

Brownfields:

The Dutch approach in a densely populated area

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A birds view of Amsterdam

The Netherlands:

- Densely populated
- High groundwater level



Dutch approach: the history

Awareness

Stagnation!

Stagnation!

750.000
polluted
sites!

- 1979: first soil remediation
- 1982: Interim law
 - stringent / aimed at full remediation
 - quantitative targets / remediation levels
 - subsidies / pre finance
 - a lot of drive (staff) to solve this problem
- 1995: Law on soil protection
 - Followed by additional policy
- 2000: **Risk based functional** remediation
- 2005: Site specific risk assessment:
approach under construction

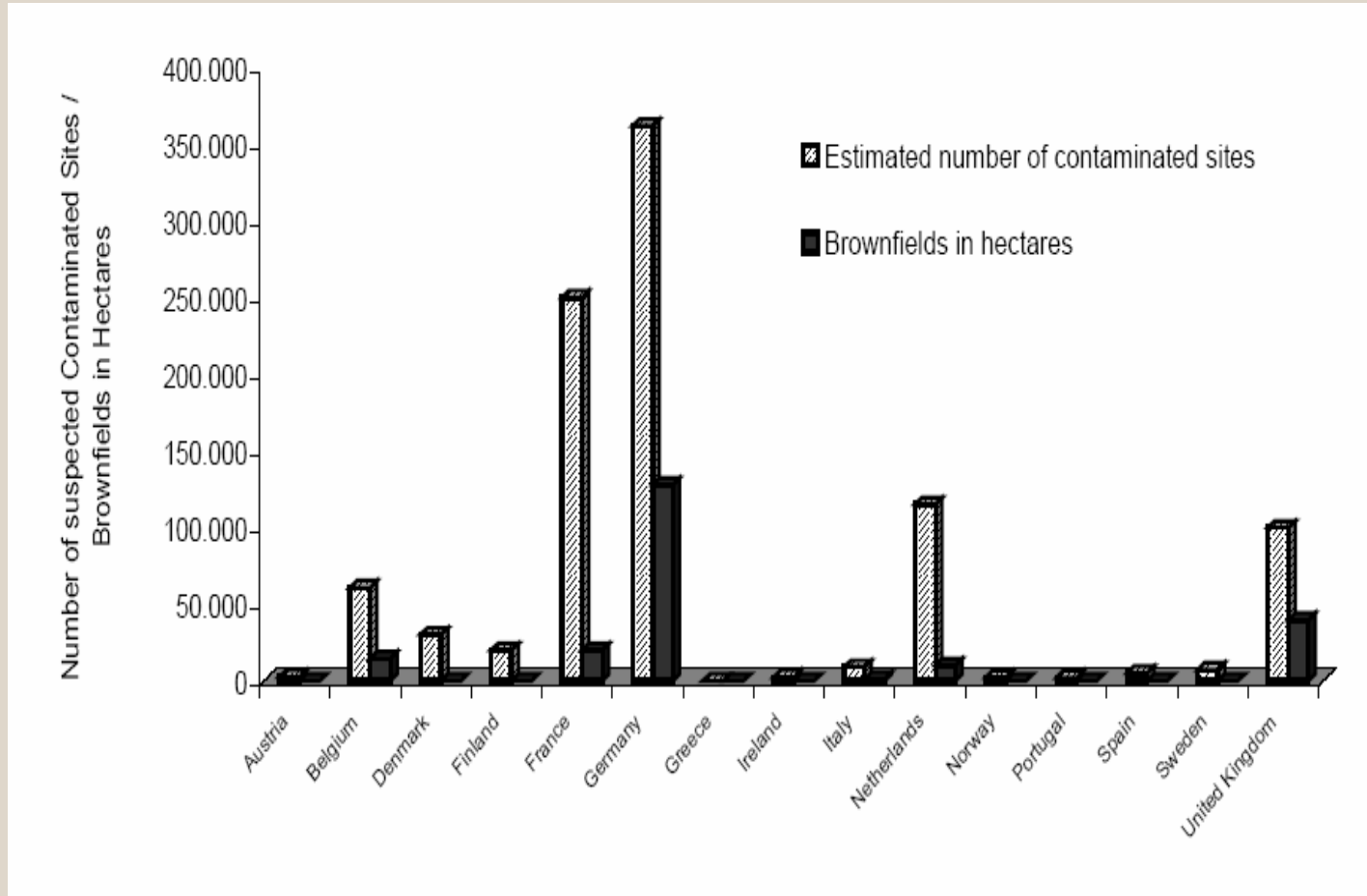
Dutch approach: our brownfields



Soil investigation

- Landfills/chemical waste, textile industry: densely populated, remediation past decades
- Current issues:
 - Old industries in cities (former gasworks)
 - Old industries in sparsely populated areas
 - Zinc ashes (Netherlands, Belgium)

Brownfields: some figures



Czech Rep: 30.000 ha.

