

***Gwinnett County Watershed
Implementation Program - Case study for
stream restoration integrated into County-
owned park***

2006 Annual Southeast Watershed Roundtable

August 3, 2006

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Bearden - ENTRIX, Inc***

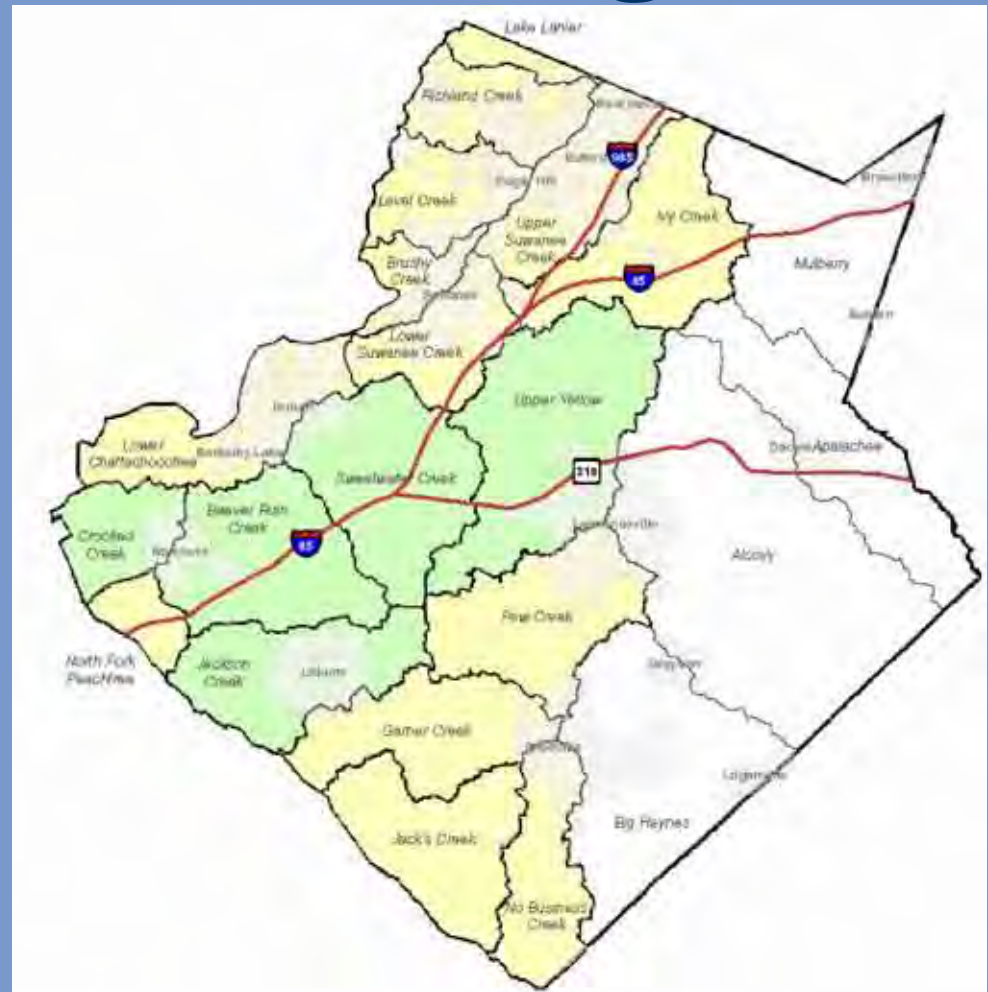
***Pete Wright - Gwinnett County Department of
Water Resources***

ENTRIX

ENVIRONMENTAL CONSULTANTS

History of Gwinnett County Watershed Planning

- Watershed Assessment - 1998
- Watershed Improvement Planning - 2000
- Project Selection and Construction - 2005



WIP Planning Process

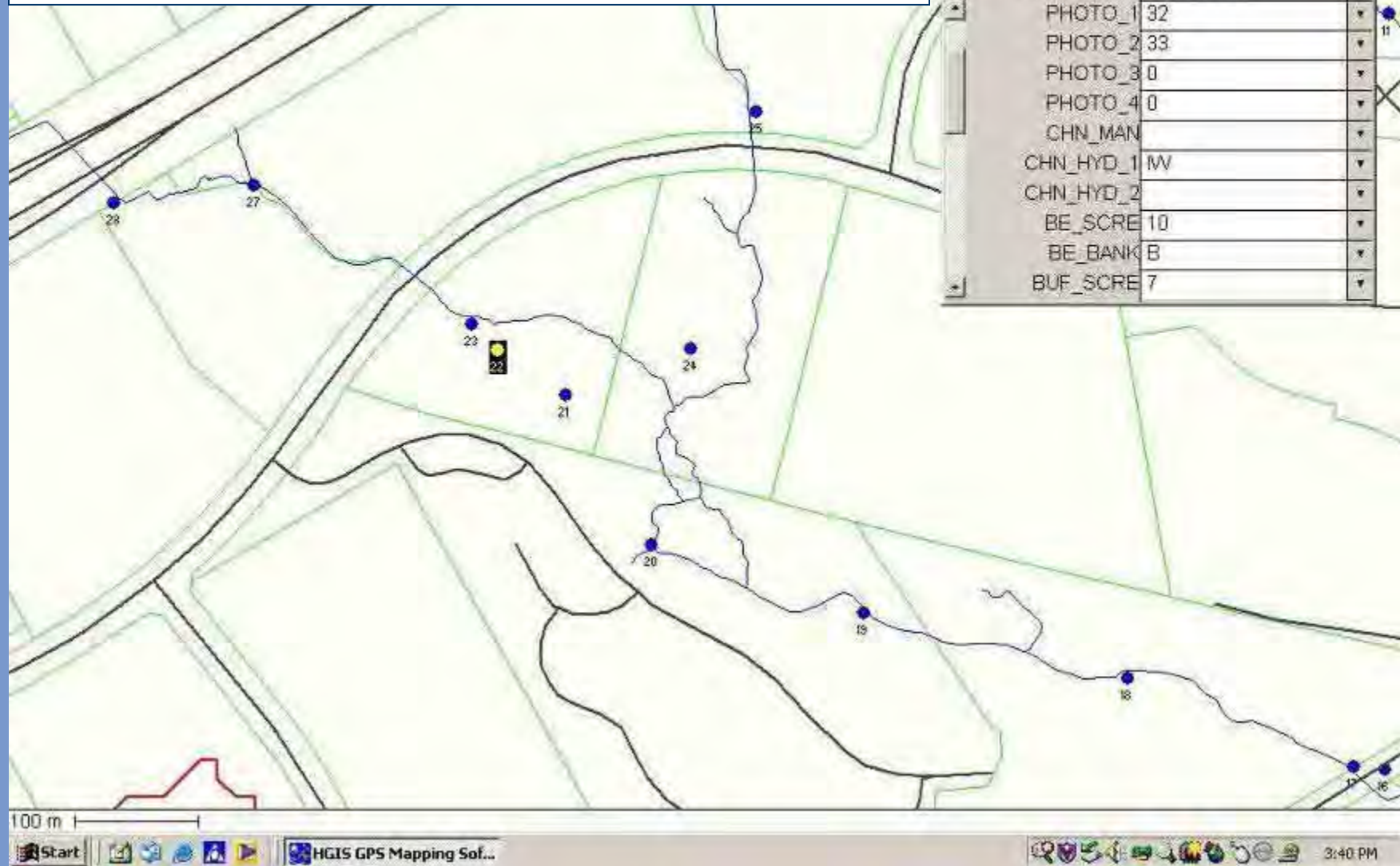
- Identify and assess watershed conditions - BMP and Stream Inventory
- Develop list of potential improvement projects
- Prioritize sub-watersheds based on modeled TSS loading and habitat conditions
- Quantify benefits and rank projects to develop the recommend CIP List

