

# 11th IOB Conference

## Indoor NSPs ...Why not?







































06.10.2021 | Stefan Bruns, Hans Graf

**POLYPLAN**   
**KREIKENBAUM**

# Content

- The 3 indoor NSPs has been investigated to find out if they indicates higher risks regarding the hygienic parameters.
- The start presentation is the first part of the Indor NSP workshop.
- Based on this presentation the workgroup will define the next steps.

<p>Aquakulturbetrieb Die Landgarnele (Typ See)</p> 	<p>Badeseen Grossbüttel</p> 	<p>Badeseen Schlöden</p> 	<p>Badeseen Walldorf</p> 	<p>Brejo Longo</p> 	<p>Die Landgarnele Damm</p> 	<p>Familien-Vital-Park Burgberg-Bleichach</p> 	<p>Freibad Hainholz</p> 
<p>Freibad Terrano (Gudensberg)</p> 	<p>Inaktives Testbad</p> 	<p>Indonesien 1</p> 	<p>IOB Test Pool</p> 	<p>Lentparkbad Köln</p> 	<p>LoRaWAN Testbad</p> 	<p>Loreto</p> 	<p>Lüttensee Tomesch</p> 
<p>Merryweathers</p> 	<p>MQTT Vorlage</p> 	<p>Naturbad Ennigerloh</p> 	<p>Naturbad Froschloch</p> 	<p>Naturbad Furth Oberhaching</p> 	<p>Naturbad Hallenberg</p> 	<p>Naturbad Herrenberg</p> 	<p>Naturbad Ivendorf</p> 
<p>Naturbad Zwen</p> 	<p>Naturerlebnisbad Glatten</p> 	<p>Naturerlebnisbad Niederalfingen (Hüttlingen)</p> 	<p>Naturfreibad Riehen</p> 	<p>NSP Borden Park</p> 	<p>Rainwater management Courtyard Strausovej</p> 	<p>Sue Preusser/ Ben Freedman</p> 	<p>test</p> 
<p>Testobjekt Ravenworks</p> 	<p>Tibean Steinsee</p> 	<p>Wasserpark Wennigen</p> 	<p>WellnessÜne 6</p> 				



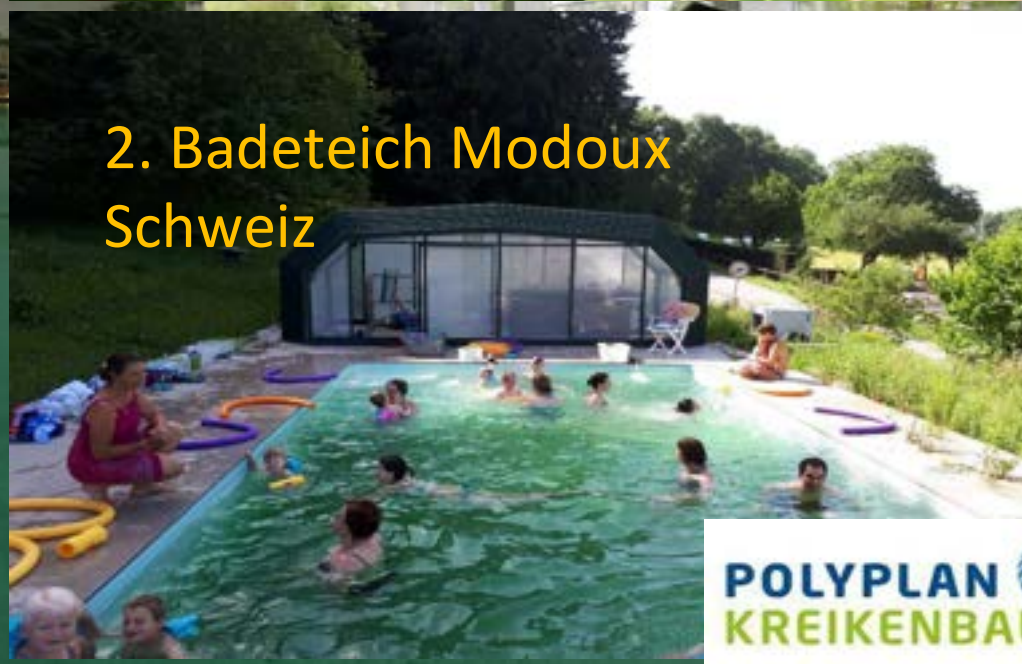
### 3 public Indoor NSP's



3. Hövelhof  
Deutschland



1. Wellnessdüne 6  
Deutschland



2. Badeteich Modoux  
Schweiz

# 1. Wellnessdüne 6


8.2.0 ▲ NEURZIEL 19.10.20

Wellnessdüne 6

Verlauf | Anordnung | Elemente | Dokumente | Mikrogruppen | Adressen etc.

Normgeber: FUG

Achtung: Karte ist nur Platzhalter für ggf. interaktive Standortkarte!



Wasserfall (Stromart) | 4220°C (gms mE)

4220°C (gms mE)

Eschenholz rot (KBE (MPN) / 500mE)

Messverfahren: SO 9308-3

[Hier info zu Messverfahren](#)

Pseudotsuga europaea (KBE (MPN) / 100mE)

Messverfahren: SO 12790

[Hier info zu Messverfahren](#)

Ulme, Entenackler (KBE (MPN) / 100mE)

Messverfahren: SO 7895-2

[Hier info zu Messverfahren](#)

LAN  
NBAUM



# 1. Wellnessdüne 6



## 1. Wellnessdüne 6

Construction: 2005  
Capacity 89 bather a day  
Basin: 240 m<sup>3</sup> 200 m<sup>2</sup>  
Water treatment: 30 m<sup>2</sup>  
Retention time > 8 h