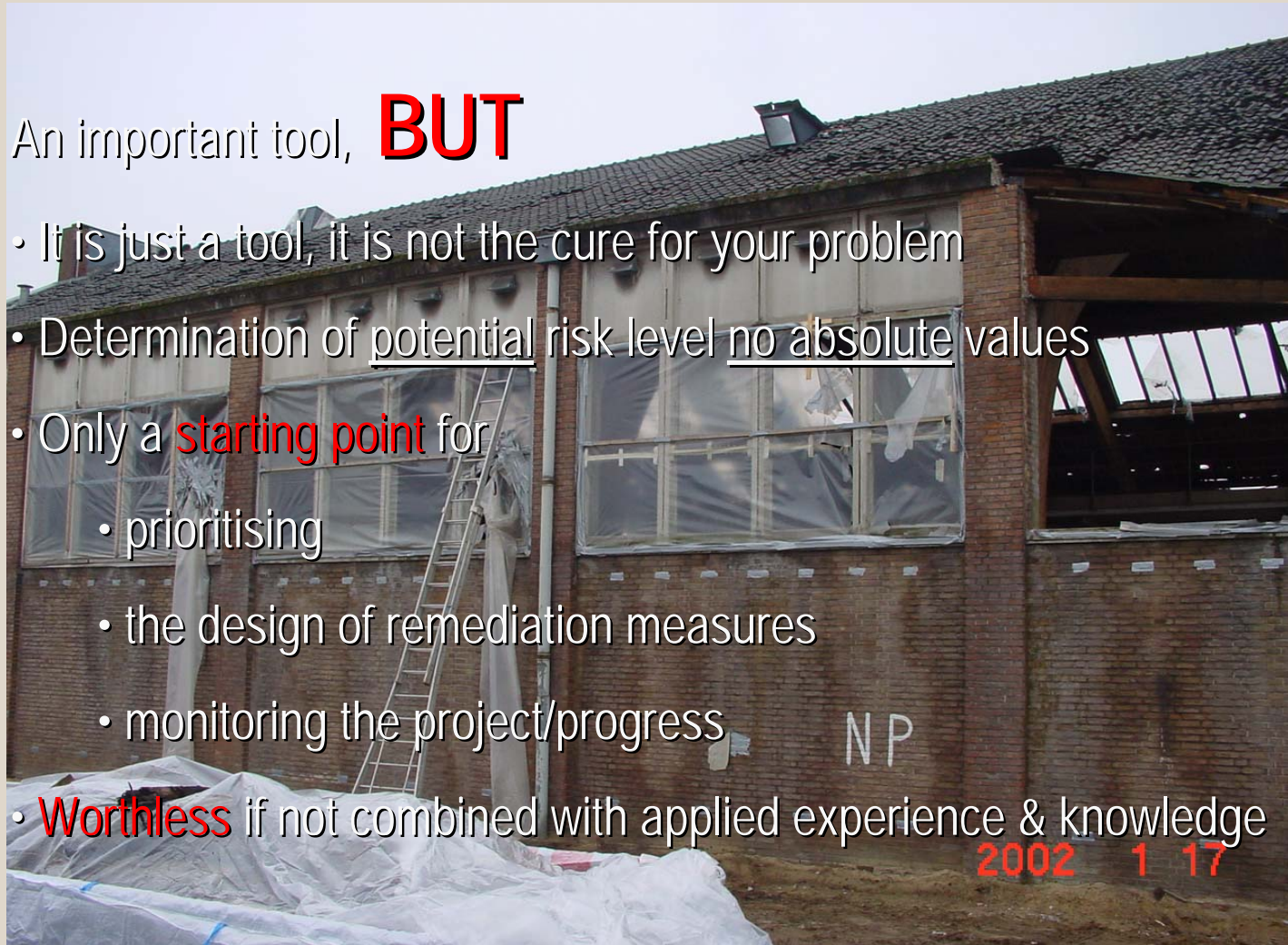
Netherlands: 10.000 ha.

