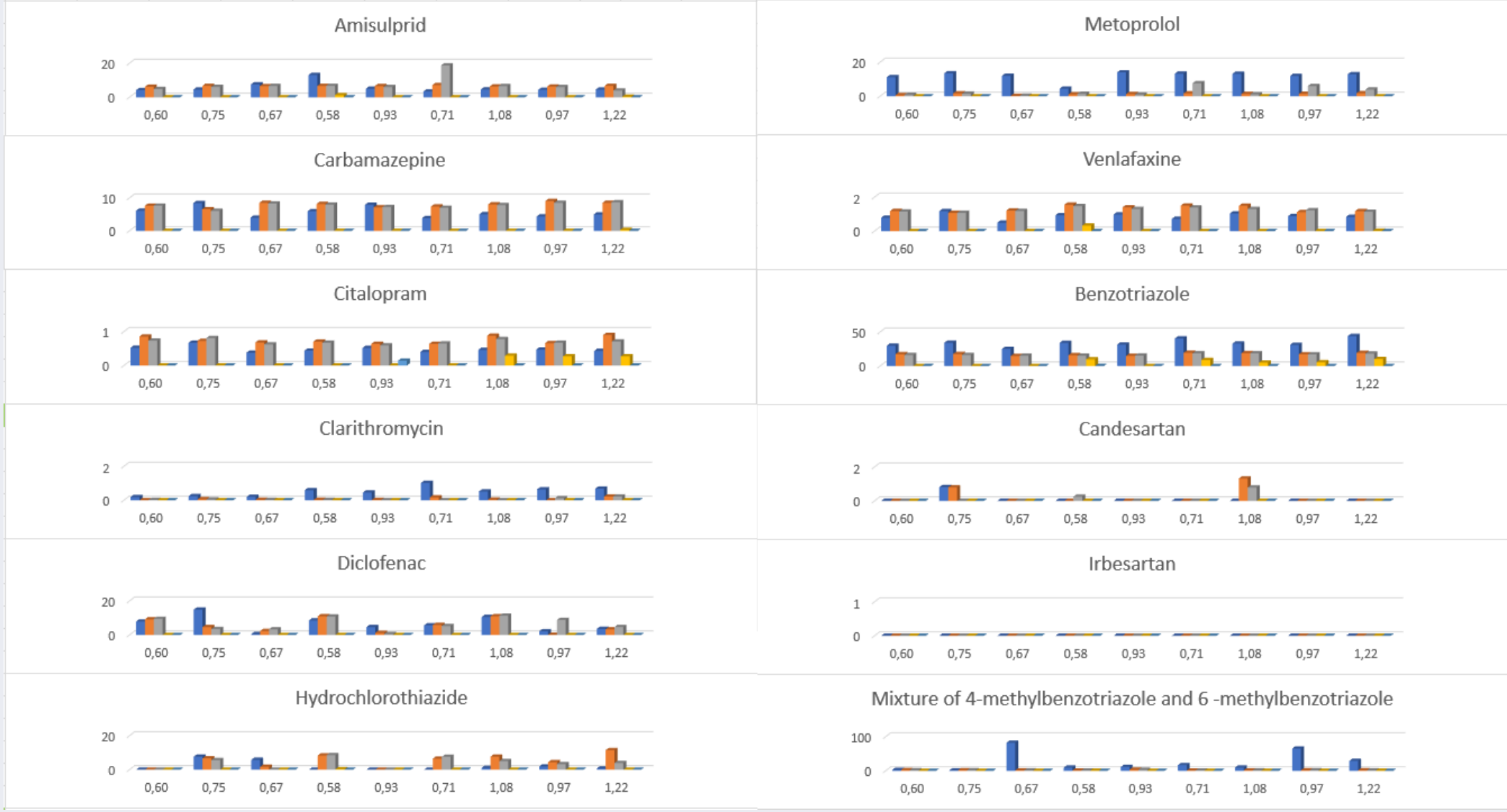






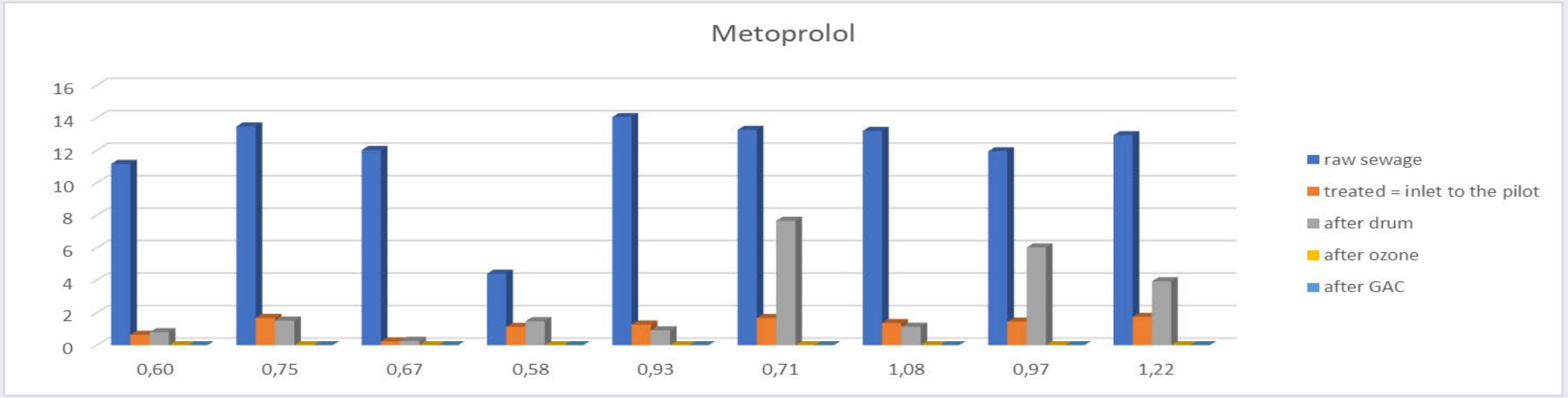
Results:

