

*City park and urban backfill :*

*a potential environmental  
management with  
phytoremediation ?*






*Avril 2017*



# Presentation



## Renaud CHAPUIS / TERE0

- Remediation firm 
- Experts in phytoremediation 
- Research scientists 
- Engineering office
  - Contaminated soils investigations 
  - Supervision of remediation projects 

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# Goal of this communication



Check faisability of phytoremediation  
on city park



Underline the constraints to be  
observed by this technology

# General context of the park



A city park....

...enclosed in a dense urban area with :



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# Uses of the park

## SPACE ORGANISATION

Meadow

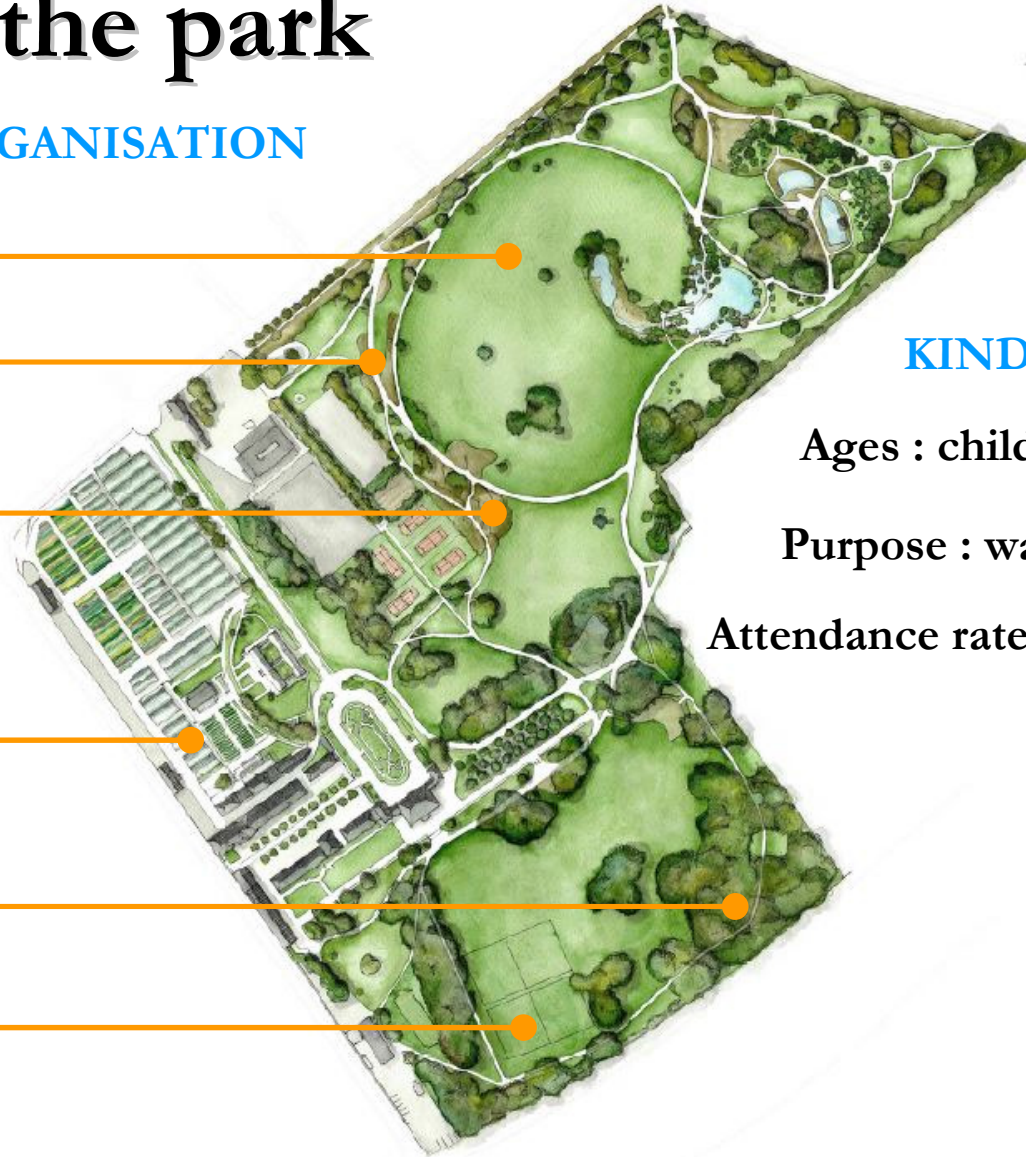
Pathways

Playground

Greenhouse

Underbrush

Sport courts



## KIND OF PUBLIC

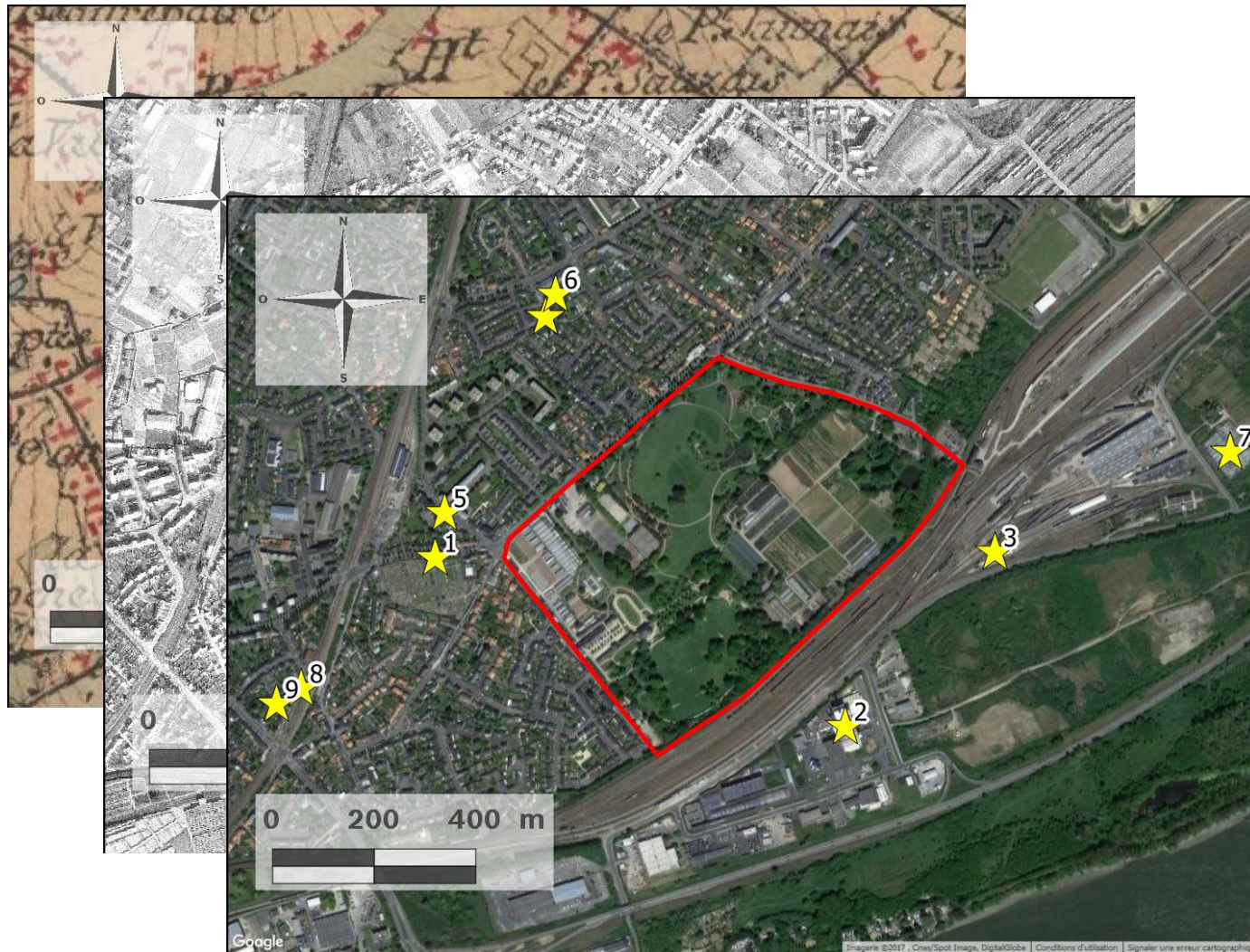
Ages : child/adult/gardener