Stream and BMP Surveys

- Integrate GPS/GIS technology and aerial photography
- Assess existing conditions
- Develop potential projects
 - stream restoration,
 - BMP retrofits, new BMPs



GIS-Based Field Data Collection



Project Development

Streambank Protection

\$235,183

↓ TSS 21,564 lbs/year

Detention Retrofit

\$128,443

↓ TSS 582,383 lbs/year

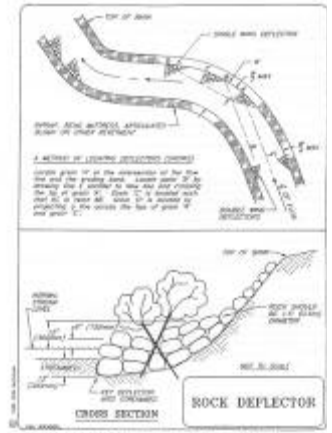
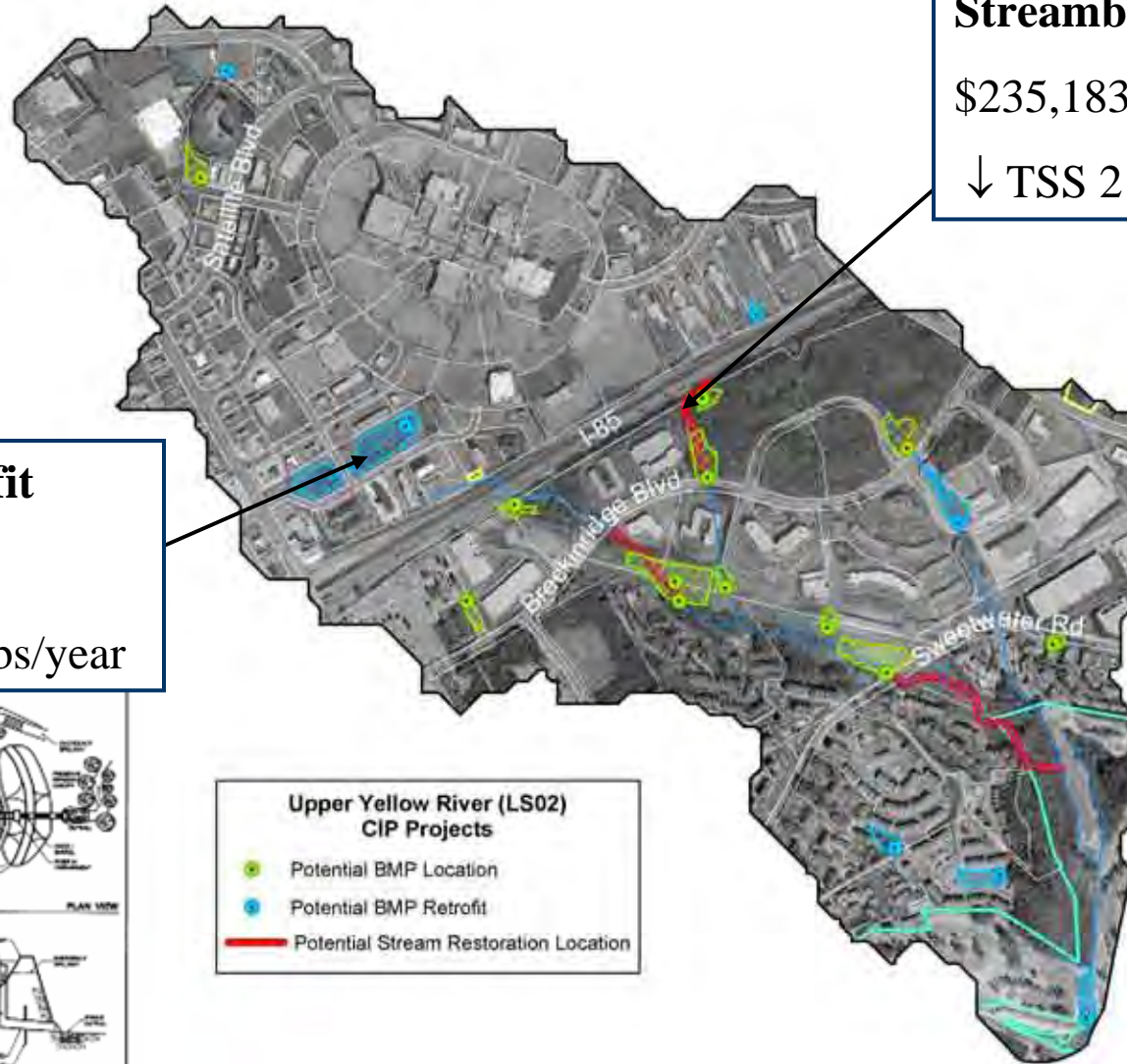
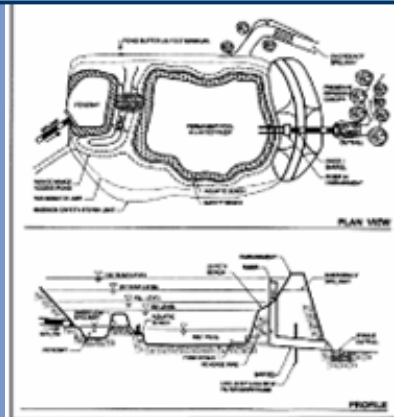


Fig. 5.22 Typical drawing of riprap bank deflector. (Source: Ebert et al., 2000)



Georgia Technical Management Manual, 2001

**Upper Yellow River (LS02)
CIP Projects**

- Potential BMP Location
- Potential BMP Retrofit
- Potential Stream Restoration Location

Capital Improvement Plan List

Table 4-1. Reach CIP Projects by Watershed

Watershed	BMP	Stream Restoration	Total Number of Projects	Estimated Cost
Pew Creek	30	17	47	\$8,799,185
Garner Creek	32	22	54	\$8,679,380
acks Creek	18	14	32	\$5,113,960
No Business Creek	5	2	7	\$1,349,924
Total Study Area	85	55	140	\$23,942,449

Table 4-2. HUC12 CIP Projects by Watershed

Watershed	BMP	Stream Restoration	Total Number of Projects	Estimated Cost
Pew Creek	0	0	0	N/A
Garner Creek	24	13	37	\$5,355,054
acks Creek	15	9	24	\$4,120,892
No Business Creek	0	0	0	N/A
Total Study Area	39	22	61	\$9,475,946

