



# ENGINEERED CONTROLS AT BROWNFIELD SITES

Engineered controls are physical barriers or systems designed to prevent the spread of contamination and reduce the risk of human and environmental exposure. At brownfields where reuse may be complicated by the presence of hazardous substances, engineered controls approved by the state environmental agency can play a key role in safe redevelopment and reuse.

There are many types of engineered controls, including:



## Soil Caps / Clean Soil Cover

Clean soil, mulch, gravel or other approved layers placed over contaminated areas to prevent direct human contact and reduce dust.



## Impervious Caps

Surface covers that isolate contaminated soil, prevent erosion and protect groundwater from infiltration of precipitation. May be designed to also prevent direct exposure.



## Vapor Barriers

Membranes installed beneath buildings to block chemical vapors from entering indoor air.




## Sub-Slab Depressurization Systems (SSDS)

Fan-driven system that prevent harmful vapors in soils from entering overlying buildings. Often coupled with vapor barriers.



## Groundwater Treatment or Containment Systems

Systems like pump-and-treat, air sparging, or permeable reactive barriers that clean or control contaminated groundwater.



Engineered controls and institutional controls must be reviewed and approved by the appropriate regulatory agencies with authority over the site.

## VAPOR INTRUSION MITIGATION

Vapor intrusion mitigation is a type of engineered control used to prevent harmful chemical vapors in the soil or groundwater from entering buildings through cracks or openings in the foundation. These vapors often come from pollutants left behind by past industrial or commercial activities, like dry cleaners, gas stations, or factories.

### Examples:

Vapor barrier, sub-slab depressurization systems, sealing cracks and openings

## MORE INFORMATION

Hazardous Building Materials  
Factsheet

[Community Guide to Capping](#)

## INSTITUTIONAL CONTROLS/LAND USE RESTRICTIONS

*Institutional controls and land use restrictions are tools used to protect people and the environment when contamination remains at a site, even after cleanup.*

Institutional controls are legal or administrative measures that help ensure land is used safely, especially at sites like brownfields or former industrial areas where some contamination may remain underground.

**Examples:** Land use restriction, environmental covenants, zoning changes, deed notice