



# Soil Contamination in the City: Approaches to Remediation and Reducing Exposure

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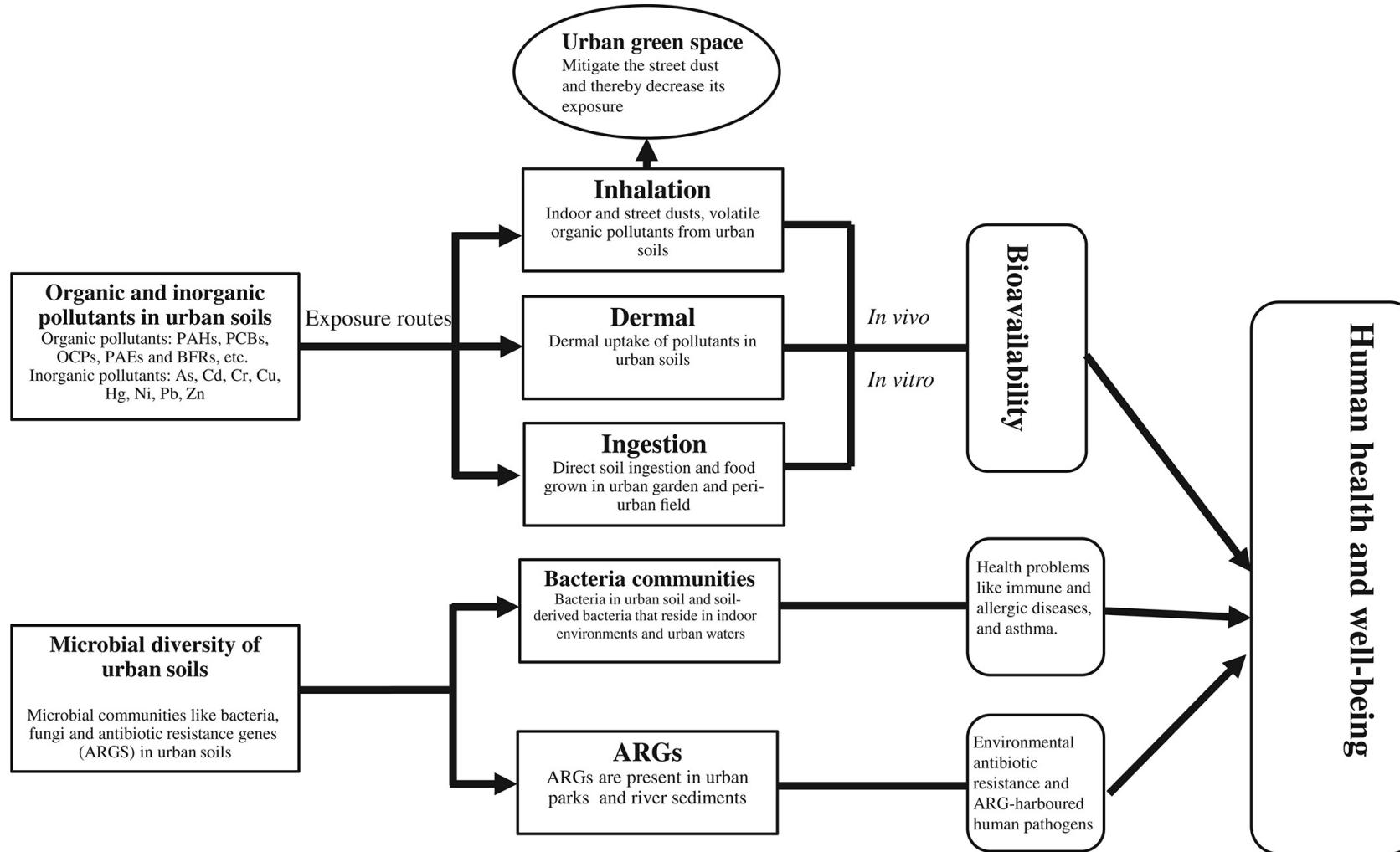
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Public Health



