Light in the black box
Consistent and knowledgeable environmental remediation makes possible the conversion of even the toughest cases.

Conversion from a “forgotten child” to a popular residential quarter
The “Sana-Klinikum” medical center in Remscheid-Lennep is history. 300 people have found a trendy new home in the new residential quarter.
“...success stories written by the consistent development of properties”
Dear readers,

Where automotive parts were still being manufactured yesterday or oils for engines were refined, there are now start-ups in the co-working space dealing with urban mobility of tomorrow. The way we live is changing rapidly, and the change in many industrial sectors makes spaces and buildings available. Quite often, these brownfields are forgotten and all grown over. Let us help you with developing these properties for you and for the future.

New city quarters are thus created where the chemical and processing industries once ruled. Soccer players are now showing their talent where just a few years ago crude oil was being refined. When reading this magazine, you will be amazed about the success stories written by a consistent development of properties. Progress based on deconstruction and densification is the need of the moment. Currently in Germany, areas equaling the size of 100 soccer fields are sealed or are being built upon every day. These are areas which could also serve for agricultural or be used for recreational purposes.

In fact, there are large quantities of brownfields which can be reinvigorated. At a first glance, some decommissioned lots may seem inadequate. However, with the right technology, the respective expertise in remediation and real estate development, and a solid project and stakeholder management, we can make this conversion a reality for you. Each brownfield in urban surroundings can be profitably developed. We are firmly convinced of this and can provide proof even with complex environmental remediation projects.

Transparency and open communication with owners, investors, authorities, and residents is important to us. It is our pleasure to use this first edition of our new Life+ magazine to look behind the façades of successful property development and provide you with insight.

Enjoy reading this magazine. If you have any questions or requests in this regard, please do not hesitate to contact us.

Dr. Karl Noé  
Sector Leader Environment, Arcadis

Martin Ritterbach  
Sector Leader Buildings, Arcadis
FOCUS ON MARKET TRENDS

- **Approx. €1 Trillion:** Combined cost of restoring all large European brownfield sites
  - [European Commission, 2013]

- **500,000 hectares:** Brownfield land waiting to be developed in EU countries
  - [European Commission, 2013]

By **2050**, the goal is to have no more additional sealing of areas in EU countries
- [Target set by the EU]

- **90%:** Of the materials from demolitions are recycled in the Netherlands
  - [European Commission, 2013]

- **217,000 areas:** Suspected contamination exist in Germany
  - [BMUB 2017]
As far as the costs are concerned, the integration of a brownfield into the real estate market seems to be a bottomless pit!

Fritz: Of course, the remediation of the lot and buildings is an expense. However, (large) areas in urban locations are worth a mint. Plus in some cases, reusable materials found on site can also be turned into money for the revitalization.

Contaminated groundwater, contaminated soil, and released emissions during the remediation; nobody can handle these risks!

Karl: In reality, we often work with heavily contaminated objects. However, there are proven and very efficient procedures for environmental remediation. By applying these, we can control and eliminate the risks. Residents thus feel and are safe. As a first step, we go deep into the history of the properties and find out everything that there is to know about damages to the soil, the groundwater and buildings. An important basis for the remediation concept is being able to explain the contamination, this means to know what we are dealing with. As far as the applied procedures are concerned, many things have changed in the 25 years that we have been working in this field. One example for new technologies is the in-situ procedure.

Does this mean that owners of contaminated sites can just lean back and relax as environmental remediation will be faster, easier, and less expensive a few years down the road?

Fritz: On the one hand, this sounds logical. On the other hand, however, the income potential of a site is not being realized. Also, environmental requirements are continuously becoming more detailed and strict.

Due to this, remediation should be performed as quickly as possible.

Is it even possible to develop a realistic time schedule for such complex projects?

Karl: It is important to look at the bigger picture from the beginning and to consider all tasks and challenges ahead. We have extensive experience with strict project management and handle everything from waste control procedures and records to the detailed time schedule for the excavation works.

When I own an environmentally contaminated area and start remediation, won’t I then become the topic of discussions?

Fritz: Of course, neighbors, authorities, and all the people affected and those interested want to know what is happening on site. We are counting on open communication. An honest and collaborative dialog is an important basis for a successful property development.

