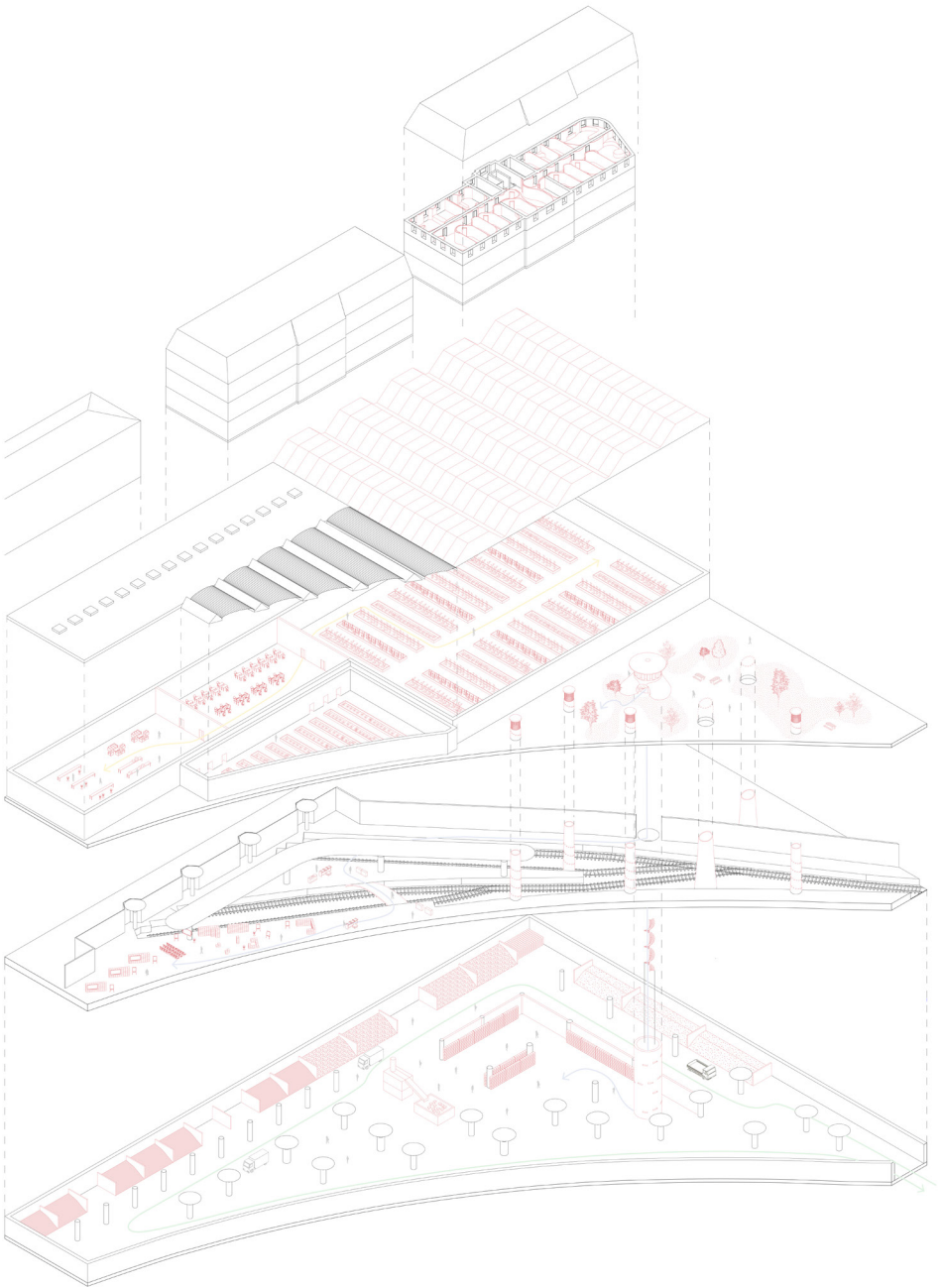


Research Booklet

Down to Earth Remedies

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Introducing our project

Shockingly, 85% of Lausanne's soil is polluted with dioxins, with 16% exceeding acceptable thresholds requiring remediation. This situation, dating back to the 1960s, was ignored until 2021. The first victims are locals whose playgrounds remain toxic and gardens unusable. Our aim is restoring what is rightfully theirs, healed soil. La Rasude becomes a nexus, integrating soil remediation logistics, research, analysis. The purified soil generates nontoxic building materials, creating a regenerative cycle. Through healing soil, we heal the city.

Level of potential
dioxin/furan pollution
*In nanograms of toxic
equivalent per kg of soil
(ng TEQ/kg)*

From 20 to 50
From 51 to 100
From 101 to 200
More than 200



The hatched areas represent the investigation threshold for polluted soils, i.e. a concentration greater than 20 ng TEQ/kg. These areas require in-depth analysis to assess the severity of the contamination. This area covers around 85% of the municipality of Lausanne, reflecting the scale of the problem.

Map of polluted soils in Lausanne



Public park area	Rental building area	Private residential area
$\frac{143'689 \text{ m}^2}{28'737 \text{ m}^3}$	$\frac{41'010 \text{ m}^2}{8'202 \text{ m}^3}$	$\frac{273'857 \text{ m}^2}{54'771 \text{ m}^3}$

Above 100 ng TEQ/kg, the clean-up threshold is crossed. Soils reaching this concentration must undergo specific treatment to eliminate the pollutants. These worst affected areas are shown in dark shading on the map and represent 16% of the territory.

This situation changed again in 2023 and the affected area was extended.