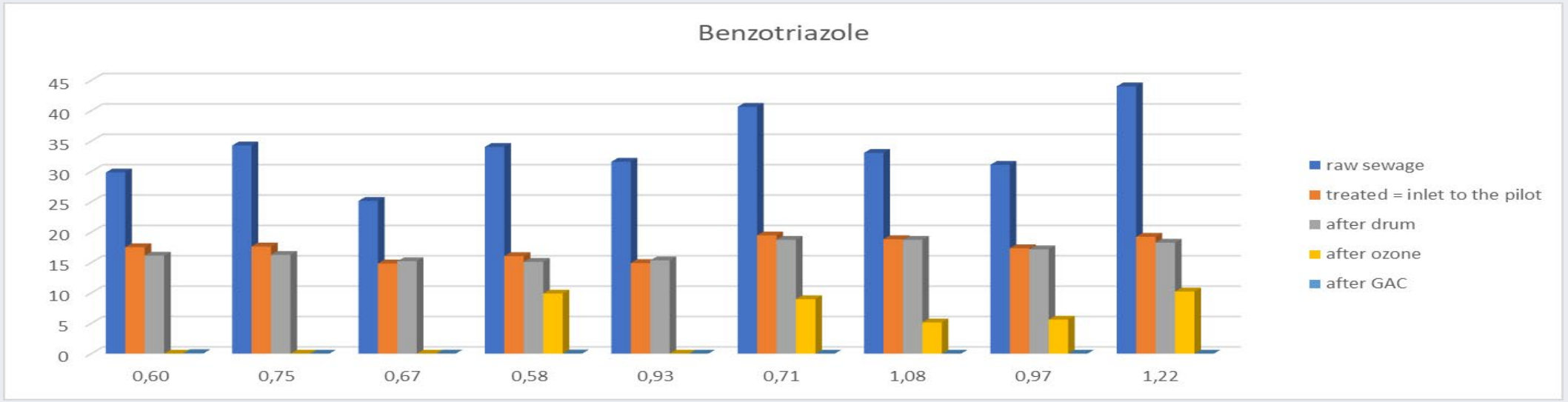
for 8 + 4 pharmacauticals at specific ozone dose (mg 03 / mg DOC)



