# Indoor Air Quality Update for the Middle River Complex

*November 2021*

## Indoor Air Quality

Lockheed Martin's investigation of soil vapor and indoor air in and around buildings at the Middle River Complex indicate that indoor air quality is safe from chemicals used historically, and that employees who work in buildings do not need to be concerned about the quality of their indoor air. In the late 1990s Lockheed Martin began environmental evaluations at the Middle River Complex to assess impacts from former industrial operations and disposal practices that were commonplace in industry more than a half-century ago. Since then, Lockheed Martin has been actively investigating groundwater, soil, sediments, surface water, subsurface soil vapor, and indoor air quality at the site.

The primary contaminants of indoor air being investigated are volatile organic compounds (VOCs), which can move from contaminated soil under buildings into the buildings themselves through cracks in foundations and basement floors, and through sumps and utility openings via a process known as vapor intrusion.

## Vapor Intrusion Safety and Prevention Program

Lockheed Martin's vapor intrusion safety and prevention program comprises two basic components: 1) continued testing of indoor air and soil vapors to assure indoor air quality is safe, and 2) operation of vapor mitigation systems. The vapor mitigation consists of sub-slab depressurization systems (SSDSs) installed in A- and C-Buildings to capture volatile organic compound (VOC) vapors residing beneath the buildings' foundational slabs and discharging the captured vapor into the atmosphere at roof level. This mitigation activity prevents the VOC vapors from moving from under the floor into indoor air.

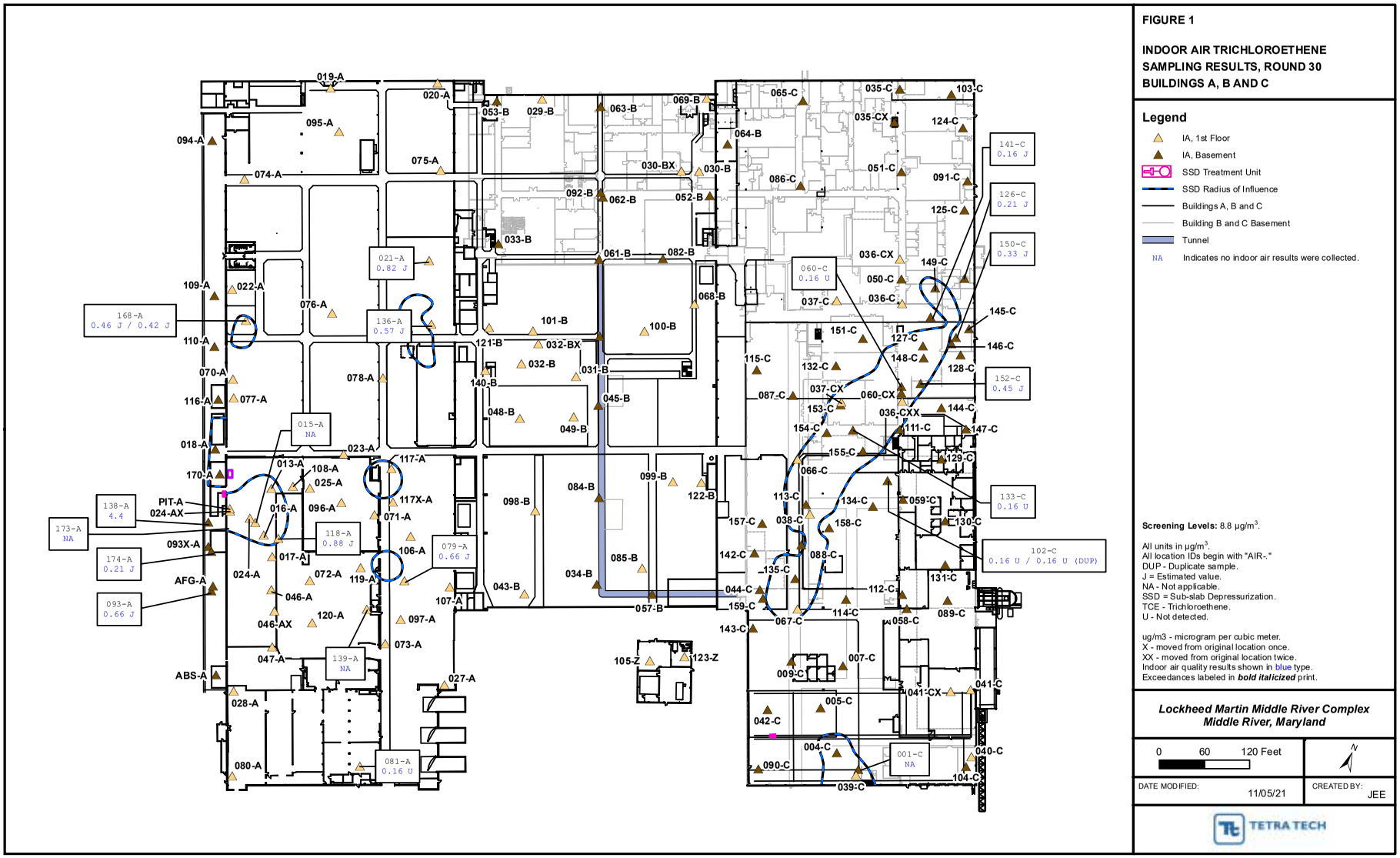
Between 2006 and July 2021, Lockheed Martin tested air quality inside A-, B-, and C-Buildings 30 times, and also tested the vapor in soil directly beneath these buildings, to ensure that indoor air quality at the Middle River Complex (MRC) is safe for workers. Sampling has been conducted generally twice a year to account for differences between summer and winter conditions, when heating, ventilation, and air conditioning can affect the rate at which subsurface soil vapors may be pulled into, blocked from entering, or pushed out of a building. Outside air is also monitored at locations around the buildings to measure any chemicals that might already be in outside air from other sources. This helps Lockheed Martin determine if any chemical vapors that might have been found inside the buildings are from ongoing site operations, outside sources, or from underneath the buildings.

