



FROM STREAM to TAP: PROTECTING DRINKING WATER THROUGH STREAM RESTORATION

*2013 Delaware Estuary Science
& Environmental Summit*

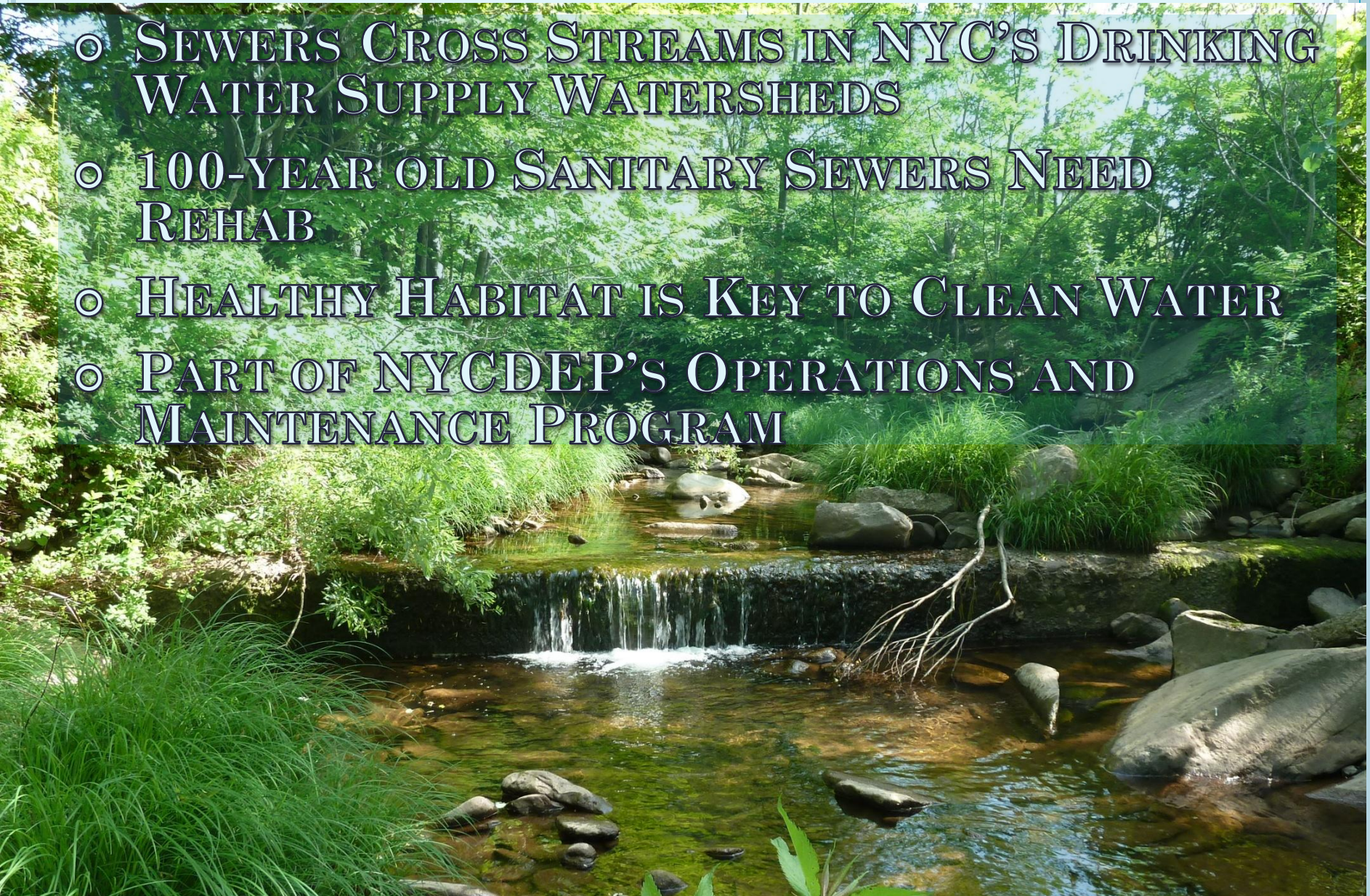
*Session 12 - Restoration,
Enhancement & Conservation*

January 29, 2013

Presenter: Jennifer Cass (Hazen &
Sawyer)

