

FLOOD INSURANCE STUDY



OCONTO COUNTY, WISCONSIN AND INCORPORATED AREAS

Volume 1 of 2



Community Name

Community Number

Oconto County

GILLETT, CITY OF	550295
LENA, VILLAGE OF	550296
OCONTO, CITY OF	550297
OCONTO COUNTY (UNINCORPORATED AREAS)	550294
OCONTO FALLS, CITY OF	550298
PULASKI, VILLAGE OF	550024
SURING, VILLAGE OF	550300

October 6, 2010



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
55083CV001A

**NOTICE TO
FLOOD INSURANCE STUDY USERS**

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone(s)</u>	<u>New Zone</u>
A1 through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date: To be determined

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City of Oconto Tributary No. 4	Panels 152-153P
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Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

**FLOOD INSURANCE STUDY
OCONTO COUNTY, WISCONSIN AND INCORPORATED AREAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Oconto County, including the Cities of Gillett, Oconto, and Oconto Falls; the Villages of Lena, Pulaski, and Suring; and the unincorporated areas of Oconto County (referred to collectively herein as Oconto County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that the Village of Pulaski is geographically located in Brown, Oconto, and Shawano Counties. Only the portions located in Oconto County are shown in this FIS. See the separately published FIS reports and Flood Insurance Rate Maps (FIRMs) for flood-hazard information.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS was prepared to include the unincorporated areas and incorporated communities within Oconto County into a countywide FIS.

Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below:

Oconto, City of: The hydrologic/hydraulic analyses for City of Oconto Tributary No. 1 (formerly Tributary No. 1)/Oconto River Tributary No. 3 (formerly Tributary No. 2) and hydrologic analysis for Oconto River Tributary No. 2 (formerly Tributary No. 3) in the February 3, 1981, City of Oconto FIS report (Reference 1) were performed by the USDA, SCS, for the Federal Insurance Administration (FIA), under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 11. The work was completed in March 1979.

Oconto County (Unincorporated Areas): The hydrologic analysis for Brookside Creek, Little Suamico River, McCaslin Brook, North Branch Oconto River, Oconto River, Pensaukee River, South Branch Oconto River, Spring Creek, Spring Creek Tributary No. 6 (formerly Spring Creek Tributary), and Oconto River Tributary No. 22 (formerly known as Tributary No. 2) in the July 6, 1982, Oconto County (Unincorporated Areas) FIS report (Reference 2) were performed by the USDA, SCS, for FEMA, under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 11.

The hydraulic analysis for Brookside Creek (From confluence with Pensaukee River to approximately 1,240 feet upstream of U.S. Highway 41), Little Suamico River (From its outlet to Green Bay to approximately 180 feet upstream of Cross Road/from approximately 2,700 feet downstream from the confluence of South Branch Little Suamico River to the Oconto-Brown County Boundary), McCaslin Brook (From just upstream of North Road to approximately 330 feet downstream of Adam Ross Lane), North Branch Oconto River (all reaches other than from approximately 4,000 feet upstream of Riverside Road to approximately 8,020 feet upstream of

Riverside Road), Oconto River, Pensaukee River (From its outlet to Green Bay to just downstream of County Highway J and Safian Road to the Oconto/Shawano County Boundary), and South Branch Oconto River in the July 6, 1982, Oconto County (Unincorporated Areas) FIS report (Reference 2) were performed by the USDA, SCS, for FEMA, under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 11. The work was completed in September 1979.

Oconto Falls, City of: The hydrologic/hydraulic analysis for the Oconto River and the hydrologic analysis for Oconto River Tributary No. 22 (formerly known as Unnamed Tributary) in the January 16, 1981, FIS report (Reference 3) were performed by the USDA, SCS, for the FIA, under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 11. The work was completed in March 1979.

Suring, Village of: The hydrologic and hydraulic analyses for Oconto River for the June 1, 1983, FIS report (Reference 4) were performed by the USDA, SCS, for the FIA, under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 11. The work was completed in September 1979.

The Village of Lena has no previously printed FIS report. The Village of Pulaski has no printed FIS report for the area of the community that lies within Oconto County.

This countywide FIS includes new hydrologic analyses completed by the Wisconsin Department of Natural Resources (WDNR) for the following detailed study streams: Christie Brook, Hayes Creek, Jones Creek, Kirchner Creek, Spring Creek, Spring Creek No. 6, Tibbet Creek, Town Creek, and Waupee Creek. Hydraulic analyses were completed by PBS&J for the following detailed study streams: Brookside Creek, Christie Brook, Hayes Creek, Jones Creek, Kirchner Creek, Little Suamico River, McCaslin Brook, North Branch Oconto River, Oconto River Tributary No. 2, Oconto River Tributary No. 22, Spring Creek, Spring Creek No. 6, Tibbet Creek, Town Creek, and Waupee Creek. All approximate stream studies were performed by the WDNR. All work was completed under Contract Nos. NMH00000763 and NMI00000486. This work was completed in January 2009.

The analysis for Green Bay, taken from the report titled Flood Levels of Green Bay (Reference 5), was prepared by the U.S. Army Corps of Engineers (USACE), Detroit District, for FEMA, under Inter-Agency Work Agreement, EMW-89-E-3218, Project Order No.1. The work was completed in February 1990.

New hydraulic analyses were completed by the WDNR for the following streams/lakes: Anderson Lake, Crooked Lake, Pensaukee River (Kuczynski Lane to just downstream of County Highway J), Round Lake, and Wescott Lake. This work was completed in January 2009.

New hydraulic analysis was completed by the WDNR for the Oconto River as part of Letter of Map Revision (LOMR) 99-05-131P. The work was completed in August 1999.

A new hydraulic analysis was completed by Ayres & Associates for the Pensaukee River (Safian Road to Kuczynski Lane). This work was completed in September 2008.

A revised hydrologic and hydraulic analysis was completed as part of a Limited Map Maintenance Project (LMMP) by the U.S. Army Corps of Engineers (USACE), Detroit District, for FEMA. This work was completed May 2002.

Base map information shown on the FIRM was derived from aerial photography dated Spring of 2004 and produced at a scale of 1:4,800. The projection used in the preparation of this map is Universal Transverse Mercator (UTM) Zone 16 North, and the horizontal datum used is North American Datum 1983 (NAD 83).

1.3 Coordination

An initial meeting is held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied or restudied. A final meeting is held with representatives from FEMA, the community, and the study contractor to review the results of the study.

The initial and final meeting dates for previous FIS reports for Oconto County and its communities are listed in the following table:

Table 1 - Initial and Final CCO Meetings

<u>Community</u>	<u>FIS Date</u>	<u>Initial Meeting</u>	<u>Final Meeting</u>
Gillett, City of	August 1, 1983	*	March 3, 1983
Oconto, City of	February 3, 1981	April 1976	July 16, 1980
Oconto Falls, City of	January 16, 1981	April 1976	July 15, 1980
Oconto County	July 6, 1982	April 1976	January 18, 1982
(Unincorporated Areas)	August 3, 1998	*	*
Suring, Village of	June 1, 1983	*	January 11, 1983

*Data not available

For this countywide FIS, the WDNR performed a cursory review of the previous effective FIS modeling and mapping. This included locating areas where new development has occurred, identifying structures that have been replaced, running available hydraulic and hydrologic modeling when possible, and checking flows for reasonableness. This information was provided at the initial countywide scoping meeting July 17, 2007. At that time the County and communities identified and prioritized areas needing to be studied and/or re-studied. A preliminary scope of work was provided to the County and communities by e-mail on August 20, 2007 for their review and comment. A final scope of work was provided to the County and communities August 27, 2007. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction through January 2009. For this countywide study, the initial scoping meeting was held on July 17, 2007, and attended by representatives of FEMA, WDNR, the communities, and consultant PBS&J. The results of the study were reviewed at the final CCO meeting held on May 20, 2009, and attended by representatives of the Wisconsin DNR and the communities. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Oconto County, Wisconsin, including the incorporated communities listed in Section 1.1.

The following streams and lakes are studied by detailed methods in this FIS report:

Table 2 - Streams and Lakes Studied by Detailed Methods

Anderson Lake	Oconto River
Brookside Creek	Oconto River Tributary No. 2
Christie Brook	Oconto River Tributary No. 3
City of Oconto Tributary No. 1	Oconto River Tributary No. 22
City of Oconto Tributary No. 4	Pensaukee River
City of Oconto Tributary No. 4A	Round Lake
Crooked Lake	South Branch Oconto River
Green Bay	Spring Creek
Hayes Creek	Spring Creek Tributary No. 6
Jones Creek	Tibbet Creek
Kirchner Creek	Town Creek
Little Suamico River	Waupee Creek
McCaslin Brook	Wescott Lake
North Branch Oconto River	

The limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

The streams that were newly studied or entirely revised by detailed methods in this countywide FIS are listed in Table 3.

Table 3 - Streams and Lakes Newly Studied or Entirely Revised by Detailed Methods

<u>Stream</u>	<u>Reach</u>
Anderson Lake	Entire Shoreline.
Christie Brook	From confluence with Oconto River to approximately 1,330 feet upstream of Klaus Lake Road.
City of Oconto Tributary No. 4	From approximately 1,000 feet downstream of County Highway S to Van Hecke Road.
City of Oconto Tributary No. 4A	From confluence with Oconto Tributary No. 4 to Van Hecke Road.
Crooked Lake	Entire Shoreline.
Green Bay	Entire Shoreline.
Hayes Creek	From just upstream of Hayes Road to just downstream of County Highway R.
Jones Creek	From just upstream of State Highway 141 to approximately 4,175 feet upstream of Harley Street.
Kirchner Creek	From approximately 225 feet downstream of Sampson Road to approximately 7,940 feet upstream of Oak Orchard Road.
Oconto River Tributary No. 2	From the confluence with the Oconto River to approximately 2,010 feet upstream of Mott Street.
Oconto River Tributary No. 22	From the confluence with Oconto River to approximately 2,600 feet upstream of South Flatley Street.
Round Lake	Entire Shoreline.
Tibbet Creek	From the confluence with Green Bay to approximately 8,450 feet upstream of Lade Beach Road.
Town Creek	From the confluence with North Branch Oconto River to approximately 1,900 feet upstream of Old 32 Road.
Waupee Creek	From the confluence with North Branch Oconto River to approximately 630 feet upstream of Old State Highway 64; and from approximately 8,400 feet downstream of County Highway W to approximately 200 feet upstream of Pritchard Lane.
Wescott Lake	Entire Shoreline.

The streams where only hydraulics were revised by detailed methods in this countywide FIS are listed in Table 4.

Table 4 – Stream Hydraulics Revised by Detailed Methods

<u>Stream</u>	<u>Reach</u>
Brookside Creek	From approximately 1,240 feet upstream of U.S. Highway 41 to approximately 300 feet upstream of Cross Road.
Little Suamico River	From approximately 180 feet upstream of Cross Road to approximately 2,700 feet downstream from the confluence of South Branch Little Suamico River.
McCaslin Brook	From approximately 8,140 feet downstream of Logging Camp Road to just downstream of North Road; and from approximately 330 feet upstream of Adam Ross Lane to approximately 450 feet upstream of Townsend Dam Road.
Oconto River	From approximately 2,000 feet downstream of County Highway J to the confluence with Oconto River Tributary No. 2.
North Branch Oconto River	From approximately 4,000 feet upstream of Riverside Road to approximately 8,020 feet upstream of Riverside Road.
Pensaukee River	From Safian Road to just downstream of County Highway J.
Spring Creek	From the confluence with Pensaukee River to approximately 400 feet upstream of County Highway E.
Spring Creek Tributary No. 6	From the confluence with Spring Creek to approximately 450 feet upstream of Burdosh Road.

The detailed studied streams that were redelineated in this countywide study are shown in Table 5.

Table 5 - Redelineated Streams

<u>Stream</u>	<u>Reach</u>
Brookside Creek	From the confluence with Pensaukee River to approximately 1,240 feet upstream of U.S. Highway 41.
Little Suamico River	From its outlet to Green Bay to approximately 180 feet upstream of Cross Road and from approximately 2,700 feet downstream from the confluence of South Branch Little Suamico River to the Oconto/Brown County boundary.
McCaslin Brook	From just upstream of North Road to approximately 330 feet downstream of Adam Ross Lane.

Table 5 - Redelineated Streams (*continued*)

<u>Stream</u>	<u>Reach</u>
North Branch Oconto River	From the confluence with Oconto River to Chicago and Northwestern Railroad; from approximately 15,250 feet downstream of North Branch Road to Logan Road; from approximately 8,200 feet downstream of State Highway 32 to just upstream of Tar Dam Road; and from approximately 6,060 feet downstream of County Highway F to approximately 4,000 feet upstream of Riverside Road.
Oconto River	From its outlet to Green Bay to its confluence with Oconto River Tributary No. 2; from approximately 2,000 feet downstream of County Highway J to approximately 11,470 feet upstream of County Highway BB; and from approximately 8,800 feet downstream of County Highway V to the confluence of North and South Branches of Oconto River.
Pensaukee River	From its outlet to Green Bay just downstream of County Highway J; and from Safian Road to the Oconto/Shawano County boundary.
*Peshtigo Brook	From the confluence with Oconto River to approximately 920 feet downstream of Peshtigo Brook Road.
South Branch Oconto River	From the confluence with Oconto River to approximately 3,150 feet downstream of River Road.
City of Oconto Tributary No. 1	From the confluence with Green Bay to just upstream of Pine Avenue.
Oconto River Tributary No. 3	From the confluence with Oconto River to approximately 580 feet upstream of McDonald Street.

*Entire stream is controlled by backwater effects from Green Bay

Approximate analyses were used to study those areas having low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and the communities. The approximate streams and lakes that were newly studied are shown in Table 6.

Table 6 - Newly Studied Streams and Lakes by Approximate Methods

Archibald Lake	McCaslin Brook Tributary #7
Bass Lake	McCaslin Brook Tributary #7.2
Bear Lake	McComb Lake
Bear Paw Lake	McComb Lake Tributary
Big Island Lake	McDonald Creek
Blue Gill Dam Tributary	Messenger Creek
Boot Lake	Munger Lake
Boulder Lake	Munger Lake Tributary
Brehmer Creek	Nelligan Lake
Brehmer Creek Tributary #2	North Branch Little River
Camp Five Lake	North Branch Little River Tributary #6
Chain Lake	North Branch Pensaukee River
Coopman Creek	Oconto River Tributary #12
Daly Creek	Oconto River Tributary #14

Table 6 - Newly Studied Streams and Lakes by Approximate Methods
(continued)

Daly Creek Tributary #1	Pecore Creek (includes Grignon Lake)
Daly Creek Tributary #7	Pecore Creek Tributary #1 (includes Wiscobee Lake)
Daly Creek Tributary #8	Peshtigo Brook
Forbes Creek	Pickerel Lake (N Br Oconto River Watershed)
French Lake	Pickerel Lake (Peshtigo Brook Watershed)
Funk Lake	Pickerel Lake Tributary
Gillett Lake	Plantation Lake
Glocke Lake	Playa Lake
Grindle Lake	Ranch Lake
Hay Creek	Reservoir Flowage
Hay Creek Tributary #1	Rost Lake
Hayes Creek (Hayes Rd-confluence with Pecore Cr)	Savage Lake
Jones Creek (USH141-confluence with Little River)	Second South Branch Oconto River
Jones Creek Tributary #1	Shadow Lake
Jones Creek Tributary #2	Shay Lake
Kelly Brook	South Branch Beaver Creek
Kelly Brook Tributary #12	South Branch Beaver Creek Tributary #1
Kelly Lake	South Branch Oconto River
Kelly Lake Tributary	South Branch Oconto River Tributary #18
Kirchner Creek (From its outlet to Green Bay to approximately 225 feet downstream of Sampson Road)	South Branch Oconto River Tributary #7
Lake John	South Fork Thunder River
Lake John Tributary	South Fork Thunder River Tributary #2
Lake Michigan Tributary #5	Splinter Creek
Lauder Lake	Splinter Creek Tributary #1
Ledge Lake Tributary	Splinter Creek Tributary #2
Leigh Flowage	Splinter Creek Tributary #3
Little Archibald Lake	Squaw Lake
Little River	Star Lake
Little River Tributary #15	Surprise Lake
Little River Tributary #18	Thomas Slough
Little River Tributary #2	Townsend Flowage
Little River Tributary #4	Ucil Lake
Little Squaw Lake	Underwood Lake
Little Wapato Lake	Upper Island Lake
Long Lake	Upper Wapato Lake
Lower Island Lake	Wapato Lake Tributary
Lower Wapato Lake	Waubee Lake
Maiden Lake	Waupee Flowage
McCaslin Brook Tributary #3.1	Wheeler Lake
McCaslin Brook Tributary #3	White Potato Lake
McCaslin Brook Tributary #6	Winslow Lake
McCaslin Brook Tributary #6.2	

For this countywide FIS, the FIS report and FIRM were converted to countywide format, and the flooding information for the entire county, including both incorporated and unincorporated areas, is shown. Also, the vertical datum was converted from the National Geodetic Vertical Datum of 1929 (NGVD) to the North American Vertical Datum of 1988 (NAVD). The projection used in the

preparation of this map is UTM Zone 16 North, and the horizontal datum used is NAD 83, GRS80 Spheroid.

Table 7 presents Letters of Map Change (LOMC) incorporated into this countywide study:

Table 7 – Letters of Map Change (LOMC)

<u>Case Number</u>	<u>Date Issued</u>	<u>Flooding Source</u>	<u>Project Identifier</u>
99-05-131P	August 3, 1999	Oconto River	Approximately 3,600 feet upstream of Brazeau Avenue to approximately 180 feet upstream of County Highway J

Table 8 lists streams that have names in this countywide FIS other than those used in the previously printed FIS reports for the communities in which they are located.

Table 8 – Stream Name Changes

<u>Community</u>	<u>Old Name</u>	<u>New Name</u>
City of Oconto	Tributary No. 1	City of Oconto Tributary No. 1
City of Oconto	Tributary No. 2	Oconto River Tributary No. 3
City of Oconto	Tributary No. 3	Oconto River Tributary No. 2
City of Oconto	Tributary No. 4	City of Oconto Tributary No. 4
City of Oconto	Tributary No. 4A	City of Oconto Tributary No. 4A
City of Oconto Falls	Unnamed Tributary	Oconto River Tributary No. 22
Oconto County (Unincorporated Areas)	Tributary No. 2	Oconto River Tributary No. 22
Oconto County (Unincorporated Areas)	Spring Creek Tributary	Spring Creek Tributary No. 6

2.2 Community Description

Oconto County is located in the northeastern portion of Wisconsin. The total land area contained within the county is approximately 998 square miles (Reference 6). Oconto County is located approximately 25 miles north of the City of Green Bay and is bordered by Brown County to the south, Shawano County and the Village of Pulaski to the southwest, Menominee County to the west, Langlade and Forest Counties to the northwest, Marinette County to the north and east, and Green Bay to the southeast. Major highways for the county include U.S. Highways 41 and 141. According to the U.S. Census Bureau, in 2000 the population for Oconto County was 35,634 (Reference 6).

The climate is characteristically continental, but modified by the nearness of Green Bay and Lake Michigan. The average summer high temperature in July is

80 degrees Fahrenheit (°F) and the average winter low temperature in January is 5°F. The average annual precipitation is 31.7 inches per year with July being the wettest month. Approximately 55 percent of the annual precipitation falls in the five month period of May through September (Reference 7).

Soils in Oconto County near Green Bay are very poorly drained, nearly level, organic soils and marshes. In the western portion of the county, soils are deep, excessively drained to poorly drained, nearly level and have a sandy sub-soil, formed on a glacial lake, outwash plains, and ridges.

The Oconto River, which flows through the county, City of Oconto, City of Oconto Falls, and Village of Suring, is 131 miles long and outlets into Green Bay. Its drainage area at Oconto is approximately 967 square miles.

The Pensaukee River, which generally flows southwest to northeast through the county just south of the Oconto River, is approximately 57 miles long. Its drainage area where it enters Green Bay is approximately 147 square miles.

The Little Suamico River, which generally flows west to east crosses the southernmost part of the county, is approximately 20 miles long. It has a drainage area of approximately 56.7 square miles.

Tibbet Creek, located between the Pensaukee River and the Little Suamico River, is approximately 11 miles long. It has a drainage area of 12.3 square miles where it enters Green Bay.

In most cases, significant development along these streams are generally limited to the incorporated areas and lands adjacent to U.S. Highways 41 and 141.

2.3 Principal Flood Problems

The history of flooding on the streams within Oconto County indicates that flooding may occur during any season of the year. The majority of flooding occurs during the months of March, April, and May, and is usually the result of spring rains and/or snowmelt. During the summer months, thunderstorms occur frequently. They are occasionally violent and accompanied by hail and high winds. Approximately 30 thunderstorms occur annually.

Oconto River near City of Oconto – Gage 04071765

A number of floods occurred on the Oconto River within the last 150 years. Large flood events occurred in 1952, 1989, 1990, 1998, 2003, and 2004 (References 8 and 9). A summary of flood discharges and/or gage heights are shown in Table 9.

Table 9 – Summary of Recorded Large Events on the Oconto River near City of Oconto

<u>Date</u>	<u>Discharge (cfs)</u>	<u>Gage Height (ft)</u>
April 21, 1952	N/A	14.00
March 31, 1998	N/A	10.47
March 28, 1989	5,300	10.91
March 13, 1990	N/A	11.24
June 23, 1990	5,060	9.65
April 17, 2003	5,200	10.23
March 29, 2004	8,320	13.24

Flood impacts at various gage heights in the City of Oconto are listed as follows:

<u>Gage Height (ft)</u>	<u>Flood Impact</u>
14.0	5 feet above floodstage...homes and businesses adjacent to the river begin to flood. Major flooding is likely occurring at this stage and higher stages.
13.0	4 feet above flood stage...a campground and park are under several feet of water. Water approaches homes on Farnsworth Street and Holtwood Way. There is widespread moderate flooding of lowland and agricultural land.
12.5	3.5 feet above floodstage...a campground and park are completely under water. There is widespread lowland flooding
11.0	2 feet above flood stage...there is more widespread flooding in a campground and park in the City of Oconto. Lowland flooding is widespread.
10.0	1.0 foot above flood stage...water partially covers a public campground in the City of Oconto.
9.0	At flood stage...widespread flooding occurs in a public campground in the City of Oconto. Water approaches the back yards of several homes along the river in Oconto...and there is widespread lowland flooding.
7.0	At bankfull stage...water approaches a public campground in the City of Oconto and there is flooding of lowland. Flood stage is at 9 feet.



Figure 1: October 2005 Normal Stage in City of Oconto (Reference 9)



Figure 2: March 29, 2004 Flood in City of Oconto (Reference 9)

The estimated 1-percent-annual-chance flood discharge of the Oconto River at the City of Oconto is 10,800 cfs (Reference 10).

Oconto River near City of Gillett – Gage 04071000

The gaging station is located approximately 28 miles above the City of Gillett. Large floods occurred in 1922, 1929, 1939, 1952, 1953, 1960, 1965, 1973, and 1991 (References 11 and 12). Ice increased the flood stage during the 1939 and 1953 events. A summary of flood discharges and/or gage heights are shown in Table 10.

Table 10 – Summary of Recorded Large Events on the Oconto River in the Town of Pulcifer (near City of Gillett)

<u>Date</u>	<u>Discharge (cfs)</u>	<u>Gage Height (ft)</u>
April 10, 1922	8,400	11.20
April 9, 1929	4,490	6.90
March 28, 1939	4,200	7.80
April 2, 1952	4,000	9.95
March 23, 1953	5,630	7.75
May 10, 1960	4,340	6.37
April 13, 1965	4,200	8.37
March 10, 1973	4,900	9.08
April 16, 1991	N/A	8.20

Flood impacts at various gage heights in the Town of Pulcifer (south of Gillett on Oconto River) are listed as follows:

<u>Gage Height (ft)</u>	<u>Flood Impact</u>
12.5	3.5 feet above flood stage...there are no known affects at this stage or higher...however major flooding is likely occurring.
11.5	2.5 feet above flood stage...water touches the lowest portion of the HWY BB bridge. Sportsmans Park in the Town of Pulcifer is flooded.
9.0	At flood stage...there is widespread flooding of lowland and agricultural land. Water spreads into Sportsmans Park in the Town of Pulcifer.
6.0	At bankfull stage...there is minor lowland flooding. Flood stage is at 9 feet.

The estimated 1-percent-annual-chance flood discharge for this station is 6,720 cfs (Reference10).

2.4 Flood Protection Measures

The watershed above the City of Oconto Falls is of such a nature as to provide a natural storage basin. The outflow is of a relatively low peak, but long duration in comparison to its size. The remaining watershed, between Oconto and Oconto Falls, consists of a steeper terrain with less internal storage and responds to local rainfall events.

Oconto County has a shoreline protection ordinance and a county zoning ordinance to protect the floodplains (References 13 and 14).

3.0 **ENGINEERING METHODS**

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

The following analyses have not changed from the previous countywide FIS. Study summaries have been compiled by waterway below:

Oconto River, North Branch Oconto River, South Branch Oconto River, McCaslin Brook –

For the Oconto River at the City of Gillett, a volume duration probability approach was used to simulate the natural hydrographs. A 15-day runoff with a 10-day distribution was used in the TR-20 computer routing model (Reference

15). The flood-frequency characteristics for the gage at the City of Gillett with 62 years of record was matched within one percent as analyzed by the U.S. Geological Survey (USGS) using the procedures in Bulletin 17A (Reference 16).

The decrease in discharges on the Oconto River between Larson Road and the Oconto Falls Power Dam is caused by the effective storage of the dam. The decreases in discharge on the Oconto River between County Highway BB and State Highway 32 are caused by storage as the floodplain widens near State Highway 32.

Brookside Creek, City of Oconto Tributary No. 1, City of Oconto Tributary No. 3, Little Suamico River, and Pensaukee River –

The selected frequencies were estimated using parametric hydrology methods, which included considerations of precipitation, soils, vegetation cover, drainage area, and hydraulic characteristics of the watershed (References 15 and 17).

