

IOWA DEPARTMENT OF NATURAL RESOURCES

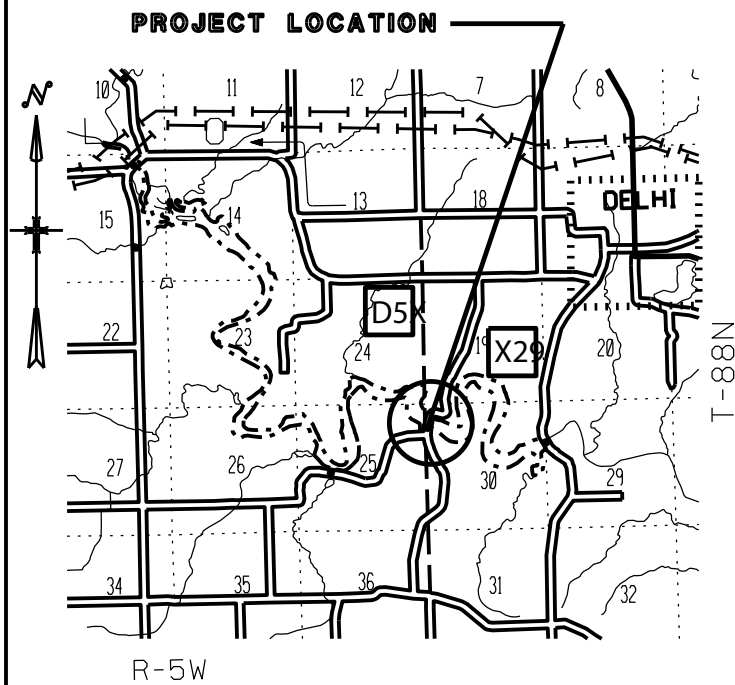
CONSTRUCTION PLANS

FOR

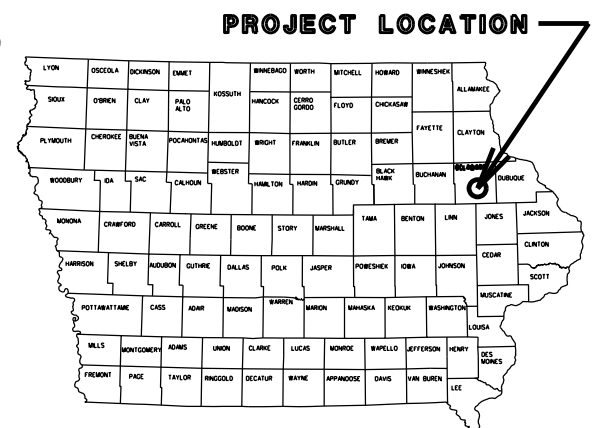
LAKE DELHI/MAQUOKETA RIVER

DELAWARE COUNTY

HARTWICK AREA RIFFLE



VICINITY MAP



LOCATION MAP



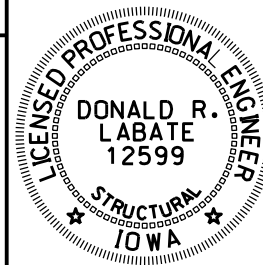
STREAM MODIFICATIONS

11-02-28-04

PLANS PREPARED BY
IOWA DNR ENGINEERING BUREAU
MANAGEMENT SERVICES DIVISION

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY
1	MOBILIZATION	LUMP SUM
2	EXCAVATION, CHANNEL (WASTE)	5,000 C.
3	REVTMENT, CLASS "D" RIPRAP FILL (PLACEMENT)	600 TONS
4	REVTMENT, CLASS "E" RIPRAP FILL (PLACEMENT)	12,000 TONS
5	DERRICK STONES, LIMESTONE (PLACEMENT)	2,200 TONS
6	CRUSHED STONE FILL, 6" MINUS MAT'L. (PLACEMENT)	1,275 TONS
7	SURFACING, CR.STONE, 3" (PLACEMENT, HAUL ROAD)	300 TONS
8	CONSTRUCT ACCESS HAUL ROAD W/TURNAROUND	LUMP SUM



I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME UNDER THE LAWS OF THE STATE OF IOWA.