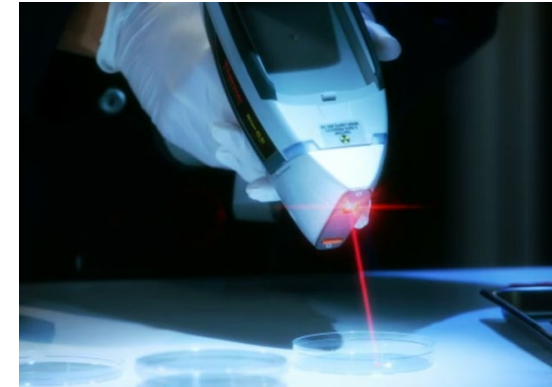
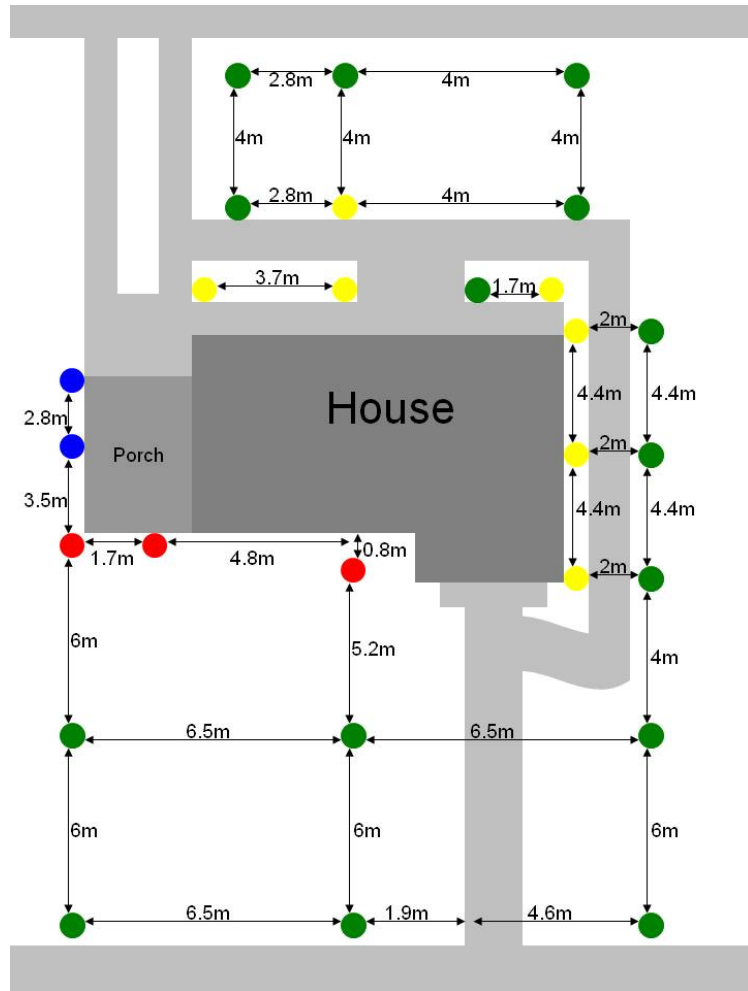
# Common urban soil contaminants

General source	Examples of previous site uses	Specific contaminants
Paint (before 1978)	old residential buildings; mining; leather tanning; landfill operations; aircraft component manufacturing	lead
High-traffic areas or near roadways	next to trafficked roadways or highways; near roadways built before leaded fuel was phased out	lead, zinc, polycyclic aromatic hydrocarbons (PAHs)
Treated lumber	lumber treatment facilities; structures built with treated lumber	arsenic, chromium, copper, creosote
Burning wastes	landfill operations	PAHs, dioxins
Contaminated manure	copper, zinc salts added to animal feed	copper, zinc
Coal ash	coal-fired power plants; landfills; homes with coal furnaces	arsenic, selenium, cadmium, sulfur
Biosolids	wastewater treatment plants; agriculture	cadmium, copper, zinc, lead, persistent bioaccumulative toxins (PBTs)
Petroleum spills	gas stations; residential/commercial/industrial uses (anywhere an aboveground or underground storage tank is or has been located)	PAHs, benzene, toluene, xylene, ethyl benzene
Pesticides	widespread pesticide use, such as in orchards; pesticide formulation, packaging, and shipping	lead, arsenic, mercury, dichlorodiphenyltrichloroethane (DDT), chlordane, and other chlorinated pesticides
Commercial or industrial site use		PAHs, petroleum products, solvents, lead, and other heavy metals (such as cadmium, arsenic, chromium, lead, mercury, and zinc)
Dry cleaners		stoddard solvent and tetrachloroethene