For this countywide FIS, the following new studies have been completed. Summaries have been compiled by waterway below:

Anderson Lake, Christie Brook, Hayes Creek –

Flood discharges were determined using the WDNR Hydrology Tool which calculates parameters based on available GIS data for use in the 2003 USGS Flow Regression Equations (Reference 18). These discharges were compared to those on gaged basins having similar watershed characteristics.

City of Oconto Tributaries No.4 and No. 4A –

Peak flows were estimated using regression equations contained in the 1992 publication “Flood-Frequency Characteristics of Wisconsin Streams” (Reference 19). A second method of estimating peak flows for comparison used the Hydrologic Engineering Center’s Hydrologic Modeling System (HEC-HMS) computer software, version 2.2.2 (Reference 20). For each subbasin, runoff Curve Numbers (CNs) were estimated from soil types identified on U.S. Soil Conservation Service soil survey maps and land use from field observations. Times of concentration were estimated using the TR-55 flowpath segment method (Reference 21). 24-hour rainfall amounts determined from Bulletin 71, “Rainfall Frequency Atlas for the Midwest” (Reference 22) was used with the SCS Type II Distribution. Both resulted in similar discharges.

Green Bay –

As described in the 1990 U.S. Army Corps of Engineers (USACE) “Flood Levels of Green Bay” report (Reference 23), base 10%, 2%, 1%, and 0.2 % annual chance flood levels for communities on the northern portion of Green Bay that are directly exposed to the effects of Lake Michigan are estimated from the Lake Michigan gage for reach “J” as defined in the “Revised Report on Great Lakes Open-Coast Flood Levels” (Reference 24). Flood levels for the southern portion of Green Bay are based on water level data from the National Oceanic and Atmospheric Administration (NOAA) gage at Green Bay. Water levels for intermediate points on Green Bay, such as Oconto County, were calculated through the Great Lakes Environmental Research Laboratory’s application of Storm Surge Planning Program (Reference 25).

Round Lake –

Runoff Curve Numbers (CNs) were estimated from soil types identified on U.S. Soil Conservation Service soil survey maps and land use from field observations. Times of concentration were estimated using the TR-55 flowpath segment method (Reference 21). The total excess precipitation was added to the highest recorded water level.

All Other Streams and Lakes Newly Studied or Entirely Revised by Detailed Methods –

For the remaining streams and lakes studied in Table 3, new hydrologic analysis were performed by the Wisconsin Department of Natural Resources (WDNR) in 2008 to compute runoff hydrographs and associated peak discharges at relevant locations in the study area. Discharges were computed using the Hydrologic Engineering Center’s Hydrologic Modeling System (HEC-HMS) computer software, version 2.2.2 (Reference 20). For each subbasin, runoff Curve Numbers (CNs) were estimated using 1992 Wisconsin Initiative for Statewide Cooperation of Landscape Analysis and Data (WISCLAND) landuse data and Soil Survey Geographic Database (SSURGO) soils data. Times of concentration were estimated using the TR-55 flowpath segment method (Reference 21). Floodplain storage was taken into account where permanent water bodies existed, such as ponds, lakes, or manmade detention structures, or where there were significant wetlands identified in the Wisconsin Wetland Inventory. The rainfall distribution used was developed by the WDNR and is based on recorded storms 2 inches and larger from 1975 to 2003 at National Weather Service (NWS) Gage No. 474961 in Madison, Wisconsin. Multiple storm durations ranging from 3-hours to 10-days were evaluated to determine which produced the critical (largest) flow for the area of interest. This critical duration varied by watershed depending on its physical characteristics.

The 12-hour duration storm was used for Jones Creek; 24-hour duration storm for Wescott Lake; and 48-hour duration storm for Crooked Lake, Kirchner Creek, Tibbet Creek, Town Creek, and Waupee Creek.

Approximate Study Streams and Lakes –

Approximate (Zone A) studies were completed for Oconto County streams using limited detail study engineering techniques. Hydrology for studied streams was determined using the best available information. For the following streams, flows were based on those in the models used or listed in the August 3, 1998 Oconto County Unincorporated Areas Flood Insurance Study (FIS): McCaslin Brook, North Branch Oconto River, and South Branch Oconto River (Suring-just upstream of Clinic Rd).

For the following streams/lakes, flows were based on those in the HEC-HMS V 2.2.2 (Reference 20) models created for detailed studies as of this revision (as of 02/20/2009): Hayes Creek (Hayes Rd-confluence with Pecore Cr), Grindle Lake, Kirchner Creek, Jones Creek (USH141-confluence with Little River)/Jones Creek Tributary #1/Jones Creek Tributary #2, and Waupee Flowage.

For the following streams, flows were determined using the WiDNR Hydrology Tool which calculates parameters based on available GIS data for use in the 2003 USGS Flow Regression Equations (Reference 18): Brehmer Creek, Brehmer Creek Tributary #2, Coopman Creek, Daly Creek, Daly Creek Tributary #1, Daly Creek Tributary #7, Daly Creek Tributary #8, Forbes Creek, Hay Creek, Hay Creek Tributary #1, Kelly Brook, Kelly Brook Tributary #12, Kelly Lake Tributary, Lake Michigan Tributary #5, Ledge Lake Tributary, Little River, Little River Tributary #2, Little River Tributary #4, Little River Tributary #15, Little River Tributary #18, McDonald Creek, Messenger Creek, North Branch Little River, North Branch Little River Tributary #6, North Branch Pensaukee River, Oconto River Tributary #12, Oconto River Tributary #14, Pecore Creek (includes Grignon Lake), Pecore Creek Tributary #1 (includes Wiscobee Lake), Peshtigo Brook, South Branch Beaver Creek, South Branch Beaver Creek Tributary #1, South Branch Oconto River Tributary #7, South Branch Oconto River Tributary #18, South Fork Thunder Creek, South Fork Thunder Creek Tributary #2, Splinter Creek, Splinter Creek Tributaries #1-3, and Thomas Slough.

For the following streams/lakes, flows were based on HEC-HMS V 2.2.2 (Reference 20) models created for approximate lake studies as of this revision (listed by watershed as of 02/20/2009): Archibald Lake, Bass Lake, Bear Paw Lake, Boot Lake, Chain Lake Watershed (Chain Lake, Little Archibald Lake), John Lake Watershed (Bear Lake, John Lake, John Lake Tributary, Munger Lake, Munger Lake Tributary), Glocke Lake, Kelly Lake Watershed (Kelly Lake/Long Lake), Lauder Lake, Leigh Flowage, Maiden Lake (Camp Five Lake, French Lake, Gillett Lake, Maiden Lake, Winslow Lake), McComb Lake/McComb Lake Tributary, Nelligan Lake, Pickerel Lake – North Branch Oconto River Watershed

(Bluegill Dam Lake, Blue Gill Dam Tributary, Pickerel Lake, Pickerel Lake Tributary), Pickerel Lake (Peshtigo Brook Watershed), Plantation Lake, Playa Lake, Ranch Lake, Rost Lake, Savage Lake, Shay Lake, South Branch Oconto River Watershed – Upstream of Oconto/Menomonee Co Boundary (Boulder Lake, Big Island Lake, Lower Island Lake, Upper Island Lake, Second South Branch Oconto River, Shadow Lake, South Branch Oconto River, Star Lake), Underwood Lake, Waubee Lake, Funk Lake Watershed (Funk Lake, Little Squaw Lake, Squaw Lake, Ucil Lake), Wheeler Dam Watershed (Little Wapato Lake; Lower Wapato Lake; McCaslin Br Tributaries #3, #3.1, #6, #6.2, #7, #7.2; Reservoir Flowage; Surprise Lake; Townsend Flowage; Upper Wapato Lake; Wapato Lake Tributary), Wheeler Lake, White Potato Lake. Lake elevations are based on storage-area-outflow relationships determined from available surveys and best assumptions that were included in the HMS models.

Peak discharge-drainage area relationships for each flooding source studied in detail are shown in Table 11.

Table 11 - Summary of Discharges

<u>Flooding Source and Location</u>	<u>Drainage Area (square miles)</u>	<u>Peak Discharges (cubic feet per second)</u>			
		<u>10-Percent-Annual-Chance</u>	<u>2-Percent-Annual-Chance</u>	<u>1-Percent-Annual-Chance</u>	<u>0.2-Percent-Annual-Chance</u>
BROOKSIDE CREEK					
At confluence with Pensaukee River	6.1	380	660	740	1,060
Just upstream of County Highway J	3.7	257	446	500	717
Just upstream of Falk Road	2.5	187	325	365	522
Just upstream of U.S. Highway 41 and 141	1.5	125	218	244	350
CHRISTIE BROOK					
At the confluence with Oconto River	14.2	390	571	650	838
Approximately 4,220 feet downstream of North Green Bay Avenue	8.3	263	383	435	578
At Chicago and Northwestern Railroad	6.1	195	282	320	410
HAYES CREEK					
Just downstream of Hayes Road	11.5	328	473	535	687
At County Highway R	6.8	212	305	345	443
JONES CREEK					
At U.S. Highway 141	0.9	170	263	324	508
KIRCHNER CREEK					
At Sampson Road	6.1	409	727	860	1,227

Table 11 - Summary of Discharges (*continued*)

<u>Flooding Source and Location</u>	<u>Peak Discharges (cubic feet per second)</u>				
	<u>Drainage Area (square miles)</u>	<u>10-Percent- Annual-Chance</u>	<u>2-Percent- Annual-Chance</u>	<u>1-Percent- Annual-Chance</u>	<u>0.2-Percent- Annual-Chance</u>
LITTLE SUAMICO RIVER					
At outlet to Green Bay	56.7	2,980	4,940	5,520	7,870
At Cross Road	33.5	2,820	4,775	5,350	7,660
Approximately 8,980 feet downstream of County Highway C	45.7	2,775	4,600	5,200	7,400
Just upstream of County Highway C	37.8	2,500	4,200	4,850	6,800
Just upstream of Schwartz Road	25.5	2,050	3,400	3,800	5,400
At Jaworski Road	9.7	1,420	2,320	2,580	3,570
At Water Treatment Plant Road	1.4	206	370	420	605
MCCASLIN BROOK					
At County Highway F	51.9	240	320	340	410
Approximately 4,700 feet upstream of North Road	38.5	173	226	247	294
At Old County Highway T	36.5	160	210	230	270
NORTH BRANCH OCONTO RIVER					
Just upstream of confluence with Oconto River	273.7	1,700	2,270	2,490	2,980
Approximately 2.8 miles downstream of North Branch Road	270.8	1,700	2,260	2,480	2,960
At Logan Road	261.5	1,660	2,200	2,410	2,870
Approximately 1.6 miles downstream of State Highway 32	255.2	1,630	2,150	2,360	2,820
At Kingston Road	188.3	1,260	1,650	1,800	2,150
Approximately 3,300 feet upstream of Kingston Road	182.2	1,230	1,610	1,760	2,090
At Chicago and North Western Railroad	177.4	1,200	1,570	1,720	2,050
At State Highways 32 and 64	172.0	1,170	1,530	1,680	1,990
At Tar Dam Road	167.4	1,140	1,500	1,640	1,950
Approximately 1.14 miles downstream of County Highway F	101.0	890	1,140	1,230	1,460
At County Highway F	89.6	790	1,010	1,100	1,310
OCONTO RIVER					
At outlet to Green Bay	966.6	5,428	9,034	10,762	14,355
Approximately 170 feet upstream of the confluence of Oconto River Tributary No. 3	961.3	5,250	8,380	9,970	13,290
At County Highway J	948.6	5,250	8,140	9,690	12,890
Just upstream of confluence of Little River	764.2	4,680	6,070	6,620	7,850
At Machickanee Dam	752.3	4,680	6,070	6,620	7,850
At Oconto Falls Power Dam	720.4	4,680	6,070	6,620	7,850
At County Highway K	714.3	4,690	6,080	6,630	7,860
At State Highway 32	706.7	4,690	6,080	6,620	7,860
At USGS Gage No. 04071000 at County Highway BB	679.4	4,700	6,090	6,640	7,870
At County Highway V	633.5	4,580	5,940	6,480	7,680

Table 11 - Summary of Discharges (*continued*)

<u>Flooding Source and Location</u>	Peak Discharges (cubic feet per second)				
	<u>Drainage Area (square miles)</u>	<u>10-Percent- Annual-Chance</u>	<u>2-Percent- Annual-Chance</u>	<u>1-Percent- Annual-Chance</u>	<u>0.2-Percent- Annual-Chance</u>
OCONTO RIVER (continued)					
AT County Highway H	614.1	4,320	5,600	6,110	7,250
Approximately 1.0 mile downstream of confluence of North and South Branches of Oconto River	599.7	4,260	5,540	6,040	7,170
Just downstream of confluence of North and South Branches of Oconto River	593.1	4,230	5,490	5,990	7,110
PENSsauKee RIVER					
At outlet to Green Bay	147.0	4,400	7,420	8,330	11,890
Just downstream of confluence of Spring Creek	126.7	4,360	7,250	8,095	11,400
Approximately 2.0 miles upstream of Chicago, Milwaukee, St. Paul, and Pacific Railroad	116.7	4,330	7,110	7,920	11,050
At Safian Road	54.0	2,040	3,400	3,800	5,330
At State Highway 32	46.7	1,810	3,030	3,390	4,780
SOUTH BRANCH OCONTO RIVER					
Just upstream of confluence with Oconto River	214.8	1,730	2,210	2,400	2,820
Approximately 1.1 miles upstream of confluence with Oconto River	214.2	1,720	2,210	2,400	2,810
SPRING CREEK					
At confluence with Pensaukee River	8.4	136	320	380	650
At Miller Road	2.4	74	160	190	320
SPRING CREEK TRIBUTARY NO. 6					
At confluence with Spring Creek	1.7	16	32	38	64
TIBBET CREEK					
At outlet to Green Bay	12.9	818	1,349	1,565	2,152
Approximately 1.4 miles upstream of Lade Beach Road	9.0	558	908	1,050	1,430
TOWN CREEK					
At confluence with North Branch Oconto River	1.9	66	140	172	267
CITY OF OCONTO TRIBUTARY NO. 1					
At outlet to Green Bay	0.8	83	175	221	358

Table 11 - Summary of Discharges (*continued*)

<u>Flooding Source and Location</u>	<u>Drainage Area (square miles)</u>	Peak Discharges (cubic feet per second)			
		<u>10-Percent- Annual-Chance</u>	<u>2-Percent- Annual-Chance</u>	<u>1-Percent- Annual-Chance</u>	<u>0.2-Percent- Annual-Chance</u>
OCONTO RIVER TRIBUTARY NO. 2 At confluence with Oconto River	1.0	18	28	32	45
OCONTO RIVER TRIBUTARY NO. 3 At confluence with Oconto River	0.2	13	32	37	58
CITY OF OCONTO TRIBUTARY NO. 4 Approximately 1100' downstream of County Highway S	6.3	*	*	410	500
OCONTO RIVER TRIBUTARY NO. 22 At the confluence with Oconto River	2.4	150	266	284	338
WAUPEE CREEK At the confluence with the North Branch Oconto River	47.9	363	831	1,107	1,954
Approximately 8,100 feet downstream of County Highway W	13.9	62	186	260	490

*Data not available

Stillwater elevations for Summary of Stillwater Elevations are shown in Table 12.

Table 12 - Summary of Stillwater Elevations

<u>Flooding Source</u>	Water Surface Elevations (Feet NAVD ¹)			
	<u>10-Percent- Annual-Chance</u>	<u>2-Percent- Annual-Chance</u>	<u>1-Percent- Annual-Chance</u>	<u>0.2-Percent- Annual-Chance</u>
ANDERSON LAKE Entire Shoreline	*	*	859.7	*
CROOKED LAKE Entire Shoreline	950.7	951.1	951.2	951.5
GREEN BAY Little River, Oconto, and Pensaukee Townships/City of Oconto	583.6	584.6	585.2	586.1
Little Suamico Township	583.9	584.9	585.4	586.4
ROUND LAKE Entire Shoreline	*	*	826.8	*
WESCOTT LAKE Entire Shoreline	845.0	845.1	845.2	845.3

*Data not available

¹North American Vertical Datum of 1988

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data Table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

The analyses for those stream reaches listed in Table 5 have not changed from the previous countywide FIS.

Cross sections used for the backwater analyses of the Oconto River were obtained from aerial photographs (Reference 26). The below-water sections were obtained by field measurements. All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry. The cross sections for all other stream reaches listed in Table 5 were obtained from field surveys.

For the streams listed in Table 5, the water-surface elevations (WSELs) of floods of the selected recurrence intervals were computed through the use of the SCS WSP-2 step-backwater computer program (Reference 27). Flood profiles were drawn showing computed WSELs for floods of the selected recurrence intervals.

Starting WSELs for the Little Suamico River, Oconto River, Pensaukee River, City of Oconto Tributary No. 1, and Oconto River Tributary No. 3. Brookside Creek, North Branch Oconto River, and South Branch Oconto River, used known starting WSELs. The slope-area method was used for McCaslin Brook (Reference 28).

U.S. Highway 41 acts as an embankment causing backwater overflow between the drainage from north of the City of Oconto city limits and Tributary No. 4. East of U.S. Highway 41 near the high school in the City of Oconto and Superior Avenue is a ridge that causes water to move to the north and join Tributary No. 4 at the intersection of U.S. Highway 41 and County Highway S (outside of the City of Oconto). This provides the controlling backwater for Tributary No. 4 and the AH Zone. This ridge can be overtopped south of the school first and as shallow flow north of the school. The overflow can cause shallow flooding in the Superior Avenue, Memorial Drive area.

For this countywide FIS, the following new studies have been completed. Summaries have been compiled by waterway below:

All New and Revised Detailed Study Streams –

For the streams listed in Table 3 and Table 4 that are either revised or newly studied by detailed methods, the cross section data was obtained from field surveys, countywide two-foot contours (Reference 29), and LiDAR point elevations (Reference 30). All significant hydraulic structures were field-surveyed. Cross section and streamline data were extracted using HEC-GeoRAS (Reference 31). This data was imported into a skeleton RAS model where structure data from field survey was added to the model. Flows were added from hydrology data supplied by the WDNR. WSELs were computed using the USACE’s HEC-RAS computer program version 3.1.3 (Reference 32).

Starting WSELs for Hayes Creek, Kirchner Creek, Oconto River Tributary No. 2, Oconto River Tributary No. 22, Tibbett Creek, Town Creek, and Waupee Creek were based on normal depth.

Starting WSELs for Brookside Creek, Christie Brook, Jones Creek, Little Suamico River, McCaslin Brook, North Branch Oconto River, Spring Creek, and Spring Creek Tributary No. 6 were based on known elevations from downstream studies.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

Channel roughness factors (Manning’s “n” values) used in the hydraulic computations were chosen based on aerial photography, field observations, and Wisconsin land use data. The Manning’s “n” values for all detailed studied streams are listed in the Table 13 below:

Table 13 - Manning's "n" Values for Detailed Study Streams

<u>Stream</u>	<u>Channel “n”</u>	<u>Overbank “n”</u>
BROOKSIDE CREEK	0.040-0.050	0.060-0.120
CHRISTIE BROOK	0.040	0.060-0.100
HAYES CREEK	0.050	0.085
JONES CREEK	0.040	0.060-0.100
KIRCHNER CREEK	0.040	0.060-0.100
LITTLE SUAMICO RIVER	0.035-0.055	0.050-0.120
MCCASLIN BROOK	0.030-0.050	0.050-0.120
NORTH BRANCH OCONTO RIVER	0.030-0.060	0.040-0.100
OCONTO RIVER	0.030-0.060	0.040-0.100
PENSAUKEE RIVER	0.035-0.050	0.080-0.120

Table 13 - Manning's "n" Values for Detailed Study Streams
(Continued)

SOUTH BRANCH OCONTO RIVER	0.040	0.120
SPRING CREEK	0.040-0.045	0.080-0.100
SPRING CREEK TRIBUTARY NO. 6	0.045	0.100
TIBBET CREEK	0.030-0.050	0.060-0.100
TOWN CREEK	0.040	0.060-0.100
CITY OF OCONTO TRIBUTARY NO. 1	0.045-0.100	0.055-0.100
OCONTO RIVER TRIBUTARY NO. 2	0.050	0.070
OCONTO RIVER TRIBUTARY NO. 3	*	*
CITY OF OCONTO TRIBUTARY NO. 4	0.04-0.045	0.04-0.07
CITY OF OCONTO TRIBUTARY NO. 4A	0.05	0.06
TRIBUTARY NO. 22	0.050	0.100
WAUPEE CREEK	0.040	0.060-0.100

*Data not available

The profile baselines depicted on the FIRM represent the hydraulic modeling baselines that match the flood profiles on this FIS report. As a result of improved topographic data, the profile baseline, in some cases, may deviate significantly from the channel centerline or appear outside the Special Flood Hazard Area.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Approximate Study Streams and Lakes –

For all streams studied, HEC-RAS version 3.1.3 (Reference 32) hydraulic models were created using the HEC-GeoRAS (Reference 31) extension for ArcMap (V9.1). Cross-section information in the model was derived by cutting cross-sections from the 5' cell grids generated from LiDAR data provided by Oconto County (based on Spring 2005 High-resolution Orthoimagery, 1"=1666' scale). Structures (bridges, culverts, dams) were modeled based on WiDOT (Reference 33) or WDNR as-built plans when available. If bridge/culvert plans were not available, they were modeled by estimating bridge deck width and openings based on the Oconto County Orthoimagery, top of road elevations were estimated based on the Oconto County LiDAR data. If dam plans were unavailable, they were modeled by estimating crest length from the Oconto County Orthoimagery, crest elevations were estimated based on the Oconto County LiDAR data.

A statewide polygon shapefile layer was developed for estimating approximate study Manning's "n" values. This layer is derived from a vector representation of

the Wisland land cover grid, which categorizes land cover types based on LANDSAT TM satellite imagery acquired in 1991 through 1993.

For approximate modeling purposes, the WDNR assigned conservative Manning's "n" values to each of the major land cover categories as described below:

Table 14 - Manning's "n" Values for Approximate Streams

<u>Land Cover Value</u>	<u>Description</u>	<u>Manning's N</u>
101	High Intensity Urban	0.025
104	Low Intensity Urban	0.05
105	Golf Course	0.04
110	Agriculture	0.06
112	Row Crops	0.06
124	Forage Crops	0.04
148	Cranberry Bog	0.045
150	Grassland	0.06
161	Upland Forest	0.1
200	Open Water	0.045
211	NonForested Wetland	0.06
223	Forested Wetland	0.1
240	Barren	0.04
250	Shrubland	0.08
255	Cloud Cover	0.06

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was NGVD29. With the finalization of NAVD88, many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD88. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities. Some of the data used in this study were taken from the prior effective FIS reports and adjusted to NAVD88. The average conversion factor that was used to convert the data in this FIS report to NAVD88 was calculated using the National Geodetic Survey's (NGS) VERTCON online utility (Reference 34). The data points used to determine the conversion are listed in Table 15.

Vertical Datum Conversion: NGVD – 0.02 = NAVD

Table 15 - Vertical Datum Conversion

<u>Quad Name</u>	<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Conversion from NGVD to NAVD (feet)</u>
McCaslin Mountain	SE	45.375	-88.375	0.007
Otter Lake	SE	45.375	-88.500	0.023
Wabeno	SE	45.375	-88.625	0.049
Wheeler Lake	SE	45.250	-88.375	-0.030
Townsend	SE	45.250	-88.500	0.010
Reservoir Pond	SE	45.250	-88.625	0.026
White Pond Lake	SE	45.125	-88.125	-0.062
Shay Lake	SE	45.125	-88.250	-0.033
Mountain	SE	45.125	-88.375	-0.030
Shadow Lake	SE	45.125	-88.500	0.043
Langlade	SE	45.125	-88.625	0.003
Marinette West	SE	45.000	-87.750	-0.092
Porterfield SW	SE	45.000	-87.875	-0.089
Coleman	SE	45.000	-88.000	-0.098
Kelly Lake	SE	45.000	-88.125	-0.052
Hickory Corners	SE	45.000	-88.250	-0.023
Breed	SE	45.000	-88.375	-0.026
Fredenber Lake	SE	45.000	-88.500	-0.016
Oconto West	SE	44.875	-87.875	-0.069
Lena	SE	44.875	-88.000	-0.075
Oconto Falls North	SE	44.875	-88.125	-0.046
Gillett	SE	44.875	-88.250	-0.013
Berry Lake	SE	44.875	-88.375	-0.026
Legend Lake	SE	44.875	-88.500	-0.052
Abrams	SE	44.750	-88.000	0.052
Oconto Falls South	SE	44.750	-88.125	-0.007
Krakow	SE	44.750	-88.250	-0.016
Average:				-0.024

For additional information regarding conversion between NGVD and NAVD, visit the NGS website at www.ngs.noaa.gov, or contact the NGS at the following address:

Vertical Network Branch, N/CG13
 National Geodetic Survey, NOAA
 Silver Spring Metro Center 3
 1315 East-West Highway
 Silver Spring, Maryland 20910
 (301) 713-3191

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and delineations of the 1- and 0.2-percent-annual-chance (500-year) floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Table, and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community.

For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using countywide two-foot contours (Reference 29), and LiDAR point elevations (Reference 30).

For each lake studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using countywide two-foot contours (Reference 29), and LiDAR point elevations (Reference 30).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AH), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). Floodplain boundaries have been delineated using five foot cell size digital elevation models (DEMs) derived from LiDAR data (Reference 30).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies. However, the WDNR has established a policy that requires a 0.0 foot surcharge except for the waterways which were redelineated, where the surcharge from the effective study remains valid (Reference 35).

