FINAL REPORT

LOWER SWAN RIVER AND WETLANDS RESTORATION PROJECT

BRECKENRIDGE, COLORADO

Submitted to:
Colorado Water Conservation Board
January 31, 2013

Colorado Water Conservation Board

PROJECT SUMMARY:

Project Purpose:

This project will restore damage caused to a short section of the lower Swan River during the epic run-off following the winter of 2011/12. Underlying causes of that damage will be addressed, river bank stabilization will assure the safety of the adjoining county open space recreation path and similarly of adjacent private structures, and a more sustainable trout habitat will be created.

Project Statistics:

Project Title: Lower Swan River and Wetlands Restoration Project

Project Location: The project is located approximately three miles north of Breckenridge and on the Swan River watershed just upstream from the Swan's confluence with the Blue River. (39°32'16.12"N 106°02"05.57"W). The project will be carried out on land belonging to the Swan's Nest Metropolitan District, the Villas at Swan's Nest HOA, and Summit County.

Primary Project Sponsor: Swan's Nest Metropolitan District

Additional Sponsors: Summit County, Villas at Swan's Nest HOA

Project Contractor: Ecological Resource Consultants

Project Cost:

Design	$3,439
Permits	$3,618.5
Materials, Construction	$62,418.5
Site Reclamation	
Project Total	***$69,476***

Project Funding Sources:

Colorado Water Conservation Board $28,100

Villas at Swan's Nest HOA (cash)	$40,276
Villas at Swan's Nest HOA (in-kind)	$950
Swan's Nest Metro District (in-kind)	$150

INTRODUCTION:

The lower Swan River area lies several miles to the north of Breckenridge and is particularly rich in recreational and historical assets. Two ponds created over a century ago by the Colorado dredge-mining king, Ben Stanley Revett, dominate the area. Since the end of the gold mining era the former dredge ponds have transformed into remarkable fisheries and are favored spots for anglers. An approximately one mile leg of the Summit County Open Space recreation path runs next to the upper pond adjacent to the Villas at Swan's Nest condominiums and then through wetland and river areas owned by the Swan's Nest Metropolitan District. This recreation area is open to the public and is serviced by two public parking areas.

