

A new perspective on area-oriented soil remediation in urban development

Tackling inner-city soil contaminations on a case-by-case basis is becoming increasingly costly. As a result, area-oriented spatial developments are stagnating. At the European level, options for applying an area-oriented approach to remediation in city centres and for financing this approach with public-private funds are being sought after. For the remediation and development of the Station Area, Utrecht is participating in the European CityChlor project.

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About the authors

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EUROPEAN PROBLEM Many cities in Europe are dealing with large-scale VOC contaminations of groundwater. The traditional approach to remediation of those contaminations is often technically possible but prohibitively expensive due to the enormous scale. Yet, something must be done, as contamination can constitute a threat to vulnerable objects (such as drinking water supply) or public health (evaporation). Doing nothing is not an option. Moreover, all kinds of activities take place in the soil that influence contaminations.

INTERREG Hence, inner-city contaminations increasingly constitute a threat to spatial developments. A solution to this issue is being sought after in Europe. That solution must be sustainable and environmentally sound and must facilitate urban development. European regions are increasingly becoming mutually dependent on each other as a consequence of globalisation, liberalisation, and the rise of new forms of government. This contributes to the growing awareness that more attention must be devoted to objectives and policy with a spatial impact. Territorial cooperation on topics that have a transnational impact and that are difficult to deal with at the national level, get therefore more and more support from European institutions, EU member states, and regions. The focus of the programmes is on topics that involve innovation, the environment, accessibility of the regions, and sustainable urban development. INTERREG IV B is a European subsidy designed to promote

collaboration between national and local governments and as a result increase spatial integration of European regions. This should generate a sustainable, harmonious, and balanced development in the EU and increased greater territorial cohesion with candidate member states and other neighbouring countries.

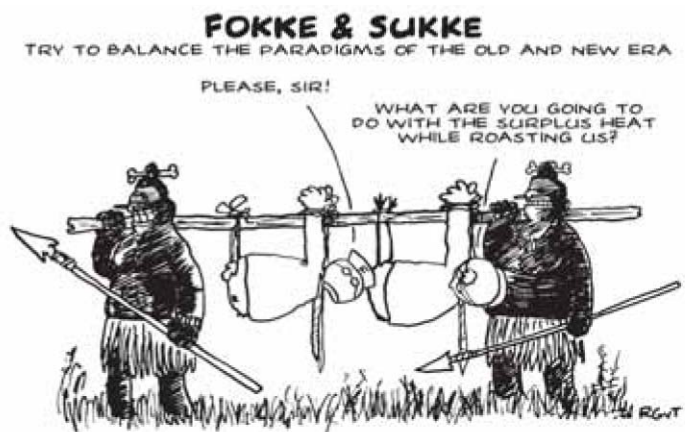
CITYCHLOR CityChlor is an example of a European project concerning possible solutions for the approach to large-scale VOC contaminations. In this project, the Netherlands, represented by the municipality of Utrecht and Agentschap NL/Bodem+, are working together with partners from Belgium, France, and Germany. CityChlor wants to enable the change from the traditional approach to soil remediation (the case-oriented approach) to an area-oriented and integrated approach. Aboveground developments are being encouraged and quality improvement of the subsoil is being worked on at the same time. Important is the integrated approach: soil survey and soil remediation, the risk assessment and communication, urban planning and economic aspects are being combined.

MANUAL By the middle of 2013, all of the above must lead to the integration of the knowledge acquired into a practical manual intended for everyone who is confronted with VOC contamination in an urban setting. This will possibly be combined with training and clear suggestions for amending national regulations. These will contain references to specific codes of proper conduct or to step-by-step plans that can be used as guidelines. Armed with the knowledge they acquired due to the collaboration, the four participating countries and the individual partners are able to optimise their own procedures and regulations.