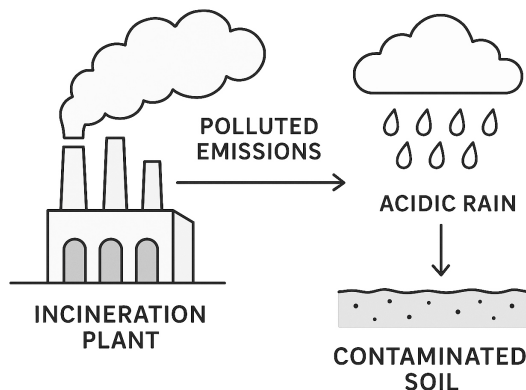
Origin of the pollution

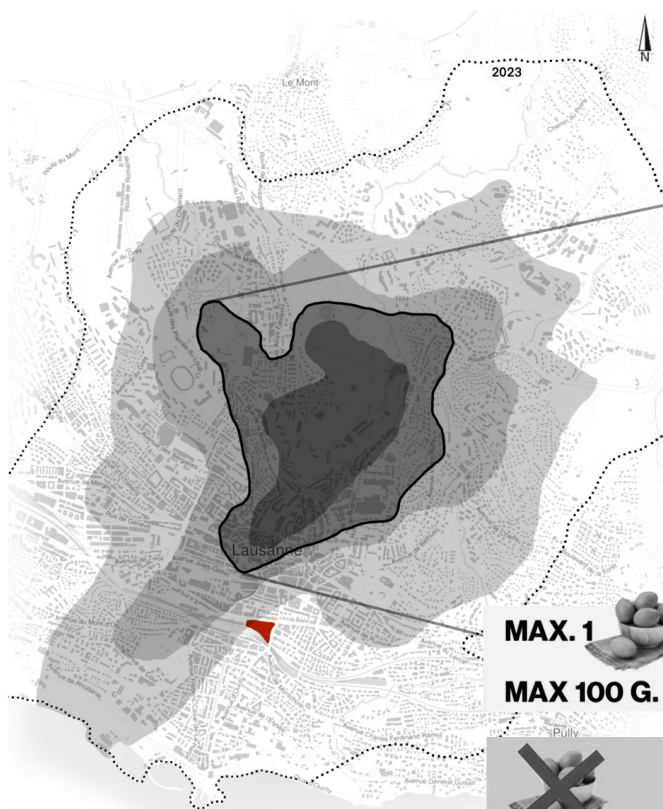
The Le Vallon plant was commissioned in 1958 and closed in 2005. It burned around 60,000 tonnes of waste a year. In its early days, the plant did not filter its flue gases. Emissions of around 7 kg/hour of sulphur dioxide and 8 kg/hour of hydrochloric gas were reported, contributing to the pollution of Lausanne's soil through rainfall. This situation was not unknown at the time. In addition to the ashes, the city was covered in 'bruchons', a kind of black greasy paste left over from the incineration of waste. Even today, residents still talk about it as part of their daily lives: this substance was deposited on cars, on bedding exposed to the air, irreparably soiling washing powder and even penetrating into flats, where it covered the walls.

It was the Ordinance on Air Pollution Control (OPair), which came into force in 1985, that put an end to this situation and prompted factories to equip their facilities with high-performance fume filters.

Following this change, flue gas scrubbing proved extremely effective against chlorides and fluorides, retaining over 90% of hydrochloric and hydrofluoric acid, which represented a significant reduction in the overall pollution emitted.

Since then, this story has been forgotten, until 2021, when work began on analysing the site's soil. The results were clear: the soil was heavily polluted with dioxins.





MAX. 1  / SEMAINE

MAX 100 G.  / SEMAINE


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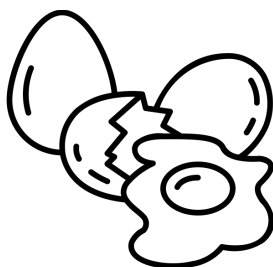
Current consequences

Today, the consequences are severe. Almost the entire municipality of Lausanne and its immediate surroundings are affected by pollution. Residents have had to give up eating eggs from their hens, and some have gone so far as to throw them away in the forest. Consumption of animal flesh is also not recommended, as dioxins are lipophilic: they accumulate in fat. Vegetables should also be avoided, especially cucurbits, which tend to absorb more of these toxic substances. These recommendations vary according to the degree of contamination in each area, but the general advice is to avoid all consumption of products grown on the land in the region concerned.

The Director General of the Environment for the canton of Vaud, Cornelis Neet, has issued a warning not to eat eggs at all.

The risks of eating eggs are serious. Dioxins are cell disruptors: they promote the development of cancer, affect fertility and disrupt the immune system.

The population, now aware of the situation, is expressing its anger at the lack of communication and care on the part of the authorities. Many residents are unaware of the exact dioxin levels on their own plots of land. Some are carrying out their own soil analyses and are planning to lodge a complaint against the municipality of Lausanne.





Ville de Lausanne



MESURES DE PRÉVENTION D'USAGE

Une pollution des sols aux dioxines a été détectée sur ce site.

En respectant les mesures suivantes, la pollution ne présente pas de menace imminente pour la santé:



NE PAS MANGER DE TERRE.
PORTER UNE ATTENTION
PARTICULIÈRE AUX ENFANTS
EN BAS ÂGE



NE PAS JOUER
AVEC LA TERRE



ACCÈS LIMITÉ À 3X/SEMAINE
AUX ENFANTS EN BAS ÂGE



SE LAVÉ LES MAINS APRÈS
L'ACTIVITÉ À L'EXTÉRIEUR

Vous avez des questions ?