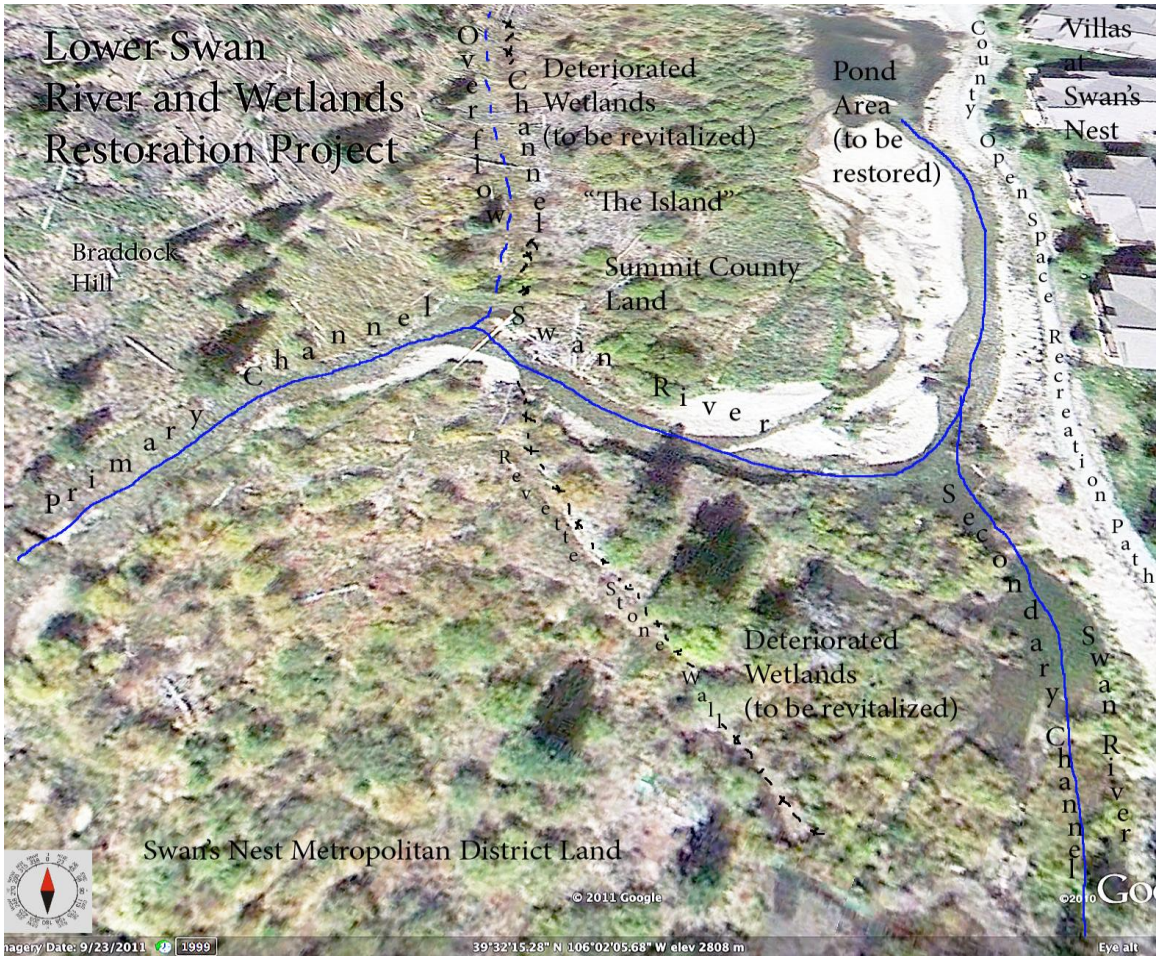
The epic snowfall and subsequent runoff of the 2010/2011 winter caused considerable damage to the area, particularly to the upper pond. Of note is erosion extending out fully eight feet along 100 feet of the east bank. Rather than a gentle slope the riverbank is now a cliff. The river along this section has undermined the adjacent recreation path, which is in danger of being temporarily closed. The sediment resulting from this event has nearly filled the upper pond and has entirely clogged the feeder channels on the adjacent Summit County wetlands. (See Photo Below.) Although anglers continue to have surprising luck fishing in what remains of the pond the brown trout population is now in a precarious and clearly unsustainable state. The most easily identifiable cause of this event was an unstable riverbank that gave way when pummeled by too much water. However, that runoff was caused by more than the previous winter's epic snowfall but also by two critical changes to the upstream river flow.

Prior to the damage caused by the run-off from the winter of 2010/11 the riverbank extended out fully eight feet past the roped-off area shown in this photo. Rubble from the bank collapse and also washed in by the run-off event is visible in the background.

The first change has occurred on Metropolitan District land about a quarter mile south of the impacted area. At that spot a channel ("Secondary Channel" on map below) has historically split from the river and then flowed through a wetlands area before rejoining the main channel just above the impacted bank. Recently debris has entirely blocked the secondary channel. Not only has this caused virtually all the water to course down the main channel and ultimately directly into the impacted bank but it has also rendered inoperational the significant filtering capacity of the wetlands. The second change occurred downstream at a junction of the river and a parcel of Summit County land often called simply "the island." At that juncture a channel (designated "Overflow Channel" on map below) used to flow due north, hence forming the island. A network of feeder channels then flowed between the two river channels and sustained the island wetlands. Sometime after 2004 a combination of sediment and a beaver dam entirely blocked the overflow channel. Again, this has caused virtually all the water to course

down the main channel and then directly into the impacted bank. And again it has neutralized the filtering capacity of the former wetlands.

