



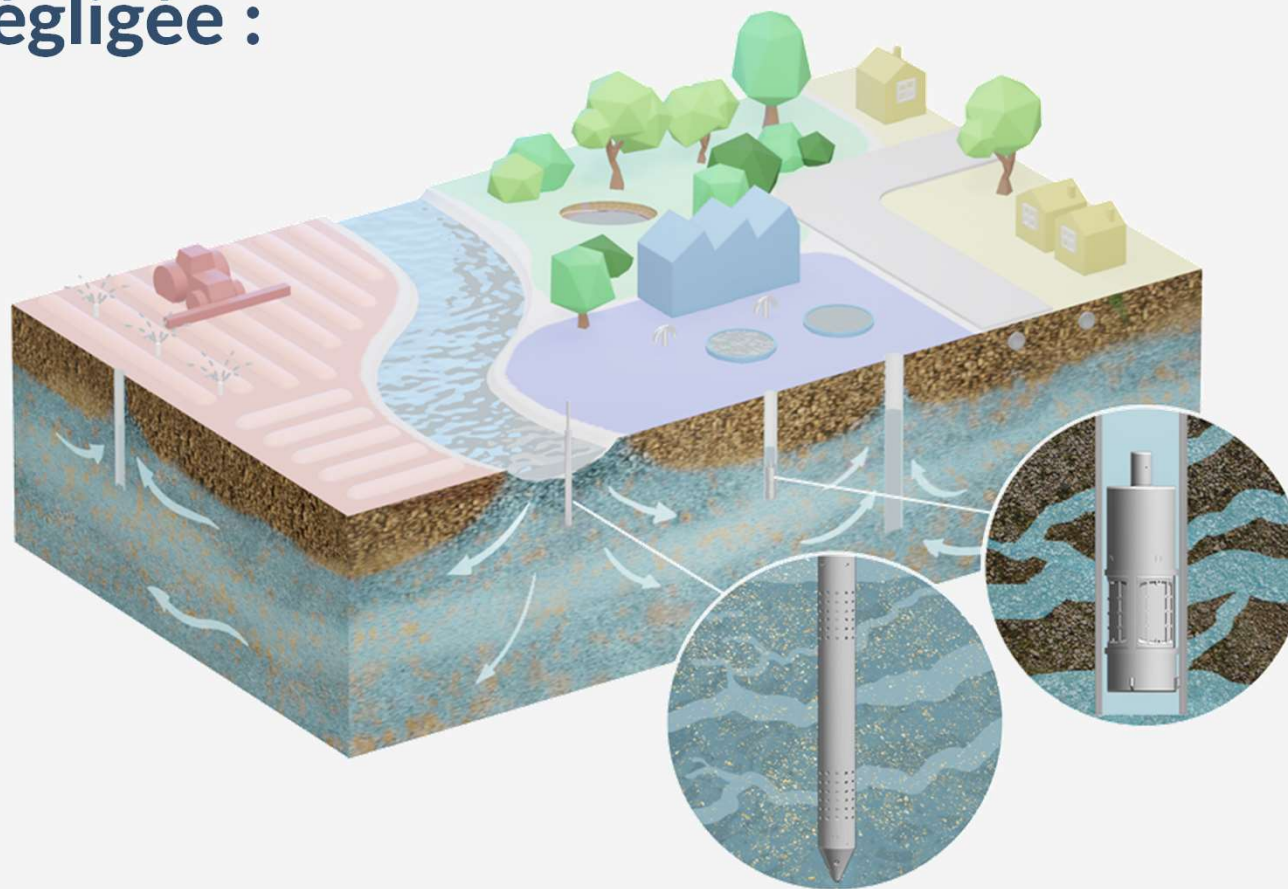
iFLUX

Groundwater on the move!

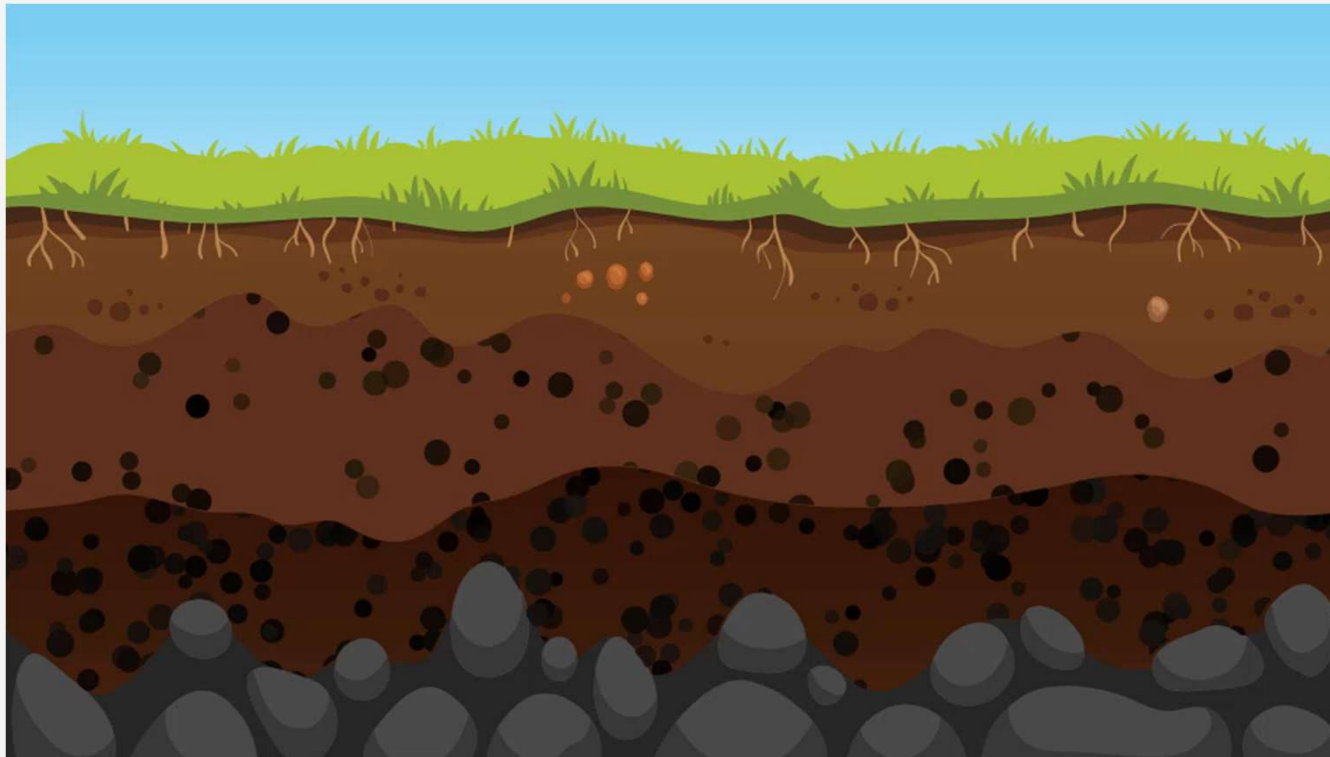
Mesure des flux pour comprendre la distribution des contaminants et leur dissémination
dans les eaux souterraines

