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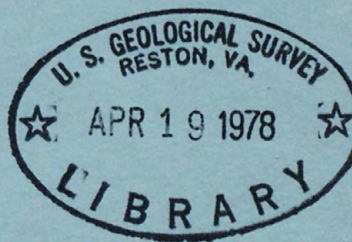
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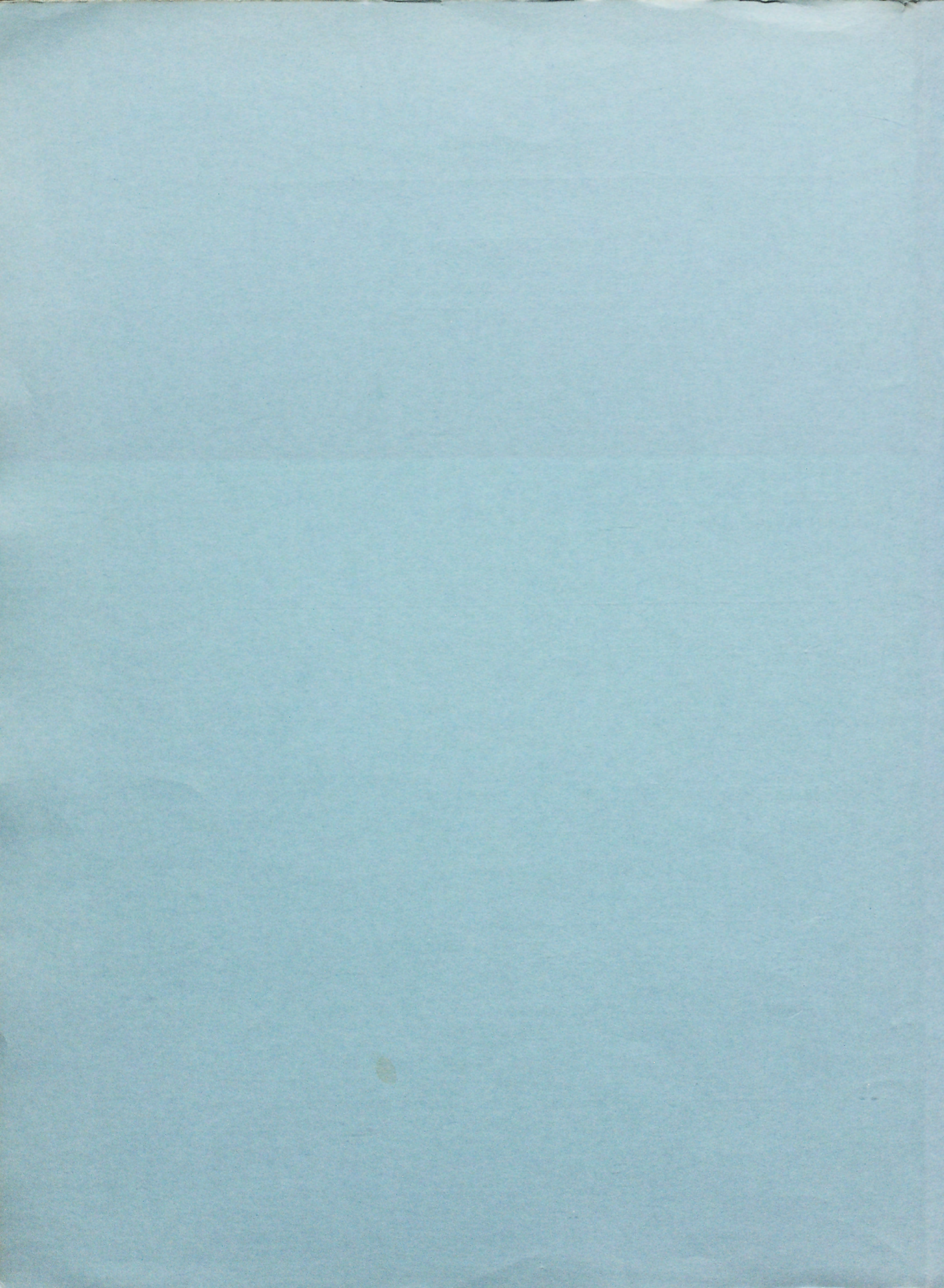
SUPPLEMENTARY HYDRAULIC ANALYSIS OF
PROPOSED BRIDGE SITE ON MOHAWK
RIVER, WHITESBORO, NEW YORK