Sub-slab depressurization systems (SSDSs) were installed beneath the former plating shop in the south end of A-Building and beneath the south end of C-Building basement in 2008 as proactive measures to minimize the potential for vapor intrusion. Each system has since been expanded to increase the overall areas beneath the floors where vapors are pulled into the system.

Indoor air concentrations in the main working areas of the Middle River Complex (MRC) have been consistently found to be acceptable. Few instances were found where the primary contaminant of concern, trichloroethene (TCE), exceeded the screening level (established by the Maryland Department of the Environment) of 8.8 micrograms per cubic meter. The last exceedance of this screening level in the main working areas of A-, B-, and C-Buildings was in the A-Building former plating shop in February 2015. When sampled at the same location in April 2015, TCE was not detected in indoor air.

## A-Building Basement Indoor Air Quality

Trichloroethene (TCE) has occasionally been found in the southern part of A-Building basement at concentrations greater than 8.8 micrograms per cubic meter. Workers' visits to this area of A-Building are typically short-term and

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*Trichloroethene (TCE) sampling results from February 2021 (Round 30) are shown for indoor air only in A- and C-Buildings and A-Building basement.*

infrequent. Because workers in the A-Building basement are typically exposed to air in the A-Building basement for only a short time, a basement-specific TCE screening level of 35 micrograms per cubic meter was developed and approved by the Maryland Department of the Environment. This screening level assumes that a worker will be safe at this exposure concentration if they do not occupy the basement for more than an average of 2 hours per day, 250 days a year, over a 25-year career. TCE concentrations detected in indoor air in the A-Building basement have never exceeded this basement-specific screening level.