Draft List from the Upper Yellow Watershed

E N T R I X

Evolution of WIP Methods

Process of Working on Three Consecutive WIPs

- When to use certain evaluation criteria
 - Improvement criteria vs. implementation criteria
- TSS loading
 - Using real bank erosion data in model
 - Easily updated with new data
- Usefulness of habitat assessment data
 - Application of data to headwater and larger stream
 - Applying qualitative data at a watershed scale

WIP Project Implementation

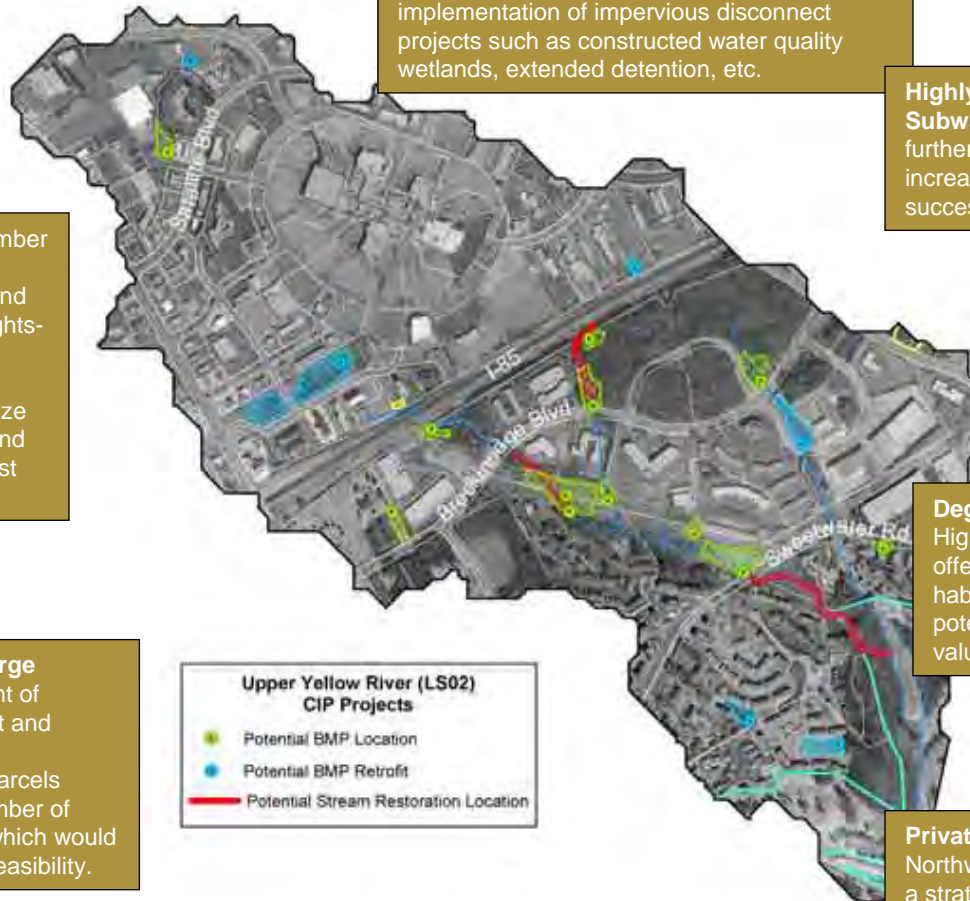
Priority Sub-basin – TSS yield exceeds 1,600 lbs/acre/year and dissimilar weighted habitat score.

Impervious Disconnect Potential – Abundance of impervious surfaces associated with the Gwinnett Place Mall commercial district and numerous car dealerships bordering I-85 offers a good opportunity for implementation of impervious disconnect projects such as constructed water quality wetlands, extended detention, etc.

Highly Developed Subwatershed – Low potential for further hydrologic alteration; increased probability of long-term success for implemented projects.

Rights-of-Way – Large number of CIP projects within and adjacent to transportation and electric transmission line rights-of-way could be addressed through a programmatic approach that would minimize land acquisition concerns and provide opportunities for cost sharing.

Limited Number of Large Parcels – Limited extent of residential development and numerous large industrial/commercial parcels would minimize the number of affected land owners, which would likely increase project feasibility.



Degraded Stream Habitat – Highly degraded stream habitat offers increased potential for habitat enhancement and potentially greater mitigation value.

Private Parkland/Open Space – Northwoods Golf Course occupies a strategic position at the bottom of the SWT01 subwatershed. Project implementation there should be met with acceptance.

Selection of first projects

- GEFA funding - 3 year time limit
- Restricts land acquisition options
- Focus on County-owned property