Consultez la page: → www.vd.ch/sols-dioxine

Information
informelle
Information
informelle



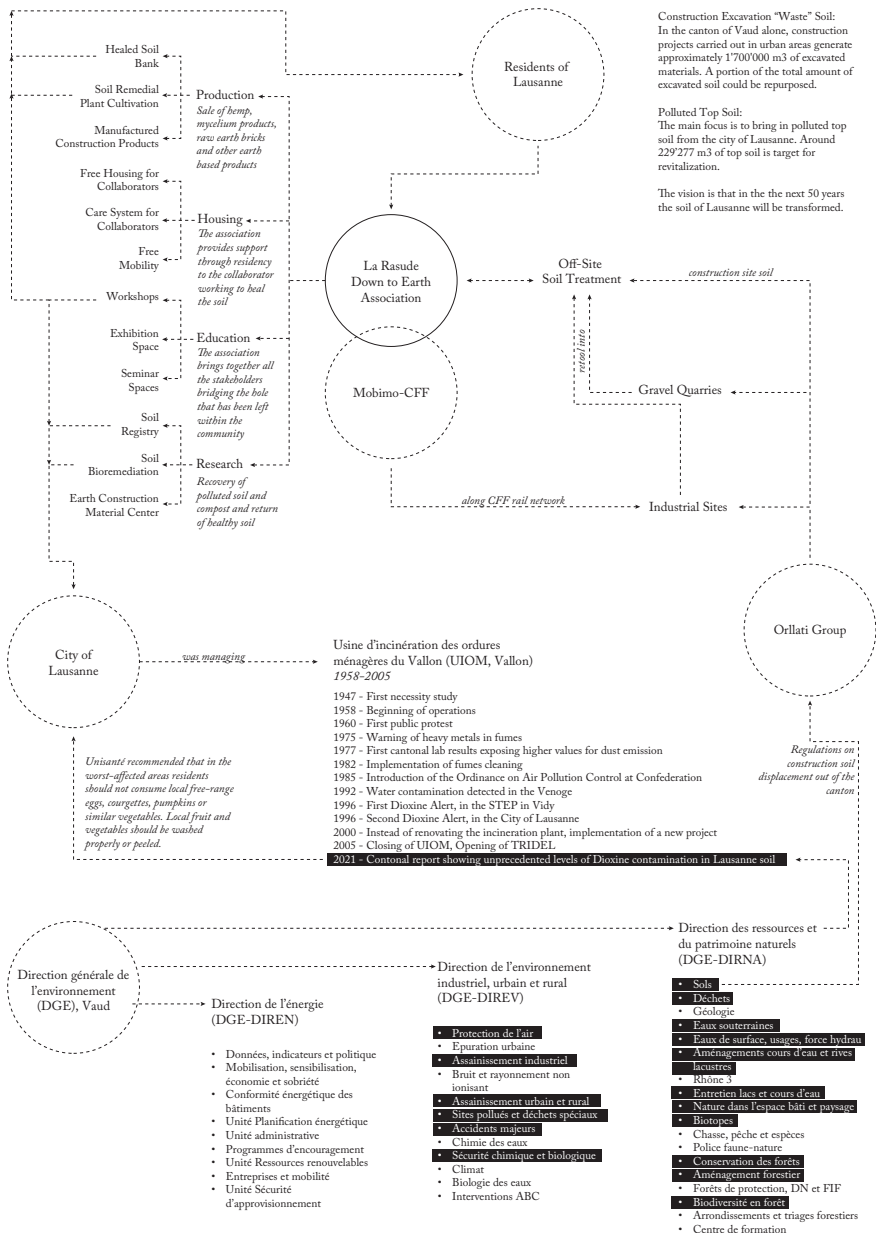
Since this problem came to light, the city has commissioned Impact-Conseil SA to carry out soil analyses on its territory, with the aim of understanding the distribution of pollutants, in particular by tracing the movements of soil since the 1960s. To date, hundreds of analyses have been carried out, enabling the approximate delimitation of contaminated areas.

Preventive measures have also been put in place to inform the public. In particular, signs have been put up in some public parks to warn parents of the risks of children coming into contact with soil.

Today, companies such as the Orlatti Group offer a system for cleaning all types of lightly polluted soil. But this only involves spreading the soil and rinsing it with water.

At the same time, the canton of Vaud has commissioned the Tibio laboratory, based in Chavornay, to carry out bioremediation research targeting these dioxins. Researchers are currently studying bacteria capable of degrading dioxins. Initial results are promising: in a controlled environment, these bacteria are able to halve the concentration of dioxins within a month. However, a major challenge remains: the high dispersion of dioxins in the soil. For the bacteria to break them down effectively, they must first locate them, which is not guaranteed. Sometimes they feed on other, more accessible organic compounds. Current research is therefore focusing on methods for directing or forcing bacteria to specifically target dioxins.





