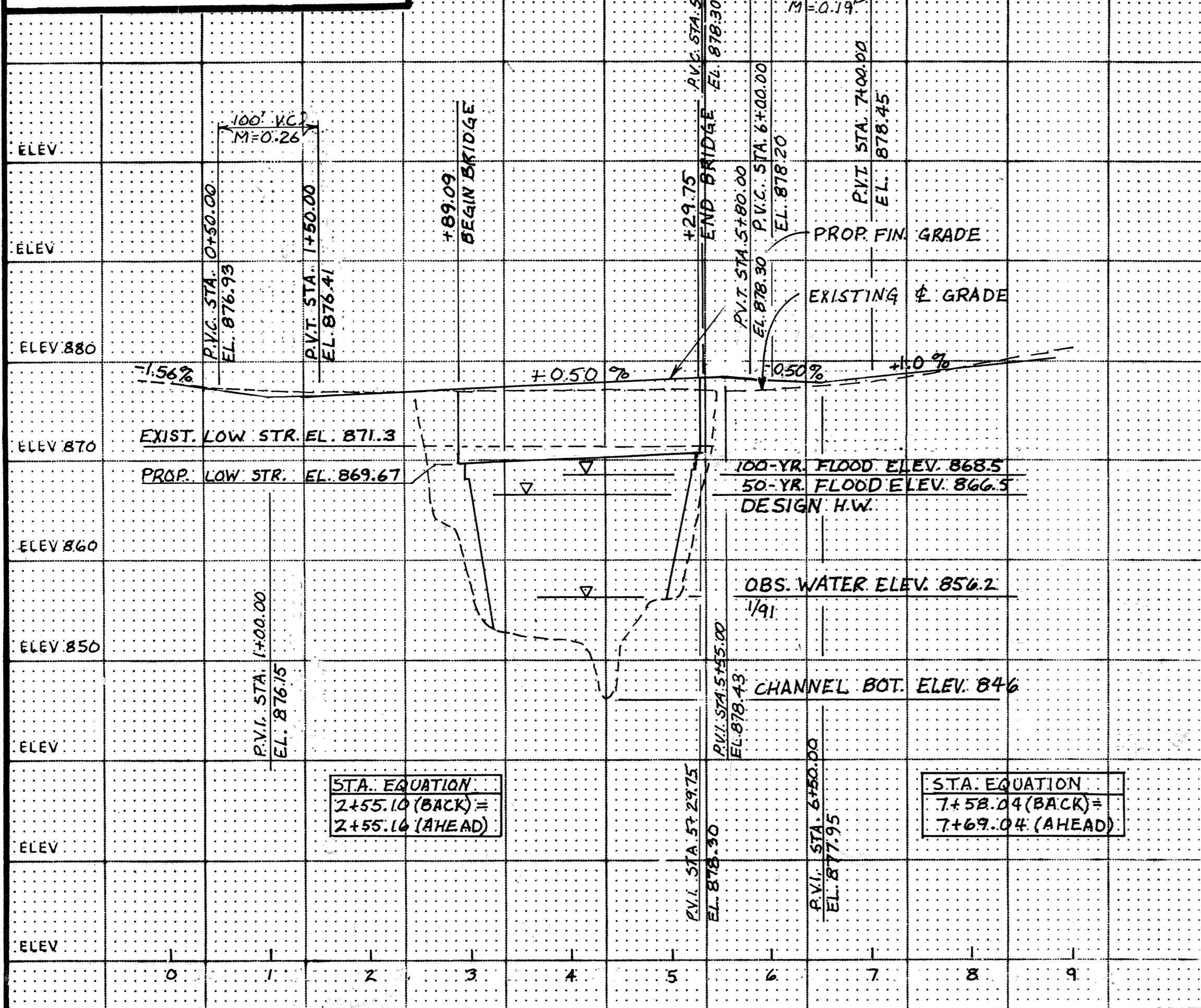


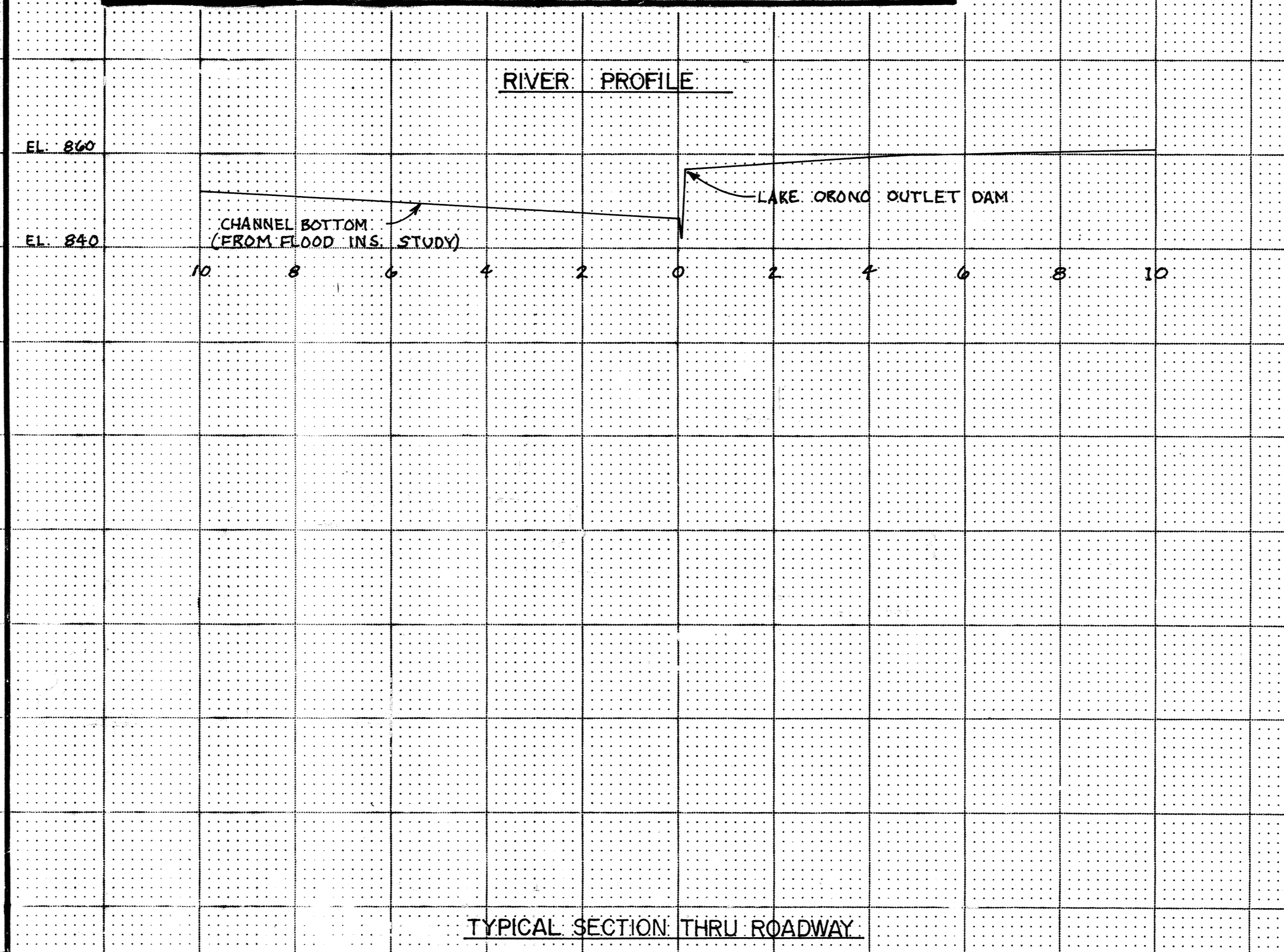
**CONTRACTED PROFILE**

SCALE: HOR. 1"=50' VER. 1"=10'



**TYPICAL SECTIONS & PERTINENT DATA**

SCALES AS SHOWN



Fed. Proj. No.

**LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE**

- Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating. LAKE ORONO DAM AND SPILWAY APPROXIMATELY 50 FT. UPSTREAM.
- Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway): Given location, type, length, height above high water, cross-sectional area etc. BR. NO. 5955 ON US 10/S2 OVER LAKE ORONO APPROX. 0.8 MI. UPSTREAM. W.W. AREA = 4681 SQ. FT. BRIDGE IS UPSTREAM FROM LAKE ORONO DAM.
- Apparent highwater elevation APPR. 856. Obtained from.....
- Other data: Approx. velocity of water at time of survey.....