The floodways presented in this FIS report and on the FIRM were computed at representative cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 16). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

In the redelineation efforts, the floodways were not recalculated. As a result, there were areas where the previous floodway did not fit within the boundaries of the redelineated 1-percent-annual chance floodplain. In these areas, the

floodway was reduced to coincide with the 1-percent-annual chance floodplain. Water surface elevations, with and without a floodway, the mean velocity in the floodway, and the location and area at each surveyed cross section as determined by the hydraulic methods can be seen in Table 16. The width of the floodway depicted by the FIRM panels and the amount of reduction to fit the floodway inside the 1-percent annual chance floodplain, if necessary, is also listed.

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BROOKSIDE CREEK									
A	647	117	903	0.8	0	607.3	605.6 ²	605.7	0.1
B	1,518	372	2,386	0.3	0	607.3	605.6 ²	605.7	0.1
C	2,592	1,362	7,561	0.1	0	607.3	605.9 ²	606.0	0.1
D	3,956	563	2,009	0.3	46	607.3	606.1 ²	606.2	0.1
E	5,524	190	995	0.6	0	608.9	608.9	609.0	0.1
F	7,163	223	1,258	0.5	0	612.6	612.6	612.7	0.1
G	7,729	352	2,063	0.3	0	612.6	612.6	612.7	0.1
H	9,028	777	3,519	0.1	0	614.1	614.1	614.2	0.1
I	10,140	665	1,558	0.3	0	614.1	614.1	614.1	0.0
J	12,525	284	443	1.1	0	618.9	618.9	618.9	0.0
K	14,158	337	694	0.9	0	628.9	628.9	628.9	0.0
L	15,707	80	406	1.7	0	634.1	634.1	634.1	0.0
M	17,919	516	700	0.5	0	638.4	638.4	638.4	0.0
N	20,400	276	420	1.3	0	640.3	640.3	640.3	0.0
O	25,496	124	202	1.2	0	652.8	652.8	652.8	0.0
P	27,516	244	740	0.3	0	665.0	665.0	665.0	0.0
Q	30,779	84	114	2.2	0	671.4	671.4	671.4	0.0
R	32,493	253	1,004	0.4	0	680.5	680.5	680.5	0.0

¹Feet above confluence with Pensaukee River

²Elevation computed without consideration of backwater effects from Pensaukee River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

BROOKSIDE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHRISTIE BROOK								
A	1,441	182	481	1.4	739.5	737.8 ²	737.8	0.0
B	2,455	238	426	1.5	739.5	738.4 ²	738.4	0.0
C	3,702	287	614	1.1	739.6	739.6	739.6	0.0
D	5,753	324	483	1.4	741.0	741.0	741.0	0.0
E	7,547	430	476	1.4	743.0	743.0	743.0	0.0
F	9,438	266	452	1.4	746.6	746.6	746.6	0.0
G	10,460	181	294	2.2	748.8	748.8	748.8	0.0
H	11,605	170	379	1.7	751.6	751.6	751.6	0.0
I	12,758	286	433	1.5	753.1	753.1	753.1	0.0
J	13,757	150	270	2.4	756.2	756.2	756.2	0.0
K	15,064	182	368	1.8	760.8	760.8	760.8	0.0
L	16,138	248	331	1.3	763.0	763.0	763.0	0.0
M	17,224	184	328	1.3	766.2	766.2	766.2	0.0
N	18,305	46	92	4.7	773.3	773.3	773.3	0.0
O	21,388	131	191	2.3	788.5	788.5	788.5	0.0
P	22,452	95	162	2.7	793.6	793.6	793.6	0.0
Q	24,415	481	810	0.4	802.0	802.0	802.0	0.0
R	25,522	155	195	1.6	803.1	803.1	803.1	0.0
S	26,508	205	281	1.1	805.6	805.6	805.6	0.0
T	27,518	250	193	1.7	808.2	808.2	808.2	0.0

¹Feet above outlet to Oconto River

²Elevation computed without consideration of backwater effects from Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

CHRISTIE BROOK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHRISTIE BROOK (CONTINUED)								
U	28,089	111	176	1.8	811.4	811.4	811.4	0.0
V	28,275	232	1151	0.3	818.1	818.1	818.1	0.0
W	28,894	102	277	1.2	818.3	818.3	818.3	0.0
X	29,300	61	186	1.7	819.1	819.1	819.1	0.0
Y	29,482	92	181	1.8	819.2	819.2	819.2	0.0

¹Feet above outlet to Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

CHRISTIE BROOK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANGE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HAYES CREEK								
A	1,994	171	392	1.4	835.0	835.0	835.0	0.0
B	3,029	233	447	1.2	836.0	836.0	836.0	0.0
C	4,182	226	454	1.2	836.9	836.9	836.9	0.0
D	5,266	257	534	1.0	838.4	838.4	838.4	0.0
E	6,237	239	532	1.0	839.6	839.6	839.6	0.0
F	7,243	295	478	1.1	840.4	840.4	840.4	0.0
G	8,311	371	803	0.4	840.8	840.8	840.8	0.0
H	9,341	363	533	0.7	841.0	841.0	841.0	0.0
I	10,410	1,020	1,300	0.3	841.1	841.1	841.1	0.0
J	11,749	1,092	1,638	0.2	841.2	841.2	841.2	0.0
K	12,893	1,288	1,700	0.2	841.3	841.3	841.3	0.0
L	13,879	1,919	3,184	0.1	841.3	841.3	841.3	0.0
M	15,134	1,766	2,069	0.2	841.4	841.4	841.4	0.0
N	16,415	1,286	1,526	0.2	841.4	841.4	841.4	0.0
O	17,707	958	658	0.5	842.0	842.0	842.0	0.0
P	18,946	752	888	0.5	842.9	842.9	842.9	0.0

¹Feet above Hayes Road

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

HAYES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
JONES CREEK								
A	2,692	1,034	227	0.9	694.2	694.2	694.2	0.0
B	4,648	33	55	3.6	695.8	695.8	695.8	0.0
C	5,975	397	413	0.5	699.3	699.3	699.3	0.0
D	7,099	68	153	0.7	702.7	702.7	702.7	0.0
E	8,690	1,384	1,698	0.1	705.6	705.6	705.6	0.0
F	10,034	576	510	0.2	705.6	705.6	705.6	0.0
G	11,372	316	201	0.5	706.7	706.7	706.7	0.0

¹ Feet above U.S. Highway 141

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

JONES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
KIRCHNER CREEK								
A	10,038	520	675	1.3	599.1	599.1	599.1	0.0
B	11,190	3,027	1,930	0.4	600.6	600.6	600.6	0.0
C	13,779	1,625	1,459	0.6	602.9	602.9	602.9	0.0
D	17,078	406	745	1.0	605.2	605.2	605.2	0.0
E	18,477	78	264	2.8	606.1	606.1	606.1	0.0
F	21,342	348	293	2.5	608.8	608.8	608.8	0.0
G	21,965	355	478	1.5	611.5	611.5	611.5	0.0
H	23,151	307	419	1.8	613.3	613.3	613.3	0.0
I	24,880	515	662	0.7	616.1	616.1	616.1	0.0
J	26,810	240	366	1.2	620.8	620.8	620.8	0.0
K	28,072	300	385	1.2	625.1	625.1	625.1	0.0
L	29,942	412	400	1.1	629.7	629.7	629.7	0.0
M	31,662	430	429	1.0	633.1	633.1	633.1	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

KIRCHNER CREEK

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SUAMICO RIVER									
A	5,909	151	1,917	2.9	721	585.7	585.7	585.8	0.1
B	7,091	166	1,234	4.5	0	586.7	586.7	586.8	0.1
C	8,229	188	1,311	4.3	0	587.7	587.7	587.8	0.1
D	8,654	292	2,735	2.0	368	589.5	589.5	589.6	0.1
E	9,896	738	5,262	1.1	0	590.8	590.8	590.9	0.1
F	13,662	629	2,344	2.4	0	593.3	593.3	593.4	0.1
G	17,941	352	1,959	2.9	62	598.6	598.6	598.7	0.1
H	19,087	443	1,968	2.9	0	600.4	600.4	600.5	0.1
I	24,990	137	1,312	4.3	104	617.4	617.4	617.5	0.1
J	25,368	934	4,928	1.1	0	619.4	619.4	619.5	0.1
K	29,638	729	1,959	2.8	0	630.3	630.3	630.4	0.1
L	32,846	665	2,652	2.0	85	636.6	636.6	636.7	0.1
M	33,146	808	5,621	1.0	0	640.3	640.3	640.4	0.1
N	35,119	354	1,835	2.9	0	643.1	643.1	643.2	0.1
O	35,692	597	1,753	3.0	0	644.7	644.7	644.7	0.0
P	39,335	737	3,274	1.6	0	648.6	648.6	648.6	0.0
Q	42,989	528	2,608	2.0	0	654.2	654.2	654.2	0.0
R	47,586	467	1,552	3.4	0	663.1	663.1	663.1	0.0
S	52,513	525	2,185	2.4	0	672.1	672.1	672.1	0.0
T	57,059	306	1,028	5.1	0	688.5	688.5	688.5	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE SUAMICO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SUAMICO RIVER (CONTINUED)									
U	59,132	703	2,498	2.1	0	694.8	694.8	694.8	0.0
V	65,124	273	1,819	2.7	0	714.3	714.3	714.3	0.0
W	68,166	417	1,294	3.8	0	720.0	720.0	720.0	0.0
X	69,347	450	2,694	1.4	0	726.9	726.9	726.9	0.0
Y	71,558	508	2,736	1.4	0	727.9	727.9	727.9	0.0
Z	76,992	552	2,647	1.4	0	732.4	732.4	732.4	0.0
AA	80,571	459	2,592	1.5	0	736.4	736.4	736.4	0.0
AB	82,946	546	1,737	2.2	0	737.7	737.7	737.7	0.0
AC	85,086	385	1,414	2.7	0	741.4	741.4	741.4	0.0
AD	86,624	413	2,298	1.1	0	746.7	746.7	746.7	0.0
AE	89,333	253	706	3.7	0	755.1	755.1	755.1	0.0
AF	91,723	238	573	4.5	0	762.1	762.1	762.1	0.0
AG	93,201	204	1,821	2.1	0	769.4	769.4	769.5	0.1
AH	95,225	230	1,892	2.9	223	771.4	771.4	771.5	0.1
AI	97,526	201	773	4.1	0	782.2	782.2	782.3	0.1
AJ	100,583	624	1,425	2.0	0	788.9	788.9	789.0	0.1
AK	101,038	442	1,763	1.4	0	789.9	789.9	790.0	0.1
AL	102,155	489	1,495	1.2	191	790.9	790.9	791.0	0.1

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE SUAMICO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SUAMICO RIVER (CONTINUED)									
AM	103,448	196	1,964	0.6	609	793.1	793.1	793.2	0.1
AN	104,073	391	631	0.7	0	793.4	793.4	793.5	0.1

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE SUAMICO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
MCCASLIN BROOK								
A	19,802	184	265	1.3	1,174.4	1,174.4	1,174.4	0.0
B	20,886	61	77	4.4	1,181.3	1,181.3	1,181.3	0.0
C	21,124	69	80	4.2	1,184.7	1,184.7	1,184.7	0.0
D	21,793	52	57	6.0	1,191.5	1,191.5	1,191.5	0.0
E	22,213	91	85	4.0	1,198.2	1,198.2	1,198.2	0.0
F	22,906	226	339	1.0	1,205.4	1,205.4	1,205.4	0.0
G	23,435	283	236	1.4	1,206.7	1,206.7	1,206.7	0.0
H	24,270	149	215	1.6	1,208.1	1,208.1	1,208.1	0.0
I	25,739	360	409	0.8	1,209.1	1,209.1	1,209.1	0.0
J	26,401	194	249	1.4	1,210.1	1,210.1	1,210.1	0.0
K	27,185	163	228	1.5	1,211.0	1,211.0	1,211.0	0.0
L	27,853	33	58	5.9	1,214.0	1,214.0	1,214.0	0.0
M	28,283	47	65	5.2	1,216.0	1,216.0	1,216.0	0.0
N	28,620	28	79	4.3	1,217.8	1,217.8	1,217.8	0.0
O	29,021	39	109	3.1	1,218.8	1,218.8	1,218.8	0.0
P	29,239	57	81	4.2	1,219.2	1,219.2	1,219.2	0.0
Q	30,033	85	145	2.4	1,219.8	1,219.8	1,219.8	0.0
R	30,922	59	117	2.9	1,222.3	1,222.3	1,222.3	0.0
S	31,824	60	135	2.5	1,224.0	1,224.0	1,224.0	0.0
T	32,566	75	129	2.6	1,226.0	1,226.0	1,226.0	0.0
U	33,334	121	173	2.0	1,228.4	1,228.4	1,228.4	0.0

¹Feet above confluence with North Branch Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

MCCASLIN BROOK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
MCCASLIN BROOK (CONTINUED)								
V	34,175	153	245	1.4	1,230.5	1,230.5	1,230.5	0.0
W	35,245	74	142	2.4	1,231.9	1,231.9	1,231.9	0.0
X	35,860	118	202	1.7	1,232.6	1,232.6	1,232.6	0.0
Y	36,524	126	208	1.6	1,233.5	1,233.5	1,233.5	0.0
Z	37,369	204	322	1.1	1,234.3	1,234.3	1,234.3	0.0
AA	38,678	95	161	2.1	1,235.4	1,235.4	1,235.4	0.0
AB	39,045	70	317	1.1	1,237.4	1,237.4	1,237.4	0.0
AC	43,770	192	500	0.6	1,238.6	1,238.6	1,238.7	0.1
AD	47,703	158	297	0.8	1,245.8	1,245.8	1,245.8	0.0
AE	48,437	89	250	1.0	1,247.1	1,247.1	1,247.1	0.0
AF	49,366	20	89	2.8	1,248.1	1,248.1	1,248.1	0.0
AG	50,508	55	100	2.5	1,249.7	1,249.7	1,249.7	0.0
AH	50,977	48	76	3.3	1,252.3	1,252.3	1,252.3	0.0
AI	51,918	84	146	1.7	1,255.6	1,255.6	1,255.6	0.0
AJ	52,672	39	69	3.6	1,260.8	1,260.8	1,260.8	0.0
AK	54,323	159	182	1.4	1,265.1	1,265.1	1,265.1	0.0
AL	55,746	135	185	1.3	1,267.6	1,267.6	1,267.6	0.0
AM	57,127	71	78	3.2	1,269.8	1,269.8	1,269.8	0.0
AN	58,540	159	180	1.4	1,273.5	1,273.5	1,273.5	0.0
AO	60,371	68	55	4.5	1,278.2	1,278.2	1,278.2	0.0

¹Feet above confluence with North Branch Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

MCCASLIN BROOK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
MCCASLIN BROOK (CONTINUED)								
AP	61,900	106	111	2.2	1,282.8	1,282.8	1,282.8	0.0
AQ	64,210	87	149	1.7	1,288.1	1,288.1	1,288.1	0.0
AR	66,587	311	221	1.1	1,294.6	1,294.6	1,294.6	0.0
AS	68,338	246	118	2.1	1,300.4	1,300.4	1,300.4	0.0
AT	69,723	165	195	1.3	1,305.7	1,305.7	1,305.7	0.0
AU	70,762	67	54	4.6	1,308.4	1,308.4	1,308.4	0.0
AV	71,115	166	364	0.7	1,309.4	1,309.4	1,309.4	0.0

¹Feet above confluence with North Branch Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

MCCASLIN BROOK

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER									
A	10,988	188	2,079	5.2	0	585.2	584.7 ²	584.8	0.1
B	12,133	211	2,308	4.7	30	585.3	585.3	585.4	0.1
C	12,355	241	2,499	4.3	0	586.1	586.1	586.2	0.1
D	13,342	400	3,100	3.5	0	586.4	586.4	586.5	0.1
E	15,279	400	3,100	3.5	0	586.9	586.9	587.0	0.1
F	16,354	244	2,420	4.5	39	587.6	587.6	587.7	0.1
G	16,513	246	2,420	4.5	37	587.8	587.8	587.9	0.1
H	17,019	189	1,670	6.5	31	587.8	587.8	587.9	0.1
I	17,209	198	2,170	4.9	42	587.9	587.9	588.0	0.1
J	17,915	341	3,200	3.4	59	588.2	588.2	588.3	0.1
K	20,533	1,811	10,800	1.0	0	588.7	588.7	588.8	0.1
L	23,007	700	5,120	2.1	0	589.5	589.5	589.6	0.1
M	25,379	527	4,220	2.6	0	590.1	590.1	590.2	0.1
N	25,779	428	2,960	5.5	0	590.1	590.1	590.2	0.1
O	26,366	640	4,120	4.4	0	590.5	590.5	590.6	0.1
P	27,111	289	2,914	4.5	254	590.8	590.8	590.9	0.1
Q	27,634	282	2,649	4.4	56	591.0	591.0	591.1	0.1
R	28,355	259	2,535	4.9	213	591.2	591.2	591.3	0.1
S	28,945	254	2,569	4.7	76	591.5	591.5	591.6	0.1
T	29,410	286	2,509	4.8	0	591.7	591.7	591.8	0.1
U	29,958	411	2,985	4.4	0	592.0	592.0	592.1	0.1

¹Feet above outlet to Green Bay

²Elevation computed without consideration of backwater effects from Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER (CONTINUED)									
V	32,384	1,276	5,019	2.2	0	592.8	592.8	592.9	0.1
W	34,388	1,232	4,957	2.2	0	593.1	593.1	593.2	0.1
X	35,989	2,586	10,870	1.0	0	593.5	593.5	593.6	0.1
Y	37,975	644	4,803	2.2	187	593.8	593.8	593.9	0.1
Z	40,164	490	4,111	2.6	0	594.3	594.3	594.4	0.1
AA	42,530	584	4,349	2.5	0	595.0	595.0	595.1	0.1
AB	44,500	847	5,288	2.0	0	595.5	595.5	595.6	0.1
AC	46,524	432	3,616	3.0	0	596.1	596.1	596.2	0.1
AD	48,178	356	3,038	3.6	0	596.7	596.7	596.8	0.1
AE	50,333	812	5,284	2.0	0	597.3	597.3	597.4	0.1
AF	52,441	206	4,652	2.3	317	598.6	598.6	598.7	0.1
AG	55,603	434	4,490	2.4	0	599.2	599.2	599.3	0.1
AH	58,290	314	3,168	2.1	0	599.6	599.6	599.7	0.1
AI	59,989	301	2,852	2.3	137	599.9	599.9	600.0	0.1
AJ	62,268	305	2,612	2.5	0	600.4	600.4	600.5	0.1
AK	65,675	199	1,835	3.6	0	601.4	601.4	601.5	0.1
AL	68,619	386	2,051	3.2	0	603.2	603.2	603.3	0.1
AM	73,118	233	1,533	4.3	0	605.9	605.9	606.0	0.1
AN	73,571	241	2,431	2.7	24	608.5	608.5	608.6	0.1
AO	74,661	74	822	8.0	62	623.2	623.2	623.3	0.1
AP	82,362	735	6,482	1.0	0	624.4	624.4	624.5	0.1

¹Feet above outlet to Green Bay

TABLE 16	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	OCONTO COUNTY, WI AND INCORPORATED AREAS	OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER (CONTINUED)									
AQ	85,472	1,095	7,874	0.8	0	624.5	624.5	624.6	0.1
AR	88,897	712	3,048	2.2	188	625.0	625.0	625.1	0.1
AS	91,455	602	2,720	2.4	84	626.8	626.8	626.9	0.1
AT	93,989	291	1,631	4.0	0	628.9	628.9	629.0	0.1
AU	96,860	290	1,881	3.5	108	631.2	631.2	631.3	0.1
AV	99,713	204	1,436	4.6	0	633.5	633.5	633.6	0.1
AW	103,007	1,704	3,212	2.1	134	639.3	639.3	639.4	0.1
AX	105,109	128	636	10.4	36	664.0	664.0	664.1	0.1
AY	105,510	30	407	16.2	40	673.3	673.3	673.3	0.0
AZ	106,056	367	3,451	1.6	41	706.6	706.6	706.6	0.0
BA	106,179	248	2,361	2.4	27	706.7	706.7	706.7	0.0
BB	106,263	275	2,363	2.4	0	706.7	706.7	706.7	0.0
BC	107,584	310	2,080	2.7	29	707.1	707.1	707.1	0.0
BD	111,184	498	5,813	1.1	89	733.2	733.2	733.3	0.1
BE	113,024	528	6,325	1.0	0	733.2	733.2	733.3	0.1
BF	115,716	587	5,813	1.1	0	733.2	733.2	733.3	0.1
BG	118,512	432	3,549	1.9	0	733.5	733.5	733.6	0.1
BH	120,956	321	2,514	2.6	0	734.2	734.2	734.3	0.1
BI	123,923	499	3,268	2.0	0	734.9	734.9	735.0	0.1
BJ	125,950	327	4,094	1.6	357	736.3	736.3	736.4	0.1
BK	128,470	650	4,406	1.5	0	736.6	736.6	736.7	0.1

¹Feet above outlet to Green Bay

TABLE 16	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	OCONTO COUNTY, WI AND INCORPORATED AREAS	OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER (CONTINUED)									
BL	131,506	728	4,627	1.4	244	737.3	737.3	737.4	0.1
BM	134,299	580	3,206	2.1	45	738.0	738.0	738.1	0.1
BN	136,562	338	4,670	1.4	246	738.4	738.4	738.5	0.1
BO	136,717	419	6,020	1.1	361	739.0	739.0	739.1	0.1
BP	139,976	1,083	7,282	0.9	75	739.3	739.3	739.4	0.1
BQ	142,580	448	3,522	1.9	0	739.8	739.8	739.9	0.1
BR	145,104	408	3,480	1.9	0	740.2	740.2	740.3	0.1
BS	147,030	403	2,696	2.4	0	740.6	740.6	740.7	0.1
BT	150,016	352	2,642	2.5	0	741.5	741.5	741.6	0.1
BU	151,942	152	2,845	2.3	252	743.5	743.5	743.6	0.1
BV	154,470	296	2,502	2.6	0	744.2	744.2	744.3	0.1
BW	158,679	209	1,347	4.9	0	750.0	750.0	750.1	0.1
BX	162,093	135	1,057	6.2	0	755.1	755.1	755.2	0.1
BY	189,902	581	3,737	1.8	0	774.1	774.1	774.2	0.1
BZ	194,165	520	3,393	1.9	0	775.2	775.2	775.3	0.1
CA	196,602	522	3,188	2.0	28	775.9	775.9	776.0	0.1
CB	198,693	259	3,281	2.0	181	776.5	776.5	776.6	0.1
CC	199,522	181	3,076	2.1	346	777.3	777.3	777.4	0.1
CD	201,987	679	3,272	2.0	60	778.2	778.2	778.3	0.1
CE	205,193	841	4,556	1.4	0	778.9	778.9	779.0	0.1
CF	214,011	1,929	10,240	0.6	0	779.7	779.7	779.8	0.1

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER (CONTINUED)									
CG	222,197	1,764	8,403	0.8	0	780.7	780.7	780.8	0.1
CH	228,141	605	3,825	1.6	0	781.8	781.8	781.9	0.1
CI	230,118	195	3,548	1.7	241	783.0	783.0	783.1	0.1
CJ	233,139	510	5,753	1.1	883	783.5	783.5	783.6	0.1
CK	284,962	1,700	6,242	1.0	0	794.2	794.2	794.3	0.1
CL	294,267	394	9,187	0.6	1,102	796.1	796.1	796.2	0.1
CM	295,053	1,413	7,685	0.8	168	796.5	796.5	796.6	0.1

¹Feet above outlet to Green Bay

TABLE 16	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	OCONTO COUNTY, WI AND INCORPORATED AREAS	OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NORTH BRANCH OCONTO RIVER									
CN	307,101	1,165	3,362	0.7	0	798.0	798.0	798.0	0.0
CO	329,153	1,420	3,341	0.7	0	802.2	802.2	802.3	0.1
CP	340,664	265	1,146	2.2	0	806.5	806.5	806.6	0.1
CQ	344,413	407	3,755	0.6	43	810.4	810.4	810.5	0.1
CR	353,258	88	743	3.3	0	813.5	813.5	813.6	0.1
CS	361,637	130	1,102	2.2	153	817.0	817.0	817.1	0.1
CT	378,733	74	503	4.8	0	834.8	834.8	834.9	0.1
CU	382,949	143	542	3.5	0	841.6	841.6	841.7	0.1
CV	387,029	121	612	3.2	0	850.0	850.0	850.1	0.1
CW	390,405	130	639	2.8	0	854.2	854.2	854.3	0.1
CX	395,934	87	1,016	1.7	153	857.1	857.1	857.2	0.1
CY	407,377	81	1,317	1.3	159	873.8	873.8	873.9	0.1
CZ	410,701	118	412	4.2	0	886.4	886.4	886.5	0.1
DA	414,073	58	303	5.7	36	912.7	912.7	912.8	0.1
DB	418,103	402	929	1.8	0	918.7	918.7	918.8	0.1
DC	422,735	76	873	2.0	210	924.2	924.2	924.3	0.1
DD	426,709	290	1,302	1.3	52	925.4	925.4	925.5	0.1
DE	431,911	79	299	5.7	0	948.7	948.7	948.8	0.1
DF	438,309	92	332	5.0	0	1,027.0	1,027.0	1,027.1	0.1

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

NORTH BRANCH OCONTO RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
NORTH BRANCH OCONTO RIVER (CONTINUED)									
DG	442,472	106	453	3.7	0	1,043.3	1,043.3	1,043.4	0.1
DH	450,188	192	586	2.8	0	1,062.4	1,062.4	1,062.5	0.1
DI	454,815	164	675	2.4	0	1,073.0	1,073.0	1,073.1	0.1
DJ	458,160	575	1,383	1.2	0	1,075.2	1,075.2	1,075.3	0.1
DK	460,880	76	319	5.2	0	1,083.9	1,083.9	1,084.0	0.1
DL	461,050	233	1,304	1.2	0	1,087.1	1,087.1	1,087.2	0.1
DM	510,280	147	468	2.6	29	1,144.6	1,144.6	1,144.7	0.1
DN	513,671	128	505	2.4	0	1,148.6	1,148.6	1,148.7	0.1
DO	516,401	128	707	1.6	96	1,150.2	1,150.2	1,150.3	0.1
DP	516,917	220	1,675	0.7	68	1,152.1	1,152.1	1,152.2	0.1
DQ	517,372	98	554	2.0	0	1,152.2	1,152.2	1,152.3	0.1
DR	521,674	111	278	4.0	0	1,164.7	1,164.7	1,164.7	0.0
DS	524,080	194	468	2.4	0	1,184.0	1,184.0	1,184.0	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