**GOAL - highly visible,
education potential, improve
TSS and instream habitat**

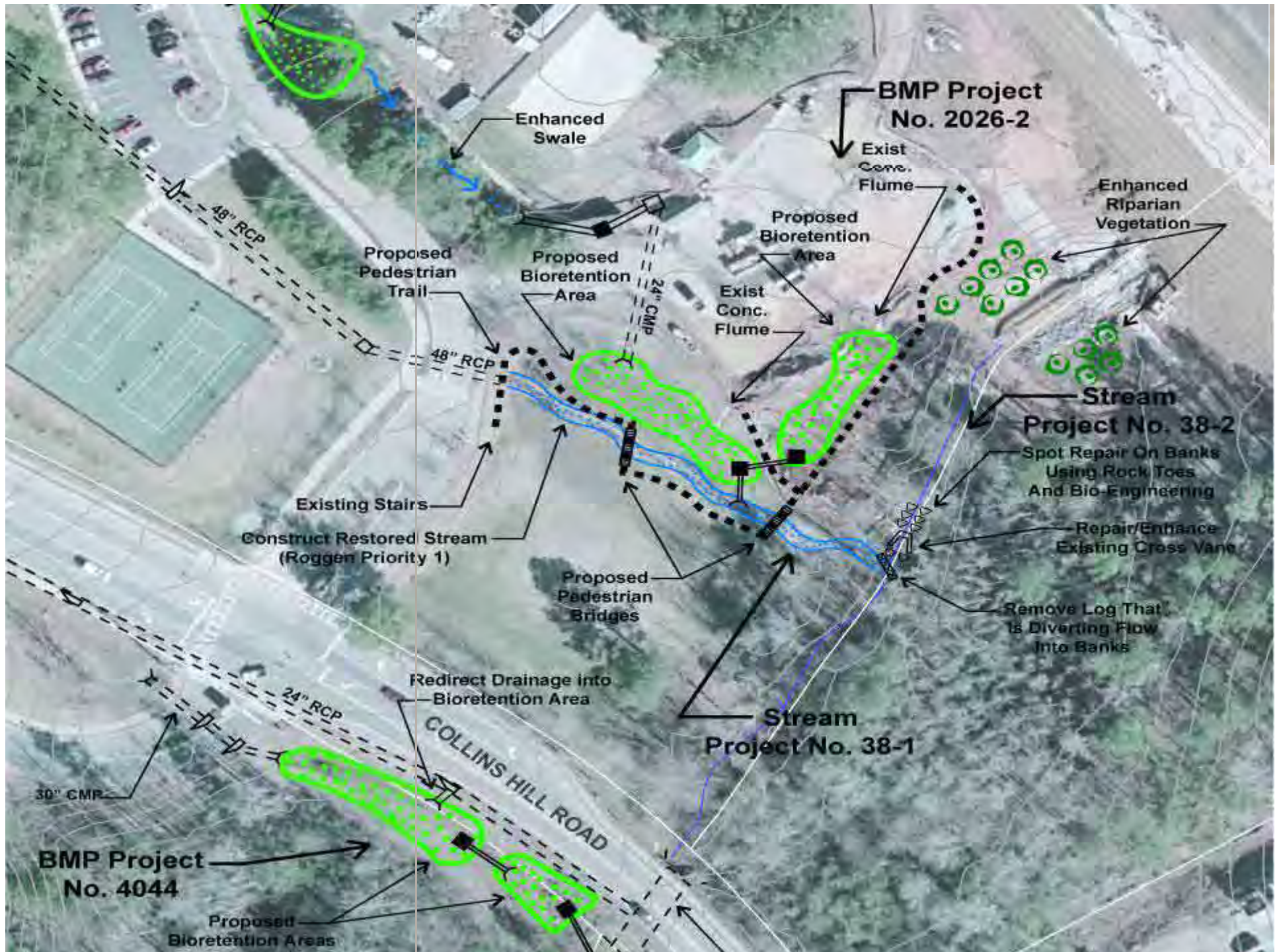
Collins Hill Park Project

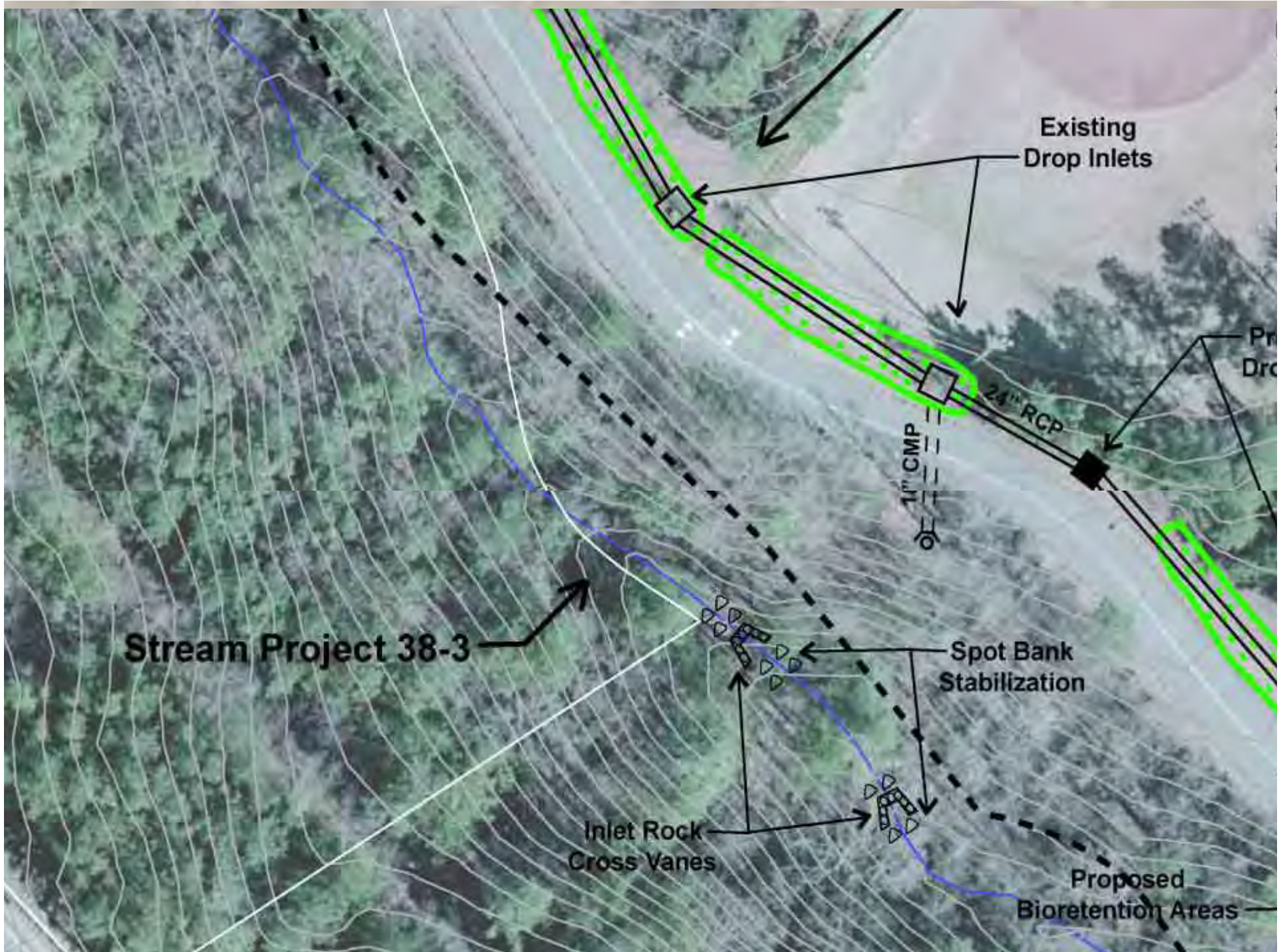
- Detention facility retrofit
- Bioretention and constructed wetland for water quality treatment
- Stream restoration - channel reconstruction and streambank stabilization

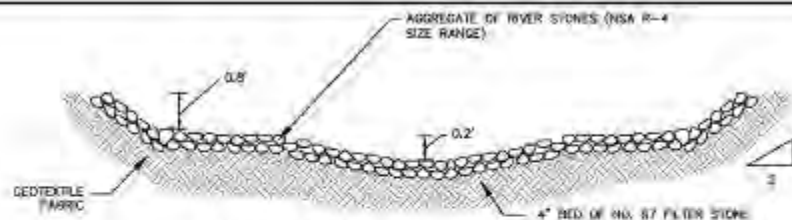
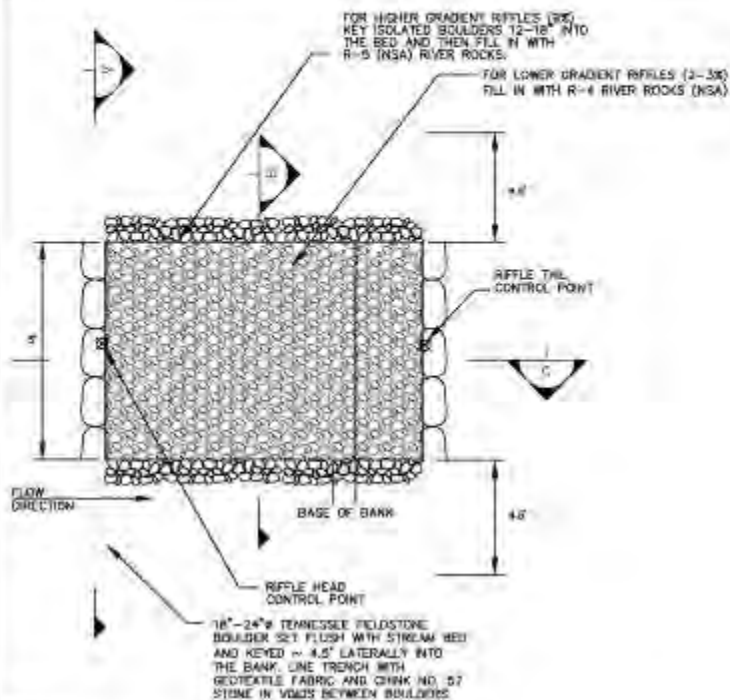