Back to the future: How does one find out how to best use a remediated property?

Karl: Working with different scenarios is a good option. We do this from a neutral position, focusing on the wishes and desires of the owners. There are no ready-made solutions. One has to look at each individual case.
Digitalization offers new possibilities for large recycling and conversion projects. An example being, the use of Big Data allows for much faster analysis of the soil condition of a certain area. Data can be filtered out of knowledge and information available on certain regions, industrial sectors, and usage histories which are useful for the individual project. Of course, this is always performed with a view to data protection and privacy. How can the areas be used after their remediation? Building Information Modeling (BIM) opens completely new paths and opportunities. In short, with BIM one builds digitally before one builds in reality and allows expert planners to coordinate their services in an integrated 3D model of the structure. BIM offers many advantages. One of these is that architecture, building statics, and M&E installations can be examined across the trades with regard to possible collisions or problems. Furthermore, BIM makes possible the use of very realistic materials for the marketing of the projects.

What is the top priority for remediation and conversion projects? This is definitely safety – both for the workers on site and for the residents.

Other than in Germany, the transformation of industrially used areas is significantly more advanced in Switzerland. After the area recycling in Zurich, the economic engine of Switzerland, the topic is also now on the agenda in Basel. The chemical city is facing rising criticism from citizens, and production was thus transferred to the cantons of Basellandschaft, Valais, and Aargau. The greatly increasing property prices in Basel make the conversion of areas such as Klybeck financially rewarding.

Where do we establish our production sites? This has always been a complex question and one which has been made even more complicated by the Brexit and the new position of the USA concerning free trade. The pressure for higher efficiency draws the caravan of many industrial sectors ever deeper into the presumably cheapest manufacturing region. However, when considering additive manufacturing, it makes more sense to move production closer to the end user.

The effects of the digitalization on the selection of sites are tremendous, but intercultural issues, political insecurities, or social and environmental standards are also factors of vital importance. Based on our experience, the latter are not adequately taken into consideration. We provide advice on site selection – with a holistic approach and a cool head.

It is not very enjoyable to live right next to a brownfield. Apart from the bleak look, there is also concern about contaminants or the dilapidation of industrial plants and installations. Once remediation has been started, there are more easily understandable concerns, such as fear of noise, dust, and the release of emissions. It is important to inform all people affected and stakeholders as early as possible about the planned steps and to maintain open communications and dialog during the duration of the entire project.

Fast, reliable, and confidential. These qualities are in demand when real estate transactions are concerned. A solid due diligence assessment on all technical and environmental aspects significantly contributes to successful transactions.

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QUOTES FROM OUR EXPERTS
Seizing opportunities together for architectural accents and innovative impulses
Why is it necessary to find industrial brownfields in cities and to develop them?

**Martin:** Because it makes sense economically from the point of view of the property owners. Brownfields inside urban areas possess a high value-creation potential. Many investors worldwide are looking for investment possibilities. The real estate prices in urban centers have skyrocketed in recent years. Also from a social and political point of view, the recycling of areas is inevitable. Many cities need new living space and want to enable new forms of work and living. At the same time, the intention is to stop the use of “fresh” areas. In specialist jargon, we talk about an interior development in cities instead of an exterior development in the open countryside outside the city limits.

Do you think that the urbanization trend is still continuing?

**Birgit:** Definitely yes. Throughout the world, megacities are dictating rhythm as far as infrastructure development is concerned. Megacity clusters in Asia are already bigger than Austria – and we will see that entire countries will become suburbs of megacities. In 2030, more than two thirds of the world’s population will be living in cities.

Why is everything moving into the cities?

**Birgit:** There are many reasons and I just want to name two as an example: first, new forms of work and living, such as co-working in inspiring and innovative surroundings which is, for example, important for start-ups and solo entrepreneurs, mainly occur in large cities. This can be found more in Berlin than in the Bavarian Forest. Secondly, immigration is also mainly taking place in the metropolitan areas as the new fellow citizens want to take advantage of the educational and cultural offers which are mainly found in city centers.

In this regard, what can be the effects of the development of brownfields?

