Vapor Intrusion Barrier a Real Salvation for Ohio Rec Facility

The Salvation Army Kroc Center is a multi-million dollar community complex containing family support, education, and recreational facilities on 17.5 acres. Dayton, Ohio was one of 29 cities to receive funding from the $1.1 billion-dollar donation from the Ray and Joan Kroc family, owners of the McDonald's food chain, for the development of community centers across the United States.

Environmental concerns arose from a neighboring, contaminated groundwater plume migrating from a former industrial facility. Ohio EPA documented elevated levels of trichloroethene (TCE) in soil gas registering at 160,000 parts per billion by volume (ppbv) beneath the facility. The proposed site for the Kroc Center facility was also affected by the neighboring contaminant plume. A vapor intrusion mitigation system was needed to protect the buildings from the possibility of chlorinated solvent vapor intrusion. The consultant specified the use of the Geo-Seal® vapor intrusion barrier and Vapor-Vent™ trenchless venting system.

In sizing up their game plan, the consultants recognized several challenges at this site that made Geo-Seal an appealing vapor intrusion mitigation option. These challenges included the need for a chemical resistant barrier, ease of application in low ambient air temperatures and retrofit application capability within an existing historical building.

Problems Solved

In looking at the challenges faced, a vapor intrusion barrier with chemical resistance was of paramount importance. A barrier was required that would be able to resist solvent vapor permeation due to the high chlorinated solvent contamination on-site. The solution: In permeation testing conducted by an independent laboratory, Geo-Seal was found to resist chemical permeation breakthrough 18 times longer than simple asphalt/latex membranes.

Low ambient air temperatures were also a determining factor in barrier selection, as cold winter temperatures of 25 degrees Fahrenheit can make the installation of a vapor intrusion barrier difficult and costly. The solution: Unlike commercially-available asphalt/latex membranes, Geo-Seal's proprietary formula, installation procedures and specialized equipment allow the product to be installed in low temperatures without the use of artificial heat saving the client considerable time and money.

One final obstacle included a retrofit vapor barrier application to an existing 100+ year old historical landmark: The Duncarrick Mansion, former home of Katharine Kennedy Brown. Geo-Seal was used to retrofit this structure and can, in such situations, be installed over the top of the concrete slab vs. beneath it.

The Essence of Geo-Seal

Manufactured by Land Science Technologies™, a division of REGENESIS, Geo-Seal is a composite vapor intrusion barrier technology designed to eliminate potential indoor air quality health risks associated with subsurface contaminant vapor intrusion. Geo-Seal creates the ideal blend between constructability and chemical resistance by using a unique and highly effective triple layer protection course which includes a spray applied asphalt latex core layer. Vapor-Vent is a low profile vent system that can be used in lieu of slotted PVC pipe. The speed of installation and the proximity of the vent to the barrier provide cost savings and performance benefits compared to other technologies. Vapor-Vent can be installed to passively or actively vent vapors from under the building. The movement towards energy efficient buildings and the cost to maintain active venting systems make passive systems an attractive alternative. In addition, a passive system can be designed to become active if needed.

The Results

The applicator, Contractors Waterproofing, was able to meet the scheduling demands of the general contractor and successfully installed the Geo-Seal vapor intrusion barrier and Vapor-Vent over approximately 100,000 sq. ft. The retrofit to the Duncarrick Mansion, was also completed and restored to its original condition. This structure houses the center's administrative offices, welcome center, board room, meeting rooms and an Old North Dayton Museum. BRN

Land Science Technologies (LST)™ provides advanced technologies for sustainable land development. One goal of LST is to provide innovative and technically sound development solutions for underutilized environmentally impaired properties such as brownfields. Land Science Technologies is located in San Clemente, Calif., and can be contacted at 949-481-8118 or www.landsciencetech.com.

VOC Resistant Vapor Barrier Components

1 GEO-SEAL BASE LAYER:

- Chemically resistant HDPE (high density polyethylene) bottom layer rolled onto soil surface
- Provides first layer of vapor protection and provides substrate for core layer application to be free of shadowing and pinholes

2 GEO-SEAL CORE LAYER:

- Spray-applied copolymer modified asphaltic membrane middle layer that ensures proper sealing of potential vapor pathways
- Highly effective seal around pipe penetrations and at terminations, eliminating welding and mechanical fastening

3 GEO-SEAL BOND LAYER:

- Top HDPE layer protects the system from post-installation punctures and damage; white color of bond layer also allows any punctures to be seen and repaired
- Provides the final layer of chemical resistance
- Top layer of geotextile allows system to adhere to underside of structural slab

4 VAPOR-VENT LOW PROFILE TRENCHLESS VENTING SYSTEM:

- Provides maximum protection against contaminant vapor intrusion when used in conjunction with Geo-Seal®
- Cost effective compared to pipe and gravel systems
- Long-term O&M costs eliminated when configured as a passive system