Our solution : Administrative strategy

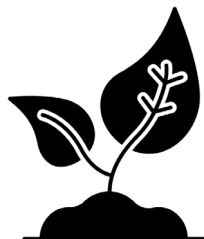
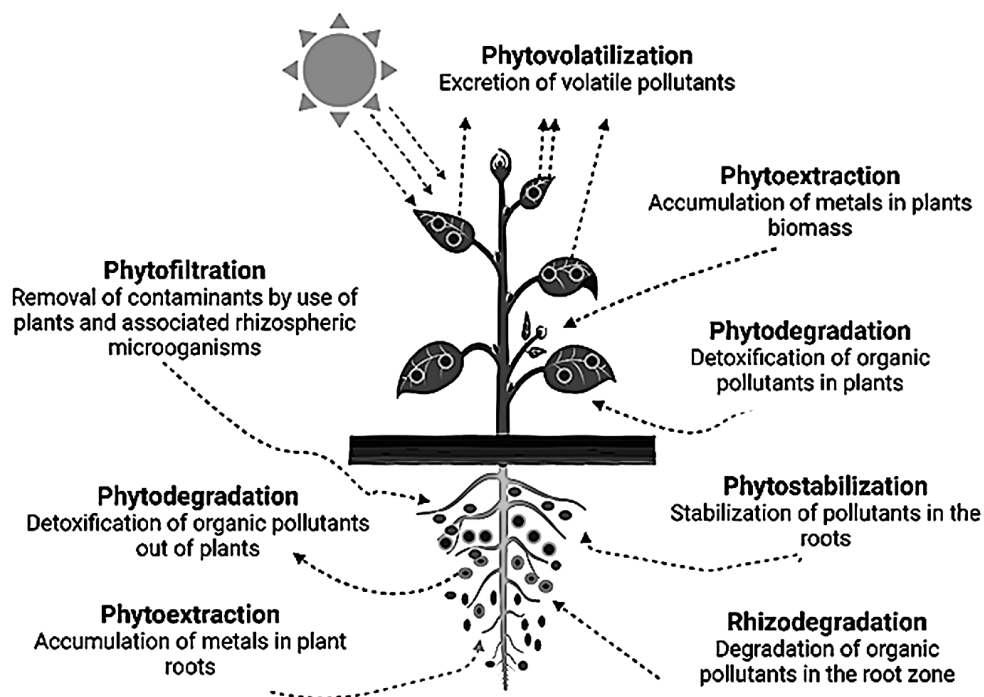
Faced with the dioxin pollution affecting Lausanne, our aim is to create an independent structure, the Down to Earth association, to coordinate and pursue long-term clean-up efforts. This association was founded in close collaboration with the Municipality of Lausanne and the Canton of Vaud, who are also contributing to its funding. Their support is explained by the fact that they could, in time, be considered co-responsible for this historic pollution.

To establish our base of operations, we will lease the La Rasude site from SV Rasude, a joint venture between Mobimo and SBB. This site will become the logistical heart of our action, a nerve center dedicated to the coordination, processing and distribution of remediated soil. Our primary mission remains clear: to decontaminate Lausanne's polluted soils and return healthy soil to its inhabitants free of charge.

To finance this free, voluntary activity, we have set up a circular business model. We valorize the products resulting from our research, in particular the plants used in bioremediation and natural materials such as raw earth bricks and mycelium-based insulation. These products are marketed on a small scale, in a spirit of solidarity economy, in order to generate the resources needed to keep the association running smoothly.

Down to Earth thus embodies a socially and scientifically responsible response to the problem of climate change.



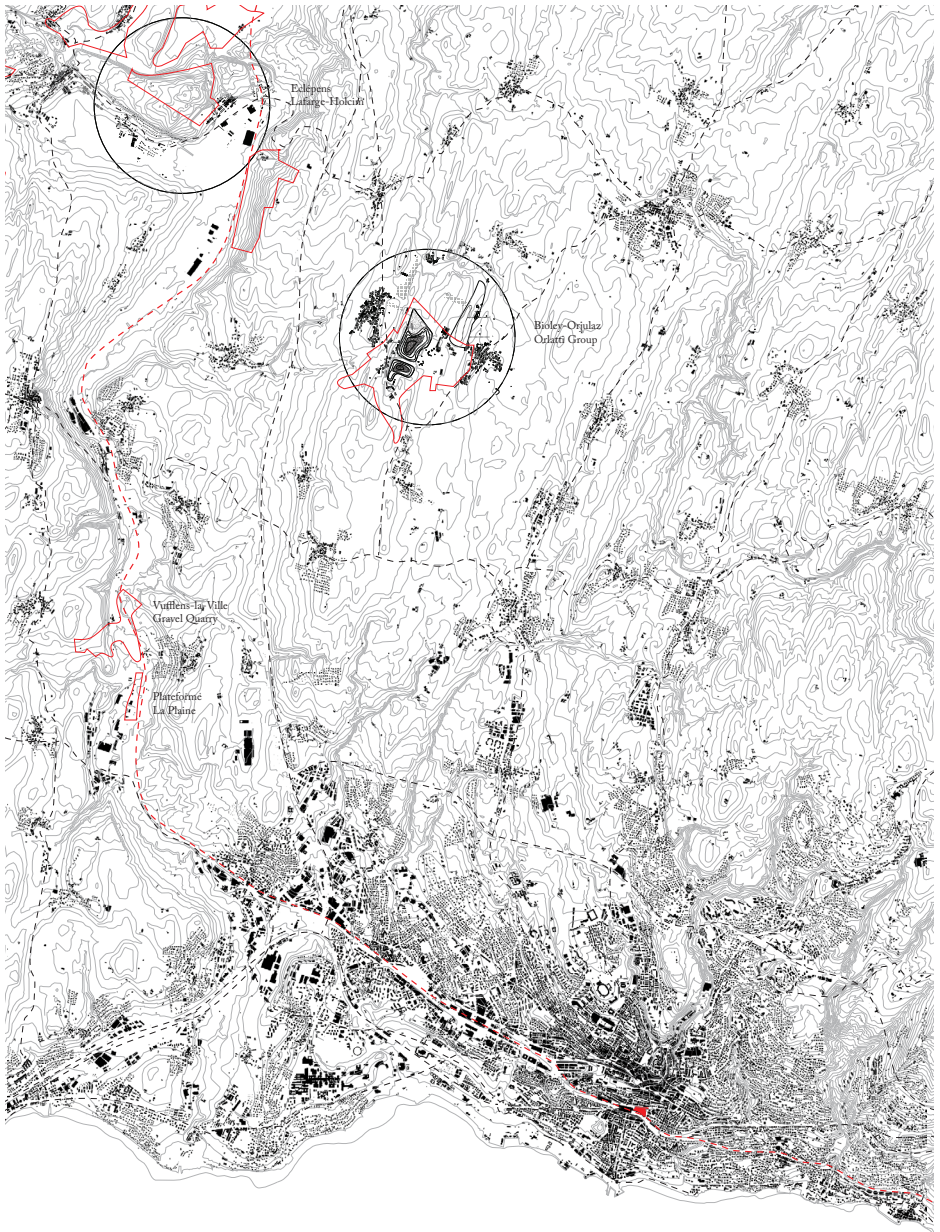


Our solution : Phytoremediation

Our remediation strategy is to use bioremediation, or more precisely phytoremediation, to clean up Lausanne's polluted soils.