Results:

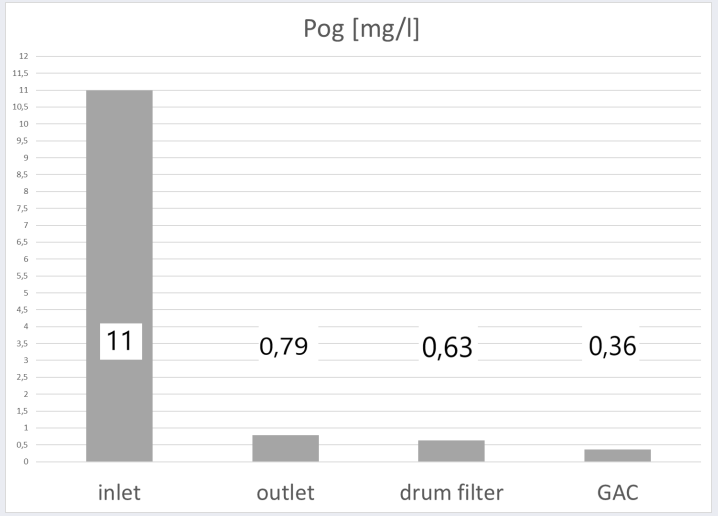
for selected pharmacauticals at specific ozone dose (mg 03 / mg DOC)



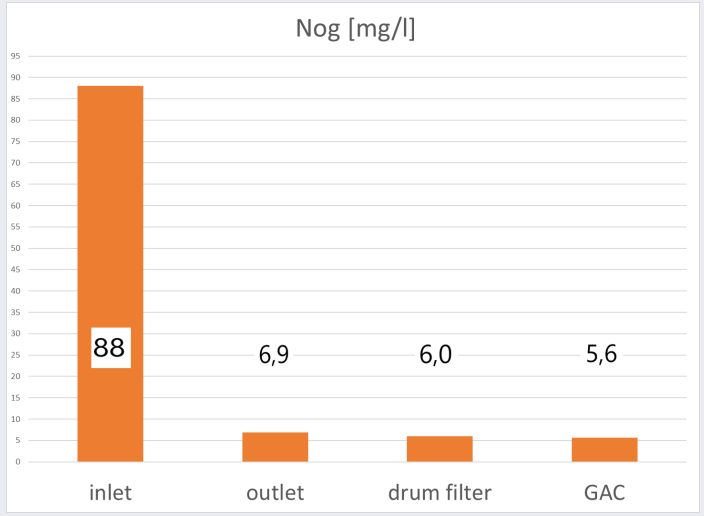


Results:

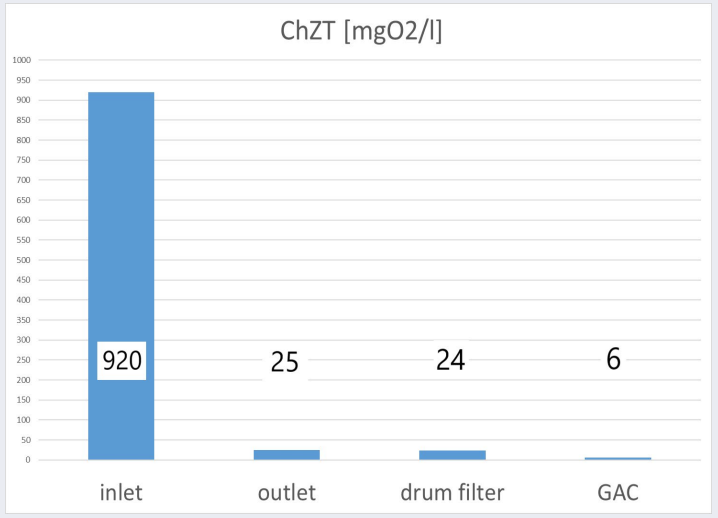
for standard parameters reduction at the pilot station



