Final Report to the Colorado Watershed Restoration Program Regarding North Massey Draw Stream Restoration Improvements at the Ken-Caryl Ranch Equestrian Center

GRANTEE: Chatfield Watershed Authority
FISCAL AGENT: Ken Caryl Ranch Masters Association

PROJECT NAME - North Massey Draw Stream Restoration Improvements at the Ken-Caryl Ranch Equestrian Center

GRANT AMOUNT – $20,000

INTRODUCTION AND BACKGROUND

Located in the northwest portion of the Chatfield watershed, North Massey Draw is a major tributary of Massey Draw which empties into Chatfield Reservoir approximately 5 miles south and east of the project site. Historic storm flows have incised the channel in some locations while increasing flooding and public safety in other areas. Due to its proximity to Chatfield Reservoir, the North Massey Draw Stream Restoration project is a priority area identified by the Chatfield Watershed Authority in need of drainageway improvements and sediment and nutrient reductions. The project focus is approximately 400 linear feet of stream reach located in the upper reaches of the Massey Draw watershed. The stream restoration improvements are entirely owned by one property owner, the Ken-Caryl Ranch Master Association (Association).

OBJECTIVES

The project objectives are;

1. Reduce flooding at the Ken-Caryl Ranch Equestrian Center (EqC) by removing a long, undersized culvert and replacing with an open channel designed to handle 10 year storm flows.
2. Mitigate unsafe conditions for open space visitors by reshaping unstable stream banks and highly degraded channel.
3. Improve water quality by stabilizing streambed and bank conditions and controlling runoff from manure laden pasture areas adjacent to the project site.
4. Reduce sediment load to Chatfield Reservoir, thereby increasing the storage capacity life of this popular front range reservoir used for flood control, water supply, fishery, and recreational purposes.

Downstream water quality in Massey Draw is expected to improve because the project will stabilize the channel, reducing erosion and entrainment of sediment with its naturally occurring soil nutrients such as phosphorus. The creation of more open channel with wetland vegetation will also serve as a water quality improvement by filtering sediments

and pollutants from runoff. In addition, the design includes features to control runoff from the adjacent pastures areas which will also reduce excessive nutrient loading to North Massey Draw. Collectively, these benefits can contribute together with other basin improvements to improve water quality that enters Chatfield Watershed from Massey Draw.

Frequency of flooding within the Equestrian Center will decrease because of removal of the undersized culvert and the shaping of a new, open stream channel. The new culvert and channel are designed for larger capacity (10-year flood) than currently exists. The project also protects the public from unsafe conditions that currently exist along very tall, unstable channel banks. The project will in fact create a safe community amenity and the Associations public information process about the project increases public awareness of stream stability and water quality issues.

KEY PROJECT INFORMATION

Engineering:	Mueller Engineering Company
404 Permit Application and Monitoring:	ERO Resources Corporation
Construction completed by:	AGE Inc.
Project Cost:	$324,702.00

The planned improvements include removing the undersized culvert and establishing an open channel designed to keep both high and low flows in the same channel. Additional work, continuing approximately 200 feet downstream of the existing culvert outlet, includes grading back unstable cut banks and installing grouted boulder drop structures to prevent stream channel head cutting. There is also the opportunity to expand an existing footpath into the project area so that open space users can visit the streamside environment.

Project Timeline- (see attached construction and restoration timeline)

Description of Project Accomplishments- (also, see attached photos of project)

TASKS

Part of Task 4 is a CWCB funded task. Other tasks are provided to highlight the comprehensive project and related tasks.

TASK 1 – Finalize Project Design

August-September, 2011: Design and bid documentation finalized based on input received from watershed agencies and stakeholders. Developed a complimentary technical memorandum that provided the design elements, design references, data used, calculations, engineer's opinion of cost, and recommended maintenance. Completed bid ready documents, including notice to bidders, contract, general contract requirements, technical specifications, and project design.

TASK 2 – Permitting Authorizations to Support Construction
July-October, 2011: Developed supporting documentation to support authorization and approval of various permitting processes, including a Section 404 permit issued by the US Army Corps of Engineers, Stormwater permit issued by the Colorado Department of Public Health and Environment, and a grading permit issued by Jefferson County. All permits secured.

TASK 3 – Advertise and Award Project
October, 2011: Engineering consultant coordinated with fiscal agent in the advertisement and bidding of the project. On-site meeting conducted with the interested contractors to answer questions and provide a project overview. AGE Inc. selected as the construction contractor.

