

## **Profile**

### **Brand**

VersaFlex / Raven Lining Systems

### **Project Location**

Windsor, Colorado

### **Market**

Raw Water

### **Project**

Irrigation Pond Liner

### **System**

FlexTain 80 / Raven 512

### **Applicator**

Unit Liner & Energes

### **Owner**

Great Western Industrial Park

### **General Contractor**

JD Enterprises

### **Date**

December 2018

### Local Applicator Installs Pond Liner at Great Western Industrial Park

In the seemingly isolated and cold vast stretch of the Colorado plains only a short drive north of the Denver Metropolitan area lays a region known as “NoCo,” or more sophisticatedly, Northern Colorado. This 6,500 square mile region is home to the cities of Greeley, Loveland, Fort Collins, Windsor, and other small towns; NoCo brings the small-town charm that can be lost within Denver. With the Rocky Mountains and the Colorado plains on either side, this region boasts in its million-dollar views. Significantly though, Northern Colorado is experiencing tremendous growth and has become an attractive place for businesses and families. From its hub for manufacturing and energy production and

agriculture to its extracurricular activities like museums and outdoor recreation, it is no surprise that Northern Colorado has a lot to offer.

Windsor, Colorado epitomizes the region of Northern Colorado. Over 125 years old, the town still holds true to its small-town charm even after experiencing unprecedented growth since 2000. Home to some of the key industries that are attracting businesses to the region, Windsor continues to balance itself between its historical roots with a strong sense of community and its ability to be a leading city in the state and in the region.

At the intersection of these industries arose a project in Windsor for the lining of a new irrigation pond at the Great Western Industrial Park, a 3,000-acre master-planned development that serves the region's key industries. The 60,000 square foot irrigation pond will be used for landscape irrigation of the expansion of the park. After awarded the project, local general contractor, JD Enterprises, constructed the holding pond, piping, and pump house equipment with Unit Liner being hired for the protective liner installation, which was subcontracted to Greeley, Colorado-based applicator, Energies Services, LLC. Due to the approaching winter season in Colorado and distance between the project site and Unit Liner's crews, this remained a collaborative agreement to subcontract this project to a local applicator who has had previous experience working with VersaFlex / Raven Lining Systems protective coatings.

The protective lining system for the irrigation pond agreed by parties included installing a composite pre-sprayed panel system adhered with a polyurea solution. Thus, the final system utilized the Raven 512-FlexTain™ 80 composite panel system to ensure the structure's long-term protection and performance. This system was chosen over traditional polyethylene liners for a variety of benefits, with a primary advantage in the panels' flexibility and durability. Due to the higher tensile strength of composite panels they remain more durable over time and throughout variable environmental

conditions. In Windsor, this is imperative that the liner does not become brittle in colder and freezing temperatures. When the composite panel liner is stretched, its elasticity returns to 80-90% of its original size compared to alternatives only returning to roughly 10% of their original size. Undergoing the ASTM D638 test method, the FlexTain 80 holds physical properties such as tensile strength between 1,225-1,650 psi, tensile elongation between 100-160%, and a modulus of elasticity of 1,750-3,300 psi. Compared to other standard industry products that may require more repairs and/or replacements, the composite panel liner can be installed at a cost-effective price due to its durability providing an extended service life, making it a higher quality long-term system solution.

The composite panel system was selected for its extreme durability and strength, and its rapid return to service with an added benefit of color-matching for the client. Traditionally, most liners are black in color. With the composite panels, the liner was able to be color-matched to the client's preferences while also remaining aesthetically pleasing within the surrounding environment. Windsor is surrounded by mountains and plains, naturally, a tan color was selected for aesthetics while also holding UV stability and color stability over time. These composite panel systems are suitable to use in a variety of water-related environments such as raw water, potable water, and wastewater environments. These liners can offer protection and expanded areas of use for all types of water-related infrastructure including, but not limited to, canals, ditches, reservoirs, sludge ponds, and concrete infrastructure systems. Notably, these lining systems are also suitable for other markets and industries related to infrastructure protection. Composite panel liners have been used in the mining industry and for secondary containments within the industrial markets.

The FlexTain 80 liner is manufactured by robotically spraying the VersaFlex 380F over a 10-ounce geotextile fabric. The panels would be bonded together with the Raven 512 to create a tough and flexible monolithic liner. The composite panel system incorporates pre-spraying 15' x 50' panels in a controlled environment with the FlexTain 80 at a given thickness. For the irrigation pond, the project

consisted of 80 panels sprayed at a thickness of 80 mils. The process is completed robotically to provide a consistent and even spray-applied thickness across the individual panels. Onsite the panels are positioned manually or with the help of machinery. Finally, the panel seams and overlaps are adhered together with a protective polyurea coating, such as Raven 512.