NORTH BRANCH OCONTO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER TRIBUTARY NO. 2								
A	2,203	289	28	1.2	596.0	596.0	596.0	0.0
B	2,828	639	632	0.1	598.1	598.1	598.1	0.0
C	3,402	432	107	0.3	598.2	598.2	598.2	0.0

¹Feet above confluence with Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

OCONTO RIVER TRIBUTARY NO. 2

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER TRIBUTARY NO. 3									
A	550	37	4,220	2.6	0	590.2	590.0 ²	590.1	0.1
B	680	139	550	0.1	142	593.0	593.0	593.1	0.1
C	1,198	229	872	0.0	238	593.0	593.0	593.1	0.1

¹Feet above confluence with Oconto River

²Elevation computed without consideration of backwater effects from Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

OCONTO RIVER TRIBUTARY NO. 3

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
OCONTO RIVER TRIBUTARY NO. 22								
A	674	31	48	5.9	641.0	641.0	641.0	0.0
B	1,244	35	98	2.9	652.1	652.1	652.1	0.0
C	2,161	62	127	2.2	657.9	657.9	657.9	0.0
D	3,270	132	86	3.3	664.5	664.5	664.5	0.0
E	4,000	29	44	6.5	685.7	685.7	685.7	0.0
F	4,343	39	72	3.9	696.6	696.6	696.6	0.0
G	4,782	42	59	4.8	709.8	709.8	709.8	0.0
H	5,067	30	48	5.9	718.5	718.5	718.5	0.0
I	5,549	32	52	5.5	729.8	729.8	729.8	0.0
J	5,996	23	43	6.6	737.7	737.7	737.7	0.0
K	6,402	64	120	2.4	741.5	741.5	741.5	0.0

¹ Feet above confluence with Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

OCONTO RIVER TRIBUTARY NO. 22

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
PENSAUKEE RIVER									
A	5,781	795	6,362	1.3	0	588.5	588.5	588.6	0.1
B	6,517	756	5,449	1.0	0	588.7	588.7	588.8	0.1
C	7,153	418	3,825	2.2	662	589.4	589.4	589.5	0.1
D	7,376	694	5,595	1.5	214	591.8	591.8	591.9	0.1
E	7,922	1,173	6,995	1.2	28	592.1	592.1	592.2	0.1
F	8,920	757	3,893	2.2	0	592.9	592.9	593.0	0.1
G	13,450	215	1,921	4.4	0	595.5	595.5	595.6	0.1
H	13,785	500	3,675	2.3	0	596.4	596.4	596.4	0.0
I	19,896	840	4,503	1.3	0	600.2	600.2	600.2	0.0
J	33,365	315	4,470	1.4	0	605.7	605.7	605.7	0.0
K	46,502	246	1,128	7.4	0	615.2	615.2	615.2	0.0
L	48,247	895	3,013	2.7	0	619.9	619.9	619.9	0.0
M	51,060	774	3,168	2.6	0	624.4	624.4	624.4	0.0
N	53,092	1,795	3,765	2.2	0	626.8	626.8	626.8	0.0
O	55,078	441	1,621	5.0	0	631.8	631.8	631.8	0.0
P	56,399	314	1,757	4.6	0	635.0	635.0	635.0	0.0
Q	58,542	512	1,978	4.1	0	638.9	638.9	638.9	0.0
R	60,505	616	2,627	3.0	0	643.4	643.4	643.4	0.0
S	65,181	193	1,304	6.0	0	652.1	652.1	652.1	0.0
T	65,774	182	1,474	5.3	0	655.0	655.0	655.0	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

PENSAUKEE RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
PENSAUKEE RIVER (CONTINUED)									
U	67,462	521	2,288	3.4	0	656.8	656.8	656.8	0.0
V	69,696	674	1,830	4.3	0	662.2	662.2	662.2	0.0
W	70,255	156	1,071	7.3	0	663.7	663.7	663.7	0.0
X	70,556	287	2,203	3.6	0	668.8	668.8	668.8	0.0
Y	72,259	663	3,616	2.2	0	669.7	669.7	669.7	0.0
Z	74,177	616	3,436	2.3	0	671.2	671.2	671.2	0.0
AA	76,455	703	2,614	3.0	0	672.7	672.7	672.7	0.0
AB	77,961	788	1,534	5.1	0	674.1	674.1	674.1	0.0
AC	80,857	551	2,120	3.7	0	678.4	678.4	678.4	0.0
AD	83,823	991	4,696	1.7	0	683.9	683.9	683.9	0.0
AE	84,296	468	3,303	2.4	0	684.7	684.7	684.7	0.0
AF	89,559	795	5,034	1.6	0	687.8	687.8	687.8	0.0
AG	91,496	388	2,606	3.0	0	689.1	689.1	689.1	0.0
AH	95,095	562	2,872	2.8	0	691.5	691.5	691.5	0.0
AI	98,945	863	3,703	2.1	0	696.2	696.2	696.2	0.0
AJ	102,933	498	3,185	2.5	0	698.5	698.5	698.5	0.0
AK	104,070	315	2,536	3.1	0	699.5	699.5	699.5	0.0
AL	104,954	567	2,791	2.8	0	701.4	701.4	701.4	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

PENSAUKEE RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
PENSOUKEE RIVER (CONTINUED)									
AM	109,595	900	6,596	1.2	0	704.4	704.4	704.4	0.0
AN	113,148	523	4,237	1.9	0	705.9	705.9	705.9	0.0
AO	115,709	465	2,225	1.7	0	706.2	706.2	706.2	0.0
AP	118,355	515	2,999	1.3	0	707.4	707.4	707.4	0.0
AQ	119,844	405	1,951	2.0	0	707.9	707.9	707.9	0.0
AR	121,154	250	930	4.1	0	708.9	708.9	708.9	0.0
AS	124,018	277	1,455	2.6	0	713.1	713.1	713.1	0.0
AT	126,965	448	1,816	2.1	0	715.2	715.2	715.2	0.0
AU	128,515	129	574	6.6	0	720.5	720.5	720.5	0.0
AV	129,471	104	554	6.9	0	724.1	724.1	724.1	0.0
AW	130,401	291	978	3.9	0	726.9	726.9	726.9	0.0
AX	132,484	270	947	4.0	0	730.5	730.5	730.5	0.0
AY	134,357	197	1,210	3.1	0	733.4	733.4	733.4	0.0
AZ	135,164	570	2,680	1.4	0	734.3	734.3	734.3	0.0
BA	135,781	892	4,910	0.8	0	734.5	734.5	734.5	0.0
BB	142,137	1,349	5,246	0.7	0	735.1	735.1	735.1	0.0
BC	144,664	604	1,229	3.1	0	736.7	736.7	736.7	0.0
BD	147,092	646	2,211	1.7	0	740.3	740.3	740.3	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

PENSOUKEE RIVER

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
PENSAUKEE RIVER (CONTINUED)									
BE	149,377	341	1,365	2.8	0	743.8	743.8	743.8	0.0
BF	150,942	230	908	4.2	0	746.0	746.0	746.0	0.0
BG	151,742	329	1,477	2.6	0	748.1	748.1	748.1	0.0
BH	153,442	191	933	4.1	0	751.8	751.8	751.8	0.0
BI	154,946	322	1,100	3.5	0	754.9	754.9	754.9	0.0
BJ	156,589	379	1,376	2.8	0	758.7	758.7	758.7	0.0
BK	157,430	160	1,062	3.4	42	759.7	759.7	759.8	0.1
BL	157,706	174	2,400	1.5	98	762.3	762.3	762.4	0.1
BM	169,622	231	1,522	2.2	49	772.4	772.4	772.5	0.1

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

PENSAUKEE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SOUTH BRANCH OCONTO RIVER								
A	666	150	904	2.1	796.9	796.9	797.0	0.1
B	6,053	510	1,536	1.1	798.8	798.8	798.9	0.1

¹Feet above confluence with Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

SOUTH BRANCH OCONTO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SPRING CREEK								
A	1,082	147	173	2.2	644.4	644.4	644.4	0.0
B	2,280	88	86	4.4	648.3	648.3	648.3	0.0
C	3,386	215	274	1.4	651.3	651.3	651.3	0.0
D	5,303	242	310	1.2	655.8	655.8	655.8	0.0
E	6,695	234	228	1.7	657.9	657.9	657.9	0.0
F	7,854	159	206	1.8	661.2	661.2	661.2	0.0
G	9,450	272	260	1.5	666.8	666.8	666.8	0.0
H	10,644	233	338	1.1	669.3	669.3	669.3	0.0
I	11,694	197	294	1.3	670.4	670.4	670.4	0.0
J	12,764	339	327	1.2	671.9	671.9	671.9	0.0
K	15,188	226	251	1.5	677.0	677.0	677.0	0.0
L	16,458	142	188	2.0	681.2	681.2	681.2	0.0
M	17,738	169	280	1.4	683.6	683.6	683.6	0.0
N	20,859	652	1,114	0.3	690.1	690.1	690.1	0.0
O	22,096	606	586	0.7	691.3	691.3	691.3	0.0
P	24,333	361	413	0.9	695.4	695.4	695.4	0.0
Q	25,766	409	328	1.2	698.3	698.3	698.3	0.0
R	27,733	108	199	1.9	703.4	703.4	703.4	0.0
S	28,767	274	471	0.8	705.8	705.8	705.8	0.0
T	29,807	488	389	0.5	706.8	706.8	706.8	0.0
U	31,774	107	104	1.8	711.8	711.8	711.8	0.0
V	33,221	28	44	4.3	713.9	713.9	713.9	0.0

¹Feet above confluence with Pensaukee River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

SPRING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SPRING CREEK (CONTINUED) W	34,136	549	1,346	0.1	717.1	717.1	717.1	0.0

¹Feet above confluence with Pensaukee River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

SPRING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SPRING CREEK TRIBUTARY NO. 6								
A	1,117	92	54	0.7	706.9	706.9	706.9	0.0
B	2,167	263	79	0.5	711.3	711.3	711.3	0.0
C	3,341	52	27	1.4	715.1	715.1	715.1	0.0
D	3,481	29	25	1.5	715.9	715.9	715.9	0.0
E	3,862	32	27	1.4	717.2	717.2	717.2	0.0

¹Feet above confluence with Spring Creek

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

SPRING CREEK TRIBUTARY NO. 6

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TIBBET CREEK								
A	7,146	336	941	1.7	588.3	588.3	588.3	0.0
B	8,490	451	1,043	1.5	589.3	589.3	589.3	0.0
C	11,032	1,272	3,563	0.4	593.6	593.6	593.6	0.0
D	13,925	366	628	2.5	596.2	596.2	596.2	0.0
E	15,339	416	1,066	1.5	597.2	597.2	597.2	0.0
F	16,503	160	475	3.3	600.4	600.4	600.4	0.0
G	17,851	437	1,097	1.4	602.8	602.8	602.8	0.0
H	19,036	158	368	4.3	608.9	608.9	608.9	0.0
I	20,205	210	796	2.0	613.4	613.4	613.4	0.0
J	21,181	209	595	2.6	615.1	615.1	615.1	0.0
K	23,079	240	641	2.4	618.5	618.5	618.5	0.0
L	24,262	228	821	1.9	621.5	621.5	621.5	0.0
M	25,828	780	2,041	0.5	623.8	623.8	623.8	0.0
N	28,170	1,108	1,895	0.6	624.3	624.3	624.3	0.0
O	30,621	864	1,349	0.8	627.1	627.1	627.1	0.0

¹Feet above outlet to Green Bay

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

TIBBET CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
TOWN CREEK								
A	1,799	29	35	4.9	925.8	925.8	925.8	0.0
B	2,091	142	87	2.0	936.3	936.3	936.3	0.0
C	2,531	65	123	1.4	940.8	940.8	940.8	0.0
D	3,102	57	52	3.3	942.2	942.2	942.2	0.0
E	3,750	30	33	5.2	949.7	949.7	949.7	0.0
F	4,214	154	126	1.4	954.4	954.4	954.4	0.0
G	4,670	145	117	1.5	955.0	955.0	955.0	0.0
H	5,217	49	86	1.5	956.8	956.8	956.8	0.0
I	5,426	89	343	0.4	961.4	961.4	961.4	0.0
J	5,925	370	984	0.1	961.8	961.8	961.8	0.0
K	6,990	423	766	0.2	962.4	962.4	962.4	0.0
L	7,787	204	416	0.3	963.4	963.4	963.4	0.0
M	8,495	150	198	0.3	963.4	963.4	963.4	0.0
N	8,833	38	19	3.3	963.6	963.6	963.6	0.0
O	9,420	91	130	0.5	967.9	967.9	967.9	0.0
P	9,901	212	407	0.2	973.4	973.4	973.4	0.0
Q	10,465	133	184	0.3	973.4	973.4	973.4	0.0
R	11,389	100	186	0.3	980.4	980.4	980.4	0.0

¹Feet above confluence with North Branch Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

TOWN CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
WAUPEE CREEK								
A	1,589	175	603	1.8	860.3	860.3	860.3	0.0
B	3,263	202	518	2.1	861.7	861.7	861.7	0.0
C	4,142	181	650	1.7	862.7	862.7	862.7	0.0
D	5,042	350	1,291	0.9	863.2	863.2	863.2	0.0
E	8,602	393	1,019	1.1	864.7	864.7	864.7	0.0
F	9,981	304	985	0.8	865.3	865.3	865.3	0.0
G	11,282	314	794	1.0	866.3	866.3	866.3	0.0
H	47,817	69	90	2.9	918.3	918.3	918.3	0.0
I	48,026	102	127	2.0	919.3	919.3	919.3	0.0
J	48,202	24	42	3.7	920.7	920.7	920.7	0.0
K	48,721	73	58	2.7	922.4	922.4	922.4	0.0
L	50,269	48	54	2.9	924.3	924.3	924.3	0.0
M	51,544	45	66	2.3	926.4	926.4	926.4	0.0
N	52,588	125	127	1.2	927.9	927.9	927.9	0.0
O	53,569	83	95	1.6	928.6	928.6	928.6	0.0
P	54,791	116	108	1.4	930.7	930.7	930.7	0.0
Q	55,883	142	156	1.0	931.3	931.3	931.3	0.0
R	56,987	261	191	0.8	932.3	932.3	932.3	0.0
S	58,378	125	168	0.9	933.0	933.0	933.0	0.0
T	59,436	60	78	2.0	933.4	933.4	933.4	0.0
U	60,928	71	105	1.5	935.0	935.0	935.0	0.0
V	61,495	149	334	0.5	937.1	937.1	937.1	0.0

¹Feet above outlet to North Branch Oconto River

TABLE 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

FLOODWAY DATA

WAUPEE CREEK

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the WSEL of the 1-percent-annual-chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

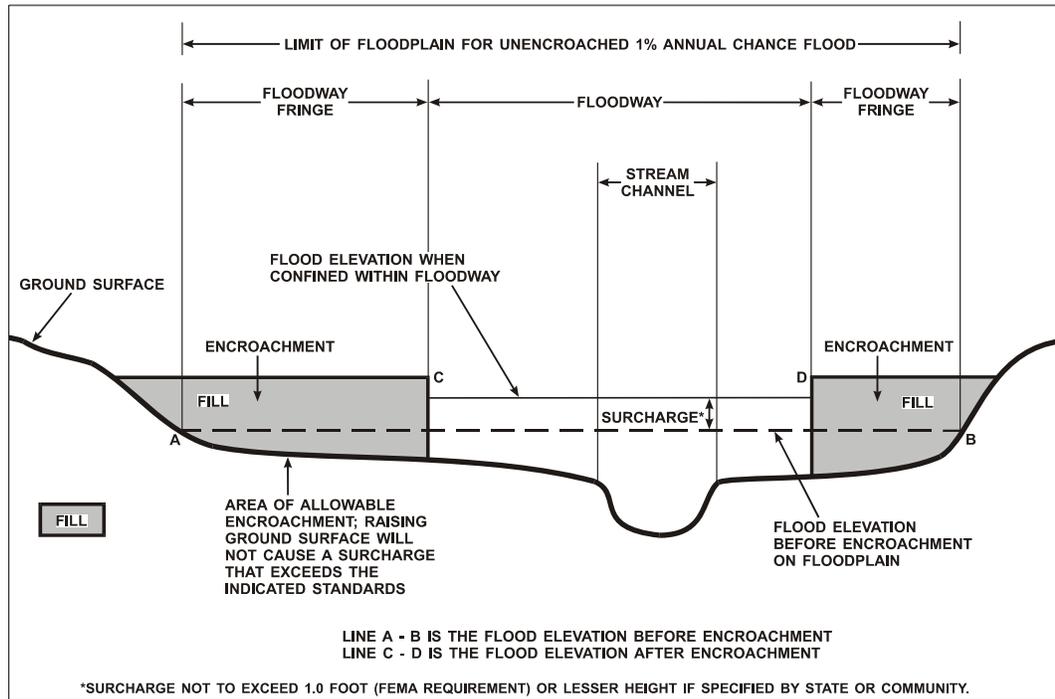


Figure 3 - Floodway Schematic

No floodways were computed for Tributary No. 1, Tributary No. 4 and Tributary No. 4A.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Oconto County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community are presented in Table 17.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE	FIRM EFFECTIVE DATE	FIRM REVISION DATE
Gillett, City of	April 12, 1974	May 21, 1976	February 1, 1984	None
Lena, Village of	June 28, 1974	None	September 18, 1985	None
Oconto, City of	December 28, 1973	August 8, 1975	August 3, 1981	None
Oconto County (Unincorporated Areas)	January 6, 1983	None	January 6, 1983	August 3, 1998
Oconto Falls, City of	January 9, 1974	May 28, 1976 July 23, 1976	July 16, 1981	None
Pulaski, Village of	May 24, 1974	May 28, 1976	August 3, 1981	August 18, 2009
Suring, Village of	May 3, 1974	June 4, 1976 February 12, 1982	December 1, 1983	None

TABLE 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

**OCONTO COUNTY, WI
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Flood Insurance Studies (FISs) have been prepared for Brown County and Incorporated Areas (Reference 36), Langlade County Unincorporated Areas (Reference 37), Marinette County Unincorporated Areas (Reference 38), and Shawano County Unincorporated Areas (Reference 39).

This report either supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, 536 South Clark Street, Sixth Floor, Chicago, Illinois 60605.

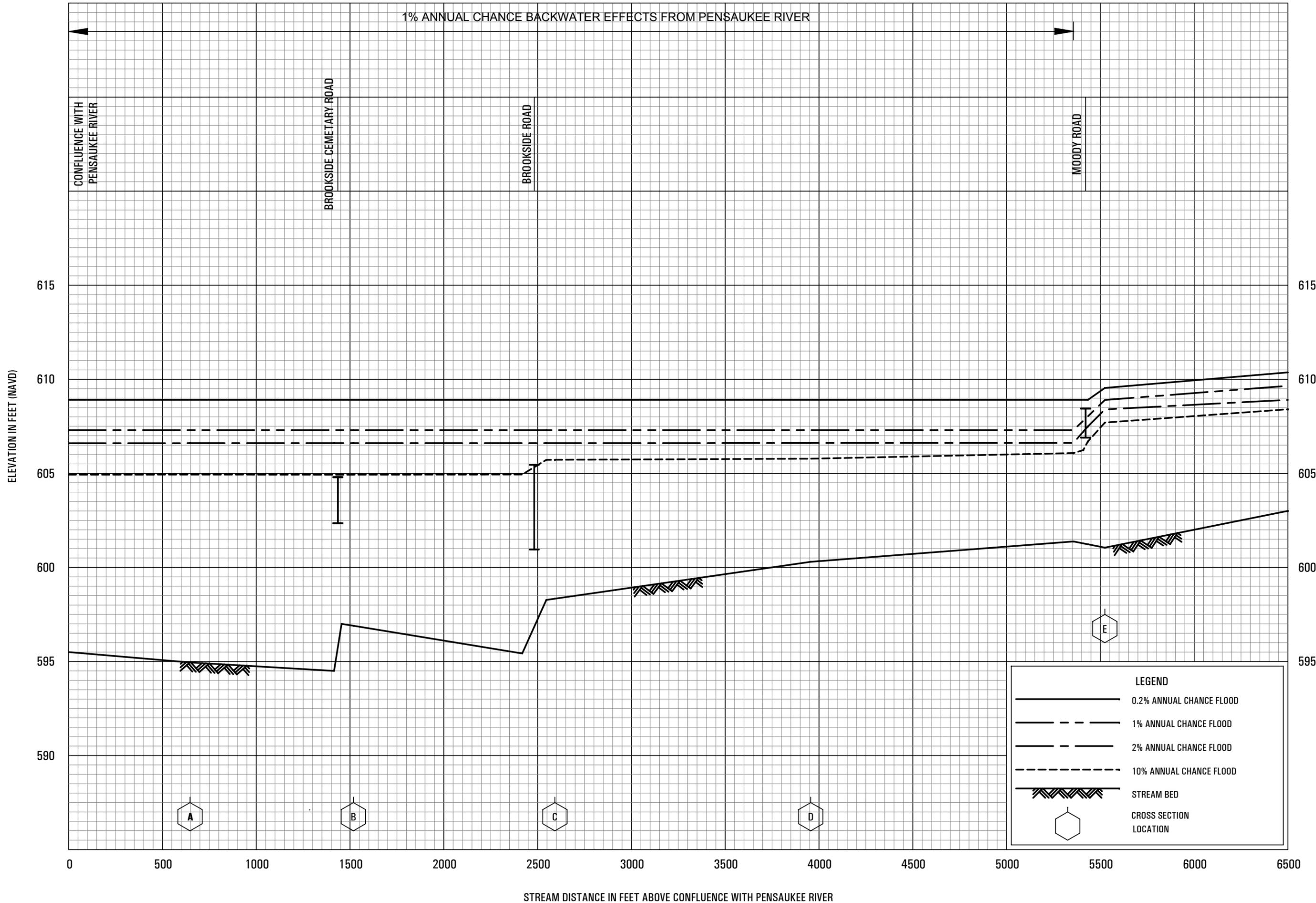
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1% ANNUAL CHANCE BACKWATER EFFECTS FROM PENSUKKEE RIVER