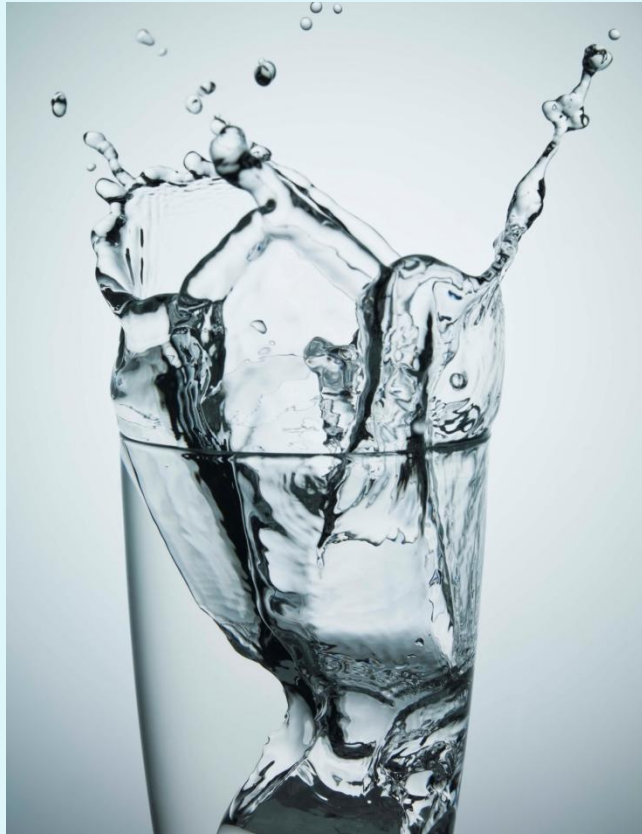
OVERVIEW

- SEWERS CROSS STREAMS IN NYC'S DRINKING WATER SUPPLY WATERSHEDS
- 100-YEAR OLD SANITARY SEWERS NEED REHAB
- HEALTHY HABITAT IS KEY TO CLEAN WATER
- PART OF NYCDEP'S OPERATIONS AND MAINTENANCE PROGRAM



PROJECT GOALS

- **PRIMARY GOAL:** PROTECT DRINKING WATER SUPPLY AND STREAM WATER QUALITY & HABITAT
- **SECONDARY GOAL:** PREVENT INFILTRATION INTO SEWER AND ADDITIONAL FLOW INTO WWTP