Phytoremediation refers to the use of plants and their associated microorganisms to limit, biodegrade or mineralize pollutants in the soil. These ecological techniques can be applied directly to a wide variety of polluted soils (agricultural soils, industrial wasteland, excavated sediments, etc.), in both rural and urban environments. They are often perceived as more compatible with the principles of sustainable development than conventional on-site and off-site treatment methods (such as excavation, thermal desorption, incineration, etc.), while having a positive impact on soil structure and functions. These approaches represent an alternative or a complement to conventional techniques, particularly in the case of large-scale pollution.

There are various methods and mechanisms involved. Phytostabilization, phytoextraction, phytodegradation and phytostimulation. Here we focus on phytoextraction and phytodegradation. They all involve the absorption or degradation of pollutants present in the soil by their roots or aerial parts (stems, leaves). Phytoextraction, for example, enables these pollutants to be stored in plants, and is mainly used to treat metal pollution, using so-called "hyperaccumulator" plants or species with a high biomass, whose plant matter can then be recovered in various forms (wood-energy, compost, eco-materials, methanization, biofuels, etc.). Hemp, sunflower and mycelium are just some of the plants that are effective at absorbing and degrading toxins. Bacteria that feed on toxins can also be used to degrade them, but these methods are still poorly understood and researched.



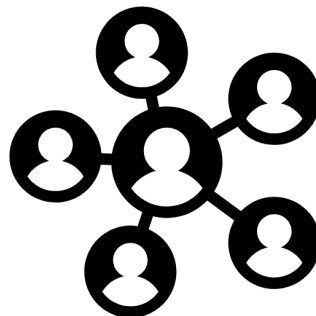
Our solution : Treatment strategy

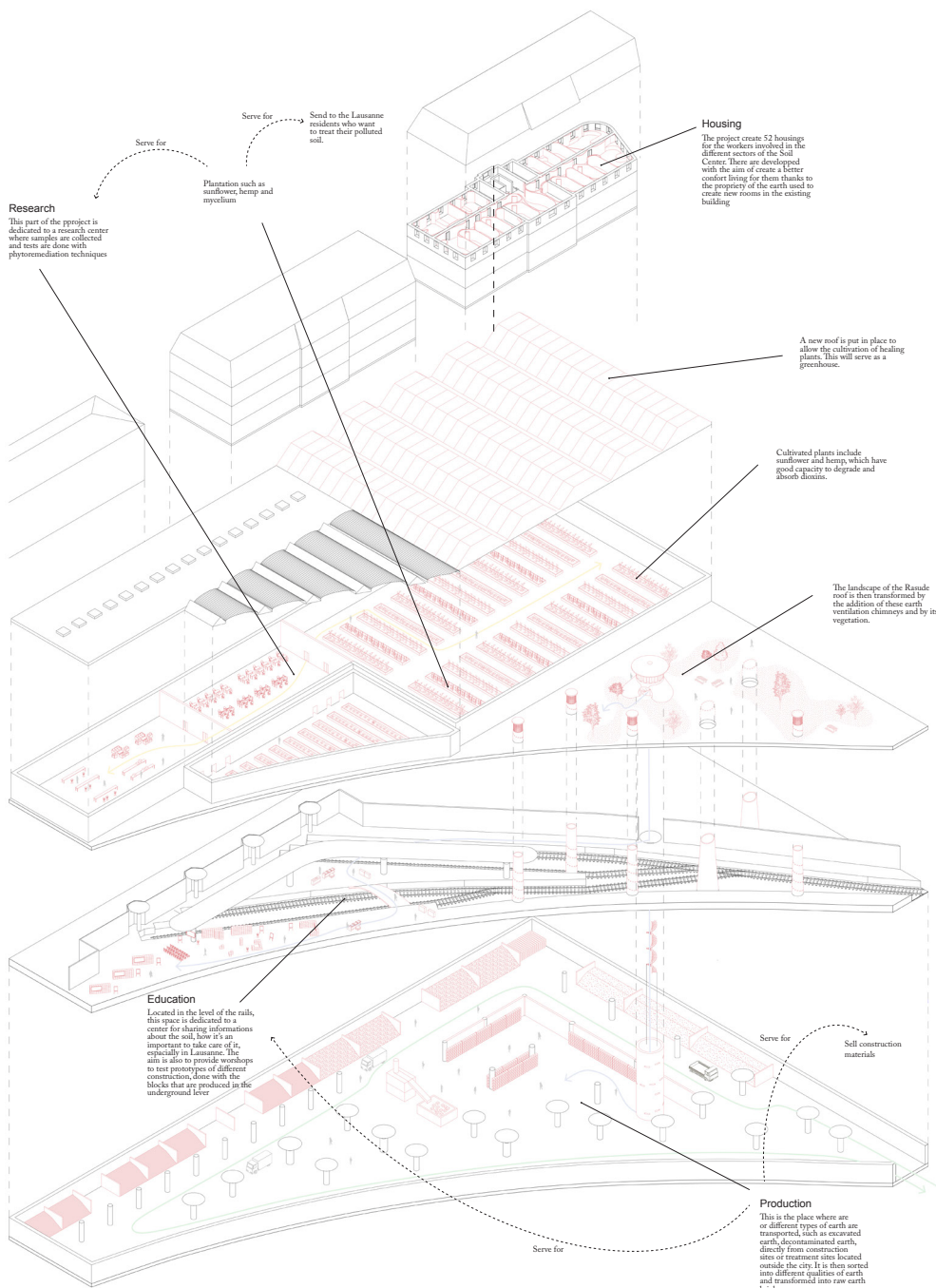
When it comes to managing polluted soil, the scale of the task far exceeds the capacity of La Rasude alone. With over 100,000 m³ of soil requiring treatment, originating from private gardens, collective housing plots and public green spaces, our strategy is to proceed gradually and decentralise operations. We envision a network of remediation sites connected to La Rasude by the existing CFF railway lines, allowing soil to circulate efficiently while keeping the central coordination on-site.

