# The City of Baltimore's Soil Safety Policy for Food Production

**Updated June 2021**

Baltimore Office of Sustainability
People · Planet · Prosperity

## Table of Contents



*This document is intended to:*

> *1. Provide requirements for preparing and submitting a Soil Safety Plan as part of the approval process for new Use Permits for community-managed open space gardens, farms, and urban agriculture sites in Baltimore City where plants are cultivated for human consumption.*
>
> *2. Provide guidance to the general public on reducing risk when growing food in Baltimore City.*

## Background & Acknowledgements

The urban agriculture movement – including backyard gardening, schoolyard gardening, community gardening, urban farming, and other forms of food production – is growing in popularity and momentum across the globe. The City of Baltimore has a robust urban agriculture sector, and in 2013 released *Homegrown Baltimore: Grow Local*, an urban agriculture policy plan (https://www.baltimoresustainability.org/projects/baltimore-food-policy-initiative/homegrown-baltimore). This document addresses the plan's Recommendation 3b, "Develop Soil Standards: Provide effective, accessible standards and guidance around identifying and managing soil contamination", and was originally released to the public in 2014, with this updated version released in 2021.

Baltimore City was founded in 1729, and, even in our parks and other natural areas, very little soil remains that has not been impacted by human activity. Most urban agriculture in Baltimore is taking place on vacant lots on which once stood houses or other structures. Due to this history, soil contamination, especially by heavy metals such as lead and arsenic, is a potential health concern for people cultivating and consuming urban-grown produce. Direct soil ingestion, especially by children, is the greatest area of concern when heavy metals are present.

The simplest way to minimize risk from contaminated soils is to limit contact with them. However, many people wish to grow in existing urban soils due to the high cost of new soil and/or a desire to embrace and enhance existing resources rather than bring in new ones. In the majority of cases, the soil at Baltimore City community gardens and farms has been found to be safe for use, but it is important to do your due diligence to make sure this is the case before starting a new project.

This document describes safety standards to which the average food producer in Baltimore City could reasonably adhere. The practices in this document will help you minimize exposure to the most commonly occurring contaminants in urban soils. Risk exists no matter where our food comes from – growing our own food at least gives us more control over its production conditions. We have an obligation to take reasonable precautions for safety, while acknowledging that it is impossible to avoid all forms of risk.

We are indebted to Thomas Klassen for his work in compiling materials for the original version of this document; to the Johns Hopkins Center for a Livable Future for their support in revisions and for their work on the Safe Urban Harvests Study (https://clf.jhsph.edu/projects/urban-agriculture/safe-urban-harvests-study), which has greatly expanded our understanding of soil and produce safety in Baltimore City; to the many others who have provided feedback; and to everyone using agriculture to make Baltimore a more sustainable, resilient, and equitable place.

## Soil Safety & Use Permits

Soil Safety Plans are required when you are applying for a Use Permit for a community-managed open space garden, farm, or urban agriculture site in Baltimore City where you intend to grow food for human consumption. Use Permits should be obtained if you are making a new garden or farm the primary, permanent use of a piece of public or private property. If the use of any structure or land is changed without a Use Permit, fines may be assessed and a Stop Work Order may be issued by the City of Baltimore, which can trigger further fines if violated. Other activities, such as construction or grading of greater than 5,000 square feet of land, may also trigger the requirement for a permit. For more guidance on when and how to obtain permits, visit: https://dhcd.baltimorecity.gov/pi/permits. If you are still not sure if you need a permit, call the Baltimore City One Stop Permits Shop at 443-984-1809, or visit 417 E. Fayette Street, Room 100, Baltimore, MD 21202.

## Soil Safety Plan Submission

Soil Safety Plans should be in the format on page 3 below, and may be submitted in person, by mail, or by email. Within 30 calendar days of receipt, applicants will be notified whether submittals are approved, approved with conditions, not approved, or whether additional information is required. Approval will be dependent on the thoroughness and appropriateness of your plan based on the guidance provided on pages 4-6 below. You may contact the Baltimore Office of Sustainability with questions before or after the submission of your Soil Safety Plan. If your Soil Safety Plan is approved with conditions or not approved, you will be provided with an explanation, and can resubmit with a new plan or, if you've amended or remediated your soil, with new test results. While there is a cost associated with applying for a Use Permit, there is no additional cost for review of your Soil Safety Plan, or for re-review.

To submit your Soil Safety Plan, or for questions:

*Baltimore Office of Sustainability*
*Abby Cocke, Environmental Planner*
*417 E. Fayette St., 8th floor*
*Baltimore, MD 21202*
*410-396-1670*
*Abby.Cocke@baltimorecity.gov*

## Soil Safety Plan Form

Name of person submitting the plan:

Email and/or phone number of person submitting the plan:

Address(es) and/or Block & Lot number(s) of the site for which you are seeking a Use Permit:

**Please check one or more boxes below and respond to the question(s) in italics that follow it. You may attach additional pages if needed.**

☐ I will be growing food in existing soil on site, in soil or compost from off-site mixed with existing soil, or in soil or compost from off-site placed on top of existing soil without a barrier.