macroinvertebrate

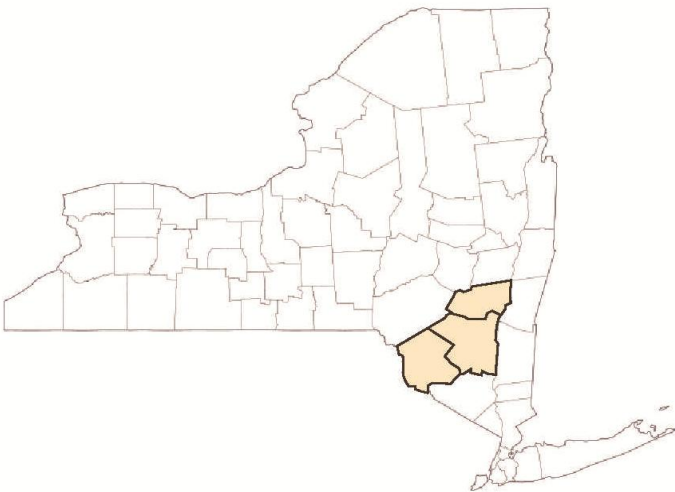
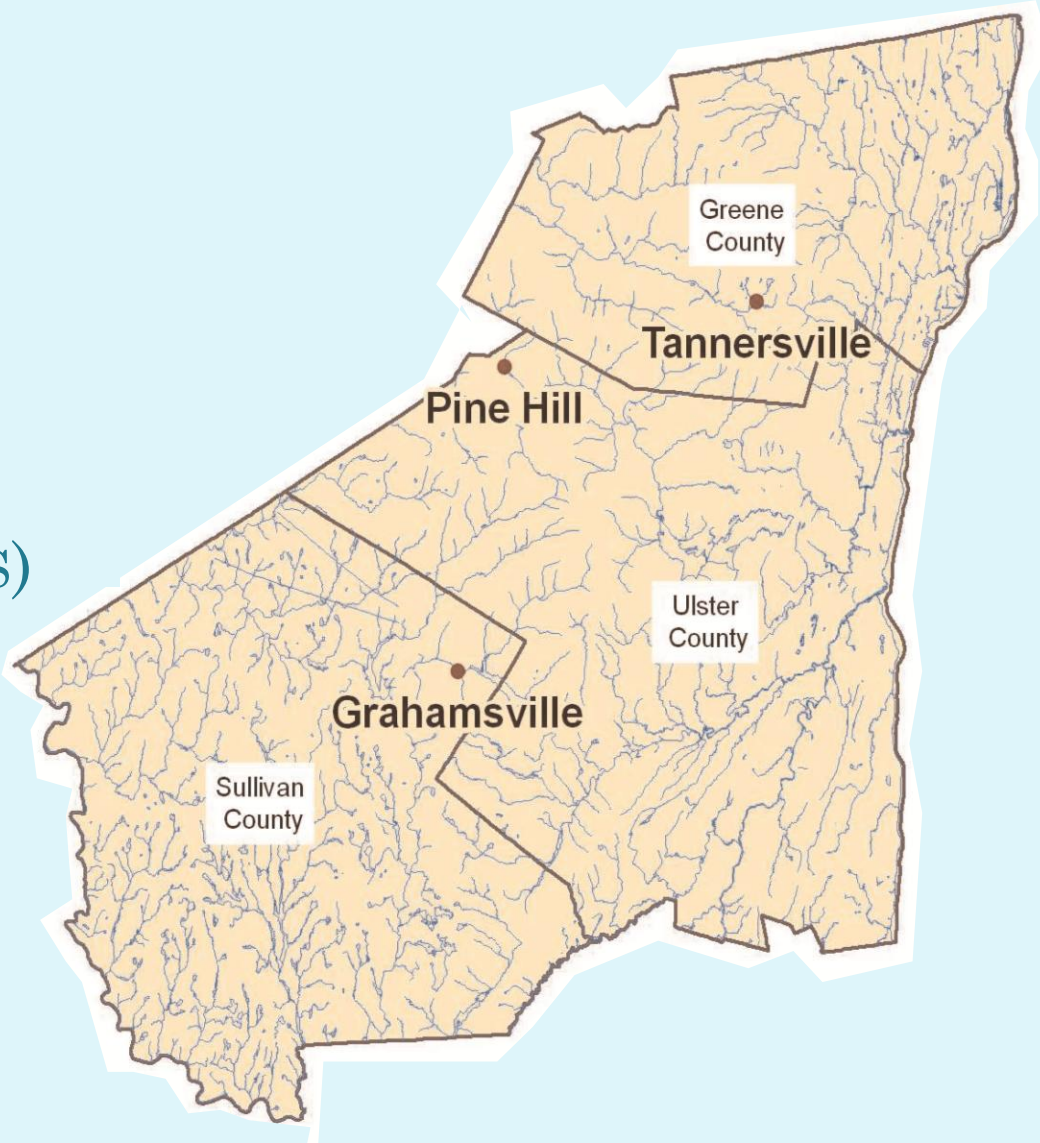
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SEWERS IN STREAMS?

NECESSARY DUE TO...

- VARYING TOPOGRAPHY
- EXTENSIVE STREAM AND WATER BODY NETWORK
- NATURAL STREAMS PRESERVED

(NOT CONVERTED SYSTEMS)



