



July 30, 2021

Willow Creek Pass Village Association
Steve Warnke
P.O. Box 1148
Clark, CO 80428

Job Number: 19-11514

Subject: Summary Report – 2021
Willow Creek Pass Village Road and
ROW Maintenance Program, Routt
County, Colorado.

Steve,

As requested by the Willow Creek Pass Village Association (WCPVA), NWCC, Inc. (NWCC) has prepared this summary report for the 2021 Willow Creek Pass Village Road and ROW Maintenance Program. This report outlines the proposed scope of work developed by NWCC, Wilderness Earthworks (WE) and members of the WCPVA in April and May 2021; the actual work completed at the project on a day by day basis in June 2021; actual costs incurred to complete the work; and recommendations for future roadway and ROW improvements for the next several years.

Proposed Scope of Work: Brian Len, P.E. of NWCC, Kris Lodwick of WE and Steve Warnke of WCPVA met at the site on April 12, 2021 to drive and observe the conditions along the subject roadways and to discuss and create a proposed scope of work and cost estimate for the 2021 Program to be completed in June 2021. Based on our site visit, discussions regarding the work completed during previous programs, the following scope of work and estimated budget for completing the work were prepared:

- 1) WE will mobilize to the site during the first part of June 2021
- 2) ROW Maintenance/Tree Removal: WE estimated that it would take 2 to 4 days to complete the ditch cleaning and tree removal from the roadside ditches located within the ROW and that are creating surface drainage and snow removal problems. The ditches along Olive Street, Frisco Place and Myrtle Court were determined to be of the highest priority for this portion of the project. WE was also going to provide better access to the failing culvert located along Lower Beaver Canyon and west of County Road 129. WE estimated the total fee for completing the above work would be approximately **\$6,400**.
- 3) Stabilize Roadway Surfaces/Blade Shape and Compact Roadways: To try and stabilize the roadway surfaces at the three major intersections with CR 129 (Neptune Place, Miners Dream Drive and Lower Beaver Canyon Drive), which are subjected to the highest traffic volumes and continue to pothole, ravel and washboard. Proposed work included constructing three new test

sections along Golden Tide Place (east of CR 129), Neptune Place (west of CR 129), and along Lower Beaver Canyon Drive (west of CR 129). Each of these test sections will be approximately 50 to 100 feet in length. The new test sections will be constructed by placing, wetting and compacting approximately 3 inches of recycled asphalt product (RAP), which consists of a mix of rotomilled asphalt and ¾ inch base coarse, after these sections of roadway have been regraded (potholes filled and compacted). The RAP will be imported from the Duckels Construction pit located west of Steamboat Springs. WE estimated the total fee for completing the above work would be approximately **\$18,450**, with WE fee being approximately **\$12,750**, including the trucking to and from the pit, and the cost of the RAP purchased from Duckels would be approximately **\$5,700**.

- 4) **Blade Shape and Compact Roadways:** This scope of work also includes the reshaping, wetting and recompaction of all of the roadways prior to magnesium chloride placement. WE estimated their total fee for completing the above work would be approximately **\$13,000**.
- 5) **New ABC Placement:** WE will add new/imported ABC to sections of the roadways that are lacking in sufficient ABC cover and pit run materials are exposed. The portions of the roadways requiring additional ABC would be determined after the roadways are shaped and rolled this spring and before work is initiated the first part of June. Based on our observations, it appeared that the majority of the ABC will be required in the areas that were disturbed by the installation of the Illuminate fiber optic cables last year. WE has estimated the total fee for completing the above work would be approximately **\$45,000**, with WE fee being approximately **\$15,000**, and the cost of the ABC materials imported from Elam, including trucking, being approximately **\$30,000**.
- 6) **Magnesium Chloride Application:** After all of the ROW maintenance is completed, additional ABC materials are placed and the existing roadways are reshaped and compacted, EnviroTech of Glenwood Springs, CO will place approximately 30,000 gallons of magnesium chloride (Roadsaver) along the roadway surfaces. WE was to provide the water truck, pump, and smooth drum compactor with operator required during this process. WE estimated their fee for completing the above work would be approximately **\$38,000**, with WE fee being approximately **\$10,000** and the cost of the Roadsaver placed by EnviroTech being approximately **\$28,000**.