La Rasude will act as the nerve centre of this remediation web — a strategic hub orchestrating the movement, analysis and distribution of bioremediators across the region. Much like the centre of a spider's web, it will remain connected to multiple outposts, ensuring responsiveness and cohesion across the network. Each external remediation point will be installed on repurposed industrial lands, prioritising locations with direct rail access.

One key example is the former gravel pit at Vufflens-la-Ville, just 15 minutes by train from La Rasude. These types of sites are ideal: already altered, no longer in use, and often located adjacent to rail infrastructure. By transforming them into remediation zones, we give them a new ecological function without consuming untouched land.

This rail-connected model allows us to scale the project without compromising its ecological integrity. It also reinforces La Rasude's status as a magnetic regional hub — centrally located, well-served and capable of anchoring an entire system of regenerative logistics. Looking ahead, we imagine a dedicated rail network growing from this initiative, linking soil, science and sustainability across the canton.





Our solution : overwhole

The aim of our proposal is to gradually decontaminate Lausanne's soil, with the aim of returning it to its inhabitants free of charge. The scale of the project means that we need to consider a number of different operations, depending on the nature of the soil, the status of the land and the degree of pollution found.

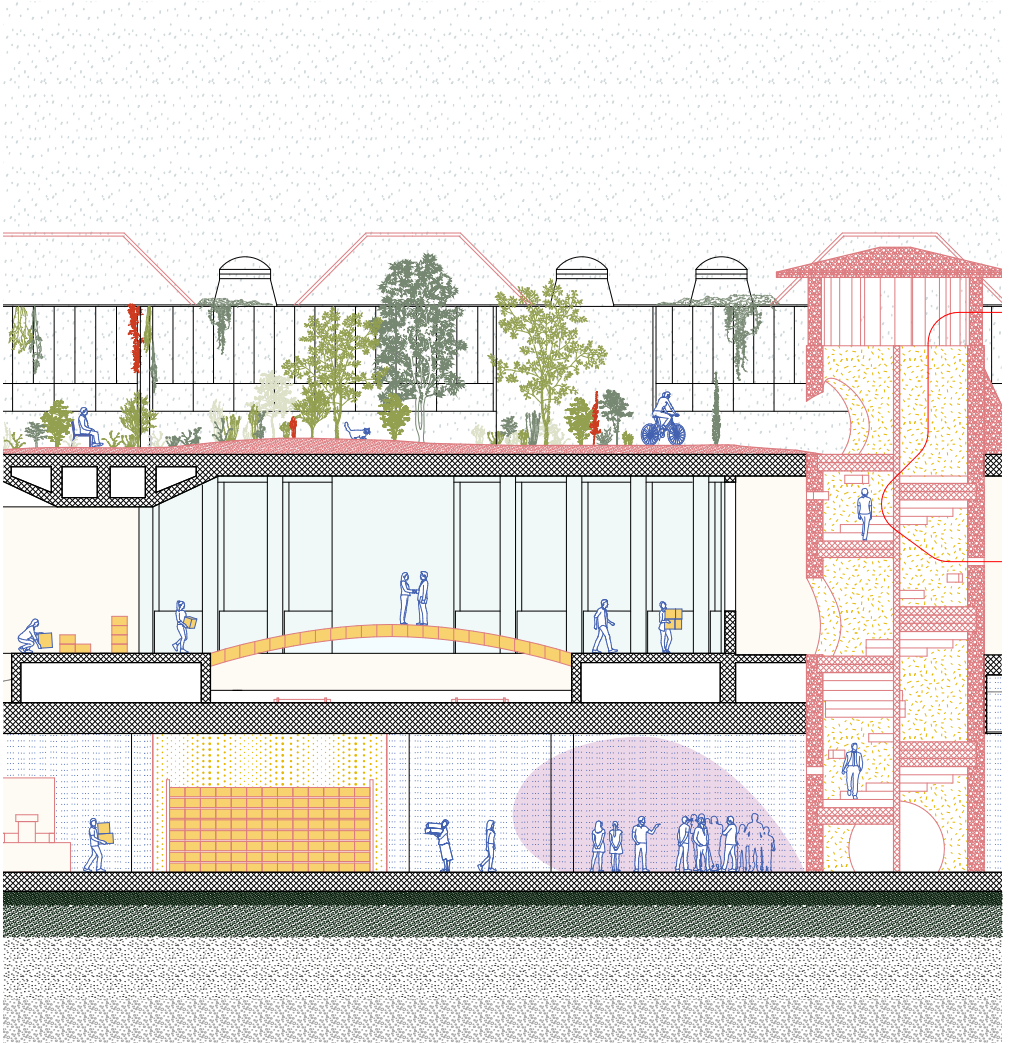
Initially, our aim is to build up a stock of healthy soil, which will serve as the project's initial capital. To do this, we will concentrate on excavated soil from nearby building sites, which we will process outside our area of operation.

Secondly, we are proposing to reallocate the La Rasude site as a regional logistics base for decontamination operations. This centralised hub will bring together logistics, research, analysis and production activities, as well as awareness-raising and workshop programmes.