**HYDRAULIC ENGINEERS RECOMMENDATION**  
 DATE JAN. 1991 (REV. JAN. 1992)

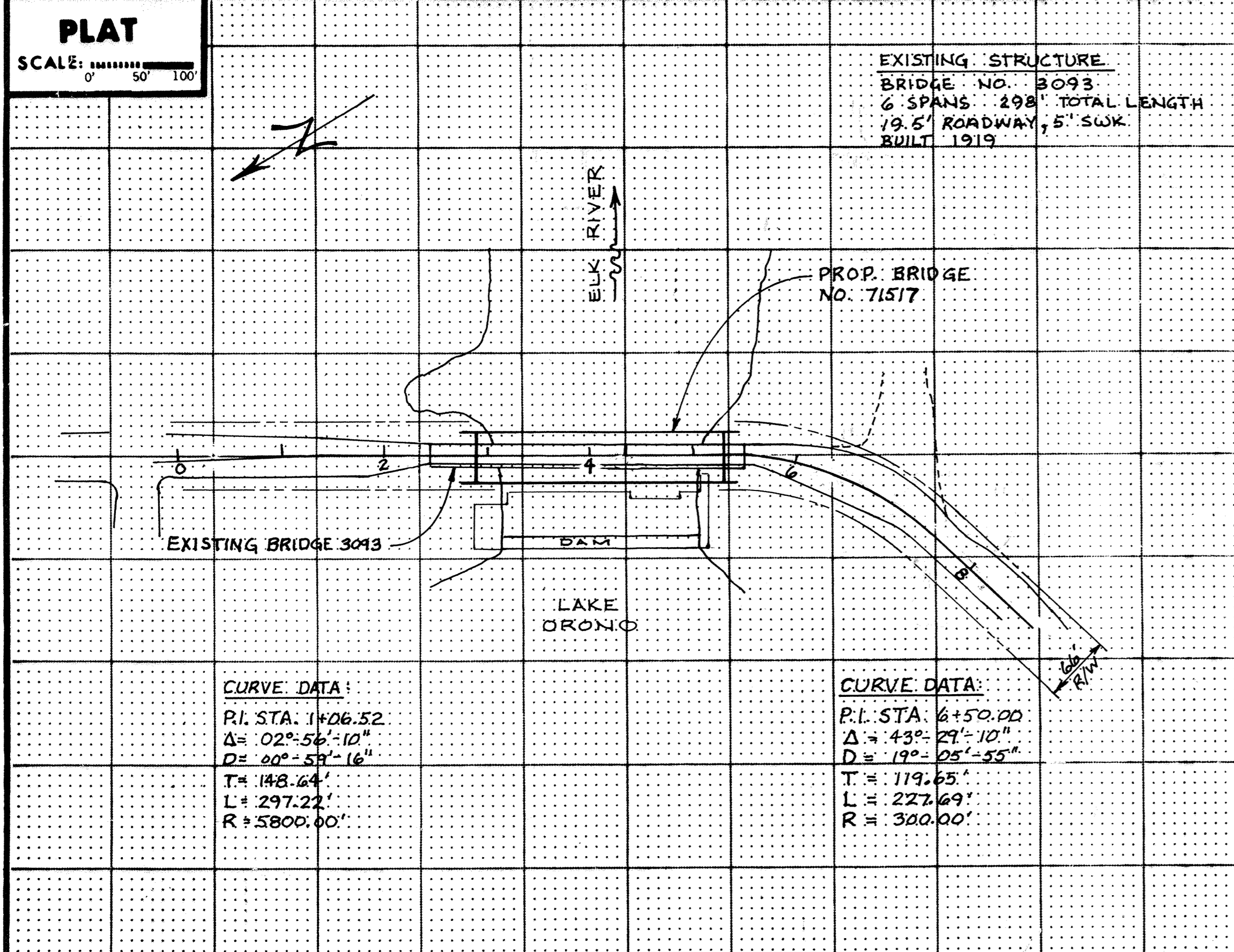
Stream or ditch designation ELK RIVER  
 Drainage area 628 SQ. MI.  
 Max. flood on record. UNK. Design flood (.50 yr. freq.) 8400 C.F.S.  
 Max. observed highwater elevation APPR. 856. Design highwater elevation 866.5  
 Design mean velocity through structure 3.2 F.P.S.  
 Low superstructure at or above elevation 869.5  
 Flowline elevation 846.0 Skew angle 0  
 Waterway area req'd. below elevation 866.5 = 2648 sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is 10,200 C.F.S. at stage 868.5 and mean velocity of 3.5 F.P.S. with 0.0 Ft. swell/head. The above recommendation will provide a structure of adequate water way to pass the regional flood within criteria established by the Dept. of Natural Resources.  
**ESTIMATED SCOUR DEPTH = 8 FT. (500-YR. FREQ.)**