Purpose : walk/sport/nap/path

Attendance rate : rare/sometime/often



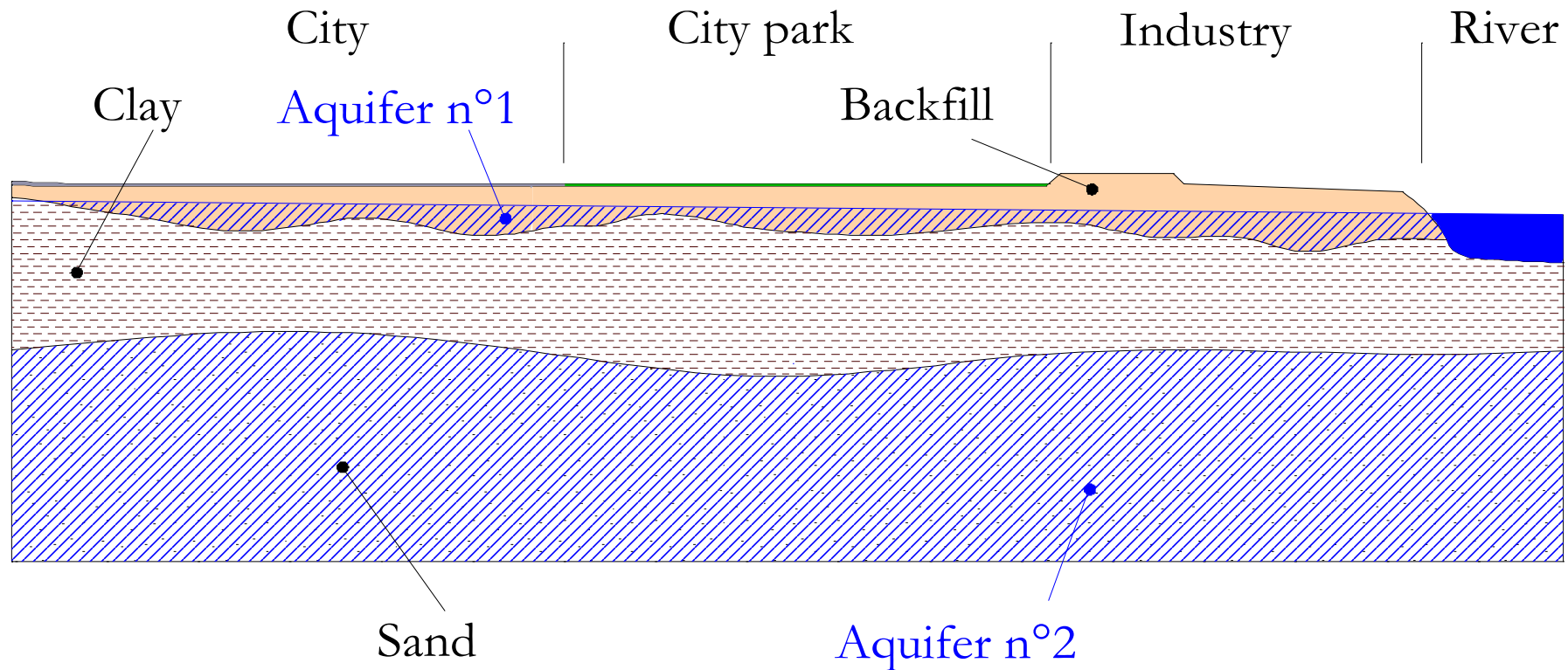
# Historical context



Historical  
backfilling

No industrial  
activities on site

# Hydrogeological context



# Site investigations



## Soil sampling

- 103 drill ling
- 3 levels of sampling
- metals/TPH/PAH...
- leachate

## Soil gas sampling

- PID
- 10 Gaz probes

## Groundwater sampling

- 8 control wells
- metals/TPH/PAH...