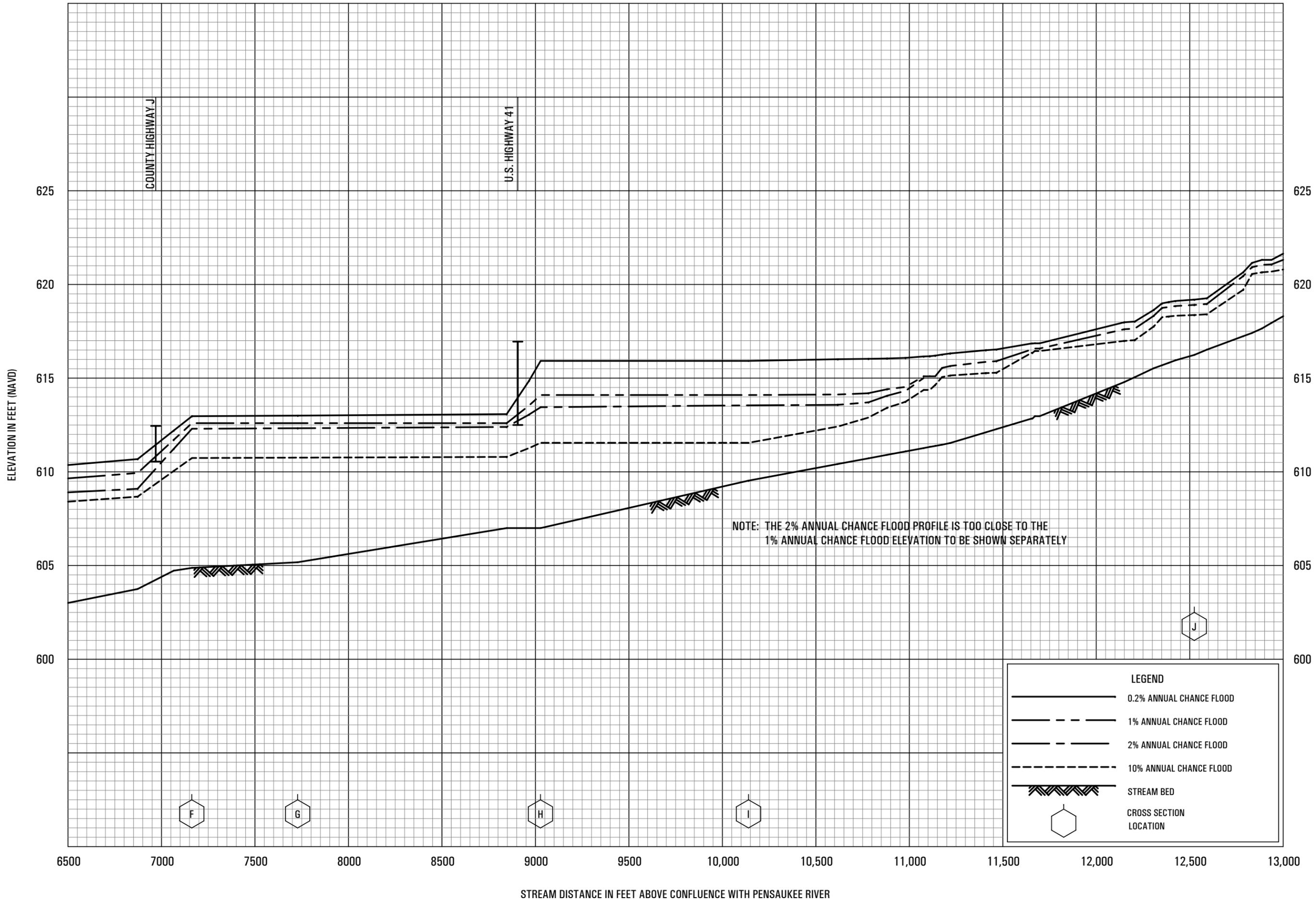
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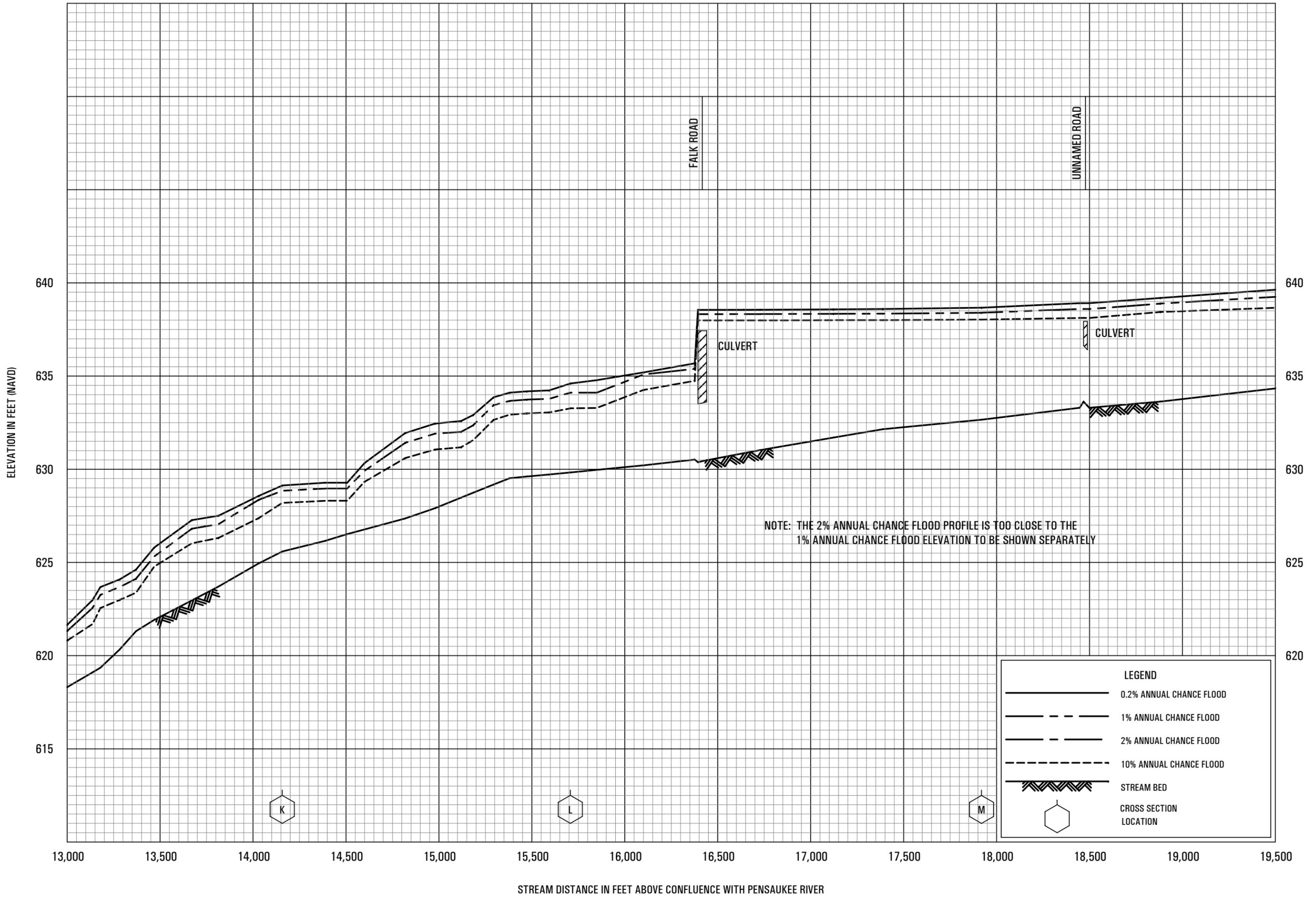
BROOKSIDE CREEK

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OCONTO COUNTY, WI

AND INCORPORATED AREAS



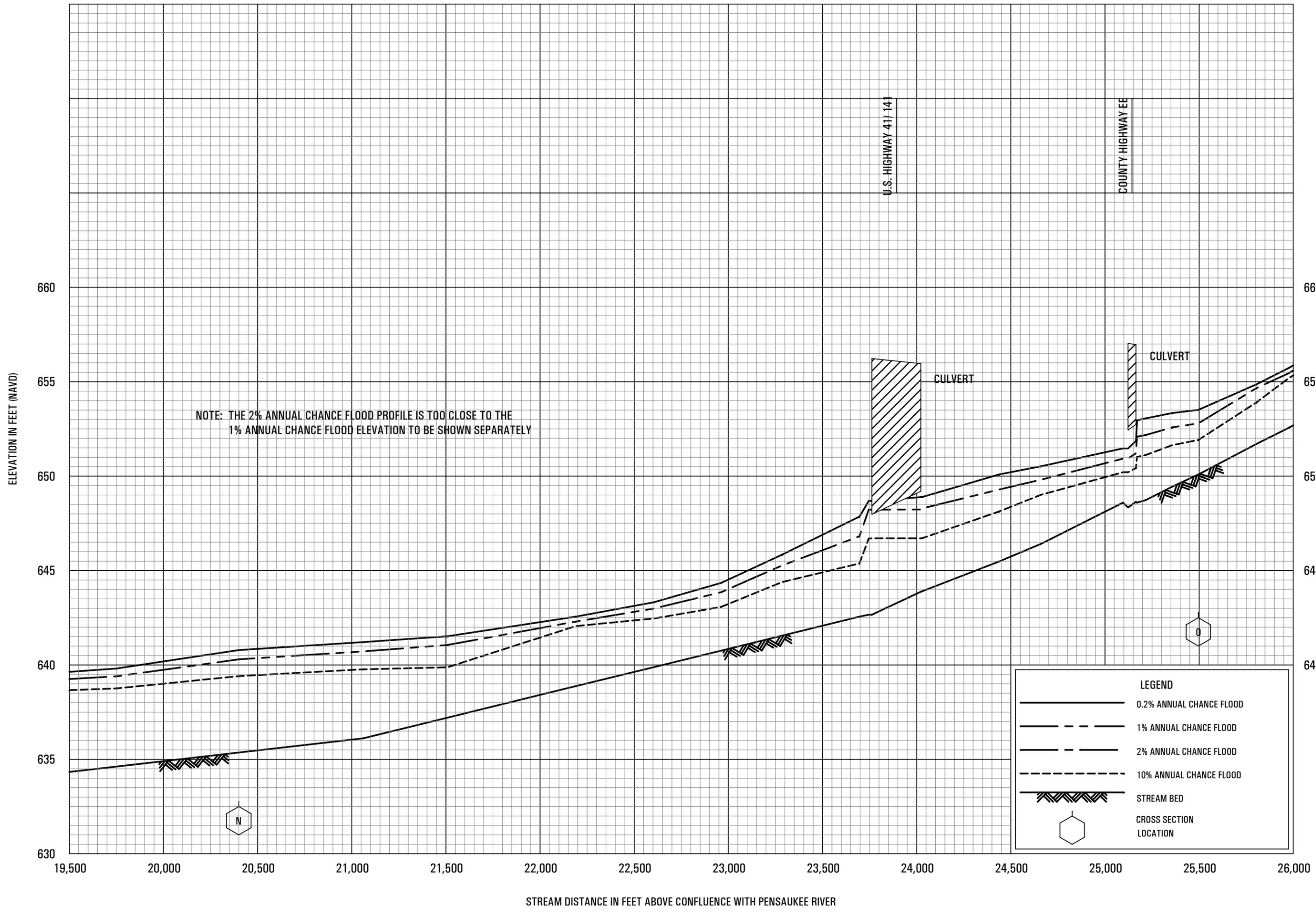


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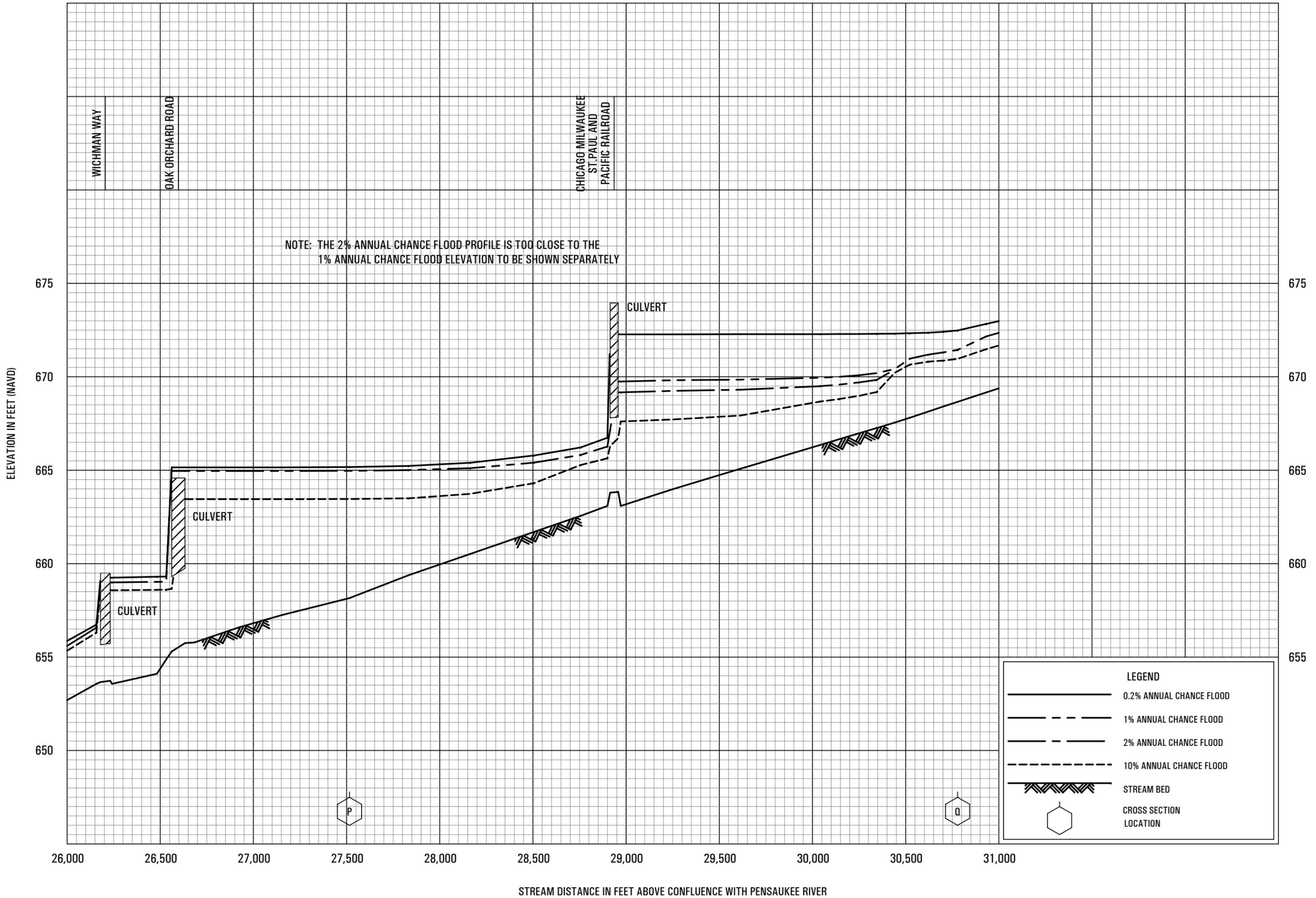


FLOOD PROFILES

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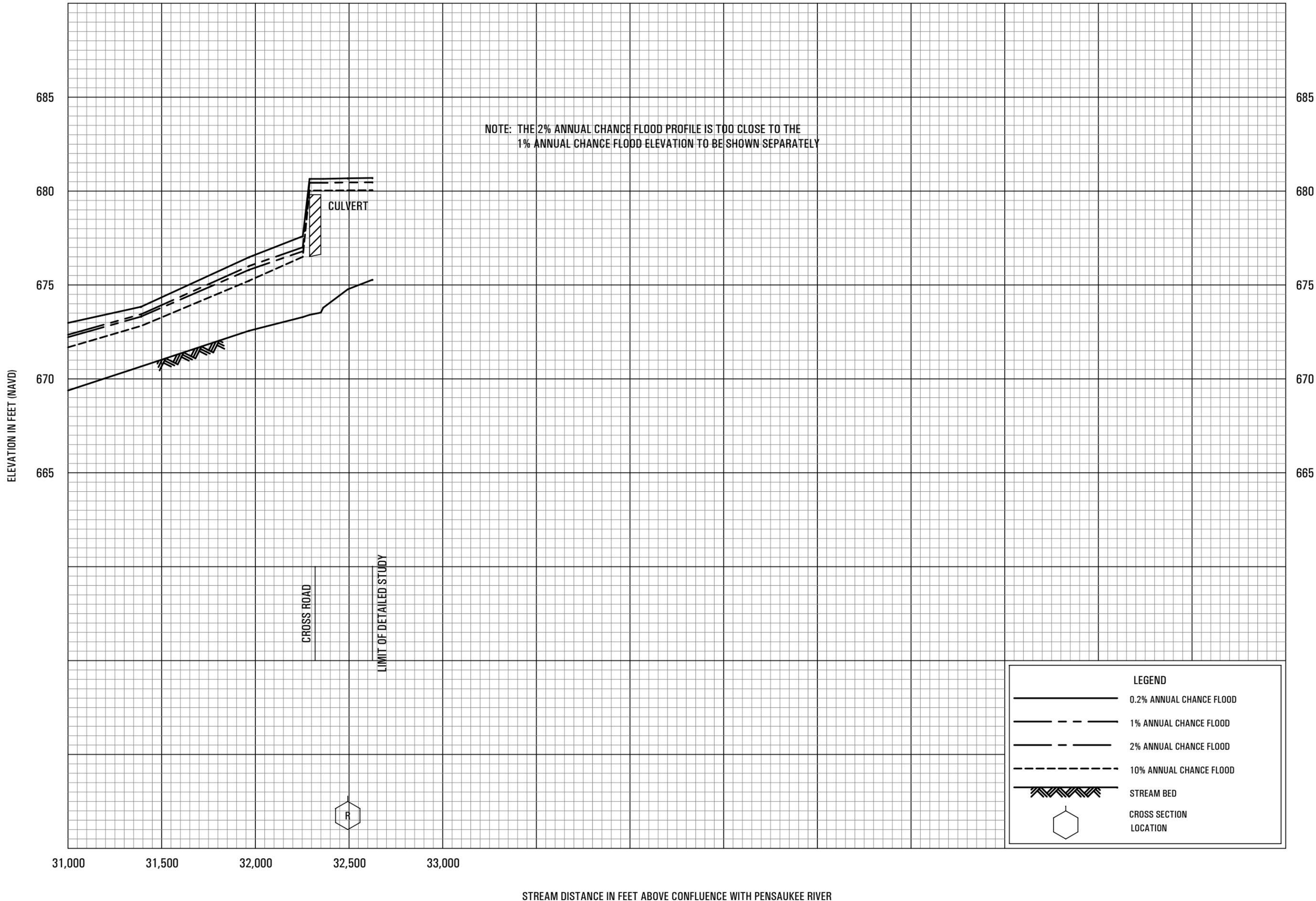


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BROOKSIDE CREEK

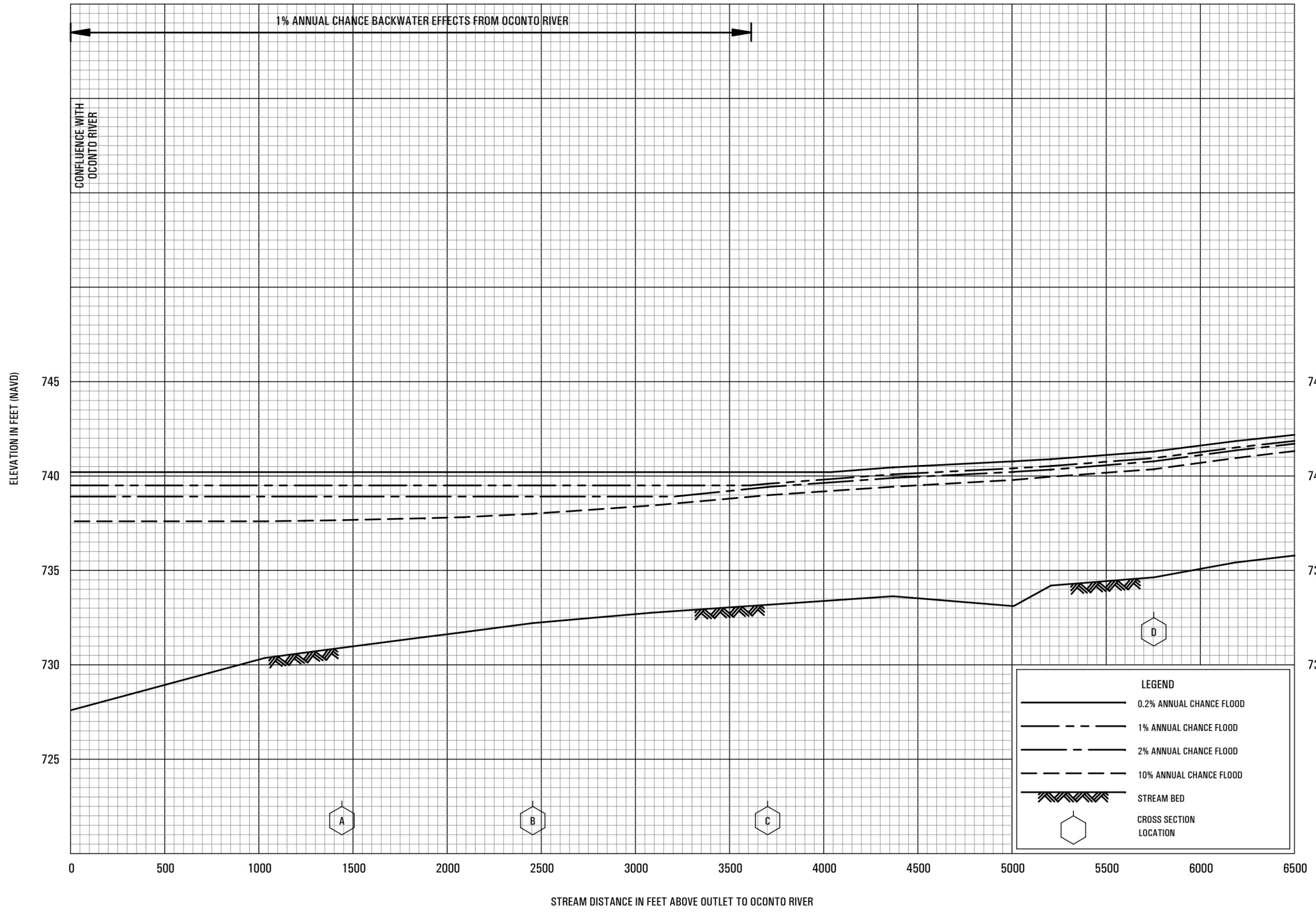
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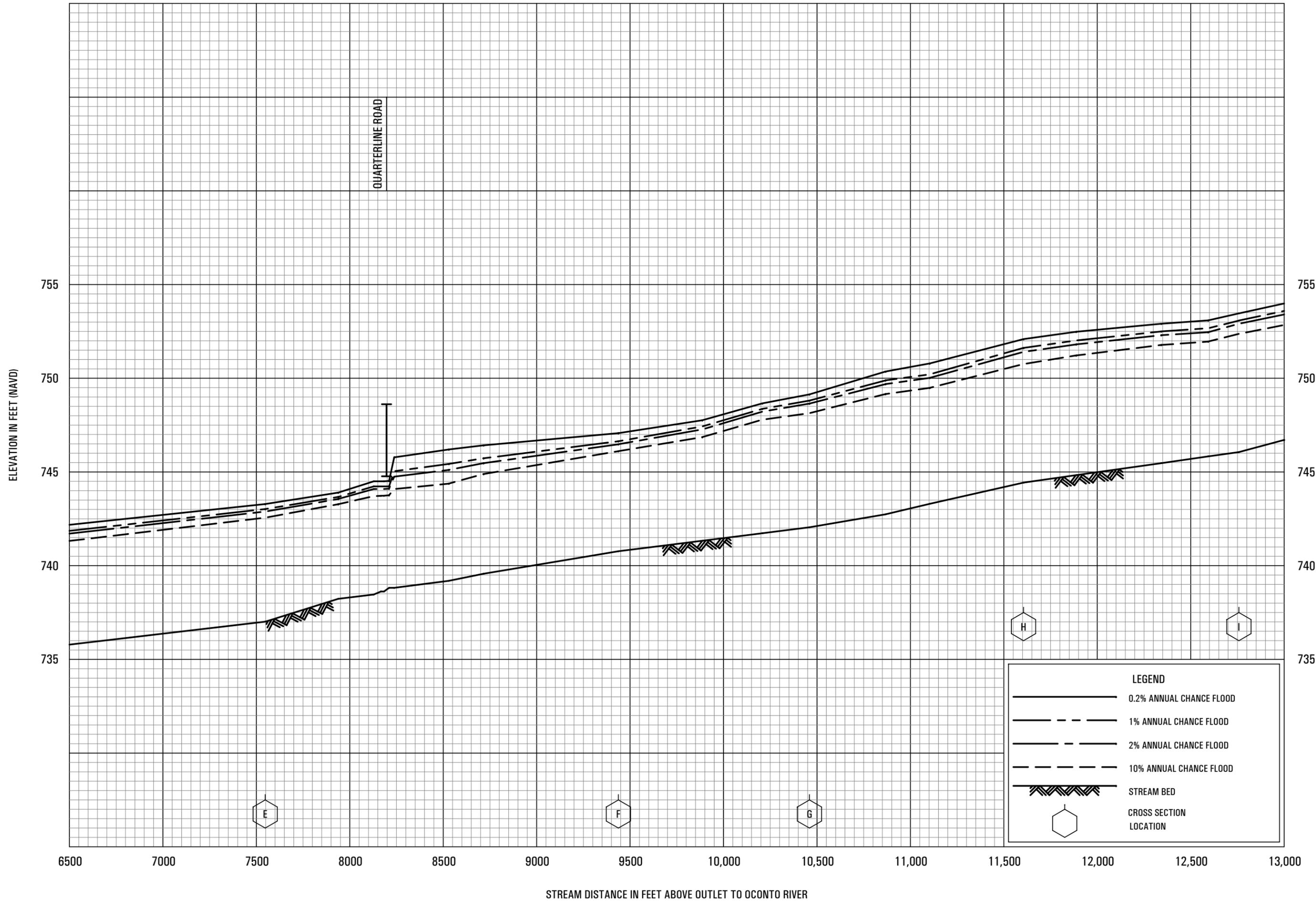
FLOOD PROFILES