30 Mars 2023
Erik Bosmans

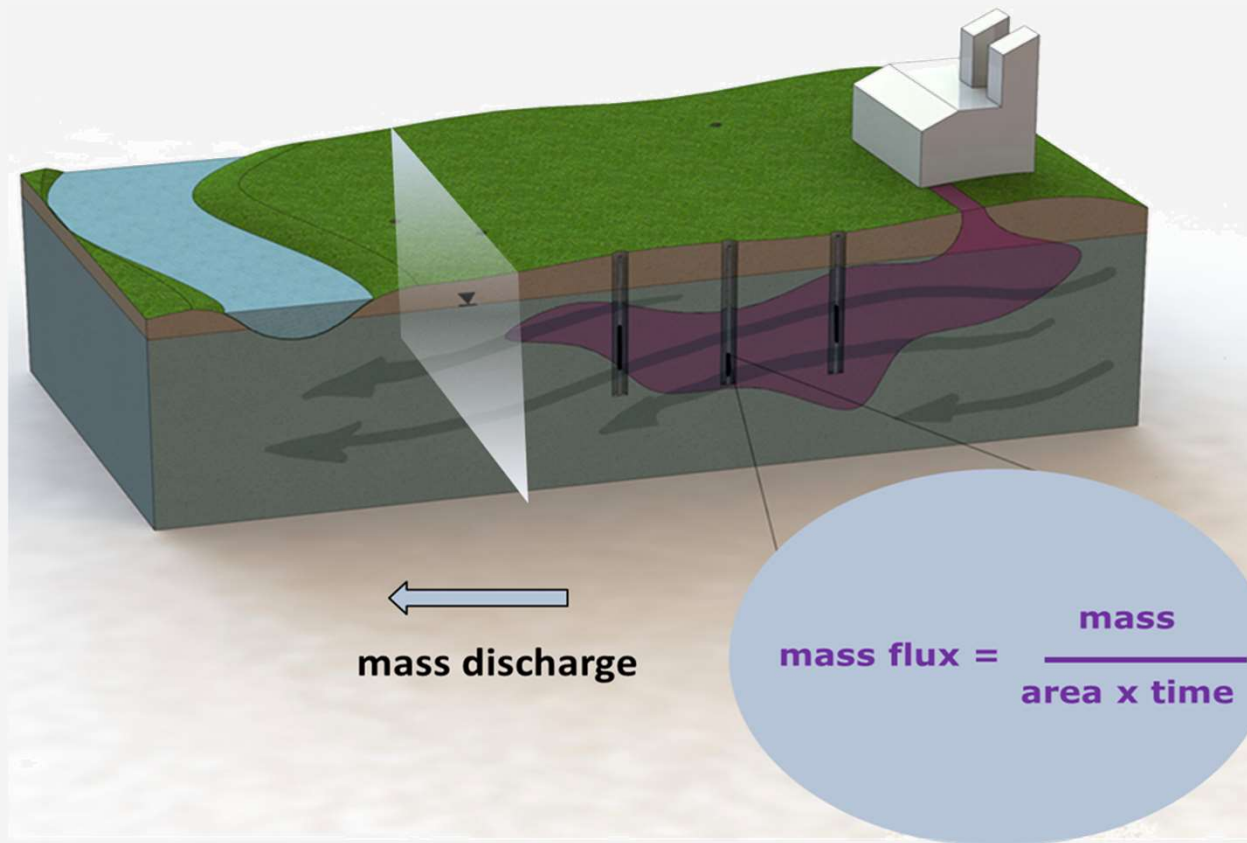
**Les systèmes aquatiques sont sous pression,
et la partie la plus importante est encore trop
souvent négligée :**