SIGNATURE _____ DATE _____

DONALD R. LABATE

PRINTED OR TYPED NAME

MY LICENCE RENEWAL DATE IS DECEMBER 31, 2010

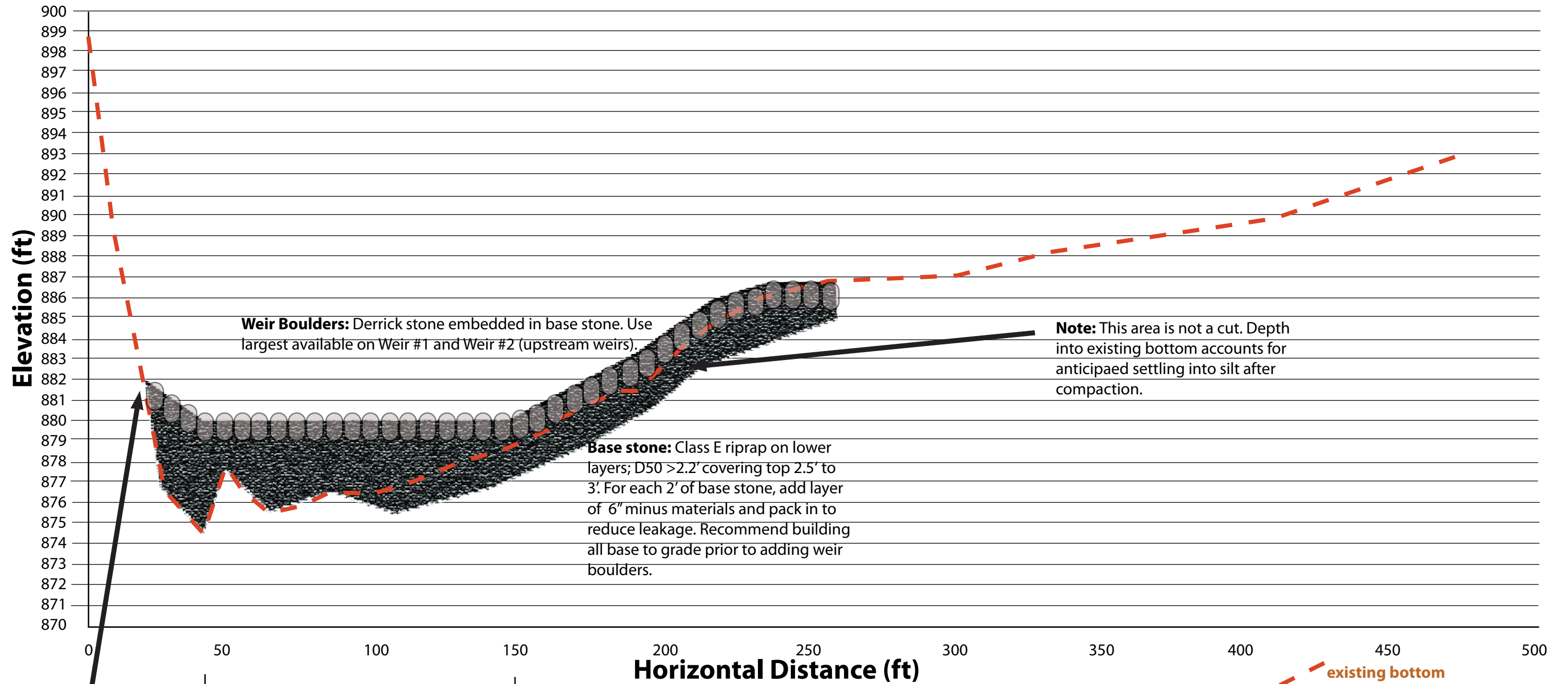
PAGES COVERED BY THIS SEAL: 1 THRU 3

DRAWING INDEX

TITLE	SHEET NO.
TITLE SHEET, ESTIMATE OF QUANTITIES, LOCATION MAPS	---
CROSS SECTIONS, PROFILES, AND PLAN VIEW	---
EXISTING CONDITIONS	---

PROJECT STREAM MODIFICATIONS PROJ. NO. 11-02-28-04
AREA LAKE DELHI/MAQUOKETA RIVER COUNTY DELAWARE

Hartwick Riffle, Proposed Conditions, Compressed Cross Section for Weir #1 (crest)



Weir Boulders: Derrick stone embedded in base stone. Use largest available on Weir #1 and Weir #2 (upstream weirs).