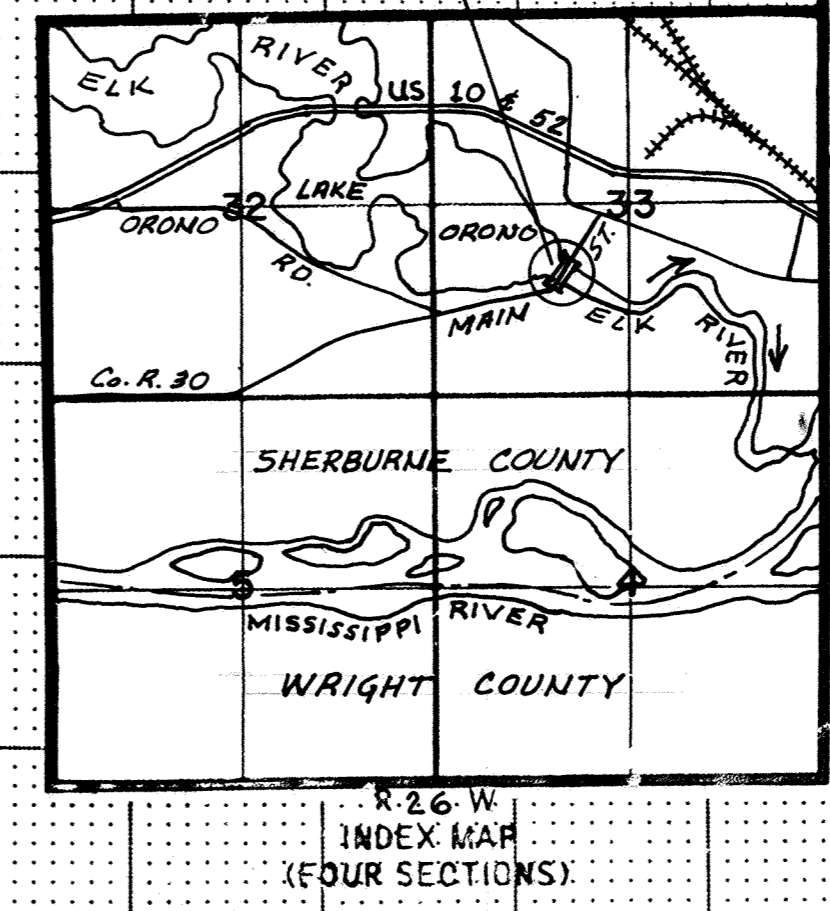
**FOUNDATION ENGINEERS RECOMMENDATION**  
 DATE .....

Bridge survey sheets made from: SURVEY BY MAIER STEWART AND ASSOCIATES

Bench mark elevation 881.34 (M.S.L. 1929 Adj.)  
 Location: TOP NUT. HYD. EAST SIDE OF MAIN ST. 300'± NO. OF ORONO DAM



PROPOSED BRIDGE NO. 7157  
 (EXIST. BR. 3093)



**BRIDGE SURVEY**

ON MAIN ST.  
 (T.H., C.S.A.H., C.R., etc.)

PROPOSED BRIDGE LOCATED 0.4 MILES EAST OF JUNCTION CR 30

SEC. 33 TWP. 33N R. 26W

CITY ELK RIVER COUNTY SHERBURNE

RECORD PLAN OCT. 1993  
 BRIDGE NO. 7157

7-2-92

DRAWING NUMBER

DRAWING NUMBER

DRAWING NUMBER

DRAWING NUMBER  
 MAINS 91  
 23