Dynamique de la pollution des sols et des eaux souterraines

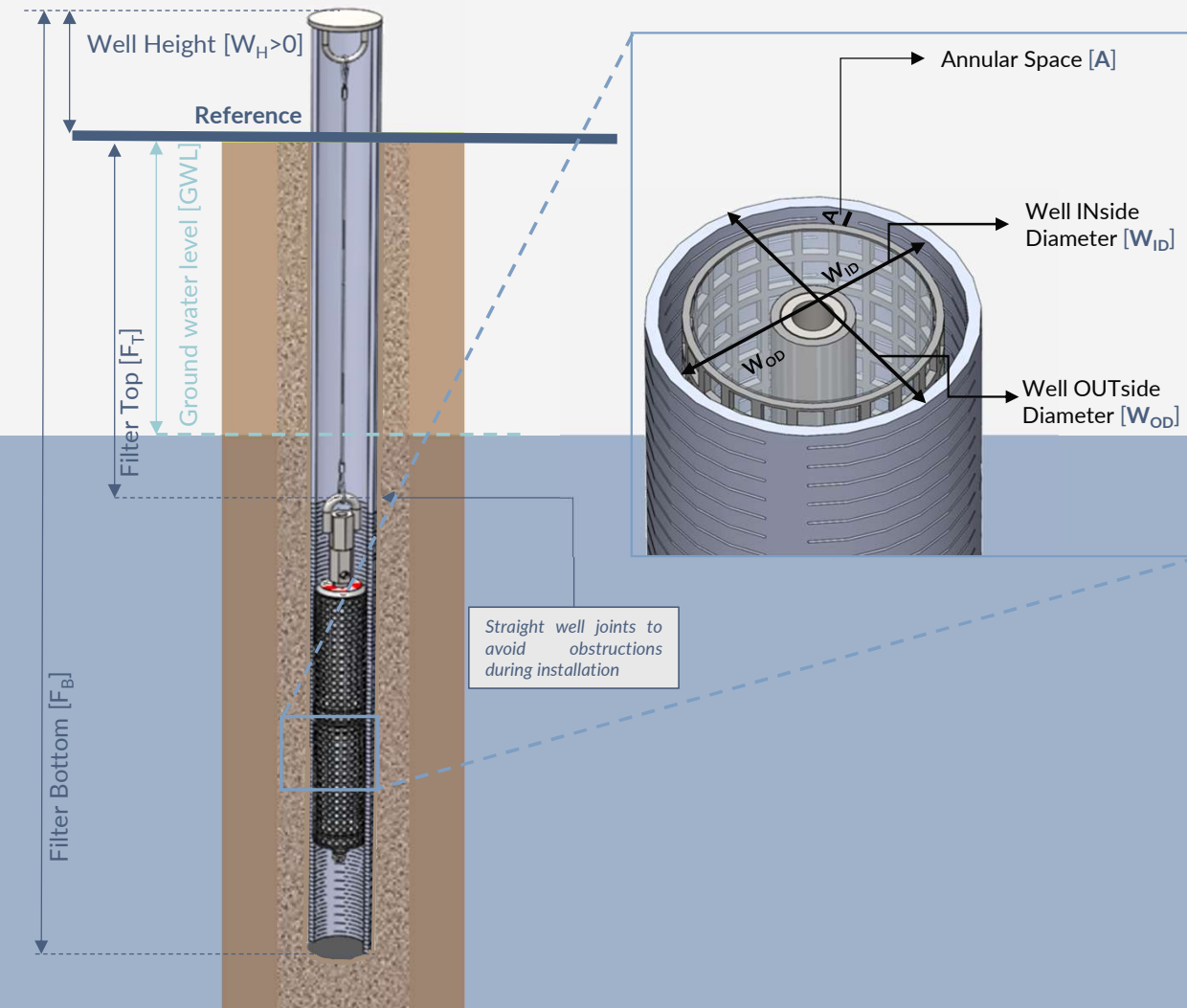


Flux : concepts



<https://www.itrcweb.org/GuidanceDocuments/MASSFLUX1.pdf>

iFLUX : facile à utiliser et fiable



Développement des puits

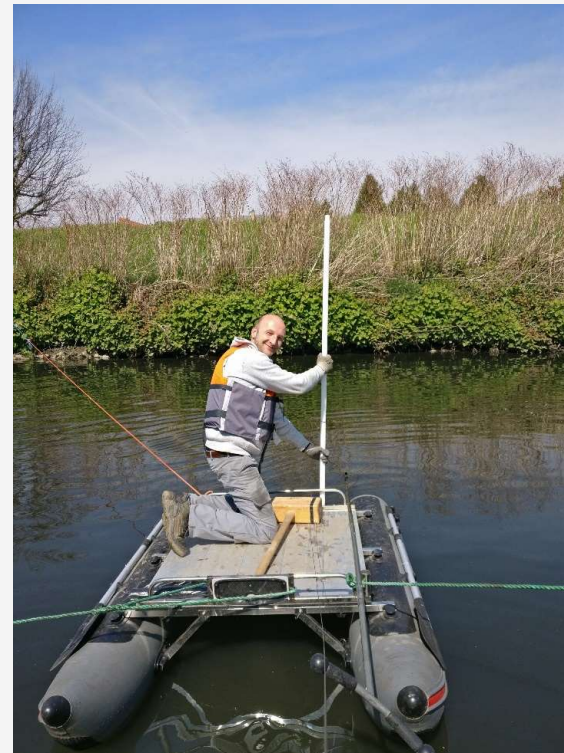
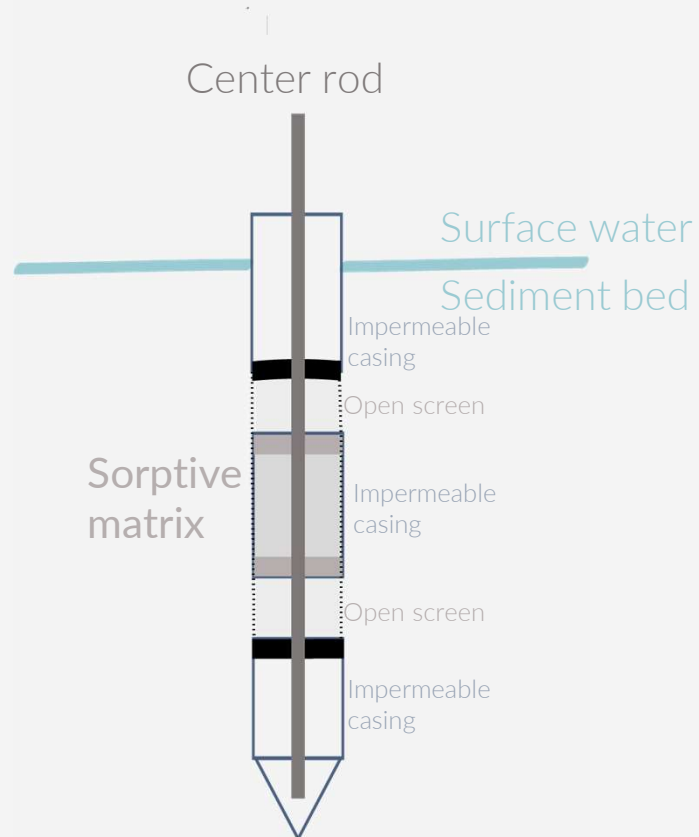


Echantillonneurs modulaires (et multi-niveaux)



Résultats optimaux → *Espace annulaire minimal*

FLUX horizontal ou verticaux (échanges eaux souterraines / eaux de surface)