Note:
 Proposed Collins Hill Park
 Improvement Projects Include:

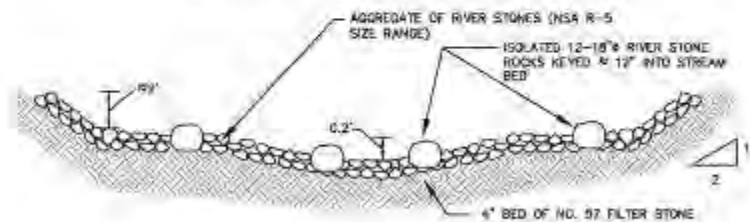
- BMP Project No. 2026
- BMP Project No. 4044
- Stream Project No. 38



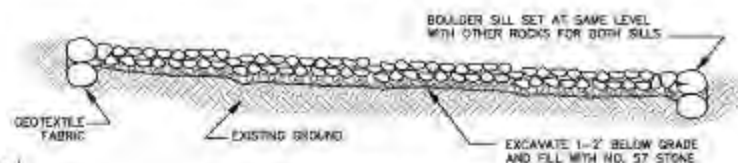




CROSS SECTION B-1
APPLIES TO LG-1 TO LG-4



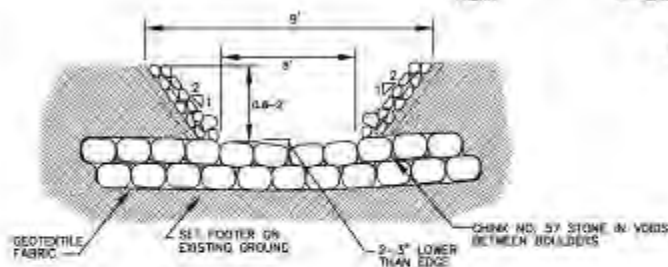
CROSS SECTION B-2
APPLIES TO HG-1, HG-2



CROSS SECTION C

NOTES:

- BOULDER SILL KEYED IN ON UPSTREAM AND DOWNSTREAM END OF RIFLE.
- BOULDER SILL COMPRISED OF 18-24" BOULDERS SET ON FOOTER STONE OF EQUAL OR GREATER DIAMETER.
- OFFSET HEADER STONE SLIGHTLY IN UPSTREAM DIRECTION.
- SET INVERT OF SILL IN CENTER OF STREAM TO CONCENTRATE FLOW, WITH INVERT SET 2-3' BELOW ELEVATION AT BASE OF EACH BANK.
- BOULDER SILL KEYED INTO EACH BANK LATERALLY 4-5'.
- CHINK NO. 57 STONE IN VOIDS BETWEEN BOULDERS.
- FOR BOTH LOW-GRADIENT AND HIGH GRADIENT RIFLE, LINE BED WITH 4" OF NO. 57 FILTER STONE.
- FOR LOW-GRADIENT RIFFLES, THEN LAYER 6" OF R-4 (NSA) SIZED RIVER STONE ON FILTER BED AND POUND TOGETHER, THEN LAYER ADDITIONAL 6" OF R-4 (NSA) SIZED RIVER STONES ON TOP.
- FOR HIGH-GRADIENT RIFFLES, LAYER 6" OF R-5 (NSA) SIZED RIVER STONE ON FILTER BED AND POUND TOGETHER, THEN PLACE LARGER STONES (12-18") RANDOMLY THROUGHOUT RIFLE AT ON-CENTER SPACING OF 4-5'. FINALLY, LAYER ADDITIONAL 6" OF R-5 (NSA) SIZED RIVER STONES ON TOP OF BED AND IN BETWEEN RANDOMLY PLACED BOULDERS, NO MORE THAN 1/3 OF BOULDER DIAMETER SHOULD BE EXPOSED ABOVE FINISHED STREAM BED ELEVATION.
- SLOPE BANKS AT 2:1 UNTIL EXISTING GRADE IS MET, OVER EXCAVATE BANKS, AND LINE WITH 2 LAYERS OF R-3 (NSA) REP-RAP, PRESS FIRST LAYER FIRMLY INTO BANK.



CROSS SECTION A
NOT TO SCALE

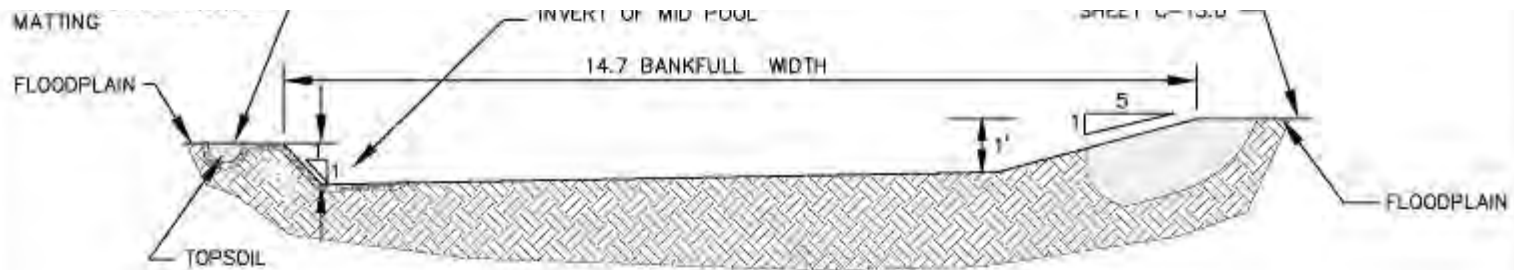
CONTROL POINTS

ID	RIFLE HEAD NORTHING	RIFLE HEAD EASTING	RIFLE HEAD ELEVATION	RIFLE TAIL NORTHING	RIFLE TAIL EASTING	RIFLE TAIL ELEVATION	RIFLE SLOPE	RIFLE LENGTH (FT)
LG-1	1481584.36	2342578.52	974.12	1481582.81	2342564.38	973.74	2.25%	17
LG-2	1481573.33	2342605.84	973.63	1481569.89	2342616.64	973.28	2.5%	15
LG-3	1481553.78	2342628.77	973.15	1481533.28	2342641.12	972.77	2.5%	15
LG-4	1481536.81	2342658.88	972.54	1481517.66	2342665.53	972.00	2.7%	20
HG-1	1481503.66	2342688.15	971.81	1481496.03	2342708.02	970.01	8%	20
HG-2	1481482.38	2342725.35	969.84	1481466.73	2342736.77	968.04	8%	20

*NORTHING AND EASTING VALUES ARE TAKEN AT CONTROL POINTS SHOWN ON DETAIL AT EACH RIFLE LOCATION. FEATURE ID'S ARE LABELED ON SHEETS D-4.A, D-5.0.

