



August 28, 2019

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

Job Number: 19-11514

Subject: Summary Report – 2019  
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 2019 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 early June 2019; the actual work completed at the project on a day by day basis in the second half of June and the first part of July of 2019; actual costs incurred to complete the work; and recommendations for future roadway and ROW improvements for the next several years.

This report has been prepared in accordance with our proposal/cost estimate and contract dated May 23, 2019.

**Proposed Scope of Work:** Brian Len, P.E. of NWCC, Kris Lodwick of WE and/or Steve Warnke and Stan Wagoner of WCPVA met at the site in the first part of June 2019 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 2019 Program to be completed later in June. 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) Longfellow Way Slide: WE estimated that it would take two days to reestablish the ditches along the west side of Longfellow Way, where the existing slope failure/landslide materials had encroached/ filled the drainage ditch along the upboard side of the road. The work to be completed consists of the removal and trucking of the failed materials to the fill area located at the northeast corner of County Road (CR) 129 and Golden Tide Place, and the reconstruction of the stacked cobble check dams in the base of the ditch after the failed materials had been removed. WE estimated the total fee for completing the above work would be approximately **\$3,500**.
- 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 West Wind Place, Upper Beaver Canyon and Willow Gulch Drive were determined to be of the highest priority for this portion of the project. WE estimated the total fee for completing the above work would be approximately **\$3,500**.
- 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 including ripping/overexcavating the existing base and underlying pit run materials, and then placing and compacting new CDOT Class 6 aggregate base course (ABC) along the sections being stabilized. This scope of work also including the reshaping, wetting and recompaction of all of the roadways prior to magnesium chloride placement. WE estimated the total fee for completing the above work would be approximately **\$15,700**, with WE fee being approximately **\$4,700** and the cost of the ABC and trucking being approximately **\$6,500 and \$4,500**, respectively.
  - 4) **New ABC Placement:** WE would add new/imported ABC to the roadways that were lacking in sufficient ABC cover and the pit run materials were exposed. The ends of the 7 cul-de-sacs, and portions of Saturn Place, Upper Neptune, Upper Beaver Canyon Drive, Greenbird Place and Golden Tide Drive were determined to be the sections of roadway that needed the new ABC. WE estimated the total fee for completing the above work would be approximately **\$12,300**, with WE fee being approximately **\$3,700** and the cost of the ABC materials and trucking being approximately **\$5,100 and \$3,500**, respectively.
  - 5) **Magnesium Chloride Application:** After all of the ROW maintenance is completed; intersections stabilized/repared; additional ABC materials are placed and the existing roadways are reshaped and compacted, EnviroTech Services, Inc. (EnviroTech) of Glenwood Springs, CO will place approximately 25,000 gallons of magnesium chloride (Roadsaver) along the roadway surfaces. WE was to provide the water truck, pump and smooth drum compactor required during this process. WE estimated the total fee for completing the above work would be approximately **\$31,800**, with WE fee being approximately **\$9,300** and the cost of the Roadsaver placed by EnviroTech being approximately **\$22,500**.

**Actual Work Completed:** The work for this project was started on June 13, 2019 was completed on July 2, 2019. 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 14, 2019:** WE began working on the Longfellow Way Slide. The equipment on-site consisted of two tandem axle dump trucks, a D-4 dozer and a Cat 320C trackhoe. Approximately 45 loads of failed materials were removed from the ditch areas and taken to the fill site at the northeast corner of CR 129 and Golden Tide Place. Approximately 320 to 350 lineal feet of ditch was cleaned out. It should be noted that

the D4 dozer was mobilized to the site the previous day and the trackhoe and was mobilized to the site on this date

June 15, 2019: WE began to shape/work on the ends of the cul-de-sacs located at Frisco Place, Myrtle Court and Olive Street. They were removing the base course materials, which had been plowed into the ditches during the winter, with the skidsteer and were placing and reshaping the cul-de-sacs with these materials. WE also mobilized the skidsteer, water truck, pump, loader and supplies to the site on this date.