Paquets d'analyses validés

WATERFLUX

Tracer alcohols

BTEX-N-S-MTBE

Benzene
Toluene
Ethylbenzene
O-Xylene
M-,p-Xylenes
Naphtalene
Styrene
MTBE

MINERAL OILS

Fraction C-10 - C-12
Fraction C-12 - C-20
Fraction C-20 - C-30
Fraction C-30 - C-40
Mineral oils (GC)

CHLORINATED SOLVENTS

Dichloromethane
1,1-Dichloroethane
1,2-Dichloroethane
Cis-1,2-dichloroethene
Trans-1,2-dichloroethene
Trichloromethane
Trichloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Tetrachloromethane
Tetrachloroethene
Vinylchloride

CHLOROBENZENES

Monochlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene

CHLOROTOLUENES

2-Chlorotoluene
4-Chlorotoluene

TRIMETHYLBENZENES

1,2,3-trimethylbenzene
1,2,4-trimethylbenzene
1,3,5-trimethylbenzene

POLYAROMATIC HYDROCARBONS

Naphtalene
Acenaphthylene
Acenaphthene
Fluorene
Fenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo(a)anthracene
Chrysene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Dibenzo(ah)anthracene
Benzo(ghi)perylene
Indeno(123cd)pyrene

POLYCHLORINATED BIPHENYLS

PCB 28
PCB 52
PCB 101
PCB 118
PCB138
PCB153
PCB180

VOLATILE ORGANIC COMPOUNDS SPECIFIC

1,1,1,2-Tetrachloroethane
1,1,2-Trichloro-1,2,2-trifluoroethane
1,1-Dichloroethene
1,1-Dichloropropane
1,1-Dichloropropene
1,2,3-Trichloropropane
1,2-Dibromoethane
1,2-Dichloropropane
1,3-Dichloropropane
2,2-Dichloropropane
2,3-Dichloropropene
2-Chloro-1,3-butadiene
2-Ethyltoluene
3-Chloro-1-propene (allylchloride)
3-Ethyltoluene
4-Ethyltoluene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromomethane
Chloroethane
cis-1,3-Dichloropropene
Cumene
Dibromochloromethane
Dibromomethane
Diisopropylether
ETBE (Ethyl tert-butyl ether)
Ethylether
Hexachlorobutadiene
Iodomethane
TAME (Tert-Amyl Methyl Ether)
trans-1,3-Dichloropropene
Tribromomethane (Bromoform)
Trichloromonofluoromethane

HEAVY METAL

Cadmium
Chromium
Copper
Lead
Nickel
Zinc

METAL SPECIFIC

Calcium
Iron
Potassium
Magnesium
Manganese
Sodium

NUTRIENT CATIONIC

Ammonium-N

HEAVY METAL SPECIFIC

Mercury
Arsenic

NUTRIENT ANIONIC

Nitrate-N
Sulfate

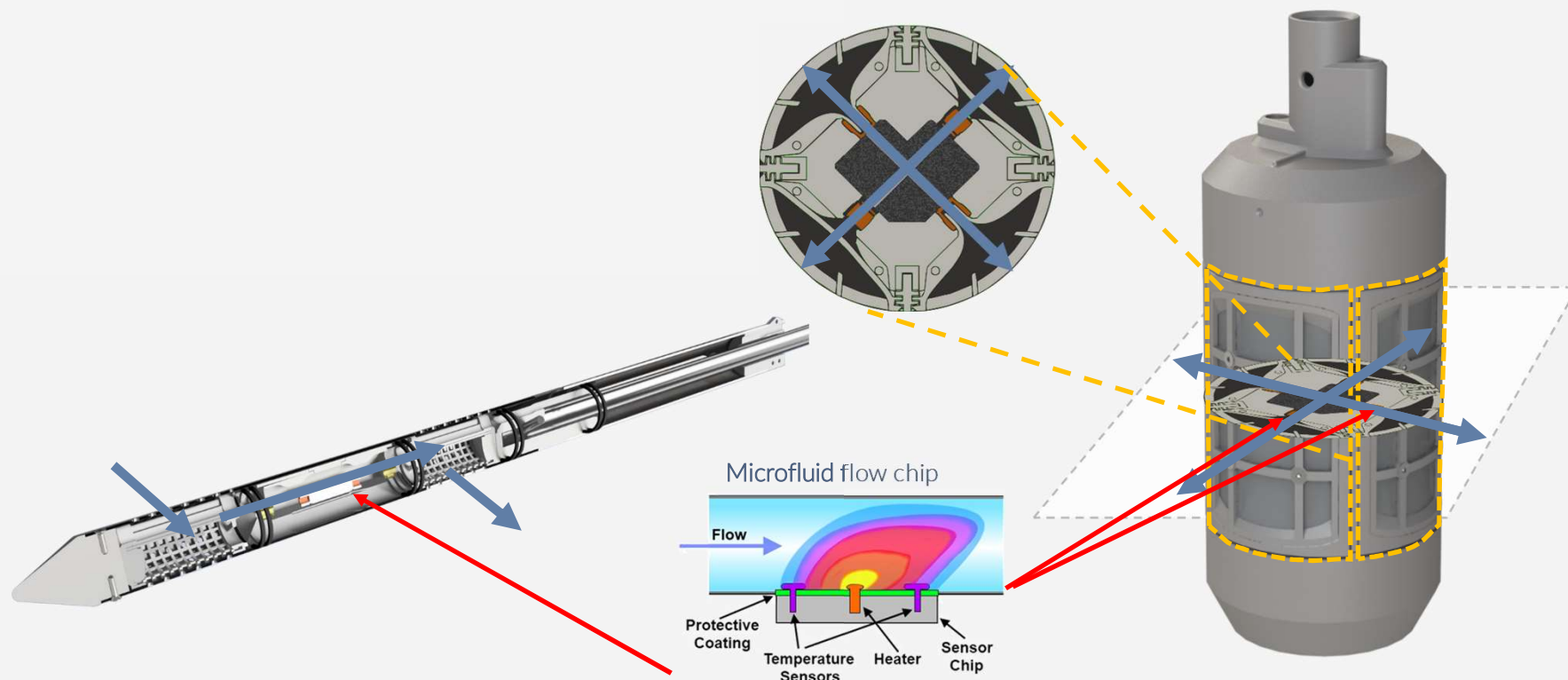
DIOXANE

1,4-Dioxane

PFAS

Perfluorohexanoic acid (PFHxA)
Perfluoroheptanoic acid (PFHpA)
Perfluorooctanoic acid (PFOA)
Perfluorononanoic acid (PFNA)
Perfluorodecanoic acid (PFDA)
Perfluoroundecanoic acid (PFUdA)
Perfluorododecanoic acid (PFDdA)
Perfluorobutanesulfonic acid (PFBS)
Perfluorohexanesulfonic acid (PFHxS)
Perfluorooctanesulfonic acid (PFOS)
Perfluorooctanesulfonamide (PFOSA)