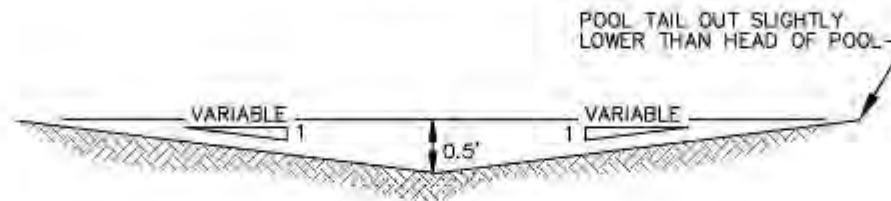
CONSTRUCTED RIFLE

NOT TO SCALE



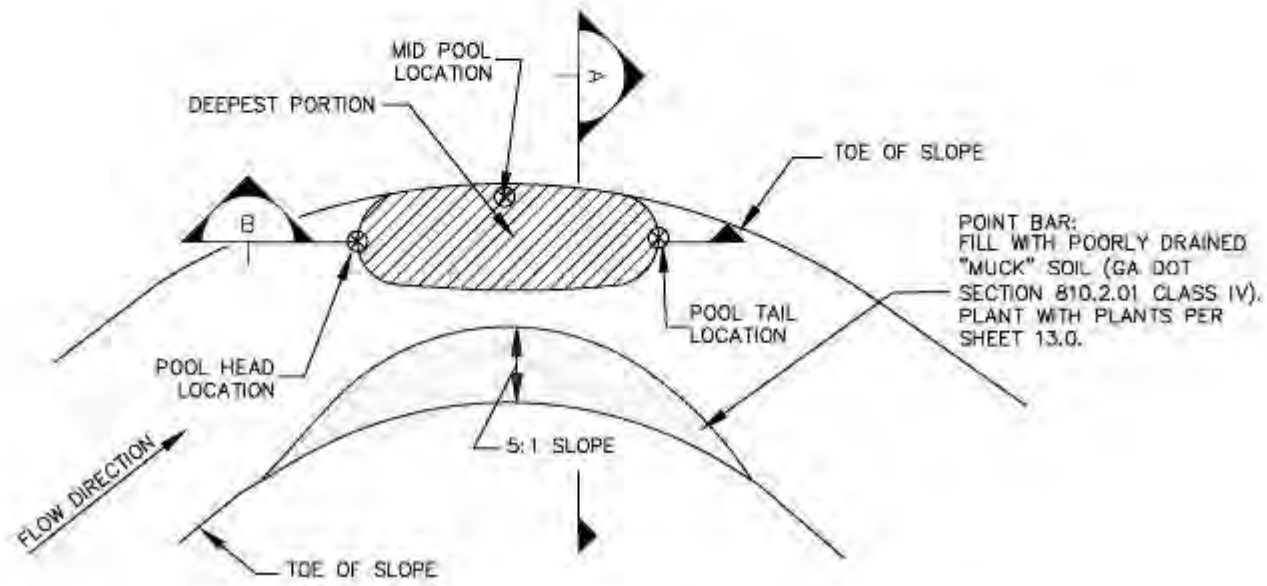
CROSS SECTION A

NOT TO SCALE



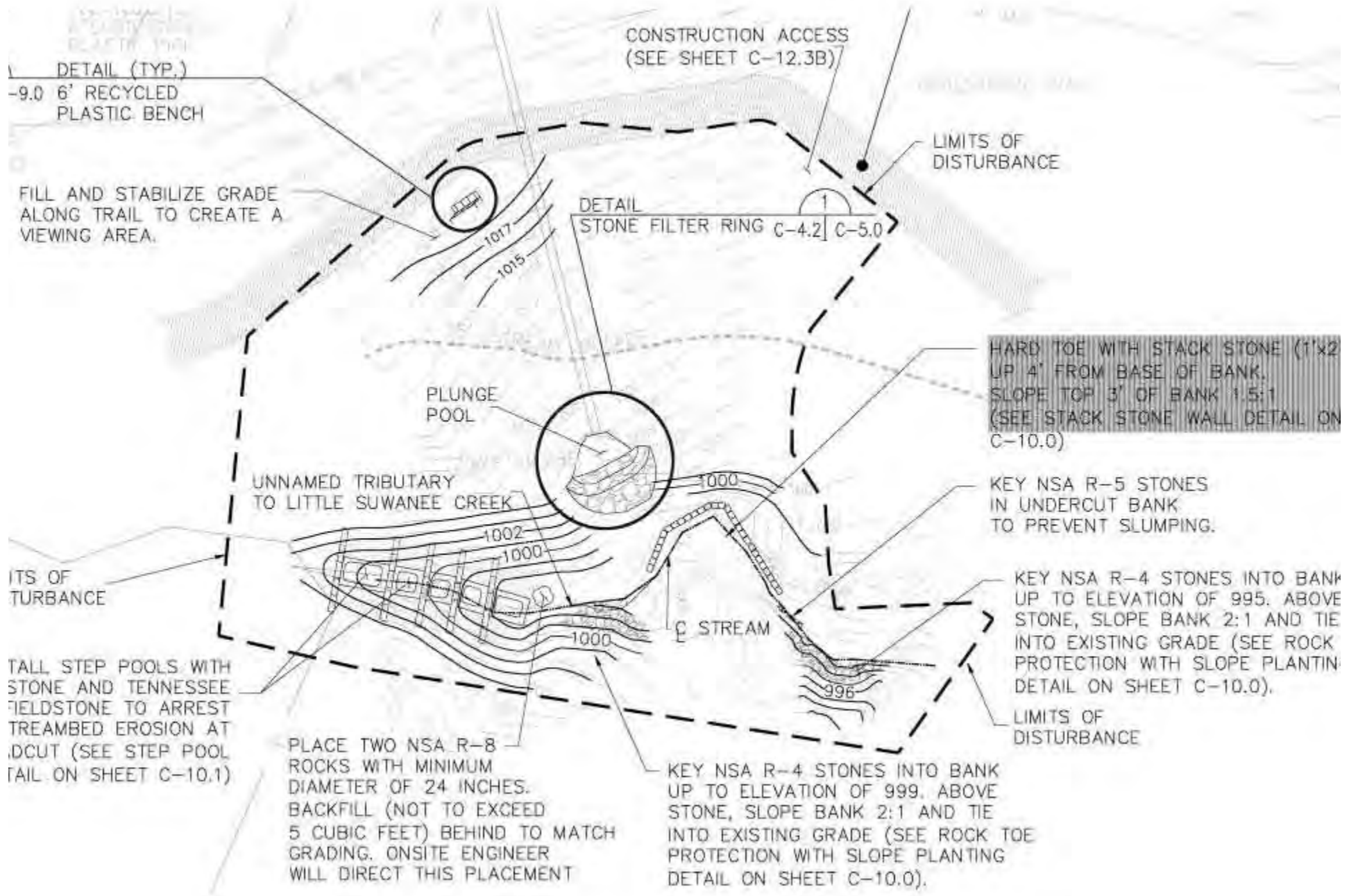
CROSS SECTION B

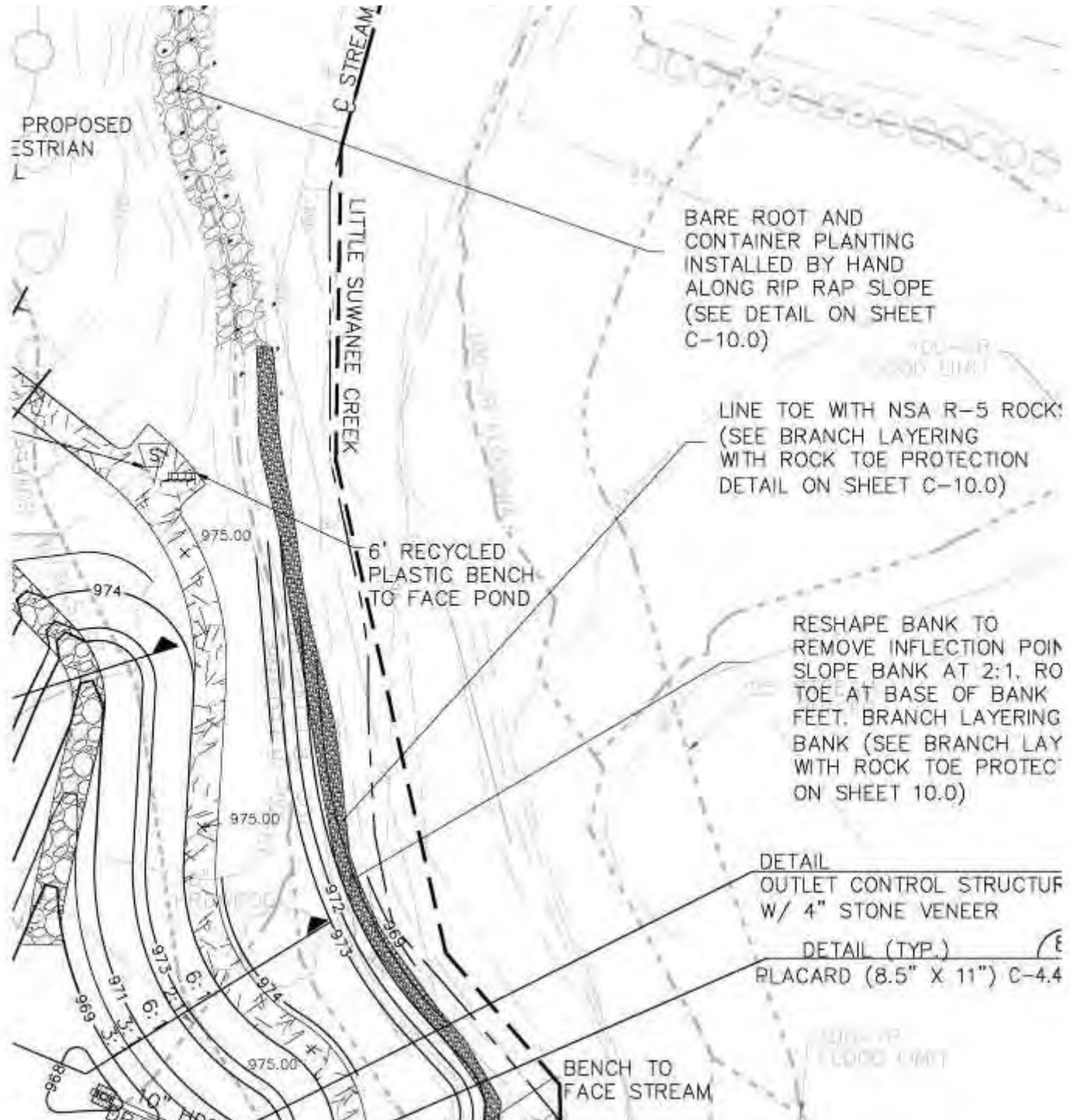
NOT TO SCALE



TYPICAL POOL

NOT TO SCALE





PROPOSED
ESTRIAN

C
STREAM
LITTLE SUWANNEE CREEK

BARE ROOT AND
CONTAINER PLANTING
INSTALLED BY HAND
ALONG RIP RAP SLOPE
(SEE DETAIL ON SHEET
C-10.0)

LINE TOE WITH NSA R-5 ROCK
(SEE BRANCH LAYERING
WITH ROCK TOE PROTECTION
DETAIL ON SHEET C-10.0)