The installation remained a straightforward project with only minor challenges due to wintery weather, leading the crew to use heaters to keep the Raven 512 at proper temperature for spray-application. A small area of the liner was sprayed with more Raven 512 followed by casting sand into the product to provide a non-skid walkway. This is an often-overlooked benefit of polyurea liners, where portions of the liner itself can be sprayed at a higher thickness according to the needs of the project.

Once the pond was shaped and heavily compacted to prevent settling and movement, a trench was dug near the upper edge of the pond for the liner to be anchored. As one team positioned and aligned the panels, a second began adhering the panels together. The two panels are fused together over a 6" lap using a two-step process that ensures added strength and a monolithic finished product. The proprietary formulations of the FlexTain 80 panels and Raven 512 allow for a fully chemically bonded finished liner system, with no distinguishable difference in performance between the manufactured FlexTain 80 panels and the seams. This bonding creates an extremely strong water tight lining system.

This irrigation pond highlights an opportunity for similar projects to be protected in this manner. The composite panel system offers durability, flexibility, and rapid installation without sacrificing future performance and protection. Just as Northern Colorado offers an attractive place for businesses and families, the composite panel system offers an attractive solution at a cost-effective price to a wide variety of infrastructure challenges.



**Before (top) – After (bottom)**



**Panel Positioning (top) – Adhering the panel seams (bottom)**

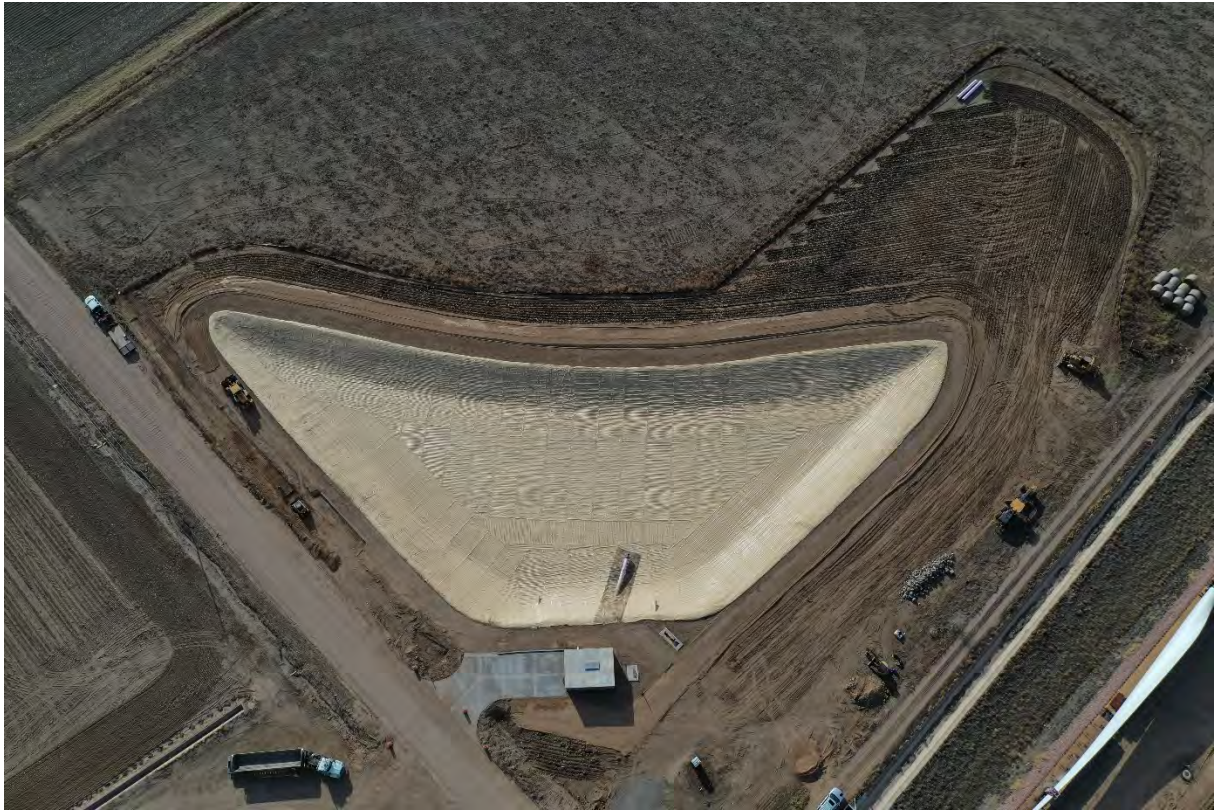


**Anchoring the panels (top) – Adhering the panel seams (bottom)**



**Installation progression Day 4 of 6 (top) – Snowy weather delay (bottom)**





**Final**