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# Soils results



**ORGANIC COMPOUNDS :**



**No significant organic contamination**

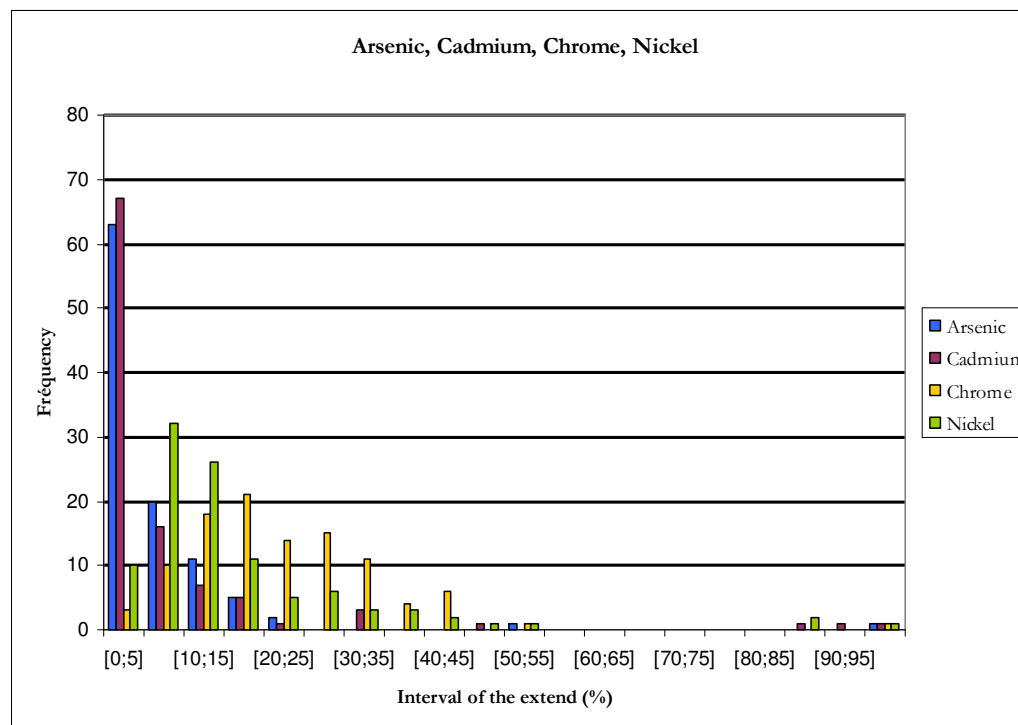
**METALLIC COMPOUNDS :**



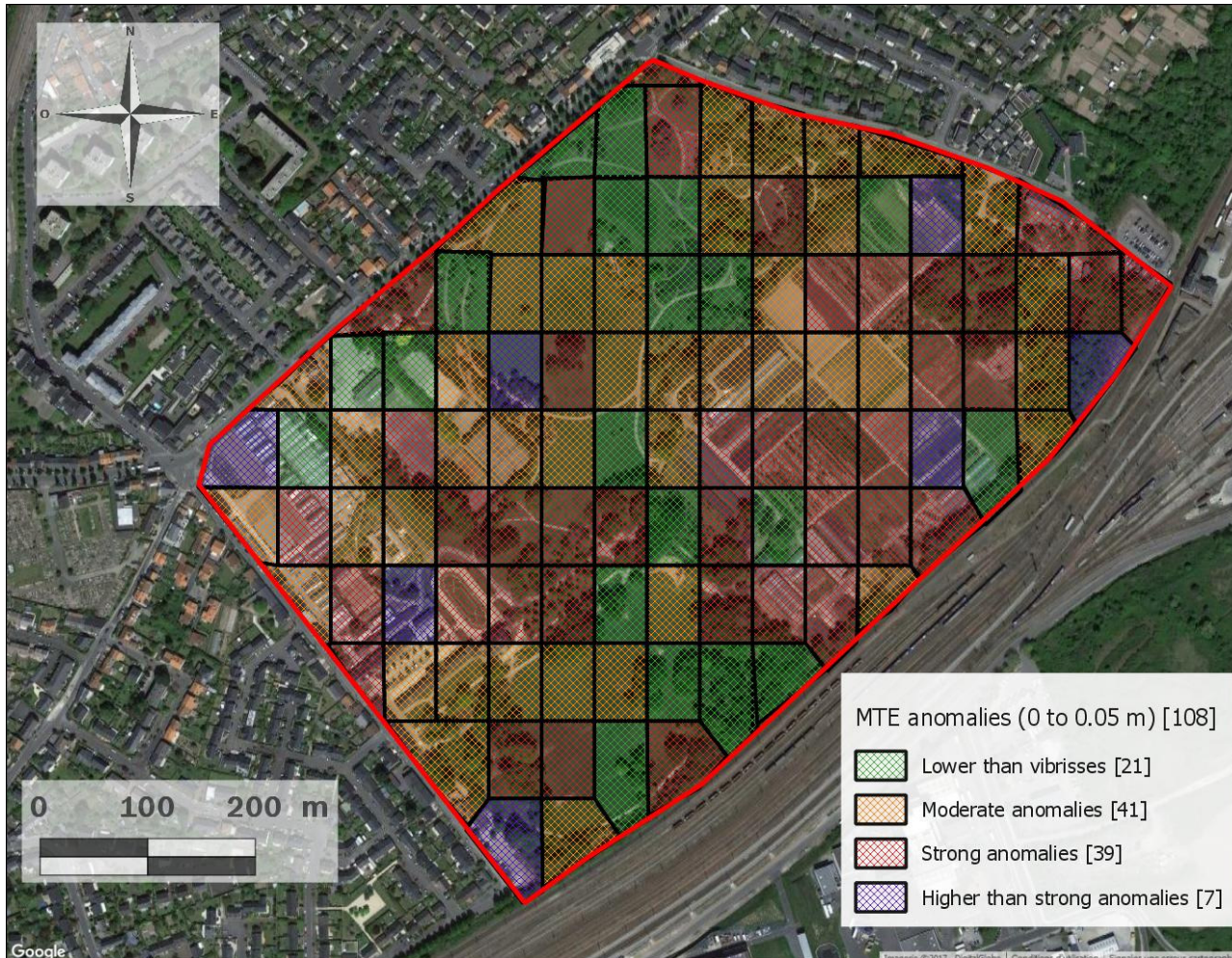