# 1. Wellnessdüne 6



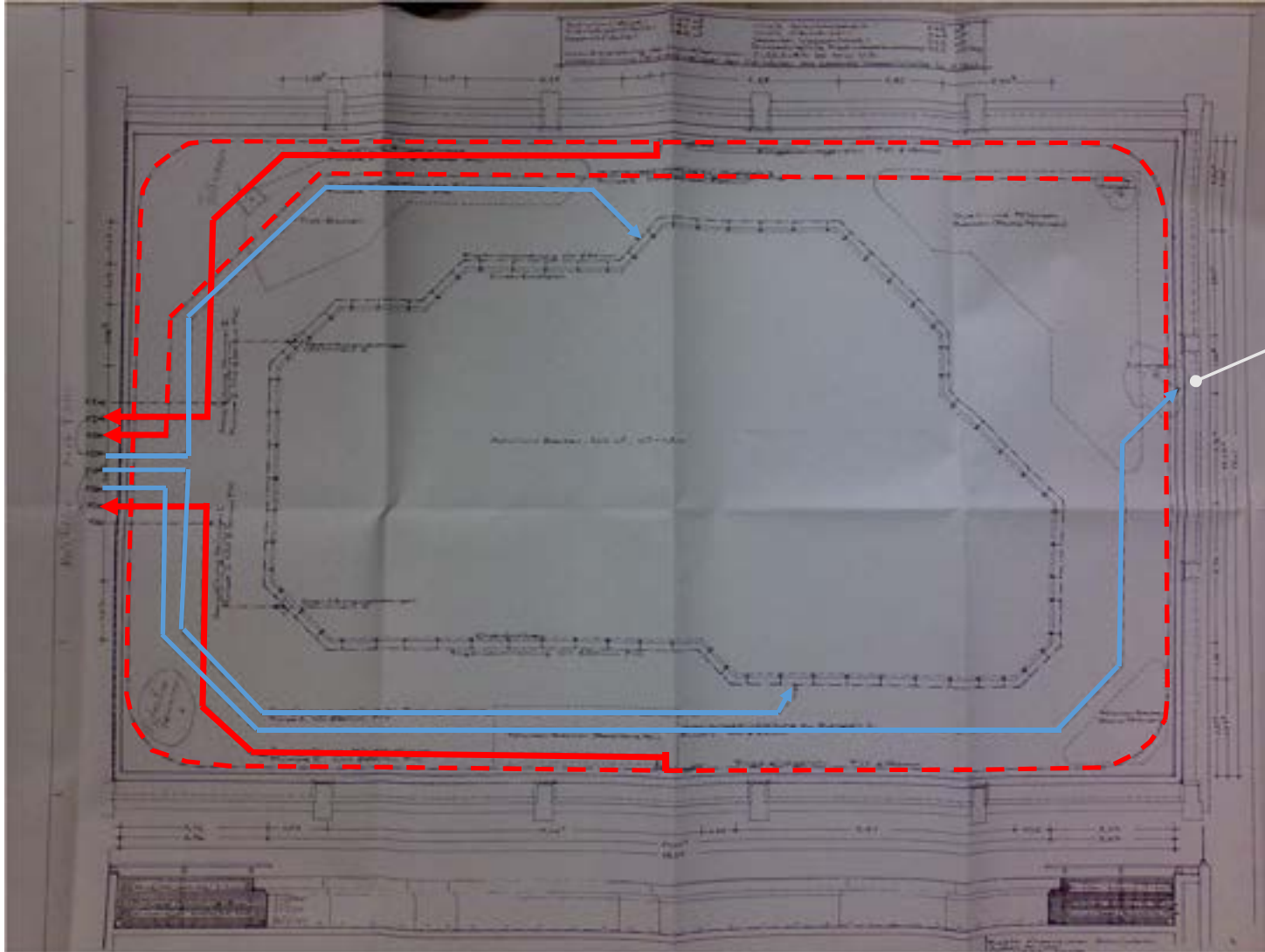
Daten	Schwimmteich Wellnesscamp-Düne 6	
<b>Bodenfilter</b>		
Fläche	0,00	m <sup>2</sup>
Filterhöhe	1,20	m
Volumen	0,00	m <sup>3</sup>
Beschickungshöhe (standard)	3,00	
Beschickungshöhe (max)	3,00	
Reinigungsleistung (standard)	0,00	m <sup>3</sup> /Tag
<b>Reinigungsleistung (max)</b>	0,00	m <sup>3</sup> /Tag
<b>Berechnungsvolumen</b>	0,00	m <sup>3</sup> /Tag
<b>Nassfilter</b>		
Fläche	174,00	m <sup>2</sup>
Filterhöhe	1,20	m
Volumen	208,80	m <sup>3</sup>
Beschickungshöhe (standard)	2,00	m <sup>3</sup> /Tag
Beschickungshöhe (max)	3,30	m <sup>3</sup> /Tag
Reinigungsleistung (standard)	348,00	m <sup>3</sup> /Tag
<b>Reinigungsleistung (max)</b>	574,20	m <sup>3</sup> /Tag
<b>Berechnungsvolumen</b>	574,20	m <sup>3</sup> /Tag
<b>Füllwasser</b>		
Volumen (max)	50,00	m <sup>3</sup> /Tag
<b>Beckenvolumen</b>		
Fläche	204,00	m <sup>2</sup>
Volumen	265,20	m <sup>3</sup>
<b>Gesamtbilanz</b>		
Berechnungsvolumen	889,40	m <sup>3</sup> /Tag
Reinigungsvolumen (max)	574,20	m <sup>3</sup> /Tag
Nennbesucherzahl	<b>89</b>	Personen



