Sugar Creek Pilot Project
Lessons Learned

Prepared By:
Coalition for the Upper South Platte

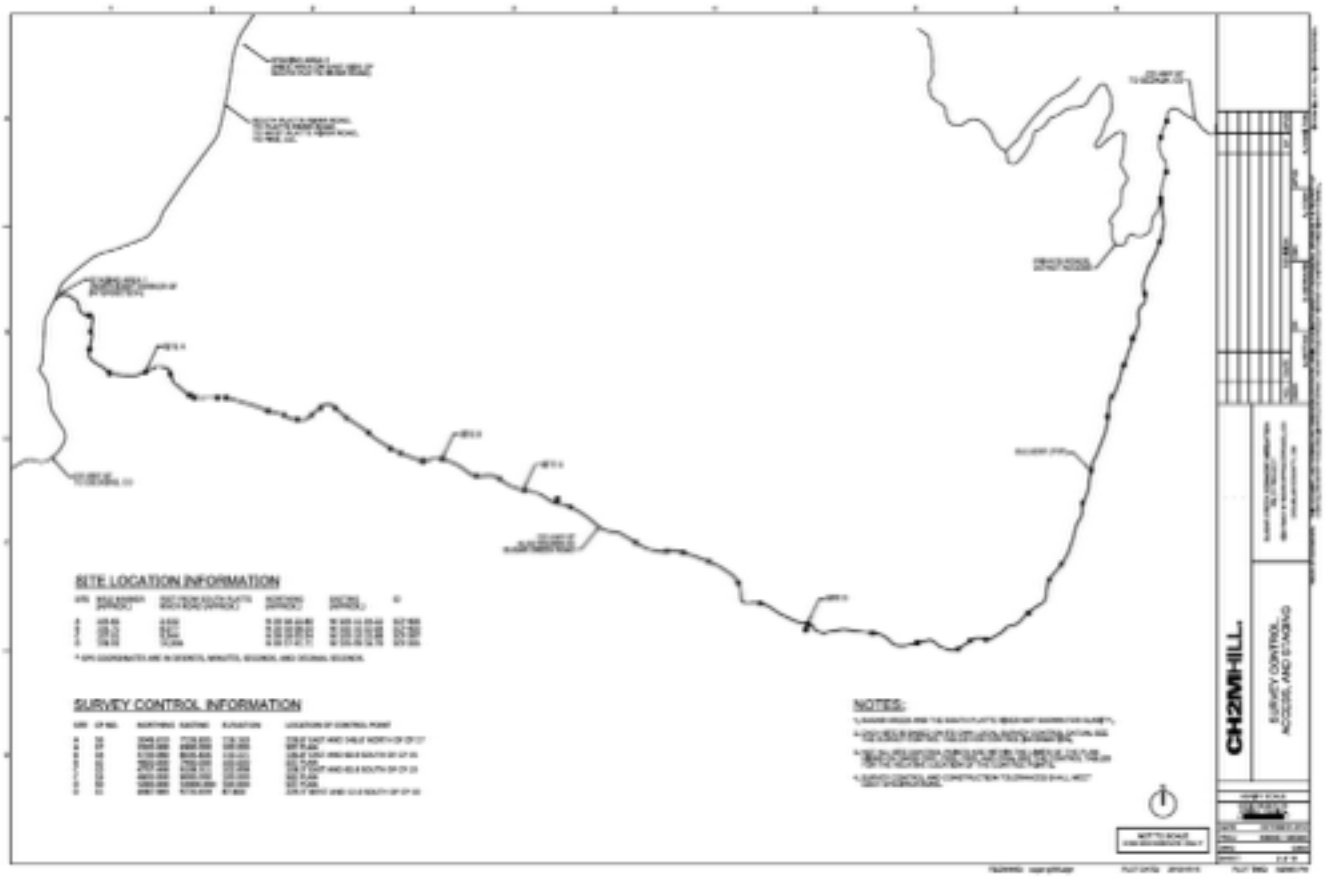
Overview

Sugar Creek is a tributary to the South Platte River in Douglas County, Colorado. Sugar Creek is listed on the Colorado Department of Public Health and Environment's (CDPHE) Regulation #94 – Colorado's Monitoring and Evaluation List due to sediment. Sediment deposition into Sugar Creek reduces the function of Sugar Creek and the South Platte River, impairs watershed health, and decreases wildlife and fisheries habitat. The Sugar Creek Sediment Mitigation Pilot Project (SCPP) is a collaborative effort between the Coalition for the Upper South Platte (CUSP), the United States Forest Service (USFS), Douglas County, the Chatfield Water Providers, Trout Unlimited, the South Platte Enhancement Board, the CDPHE 319 Nonpoint Source Program, the Colorado Water Conservation Board's Watershed Protection Fund, and CH2M HILL supported the project in various roles.

The SCPP involved installing four concrete sediment containment structures along Sugar Creek Road, also known as County Road 67 (CR 67), in order to accomplish the following:

- Reduce sediment impacts to Sugar Creek and the South Platte River

- Serve as a pilot project for sediment mitigation for similar road and river corridors
- Serve as a pilot project for future mitigation of Preble's Meadow Jumping Mouse (PMJM) riparian habitat impacts associated with the Chatfield Reservoir Reallocation Project
- Assess the technical aspects of constructing sediment collection and erosion control structures in a remote and mountainous environment



Design and Construction

Design of the SCPP was performed by CH2M HILL in general compliance with criteria and standards from Douglas County, the Urban Drainage and Flood Control District, and the Colorado Department of Transportation. Douglas County approved the design.

Construction of the SCPP was performed by American West Construction, LLC. Construction occurred in December 2012 and January 2013 so that monitoring could occur during the 2013 calendar year. The construction progress was monitored by CUSP, CH2M HILL, and Douglas County.