The Lower Swan River and Wetlands Restoration Project will repair the damage caused by the 2011 run-off event in a manner that is sustainable and actually improves the watershed. Stabilization of the riverbank will allow the recreation path to again be safe for the public. It will return river flows to their recent courses, which in turn will help to revitalize neglected wetlands and similarly to reduce sedimentation and render the watershed more sustainable. All plans will be subject to approval by Summit County and the Army Corps of Engineers in compliance with the Colorado Division of Fish and Wildlife.



This map shows the area involved in the implementation of the Lower Swan River and Wetlands Project. (Photo from Google Earth)

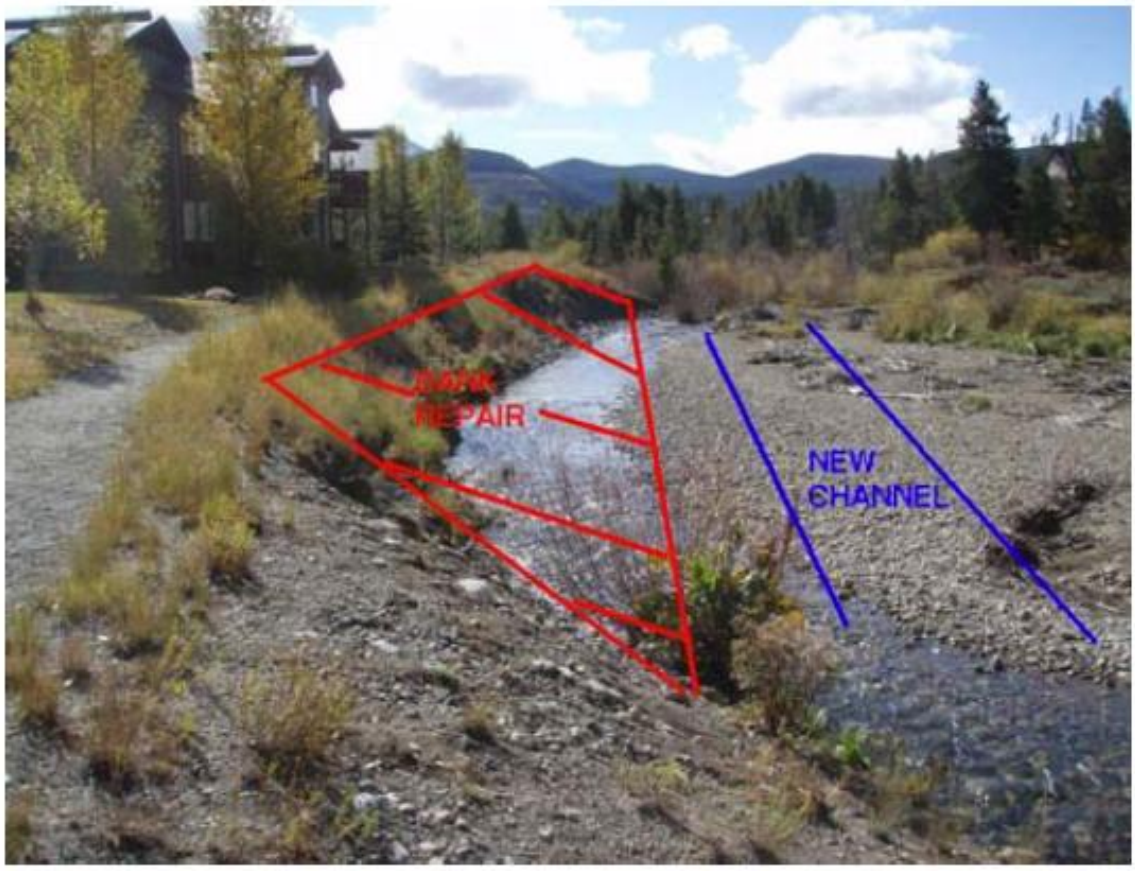
PROJECT DESIGN:

In order to accomplish its goals the project will employ a three-fold approach. The first task will be to complete a concept design plan. Ecological Resource Consultants (ERC) will complete this. ERC will conduct the necessary field evaluation to complete and concept design-build plan for the bank repair. ERC will provide a sketch plan suitable for permitting, accurate project cost estimate and construction implementation. The plan will be developed suitable for design-build implementation. ERC will provide a concept design plan, summary memo explaining restoration techniques, material quantities, cost estimate, permit requirements and anticipated implementation schedule.