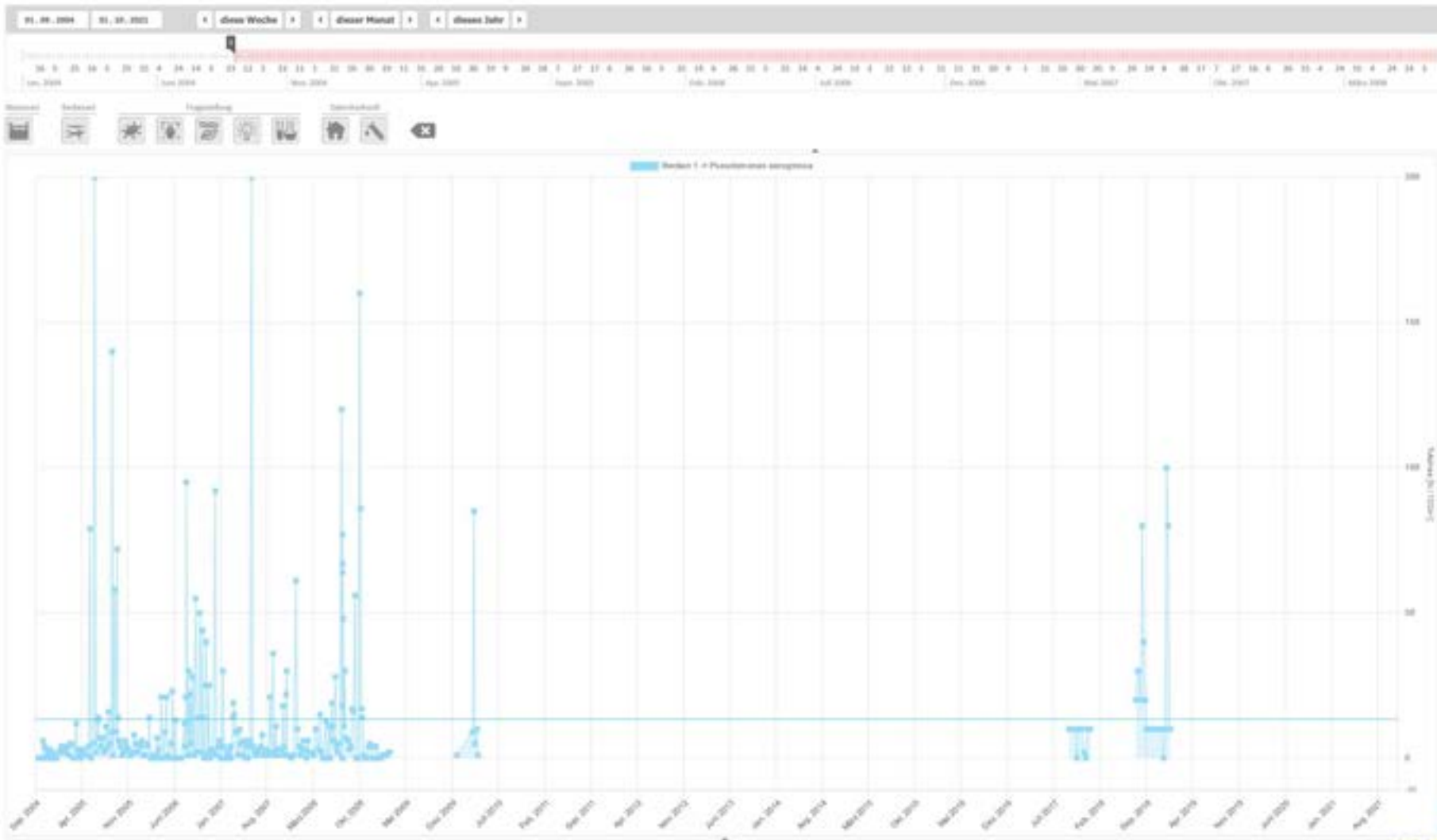
# 1. Wellnessdüne 6



# 1. Wellnessdüne 6, Flow diagram

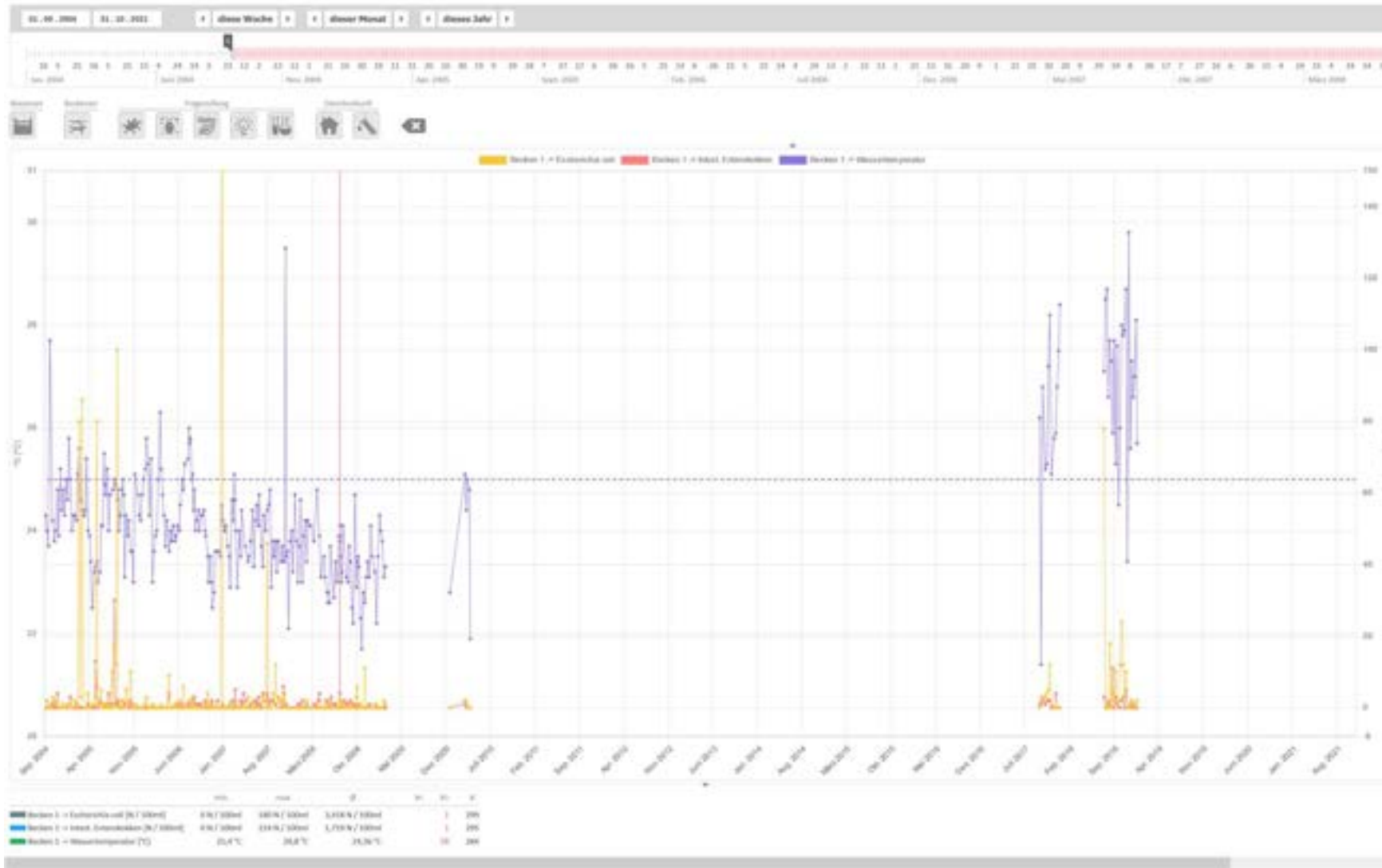


# 1. Wellnessdüne 6, P.a.





# 1. Wellnessdüne 6, E.coly, Enterococci and Water Temperature



## 2. Badeteich Modoux



Construction: 2018

Capacity ??? bather a day

Area: 60,1 m<sup>2</sup>; Volume: 25 m<sup>3</sup>

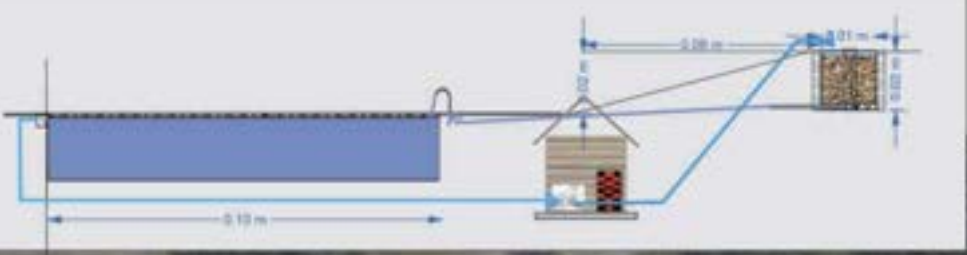
Retention time: >3h

Water treatment: 11,52 m<sup>2</sup>



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# 2. Badeteich Modoux, flow diagram



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 Mest: CHE-226.577.816

Envie Nature Mme. Catherine Modoux Rte de Gillarens 19 1673 Fromasens

Baignade Naturelle Schéma pour le filtre

Bolligen, 22 August 2018 val = 1:100





## 2. Badeteich Modoux, Hygienic report

Prüfbericht ULS19-004604-1  