Digital iFLUX sensor

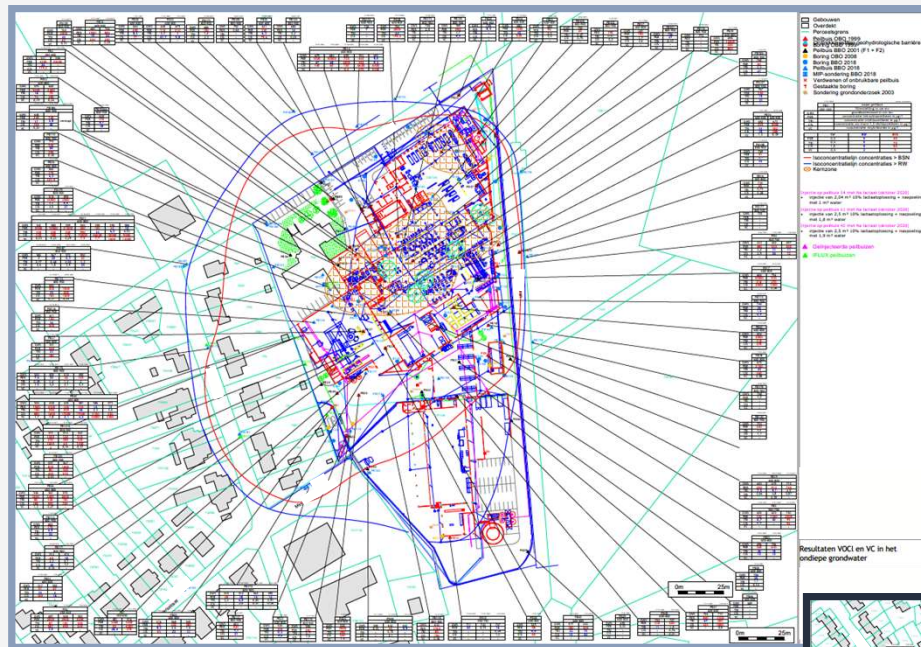


Cas 1 : Vlabotex – Blanchisserie



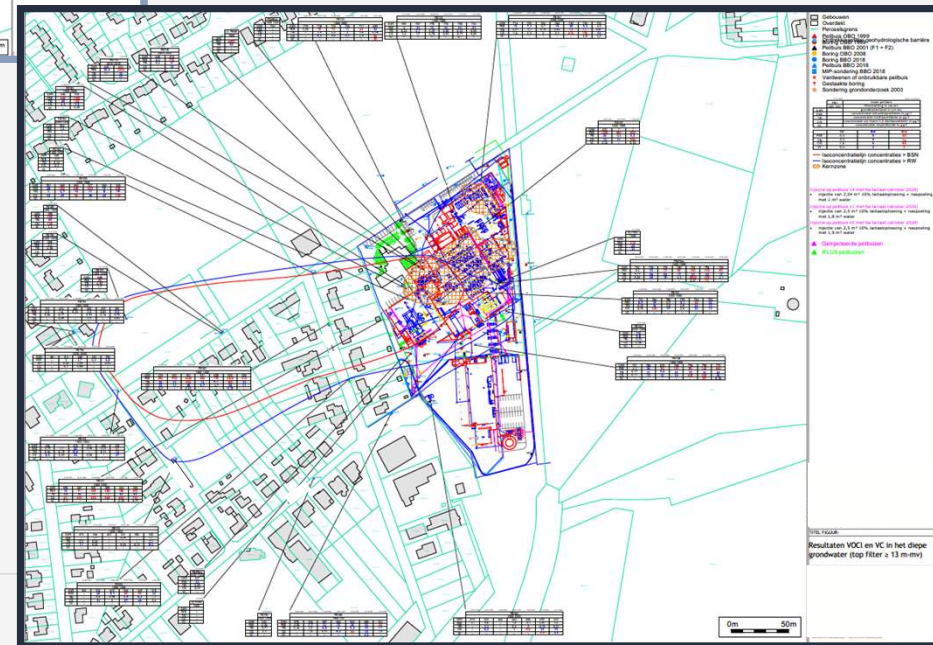
FLUCTUATION DES CONCENTRATIONS EAU SOUTERRAINE (= Hard to digest maps)