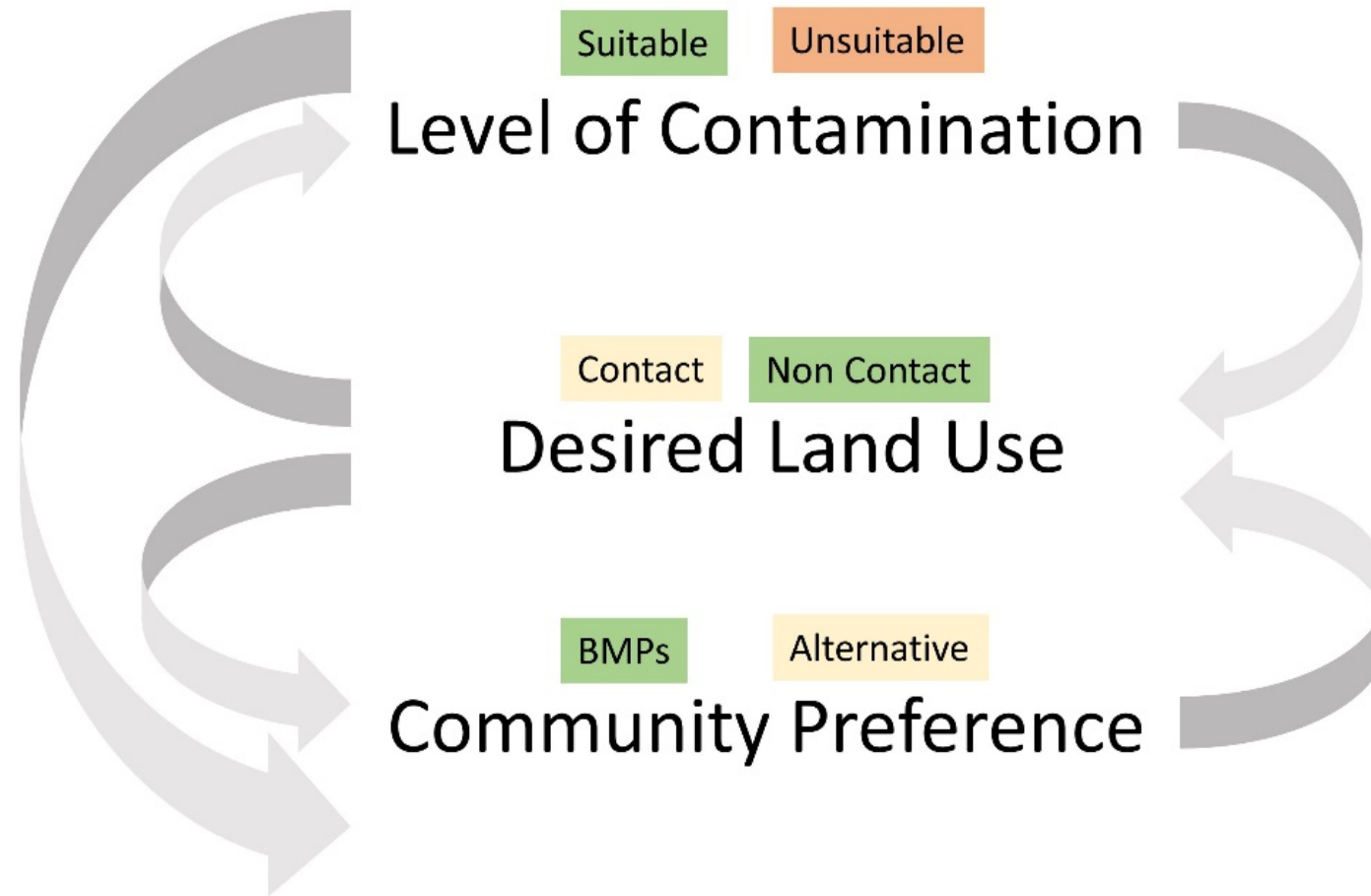
# How they impact health



# Lead as an example

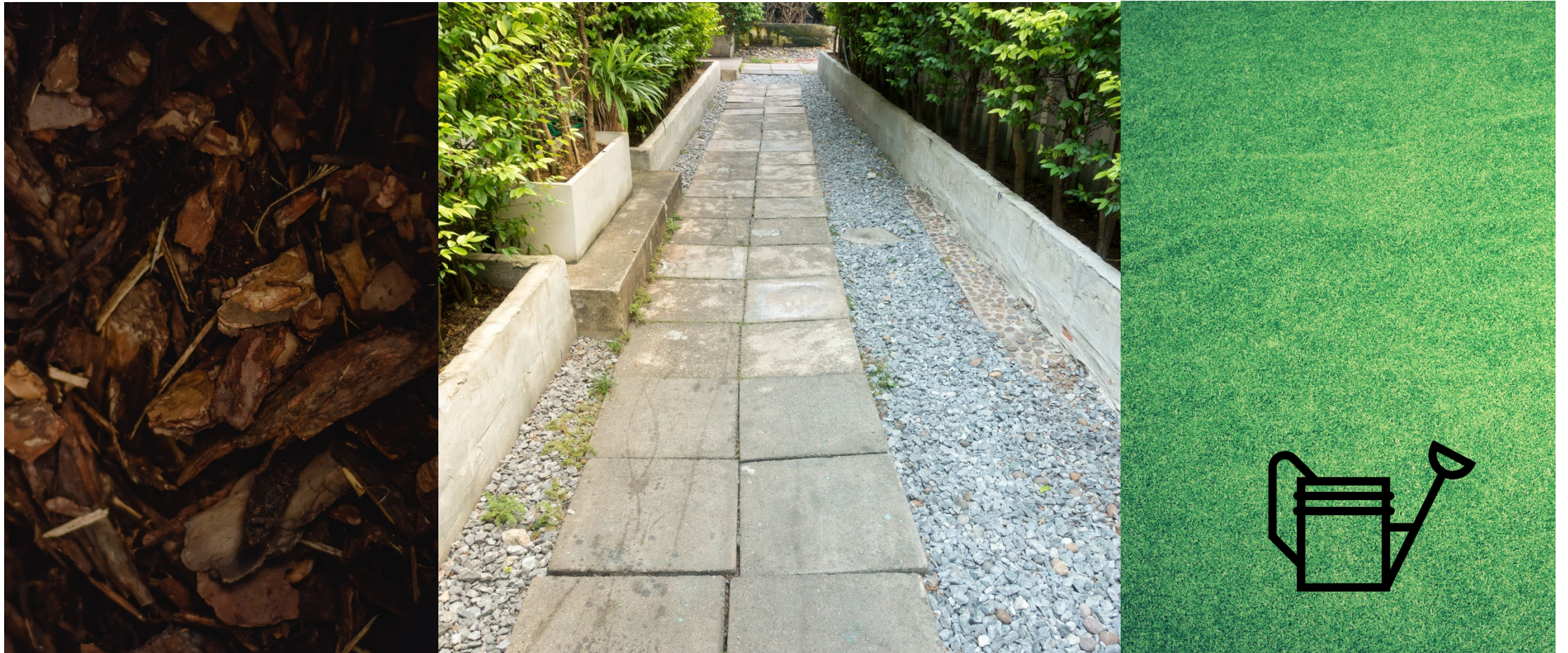


# A framework for soil lead management





# Reducing contact with soil





# Covering contaminated soils



Using clean Mississippi River alluvium to cover contaminated soil.

Median surface soil lead, >1,000ppm to 6ppm.

New Orleans, approx. 86,000 homes >400ppm , cost \$225.5 and 290.4 million.

# Soil removal

At some levels necessary,  
but there are high costs.

Issues with disposal.

Soil systems take a long  
time to develop.

Given the extent,  
widespread  
implementation not  
feasible.



Photo Credit: Dennis Oda, *Star Advertiser*



# Phytoremediation



Using plants to remove, degrade, or sequester pollutants.

Often requires mobilizing lead so that it's available for uptake.

While phytoextraction is not a viable option, phytostabilization may be an effective tool.

# Soil amendments

Amendments can make lead less bioavailable, i.e. able to enter tissues of plants or animals.

Phosphate, compost, fertilizers, biosolids, and others.

Adding amendments can also dilute the amount of lead in soil.

Soil properties can change, may require monitoring. Tradeoffs, phosphates can increase the solubility of soil As.





# Gardening as solution?

**Soil management** - many of the same properties that gardeners manage in an effort to maintain soil health and fertility also reduce potential exposure to Pb.