**Variable concentration range**



**High dispersivity**



# Soils results

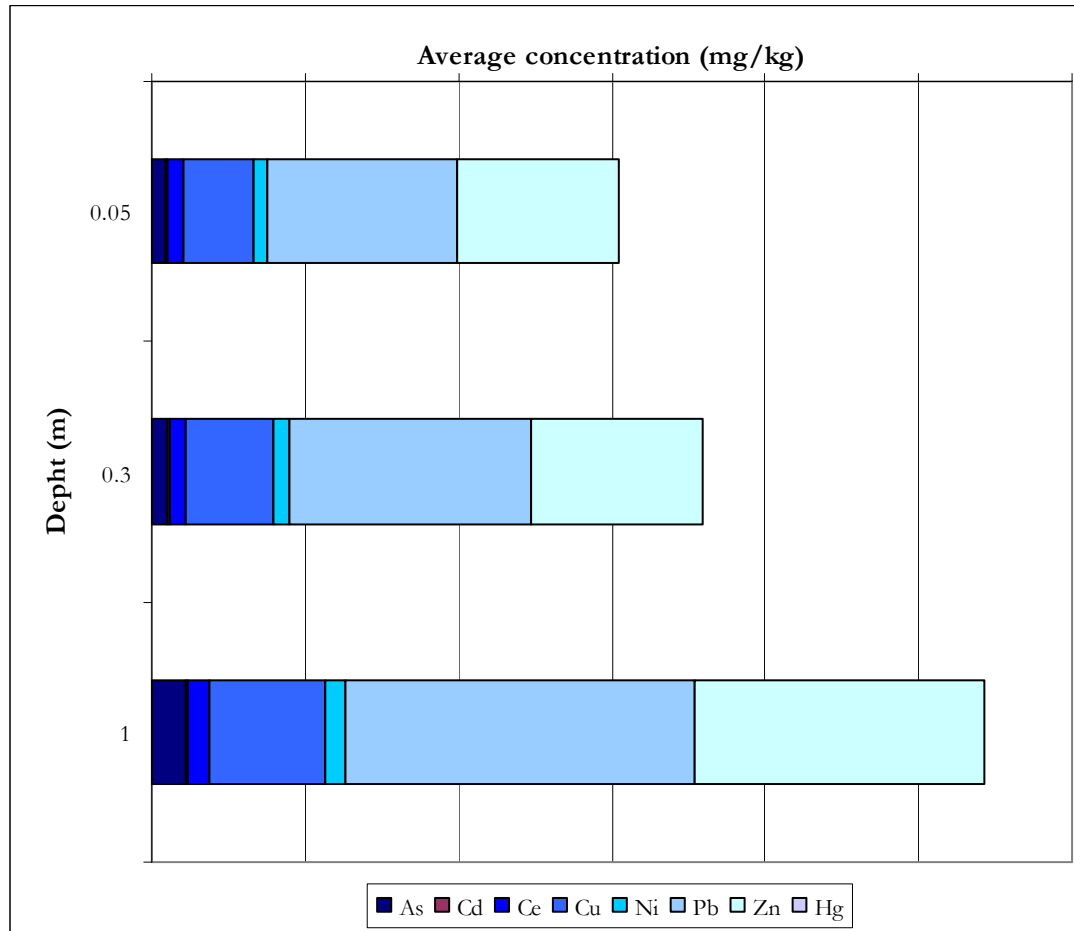


Comparison with  
regulatory value : natural  
background level

Spatial heterogeneity

Locally overtake  