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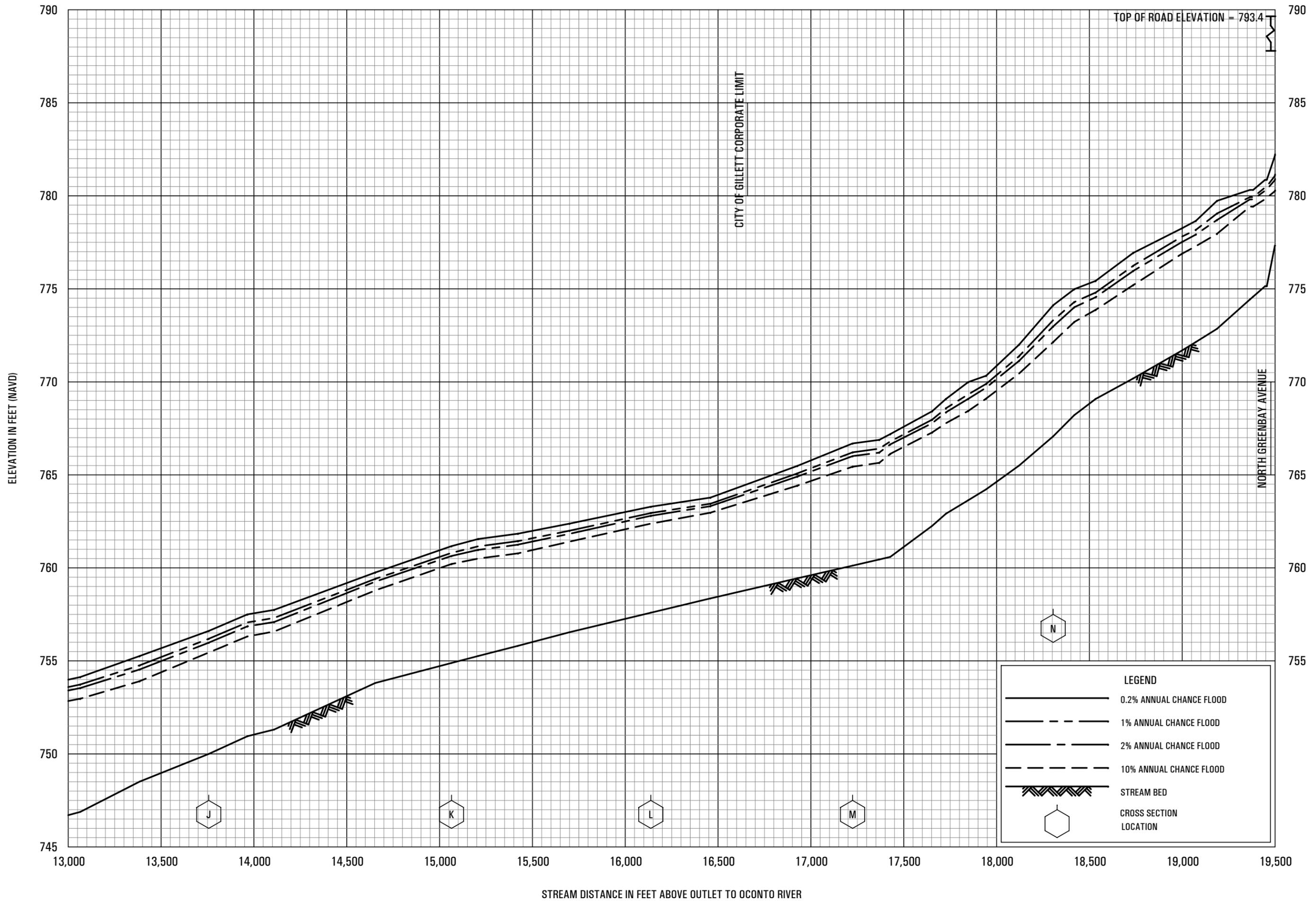
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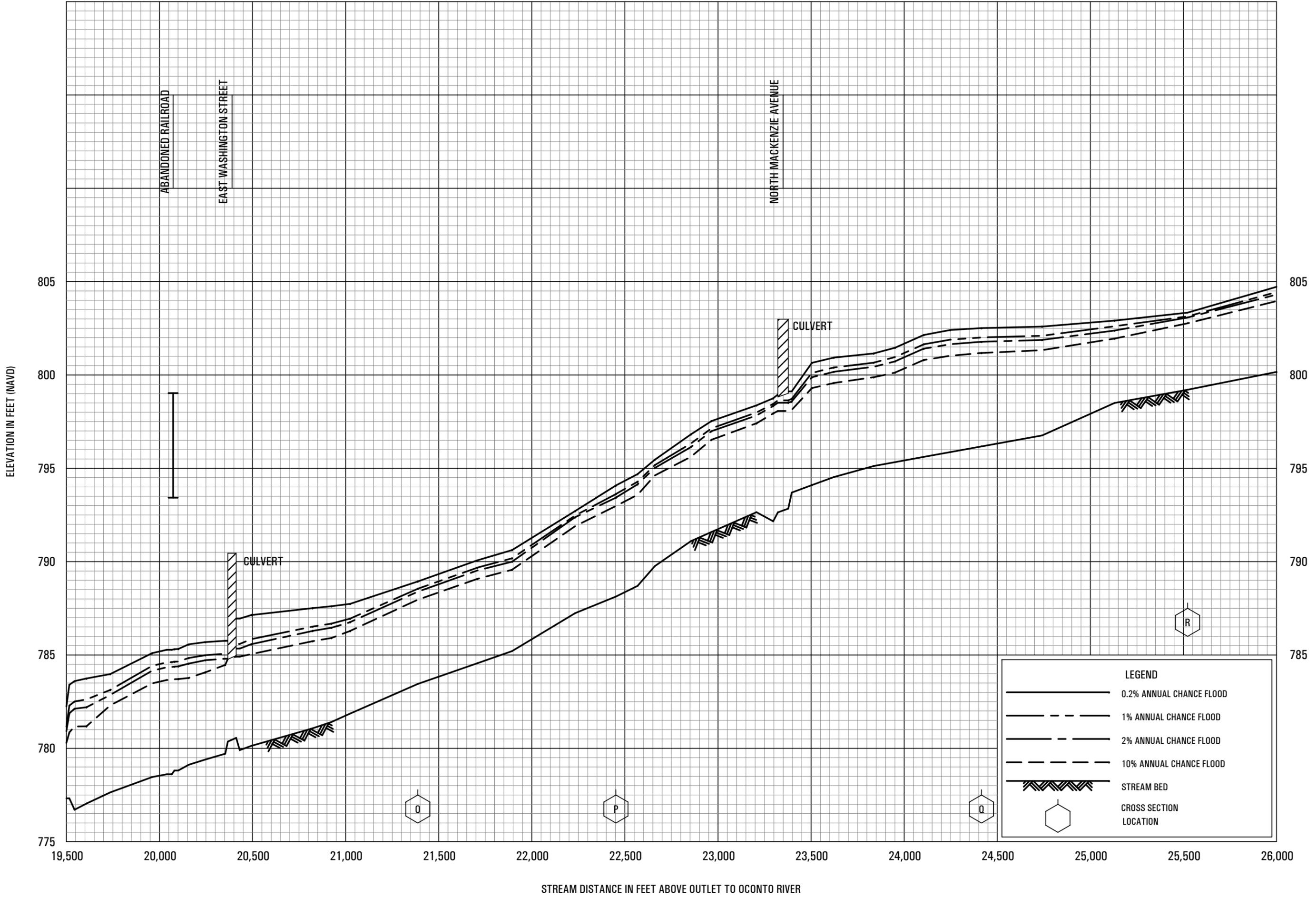
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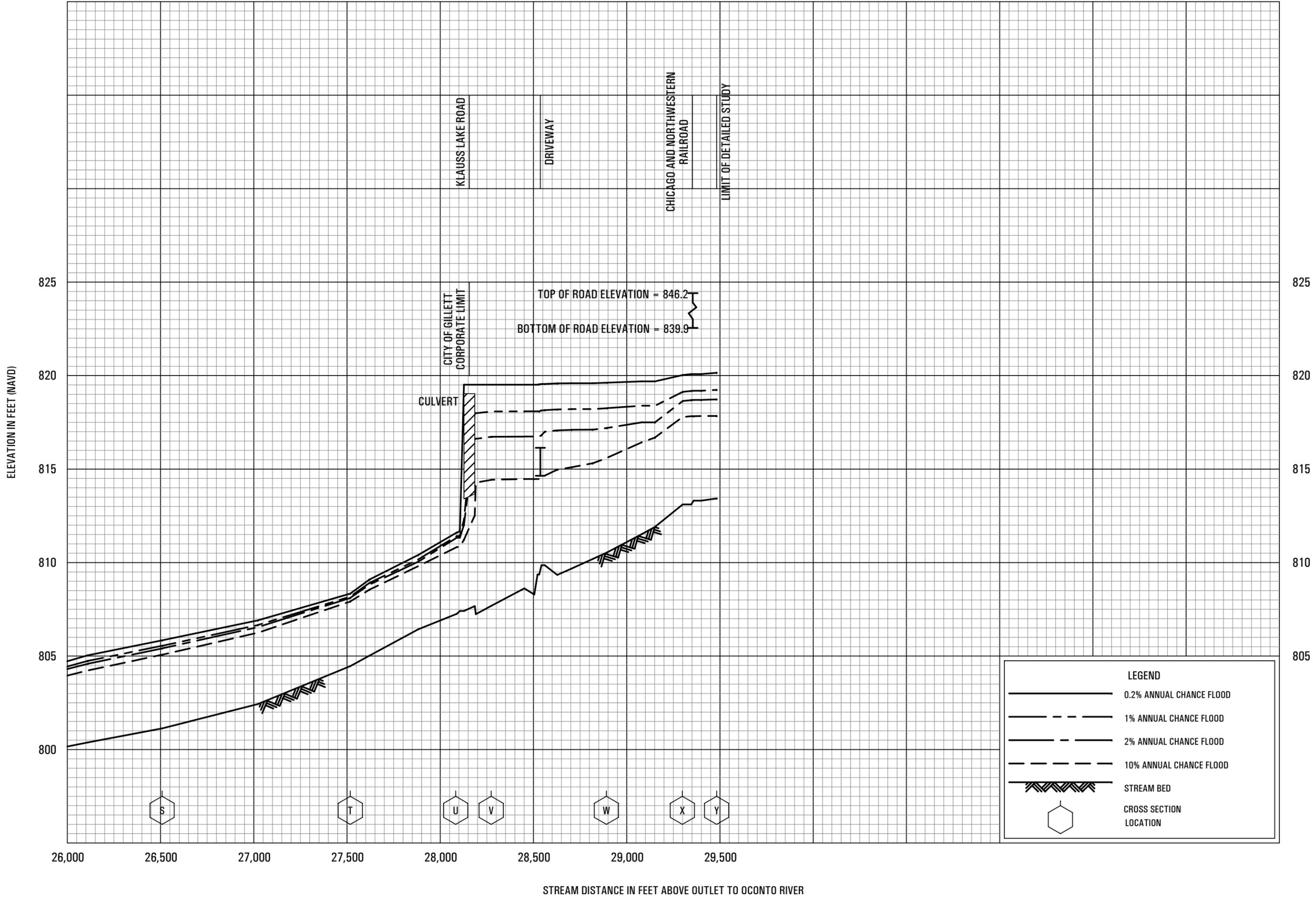
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OCONTO COUNTY, WI
AND INCORPORATED AREAS

LEGEND

-  0.2% ANNUAL CHANCE FLOOD
-  1% ANNUAL CHANCE FLOOD
-  2% ANNUAL CHANCE FLOOD
-  10% ANNUAL CHANCE FLOOD
-  STREAM BED
-  CROSS SECTION LOCATION

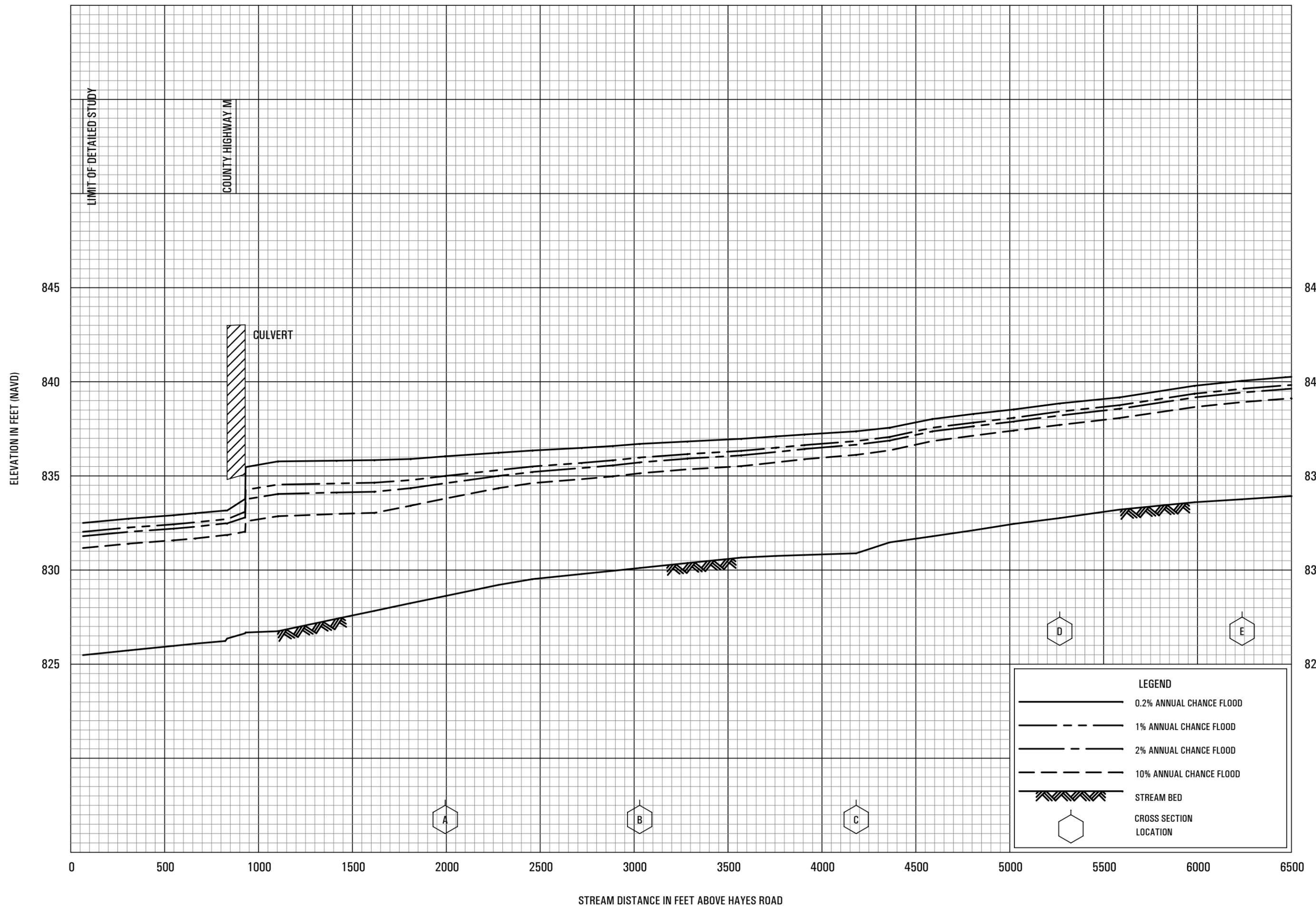


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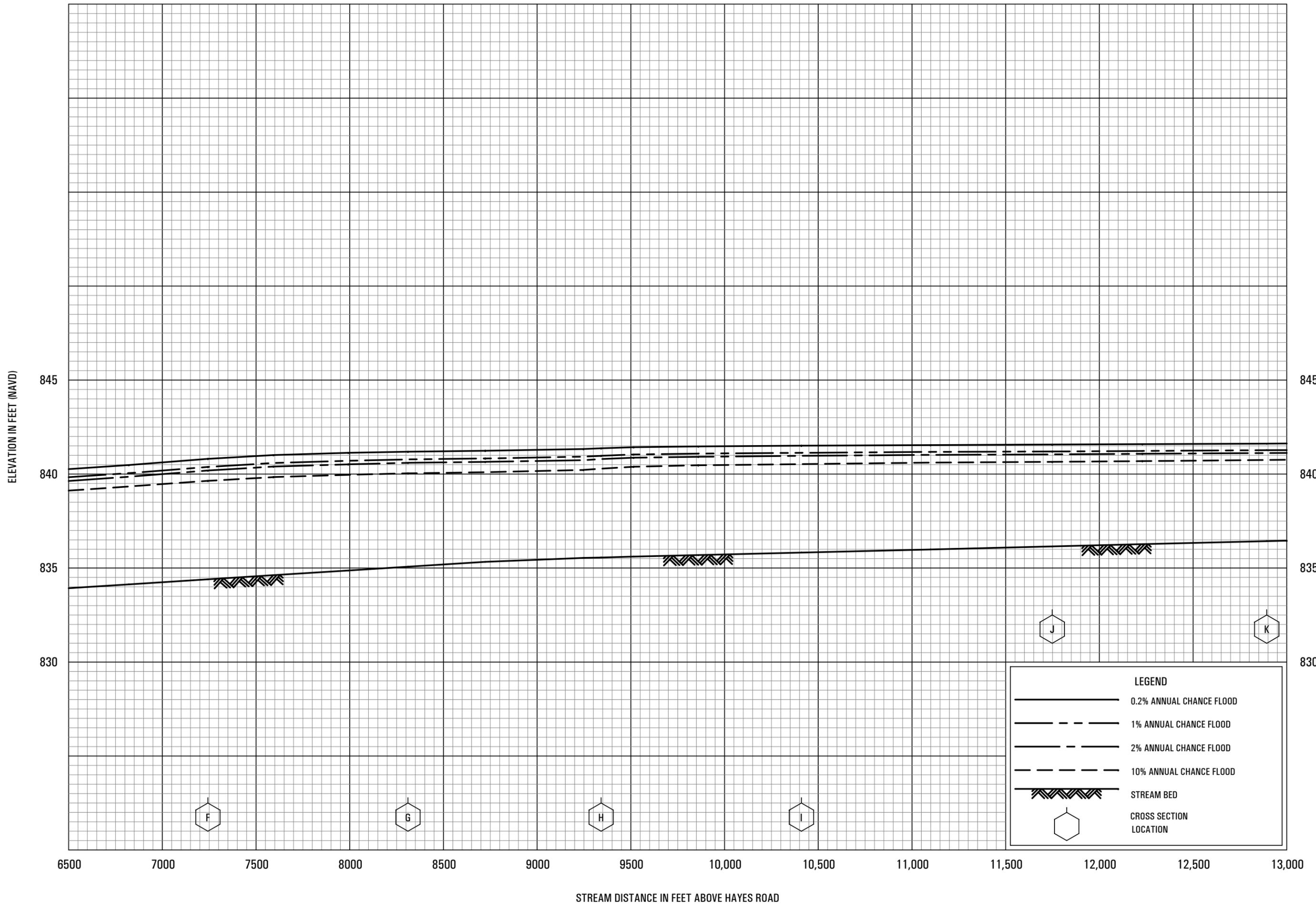


FLOOD PROFILES

HAYES CREEK

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OCONTO COUNTY, WI
AND INCORPORATED AREAS

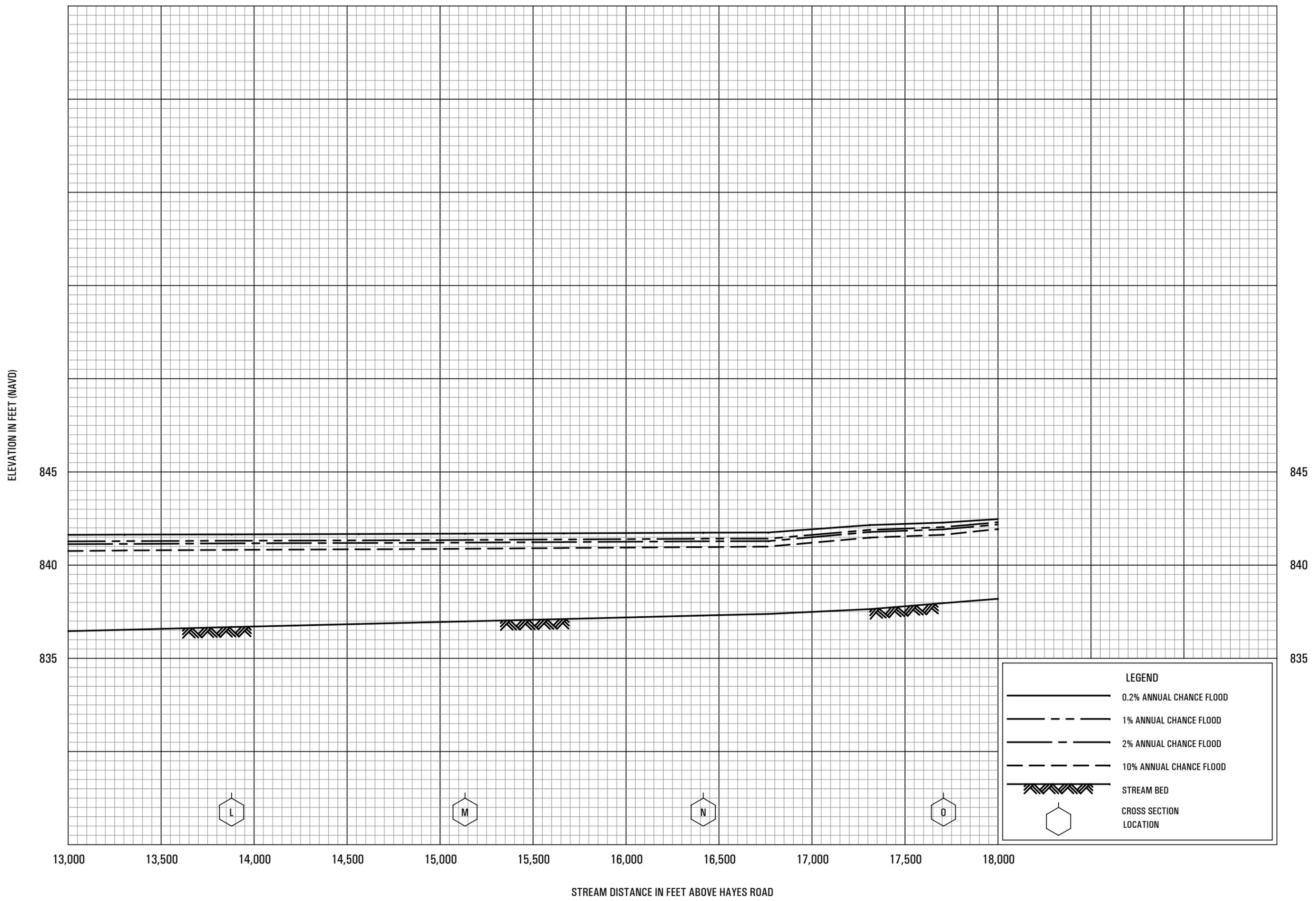


FLOOD PROFILES

HAYES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

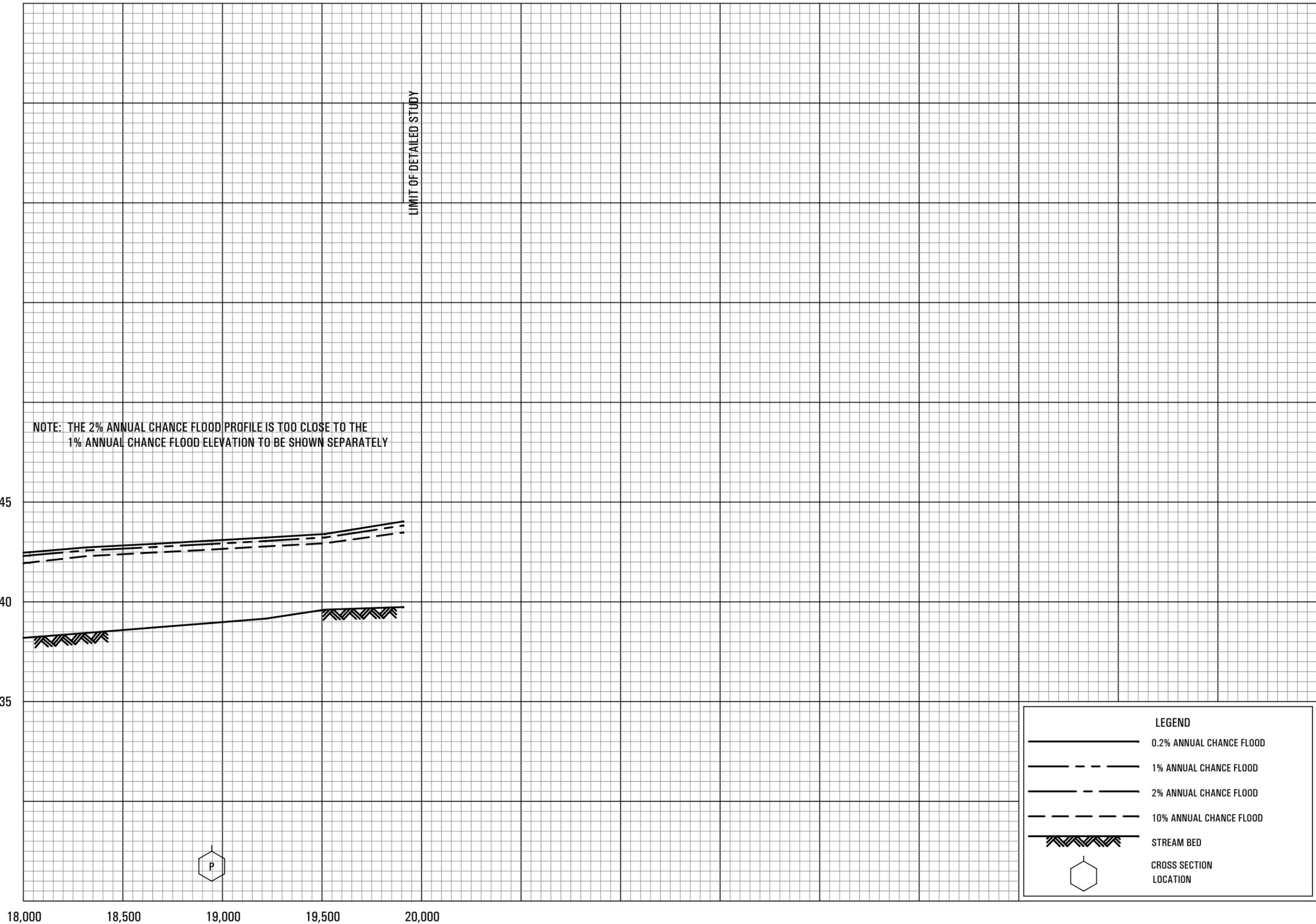
OCONTO COUNTY, WI
AND INCORPORATED AREAS



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD)



