



## Case Study

application	Paving Fabric under Chip Seal
location	Greeley, CO
product	Mirafi® MPV500

job owner	City of Greeley, CO
engineer	City of Greeley, CO
contractor	Vance Brothers, A-1 Chip Seal Broomfield, CO

TenCate develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

### THE CHALLENGE

Like many cities, counties, and agencies around the country, the City of Greeley, Colorado is experiencing increased road maintenance needs due to growth and yet has a shrinking or static budget for road rehabilitation and repairs. This was especially true for Greeley this spring and summer after surviving one of the harshest winters in two decades. They have an annual road maintenance budget of \$2.0 million, yet had over \$6.2 million in road repairs from last winter's storms alone.

The Street Infrastructure Management Division (SIM) of Greeley's Public Works Department is progressive and will try an innovative technique if they think it can save money and increase the life expectancy of their roads. The City of Greeley also has an active seal-coating program. A part of this is the chip seal program. After evaluating and reviewing the results of successes experienced by other entities using paving fabric under chip seal, Greeley chose to install two test sec-

tions of Mirafi® MPV500 paving fabric under some of their regular chip seal applications. The projects that they reviewed showed 50% to 100% increases in chip seal life with increases, rather than the normal decreases, in pavement condition after up to 7 years.

The City of Greeley is expecting to obtain a longer life (performance) out of their chip seal street program with the addition of the Mirafi® MPV500. This would allow the City of Greeley to spread their maintenance dollars even further, perform maintenance instead of costly rehabilitation where they can, and provide their citizens with better maintained roads.

### THE DESIGN

The City of Greeley and Vance Brothers chose two streets to install test sections on. The first section, 35th Avenue Court North of 22nd Street, was a street 403 feet long, 37 feet wide with a cul-de-sac that had light traffic loading. This street was in poor condition and in need of an overlay. The surface condition of the street showed severe alligator cracking and was starting to show signs of structural failure (it was starting to pump under trash truck loads). They decided that this would be a worst case scenario and an excellent section to test the limits

of the paving fabric under chip seal. Vance Brothers would install Mirafi® MPV500 over the straight section of the road leaving the cul-de-sac open for a control section. Both areas will get car and trash truck traffic.

The second section was 9th Street between 47th Avenue and 46th Ave Court. A busier through street, 1,116 feet long, 37 feet wide that funnels traffic into a large subdivision and has minor access to a retail center. This street had a previously applied slurry seal, moderate alligator cracking and some longitudinal and transverse cracks. The City of Greeley felt that this road would be a good test of the paving fabric under chip seal on a structurally sound road with longitudinal and transverse cracks. Two rolls of paving fabric were installed from 47th Avenue under about one-third the length of the chip seal, leaving the remainder of the section as a control.

The City of Greeley, Vance Brothers and A-1 Chip Seal worked closely together to coordinate schedules and installation steps to ensure the best test sections possible.



Existing pavement on 35th St. Ct.



Installation of the PG64-22 and Mirafi® MPV500 on 35th St Ct.

## THE CONSTRUCTION

Many factors, such as pavement and ambient air temperatures and existing pavement conditions, must be considered during any chip seal or paving fabric installation. Combining these processes adds another dimension to the installation process. Unlike paving fabric under a hot mix overlay, a paving fabric under a chip seal must be thoroughly saturated before the chip seal is placed to ensure that none of the chip seal emulsion is lost into the fabric, which could cause significant chip loss. This is achieved by adjusting the tack coat application rate and rolling the paving fabric with a rubber-tire roller.

Because 35th Avenue Court North of 22nd Street was badly weathered, raveled and alligatored it would need additional tack coat applied under the paving fabric to ensure complete saturation. The first test section was started in the morning when the ambient temperature was 78 degrees and rising. Vance Brothers applied the tack coat at 0.27 gal/sy on the east two-thirds and 0.29 gal/sy on the west third of the street. A-1 Chip Seal followed with a rubber-tire roller until the top of the paving fabric was tacky then applied the chip seal emulsion at 0.40 gal/sy on the east half of the street and 0.42 gal/sy on the west half of the street. This combination of fabric and chip seal rates will let Greeley evaluate what application rates will work best for this type of street condition if they decide to include paving fabrics in their chip seal program.

For 9th Street between 47th Avenue and 46th Ave Court, however, they applied the tack coat at rates of 0.25 gal/sy for the Mirafi® MPV500 tack coat and 0.40 gal/sy for the chip seal emulsion because of the previous slurry seal, moderate alligator cracks prior sealing of most of the longitudinal and transverse cracks.

The chip seal emulsion for both test sections was a CRS-2P emulsion with 3/8" chips spread at about 26-27 lbs/sy. To help lock in the chips,

A-1 applied a fog seal (Armor Coat) over both the control and paving fabric sections of the chip seal.

## THE PERFORMANCE

The information that the City of Greeley reviewed on the performance of paving fabrics under chip seals showed that this system can significantly increase the life expectancy of a chip seal and improve the pavement condition. This is because the process completely seals the pavement from surface water intrusion and keeps the pavement surface rich with liquid asphalt. The key to this system's performance is proper installation of both the paving fabric and the chip seal. The City of Greeley worked closely with Vance Brothers and A-1 Chip Seal to ensure that these test sections were installed as flawlessly as possible. They also made sure that a Mirafi representative was on-site to provide guidance.

The City of Greeley will continue to monitor the performance of these test sections at least monthly over the next year. They will monitor items such as crack reflection, structural condition, ride, chip loss, bleeding, and paving fabric durability and a report will be issued in the future.



Installation of the CRS-2 and 3/8" chips over Mirafi® MPV500 on 35th St. Ct.



9th Street during installation. Paving fabric is on left and under the chip seal on the right.

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