Risk assessment tools: important but relative

An important tool, **BUT**

- It is just a tool, it is not the cure for your problem
- Determination of potential risk level no absolute values
- Only a **starting point** for
 - prioritising
 - the design of remediation measures
 - monitoring the project/progress
- **Worthless** if not combined with applied experience & knowledge

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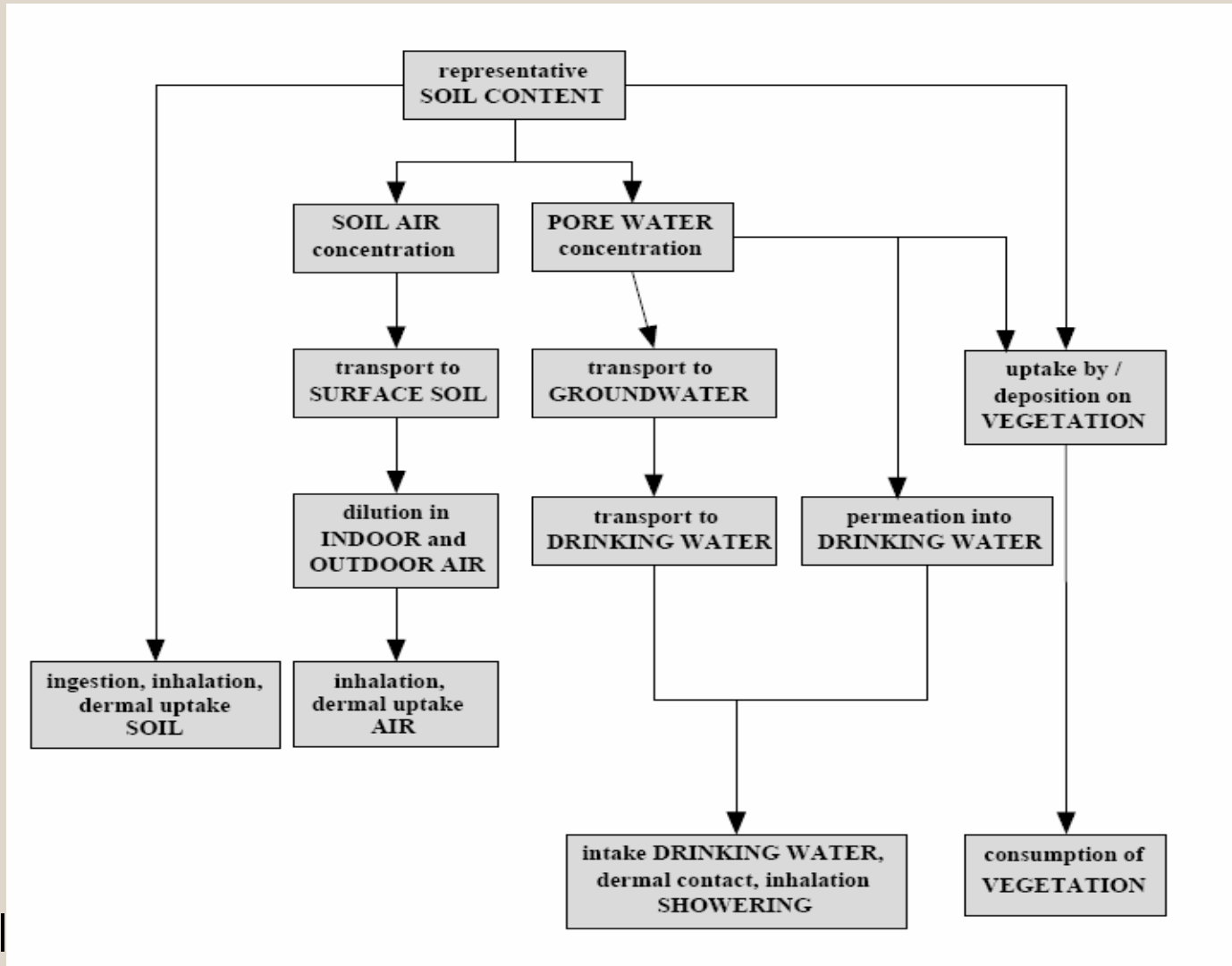