iFLUX



SHALLOW
0-13 m-ns

DEEP
13-23 m-ns



Contamination

- Source & panaches

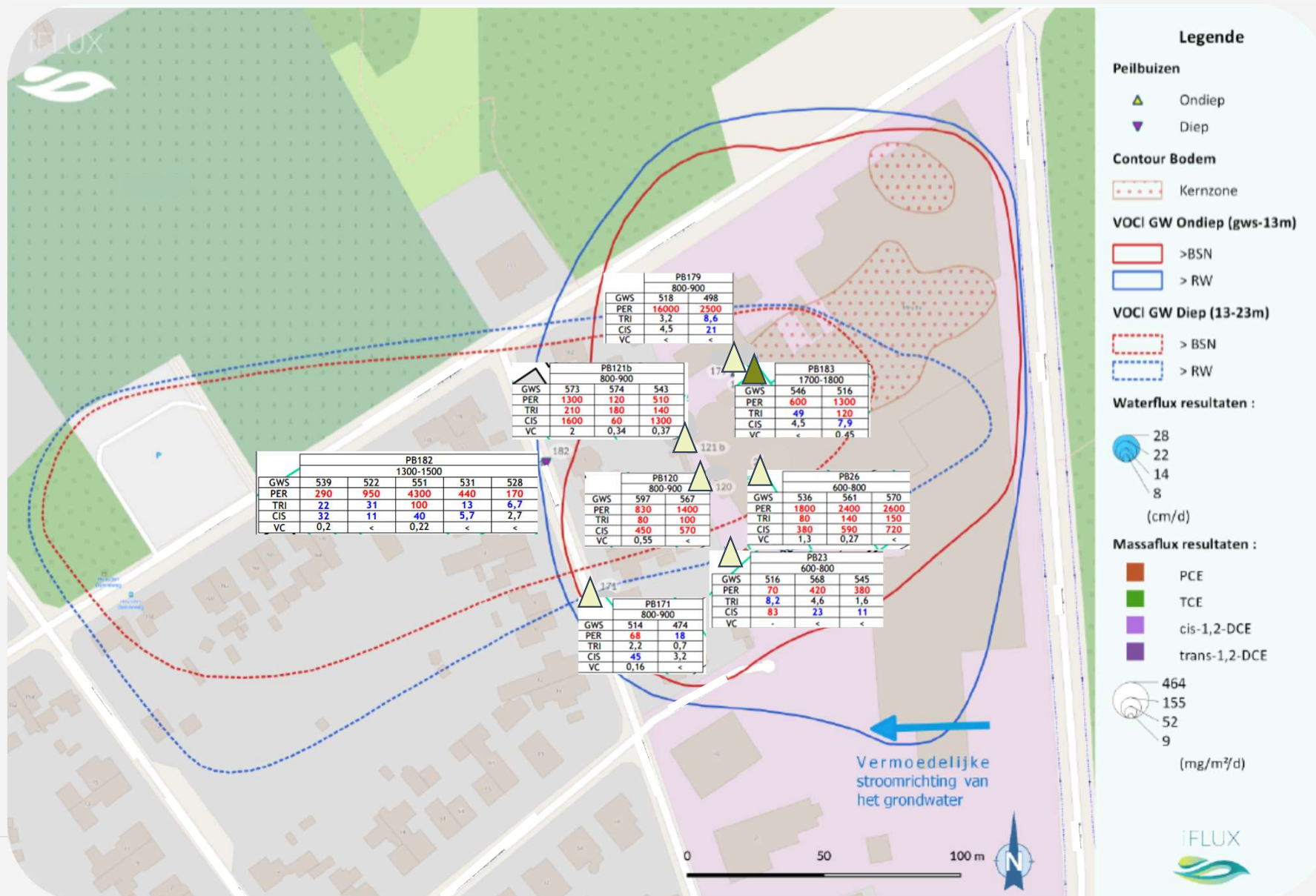
- Piézomètres disponibles

iFLUX