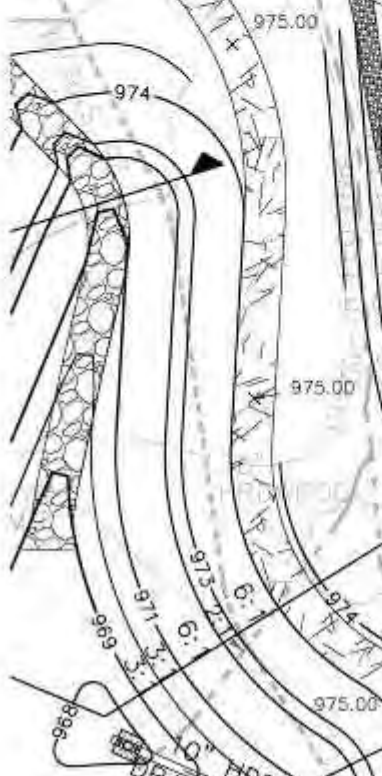
6" RECYCLED
PLASTIC BENCH
TO FACE POND

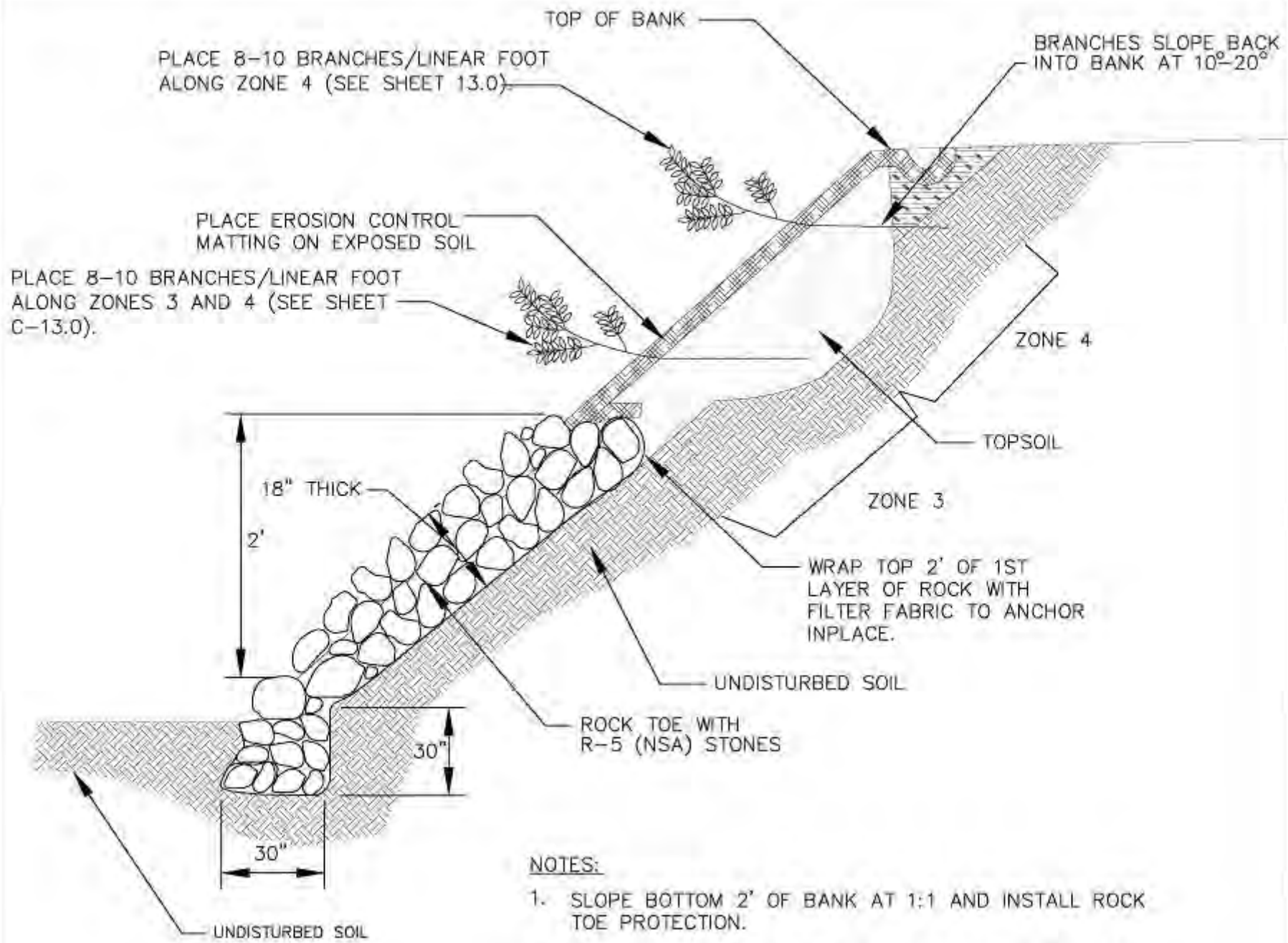
RESHAPE BANK TO
REMOVE INFLECTION POINT
SLOPE BANK AT 2:1. RO
TOE AT BASE OF BANK
FEET. BRANCH LAYERING
BANK (SEE BRANCH LAY
WITH ROCK TOE PROTECT
ON SHEET 10.0)

DETAIL
OUTLET CONTROL STRUCTURE
W/ 4" STONE VENEER

DETAIL (TYP.)
PLACARD (8.5" X 11") C-4.4

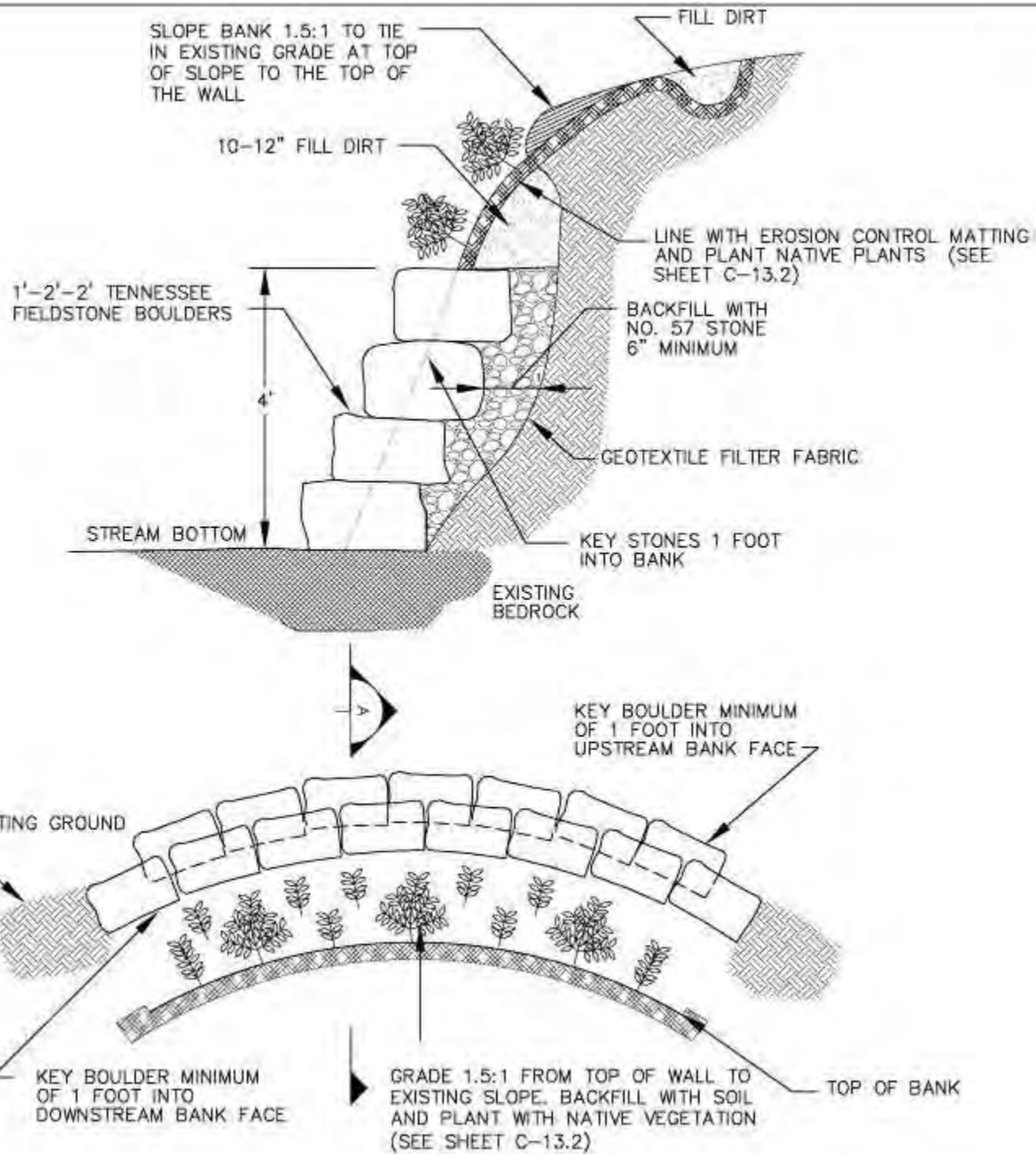
BENCH TO
FACE STREAM





NOTES:

1. SLOPE BOTTOM 2' OF BANK AT 1:1 AND INSTALL ROCK TOE PROTECTION.
2. ROCK TOE CONSISTS OF R-5 (NSA) STONES SET 30" BELOW GRADE AND 18" THICK.



Design Hurdles

- Blend with existing park features
- Minimize clearing and disturbance
- Sanitary sewer restrictions
- Reference reach data

Next Steps

- Construction slated for Fall/Winter 2006
- Implement additional projects in sub-basin
- Address longer term needs

Acknowledgements

- Gwinnett County Department of Water Resources - Pete Wright
- Brown and Caldwell, Inc. - teaming partner on WIPs
- Arcadis, Inc. - teaming partner on WIP Implementation