AS DESIGNED

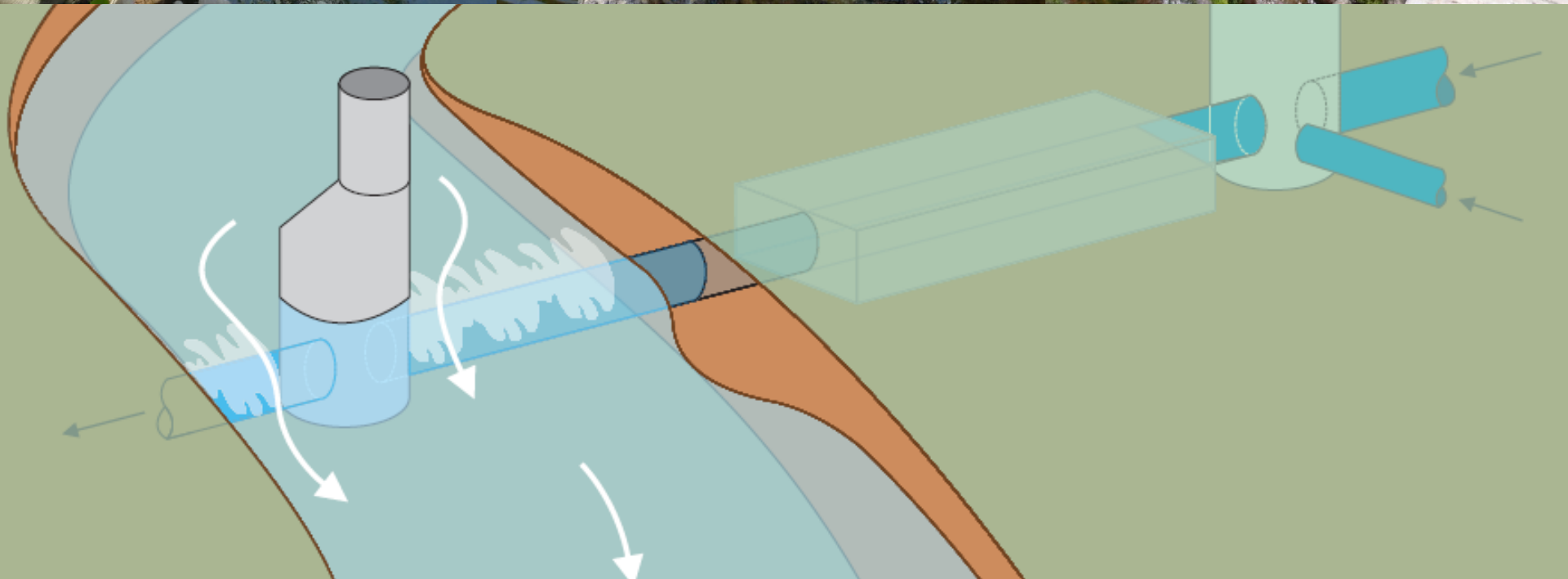


DETERIORATION

- NATURAL HEADCUTS
- ERODING ENCASEMENT
- EXPOSED PIPES
 - ➔ POSSIBLE FISH BARRIERS
 - ➔ FUTURE LEAKY JOINTS



OVER TIME...