Lyss, den 02.07.2019

### Übersicht

Probe Nr.	19-104397-01
Eingangsdatum	27.06.2019
Bezeichnung	Modoux (Badeteich)
Probenart	Badewasser
Probenahme	27.06.2019
Entnahmezeit	10:00
Eingangszeit	14:50
Probenahme durch	Graf Gartenbau + Schwimmteich GmbH
Entnahmetemperatur	28,0 °C
Eingangstemperatur	31,7 °C
Untersuchungsbeginn	27.06.2019
Untersuchungsende	02.07.2019

### Mikrobiologische Untersuchung

Enterokokken	KBE/100 ml	13	50 (HW)
Escherichia coli	KBE/100 ml	40	100 (HW)
Pseudomonas aeruginosa	KBE/100 ml	nn	10 (HW)

### Bewertung (Mikrobiologie):

Die gemessenen Werte erfüllen die gesetzlichen Vorgaben



# Datenherkunft DANA 1.0 und DANA 2.0



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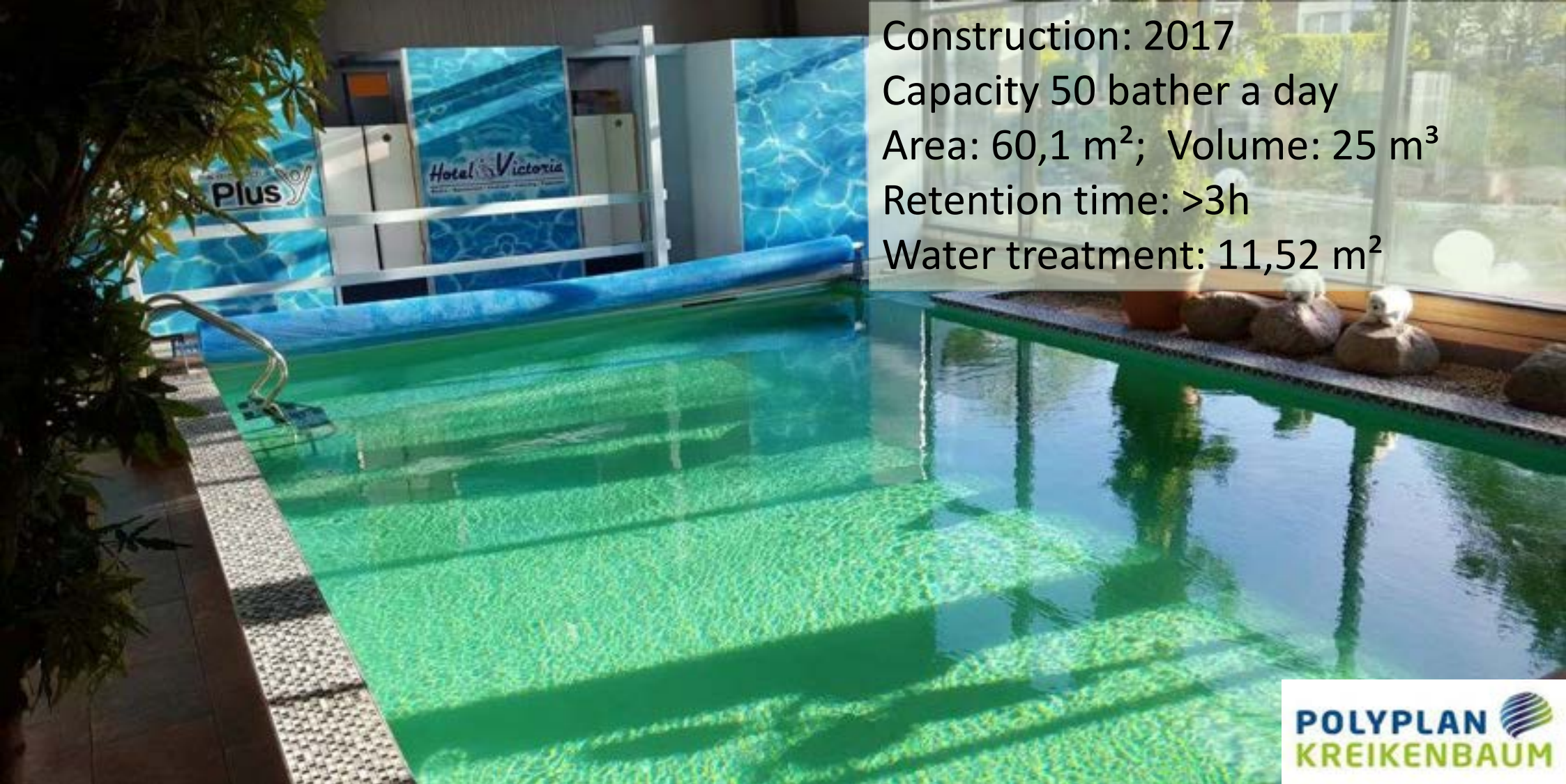
Envie Nature Mme. Catherine Modoux Rte de Gillarens 19 1673 Fromasens