TASK 4 – Project Construction
November 2011-Summer 2012: Construction completed over 9 months including installation of the lower channel, grouted boulder drop structures (completed between February 2012 through April 2012) of which **80 square yards of grouted boulder drop structure is directly attributable to money received from the CWCB.** No major problems were encountered during construction of this project.

TASK 5 – Project Oversight/Construction Management
November 2011-Spring 2012: Construction management and oversight provided by the project engineer, construction contractor and the fiscal agent. Construction management included various tasks such as construction inspection, requisition of supplies and materials to complete the construction project, progress reporting and cost tracking reports, materials testing, and providing oversight and direction to deal with potential delays, bad weather, or emergencies at construction site.

TASK 6 – Monitoring and Reporting Project Effectiveness-
July 2011 – July 2016: Baseline conditions established through on-site water quality tests conducted by Tetra Tech RMC prior to construction. Post-construction water quality measurements will be completed to quantify project effectiveness (i.e. reduction of sediment load, improved water quality, etc.). Project was issued a Final Construction Acceptance letter (letter attached) by the Urban Drainage and Flood Control District in October 2013 which means that the project is now eligible for the UDFCD Maintenance Program. ERO Resources Corp. has been retained by the Fiscal Agent to monitor and report on the success of the restoration phase of the project, a Corps of Engineer's permit requirement. The mitigation reporting is expected to last for three to five years, post-construction.

North Massey Draw
Stream Restoration Improvements at the Ken-Caryl Ranch Equestrian Center

EQC NMD drainage May 2011

EQC NMD drainage Oct 2012

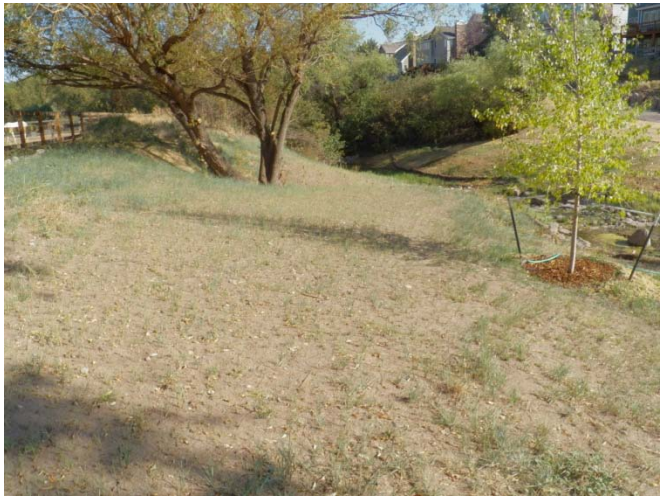
1. Pre-construction photo of downstream end of culvert.

2. Post-construction photo of same location. Culvert was Replaced with open channel.

3. Pre-construction photo of area downstream of culvert Outlet.

4. Post-construction photo of same general area. Tree in Upper left corner is same tree in pre-const. photo. New Stream channel is south of old channel with extensive bank grading

5. Pre-construction photo of area downstream of culvert. Tree in photo same as photos #3 and #4.



6. Post-construction photo of area downstream of culvert. Tree in photo same as in photo #5. Fence at top of bank Stayed in original location.

7. Pre-construction photo of area downstream of large tree above.

8. Post-construction photo of area in photo #7 taken from Opposite bank.

9. Post-construction photo of downstream end of box culvert.

10. Post-construction photo of upstream end of box culvert.

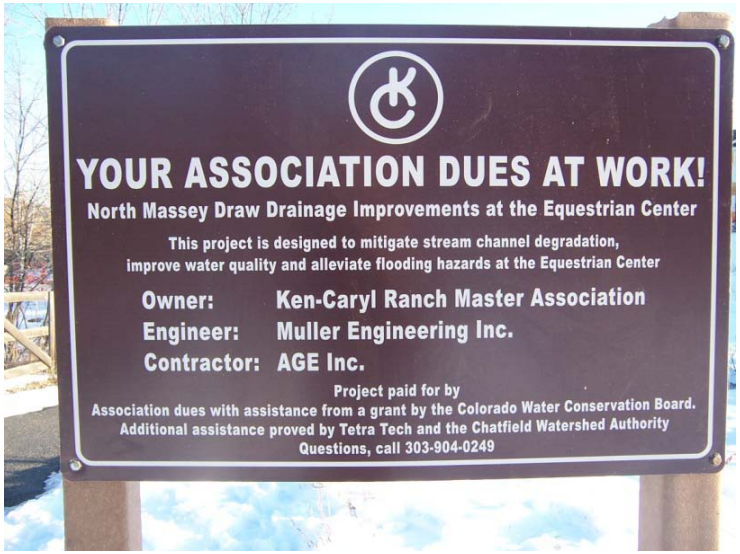
11. Post-construction photo of rock lined berm designed to prevent manure from entering drainage.