Actual Work Completed: The work for this project was started on June 7, 2019 and was completed on June 22, 2021. Channing Reynolds-Senior Field Engineer with NWCC was on-site to provide the construction quality assurance/project management services. Mr. Reynolds was able to observe and document the actual work completed, as well as obtain the delivery tickets for the ABC and Magnesium Chloride being imported and used at the site. A summary of the work completed on each date is provided below:

June 7, 2021: WE worked half of the day improving the water tank access at the Willow Creek Pump Station located north of the subdivision and along the east side of County Road 129. In addition, WE and Channing Reynolds drove all of the roadways to identify the ditches that needed cleaning and brush removal, as well as to identify the areas that had excessive settlement due to the Illuminate fiber optic installation last year.

June 8, 2021: WE mobilized equipment to the site. The equipment on-site consisted of two tandem axle dump trucks, one wheeled skid loader and one mini excavator.

The excavator and skid loader were used to clean the ditches and load the spoils into one of the dump trucks. The ditches along Beaver Canyon Drive, Green Bird Place and Neptune Place were cleaned on this date. The second dump truck was hauling Class 6 ABC from the Elam Bunn Pit to the site. Ten (10) loads of ABC were delivered to the site and placed on Clara Way and Upper Neptune Place.

June 9, 2021: The equipment on-site consisted of two tandem axle dump trucks, one wheeled skid loader and one mini excavator. Ditch cleaning continued along Neptune Place, Longfellow Way, Willow Gulch Drive and Jupiter Place.

Twelve (12) loads of ABC were delivered to the site and placed on Upper Jupiter Place, Neptune Place and Upper Beaver Canyon Drive. The motor grader was mobilized to the site to help spread the ABC materials being delivered from the Elam Bunn Pit.

June 10, 2021: The equipment on-site consisted of two tandem axle dump trucks, one wheeled skid loader and one mini excavator. WE continued the ditch cleaning on Upper Beaver Canyon Drive and on Lower Neptune place. WE also started on the willow removal at the culvert that runs under Lower Beaver Canyon Drive and west of CR 129.

Fifteen (15) loads of ABC were delivered to the site from the Elam Bunn Pit and placed along various roadways.

June 11, 2021: The equipment on-site consisted of three tandem axle dump trucks, wheeled skid loader, motor grader, water truck and one mini excavator. WE completed the willow removal at the culvert that runs under Lower Beaver Canyon Drive and west of CR 129.

Twenty seven (27) loads of ABC were delivered to the site from the Elam Bunn Pit and placed along various roadways. Motor grader was grading the previously placed ABC along the roadways on the west side of CR 129. Water truck was wetting ABC as it was being graded.

NWCC and WE drove the roads again to verify what areas along Olive Street, Myrtle Court and Frisco Place would need additional loads of ABC. NWCC and WE also observed several illuminate crossings that would need additional ABC along the roadways situated east of CR 129.

June 14, 2021: The equipment on-site consisted of two tandem axle dump trucks, wheeled skid loader, full size wheeled loader, motor grader, water truck and smooth drum roller.

Sixteen (16) loads of ABC were delivered to the site from the Elam Bunn Pit and placed along Miners Dream Place, Golden Tide Place and West Wind Place, Olive Street, Myrtle Court and Frisco Place. Motor

grader was grading the placed ABC along the roadways on the west side of CR 129. Water truck was wetting ABC as it was being graded and then compacted with the smooth drum roller.

NWCC, WE and Steve Warnke met at the site to discuss progress for all work completed to date, as well as observe the soft, unstable roadway surface at the upper end of Neptune Place.

June 15, 2021: The equipment on-site consisted of wheeled skid loader, full size wheeled loader, motor grader, water truck and smooth drum roller.

Motor grader completed the grading of the placed ABC along all of the roadways with the exception of a portion of Miners Dream Place. Water truck was wetting ABC as it was being graded and then compacted with the smooth drum roller. All of the roadways were ready for application of the magnesium chloride.

