CONTAMINATED SOIL

An example of how one Chicago neighborhood, Pilsen decided on a strategy to protect residents from contaminated soil in their community garden.

PLANNING CONCERNS:

The Pilsen project leaders had three main priorities when deciding on their strategy:

COMMUNITY

- Create a safe place for children to play
- Provide health education for families
- Complete project on schedule
- Use remediation as demonstration

SITE DESIGN

- Insure safe construction
- Proper mitigation of soil contaminants (Lead and Mercury)
- Design for proper rain water drainage

CLIMATE + ENVIRONMENT

- Ensure environmental health and safety
- Use brown field best practices
- Choose proper plants
- Limit airborne lead from disturbing the soil
- Ensure environmental healthy and safety

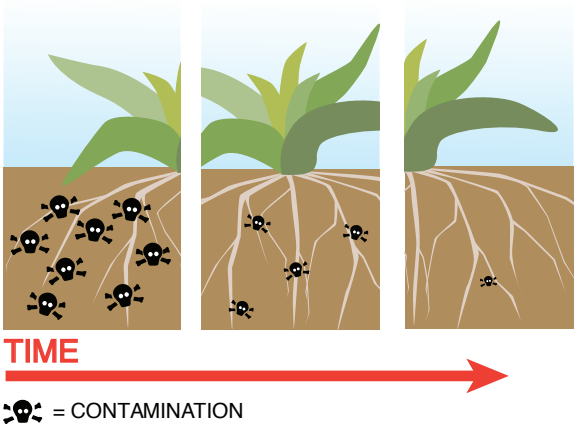
STRATEGIES CONSIDERED:

Conversations with Field Museum partners, the City of Chicago Department of environment, and Region 5 EPA brought about a number of different options for protecting plants and people from this type of contamination.

OPTION 1:

Cleaning the soil with plants

There are many species of plants that are metal hyperaccumulators. This means their roots attract and break down heavy metal contaminants in the soil. This process for soil cleansing takes a long time, at least a couple of years.



OPTION 2:

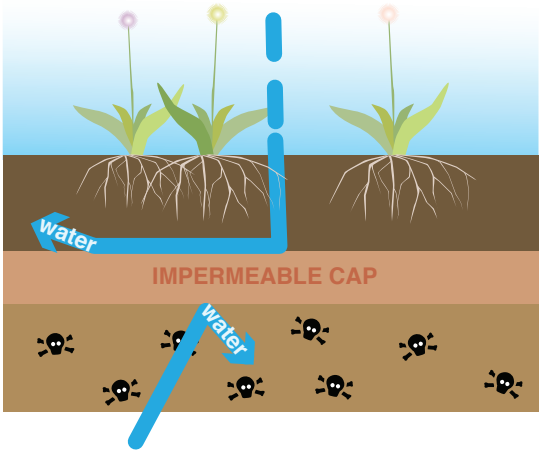
Removing contaminated soil

Removing six to twelve inches of contaminated soil and replacing it with soil that is proven to be clean. One problem with this solution is that it involves contaminating an additional site by dumping the toxic soil somewhere else.

OPTION 3:

Using an impermeable cap

When sites have very high levels of dangerous toxins then measures have to be taken to keep rain water from drawing the toxins up to the surface. Clay caps can be used to cover a site before building it out, yet in some cases this solution will cause flooding.



OPTION 4:

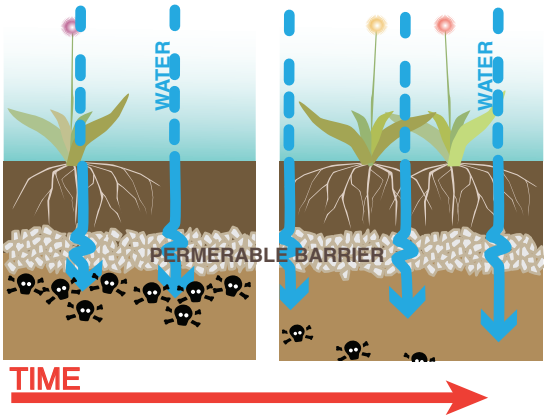
Building raised planting beds

It is recommended that all urban edible gardens be planted in raised planter boxes or some place out of contact with urban soil. Yet for this project our plan did not involve growing food.

OPTION 5:

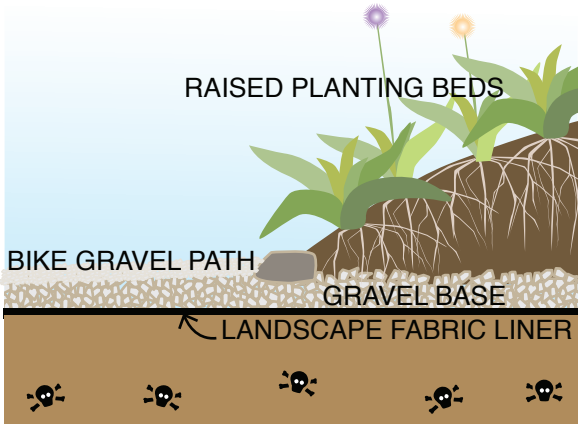
Using a permeable barrier

Many urban gardeners use permeable barriers to stop contaminated soils from mixing with the fresh soil of their raised beds and to cover garden pathways. Permeable products include landscape fabrics,mulch, gravel and sand. A permeable barrier allows water to flow down into the soil, which can help to push contaminates deeper underground, away from the surface.



DECISION:

To use permeable barrier, raised planting beds and plant metal hyperaccumulators.



Working with an environmental engineer and a landscape architect the team of Pilsen community leaders decided on a design solution that includes a permeable barrier of landscape fabric and gravel to cover the contaminated site. The planting beds are designed to be raised hill forms, and the rain garden on the site will incorporate metal hyperaccumulators that will help mediate the constant seep of pollution that the Pilsen neighborhood incures from nearby industry.

When making their decision the team decided that removing soil did not fir into their plan for creating a replicable demonstration site. Removing soil would also cause additional air-born lead to pollute the neighborhood. The location of the site made it vert important to account for rain water drainage in the design, so a permeable barrier was chosen rather than an impermeable cap. The site is intended for use by the local neighborhood residents and their children, so extra precaution was taken to insure a safe environment in the garden.