Base stone: Class E riprap on lower layers; D50 > 2.2' covering top 2.5' to 3'. For each 2' of base stone, add layer of 6" minus materials and pack in to reduce leakage. Recommend building all base to grade prior to adding weir boulders.

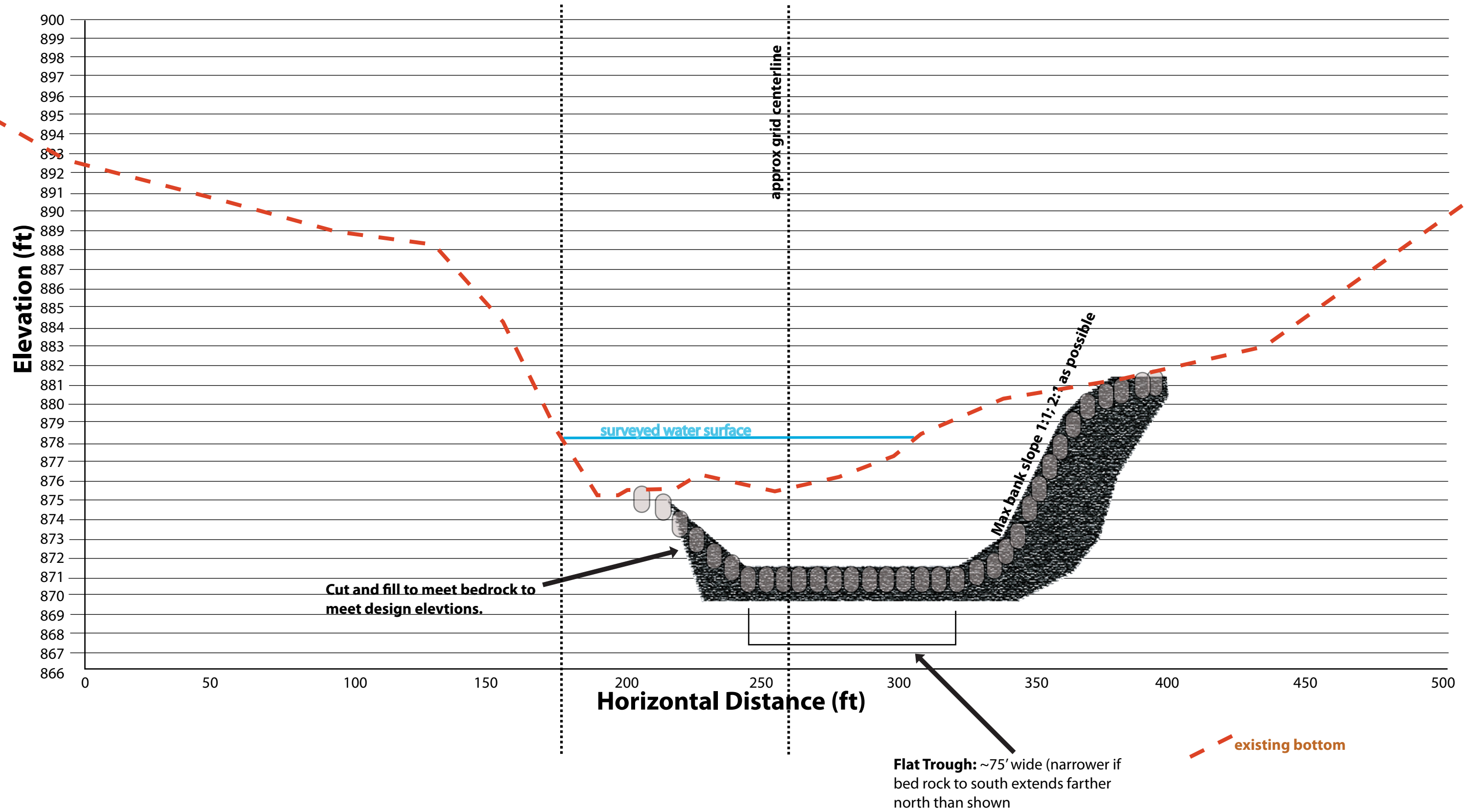
Note: This area is not a cut. Depth into existing bottom accounts for anticipated settling into silt after compaction.