**Martin:** Brownfields can give a true push to city development. Citizens, the local authorities, and investors can all jointly use the opportunity to create architectural accents and provide innovative impulses for the city community. When new quarters are created on former brownfields, several generations living under one roof are just as possible as so-called third places, such as libraries. In our opinion, it is important to involve the city community as early as possible in the visions and plans.

What makes these projects personally interesting to you?

**Martin:** I like the challenges posed by the complexity of the topics. With our cradle-to-cradle approach, we have the entire life cycle of buildings and structures under control. We are looking for solutions which make sense from a technical, economic, environmental, and social point of view.

**Birgit:** I fully agree with you. Each project is new, fascinating, and different. Information is exchanged with many different people – authorities, neighboring companies, or private initiatives. As I might say, communication is the most important thing when developing properties. It is a real pleasure to design the future in cooperation with others.
Due to its central geographical location, Łódź is of high importance to the logistics sector. For this reason, logistics and real estate developers are focusing more strongly on brownfields in this area. However, before new warehouses, industrial or commercial parks can be built, these areas have to be examined with regard to possibly existing contaminations which would then require proper remediation.

Panattoni, a leading developer of logistics and industrial properties in Europe, commissioned Arcadis to provide environmental services for a site in the eastern part of Łódź which they planned to acquire. As a first step, it was to be determined which environmental damages to the soil and groundwater had been caused by the asphalt production facilities previously located on this site. The project team identified possible environmental risks, established remediation measures and accompanied the entire project with consultancy services. The latter included a formal approach based on the identified pollution load and a remediation plan accepted by the environmental authorities. As a last step, both the soil and the groundwater were remediated via ex-situ procedures, i.e. 22,000 tons of contaminated soil were removed and disposed of. A particular challenge was posed by missing data on the position of underground cables and also on the exact location of the contamination which made it more difficult to assess the environmental risks. For example, old plant parts and underground tanks were detected during the soil excavations which then required special demolition and disposal procedures.

Despite these unexpected problems, a very tight schedule and adverse weather conditions during the winter, Arcadis succeeded in converting the contaminated brownfield into a site suitable for development. In the meantime, a new logistics park has been built on the premises.
Since the nineties, when in the course of political and economic upheaval and the following privatization of real estate the first environment-related regulations were introduced and decontamination responsibilities and processes were determined, the remediation of areas has been on the agenda in Poland. A large part of the sites in need of remediation were former installations of the Soviet army which were contaminated with oil residues. The remediation measures were financed by the Polish Ministry of Environmental Protection, Natural Resources and Forestry. Two companies were commissioned with the execution of the remediation, one of which was Ekokonrem from Wrocław – a predecessor company of Arcadis in Poland. As appropriate laws and fundamentals were missing, these were just imported without further ado. The so-called “Dutch List” as well as American remediation technologies played a significant role and formed the driving force of Polish environmental policies. Local companies gained in experience when performing remediations of filling stations, oil production facilities, refineries and military bases. Ekokonrem developed into a specialist for the decontamination of oil residues.

When Poland joined the EU, international companies entered the country which adhered to high environmental standards. The market was growing and local providers competed with international providers such as Arcadis. The real estate boom expanded the range of orders for project developers and provided access to additional groups of clients.

With joining the EU, the “polluter pays” principle was introduced. Because of this, Polish lawmakers once again tightened the legal situation with regard to responsibilities, processes and risk assessments for man and the environment in 2014. In the course of the implementation of these new regulations, the demand for remediation services is increasing. However, the clients’ budgets are relatively small when compared to Western Europe. For this reason, more efficient and faster procedures should increasingly be applied. In-situ procedures, i.e. the decontamination of materials on site, are one example. One weakness of the new regulation is the handling of groundwater issues; more precise rules in this regard are needed.

“One weakness of the new regulation is the handling of groundwater issues”
The site of the former Sana medical center in Lennep which had been vacant since 2005 due to the merger of two hospitals in Remscheid, deterred many investors for a long time. Who wants a 55,000 m² hospital site with dilapidated and problematic building structures in a city with a shrinking population away from booming real estate regions? For a long time, there was nobody interested in venturing on the demolition and new development of the Lennep hospital “ruins”.