background level

# Soils results

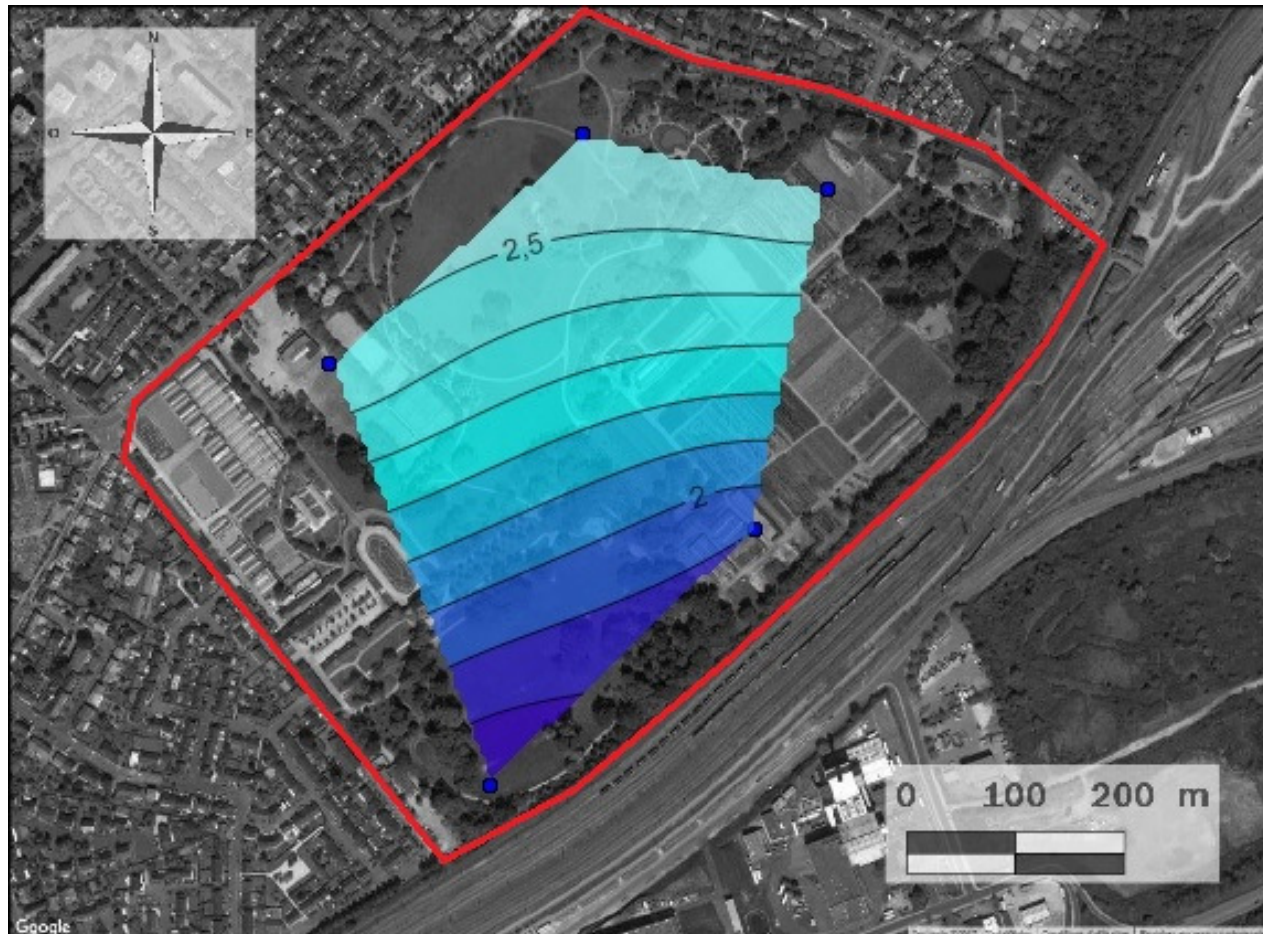


Metals concentrations increasing vs depth



No significant leachate

# Underground water and soil gas results



Contamination of the narrow aquifer...