existing bottom

May consider: Pulling down large boulders on bluff to replace these weir stones and some base material. LDRA requested this, and these boulders will be under highest potential shear stress at this location

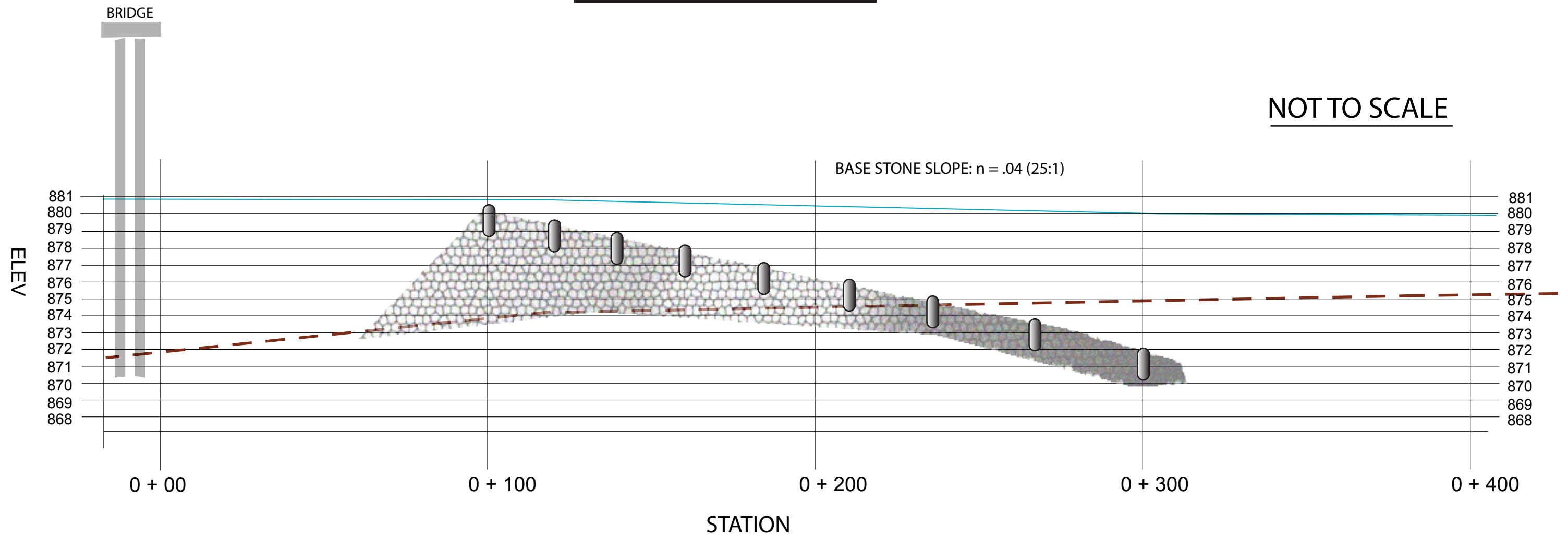
Flat Trough: 100' wide, base stone built to elev 880. Weir boulders protrude .5' higher than base stone