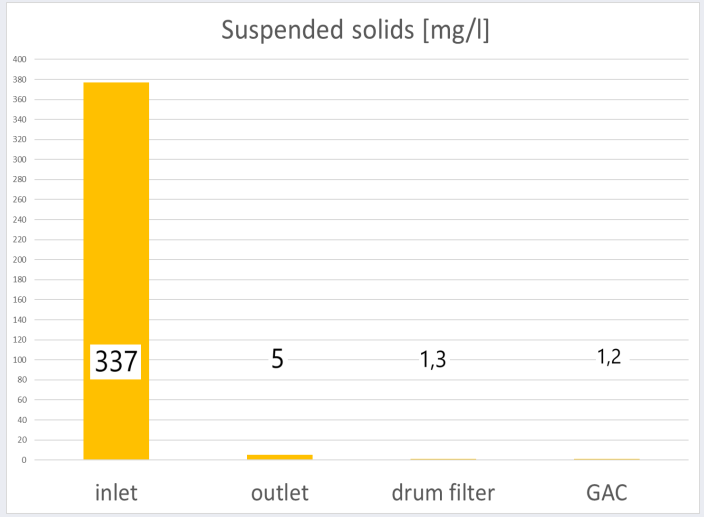
11		
0,79	93%	
0,63	94%	20%
0,36	97%	43%



88		
6,9	92%	
6,0	93%	13%
5,6	94%	7%



920		
25	97%	
24	97%	4%
6	99%	75%



337		
5,0	99%	
1,3	100%	74%
1,2	100%	8%

Conclusions concerning current and further measurements:



- To get real levels of micropollutants reduction on WWTP, **reliable measurements are required**.
- Current measurements show that the **amount of available accredited laboratories is very limited**, they are distant and the return information is very late and usually of 2-4 weeks.
- **Detection level is low** and thus very problematic and susceptible to errors.
- At current state it is recommended to have the same probes measured by different labs **for design purposes**.
- It is observed that **micropollutants do accumulate in the sludge** and mesh or fabric filters and can be released to the treated sewage at the most unwanted moment thus influencing the results.

Further actions:

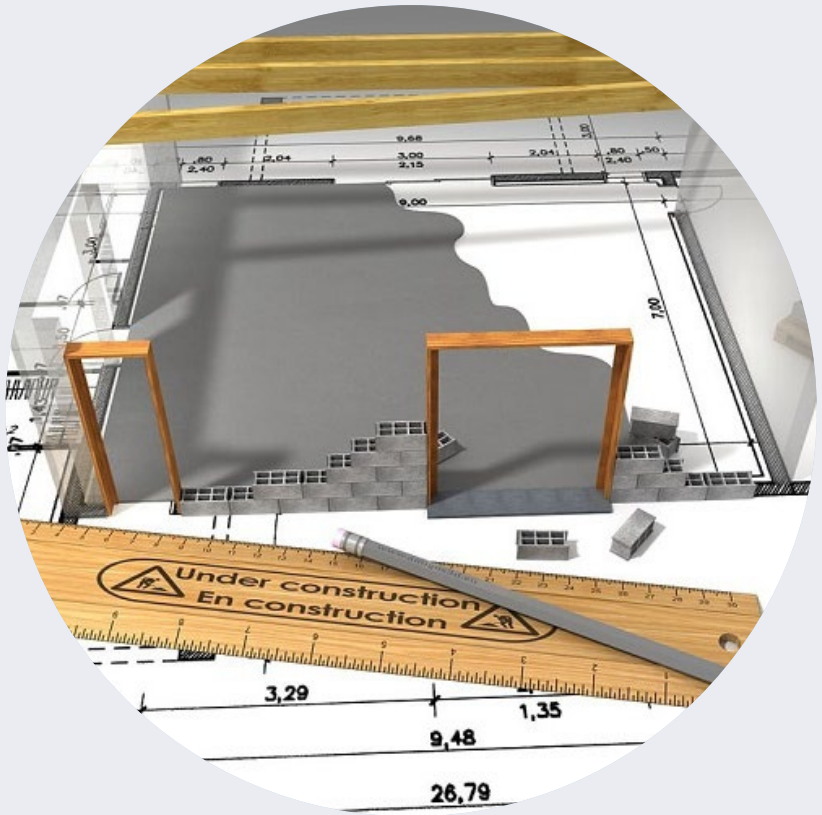


- **2025** – purchase of land necessary for development of WWTP Pomorzany
- **2026-2027** – commision of the Concept for the WWTP Pomorzany development
- **2027** – national application of the EU Directive
- **2027 – 2033** – design and construction of extended tertiary and new quaternary step for WWTP Pomorzany