If an Environmental Site Assessment was performed for the site by a professional within the last five years, please attach it (this is required in certain cases – see the list in italics on page 4 below).

*If you performed your own assessment, please describe:*

*1) How you assessed the site's history and what historical uses you found.*

*2) The current conditions at the site, including whether you have identified any potential hot spots for soil contamination in areas of the site where you intend to grow food.*

*3) How you tested soil in areas where you intend to grow food covering, at a minimum, lead and arsenic. Attach test results, and include separate testing results for any potential hot spots.*

*If contamination at levels that could be harmful to human health was found or is suspected, please describe the steps you are taking or intend to take to mitigate risk (see "Additional Information" on pages 6-8 below for guidance).*

☐ I will be growing food in soil or compost from off-site, and will separate existing soil from new soil or compost.

*Please list the source(s) of the new soil and the type of separation between existing and new soil.*

☐ I will be growing food using a soil-less method.

*Please describe the soil-less growing method you intend to employ.*

_____

Reviewer only – Date Received: _____ Date of Response: _____ Approved / Disapproved / Incomplete

## Guidance for Creating Soil Safety Plans

Growing in Existing Soil

If you intend to grow food using one of the following –

a) existing soil on your site,
b) new soil or compost mixed with existing soil, or
c) new soil or compost placed without a barrier over existing soil

– you will need to describe the steps you have taken to understand potential risk factors. Growing food in existing soil at your site may be a higher-risk option, but that risk can be minimized by doing a thorough investigation and taking some simple steps to improve your growing area before starting. The first and most important step is assessing your site for potential sources of soil contamination.

*Environmental Site Assessments*

One way to assess your site is via an Environmental Site Assessment (ESA). ESAs come in two phases. A Phase I ESA is an investigation of potential risks based on history and visual assessment, generally performed by a professional engineer or geologist. No soil testing is involved. The purpose of a Phase I ESA is to provide recommendations, if any, for further testing. A Phase I ESA typically costs over a thousand dollars, and is generally performed for new development projects. A Phase I ESA may include a recommendation to perform a Phase II ESA, a more expensive process which involves testing soil and developing a plan for cleanup if needed. ESAs are considered to be valid for five years. If you have a valid ESA for your site, you can attach it rather than performing your own assessment. For more information on ESAs: https://www.epa.gov/sites/production/files/2020-07/documents/assessing_brownfield_sites.pdf

Please note that if you find any of the following past uses at your site – *automobile maintenance or repair shop, car wash, dry cleaners, hazardous material storage or transfer, industrial or chemical manufacturing, industrial lagoon or pit, landfill or junkyard, machine shop or metalwork shop, railroad tracks or yards, or wood preserving shop* – and still intend to grow in or on existing soil without a barrier, a valid ESA is **required** in order to receive approval for your Use Permit. This should include a Phase I ESA, a Phase II ESA if recommended by the findings in Phase I, and documentation of any cleanup activities recommended in Phase II.

As long as your site was not used for one of the uses listed in the preceding paragraph, it is acceptable to perform your own site assessment. There are two parts to site assessment – assessing site history and assessing current conditions.

*Assessing Site History*

Knowledge of the activities that occurred at your site in the past is essential to understanding potential soil contamination risks. Record ALL past land uses you find, and submit the list as part of your Soil Safety Plan, along with a brief explanation of the type(s) of research you performed. There are several methods for assessing a site's history. You should start with the first method, and then proceed to the next two methods as needed.

1. Historic records such as Sanborn Maps are an excellent resource for determining the past uses of your site. Sanborn Maps are large-scale plans drawn at a scale of 50 feet to an inch. They were created to help fire insurance companies assess risk. They identify street names and numbers, building materials, and, in many cases, building uses. Sanborn Maps for Baltimore City are available from 1890-1982 for free through the Enoch Pratt Free Library. Sanborn Maps from 1890-1953 may be accessed digitally (https://www.prattlibrary.org/research/databases/maryland-dc-sanborn-maps) with a library card number. However, the digital maps are not in color and may be difficult to read in some cases. They also do not include the final edition of the Baltimore City Sanborn Maps, which was updated in 1982. In order to access color

versions of the maps, and to see the 1982 set, you can visit the Maryland Department at the Central Branch of the Enoch Pratt Free Library. Staff there can assist you in finding your site and in interpreting the maps.