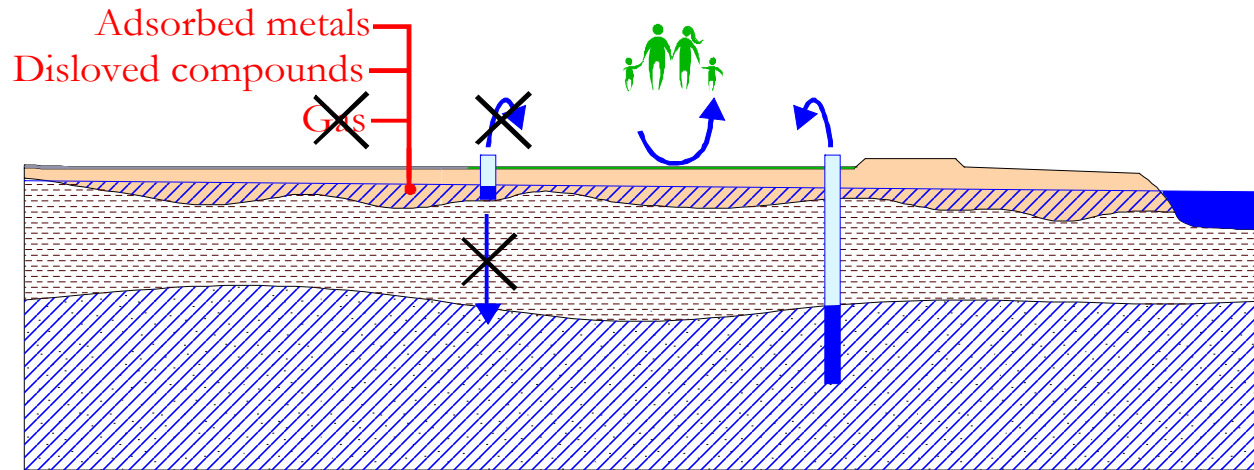
... but not linked with the site

No contamination of the deeper aquifer

No soil gas

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# Conceptual design



Relevant exposition pathway



Soil and dust ingestion :  
thin and discontinuous  
topsoil

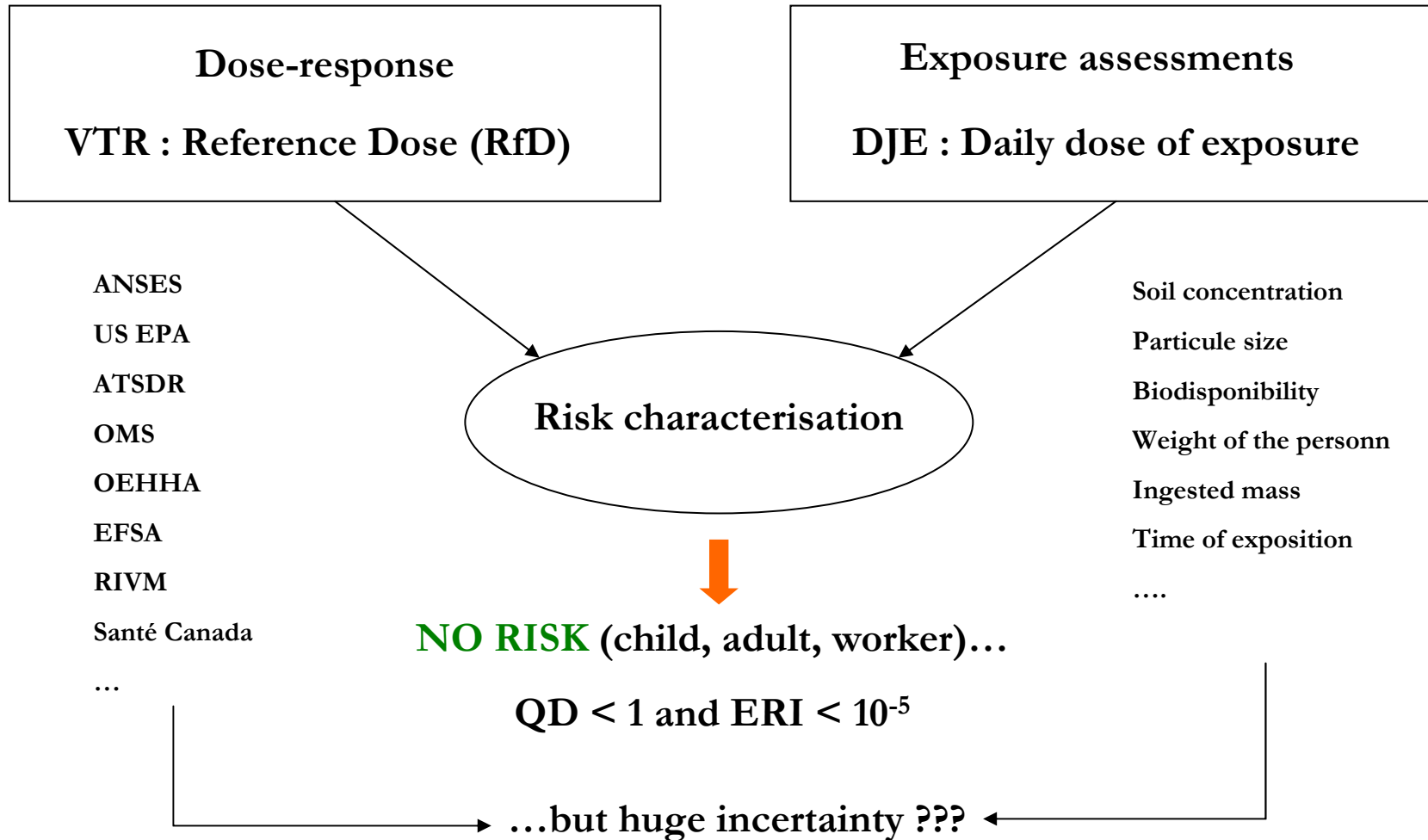
$$\text{Risk} = f(\text{Danger Transfer Target})$$