Baignade Naturelle Schéma pour le filtre

Bolligen, 22 August 2018 val = 1:100



### 3. Hövelhof



Construction: 2017

Capacity 50 bather a day

Area: 60,1 m<sup>2</sup>; Volume: 25 m<sup>3</sup>

Retention time: >3h

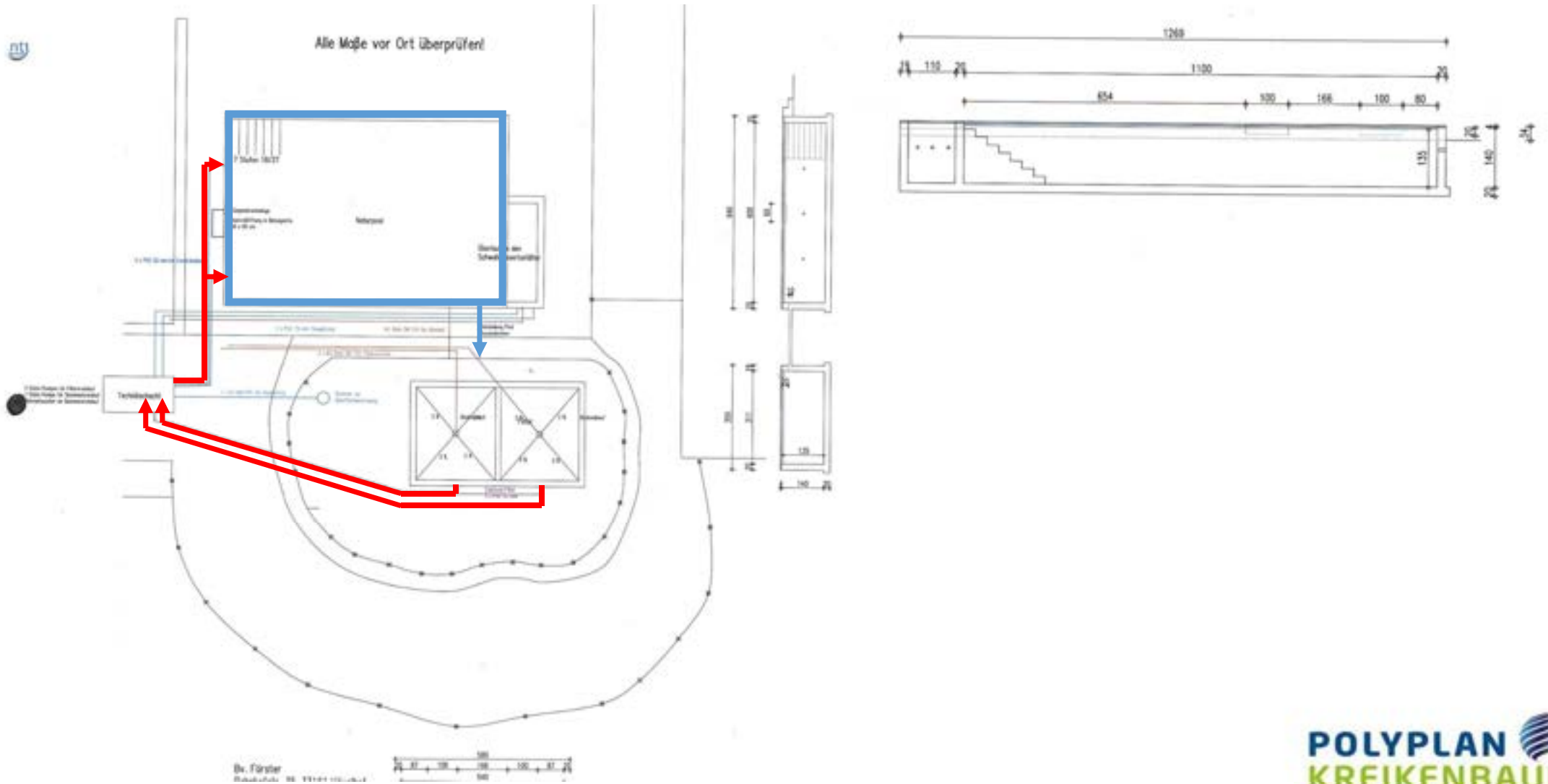