Components to be considered as part of the Task 1 design:

1. Natural stabilization techniques along the east bank
2. Reestablish the stream channel along the east bank ‑however pushed farther west and away from stabilization measures
3. Establish a more permanent pond outfall structure
4. Maximize fish habitat within the pond
5. Establish a more permanent "highflow overflow" into the western historic channel
6. Explore opportunities for wetland enhancement upstream of the bank stabilization

Task 2 will be initiated only upon completion of Task 1 and will entail ERC's obtaining required permits. Task 3 comprises the actual construction, which will commence after the spring run-off, which is normally around July 1. ERC estimates that on-site completion of their work will take 4-5 days. The bank stabilization process is relatively straightforward. Structural material (large cobble and/or riprap) will be imported and placed to create a stable foundation. Rubble now filling the pond will be used as backfill to re-construct the bank slope and cover the foundation. The bank will be graded to a slope of 3:1 and will then be further stabilized with willow plantings and native grass seedlings. A new channel will be created through the existing gravel bar to re-align the channel away from the bank repair. A rock drop structure will be placed at the downstream end of the pond and will be set at a desired elevation for the pond.



Imported and native rock will be used to reconstruct and repair the impacted riverbank. A new channel will be more closely in alignment with its recent position. The Summit County Recreation Path is visible on the left side of the image.

In addition to the activities described above, which will be performed by ERC, voluntary labor provided by community members will clear upstream blockage on the secondary river channel passing through Metro District land. In addition, feeder channels from the main channel to the secondary channel and wetlands will be restored. This will result in a source of clean water that will feed directly into to the upper pond area. The flow will parallel the impacted bank and hence minimize erosion.