2. Internet research can help you round out your understanding of your site's history. Sites such as Historical Aerials (https://www.historicaerials.com/viewer) can help cover the gap in time between when Sanborn Maps stopped being produced and the present. While they do not provide the same level of detailed information, you can at least see whether there were structures on the site. From there, you can perform a web search for your site's address to look for further clues as to past uses. This is not always the most reliable way to find information, but it may turn up something you could have otherwise missed.

3. Finally, you can talk to neighbors and local community associations to find out what they know about past uses on or around your site. You can also consult organizations such as the Baltimore City Historical Society (https://www.baltimorecityhistoricalsociety.org/) to see if they can help with information about your site.

Remember that if your assessment of your site's history finds any of the uses listed in italics in the section on Environmental Site Assessments (ESAs) on page 4 above, you will be required to either attach an ESA to your Soil Safety Plan in place of continuing with your own assessment, or to choose a different growing method that does not involve using existing soil.

*Assessing Current Conditions*

In addition to understanding your site's past, it is important to perform a thorough visual inspection of its current condition to identify any potential "hot spots" of contamination, i.e. places where contamination is more likely and where you need to test the soil separately if you intend to grow food there. Your assessment of current conditions should include information on:

- Adjacent uses and slopes. Take notes on how land is being used on the properties immediately surrounding your site, particularly any that are located uphill of your site, from which contaminated runoff could flow (see the table of potential sources of contamination at the top of page 9 below).

- Ruts, bare spots, or standing water. These can indicate areas where rainwater runoff tends to flow and collect during storms. If contamination is suspected, it is likely to be higher in these areas.

- Illegal dumping. If trash or other debris has been dumped at your site, take notes on what you found and where before you clean it up. Certain items, such as oil cans or old batteries, could contaminate the soil in that spot.

If applicable, you may wish to draw a map of your site which shows slopes and has labels for any potential hot spots, though it is acceptable to simply describe the conditions.

*Soil Testing*

Now that you understand as much as you can about your site, the next step is testing the soil. All sites in Baltimore City where you intend to grow food in or on existing soils without a barrier should be tested for **lead and arsenic** at a minimum, with separate testing for any potential hot spots. Describe what you tested for, who conducted the test, and attach the results. A broader heavy metals panel that includes cadmium and nickel is recommended, but not required.

At-home soil testing kits should **NOT** be used for assessing soil safety, as they are primarily meant for assessing nutrients, not contaminants, and may be unreliable. There are a number of university labs that offer affordable and reliable soil testing services to the public. Different labs use different methods of testing. We recommend choosing a lab which uses EPA Method 3050, Mehlich 3, Morgan, or Modified Morgan extraction, as other methods may produce less reliable results. For guidance on how to collect soil samples for testing, and information on universities that provide soil testing and analysis services: https://clf.jhsph.edu/sites/default/files/2019-03/suh-soil-testing-guide-2019.pdf

Growing in Soil from Off-Site

You can significantly lower the risks associated with soil contamination by growing food in soil that you bring to your site from a trusted source and that is kept separate from existing soil. While this is not a guaranteed method of eliminating risk, soil imported from off-site has generally been found to create safer growing conditions in Baltimore City compared to existing soils. If you intend to grow food **only** in soil brought onto your site from another location, and kept separate from existing soil on site, describe the source(s) of the new soil and how you will separate new soil from existing soil.

Acceptable sources of new soil include professional landscaping companies and land that been used for farming for multiple years and that is regularly tested for safety. **You may still wish to test soils brought in from off-site,** but doing so is not required for your Soil Safety Plan. For more information on the regulation of compost and soils for sale in Maryland: https://clf.jhsph.edu/sites/default/files/2019-03/suh-compost-faq-2019.pdf.

Acceptable methods of separating new soil from existing soil include removing and fully replacing the top 12" of existing soil; growing on top of concrete or asphalt (if growing on asphalt, another barrier such as landscape fabric or plastic sheeting is also required); growing in structures or containers with bottoms made of hard plastic, clay, or untreated wood; or putting a barrier over existing soil, such as tear-resistant woven landscape fabric, heavy-duty plastic sheeting, or a 4"+ thick layer of gravel, before adding new soil. A layer of mulch, wood chips, or clay can also help separate new soil from existing soil, but is not sufficient alone. These barriers should be maintained each growing season and replaced if penetrated or worn out.

Soil-less Growing Methods

You can avoid the risks associated with soil contamination by not using soil at all. If you intend to grow food using a method that does not require soil, describe your growing method. Examples include hydroponics and aquaponics (growing plants in water) and aeroponics (growing plants with their roots exposed to the air).

## Additional Information

Concerns Specific to Commercial Urban Farms

Because commercial farm workers spend far more hours in close contact with soils than most home gardeners or community garden members, their health may be at greater risk from soil contamination. Stronger consideration should be given to using imported soil at commercial urban farms. If you are growing in existing soil, you should create a worker safety plan following best management practices for limiting exposure to soil. For support creating a worker safety plan, contact the University of Maryland Extension's Urban Agriculture program (https://extension.umd.edu/urbanag).

