

A photograph of a stream flowing through a wooded area. The water is turbulent, creating white rapids as it flows over rocks and fallen branches. The surrounding forest is dense with trees, some of which are bare, suggesting a late autumn or winter setting. The overall scene is natural and somewhat rugged.

Sager Creek Urban Stream Restoration Phase 2

319 Grant Project No. 09-1300

**Funded by: EPA Region 6, ANRC and the City of
Siloam Springs**

First; was the Sager Creek Watershed Assessment and Management Plan

- ◆ Assessment and management plan completed in 2005
- ◆ Critical stream reaches were identified
- ◆ 14 major environmental perturbations affecting water quality, aquatic biota and aesthetics were also identified and ranked
- ◆ The City and the Sager Creek Advisory Commission used the management plan to initiate efforts to improve Sager Creek

Second; Phase I Restoration, the First Project Resulting From the Management Plan was completed Spring 2009

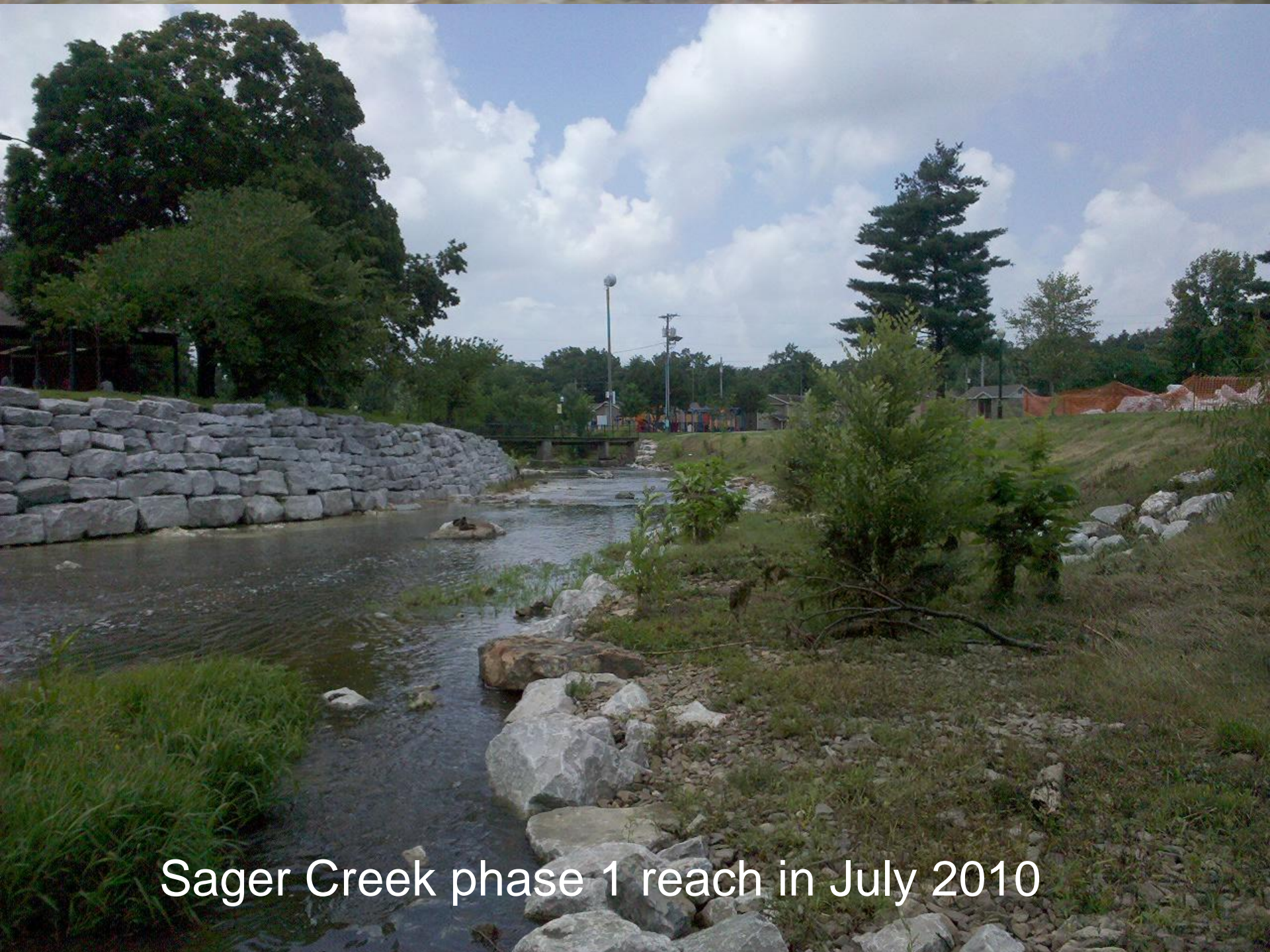
- ◆ **Goals accomplished:**
 - ◆ **Restored natural hydrology**
 - ◆ **Restored natural geomorphology (channel shape)**
 - ◆ **Improved aquatic habitat**
 - ◆ **Improved water quality**
 - ◆ **Algal reduction.....waiting on trees to mature and provide shade to the stream**
 - ◆ **Work funded through a 319 Grant**