Hartwick Riffle, Proposed Conditions, Compressed Cross Section for Weir #9



CENTERLINE PROFILE

NOT TO SCALE

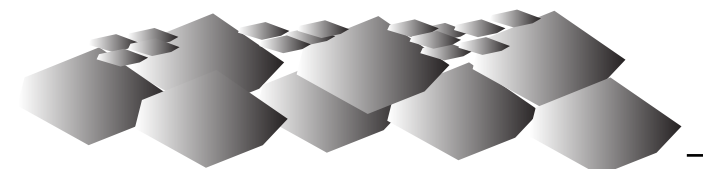


BASE STONE:
CLASS E RIPRAP W/ 6" MINUS
CHINKED IN FOR EACH 2' LAYER;
TOP 2-3' D50 2.2' AND GREATER

WEIR STONES:
~ 3' boulders

~WATER SURFACE

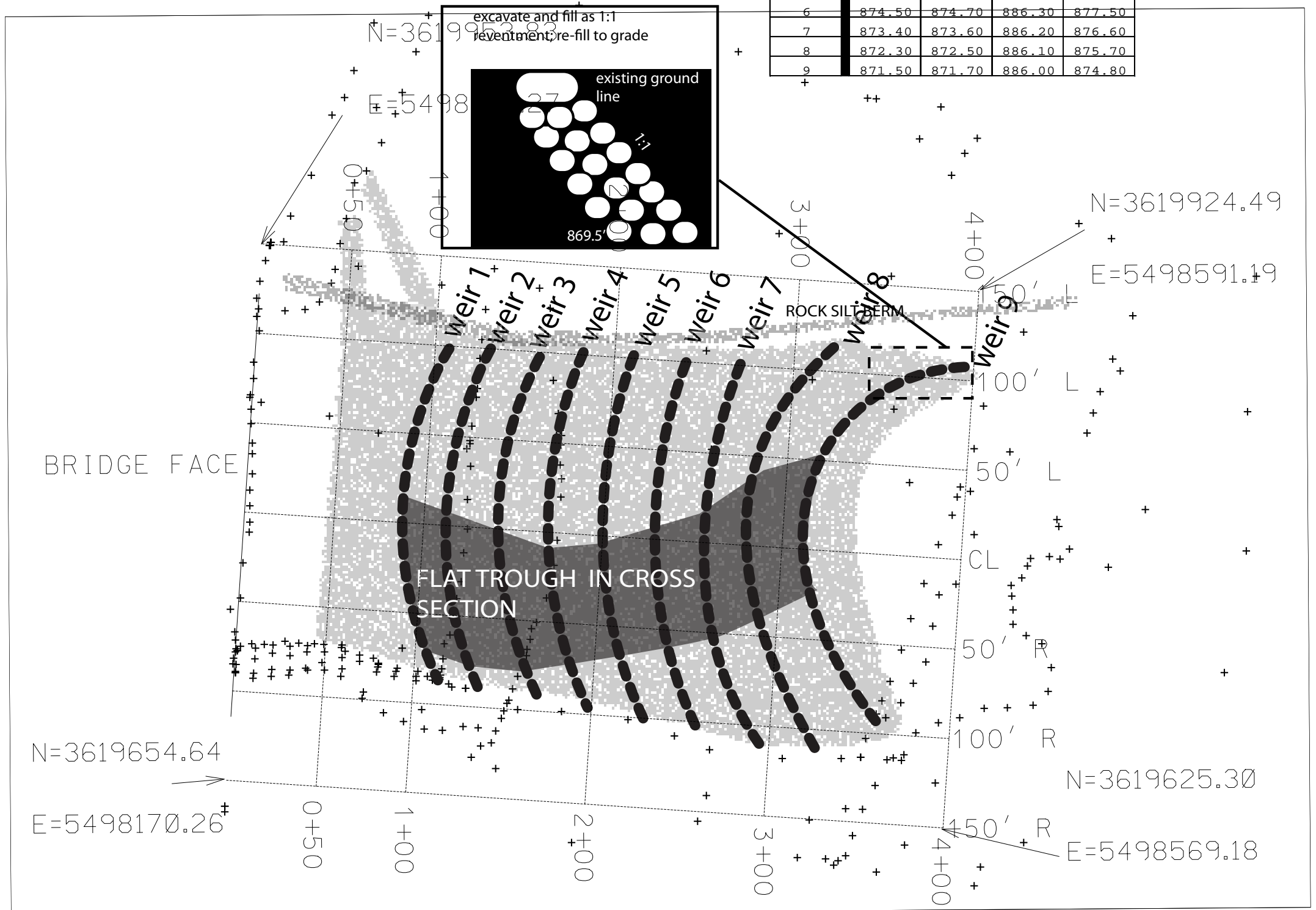
DEEPEST CHANNEL
BOTTOM, EXISTING
CONDITIONS



