Land Science®
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5 REASONS

To Consider A Preemptive Vapor Barrier System to Protect Your Property Investment

Why are Leading Developers Specifying MonoShield to Preemptively Mitigate Risk?

Historically, easily-punctured thin-mil plastic sheets or inflexible and difficult-to-seal High Density Polyethylene (HDPE) Barriers were the only option for vapor mitigation at large warehouses or sites where regulatory requirements were not a driving risk factor. These solutions offered either chemical resistance or constructability, but not both.

Composed of an innovative, metallized-film, MonoShield sets the standard for preventing diffusion and permeation of chemical vapors. It's Nitrile-based asphalt latex ensures a seal far more effective and easier to apply than tape-based or heat-welded systems. MonoShield offers the best of both worlds; providing developers with a viable long-term solution for reducing liability and protecting human health at a competitive cost.

MonoShield is the perfect solution for large, low-level-contaminant sites where developers want to install a pre-emptive vapor mitigation system to ensure peace of mind.

From reducing long-term risk to human health to saving money in remediating brownfield sites, there are a multitude of reasons to incorporate MonoShield into your construction plans. The following reasons are a compelling argument to strongly consider MonoShield for your next brownfield development site.

> *"MonoShield is the perfect solution for large low-level-contaminant sites where developers want to install a preemptive vapor mitigation system to ensure peace of mind."*

5 Reasons to Consider MonoShield VIM Barrier to Protect Your Property Investment

#1 Reduce Risk to Human Health

Preemptively Mitigate the Threat of Vapor Intrusion

The purpose of a vapor mitigation system is to prevent the intrusion of harmful chemical vapors that pose a risk to human health. Even when there are no regulatory requirements, having a preemptive barrier in place to protect the building envelope can significantly reduce long-term liability.

MonoShield includes a metalized film which has superior performance and chemical resistivity compared to thin-mil plastic. However, with vapor mitigation systems, seams and penetrations are typically the weak point. As a result much of the research and development on MonoShield went into the asphalt spray used to seal these potential points of entry.

Using specialized testing equipment, different materials were exposed to various low-level contaminants to understand how those contaminants may diffuse through the system on a typical MonoShield site. Nitrile proved to be the most chemically resistant ingredient and, when mixed into the asphalt, provided ten times better performance versus tape-based thin-mil plastics, which were not designed to protect against contaminants typically found at brownfield sites.

> *"With the MonoShield spray applied system, there is greater confidence for creating a competent seal that will last for years to come."*

The most common challenge with tape-based or inflexible HDPE barriers is properly sealing all the penetrations and seams. Even with a qualified installer, it will either take a significant amount of time to ensure a secure system or there will be leaks in the most vulnerable areas. With a spray-applied system, there is a much greater confidence of creating a competent seal that will last for years to come.

#2 A Preemptive VIM Barrier Can Reduce Construction Costs

A Faster Vapor Barrier to Install

With construction, time is money. The quicker a vapor mitigation system can be installed, the lower the overall cost of the project.

MonoShield is applied by rolling out composite sheets, then sealing seams and penetrations with spray-applied nitrile-modified asphalt. With this simple method, installation is 40% faster compared to alternate plastic sheeting or HDPE-welded systems. The spray-applied nitrile-modified asphalt also makes it easier to seal around difficult positions, especially when terminating onto concrete or acrylonitrile butadiene styrene (ABS) and polyvinyl chloride (PVC) piping, saving even more time while still creating a robust system.

> ***With this simple method, installation is 40% faster compared to alternate plastic sheeting or HDPE welded systems.***

Proven to Reduce Construction Costs

At Liberty Park — a former brownfield site in Sterling Heights, Michigan — MonoShield was used to create a preemptive vapor mitigation system beneath a 570,000 square foot industrial warehouse that had multiple environmental challenges (arsenic, lead, and methane). MonoShield was chosen primarily because of the efficiency of its installation.

With other VI systems, the developer estimated that they would have only been able to install 15,000 square feet per day, but Land Science certified applicators were able to install 40-50,000 square feet of MonoShield per day, which shaved months off of the construction timeline, resulting in a significant cost savings.

Additionally, the size of the building created concerns regarding the cost of having to pump concrete over long distances. This is where the unique composition of MonoShield made a significant difference.

MonoShield is constructed of several layers, each adding to the physical robustness of the overall system. Composed of a metallized film laminated to a geotextile, a co-polymer polyethylene, and a tear resistant polyester reinforced grid structure that provides superior durability, MonoShield is designed to withstand the stresses of a construction site. Thin-mil plastic sheets, on the other hand, are highly susceptible to punctures which greatly reduces their ability to prevent vapor intrusion.

> ***Land Science certified applicators were able to install 40-50,000 square feet of MonoShield per day, which shaved months off of the construction timeline...***

Because MonoShield was designed to withstand stresses inherent to the construction process, the site could be prepared uniquely with an 8-inch layer of stone on top of MonoShield followed by a building slab. This unique profile provided a buffer area for utilities and a structural component allowing for concrete to be poured directly from a truck inside the building resulting in more cost reductions .

With its unique rollout system and nitrile core seal, MonoShield offers the efficiency of a pre-fab barrier system with the flexibility of a spray-applied component and drastically reduces the construction time leading to significant savings.

#3 Warehouse Construction Requires a Highly Constructable Solution

> *"MonoShield's spray-applied seams offer ease of installation around penetrations, footings, grade beams, and openings."*

Be Confident Your Vapor Barrier System Can Withstand Construction Challenges

Every construction project offers unique challenges and one of the biggest strengths of MonoShield is its constructability. Due to the nature of the product and the way it is installed, MonoShield lends itself to installation in unique situations. The spray-applied seams offer ease of installation around penetrations, footings, grade beams, openings, and helps avoid unintended 'fish mouths' and vulnerabilities in seals leading to seam failures that are common in tape-based systems.