Sager Creek in Downtown Siloam Springs - 2005/2006



Before and After - Looking Downstream (Primary Reach)





Sager Creek phase 1 reach in July 2010

Now; Phase 2 of the Restoration Has Been Funded By EPA

Goals are:

- ◆ **Reduce algae growth**
- ◆ **Restore natural hydrology**
- ◆ **Improve water quality (decrease sediment, nutrients and temperature)**
- ◆ **Restore channel to natural geomorphic condition**
- ◆ **Aquatic habitat improvement**

Means to Accomplishing Goals for Phase 2:

- ◆ Channel re-design
- ◆ Stream bank stabilization
- ◆ Riparian re-forestation
- ◆ Ancillary to grant project but critical to success: Dam (low-water bridge) replacement with a Con-span style bridge
- ◆ Channel reconfiguration in UTS-1 to enhance pollutant assimilation

Phase 2 Project Location

REACH-7
North Bank lacks Riparian buffer
3 dams restricting natural hydrology
Concrete lined channels limit floodplain access

Previous Restoration

Proposed Restoration

R-7

**UTS-1
Enhancement**

UTS-1
Proposed
Assimilation Reach

UTS-1 subwatershed produces largest load of nutrients and suspended sediment.

R-1

R-4

R-2

R-5

R-3

R-6



2,000

FEET

Phase II Restoration

Phase 2 Project Tasks

- ◆ **Financial Review**
- ◆ **Monitoring & Quality Assurance Project Plan (QAPP)**
- ◆ **Topographic Survey**
- ◆ **Sager Creek Restoration Design and Construction Management (Includes hydraulic modeling and flood evaluation)**
- ◆ **Sager Creek Stream Restoration Construction**
- ◆ **UTS-1 Sub-watershed Re-configuration for Enhanced Pollutant Assimilation**
- ◆ **Reporting and Grant Coordination**

Key Tasks:

1. Monitoring / QAPP

- ◆ **Quality Assurance Project Plan (QAPP) development**
- ◆ **Water quality sampling**
 - ◆ **Monthly sampling above and below restoration for one year**
 - ◆ **Stormwater sampling above and below restoration for six events**
- ◆ **Stream bank stability surveys at two permanent cross sections**
- ◆ **Benthic macroinvertebrates monitoring before and after the restoration in Sager Creek.**