The RAP test sections on Lower Beaver Canyon Drive and Neptune Place were completed on this date. The test section along Miners Dream Drive was started but not completed. Each test section was approximately 50 to 60 feet in length and the entire width of the roadways. The thickness of the RAP ranged from 3 to 12 inches. After the RAP was placed it was wetted and then compacted with the smooth drum roller.

June 16, 2021: The equipment on-site consisted of one tandem axle dump truck, wheeled skid loader, full size wheeled loader, motor grader, and smooth drum roller. WE completed the RAP test section along Miners Dream Place on this date.

Five (5) loads of ABC were delivered to the site from the Elam Bunn Pit and two (2) loads of RAP were delivered to the site from the Duckels Construction pit. These materials were used to complete the RAP test section and final grading of Miners Dream Place.

June 17, 2021: The equipment on-site consisted of mini excavator and wheeled skid loader. WE worked on improving/cleaning and regrading the ditches along Olive Street, Myrtle Court and Frisco Place.

June 18, 2021: The equipment on-site consisted of two motor graders, smooth drum roller and water truck. WE completed the final fine grading, wetting and compacting all of the roadways in preparation of the placement of Magnesium Chloride, which is to begin on Monday June 21st.

June 21, 2021: On this date, EnviroTech started the placement of the magnesium chloride (Roadsaver) across the majority of the roadways situated west of CR 129. The magnesium chloride was applied at a rate of 0.25 gallons/square yard. A second pass of magnesium chloride was applied to Lower Neptune Place and Lower Beaver Canyon Drive bringing the rate of application to 0.50 gallons/square yard for these two roadways. Approximately 18,084 gallons of Roadsaver was placed on this date.

WE watered the roadways, prior to placing the Roadsaver, using the water truck and then compacted them with smooth drum roller.

It should be noted that the magnesium chloride application over the RAP test sections did not appear to be working to stabilize the previously placed RAP.

A load of ABC was placed and compacted in the low spot located along the east edge of Lower Pueblo Drive.

June 22, 2021: On this date, EnviroTech completed the placement of the magnesium chloride (Roadsaver) across the subdivision roadways that did not receive any Roadsaver on June 21, 2021. A second pass of magnesium chloride was applied to portions of Miners Dream Place, Golden Tide Place, Upper Neptune Place, Upper Beaver Canyon, Lower Pueblo Drive and Olive Street, as well as the entire length of Clara Way, Longfellow Way and Saturn Court bringing the rate of application to 0.50 gallons/square yard for these portions of the roadways. Approximately 12,864 gallons of Roadsaver was placed on this date.

WE watered the roadways, prior to placing the Roadsaver, using the water truck and then compacted them with smooth drum roller.

Cost Breakdown: The contractor's actual costs associated with completing this project, as well as the estimates provided by Wilderness Earthworks have been broken down for each of the line items discussed above.

Mobilization

(June 4 to June 7, 2021)

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$1,707.50	\$1,100

ROW Maintenance/Tree Removal

(June 8 to June 11 & June 17, 2021)

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$5,993.75	\$6,400

Stabilize Roadway Surfaces

(April 26 to June 16, 2021)

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$6,286.61	\$12,750.00
Wilderness Trucking	\$3,065.00	
Wilderness RAP (Duckels)	\$6,198.60	\$5,700.00
	\$15,550.21	\$18,450.00

**Blade, Shape and Compact Roadways
 (June 9 to June 16, 2021)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$5,940.00	\$13,000.00

**New ABC Placement
 (June 9 to June 16, 2021)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$6,395.00	\$15,000
Wilderness-Trucking	\$7,172.50	
Elam - ABC	<u>\$22,127.84</u>	<u>\$30,000</u>
	\$35,695.34	\$45,000

**Magnesium Chloride Placement
 (June 21 and June 22, 2021)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$9,847.50	\$10,000
EnviroTech	<u>\$25,160.38</u>	<u>\$28,000</u>
	\$35,007.88	\$38,000

The total invoices for each of the contractors and NWCC are shown below.

Wilderness	\$56,123.96*		
Elam/Kilgore	\$22,127.84		
EnviroTech	\$25,160.38		
<u>NWCC</u>	<u>\$11,414.00</u>		
Actual Total Fees	\$114,826.18	Total Estimated Fees	\$136,468.00

*Wilderness Invoice includes \$3,517.50 for regrading work completed in April and May 2021.