A sample analysis laboratory will be set up there, offering the public a free service for measuring the dioxin content of their soil, meeting a strong demand. Like the Tibio laboratory, this centre will also be involved in research into natural bioremediation, exploring the potential of fungi, plants, earthworms and other living organisms.

The underground car park will be transformed into a production area for these bioremediators, using soil to be treated in a controlled environment.

To finance all these services at no cost to the public, part of the premises will be dedicated to raising awareness: a permanent exhibition on soil will be on display, as well as a tour of our facilities, accompanied by workshops on soil as a building material. A building in the La Rasude complex will also be converted into a hotel to accommodate participants in the activities on offer.



Our solution : research / education

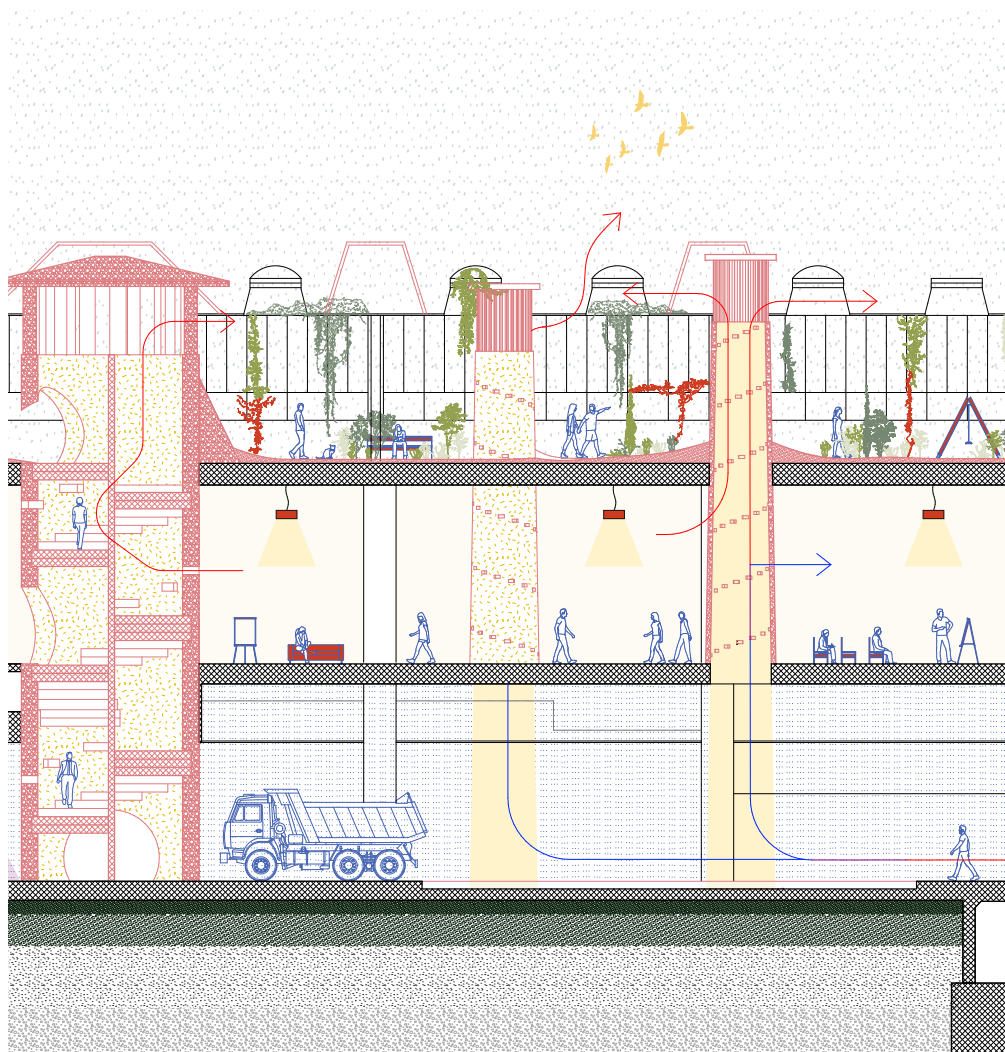
A portion of the excavated soil collected through our operations will be stored directly on the La Rasude site. Unlike the volumes dedicated to decontamination, this specific stock will serve primarily as a resource for experimentation and education. Part of it will be used by our laboratory teams as a reference material for sample testing and calibration. Another portion will become the foundation for our research into bioremediation techniques, enabling us to simulate various conditions and monitor the efficacy of natural decontamination processes in a controlled setting.

These tests will involve living agents such as fungi (notably mycelium networks), phytoremediative plants, earthworms and a variety of beneficial microorganisms. By working directly with the earth, we will be able to fine-tune our understanding of how these organisms interact with pollutants, soil structures and each other — insights that will directly inform our remediation strategies on the

ground. This ongoing research will be made visible to the public as part of the site's educational mission, offering visitors a rare, tangible look into the living science of soil regeneration.

Alongside this, we will maintain a separate reserve of non-contaminated earth — a precious material in its own right. This clean soil will be used to produce construction materials directly at La Rasude. Within the repurposed underground levels, a dedicated production space will manufacture compressed earth blocks (CEBs) and prefabricated pisé panels.

But this space is not only for production — it is also open to participation. We will host hands-on workshops where members of the public can learn traditional and contemporary techniques of building with earth: crafting CEBs, forming pisé walls, mixing and applying earthen plaster, and more. These activities connect citizens to the materiality of soil, not only as a living substrate but as a vital, beautiful and versatile component of our built environment.