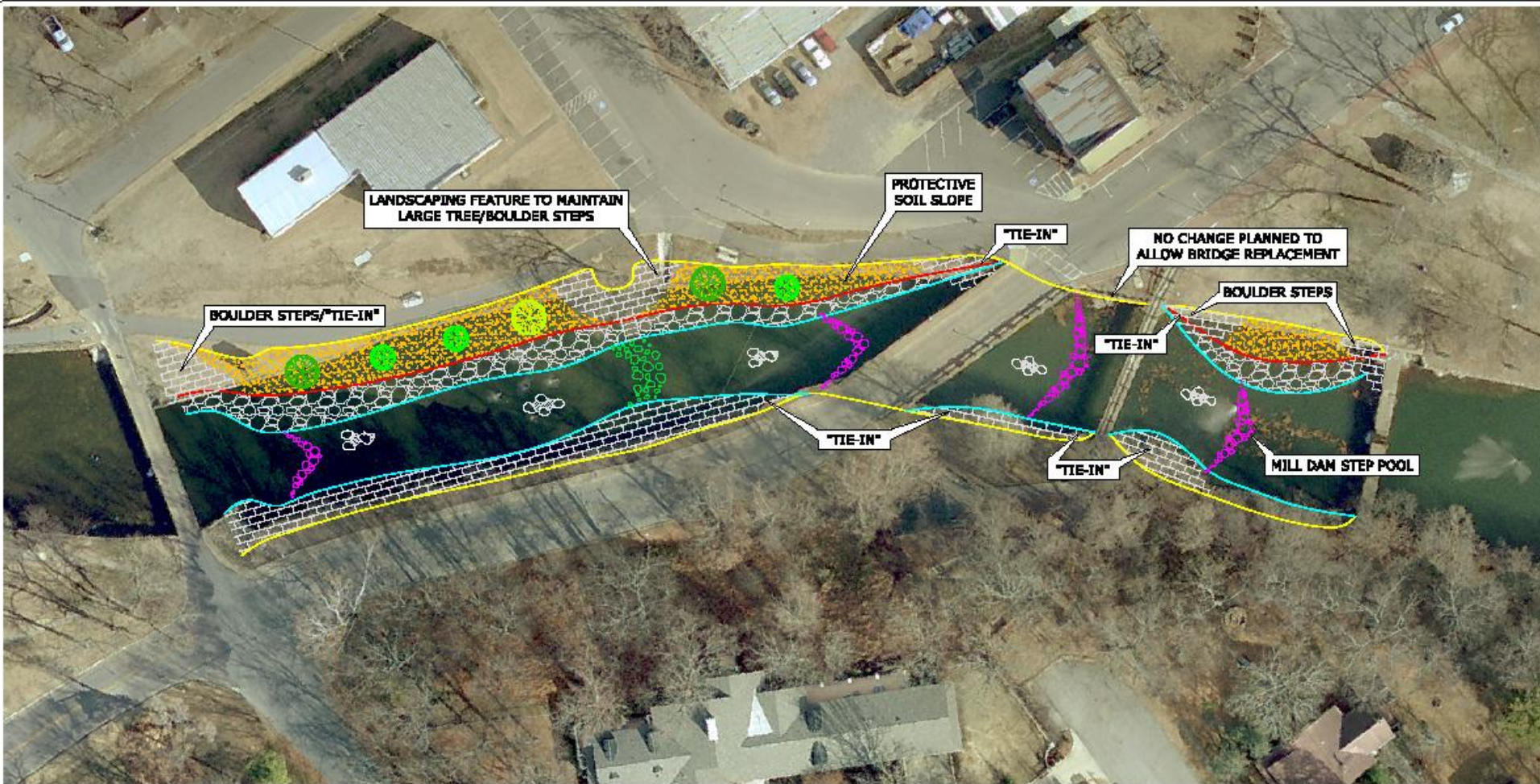
2. Restoration of Sager Creek:

- ◆ **Restoration design and hydraulic modeling**
- ◆ **Re-shaping of stream banks**
- ◆ **Construction of sloped or stepped boulder revetments (imbricated rip rap)**
- ◆ **Construction of bankfull bench and boulder toes**
- ◆ **Constructing of step pools and/or riffles and boulder clusters**
- ◆ **Planting of native riparian vegetation**



Timeline

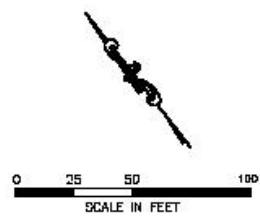
- ◆ Funding available February 1, 2010
- ◆ Final design plans/specs for Sager Creek completed September 10, 2010
- ◆ UTS-1 plans/specs in progress
- ◆ Monitoring began August 26, 2010
- ◆ Construction in Sager Creek began September 13, 2010
- ◆ Construction timeframe (for both areas):
September 2010 - March 2011
- ◆ Final report due to EPA/ANRC Sept 30, 2011

Restoration Layout



LEGEND

-  STEP POOL
-  RIFFLES
-  BOULDER CLUSTERS (NOT REPRESENTATIVE OF PLACEMENT, LOCATION OR NUMBERS)
-  STACKED BOULDER REVETMENT
-  SOIL SLOPE
-  BENCH
-  TOE OF UPPER BANK SLOPE
-  TOP OF BANK
-  EDGE OF BOULDER TOE/BASEFLOW CHANNEL



4600.900.006			
SAGER CREEK RESTORATION DESIGN LAYOUT DETAIL			
CITY OF SILDAM SPRINGS SILDAM SPRINGS, ARKANSAS			
Approved by:	SKH/CDC		Project No.: 4800-10-900
Checked by:	JdF	Date:	09/10/2010
Drawn by:	IT	Scale:	SHOWN

