

NITRA-SEAL SPECIFIED TO MITIGATE VOCs

CASE STUDY:

**Brownfield Site Makes Way for Urban
Atlanta Townhome Development**



Land Science
a division of REGENESIS



Background

Vapor Mitigation System Breathes New Life into Urban Brownfield Development

Midtown Atlanta is a bustling commercial and residential district located three miles north of downtown. Nicknamed “The Heart of the Arts,” the area boasts the highest density of art and cultural institutions in the Southeast. Midtown has been a prime target for high-density commercial and residential development over recent decades due to its mass transit options, urban street grid, and desirable location.

A leading national builder of luxury homes recently acquired a brownfield site in Midtown Atlanta with plans to develop a large-scale multi-phase town home project. Several commercial fuel and industrial tenants operated on the site prior to this acquisition since at least the early 1990’s, and an environmental consultant was brought on to provide guidance on any necessary remediation.



Realizing that extensive soil sampling and vapor intrusion mitigation expertise would be required, the environmental consultant hired Total Vapor Solutions (TVS), a firm specializing in all aspects of vapor intrusion projects, to lead the efforts and create a vapor intrusion work plan. Once all assessments were completed, TVS was also tasked with submitting solution proposals to the developer to allow for construction to proceed.



Overview

Nitra-Seal Protects Future Residents of New Urban Town Home



Nitra-Seal is a chemically resistant composite spray applied barrier system



TerraVent is a low-profile venting system for sub-slab vapor ventilation

The developer planned to construct nine individual buildings on the site, each ranging from 4,000 to 6,000 square feet, with multiple townhouse units inside. Slab-on-grade foundations were set, but construction could not continue without understanding each building's vapor intrusion risks and creating a plan to provide reliable protection for future residents.

TVS collected multiple soil and gas samples within the footprints of the nine planned buildings and conducted a preliminary risk analysis based on the results. Vapor concentrations beneath five of the planned buildings posed unacceptable risks due to high levels of chlorinated solvent contamination. Observed contamination concentrations beneath the remaining four buildings were lower, suggesting less of a risk to future residents. Nonetheless, the developer opted for a preemptive approach to ensure the safety of all future residents and requested recommendations for a vapor intrusion mitigation solution for every building.

The complexity of the buildings' slabs, which were relatively small and featured multiple elevation changes, footers, utility penetrations, and concrete piers, was a significant consideration in determining the best vapor intrusion mitigation solution.

After consulting with Land Science, a division of REGENESIS, regarding the unique challenges of the project, TVS offered the developer a solution proposal that combined Nitra-Seal, a chemically resistant composite spray applied barrier with TerraVent, a low-profile venting system, for sub-slab ventilation.

 **Nitra-Seal**[™]
Nitrile-Advanced Vapor Barrier **TerraVent**[™]
Low-Profile Venting System

Nitra-Seal was developed as an improvement upon existing vapor barrier systems. Unlike other vapor barriers on the market, Nitra-Seal uses chemically resistant nitrile, a material which laboratory testing has shown to provide up to ten times higher chemical resistance than other vapor barrier materials. TerraVent offers additional protection when implemented in conjunction with Nitra-Seal and provides flexibility as it can be utilized as an active or passive ventilation system based on the requirements of the job.

Following a thorough cost-benefit analysis of the Land Science solution and other competing technologies, the developer chose to move forward with Nitra-Seal and TerraVent due to the solutions' superior cost-effectiveness and trust in Land Science's approach to meeting the complex vapor intrusion mitigation needs of the site. The capabilities of this combined solution were considered highly applicable to the distinct circumstances of the development that the builder needed to address.



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Application

Powerful Vapor Barrier Preemptively Mitigates Risk to Future Occupants



Total Vapor Solutions selected Nitra-Seal and TerraVent for this site after soil and gas samples revealed the need for a vapor intrusion mitigation system



Land Science Certified Applicator, Buckeye Elm provided installation services on this site

Due to the varied underlying contamination levels for each of the buildings, a creative remedial design was required. It was determined that Nitra-Seal should be laid across every foundation, but ventilation needs were not uniform for all the buildings.

Active ventilation was combined with the Nitra-Seal barrier for the five high-risk buildings with the greatest chlorinated solvent contamination levels. For the remaining four buildings whose contamination levels posed less of a risk, TerraVent passive ventilation was chosen as the best preemptive mitigation approach.

Land Science Certified Applicator Buckeye Elm provided installation services for the solution, with TVS conducting third-party inspections including smoke testing, coupon sampling, pre-pour inspections, and documentation. TVS also installed monitoring ports for post-installation sampling to ensure that risk levels posed by the soil contamination remain low after construction is complete.