GOOD CONDITION



IMPAIRED CONDITION



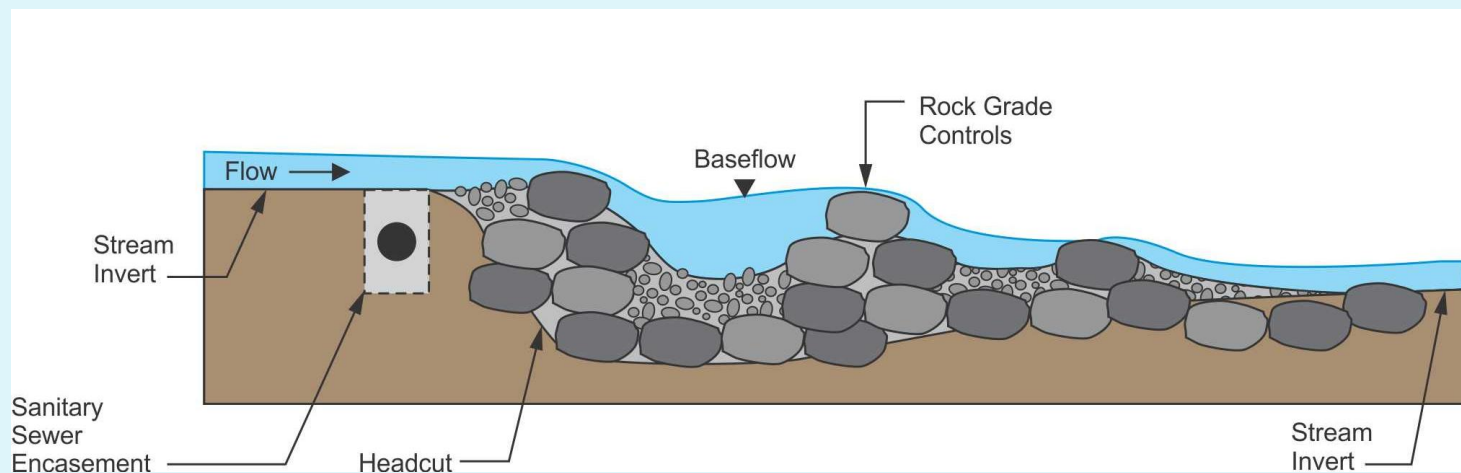
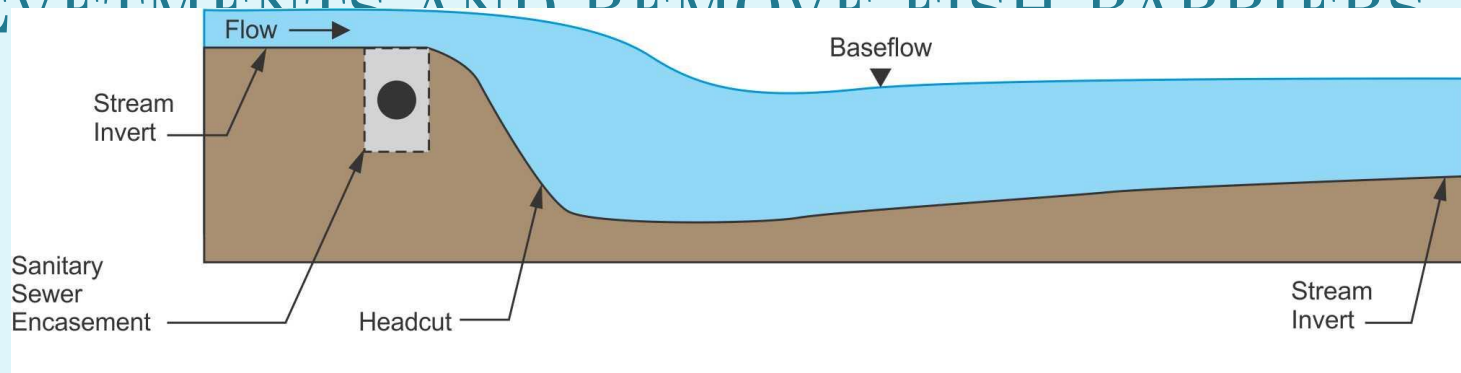
STREAMS AND IMPROVE SEWERS

- MOVE SEWER OUT OF STREAM, IF POSSIBLE
- PERFORM STREAM RESTORATION
- TRENCHLESS TECHNOLOGIES (CIPP)