Future Roadway Improvements: Based on our observations made this past summer along the subject roadways and drainage features, we have prepared a list of recommended improvements to be completed within the roadways in the next 1 to 3 years. The recommended improvements are summarized below:

2022 Maintenance Program

- 1) The cul-de-sac at the north end of Diana Place does not appear to have been properly constructed. Based on a recent survey, the actual center of the cul-de-sac should be located 30 to 50 feet north of the current end of the road. The construction of the residence at the end of the cul-de-sac is nearly completed. Therefore, NWCC recommends that the reconstruction of the cul-de-sac be

completed in 2022. NWCC estimates the cost for constructing the cul-de-sac to the correct dimensions and with a suitable pavement section will be on the order of \$40,000 to \$50,000.

- 2) NWCC strongly recommends that the sections of roadways in which the RAP test sections were constructed (Lower Beaver Canyon Drive, Neptune Place and Miners Dream Drive) be monitored over the next 6 to 10 months to determine if the placement of the RAP in these areas is performing adequately and the amount of potholing and wash boarding has been reduced. If this method of stabilization/reconstruction appears to be working, then NWCC recommends the upper and lower ends of Longfellow Way be stabilized/reconstructed in a similar manner in 2022.
- 3) NWCC believes that continuing settlement of the Illuminate trenches within the roadways will most likely occur. NWCC recommends that these areas be evaluated next spring after the snow has melted. In addition, several of the Illuminate boxes and wooden shoring have been installed directly in the existing drainage ditches. The drainage conditions should be evaluated next spring during the snowmelt to determine if these boxes and shoring are having adverse impacts on the existing drainages and determine if they may need to be moved or stabilized differently.
- 4) NWCC recommends continuing the practice of compacting the roadways with a smooth drum roller after they are regraded in the spring and summer.
- 5) NWCC recommends that the WCPVA continue with a maintenance program similar to the one that was completed this year. NWCC recommends that new/additional Class 6 ABC be added to the roadways, as necessary and that the roadways get regraded, compacted and have magnesium chloride applied every year.

Future Maintenance Programs

- 1) The 60-inch corrugated metal pipe (CMP) situated beneath Lower Beaver Canyon Drive and west of CR 129 has failed and will need to be replaced. The base of the CMP has rusted and rotted out from the south end of the pipe to a point approximately 30 feet north into the pipe, which appears to be approximately 80 +/- feet in length. Approximately 1 to 2 feet of the bearing soils at the base of the pipe have scoured/eroded, as a result of the failure at the base of the pipe and the water flows in the pipe.

NWCC strongly recommends that the CMP pipe be replaced within the next one to three years. It should be noted that imminent failure of the pipe and the roadway embankment over the pipe will most likely occur very rapidly once the CMP totally fails. It appears the remaining section of pipe and soils overlying the pipe are currently bridging the roadway; however, increased erosion below the pipe may result in a total pipe collapse, which will cause the overlying embankment materials to fail. Based on the structural condition of the pipe, NWCC does not believe that lining the pipe will be an option. NWCC estimates the cost for replacing the 60-inch CMP pipe with a new 60-inch pipe will be on the order of \$45,000 to \$55,000.

- 2) The existing asphalt aprons at the intersections with CR 129 at Lower Beaver Canyon Drive, Neptune Place and Miners Dream Drive are fair to poor condition and will most likely have to be replaced within the next 2 to 3 years.

- 3) The adverse surface drainage conditions within the cul-de-sacs located at the western ends of Neptune Place and Saturn Court continue to deteriorate and are most likely causing the pumping and deflection in the roadway areas. Cleaning or regrading of the ditches is very difficult based on the number of existing driveways and buried utility lines within these areas. Therefore, NWCC believes that it may be more feasible to increase/raise the grade at the center of the cul-de-sacs so that surface drainage from the adjacent properties is directed around the cul-de-sacs rather than across them. NWCC recommends that the raising of the cul-de-sacs occur within the next 1 to 3 years.

If you have any questions concerning this report, or if we may be of further service, please contact this office.

Sincerely,

NWCC, Inc.

Brian D. Len, P. 25750
Principal Engineer