Input:

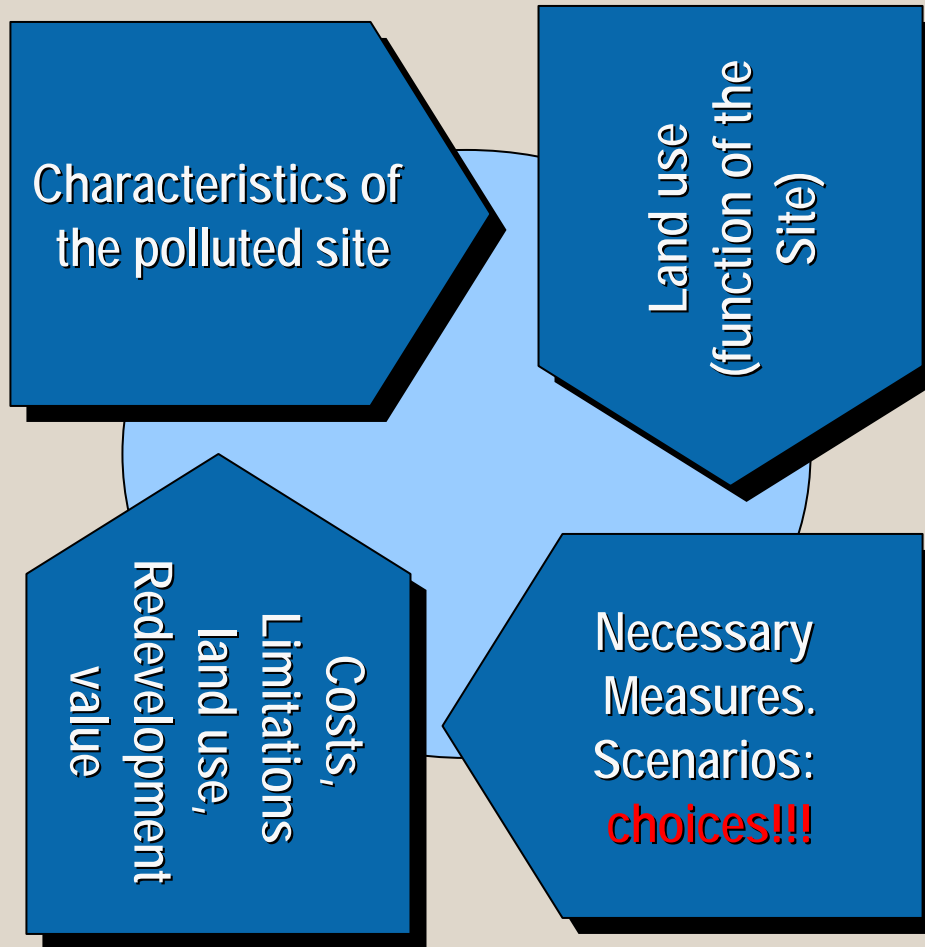
- pollution
- concentration
- appearance
- transport
- land use
- exposure
- threats

Risks:

- human
- environmental
- spread



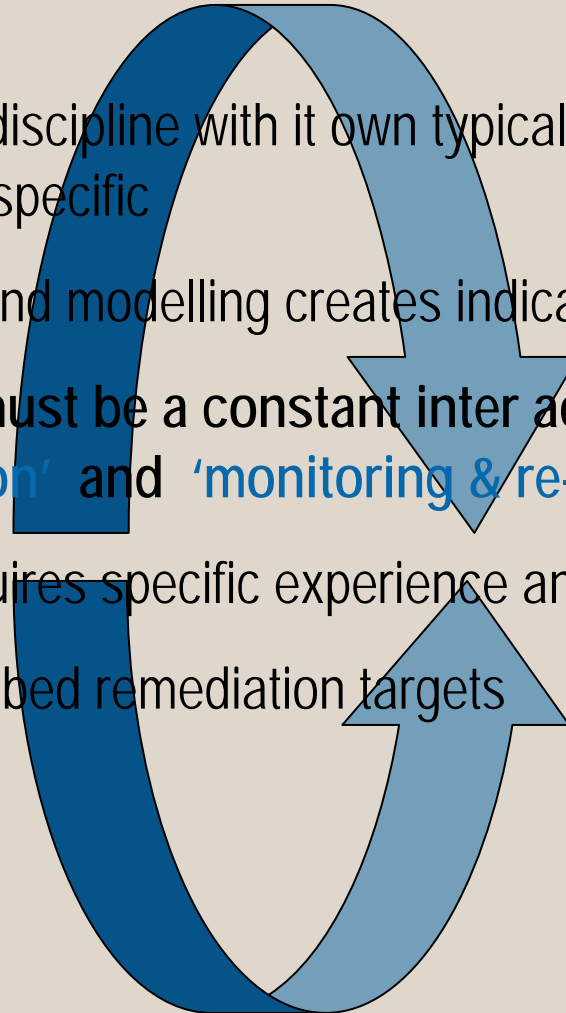
Remediation for specific land use



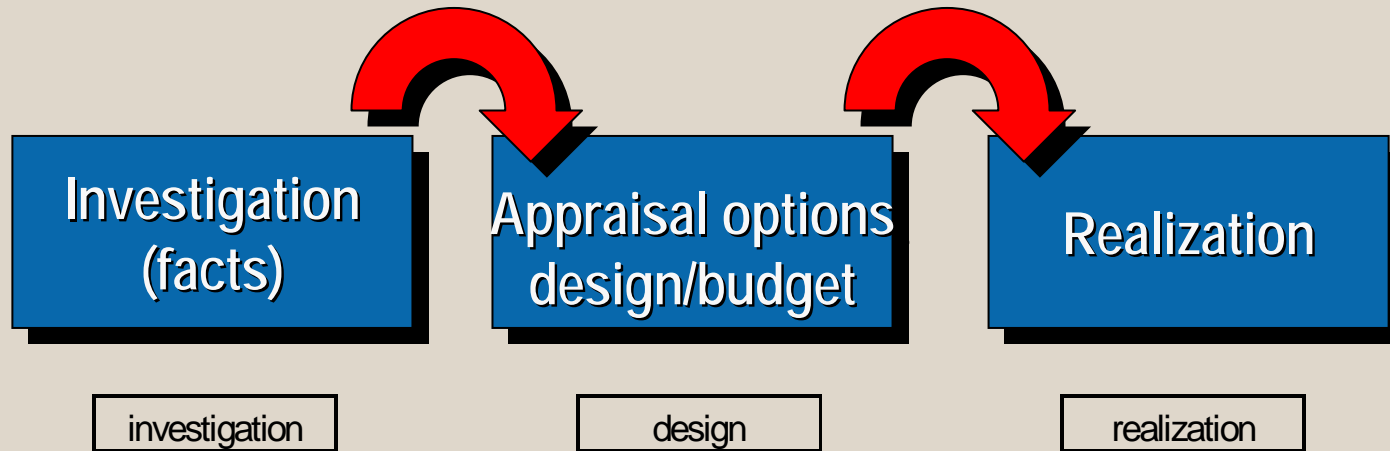
Dutch approach

Flexibility in design and realization

- Remediation is a discipline with its own typical qualities / characteristics: site specific
- Soil investigation and modelling creates indicators not facts
- **Therefore there must be a constant interaction between 'design & realisation' and 'monitoring & re-adjustment'**
- Project control requires specific experience and skills
- Qualitatively described remediation targets