Lead (Pb)

Below are guidelines to help you interpret how to respond to levels of lead at your site:

- **0-50 parts per million (ppm)** or below of lead is equivalent to background levels of lead in soils and is of negligible concern.

- **50-400 ppm** of lead represents low risk, and is suitable for food production. However, children should limit contact with soils at these sites and parents should ensure that young children avoid getting soil in their mouths. Consider following best management practices, especially if there will be children on site.
- **400-999 ppm** of lead represents moderate risk, and any food production should be done carefully. Root vegetables and tubers should NOT be grown, as they tend to take up lead at higher rates. Best management practices should be followed (see page 8 below), and children under the age of six should NOT be allowed to interact with the soil. If children are on site, they should be closely monitored to ensure they are not ingesting soil. Pregnant women should be advised to limit soil contact to protect their unborn children. If your lead levels are in this range, any approval of your plan will include these conditions.
- **1,000 ppm or above** represents high risk. You should not grow food in or on this soil without a barrier, and may wish to consider choosing a different site for food production.

Arsenic (As)

There are no guidelines for arsenic levels in soils used for agriculture. 6.4 parts per million (ppm) is the average level of naturally occurring (or background) arsenic in soils in the US. Background levels in Maryland may be slightly higher or lower than the U.S. average, ranging from 3.6-11 parts per million. If your arsenic levels are above 6.4 parts per million, best management practices should be followed to limit contact with soils (see page 8 below), and your plan may be either approved with conditions or not approved, depending on the level found.

Other Contaminants

Many heavy metals tests include chromium, but unless chromium is of specific concern for your site based on your site assessment, high levels do not necessarily indicate cause for concern, as the typical tests available to growers do not distinguish between a safe, natural, and common version of chromium and an unsafe version of chromium generated by industry.

Our policy focuses on heavy metals because they are commonly found in the urban environment and their presence may not depend on how a site was previously used. It is important to note, however, that other soil contaminants are much more likely to be present if your site was used for certain purposes in the past. Unfortunately, most soil testing labs do not test for contaminants other than heavy metals. The reason for this is that testing for other contaminants tends to be much more expensive, and demand for these tests isn't very high.

Given this, it is important to recognize that a negative test result for heavy metals is good news, but it doesn't mean that other contaminants may not also be present. For this reason, investigating your site's history and prior uses is an important complement to soil testing.

The EPA's 2011 "Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices" (https://www.epa.gov/sites/production/files/2015-09/documents/bf_urban_ag.pdf) provides the following examples of past site uses that can cause various types of soil contamination:

| Land Use | Common Contaminants |
|---|---|
| Agriculture, green space | Nitrate, pesticides/herbicides |
| Car wash, parking lots, road and maintenance depot, vehicle services | Metals, PAHs, petroleum products, sodium, solvents, surfactants |
| Dry cleaning | Solvents |
| Existing commercial or industrial building structures | Asbestos, petroleum products, lead paint, PCB caulks, solvents |
| Junkyards | Metals, petroleum products, solvents, sulfate |
| Machine shops and metal works | Metals, petroleum products, solvents, surfactants |
| Residential areas, buildings with lead-based paint, where coal, oil, gas or garbage was burned | Metals, including lead, PAHs, petroleum products creosote |
| Stormwater drains and retention basins | Metals, pathogens, pesticides/herbicides, petroleum products, sodium, solvents |
| Underground and aboveground storage tanks | Pesticides/herbicides, petroleum products, solvents |
| Wood preserving | Metals, petroleum products, phenols, solvents, sulfate |
| Chemical manufacture, clandestine dumping, hazardous material storage and transfer, industrial lagoons and pits, railroad tracks and yards, research labs | Fluoride, metals, nitrate, pathogens, petroleum products, phenols, radioactivity, sodium, solvents, sulfate |

*PAHs = polycyclic aromatic hydrocarbons* *PCB = polychlorinated biphenyl*

Best Management Practices

Farmers and gardeners may come into contact with soil contaminants when they get soil into their mouths, by breathing soil and dust in the air, and through skin contact. You can reduce risks caused by contact with contaminated soil by mixing compost and/or new soil from a trusted source with existing soil, growing in raised beds, wearing gloves, washing hands after working in soil, taking care not to track soil into your home, thoroughly washing produce, peeling root crops and removing the outer leaves of leafy vegetables, building plots away from roads or creating a barrier to block windblown contamination, and covering soil in pathways with wood chips or another barrier.

For more details on best management practices and other guidance: https://clf.jhsph.edu/sites/default/files/2019-02/soil-safety-guide-for-urban-gardeners.pdf