Appendix A
Pre-Construction Photos

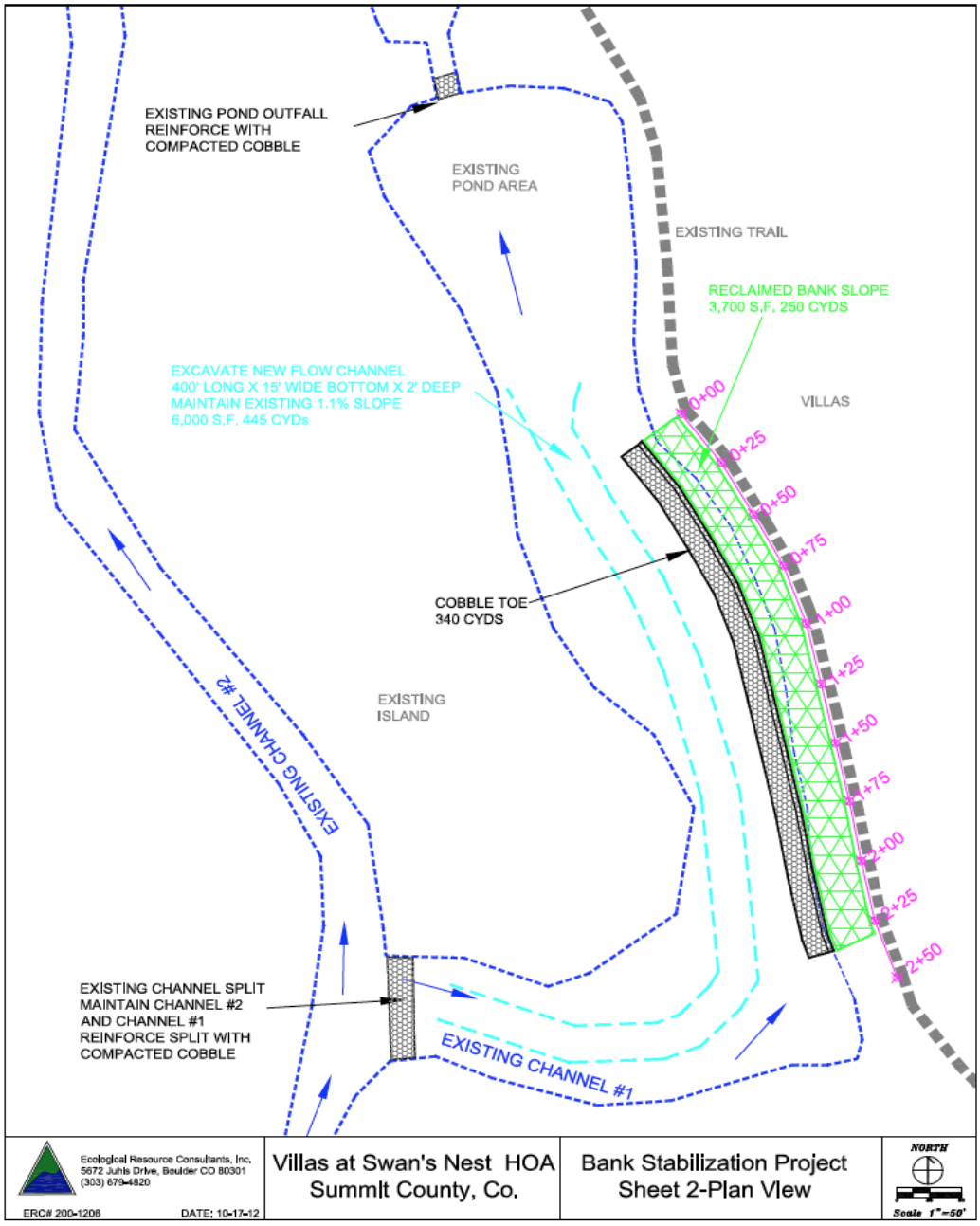
This photo shows the near peak runoff following the winter of 2010/11