**Indoor Air Quality Trichloroethene (TCE) Screening Levels**

| Location | Level of TCE in Indoor Air | Exposure Scenario |
|---|---|---|
| Main buildings | 8.8 micrograms of TCE in a cubic meter of indoor air | A worker can work safely in air with this level of TCE for an average of 8 hours a day, 250 days a year, over a 25-year career |
| A-Building Basement | 35 micrograms of TCE in a cubic meter of indoor air | A worker (typically a maintenance worker) can safely enter a work area with this level of TCE for an average of 2 hours a day, 250 days a year, over a 25-year career |

Sampling performed in A-Building basement identified vapors coming from sumps as the source of indoor air contaminants. Consequently, the A-building sub-slab depressurization system (SSDS) was expanded to remove vapors from the active sump with the highest TCE levels in 2017. In 2020, Lockheed Martin permanently abandoned and sealed three sumps in the A-Building basement and anticipates that this should further improve indoor air quality in the basement. None of the indoor air samples taken in the August 2020 round (Round 29) or February 2021 round (Round 30) in the A-Building basement exceeded the more protective safe screening level of 8.8 micrograms per cubic meter. However, one A-Basement sample collected in August 2021 (Round 31) had a TCE concentration of 12 micrograms per cubic meter, which is still less than the A-Building basement screening level of 35 micrograms per cubic meter.

## GLOSSARY

**SSDS** – sub-slab depressurization system, draws air and contaminated soil vapors from beneath a building, through closed piping, and releases them at the roof to the atmosphere. In the past, treatment occurred before release; however, it is no longer efficient since VOC levels are so low.
**TCE** – trichloroethene, a solvent commonly used historically for degreasing.
**VOCs** – volatile organic compounds, a group of chemicals like TCE that easily volatilize or evaporate into air.

## Looking Ahead

Based on the extensive data collected from sampling indoor air and subsurface soil vapor twice a year from 2006 through 2020, Lockheed Martin has concluded that sampling frequency can be reduced to once per year each February in those areas where trichloroethene (TCE) has not been detected or has been detected infrequently at concentrations below screening levels. Areas designated for sampling once per year include the main floors of the A- and C-Buildings. The number of locations that are being sampled will also be reduced, as will those where sub-soil depressurization system (SSDS) performance is routinely monitored. B-Building was removed from the monitoring program in 2021 because data collected over the years indicated that vapor intrusion is unlikely to occur in this building. TCE detections in A-Building Basement merit continued sampling in both February and August. The Maryland Department of the Environment approved this optimized indoor air quality testing program beginning in 2021.

Lockheed Martin will also be augmenting the A- and C-Building SSDSs by expanding the areas from which vapors will be drawn from the main floors and installing a new SSDS in the Drop Hammer Building. The A-Building expansion will also include extracting vapors from an active sump that will help to control TCE indoor air levels in the basement. Air quality will be tested for three months this fall in the areas where sumps have been sealed without continued use of the portable air filtration units in the A-Building Basement; if the air filtration units are no longer needed, they will be removed.

Treatment of the discharge from the A- and C-Building SSDSs will be discontinued because of the very low concentrations of contaminants found in the off-gas. At these low concentrations, which are far below regulatory standards, treatment is only marginally effective. The air coming out of the SSDSs is discharged above the roofline of A- and C-Buildings.

## Drop Hammer Building

Over the past year and a half, Lockheed Martin has focused investigations on the former Drop Hammer Building, which is located to the west of A-Building. While elevated levels of volatile organic compounds (VOCs) have been found under the building slab, current sampling indicates that the air quality inside the building is acceptable for workers. However, in an abundance of caution, and ensuring its commitment to maintaining safe indoor air for employees, Lockheed Martin will be installing a new sub-slab depressurization system (SSDS) in the Drop Hammer Building in late 2021 to extract the vapors that have been found under the building. Semi-annual monitoring of indoor air and subsurface vapors will continue after the SSDS is installed.

## For More Information

Employees with questions or concerns about indoor air quality in the Middle River Complex are encouraged to contact Lockheed Martin. Questions will be answered promptly.