No relevant exposition pathway

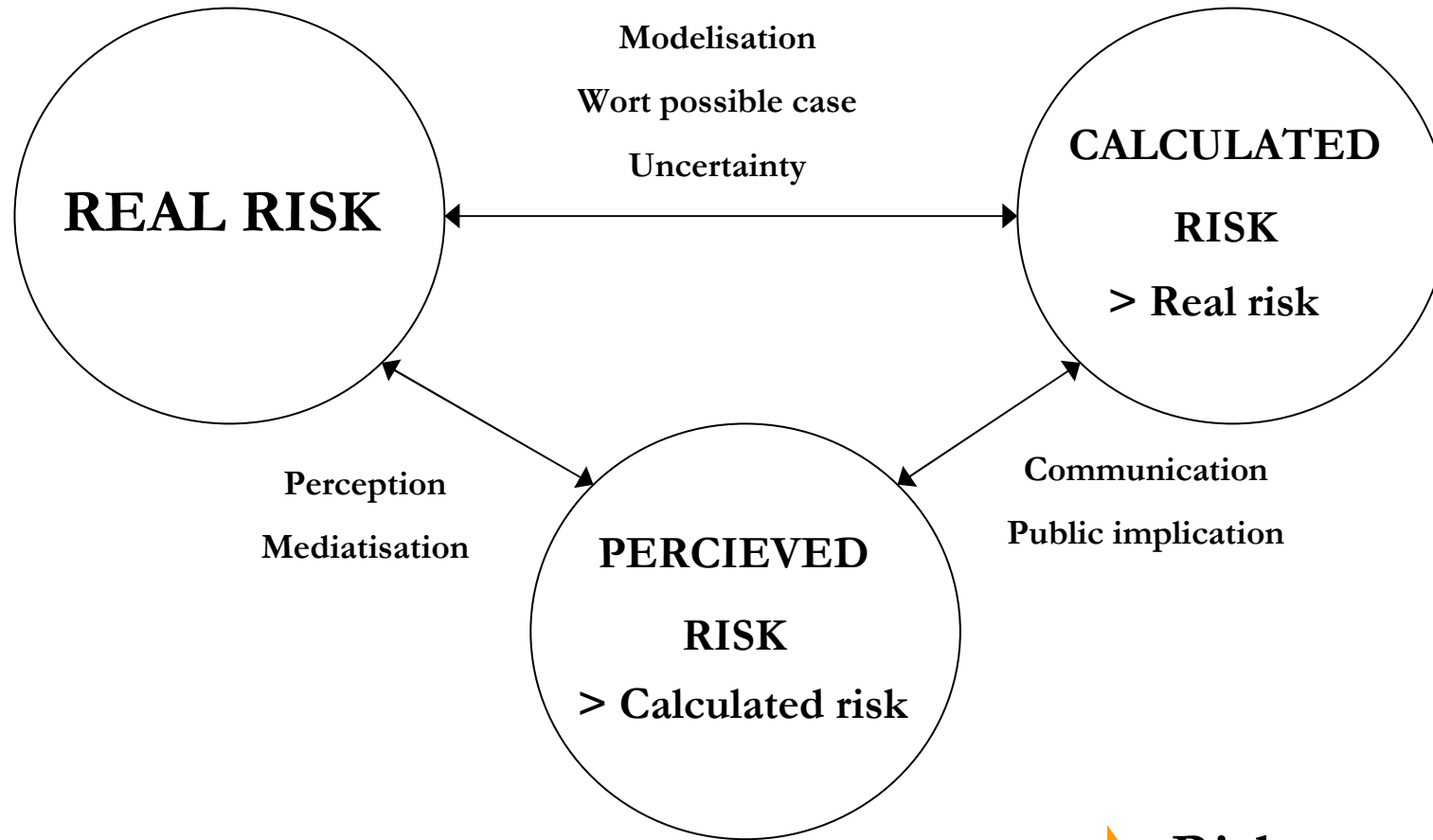
⊘ Gas inhalation : no gas

⊘ Water ingestion : no uses of the narrow aquifer / no contamination of the deeper aquifer

# Risk characterisation



# Risk assessment



➡ Risk managment

# Risk management



Available treatment for a non mobile contamination  
(low solubility, no volatility and degradability...) ???

Earthmoving and evacuation

€€€€€€€€

Stabilisation

€€€€€

Covering

€€€

No realistic  
options



Phytostabilisation

# Rules to be observed



No soil-plant transfert

Covering ability

Sustainability (chemical and physical constraints)

Low cost implementation/servicing

...

# Strategic approach proposal