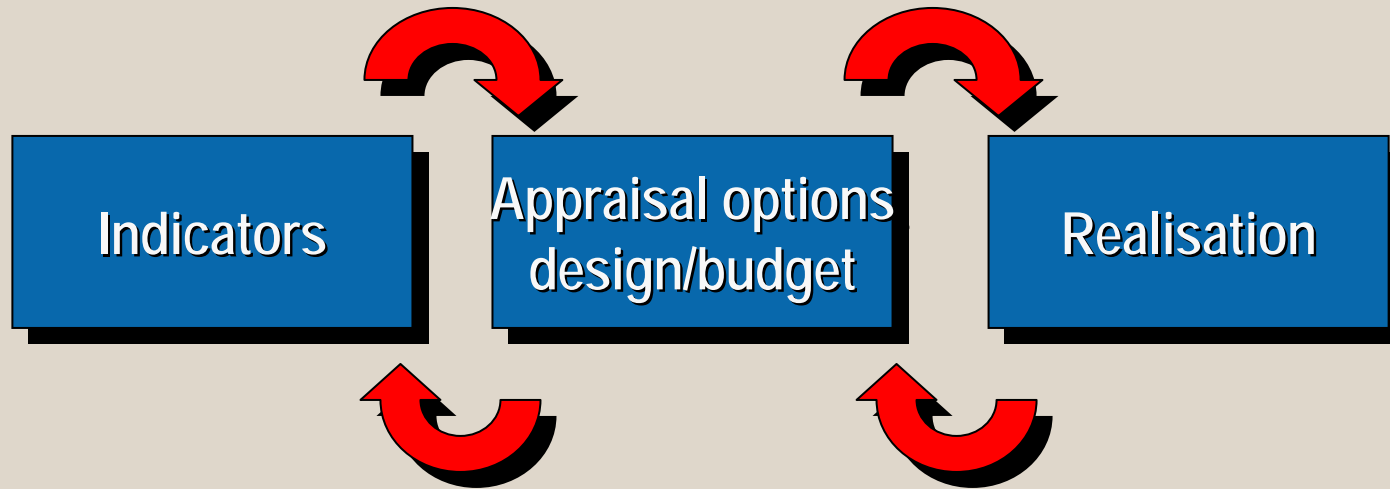
Dutch approach: cyclic design



Traditional

Dutch approach

Flexibility in design and realization

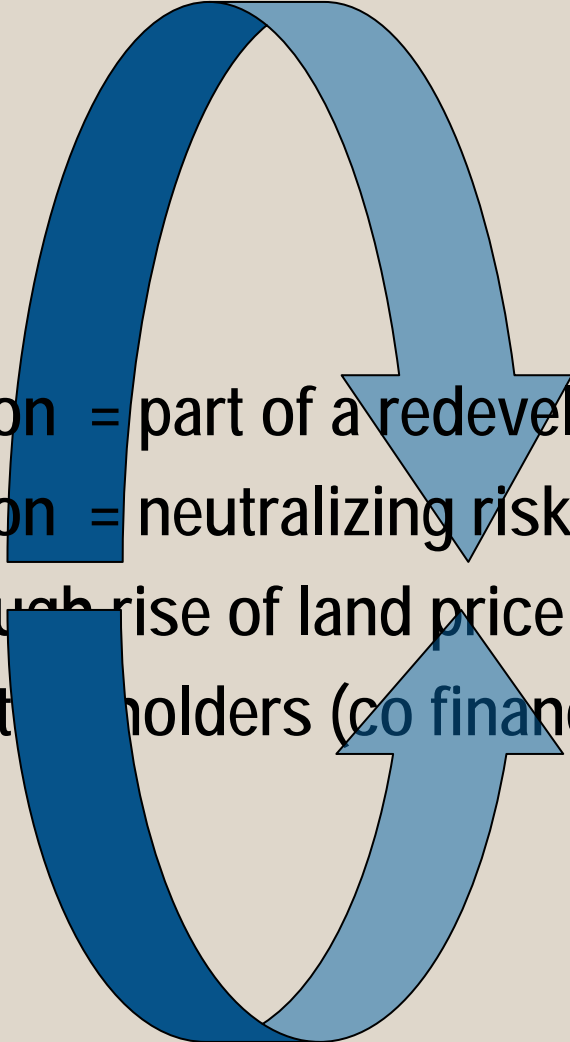


Flexibility

interaction/feedback between steps

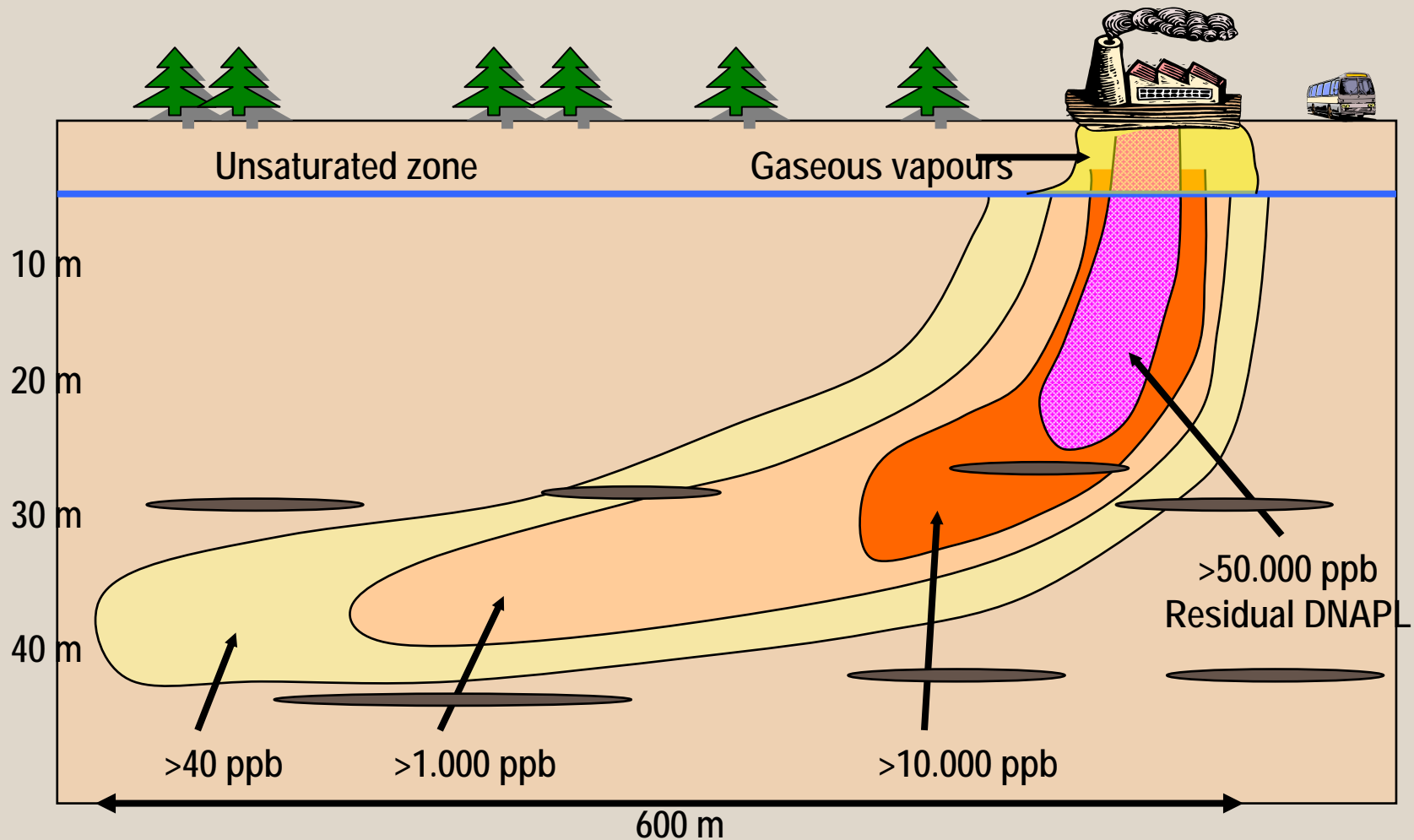
Dutch approach

Remediation and redevelopment as **ONE** integrated process / project

- 
- Soil remediation = part of a redevelopment process
 - Soil remediation = neutralizing risks
 - Financed through rise of land price (appreciation)
 - Financed by stakeholders (co financing) and subsidies