Meanwhile, HDPE barriers can provide significant chemical resistance, but fall short in many areas of constructability. Penetrations are particularly problematic due to the difficult nature of sealing an inflexible 60 mil HDPE sheet. Consequently, HDPE barriers are often installed several feet below the slab, which requires additional sub-base materials. Subsidence is a major risk, especially at former landfill sites where significant stress may be placed on the HDPE barrier.

> *"...Having MonoShield was really going to make the vapor barrier construction a lot more efficient, both in terms of time and money."*
>
> *- Mark Quimby, Senior Consultant at SME*

Former Hazel Park Racetrack Transformed into Office/Warehouse Space Bringing Jobs to Eastern Michigan

At a site in eastern Michigan, a horseracing track built atop a former landfill was slated for redevelopment. One of the major challenges of construction on this site was load-bearing issues from previous landfill activities. The foundation had to be fortified with 8,000 geo-piers to increase the allowable bearing pressure and limit foundation settlement to meet project requirements.

An HDPE barrier could not have paired with this solution due to its inflexible nature, and a tape-based system would not have provided effective vapor mitigation over the long-term. However, because of the flexibility offered by MonoShield, it was possible for the developers to install a long-term vapor mitigation system that was compatible with a solution to a geotechnical problem that would have otherwise prevented any development on the site.

AshleyCapital opportunity into value

SME

#4 Certified Applicators and Inspectors Ensure Barriers are Effectively Installed

Backed By Industry-Leading Quality Assurance

If installed improperly, a vapor barrier is likely to fail, regardless of the innovation behind the underlying technology. For this reason, Land Science invests heavily in their applicator's training and certification. All MonoShield contractors must pass a rigorous applicator certification and training program to properly maintain installation standards. There is a continuing education program available for all applicators to ensure that they are up to date on best practices for installation and inspection.

MonoShield components are shipped to and installed on site. Final assembly on-site ensures tight seals between seams, around penetrations, and terminations. Once installed, applicators perform a full smoke test beneath the barrier to confirm that all the seams, terminations, and penetrations are completely sealed and that the system will prevent vapor intrusion to the best of its ability. No other barrier systems of this size, including thin-mil plastic sheets, utilize smoke tests for quality assurance.

Certified applicators are located throughout North America and are available to install MonoShield quickly and efficiently.

> ***"Certified applicators are located throughout North America and are available to install MonoShield quickly and efficiently."***

#5 A Highly Reliable, Long-Term Preemptive Solution

Chemically Resistant and Durable

Reliability is one of, if not the most, important factor when it comes to selecting a vapor intrusion mitigation system. While a vapor barrier can protect occupants over the short-term, it is critical that it can be reliable for the long-term. An unreliable vapor mitigation system can jeopardize the health of building occupants operating under the false assumption they are protected.

When lab testing the chemical resistance of the nitrile core, the research and development team at Land Science found that the diffusion rate of harmful vapors was vastly improved versus common vapor barrier alternatives (i.e. HDPE sheets and thin-mil plastics) and, if properly applied, would prevent low concentrations of vapors from passing into an occupied space almost indefinitely. Certified applicators ensure that the system was installed properly and thoroughly tested to confirm its integrity.

Between the underlying technology and the high standards for installation, MonoShield can reliably safeguard building occupants from harmful vapors and protect owners from potential exposure.

> ***"MonoShield can reliably safeguard building occupants from harmful vapors and protect owners from potential exposure."***

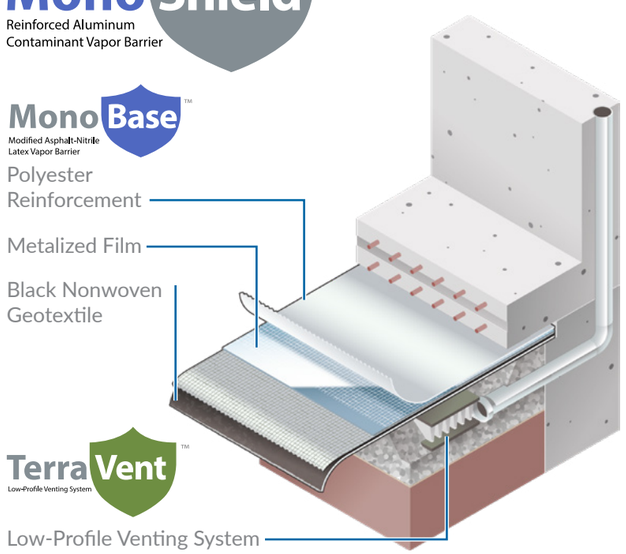
A Cost-Effective Solution for Industrial and Commercial Warehouse Projects

With its innovative metalized film technology, MonoShield provides developers with a viable long-term solution for reducing liability and protecting human health, while speeding up construction times. Combined with a spray-applied core material to ensure that penetrations and seams are sealed, the result is an incredibly secure system at a very competitive cost.

For large spaces (i.e. warehouses and retail developments) where the risk of vapor intrusion is low but owners still want protection against any potential liability, MonoShield is the best vapor barrier currently available on the market.

MonoShield™
Reinforced Aluminum Contaminant Vapor Barrier

MonoBase™
Modified Asphalt-Nitrile Latex Vapor Barrier



WE'RE READY TO HELP YOU FIND THE RIGHT SOLUTION FOR YOUR SITE

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Get Started Today

To recieve a custom vapor intrusion solution, please call 949.481.8118 or e-mail info@landsciencetech.com. One of our Technical Solutions Managers will review your project details and provide you with a customized vapor intrusion solution designed to achieve your site goals.

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