NATURAL CHANNEL DESIGN

- ALLOW THE CREEK TO DEPOSIT NATURAL BEDLOAD
- OVER TIME WILL COVER AND PROTECT REVENEMENTS AND REMOVE FISH BARRIERS

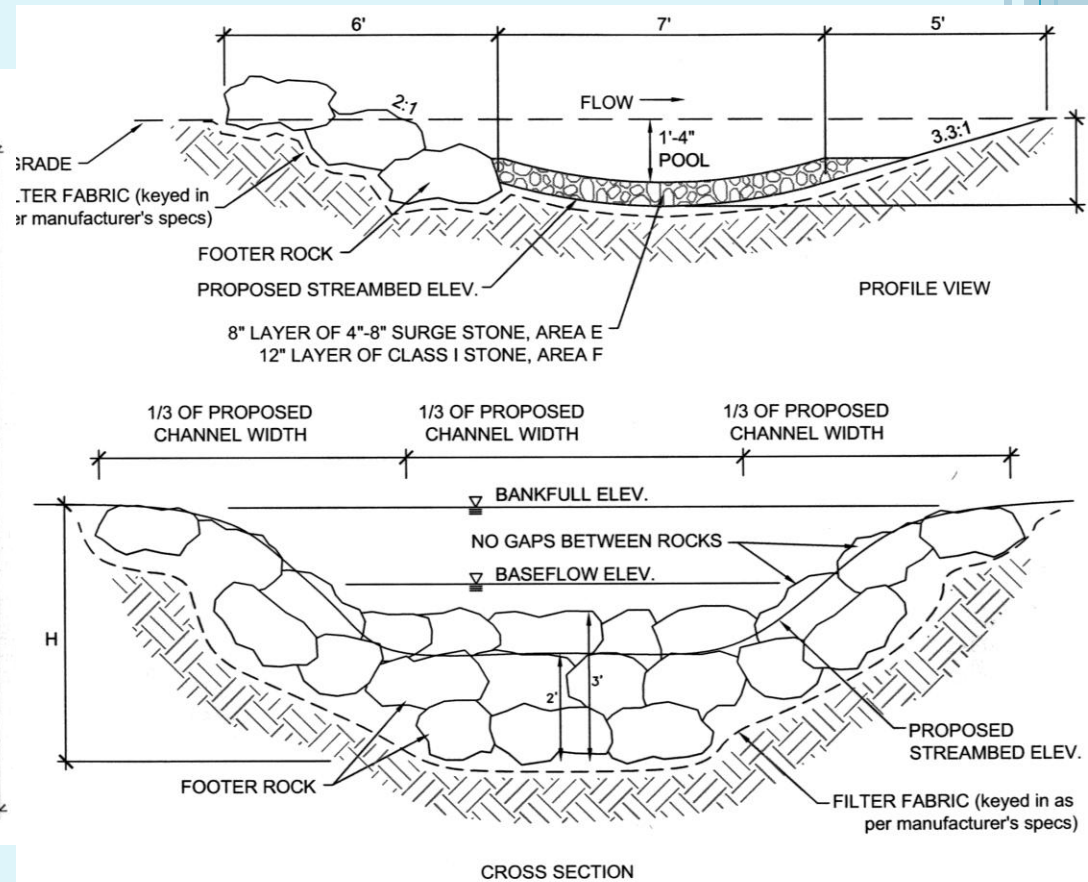
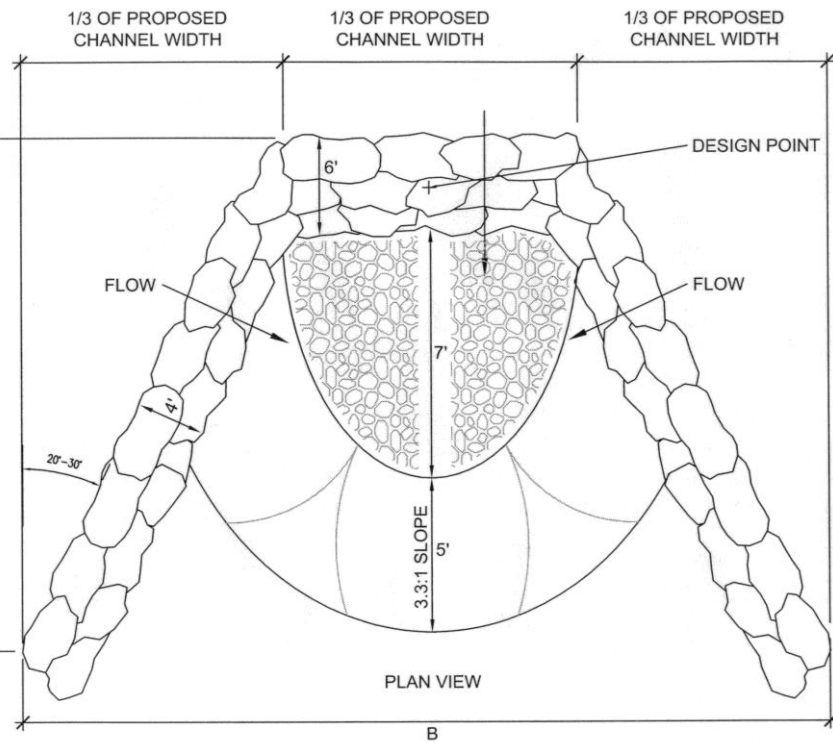