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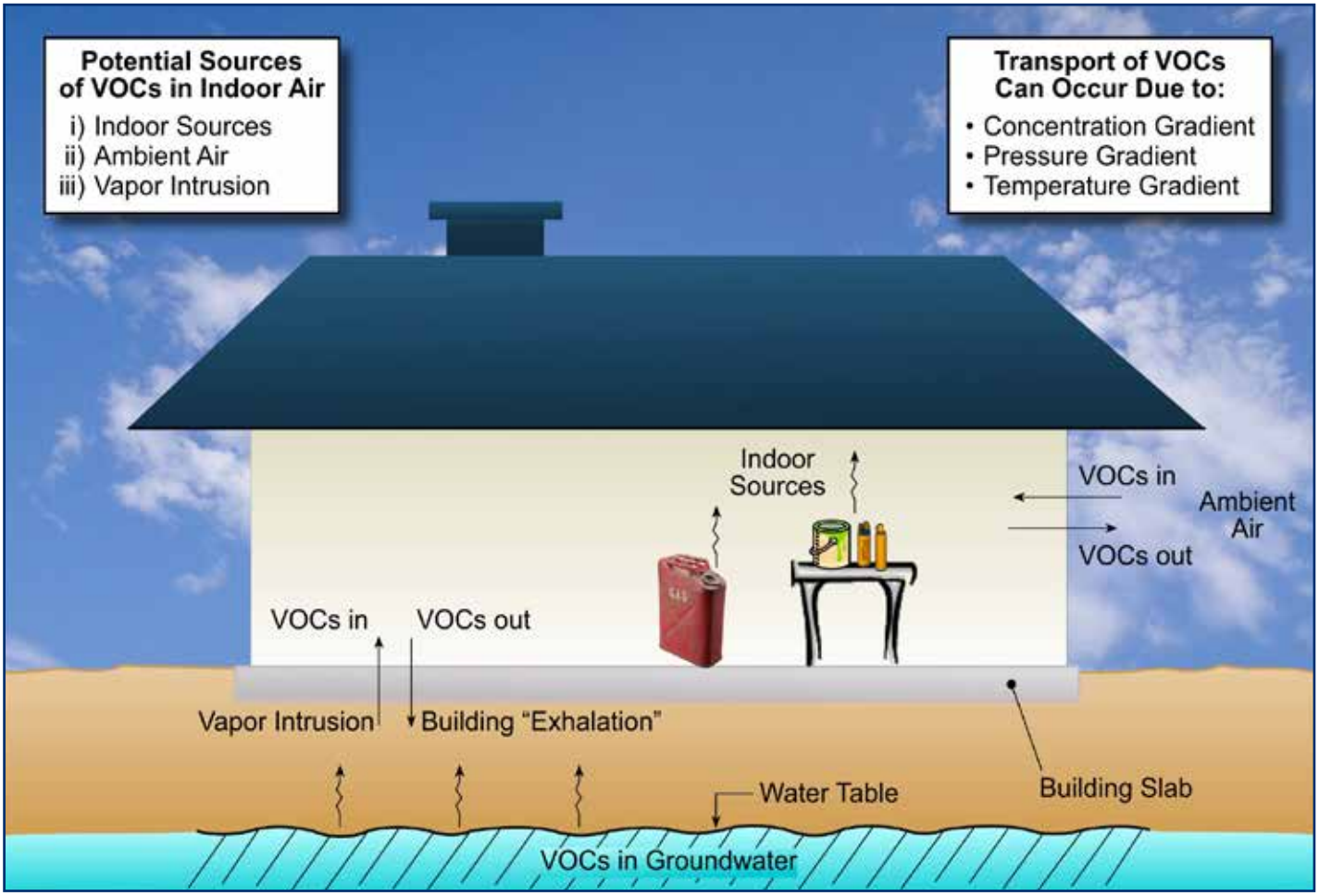


***Volatile organic compounds (VOCs) can move from contaminated soil under buildings into the buildings themselves through cracks in foundations and basement floors, and through sumps and utility openings via a process known as vapor intrusion.***