Echantillons : eau souterraine

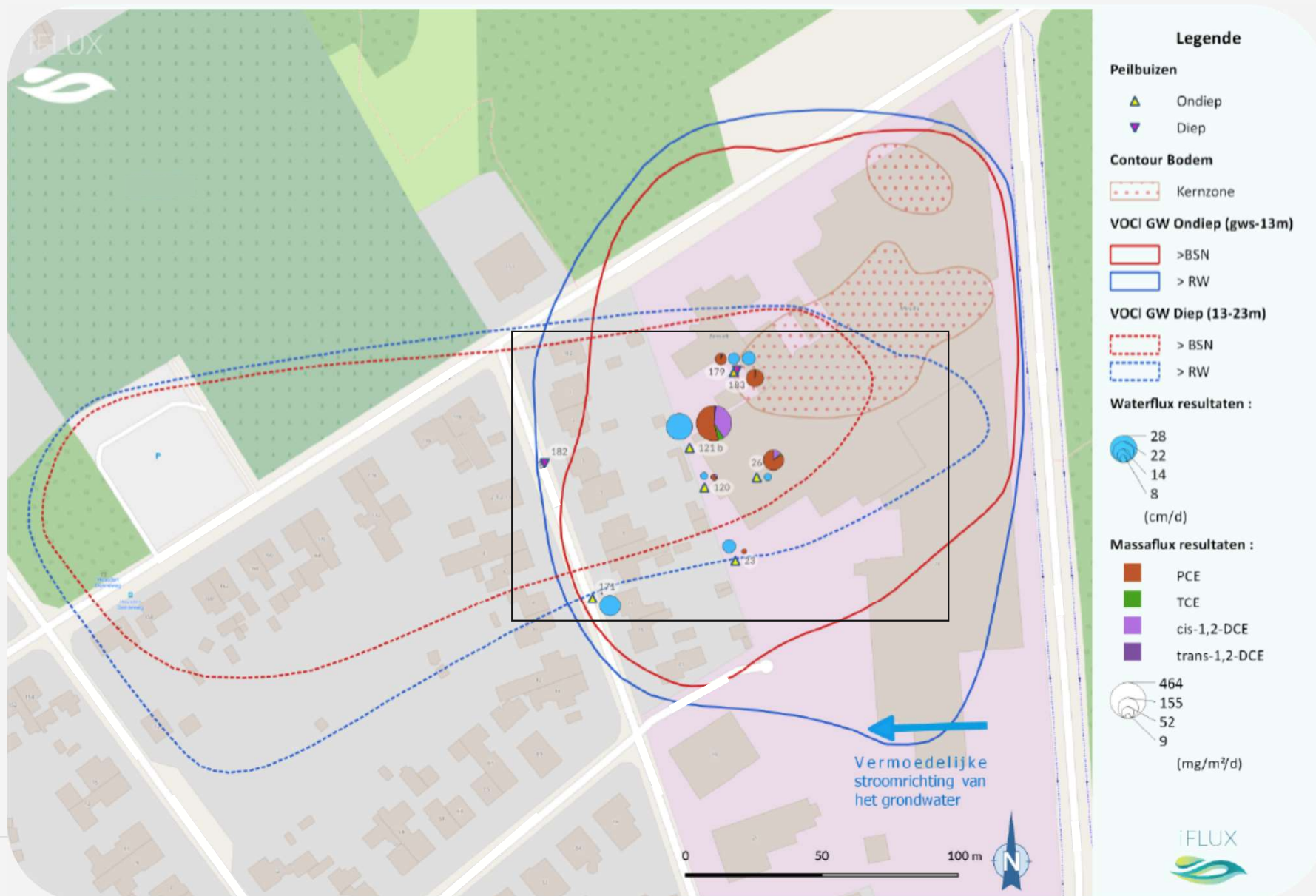
iFLUX



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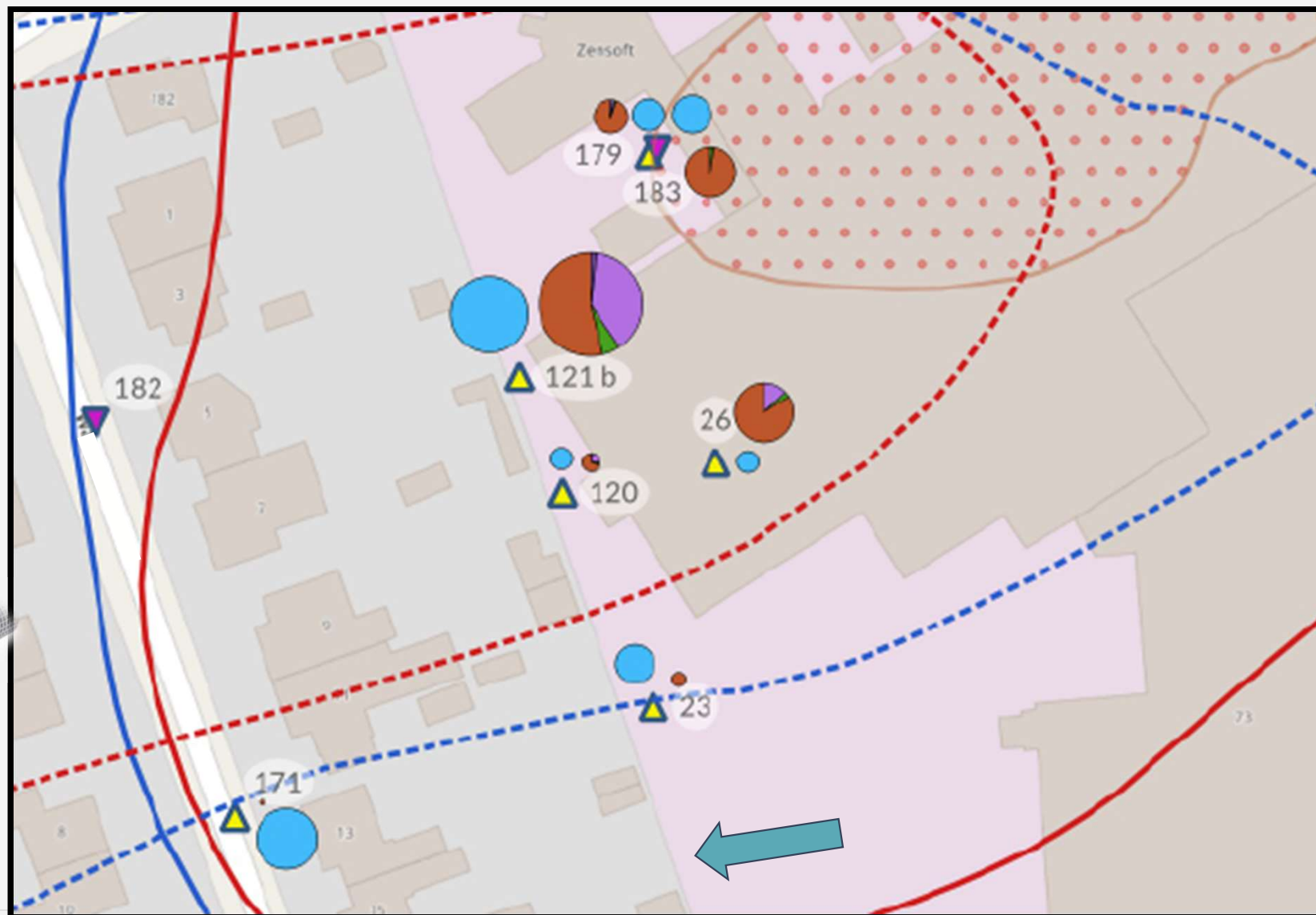
iFLUX