Technology Used

Nitra-Seal and TerraVent



Nitra-Seal is a chemically resistant composite spray-applied vapor barrier. The solution's unique triple-layer system is composed of the Nitra-Base layer (bottom) and the Nitra-Bond layer (top), with the Nitra-Core layer in between. Both top and bottom layers consist of a HDPE material bonded to a geo-textile on the out-facing side. HDPE provides chemical resistance, high tensile strength, crack resistance, and reliable subsurface containment. The geo-textile is physically bonded to the chemical resistant layer. This allows the Nitra-Bond layer to adhere to the slab, and provides a friction course between the Nitra-Base layer and the soil. The Nitra-Core layer is composed of a nitrile-modified asphaltic membrane. The incorporation of nitrile, which is proven to provide exceptional chemical resistance in a range of applications, is unique to the Nitra-Seal system. The Nitra-Core spray-applied nitrile/asphalt emulsion forms a highly robust seal around slab penetrations and eliminates the need for mechanical fastening at termination points.



TerraVent is a low profile, trenchless, flexible, sub-slab vapor collection system. It consists of a heavy-duty 3-dimensional, high flow, polypropylene dimpled core that is wrapped and bonded with a non-woven geotextile to prevent soil, sand, or gravel pass through. When combined with Nitra-Seal, TerraVent helps significantly reduce vapor accumulation beneath buildings.



Nitra-Seal™

Nitrile-Advanced Vapor Barrier

Land Science Bond

HDPE/Geotextile

5 mil high density polyethylene (HDPE) sheet thermally bonded to a 3 ounce geotextile facing up to bond into concrete.

Nitra-Core

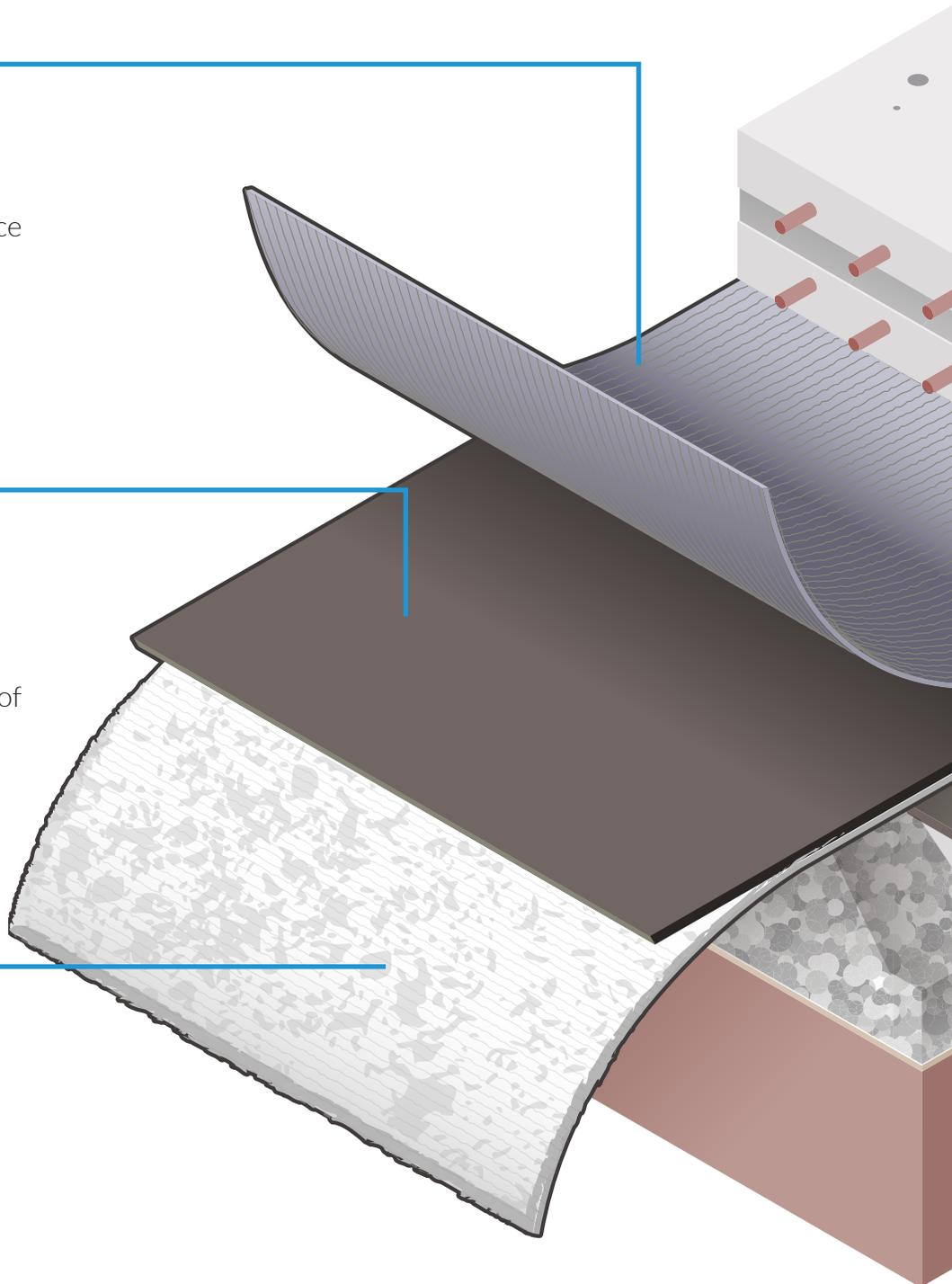
(Spray Applied)