PILOTS In the context of CityChlor, the Utrecht station area is the Dutch pilot. For the station area, Utrecht has opted for a combination of area-oriented remediation and aquifer thermal energy storage (ATES), namely the Bio-Washing Machine. This is being combined with the

spatial redevelopment of a large section of the city centre. Within the designated area of the Bio-Washing Machine, contaminated groundwater is being circulated by means of ATEs systems. By mixing and heating the contaminated groundwater, the contamination becomes more accessible and the natural degradation capacity of the contaminations is being stimulated. Research into quantifying this natural degradation is currently being performed within the CityChlor programme. In addition to the municipality, numerous private parties are realising construction activities in the area. Without the municipal Bio-Washing Machine, this would require considerable additional time and money from the developing parties, because they would have to make arrangements to prevent the soil contamination from migrating. By means of the approach selected, the municipality facilitates spatial developments and achieves sustainability objectives, such as CO₂ reduction. The pilot of the OVAM in Belgium, lead partner of CityChlor, consists of research into the impact of communication concerning soil remediation in the urban area of Gent and Mortsel. In addition, there is a pilot test with (nano-) iron injection for soil remediation in Herk-de-Stad, as well as a pilot concerning the application of ISCO (in-situ chemical oxidation). The final pilot is a test in Kortrijk of the application of innovative survey techniques for the detection of pure VOC product (including sinkers). In France, partner INERIS is namely focusing on characterisation techniques in respect of soil air, soil, and groundwater, in addition to performing a risk assessment at a pilot site. ADEME is performing a pilot in France concerning the application of the ATTENA protocol for MNA (Monitoring Natural Attenuation) in an urban environment, as well as two methodologies for kinetically determining the bio-degradation. Finally, Landeshauptstadt Stuttgart is performing an innovative in-situ remediation technique, including THERIS (thermally enhanced in-situ remediation), on-site in a source zone in Stuttgart-Feuerbach.

MARKET FUNDING The remediation in the Utrecht station area is currently funded largely through taxes, benefiting private parties. This is often not much different for the partners participating in CityChlor. Due to the disengaging government, the decentralisation of authorities, and cost-cutting, guarantees for the future in that respect are no longer ensured. In the context of CityChlor, solutions for obtaining more funds from the markets are being sought after. In addition, legal aspects play a role. To what extent do the current (European) rules constitute an obstacle to the area-oriented approach and what should be changed? Or are there plenty of options, but we are not using them properly? Sustainable area development also means the redevelopment and the intensification of the use of space in the city, in addition to a reduction of the use of open areas. For that purpose, investing in the existing city must become more attractive. A more intensive use of space in the city contributes to making and keeping technical and social infrastructures more affordable. In the case of sustainable developments, most costs do not reside in the aboveground structures, but rather in the management and maintenance of the area. To finance this, new earning opportunities will have to be developed, in which parties will have to establish longer-term connections with each other. In short, long-term planning is required for financing a sustainable inner-city redevelopment. In that context, a two-day international conference was held in June of 2011, where the above aspects were discussed with experts from various fields. As a



result of the outcome of the conference, a study is now being performed of the possibilities and conditions for recovering costs within the scope of the Dutch Land Development Act (*Grondexploitatiewet*).

LEGAL ASPECTS In addition to the technically oriented pilots, the legal aspects of the area-oriented remediation of VOC contamination are also assessed within the project. In doing so, the extent to which the area-oriented remediation of VOC contamination in the groundwater is in conformity with environmental law principles and standards generally accepted in Europe is verified by means of the experiences acquired in Utrecht. The outcome of this research contributes to the further development of the area-oriented remediation of large scale groundwater contamination in urban areas in combination with area development. The research questions also fits in with the planned transition of governmental policy in which the soil policy will be broadened by seeking harmonisation with spatial planning, water, and energy

TRANSITION It is clear that we are at the beginning of a transition. In the near future, there will be a new approach to soil remediation and urban redevelopment. This approach will require experts from various fields to collaborate with each other. There will be new rules that will lead to more opportunities and possibilities. The challenge in that respect is to achieve a broadly-supported economic model to make the financing of the area-oriented approach possible.

SUSTAINABLE AREA MANAGEMENT The traditional approach to soil remediation for large-scale contamination in inner-city areas no longer suffices. The solution is to combine remediation with spatial developments. This yields time savings, cost savings, and deregulation. Moreover, sustainable area management leads to a higher quality of life, more greenery in the city, more room for relaxation and recreation, and spares the white land. This integrated approach to the use of space in the city is necessary from the perspective of climate control (reduction of CO₂, use of sustainable energy, urban heat island). In order to achieve all this, public and private parties will have to work together. The era in which the government stipulated and paid for urban redevelopment is over. Experts with various backgrounds, such as economy, finance, law, urban development, architecture, etc. will work together on the same objective: 'How do I realise a sustainable city and an agreeable living environment for the people who live, relax, reside, and work there.'

More information about CityChlor can be found at www.citychlor.eu.