Targeted Areas for Phase 2 Restoration - Upstream of Low-Water Bridge

Boulder step
access points

Vegetated
Slope ~3:1

River Rock or
Slab Boulder
Bench

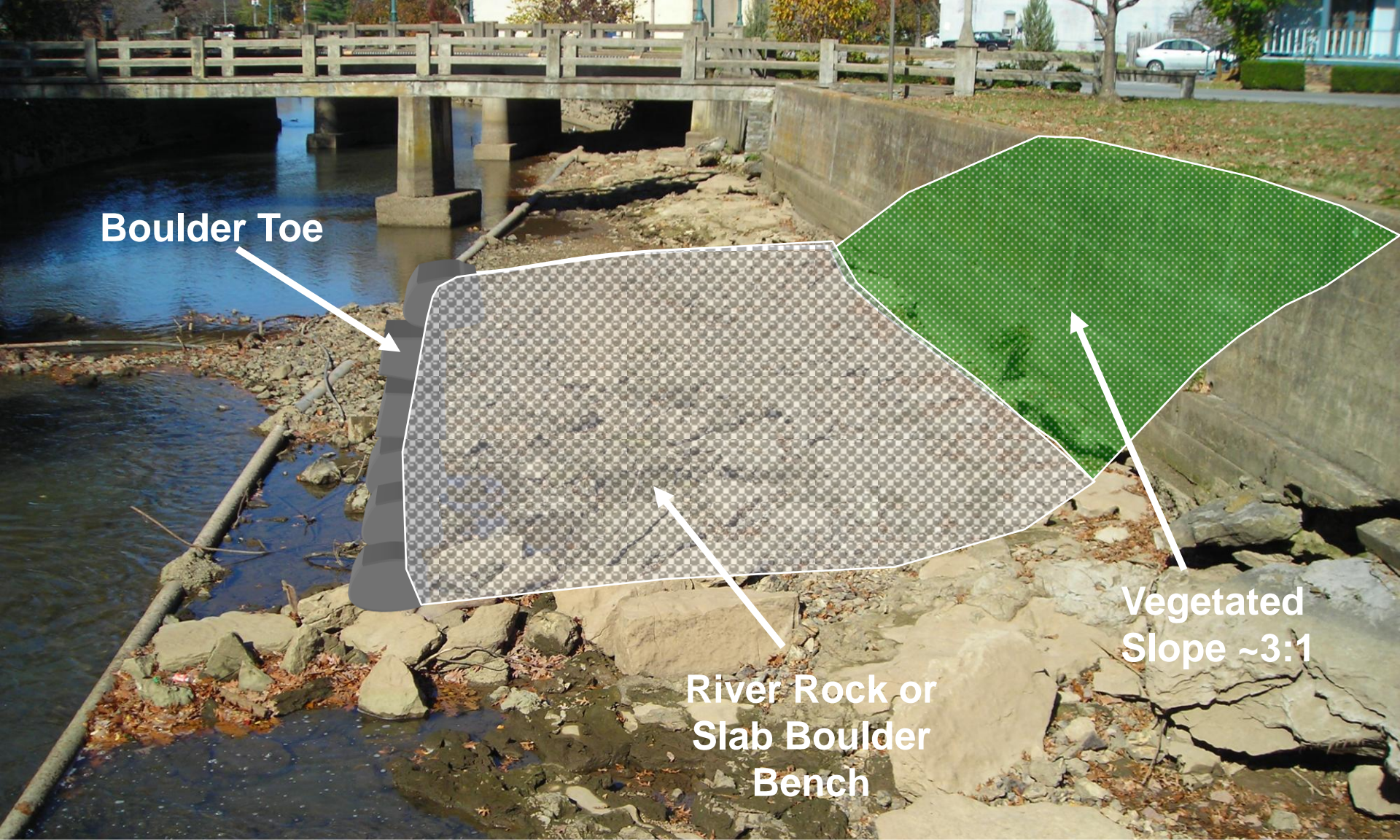
Boulder Toe



Upstream of Low-Water Bridge (Right Side)