For a project of this size, more is needed than just a smart realtor and visionary billboards. A structured and coordinated approach to the development of the property under consideration of the specific site conditions, the regional real estate market, and the goals of the owner are required. This is exactly what we have been doing successfully for many years. For the Lennep hospital project, a large team of Arcadis experts from the fields of buildings and environment from five different offices were involved.

In the beginning, there was the preparation of an asset evaluation aimed at determining the basic utilization options, market opportunities, development goals, and general economic data of the project. This evaluation then formed the basis for a tailor-made site exit strategy. Arcadis was thus able to develop the property into a marketable product for the owner Sana and also assessed the economic risks and successfully marketed the property.

One of the essential building blocks was the determination of the demolition costs as the central parameter for the profitability of such a project. We determined these costs based on an exploratory contamination expert opinion and the requirements with regard to future building developments. Among others, we checked whether demolition material could be used to help with project financing. However, due to the long vacancy, there were only very few recyclable items in the hospital in Lennep, such as window frames and heating pipes. Cost savings were therefore only possible with regard to construction debris which did not have to be disposed of at high cost but could be used as refilling material on site after proper contaminant testing and crushing.

Knowledge of the general conditions regarding both the demolition and the development of the site made it then possible for our experts to manage and control the zoning plan procedure required for the change of use from a hospital site to residential use in such a way that the planned development was in compliance with the permits. As a result, we were able to create prerequisites for a building development which made the project economically viable for both an investor and the property owner. An investor was found who is planning to turn the former hospital site into a residential area. In September 2015, the property purchase agreement was notarized and the legally binding land-use plan was agreed and passed. The demolition works were begun in November 2015, and already in June 2016, the groundbreaking ceremony for the new city quarter took place. According to our re-development concept, approximately 300 residents will soon have a trendy new home in the quarter. The hospital will then be history remembered only by those who were born there. A nice memory!
from the contamination expert opinion to the re-development concept
LONG METHAMORPHOSIS OF A BROWNFIELD

Conversion of a brownfield which had not been used in 20 years into an attractive mixed-use quarter

The project implementer Allreal commissioned Arcadis with the site management for measures regarding contaminated sites and environmental construction aspects.

DATA & FACTS

- 70,000 m² property with previous use as cement slurry landfill
- 64,500 m² can be built upon
- 20,000 m² are green spaces
- 6 large block perimeter buildings, one high-rise, 6 green inner courtyards
- 450 condominiums and rental apartments
- For approximately 1,200 residents
- Approximately 2,500 jobs

Sources: photo top left – Allreal Group; photo top right - Ralph Bensberg; photos below - Reinhard Zimmermann
“Where there is a will – there is a way.” This best describes the “Schoch-Areal” remediation project of the city of Stuttgart. To turn the highly contaminated industrial brownfield into the “Quarter at Wiener Platz” with a mixture of residential, work, retail, and service spaces as well as social infrastructure, not only an urban-planning vision is needed but also a complete remediation of the contaminations. According to estimates, the remediation will be completed by mid-2018 and will cost approximately 23 million euro. Such a bad case of pollutant contamination is not something we deal with every day. The groundwater, the soil, and the building structures were heavily contaminated by hard chromium plating and anodization with chromate as well as with volatile chlorinated hydrocarbons (VOC). Parts of some adjacent areas, which were still in operation, were also affected. With our proven structured approach to the analysis and evaluation of contaminations with regard to an economically viable remediation concept, Arcadis supported this ambitious project from the beginning. As expected, the soil proved to be the most difficult part of the remediation. 50,000 m³ of soil have to be replaced, in some areas down to a depth of 12 meters. The “mountain” has almost been moved, the remediation of the area is already at an advanced stage, and new construction can begin in the near future.
Arcadis is the leading global design and consultancy firm for buildings, environment, infrastructure, and water. In the past year, our experts have worked on flood protection in New York, the metro network in Paris, and wind energy in the Baltic Sea.

As a market and technology leader, we have contributed to solving complex global challenges such as climate change, shortage of resources, urbanization, and mobility for more than 100 years. A team of 27,000 employees develops sustainable solutions across the world for both industrial and public clients.

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