## **Social network and community building**

Urban gardens are places of social transformation – while vacancy leaves holes and disconnects communities, networks of gardens can grow in and connect.



# Working towards system level solutions





# Community testing models

## LEAD AWARENESS AND ACTION DAY

Saturday, July 21st 10am - 1pm  
61 Franklin Street Community Garden  
(rain date Sunday, July 22 10am - 1pm)

### Featuring:

- FREE SOIL TESTING  
provided by NYC Urban Soils  
Institute on site, bring a soil sample  
from your yard or nearby park!
- ADVOCACY AND  
RESOURCE INFORMATION  
from Neighbors Allied for  
Good Growth (NAG)
- REPRESENTATIVE  
from Montefiore Lead Poisoning  
Treatment & Prevention Program
- KIDS ARE WELCOME!  
Children's coloring/drawing  
activity in the garden
- COMPOST GIVEAWAYS  
from Soil Cycle
- LIGHT REFRESHMENTS  
will be provided

Brought to you by Greenpoint Eco-Schools  
Program, PS120 P.S., 61 Franklin Street  
Community Garden and the Greenpoint  
Community Environmental Fund



## FREE SOIL SCREENING FOR LEAD EVALUACIÓN GRATUITA DE PLOMO EN EL SUELO



For more local information /  
para más información local:  
CT Department of Public Health, Lead Poisoning  
Prevention and Control Program-  
[www.ct.gov/dph/lead](http://www.ct.gov/dph/lead)  
CT Local Health Departments-  
<https://tinyurl.com/yxhu45zf>  
Agency for Toxic Substances and Disease Registry  
(ATSDR) soilSHOP webpage-  
<https://www.atsdr.cdc.gov/soilshop/index.html>

**When:** Wednesday, August 7, 2019  
10:00 a.m. - 4:00 p.m.  
at the 109th Plant Science Day

**Where:** LOCKWOOD FARM  
890 Evergreen Avenue,  
Hamden, CT 06518

*Bring a soil sample in a ziplock plastic bag, and  
we will screen it for lead on-site!  
(Soil Collection Information in next graphic)*

*Traiga su muestra de suelo en una bolsa  
ziplock y le haremos un análisis de detección  
de plomo!  
(Información sobre recolección del suelo se  
encuentra en la próxima imagen)*



## FREE SOIL LEAD TESTING

with soil contamination and  
remediation information

ALLEGHENY COUNTY  
CONSERVATION DISTRICT  
BLACK URBAN GARDENERS  
AND FARMERS CO-OP (BUGs)  
AND PARTNERS

**APRIL 8TH**  
11:30 to 1:30

**Central Baptist Church**  
*parking lot at corner of:*  
Kirkpatrick St. and Centre Ave.

Join the Allegheny County  
Conservation District and  
partners on April 8th to learn why  
soil lead contamination is a serious  
problem in Pittsburgh. Bring a properly  
collected, dry soil sample from your  
yard or garden and we will screen it for  
lead and other heavy metals free of  
charge. Staff will be on hand to answer  
questions and provide information.



FOR MORE INFO ON SOIL COLLECTION, CONTACT:  
JONATHAN BURGESS (ACCD) @ (412) 291-8017

Instructions on how to collect a soil sample can be found at:  
<http://www.growpittsburgh.org/start-a-garden/growers-resources/soil-compost/>  
see Soil Sampling diagram on reverse

# NYC clean soil bank & PUREsoil as models



Recycles clean native soil from deep excavations at construction sites to other NYC construction sites, both public and private.

PUREsoil NYC is a new program from the Mayor's Office of Environmental Remediation that makes clean soil available to community-based organizations to improve the quality of degraded soil in NY.

Soils, mixed with compost, had significantly lower contaminant levels and comparable crop yields (Egendorf et al. 2018)





# Avoiding the next lead

A Clean Soil Act?

[\*The World Food Prize Winner Says Soils Should Have Rights  
Earth Needs a Clean Soil Act\*](#)

Policy that connects across systems.

Accessible testing and remediation resources.

Solutions that don't place the burden of clean-up on individuals.

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# Resources

[Soils in Urban Agriculture: Testing, Remediation, and Best Management Practices](#), UCANR

[Our Soil](#), building health relationships with soil

[PUREsoil NYC](#)





*Thank you!*