Our solution : production

La Rasude site will also serve as a production hub for a range of finished products, developed from natural and local resources. Our underground facilities will be equipped with machinery including presses for compressed earth blocks to manufacture sustainable building materials such as pisé, CEBs, and other earthen components. These materials will be made available to nearby construction sites.

Beyond construction materials, we will also cultivate plants with proven bioremediation capabilities. These species, grown on-site, will be distributed free of charge for use in contaminated areas across Lausanne. By deploying them in both public and private spaces, we contribute not only to soil regeneration but also to the greening of the city. We are also growing hemp for its impact on pollutants but as well for its potential in construction, like insulation or hempcrete.

Alongside plant-based remediation, we are also developing fungal technologies. Our laboratories will cultivate mycelium, which plays a key role in natural decontamination processes. But its applications go further: mycelium can also be used as a construction material. We are researching and producing mycelium-based insulation panels and even bricks.

Lastly, our production efforts extend underground as well. We are cultivating earthworms, which play a crucial role in soil restoration through their natural aeration and nutrient cycling. These worms, along with specific microbial cultures, will be packaged into bioremediation kits. Distributed freely to Lausanne residents, these kits will empower citizens to practice in-situ soil regeneration directly at home or in their communities, turning individual gardens into micro-laboratories of ecological repair. It doesn't pollute, but heals. It is a space where biology, ecology and construction converge to invent new ways of inhabiting and repairing the urban environment.



Our solution : logement

To support the smooth operation of our activities at La Rasude, we are also proposing an innovative housing solution for the workers involved in the project including scientists, logistics personnel, office staff, workshop leaders and exhibition coordinators. All will be accommodated directly on site, free of charge, in exchange for their active contribution to the project. This arrangement fosters a sense of community and shared purpose, while reducing commuting-related emissions and strengthening the collective spirit of the initiative.

The existing buildings on the La Rasude site will be carefully repurposed to provide these living spaces. Rather than demolishing the structures, we will retain the original load-bearing framework, ensuring minimal environmental impact and preserving the memory of the site. Within this skeleton, we will construct new, fluid interior spaces using earth-based materials. These organic partitions will follow curved, non-linear lines, giving rise to a new architectural language inspired by natural forms.

This approach breaks away from the rigidity and angularity of conventional interiors, introducing instead rooms that feel more organic, enveloping and serene. Natural textures and the warm ochre tones of earth will dominate the visual language, while the malleable nature of the material allows for continuous surfaces such as walls that seamlessly transition into horizontal kitchen counters or seating alcoves. This fluidity contributes not only to aesthetic appeal but also to functional efficiency and ergonomic comfort.

From a performance standpoint, raw earth offers significant advantages. Its thermal mass helps to regulate indoor temperatures by storing and slowly releasing heat, creating a stable and energy-efficient living environment. Acoustically, the density of earthen walls softens ambient noise, enhancing both privacy and calm. Furthermore, earth's hygroscopic properties naturally regulate humidity, absorbing excess moisture and releasing it as needed, contributing to a healthier indoor climate.



Our solution : comfort

More broadly, our project on the La Rasude site promotes a new approach to comfort — one that is more natural, less energy-intensive, and deeply rooted in vernacular techniques. This philosophy extends not only to the design of our housing units but to the entire site, where raw earth plays a central role as both material and symbol. By reintroducing ancestral practices and embracing the thermal and aesthetic qualities of earth, we seek to redefine what it means to live and work sustainably in an urban context.

One of the most emblematic examples of this approach is the installation of wind towers, inspired by the traditional badgirs of the Middle East. These vertical structures serve to naturally ventilate and illuminate the underground levels of La Rasude, particularly the existing car park, which no longer meets current ventilation standards and would otherwise require costly renovation work.

Rather than relying on energy-heavy mechanical systems, we propose a passive and elegant solution: circular openings will be created in the existing concrete slabs, following the precedent of the opus circular, an architectural gesture made several years ago in the same location. These voids will host raw earth towers that channel natural airflow, leveraging the chimney effect to extract stale air and introduce fresh currents. They will also act as light wells, bringing daylight into previously dark, inert spaces.

Some of these towers will serve a dual function, integrating staircases that connect different levels of the site. In doing so, they become both infrastructural and sculptural elements — organic vertical links between the subterranean and the surface, between past wisdom and present needs. Through these interventions, La Rasude becomes not only a technical site, but a living demonstration of architecture in harmony with the earth and the climate.



Conclusion

Through this project, we are directly engaging with one of the most pressing environmental issues in the Lausanne region — a hidden pollution crisis that, after decades of silence, has resurfaced with urgency. Restoring this land and making it safe again for its inhabitants is not only a technical necessity but a moral imperative. Our mission is clear: to detoxify the soil, return it freely to the people, and transform a legacy of neglect into an opportunity for healing and regeneration.

But beyond remediation, our goal is also cultural. We aim to reconnect the public — citizens, professionals, students and policymakers — with the very substance beneath their feet: earth. This material, often overlooked or discarded, holds incredible potential. Earth regulates temperature and humidity, absorbs sound, and provides a naturally soothing atmosphere. It enables the creation of organic, curved spaces that feel alive and grounded, offering visual and psychological comfort far removed from the rigid lines of conventional construction.

Our project is also anchored within existing material and actor networks, which we aim to reactivate and transform to generate regenerative practices and resources. By working with what already exists — infrastructures, materials, knowledge — and reorienting them toward ecological goals, we weave new value into the local fabric and amplify collective resilience.

Through architecture, education and hands-on engagement, we want to help people rediscover the intelligence of earth as both a material and an ecosystem. It is beautiful, functional, abundant — and fragile. We must learn to protect it, to work with it rather than against it, and above all, to stop polluting and wasting it.

Earth is not just the ground we walk on. It is a living medium for building, breathing and belonging. And it deserves our full respect.