NOTE: THE 2% ANNUAL CHANCE FLOOD PROFILE IS TOO CLOSE TO THE 1% ANNUAL CHANCE FLOOD ELEVATION TO BE SHOWN SEPARATELY

LIMIT OF DETAILED STUDY



LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

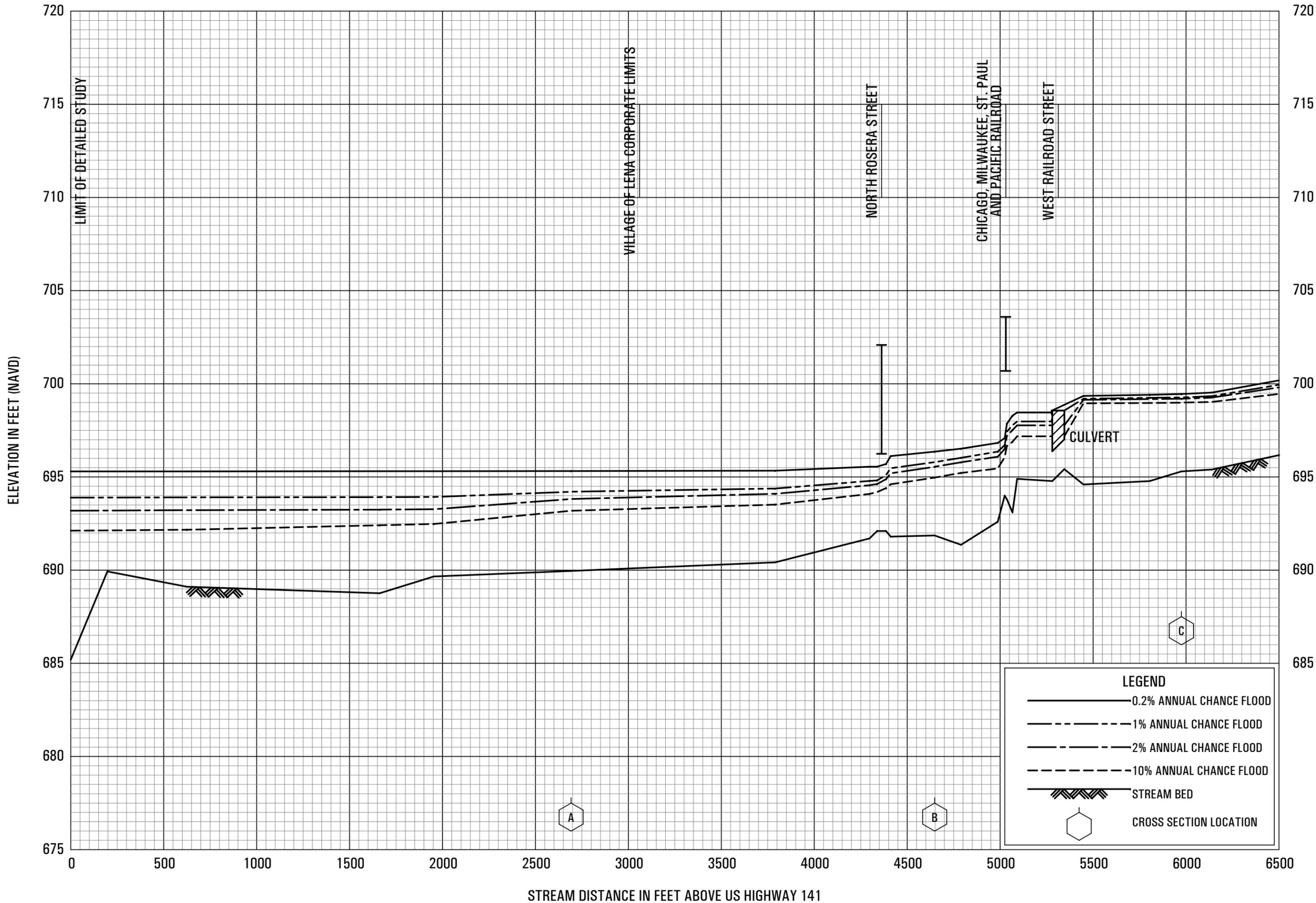
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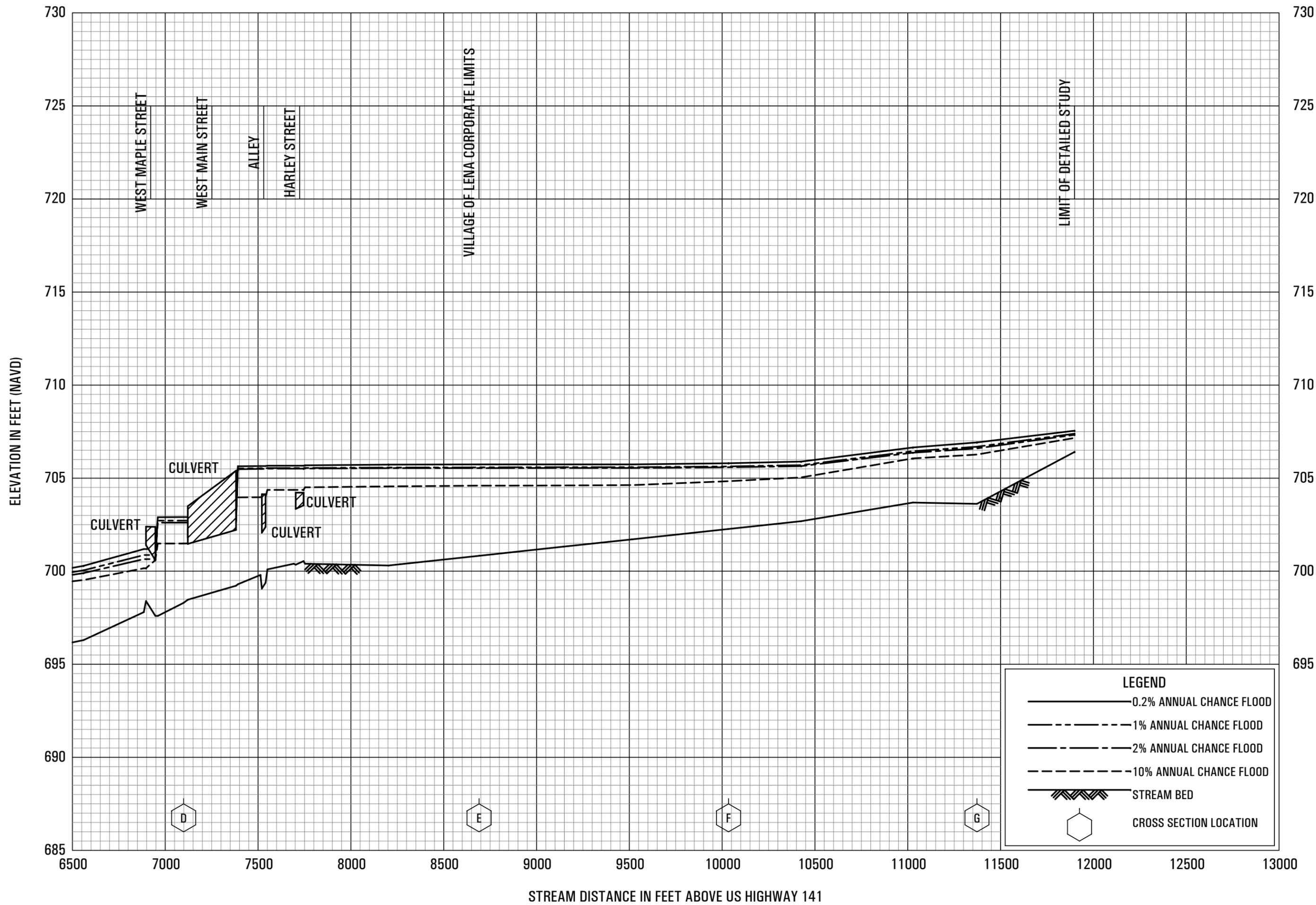
STREAM DISTANCE IN FEET ABOVE HAYES ROAD

FLOOD PROFILES

HAYES CREEK

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OCONTO COUNTY, WI
AND INCORPORATED AREAS

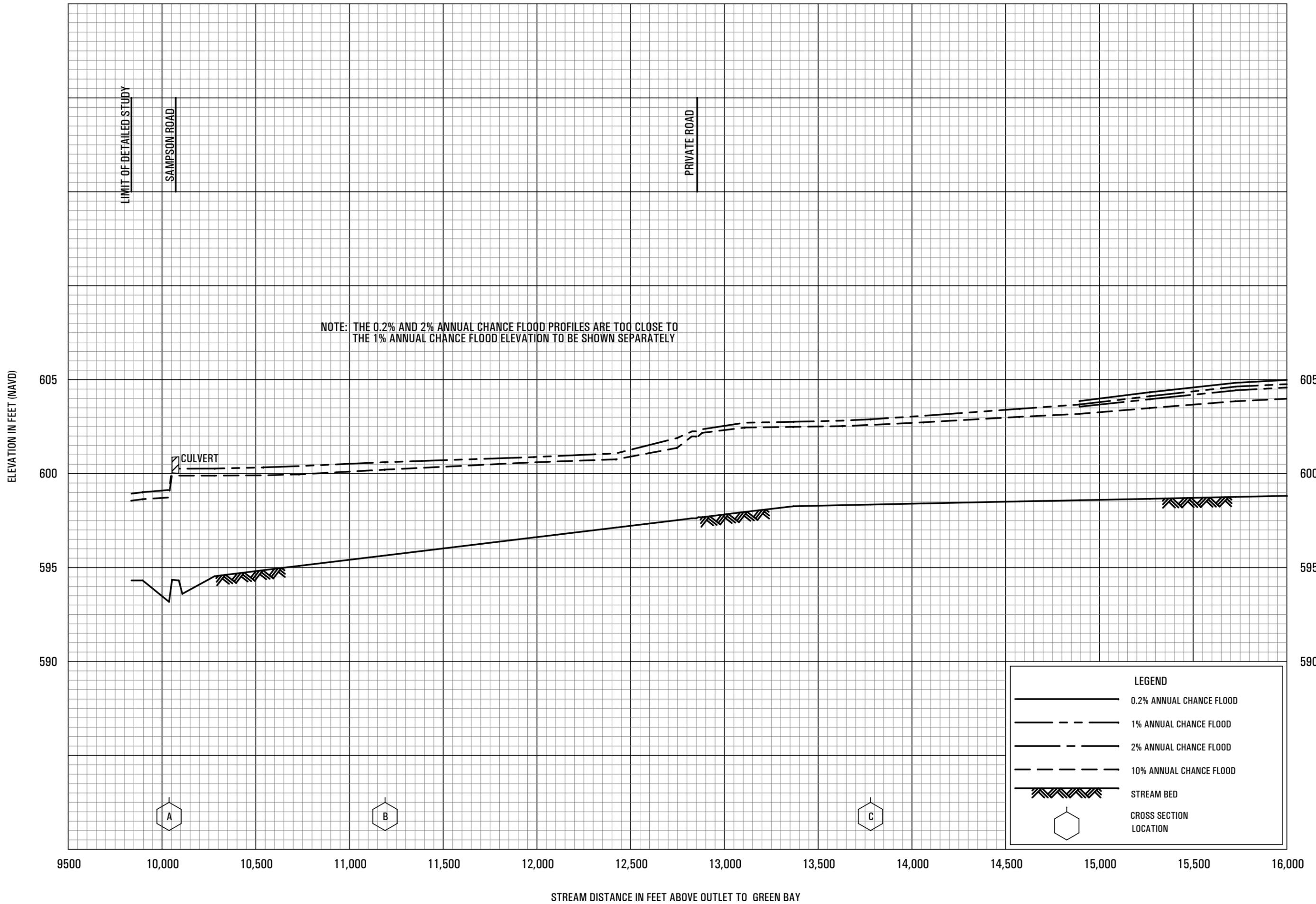




FLOOD PROFILES

JONES CREEK

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 AND INCORPORATED AREAS

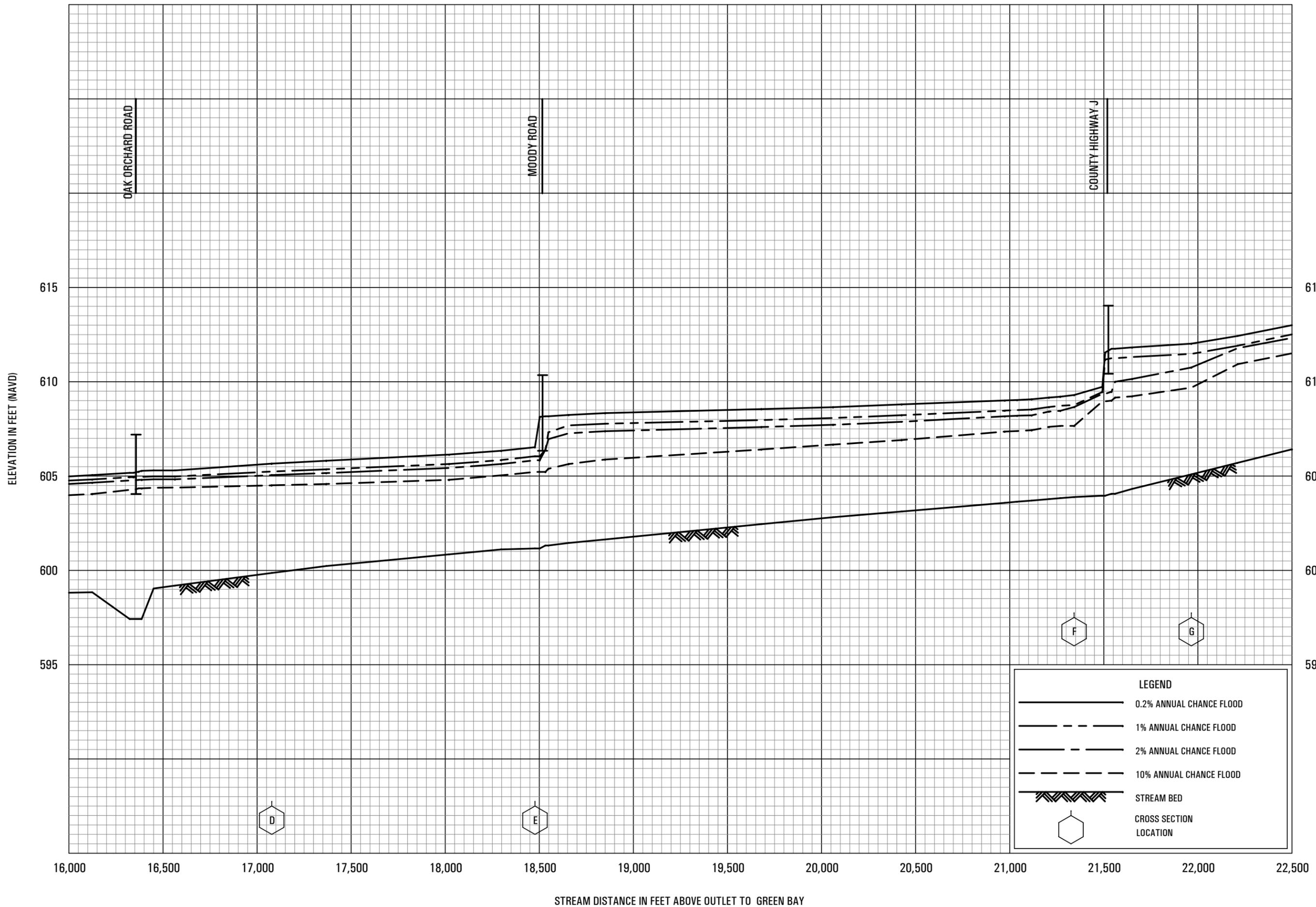


FLOOD PROFILES

KIRCHNER CREEK

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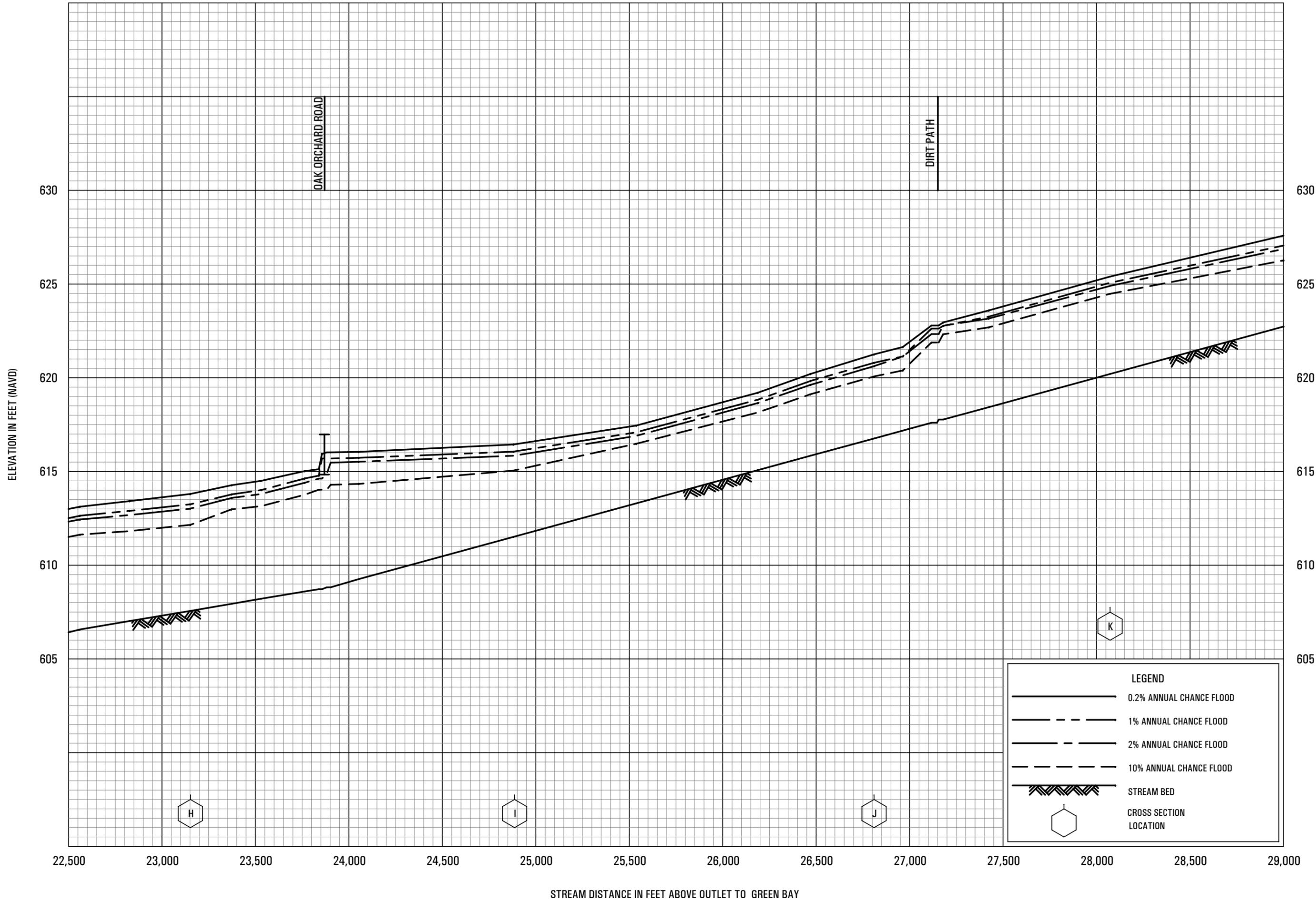


FLOOD PROFILES

KIRCHNER CREEK

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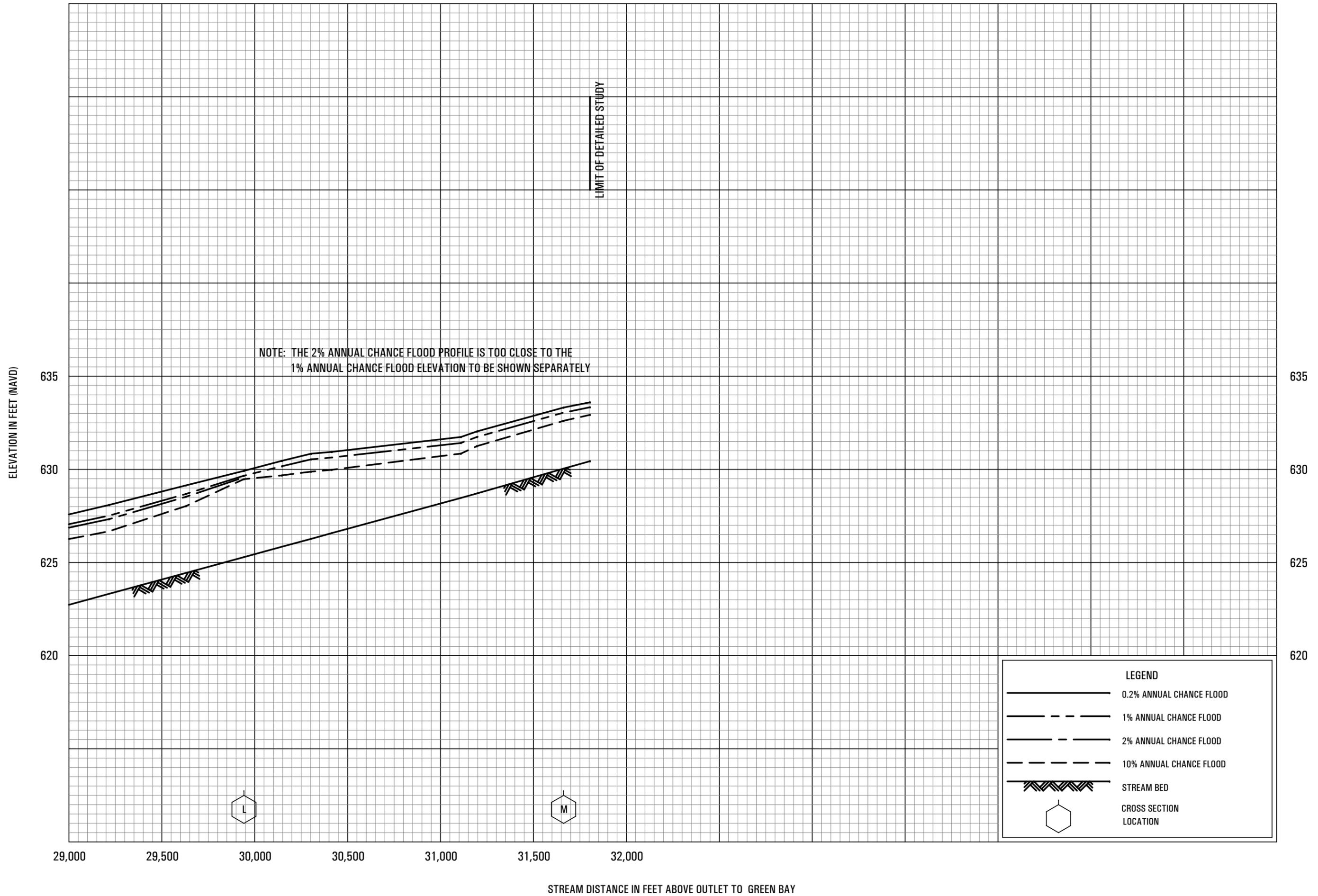


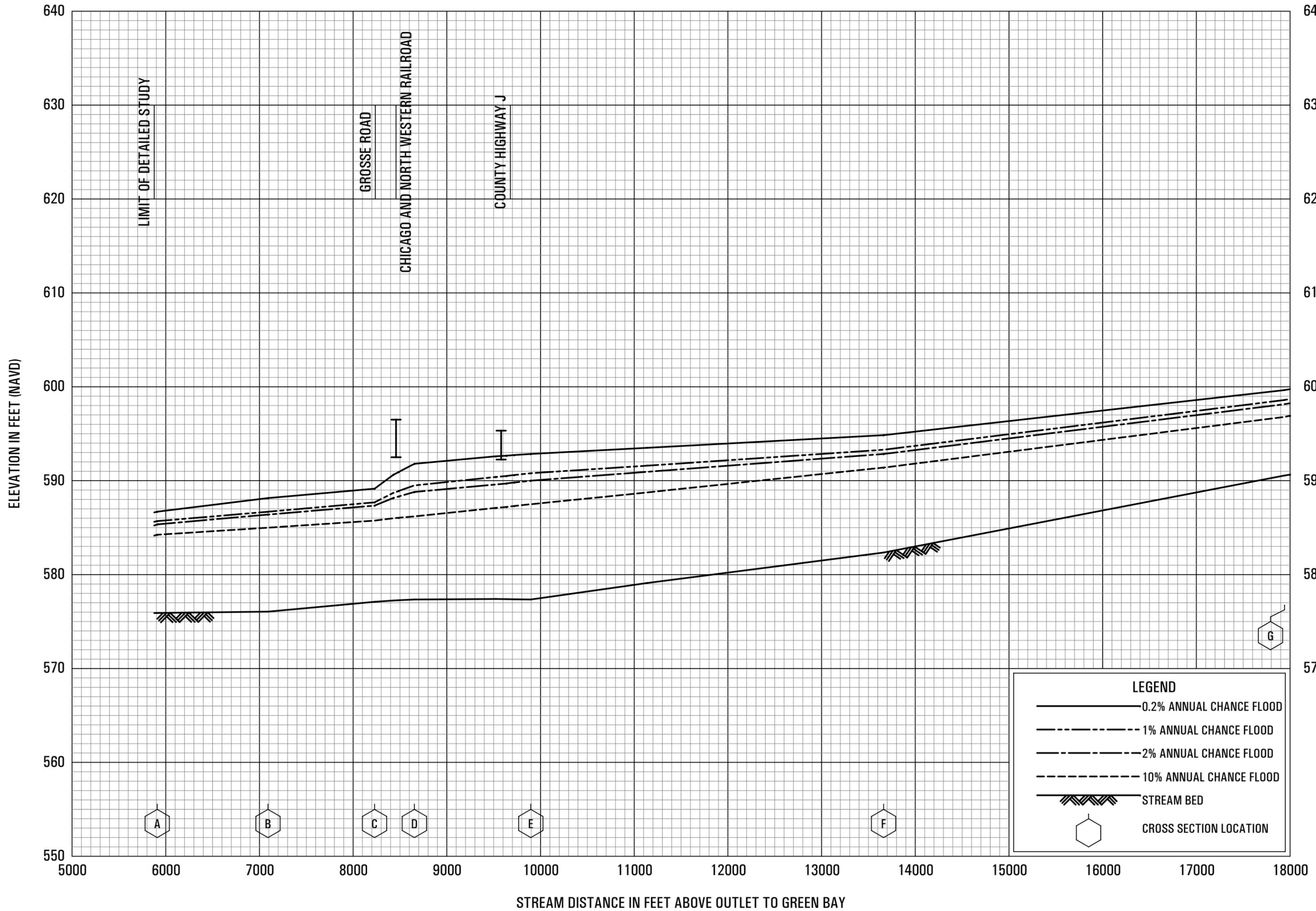
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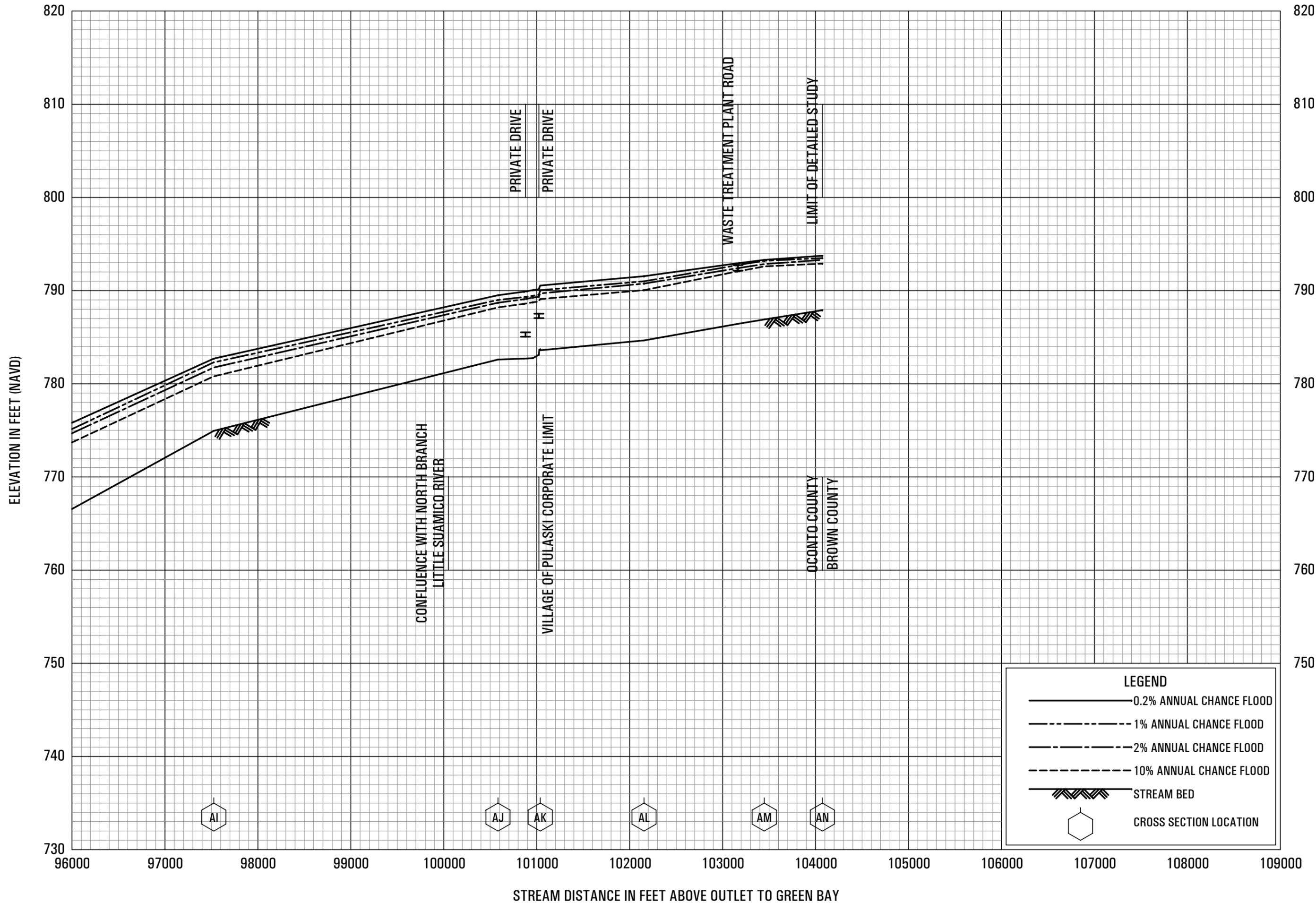
KIRCHNER CREEK