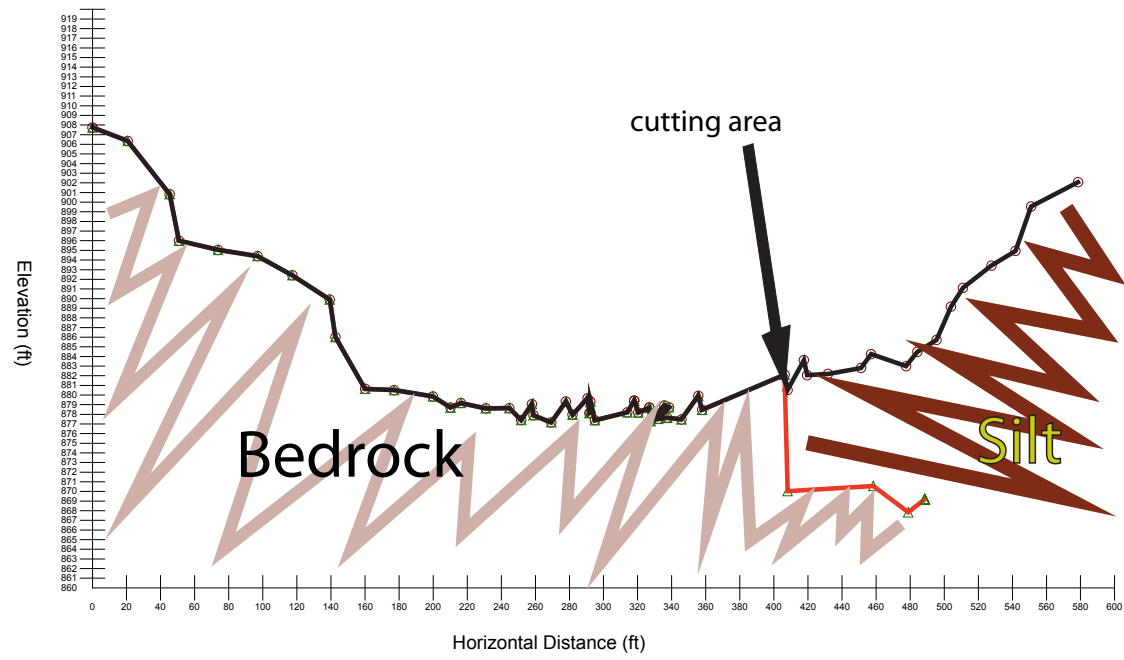
FROM TOE OF BACKSLOPE THROUGH WEIR 3 IN PROFILE, LAYER 6" MINUS GRADATION AND CHINK IN WITH BUCKETS FOR EVERY 2' LAYER OF CLASS E. FROM DOWNSTREAM WEIR 3 ON DOWN, 6" MINUS ON TOP LAYER ONLY

PLAN VIEW

WEIR #	CENTER TROUGH ELEVATIONS	NEXT BASE OUTSIDE TROUGH	NORTH BANK BOULDER WEIR ELEVATIONS	SOUTH BANK BOULDER ELEVATIONS
1	880.00	880.20	886.80	882.00
2	878.90	879.10	886.70	881.10
3	877.80	878.00	886.60	880.20
4	876.70	876.90	886.50	879.30
5	875.60	875.80	886.40	878.40
6	874.50	874.70	886.30	877.50
7	873.40	873.60	886.20	876.60
8	872.30	872.50	886.10	875.70
9	871.50	871.70	886.00	874.80



Wagon Ford Riffle



Profile, Existing Conditions As of Oct. 6