Boulder
Revetment



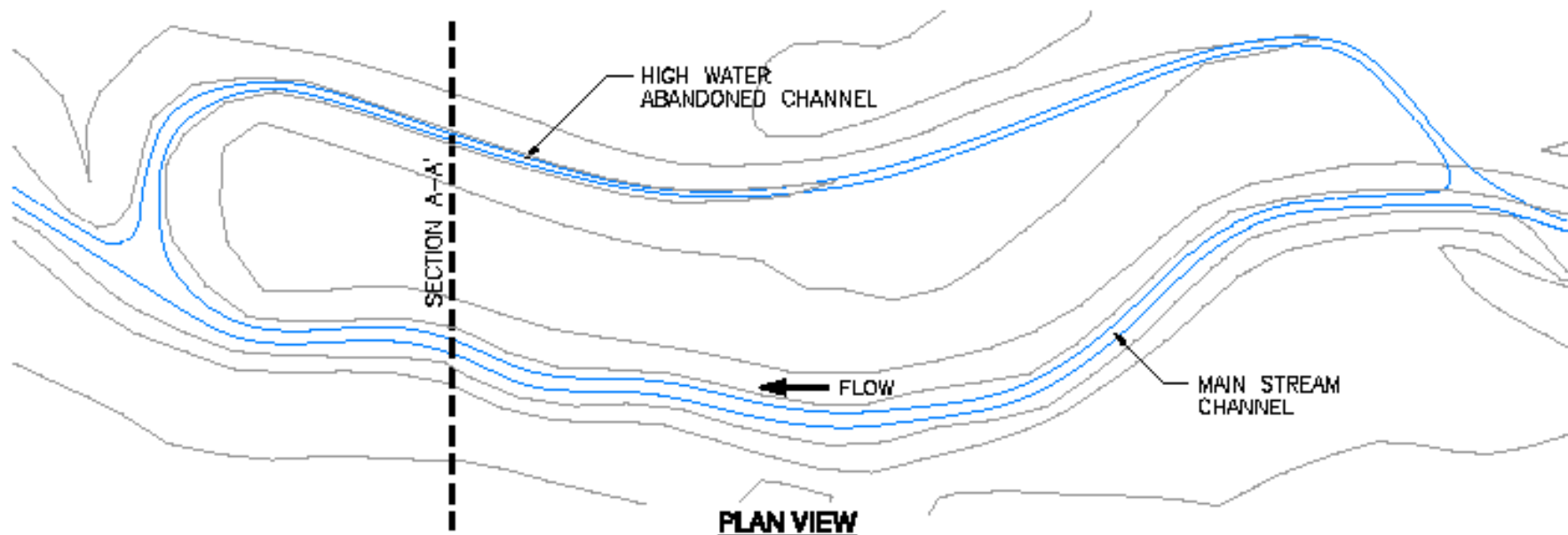


Boulder Toe

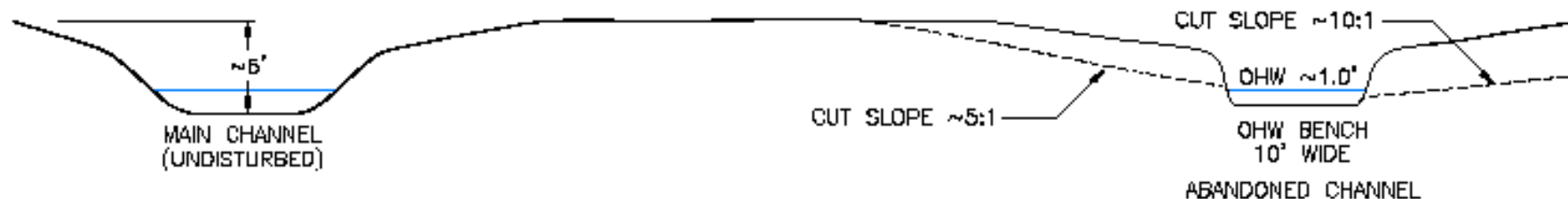
River Rock or
Slab Boulder
Bench

Vegetated
Slope ~3:1

Area immediately below large dam in City Park. This is the upstream limit of the Phase 2 restoration effort in the main channel