Water treatment: 11,52 m<sup>2</sup>



### 3. Hövelhof

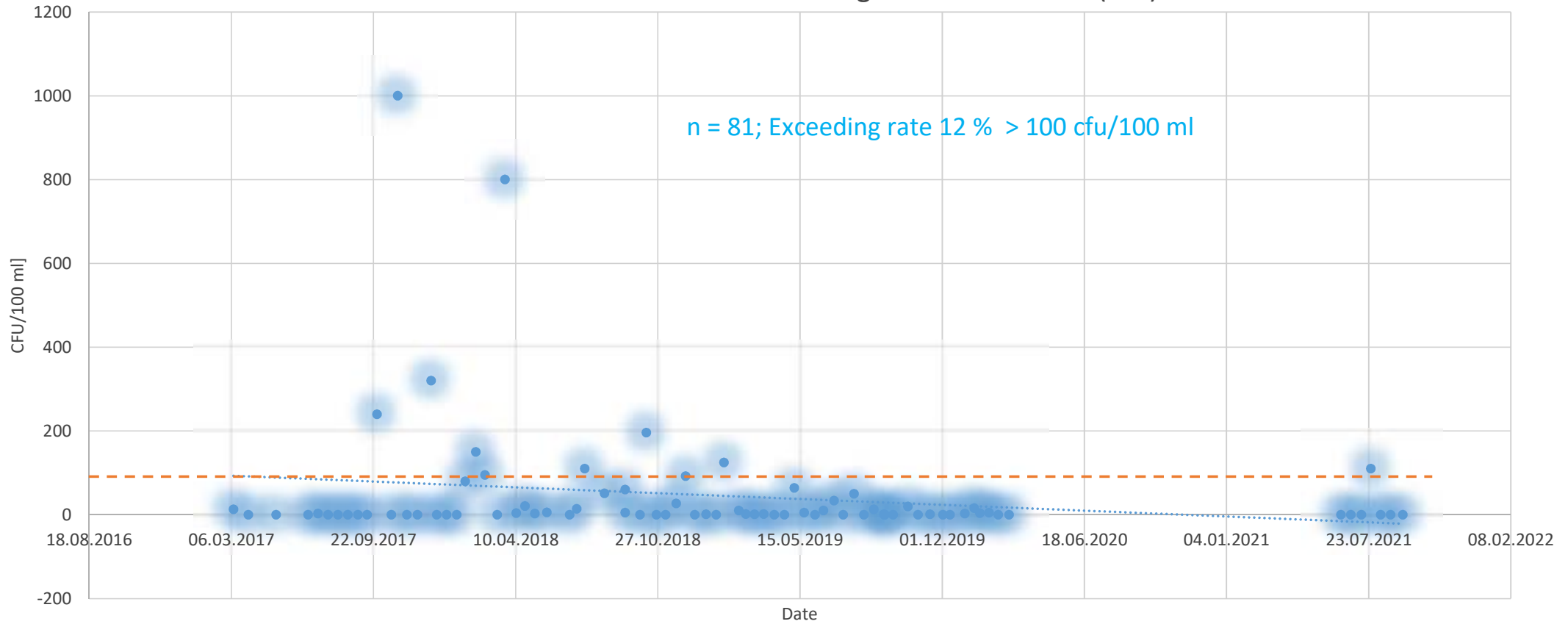


# 3. Hövelhof, Flow diagram



### 3. Hövelhof, Hygienic report 2016..2021

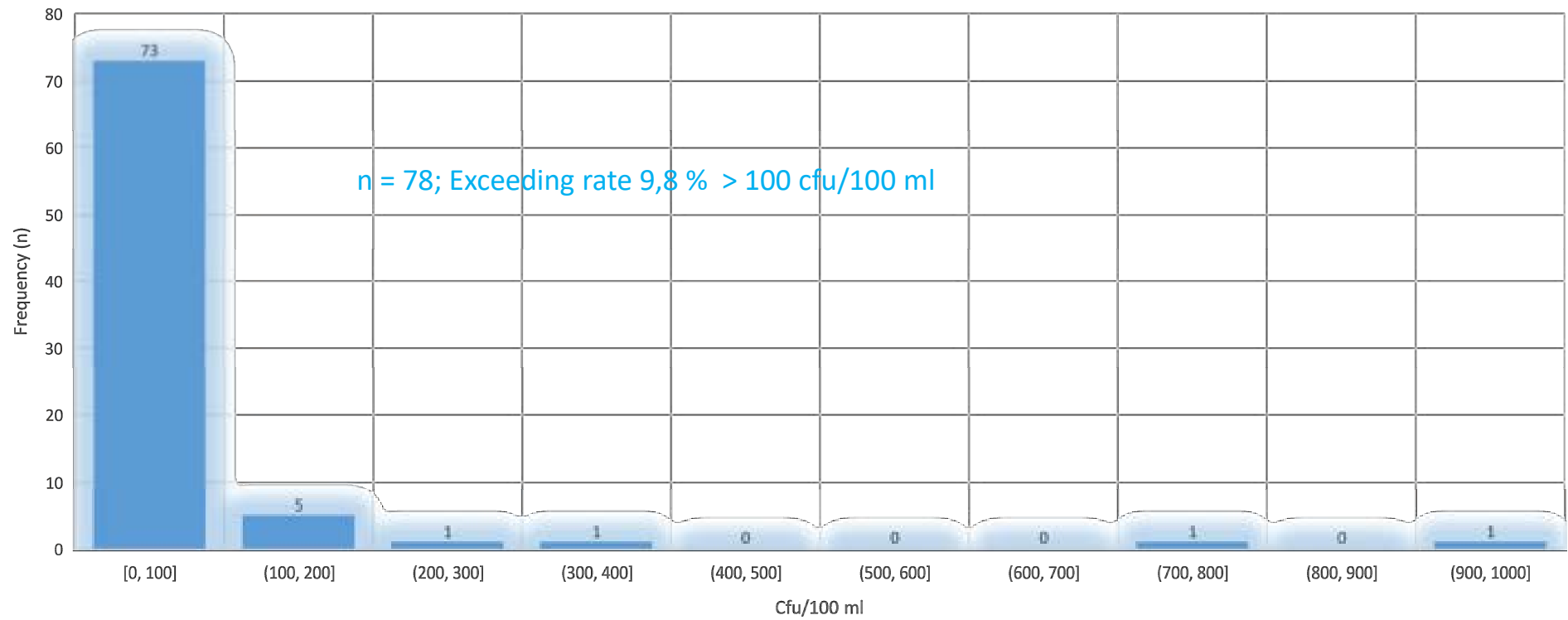
Pseudomonas aeruginosa basin water (P.a.)