NATURAL CHANNEL DESIGN

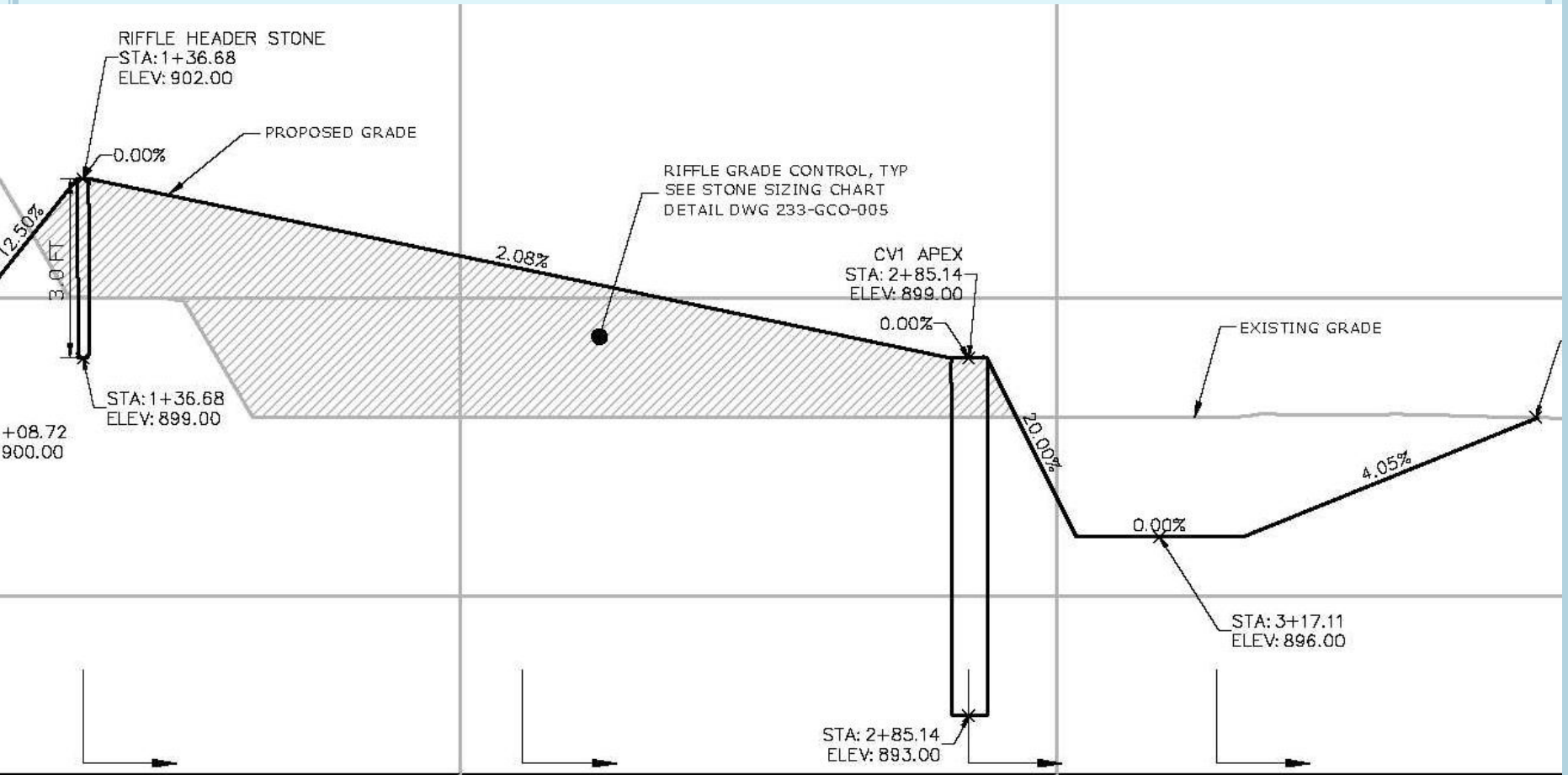
- USE STREAM'S OWN POWER TO RESTORE STREAM FOR LONG-LASTING SOLUTION
- PROVIDES IMMEDIATE HABITAT IMPROVEMENTS
- WORK WITH STREAM'S CURRENT ALIGNMENT AND CONSTRAINTS
 - ADJACENT LAND
 - SEWER
 - BRIDGES, ROADS
 - BUILDINGS
- RESTORE'S HABITAT



ROCK CROSS VANES



RIFFLE GRADE CONTROLS



CONCLUSIONS

- STREAM RESTORATION CAN BE USED TO PROTECT DRINKING WATER SUPPLIES
- SEWER OR STREAM RELOCATION IS NOT RECOMMENDED



THANK YOU

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QUESTIONS?

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