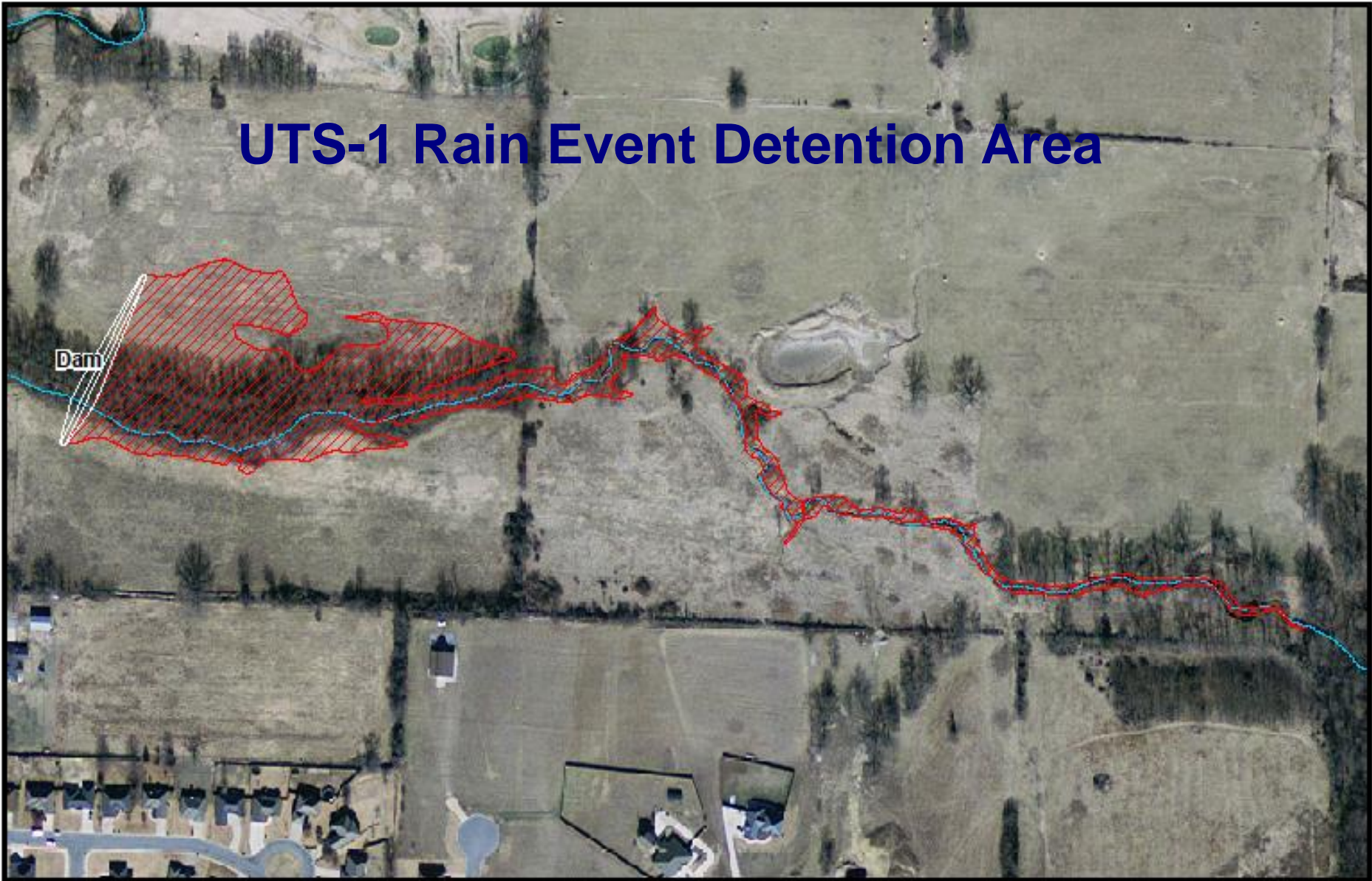
UTS-1 Design Concept





SECTION A-A'

4600.900.005			
UTS-1 CHANNEL RECONFIGURATION/ENHANCEMENT PLAN & CROSS-SECTION CITY OF SILOAM SPRINGS SILOAM SPRINGS, ARKANSAS			
Approved by:	CLP	GBM CONSULTANTS	Project No.:
Directed by:	CLP		Date:
Drawn by:	IT		Scale:
			4600-10-900 06/08/2010 NTS

UTS-1 Rain Event Detention Area



 Flooded Area Under 72 Hr Detention
 Streams

400
FEET



Aerial depicting dam and flooded area.

Phase 2 Underway.....



Questions?

For further information, contact:

Adam Roark, PE

(479) 238-0927

City Engineer

aroark@siloamsprings.com

Greg Phillips

(501) 847-7077

GBM^c & Associates

gphillips@gbmcassoc.com