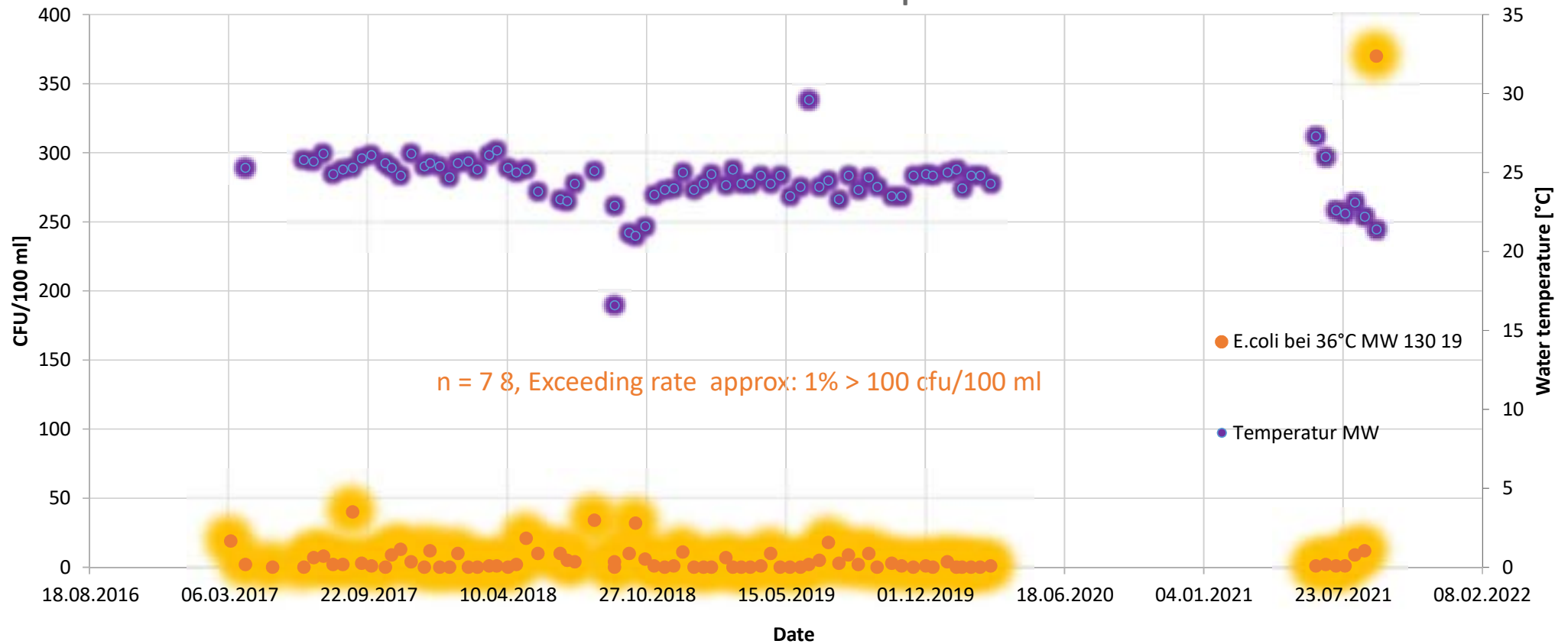
### 3. Hövelhof, Pseudomonas aeruginosa (P.a)

Pseudomonas aeruginosa MW



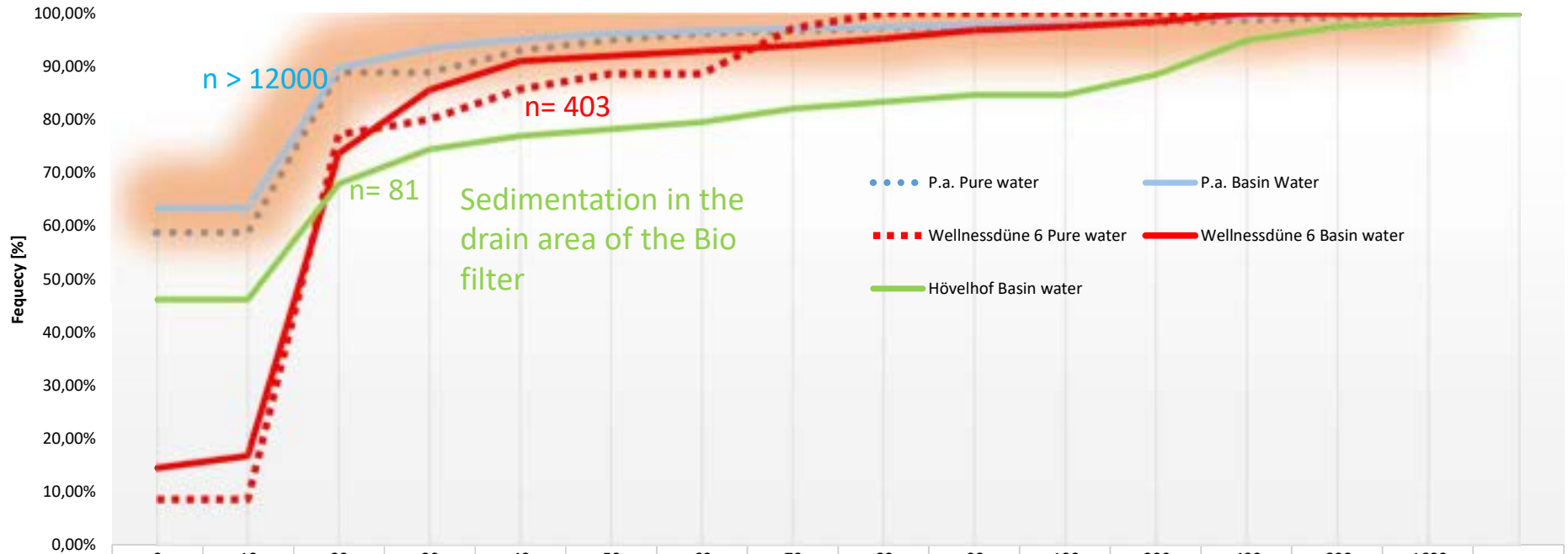
### 3. Hövelhof, E.coli and Water temperature