U.S. GEOLOGICAL SURVEY

Open-File Report 78-348



Prepared in cooperation with the
New York State Department of Transportation



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SUPPLEMENTARY HYDRAULIC ANALYSIS OF
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By Richard Lumia

U.S. GEOLOGICAL SURVEY

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Albany, New York

April 1978

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CONVERSION FACTORS AND ABBREVIATIONS

The following factors may be used to convert U.S. customary units to the International System of Units (SI):

Multiply U.S. customary units	By	To obtain SI units
	<u>Length</u>	
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
	<u>Area</u>	
square miles (mi ²)	2.590	square kilometers (km ²)
	<u>Flow</u>	
cubic feet per second (ft ³ /s)	.02832	cubic meters per second (m ³ /s)
feet per second (ft/s)	.3048	meters per second (m/s)

SUPPLEMENTARY HYDRAULIC ANALYSIS OF PROPOSED BRIDGE SITE

ON MOHAWK RIVER, WHITESBORO, NEW YORK

By

Richard Lumia

ABSTRACT

As a supplement to a 1975 report, titled "Floodflow Characteristics at Proposed Bridge Site on Mohawk River, Whitesboro, New York," by Bernard Dunn (U.S. Geological Survey open-file report), in which the hydraulic effects of two alternative highway plans during a large-magnitude flood were evaluated, a hydraulic analysis was made for a third highway plan. The two plans evaluated in the original report had been found by the State Department of Transportation to be infeasible. A design-flood discharge of 18,200 cubic feet per second was used in the new evaluation, as in the original report. The recurrence interval of that flood is approximately 100 years. The corresponding peak flood stage at the proposed bridge site was determined by the New York State Department of Transportation to be 411.8 feet.

During the design flood, the new proposed alternative would cause a 0.1-foot increase in water-surface elevation from the bridge to the approach section; 1,300 cubic feet per second would overflow the road north of the bridge and 6,800 cubic feet per second south of it. Discharge through the bridge would be 10,100 cubic feet per second.

INTRODUCTION

To supplement a previous evaluation (Dunn, 1975) of floodflow characteristics at a proposed bridge site on the Mohawk River in Whitesboro, Oneida County, N.Y., the hydraulic effects of an alternative highway plan were evaluated. The New York State Department of Transportation had found the two previously evaluated designs undesirable because they would have disturbed an area of potential archeological significance and incurred damage to adjacent private property.

The new highway design, designated in this report as alternate III, is approximately parallel to and 200 ft upstream from the site of alternate II in the original report. Alternates II and III coincide approximately 0.5 mi south of the New York State Thruway (fig. 1-A). Road elevations along the approaches to the alternate III bridge are lower than those in alternates I and II by as much as 6 ft on the south and as much as 19 ft on the north.

ANALYSIS

As in the original report (Dunn, 1975), the hydraulic analysis was based on data from the flood of October 2, 1945, collected by the U.S. Geological Survey and the New York State Department of Transportation. The design-flood discharge is 18,200 ft³/s and has a recurrence interval of approximately 100 years. Additional data included plan drawings and cross-sectional profiles provided by the New York State Department of Transportation. Water-surface elevation at the downstream side of alternate III bridge site at that discharge was determined by the New York State Department of Transportation to be 411.8 ft above mean sea level.