11. Post-construction photo of water quality trench. Run-off from Adjacent pasture is intercepted by the trench and treated Before entering the stream channel.

13. Post-construction photo of recreation trail/maintenance access

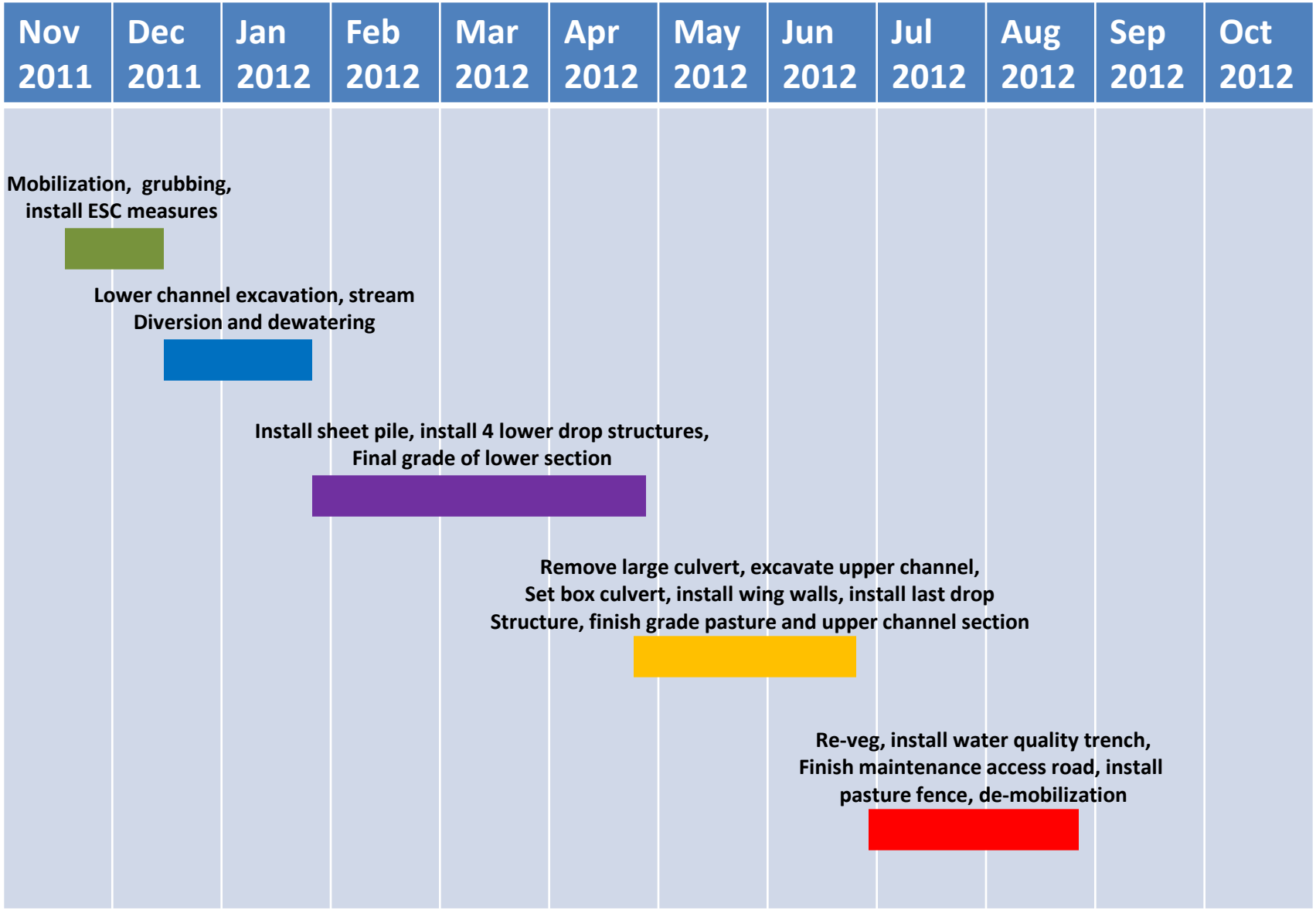
14. post-construction photo of upper channel. Wetland vegetation Establishing quickly.

15. Post-construction photo of grouted boulder droop structures During storm event.



16. Project sign posted on recreational trail running Along south side of project site

North Massey Draw Stream Restoration Improvements at the Ken-Caryl Ranch Equestrian Center
Construction Timeline



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