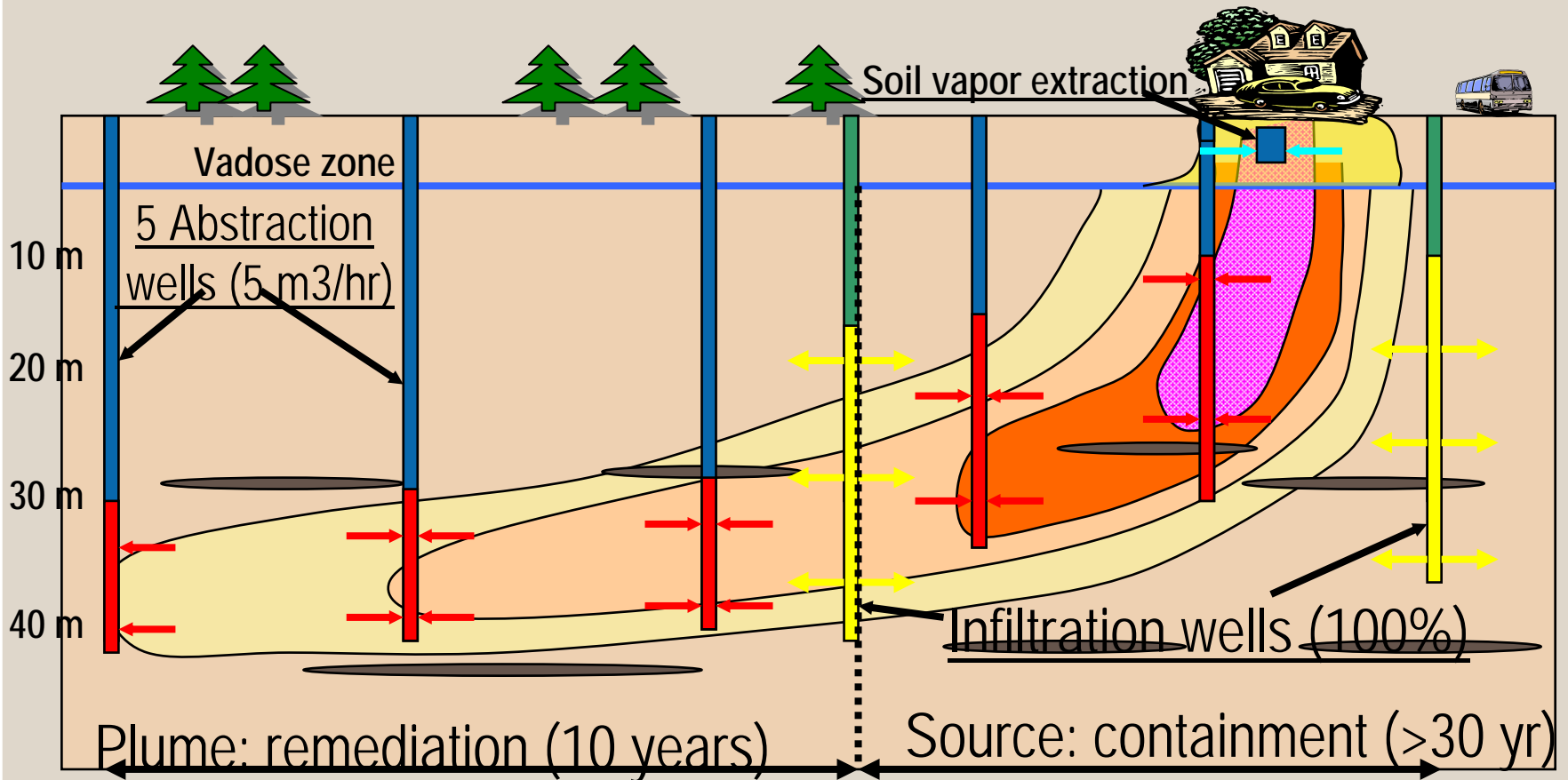
Dutch approach

Remediation and redevelopment as **ONE** integrated process / project



Dutch approach

Remediation and redevelopment as **ONE** integrated process / project



Dutch approach

Qualitatively described remediation targets

STEADY FINAL RESULT/SITUATION (to achieve within 30 years)			NO STEADY FINAL RESULT	
1 no remaining pollution	2 some remaining pollution	3 large remaining pollution	4 remaining pollution	5 remaining pollution
<ul style="list-style-type: none"> - no risks - no limitations land use - no diffusion 	RISKS & LIMITATIONS			<ul style="list-style-type: none"> - no risks - no limitations land use - no diffusion by active control
	none	none	none	
	SPREAD/DIFFUSION			
	stationary, demonstrated within 30 years	stationary, demonstrated within 30 years, including monitoring protocol	guarding by monitoring protocol	
AFTER CARE MEASURES				
NONE	PASSIVE		ACTIVE	
	register / record		register / record	containment: isolate / control / monitoring

← More removal of hot spots and plume
 Reducing after care measures

The approach of Brownfields needs experience and flexibility

- For you to decide !
- Start a pilot “functional soil remediation”

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