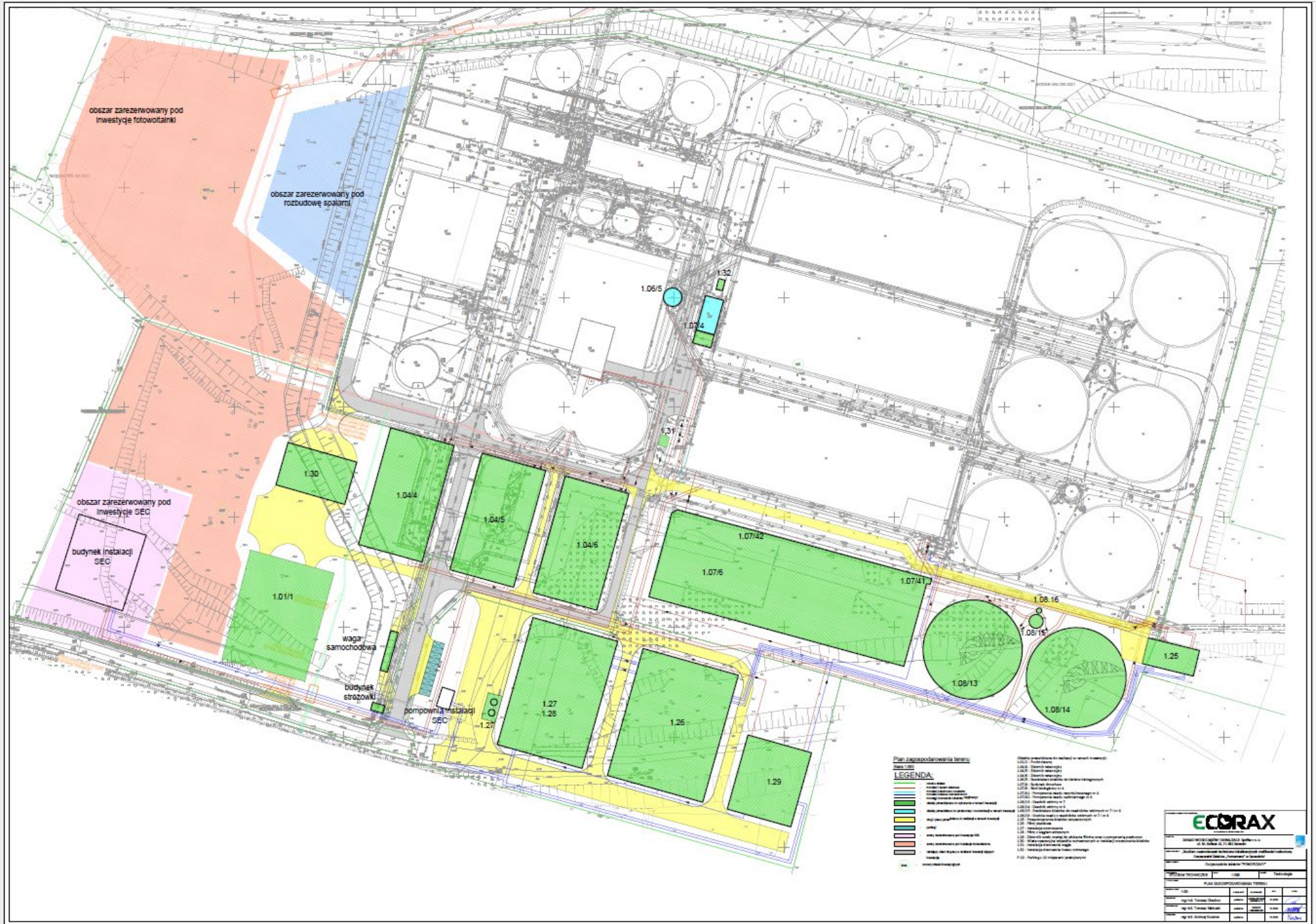

Tama Pomorzańska
Szczawiowa
9/29
9/17
9/28
9/2
9/26
9/27
9/5
9/30
9/32
9/31
9/34
9/36
9/35
9/33
9/6
9/25
9/23
5/1
1/14
1/13
3/4
3/49
3/48
3/50
3/69
3/73
3/91
3/70
3/75
3/59
6/5
6/3
6/2
9/19
71A
71B
71D
71E
71G
71BA
69B
54A
54B
53L

Necessary development:

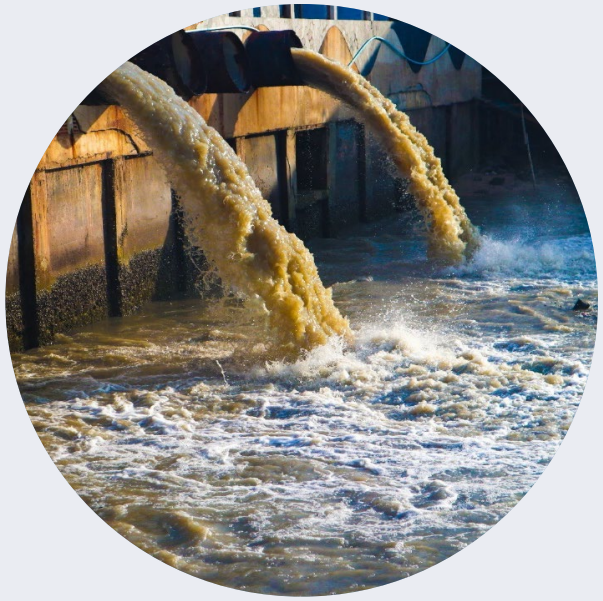
- 4th line of biological section for tertiary treatment
- Increased retention capacity
- Energy neutrality facilities



- Quaternary step with sand filters, ozone and GAC


obszar zarezerwowany pod inwestycje fotowoltainki
obszar zarezerwowany pod rozbudowę spalarni
obszar zarezerwowany pod inwestycje SEC
budynek instalacji SEC
1.06/5
1.32
1.07/4
1.31
1.30
1.04/4
1.04/5
1.04/6
1.07/42
1.07/6
1.07/41
1.08.16
1.08/15
1.01/1
waga samochodowa
budynek strożówki
pompownia instalacji SEC
1.27
1.28
1.26
1.29
1.08/13
1.08/14
1.25
LEGENDA:
ECORAX

Expected problems vs risk?



- **Land purchase – LOW** being surrounded with municipal undeveloped and former dump area makes it possible to get it
- **Proper design and technology – LOW** is known and solid as it corresponds 99% to what is currently used in water treatment plants
- **Money to fund the construction i.e. 80% refund for quaternary step according to EU Directive - HIGH** the mechanisms for obtaining refund for quarternary step are unclear at best and money for development of tertiary step as well as energy self-sufficiency need to be covered at 100% level
- **Available experienced contractors - HIGH** with so many Europe-wide investments realised at the same time available contractors as well as material prices are very questionable



Thank you for your attention!

Piotr Miakoto

Water and Sewage Company Ltd. of Szczecin

p.miakoto@zwik.szczecin.pl

#EMPEREST

The project EMPEREST co-financed by the Interreg Baltic Sea Region helps to drive the transition to a green and resilient Baltic Sea region.

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS EMPEREST