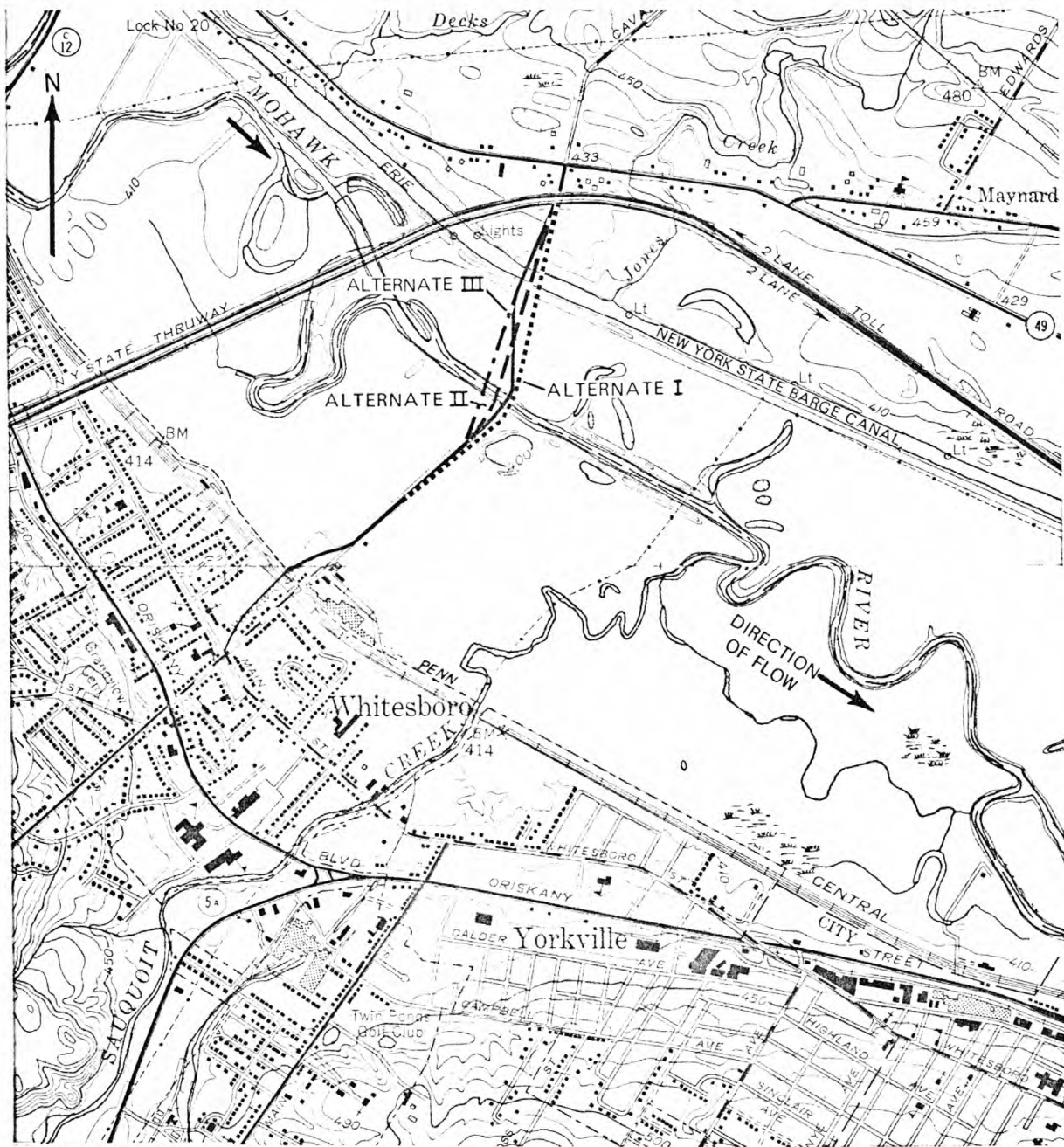
Results of the hydraulic analysis for highway alternate III are summarized in the following table (p. 3).

SELECTED REFERENCES

- Chow, Ven Te, 1959, Open-channel hydraulics: New York, McGraw-Hill Book Co., Inc., 680 p.
- Dunn, Bernard, 1975, Floodflow characteristics at proposed bridge site on Mohawk River, Whitesboro, New York: U.S. Geol. Survey open-file rept., 5 p.
- Shearman, J. O., 1976, Computer program E431 users' manual; computer application for step-backwater and floodway analyses: U.S. Geol. Survey Open-File Rept. 76-499, 103 p.

Table 1-A.--Hydraulic analysis of highway alternate III,
Mohawk River at Whitesboro, New York

<u>Section</u>	<u>Water-surface elevation (ft above mean sea level)</u>	<u>Average stream velocity (ft/s)</u>	<u>Velocity in main channel (ft/s)</u>	<u>Stream discharge (ft³/s)</u>	<u>Maximum water depth (ft)</u>	<u>Horizontal length of water surface (ft)</u>
Approach	411.9	1.20	3.14	18,200	--	--
Bridge	411.8	--	3.84	10,100	--	--
<u>Road overflow</u>						
Left side (north)	--	1.71	--	1,300	2.2	440
Right side (south)	--	1.93	--	6,800	2.2	1790



Base from U.S. Geological Survey
Oriskany, N.Y., 1:24,000, 1955 and
Utica West, N.Y., 1:24,000, 1955

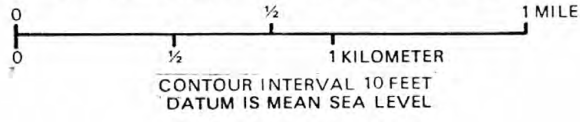


Figure 1-A.--Three alternate bridge-relocation sites,
Mohawk River at Whitesboro, N.Y.

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