Spray applied as an asphalt/nitrile emulsion to form a chemically resistant layer with nominal thickness of 40 mils (dry).

Nitra-Base

HDPE/Geotextile

10 mil high density polyethylene (HDPE) sheet thermally bonded to a 3-ounce geotextile facing down as course protection.





TerraVent is a flexible sub-slab trenchless vapor collection system, allowing for fast and effective installation

Results

Vapor Intrusion Mitigation System Allows Development of Brownfield Site

With Nitra-Seal and TerraVent in place, all of the buildings planned within the new townhome development are preemptively protected from any harmful vapor intrusion. The new development will serve to meet the growing demand for high-end housing in the rapidly expanding economic center of Midtown Atlanta, rejuvenating a formerly unusable site with life and activity.

TVS will remain involved with the project to conduct routine post-installation monitoring as is required by the Georgia Environmental Protection Division at brownfield sites. As the developer proceeds with new construction in the area, Nitra-Seal and TerraVent will continue to be used as a cost-effective and reliable solution where vapor intrusion is deemed a potential threat.



Nitra-Seal is installed above TerraVent and all seams and penetrations are sealed with a spray-applied nitrile/latex emulsion



The Consultant

Total Vapor Solutions



Total Vapor Solutions is a leading provider of vapor intrusion services in the United States and internationally. A boutique firm specializing in all aspects of vapor intrusion, Total Vapor Solutions has completed projects in three countries and more than 30 states. Core services include soil vapor sampling, indoor air/ambient air & crawl space sampling, risk assessment/work plan development, and vapor mitigation consulting. The firm was founded in 2017 by Jim Fineis, P.G., a renowned expert in the vapor intrusion field. Jim has lectured at numerous environmental conferences throughout the country and serves as an instructor on active and passive soil gas collection methods in the Hartman Environmental Geoscience vapor intrusion course.



About Jim Fineis, P.G.

Jim is the President and owner of Total Vapor Solutions. In addition, Mr. Fineis is an instructor in Hartman Geosciences “Practical Guide to Vapor Intrusion” 2 day course. The training has been given to over 20 regulatory agencies and over 500 students. Additionally, Mr. Fineis speaks at various vapor intrusion conferences each year.

Prior to opening Total Vapor Solutions, Mr. Fineis was the President and owner of Atlas Geo-Sampling Company. Atlas was an integrated geo-sampling and drilling firm located in Atlanta, GA. Mr. Fineis has been responsible for all aspects of P/L, business development and operations since starting Atlas in 2004. In addition to the responsibilities with Atlas, Mr. Fineis is a Professional Geologist (ASBOG) with certification in Georgia and Florida, and over 20 years’ experience in the environmental services industry.



The Land Science Certified Applicator Buckeye Elm Contracting



Buckeye Elm Contracting is a full service environmental services and remediation solutions company dedicated to solving environmental challenges in the safest and most cost-effective manner possible. The Buckeye Elm team has decades of technical and operational experience in helping solve environmental challenges. Core services include: waste management, AST/UST removals, *in situ* and *ex situ* waste treatment, landfill capping and closure, barrier wall installations, vapor barrier installations, soil vapor and liquid extraction systems, industrial cleaning services, infectious disease decontamination and cleanup, advanced fluid vapor recovery (AFVR), emergency response, catastrophe response, and demolition. Buckeye Elm Contracting is a SBA Certified Woman Owned Small Business (WOSB).



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