Site Descriptions

Site A

Site A consists of the following:

- Soil riprap entrance.
- Cast-in-place concrete sediment basin. The sediment basin is positioned adjacent to the road to collect sediment from the roadside ditch and the hill slopes above the ditch.
- Vegetated outflow ditch.
- Seeding and erosion control blankets at the disturbed areas.

- Location: CR 67 Mile Marker: 105.65, Coordinates: N 39° 18’ 22.80”, W 105° 11’ 34.22”.

Site B

Site B consists of improvements on both sides of the culvert under Sugar Creek Road, and consists of the following:

- A concrete CDOT Type D inlet structure for sediment containment.
- Boulders to transition grades around the inlet.
- A grouted boulder rundown at the downstream side of the culvert.
- Willow stakes and native vegetation between the stilling basin at the base of the rundown and Sugar Creek.
- Seeding and erosion control blankets at the disturbed areas.
- CR 67 Mile Marker: 106.75, Coordinates: N 39° 18’ 08.50”, W 105° 10’ 32.68”.

Site C

Site C consists of improvements on both sides of the culvert under Sugar Creek Road, and consists of the following:

- A concrete CDOT Type D inlet structure for sediment containment.
- Boulders to transition grades around the inlet.
- A SmartDitch trapezoidal ditch liner at the downstream side of the culvert to convey flows across the overbank to Sugar Creek.
- Soil riprap stilling basin.
- Seeding and erosion control blankets at the disturbed areas.
- CR 67 Mile Marker: 107.01, Coordinates: N 39° 18’ 03.54”, W 105° 10’ 15.68”.

Site D

Site D consists of the following:

- A large cast-in-place concrete sediment basin located on the inlet side of a culvert under Sugar Creek Road, where a roadside ditch and a natural drainage swale converge.
- The basin includes a sediment containment wall, which allows sediment to be captured above the invert elevation of the existing culvert under the road.
- Soil riprap at the roadside ditch entrance to the basin.
- Soil riprap at the natural swale entrance to the basin.
- Seeding and erosion control blankets at the disturbed areas.
- CR 67 Mile Marker: 108.02, Coordinates: N 39° 17’ 41.71”, W 105° 09’ 16.79”.

Applicability to Other Projects

The lessons learned from the SCPP will help guide future watershed projects where dirt roads are adjacent to creeks and rivers, including a future project on Pine Creek Road, which is the watershed adjacent to Sugar Creek. Pine Creek is also listed on CDPHE’s Monitoring and Evaluation List due to sediment. Similarly, the lessons learned through the SCPP will be used for the full-scale sediment mitigation project associated with the CRRP, assuming the CRRP moves forward.

Monitoring and Maintenance

Monitoring of the SCPP is ongoing. Monitoring consists of observing the sites for revegetation establishment, potential areas of erosion, and tracking sediment accumulation in the sediment containment structures. Douglas Count will perform sediment removal services using a vacuum truck.

As of September 2013, three of the four sediment traps have filled with sediment. Douglas County removed the sediment from all sediment containment structures on September 24. (See photos that follow of the structures during cleaning.

Lessons Learned

The lessons learned from the SCPP include the following:

1. Cast-in-Place Concrete
    a. The remote location required a long travel time for the concrete supplier. This was addressed by using a CDOT approved concrete additive to prolong the allowed time from batching the concrete to placing the concrete to be 3 hours.
    b. Maintaining concrete curing temperatures during winter work was accomplished by using Thawzall portable heaters, which are a USFS-approved heating method that does not have an open flame or high fire-starting potential. Concrete blankets were also used with the Thawzall unit.
    c. Concrete test cylinders were used to verify the concrete strength due to the highly varied winter temperatures.

   d. Contractors need to carefully plan the amount of concrete ordered, since it will take a long time to have additional concrete delivered and an unintended concrete joint may occur if the planned quantity is not adequate.

   e. Performing concrete work during non-winter months is preferred, but winter construction in the Sugar Creek area is feasible.

2. Sediment Containment Structures

   a. CDOT Type D structures – After the project, the Contractor requested a future option to back fill the structures will low strength concrete, in lieu of backfilling and compacting native material. This is a reasonable consideration and Contractor option for future projects. A backfill and pay limit for this work could be defined.

   b. Although some of the sediment containment structures have retained some water during 2013, the constructed weep drains all operated normally after the accumulated sediment was removed. It appears the water could not drain due to the fines in the soil that was collected, even though the majority of the soil material in the area is decomposed granite pea-gravel. The weep drains will continue to be monitored to determine if additional weep drains or a riser pipe should be included. Douglas County maintenance staff would prefer to not add riser pipes if possible.

3. Invasive Species Inspections – The Contractor failed some of the heavy equipment invasive species inspections. Therefore, it is efficient to meet the Contractor in town immediately before the equipment is delivered to the site to save time and costs associated with rejecting the equipment. This relies on the availability and willingness of the project partners to support the Contractor in this manner.

4. Topsoil – Due to existing invasive species, topsoil should not be relocated to other project sites.

5. Habitat Protection Versus Allowed Disturbance Area – The allowed disturbance area at each site is a balance between allowed impacts to the area, protection of habitat, and permitting needs. In cases where limited impacts are desired, the contract specifications could require the type of equipment to be used and allowed staging locations. For example, a long-reach excavator could be required to prevent the need for the Contractor to track down the road slope to the overbank area. It is anticipated that heavy equipment access down some steep slopes will be required under certain conditions.
6. Grouted Boulders – If a Contractor elects to not pour the grouted structures in separate lifts for stability, the Contractor will need to have a large number of staff on site during grout placement to address grout sloughing. The Contractor on the SCPP successfully placed the grout without pouring the grout in lifts.