June 17, 2019: On this date, the ABC materials were being imported to the site by Rock Solid Transport, Rossman Brothers and WE. Three tandem dump trucks were used to import the ABC materials, which were being placed along portions of Greenbird Place, Venus Place, Buckhorn Place, Golden Tide Place, Miners Dream, Longfellow Way and Clara Way. Approximately 450 tons of Class 6 ABC was imported from the Elam pit on this date and placed along the roadways. A Cat 143H grader was used to spread and grade the ABC and a smooth drum compactor was used to compact the new ABC materials. WE was reshaping the cul-de-sacs at Saturn Court, Neptune Place and the end of Beaver Canyon Drive with the skidsteer prior to placement of the new ABC and/or shaping of the existing base course materials.

On this date WE completed the construction of the cobble check dams along Longfellow Way using the Cat 930G loader and started the maintenance/ditch cleaning along Upper Beaver Canyon Road with the Cat 305 trackhoe.

WE also started the rebuild of the existing gravel section along Lower Beaver Canyon Drive west of CR 129. WE ripped and removed some of the pit run materials from the potholed areas and then placed and compacted new ABC materials in these areas to bring the roadway section back to the previous grades. The Cat 320 loader was used to dig out the pit run materials and load them. It should be noted that ABC materials were not available at the Elam Pit. Therefore, the stabilization of Neptune Place west of CR 129 and Miners Dream Drive east of CR 129 could not be started or completed. A load of very sandy, fine grained gravels was delivered to the site by Elam; however, these materials were rejected by Mr. Reynolds.

WE also began to shape the roadways with the grader. Roads that were completed on this date consisted of Longfellow Way, Clara Way, Neptune Place and Beaver Canyon Drive.

June 18, 2019: On this date, WE continued working on the ends of the cul-de-sacs at Willow Gulch Drive, Jupiter Place and Golden Tide Place with the skidsteer.

On this date WE also worked on shaping, wetting and compacting the existing base course materials along Miners Dream, Neptune Place, Clara Way, Beaver Canyon Drive, Golden Tide Place, Buckhorn Place, Jupiter Place, Willow Gulch Drive and Longfellow Way. This work was being completed with the grader, water truck and smooth drum compactor.

WE continued the maintenance/ditch cleaning along Willow Gulch Drive, Jupiter Place, Golden Tide Place and West Wind Place with the Cat 305 trackhoe, tandem dump truck and skidsteer. Trees were also being cut down within the ditch lines by a laborer with a chain saw.

It should be noted that the Elam Pit ran out of all base course materials earlier in the day; therefore, no new ABC materials were delivered to the site.

It should also be noted that very heavy rains started in the afternoon, which limited the amount and type of work throughout the afternoon.

June 19, 2019: On this date, WE continued working on the end of the cul-de-sac at Golden Tide Place with the skidsteer.

WE also worked on fine grading and compacting the existing base course materials throughout the subdivision. This work was being completed with the grader and smooth drum compactor.

WE continued the maintenance/ditch cleaning along Green Bird Place, Neptune Place and Clara Way with the Cat 305 trackhoe, tandem dump truck and skidsteer. Trees were also being cut down within the ditch lines by a laborer with a chain saw.

June 20, 2019: On this date, EnviroTech started the placement of the magnesium chloride (Roadsaver) across the majority of the roadways situated west of CR 129. Approximately 16,686 gallons of Roadsaver was placed on this date. The roadways not receiving any Roadsaver were Golden Tide Place, Buckhorn Place, Miners Dream Place, Miners Dream Drive, and Green Bird Place.

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

Rain showers began at 3:30 that afternoon. Due to pending heavy rain, the Roadsaver application scheduled for the next day was postponed until the first week of July.