iFLUX



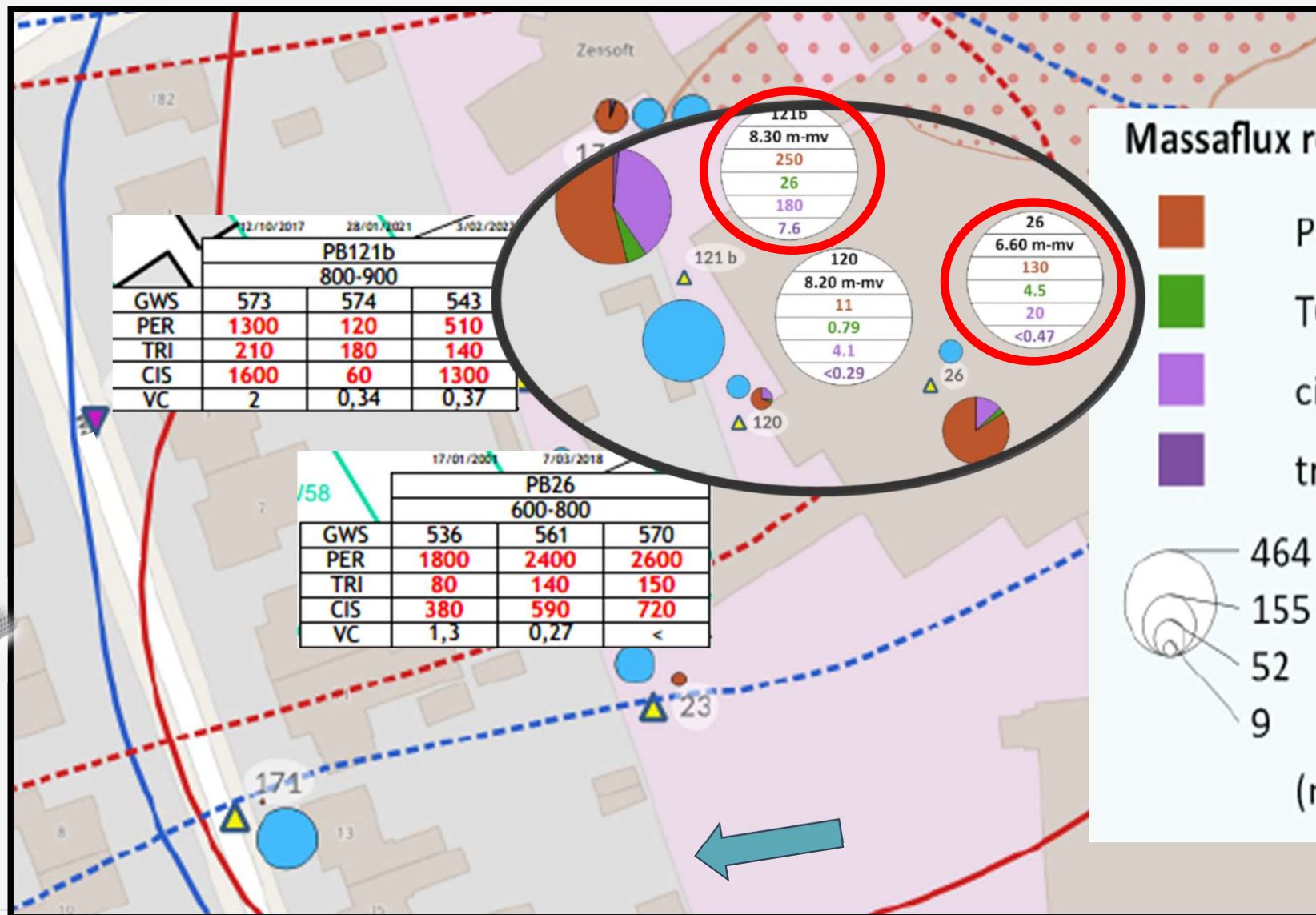
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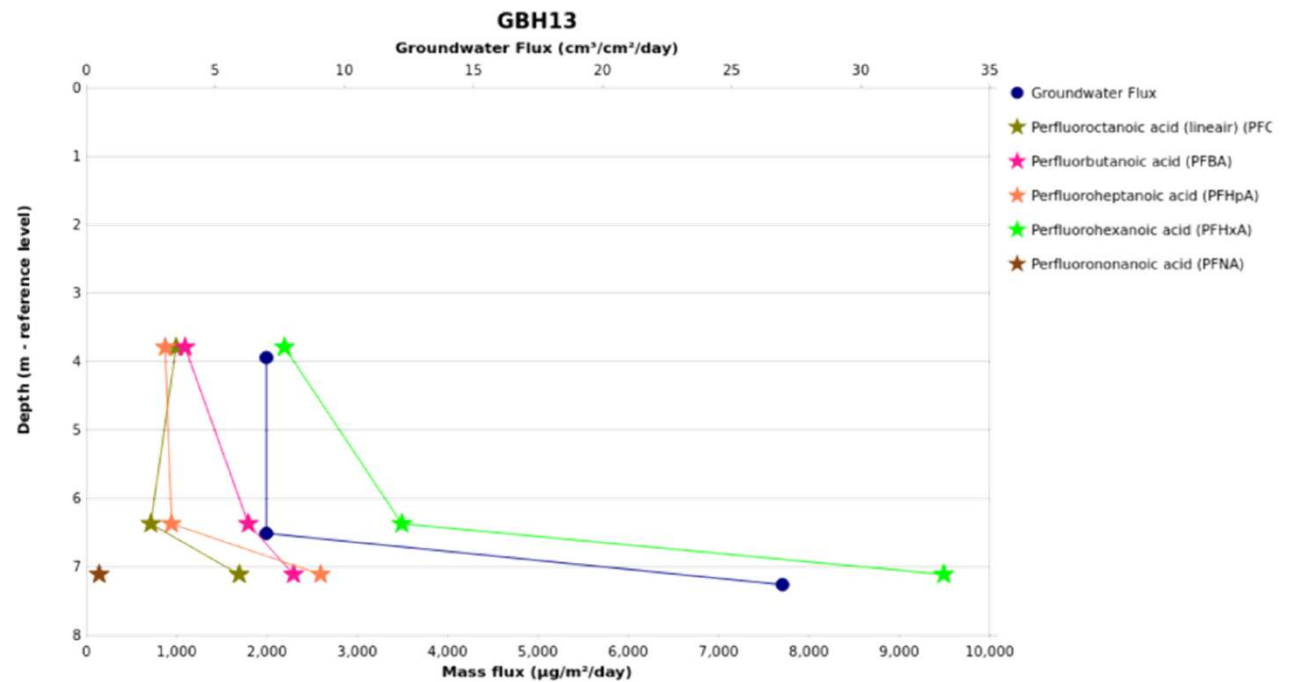
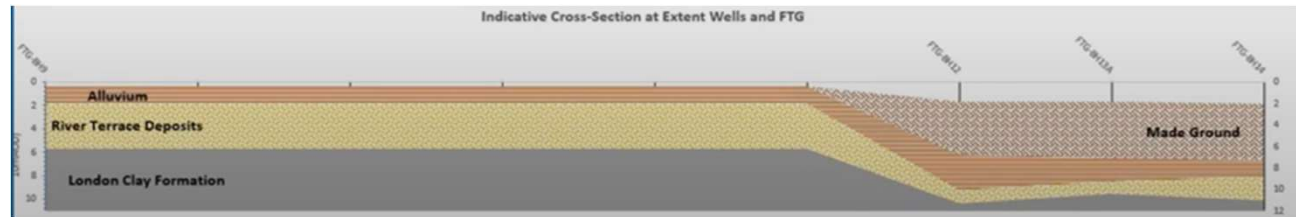
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Cas 2 Airport - PFAS



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Merci ! Questions ?



erik@ifluxsampling.com



+32 471 90 41 12

www.ifluxsampling.com