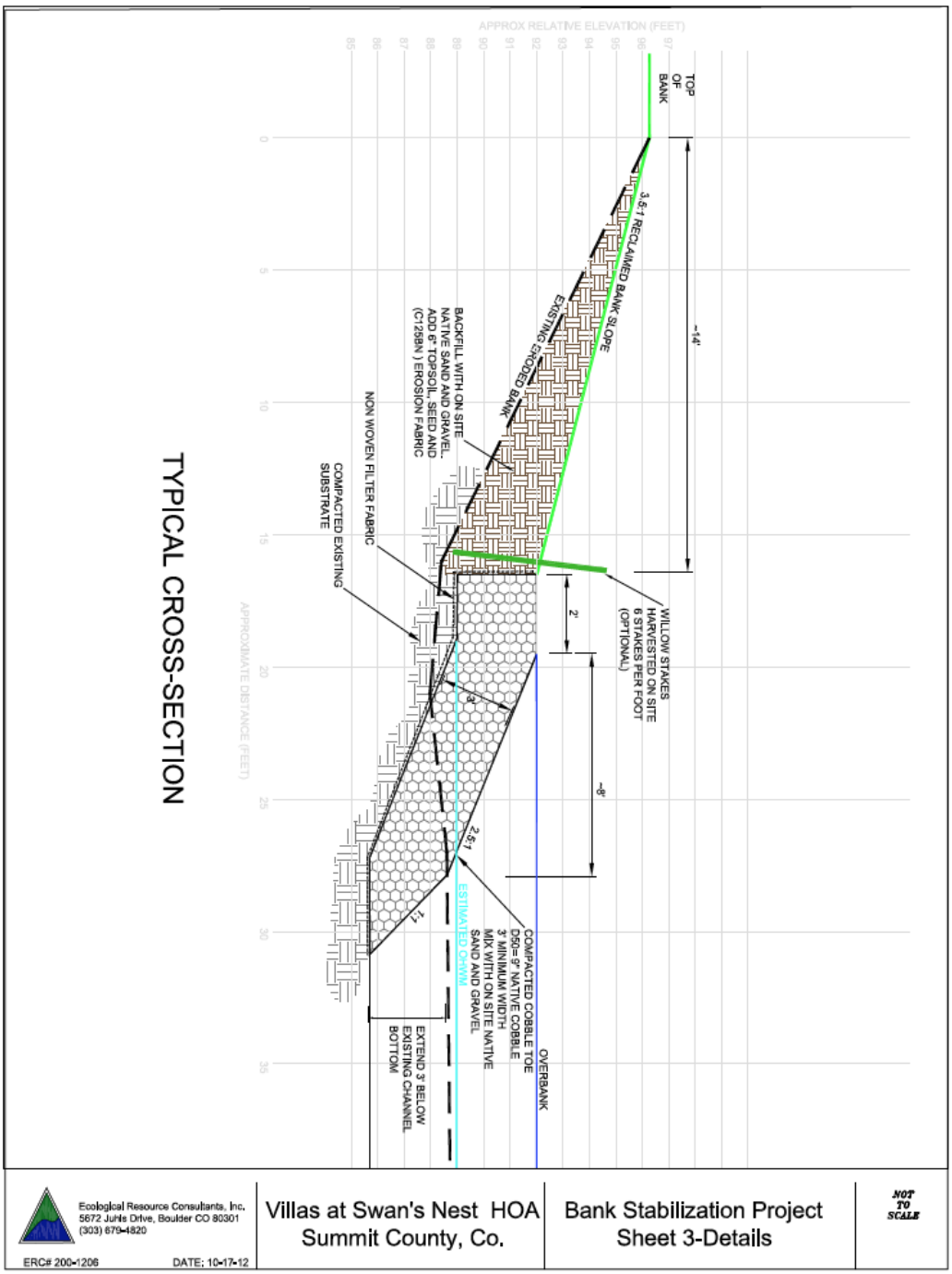
This photo shows the rubble brought in by the 2010/11 runoff as well as what remains of the upper pond.

Virtually all of the rubble evident in this photo came from the collapsed bank shown in the background.

Appendix B

Bank Stabilization Project Details




TYPICAL CROSS-SECTION
APPROX RELATIVE ELEVATION (FEET)
APPROXIMATE DISTANCE (FEET)
TOP OF BANK
~14'
3.5:1 RECLAIMED BANK SLOPE
EXISTING ERODED BANK
BACKFILL WITH ON SITE NATIVE SAND AND GRAVEL. ADD 6" TOPSOIL, SEED AND (C125BN) EROSION FABRIC
NON WOVEN FILTER FABRIC
COMPACTED EXISTING SUBSTRATE
WILLOW STAKES HARVESTED ON SITE 6 STAKES PER FOOT (OPTIONAL)
2'
~8'
2.5:1
1:1
ESTIMATED OHWM
COMPACTED COBBLE TOE D50=9" NATIVE COBBLE 3' MINIMUM WIDTH MIX WITH ON SITE NATIVE SAND AND GRAVEL
OVERBANK
EXTEND 3' BELOW EXISTING CHANNEL BOTTOM
Ecological Resource Consultants, Inc.
5672 JuNe Drive, Boulder CO 80301
(303) 679-4820
ERC# 200-1206
DATE: 10-17-12
Villas at Swan's Nest HOA
Summit County, Co.
Bank Stabilization Project
Sheet 3-Details
NOT TO SCALE

Appendix C

Construction Photos

December 11, 2012: the project is underway.

Day one sees the placement of almost 200 feet of cobble toe.

Cobble Placement

Days 2 and 3 entailed grade control and channel cutting

A cobble side channel split is constructed upstream.

By the end of work Thursday Dec. 13 heavy construction is finished and bank repair underway.

Just ahead of the winter's first major blast, Friday Dec. 14 was dedicated to seeding and the placement of erosion control fabric. The heavy equipment was moved out on Saturday Dec. 15.