July 2, 2019: On this date, EnviroTech completed the placement of the magnesium chloride (Roadsaver) across the subdivision roadways that did not receive any Roadsaver on June 20, 2019. They also reduced the application rate to 0.180 and reapplied the Roadsaver along Neptune Place to Clara Way, Clara Way, Lower Beaver Canyon, Miners Dream to Golden Tide, Golden Tide to the end, Longfellow Way, Willow Gulch Drive and Jupiter Place. Approximately 8,338 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.

**Longfellow Way Slide (June 13 and June 14, 2019)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$3,191.75	\$3,500

**ROW Maintenance/Tree Removal (June 14 to June 19, 2019)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$5,209.50	\$3,500

**Stabilize Roadway Surfaces/Blade Shape and Compact Roadways (June 17 to June 19, 2019)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$4,900.00	\$3,700
Elam	\$0	\$6,500
Trucking	<u>\$0</u>	<u>\$4,500</u>
	\$4,900.00	\$15,700

**New ABC Placement (June 17 to June 19, 2019)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$3,421.75	\$3,700
Elam	\$5,885.75	\$5,100
Trucking	<u>\$1,485.00</u>	<u>\$3,500</u>
	\$10,792.50	\$12,300

**Magnesium Chloride Placement (June 20 and July 2, 2019)**

	<u>Actual Costs</u>	<u>Estimated Costs</u>
Wilderness	\$7,320.50	\$9,300
EnviroTech	<u>\$22,917.22</u>	<u>\$22,500</u>
	\$30,237.72	\$31,800

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

Wilderness	\$26,247.00*		
RST Transport	\$765.00		
Rossmann	\$720.00		
Elam/Kilgore	\$5,885.75		
EnviroTech	\$22,917.22		
<u>NWCC</u>	<u>\$8,520.00</u>		
Actual Total Fees	\$65,054.97	Total Estimated Fees	\$66,800.00

\*Wilderness Invoice includes \$2,203 for regrading work completed in April and May 2019.

It should be noted that the total fees for this project were less than the total estimated fees because the Elam Pit ran out of all of their ABC materials before the stabilization/reconstruction of Neptune Place and Miners Dream Drive could be completed.

**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:

- 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. It should be noted that access to the CMP is very limited due to the amount of willows growing at each end of the pipe. 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 two 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 \$35,000 to \$50,000.

- 2) 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. NWCC understands that a residence is being constructed at the end of the cul-de-sac and recommends the cul-de-sac construction be completed prior to the driveway for the new residence being constructed. 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 \$30,000 to \$40,000.
- 3) NWCC strongly recommends that the reconstructed section of Lower Beaver Canyon Drive, located immediately west of CR 129, be monitored over the next 6 to 9 months to determine if the method of stabilization/reconstruction of the pavement section, completed this year, 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 sections of Neptune Place (west of CR 129) and Miners Dream Drive (east of CR 129) should be stabilized/reconstructed in a similar manner. As noted previously, these two sections of roadway were not stabilized/reconstructed this year because Elam ran out of Class 6 ABC.
- 4) NWCC recommends all of the roadways be compacted with a smooth drum roller after they are regraded in spring. NWCC understands the regraded roadways were compacted with a roller this spring for the first time and the overall condition of the roadway surfaces were vastly improved.

- 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.
- 6) A considerable amount of time was spent this year on removing trees from several of the drainage ditches within the ROW. NWCC recommends that this practice continue so that the drainages are not compromised from the larger stands of willows and aspens. Not only will the removal of the trees improve the drainage characteristics, it will also allow more efficient snow storage along the roadways in the winter. Based on our observations, we recommend the trees and willows growing along portions of Beaver Canyon Drive, Neptune Place and South Golden Tide be removed next year as part of the maintenance program.
- 7) NWCC observed that several of the High Density Polyethylene (HDPE) flared ends of the culvert pipes crossing the roads have been compromised. NWCC recommends that the HDPE flared ends be replaced with more durable CMP flared ends.

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. Lee, P.E.  
Principal Engineer