E.coli and Water temperature in basin water



# P.a. frequency NSP Outdoor NSP Indoor

P.a. Frequencies Basin water and Pure water 2004.. 2021



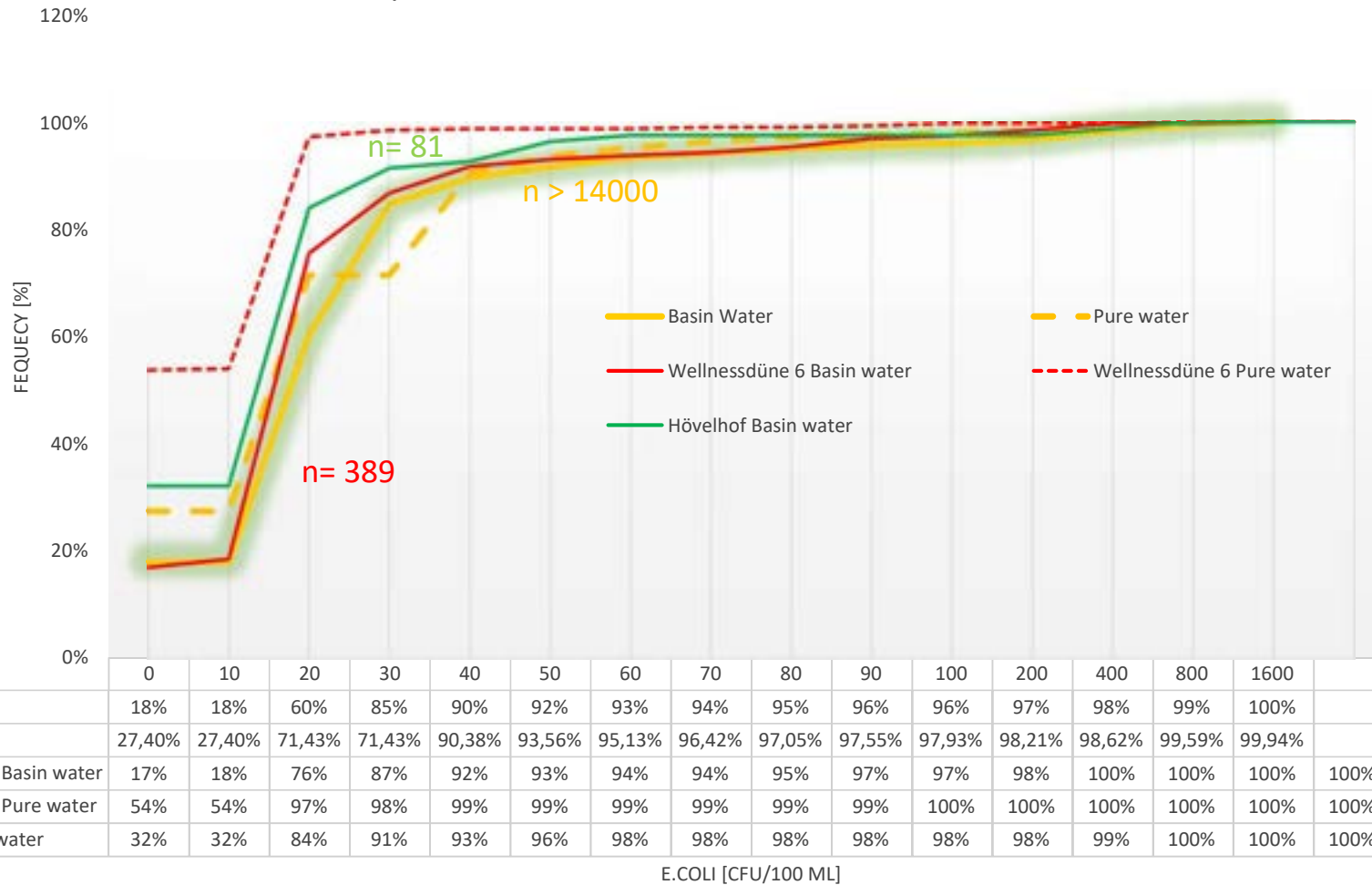
	0	10	20	30	40	50	60	70	80	90	100	200	400	800	1600
●●● P.a. Pure water	58,76%	58,76%	88,85%	88,85%	92,97%	94,95%	96,15%	96,66%	97,16%	97,40%	97,90%	98,13%	98,64%	99,26%	99,73%
— P.a. Basin Water	63%	63%	90%	93%	95%	96%	97%	97%	97%	98%	98%	98%	100%	100%	100%
■ Wellnessdüne 6 Pure water	9%	9%	77%	80%	86%	89%	89%	97%	100%	100%	100%	100%	100%	100%	100%
— Wellnessdüne 6 Basin water	14%	17%	74%	86%	91%	92%	93%	94%	95%	97%	97%	98%	100%	100%	100%
— Hövelhof Basin water	46%	46%	68%	74%	77%	78%	79%	82%	83%	85%	85%	88%	95%	97%	99%

Pseudomonas aeruginosa CfU/100 ml]



# E. Coly frequency NSP Outdoor and NSP Indoor

E.coli Frequencies Basin water and Pure water



# Actual projects



## Actual projects





## Conclusions (Hygiene)

- 1. The constant documentation about the Hygienic situation in NSP is important for all actors. (Badeteich Modoux)**
- 2. The ratio of typical mistakes is not less than in outdoor NSPs (Hövelhof, Wellnessdüne 6)**
- 3. Exceeding rates regarding (P.a. > 10 cfu/100 ml) are higher than the average in the outdoor NSPs 2005... 2021**
- 4. the frequency of E. coli is really similar to the outdoor NSPs**
- 5. Temperatures up to 29 °C did not affect the E.coli concentration**

## Conclusions (construction)

- 1. Air exchange rates can be reduced due to the missing disinfection by- product Trihalogenmethane (THM)**
- 2. Heat exchanger work without Corrosion**
- 3. Longer Lifetimes for tanks, Concrete, Roof elements, etc.**
- 4. Lower investment costs**
- 5. Less energy consumption for pumps and air conditioning**
- 6. No Biofilm because of the missing light spectrum**
- 7. limited temperatures, max. up to 26..28 °C water temperature and 28..30 °C Air temperature**

## Next steps