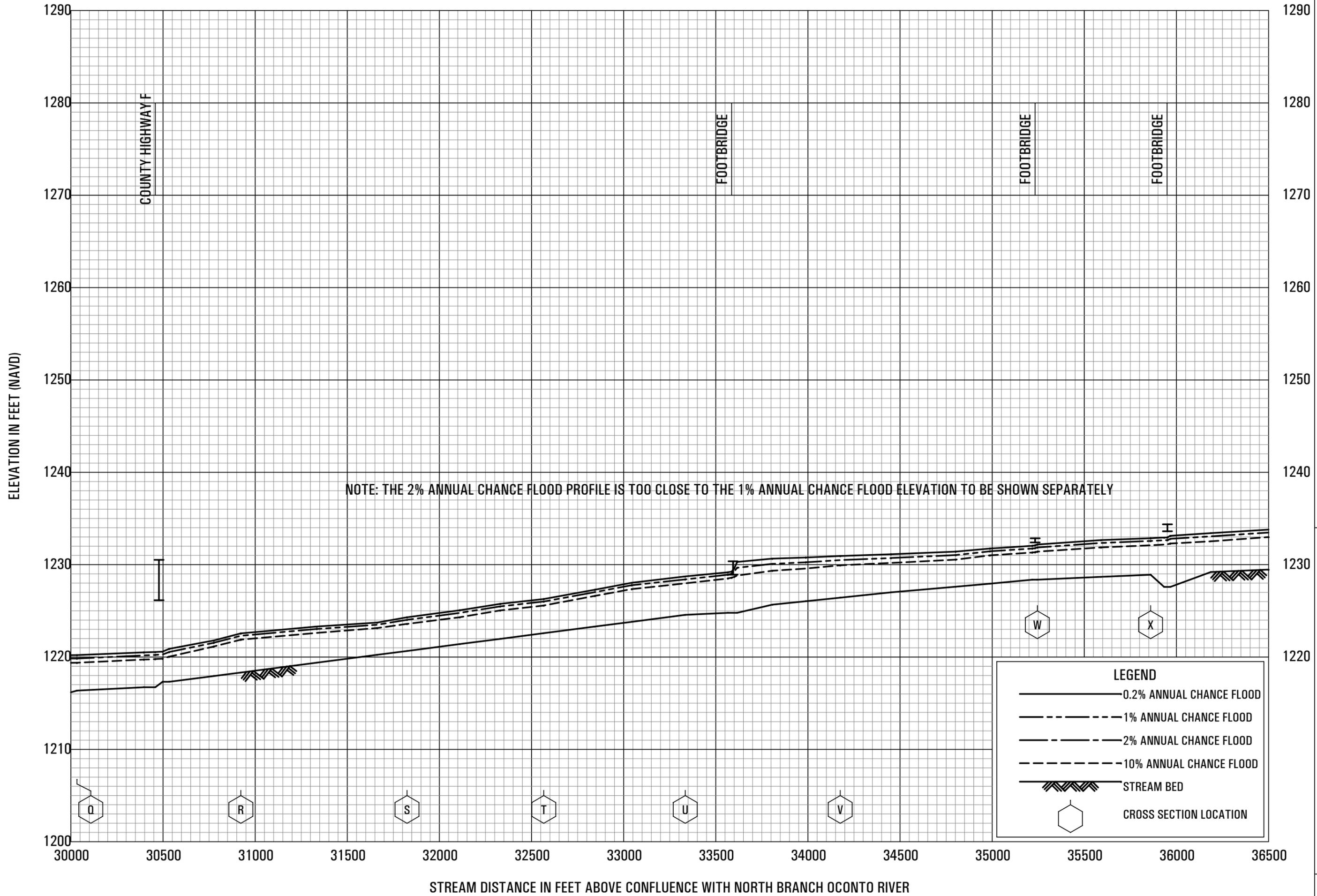
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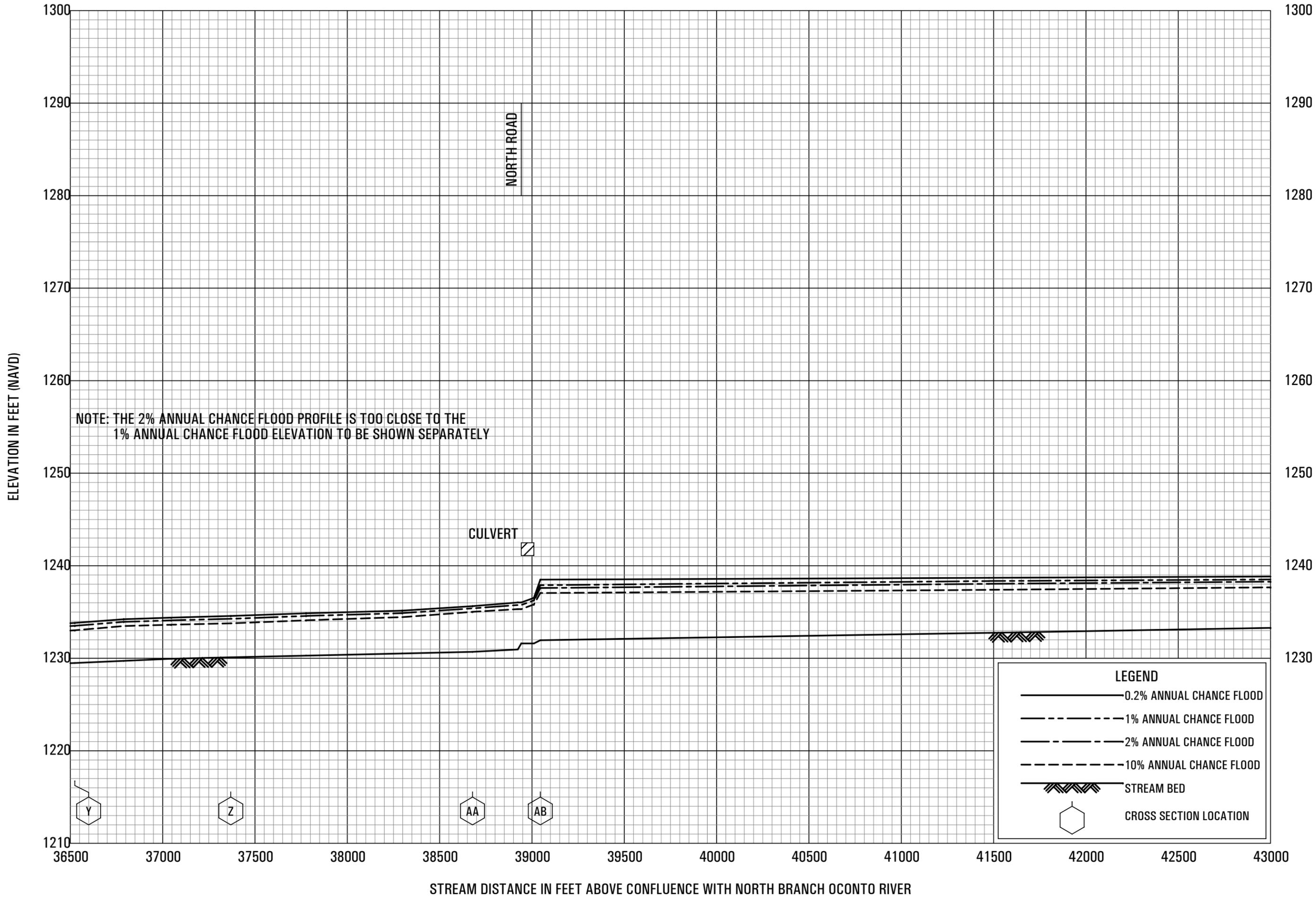




FLOOD PROFILES

MCCASLIN BROOK

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OCONTO COUNTY, WI
AND INCORPORATED AREAS**

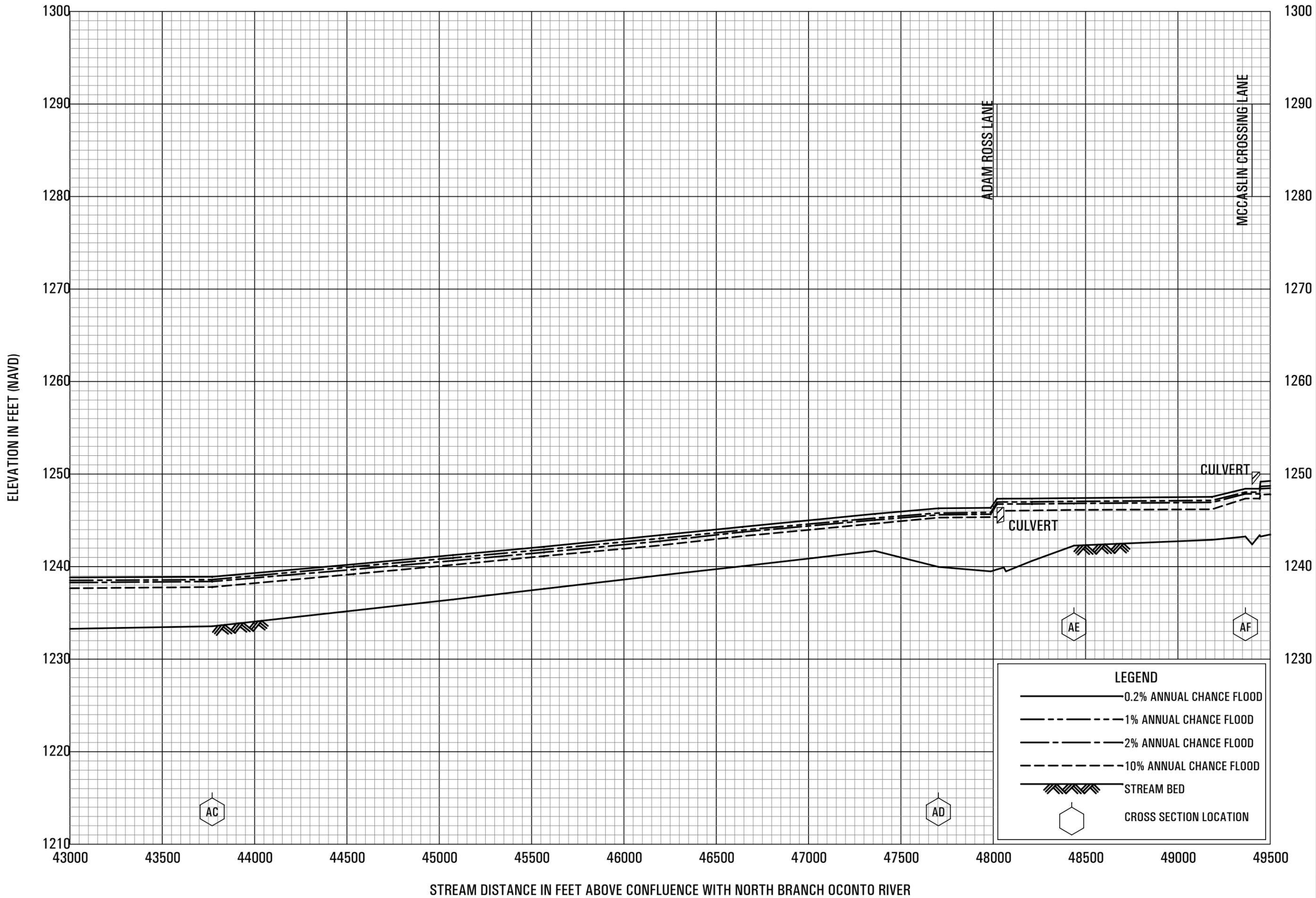


FLOOD PROFILES

MCCASLIN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

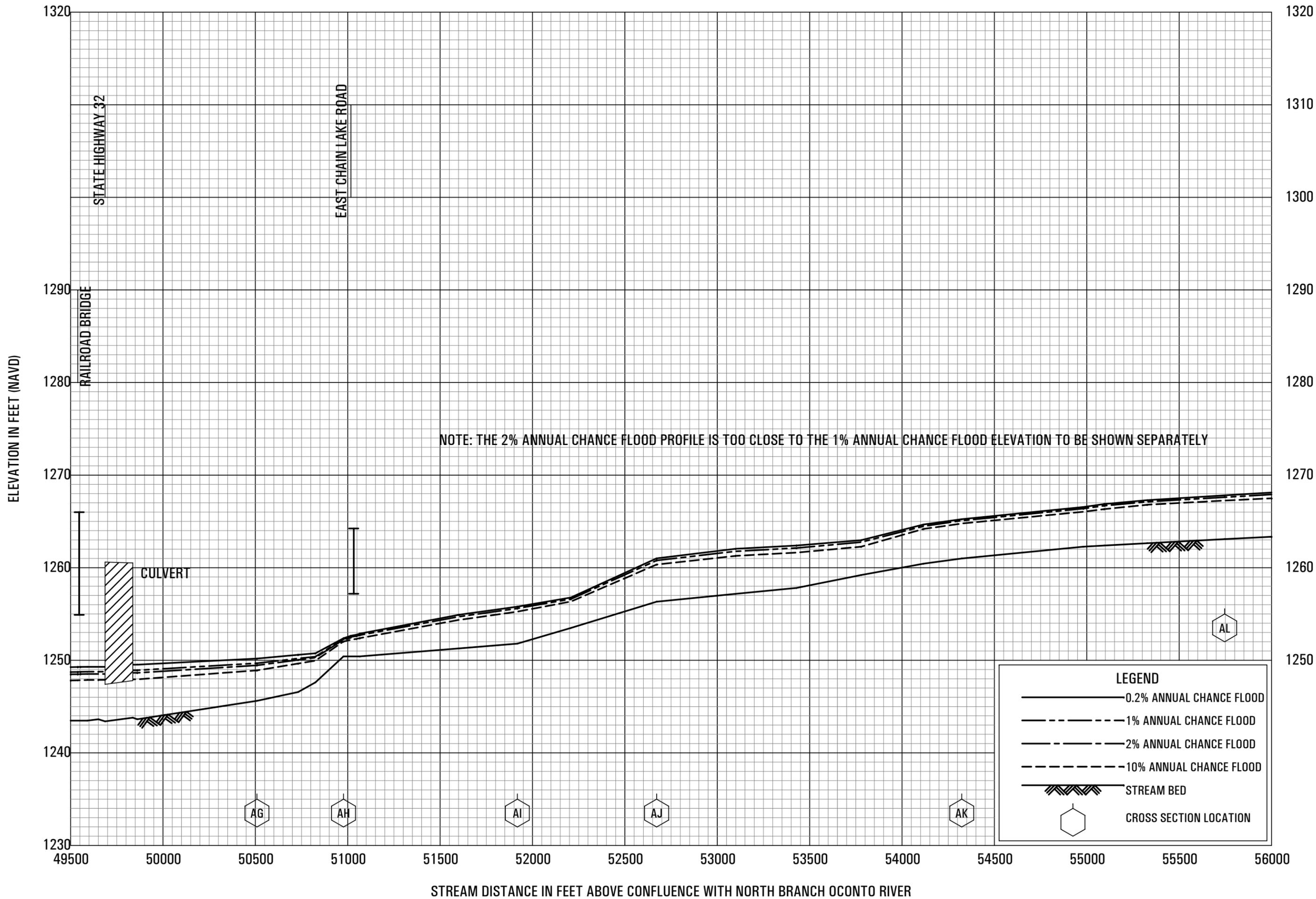
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FLOOD PROFILES

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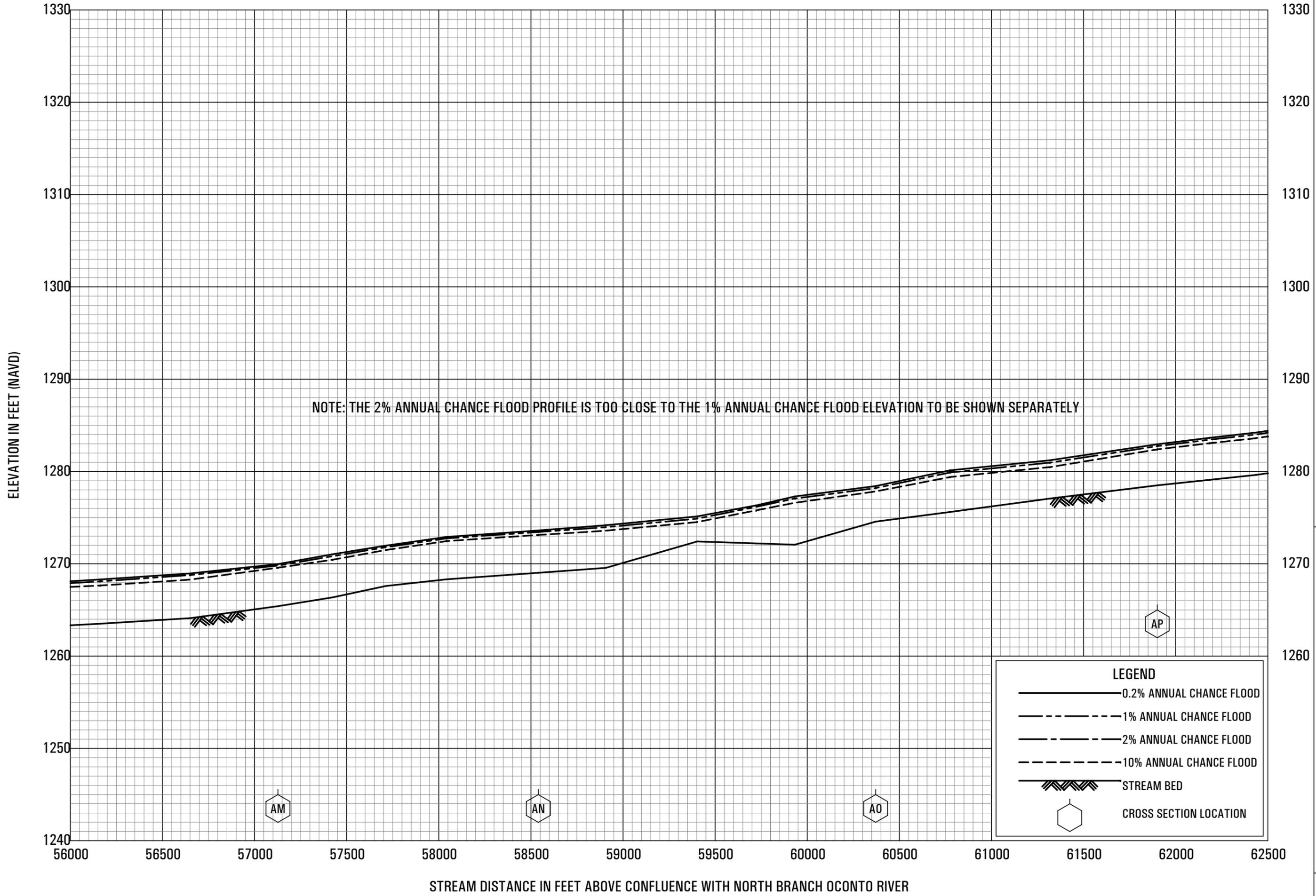


FLOOD PROFILES

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FEDERAL EMERGENCY MANAGEMENT AGENCY

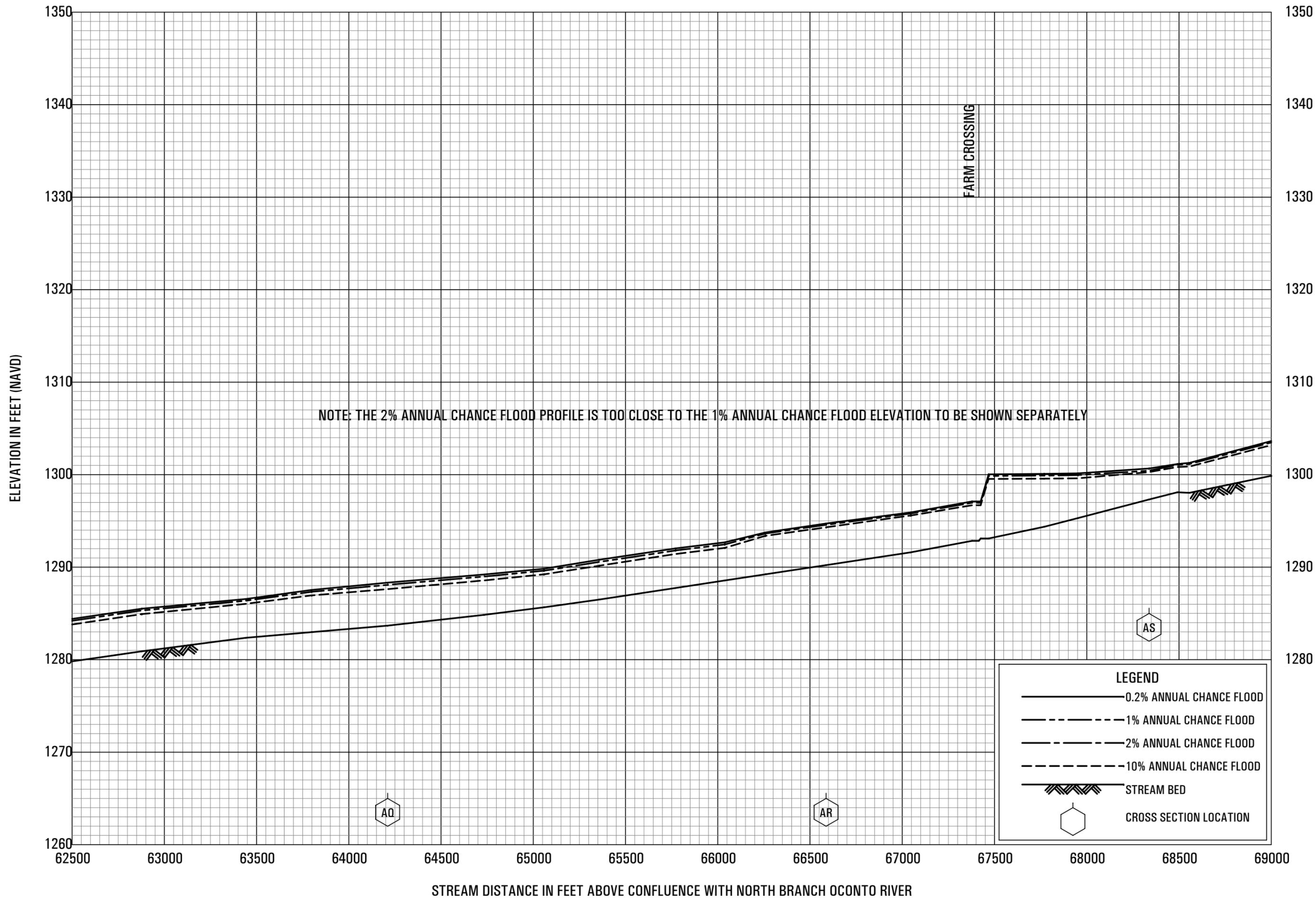
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FLOOD PROFILES

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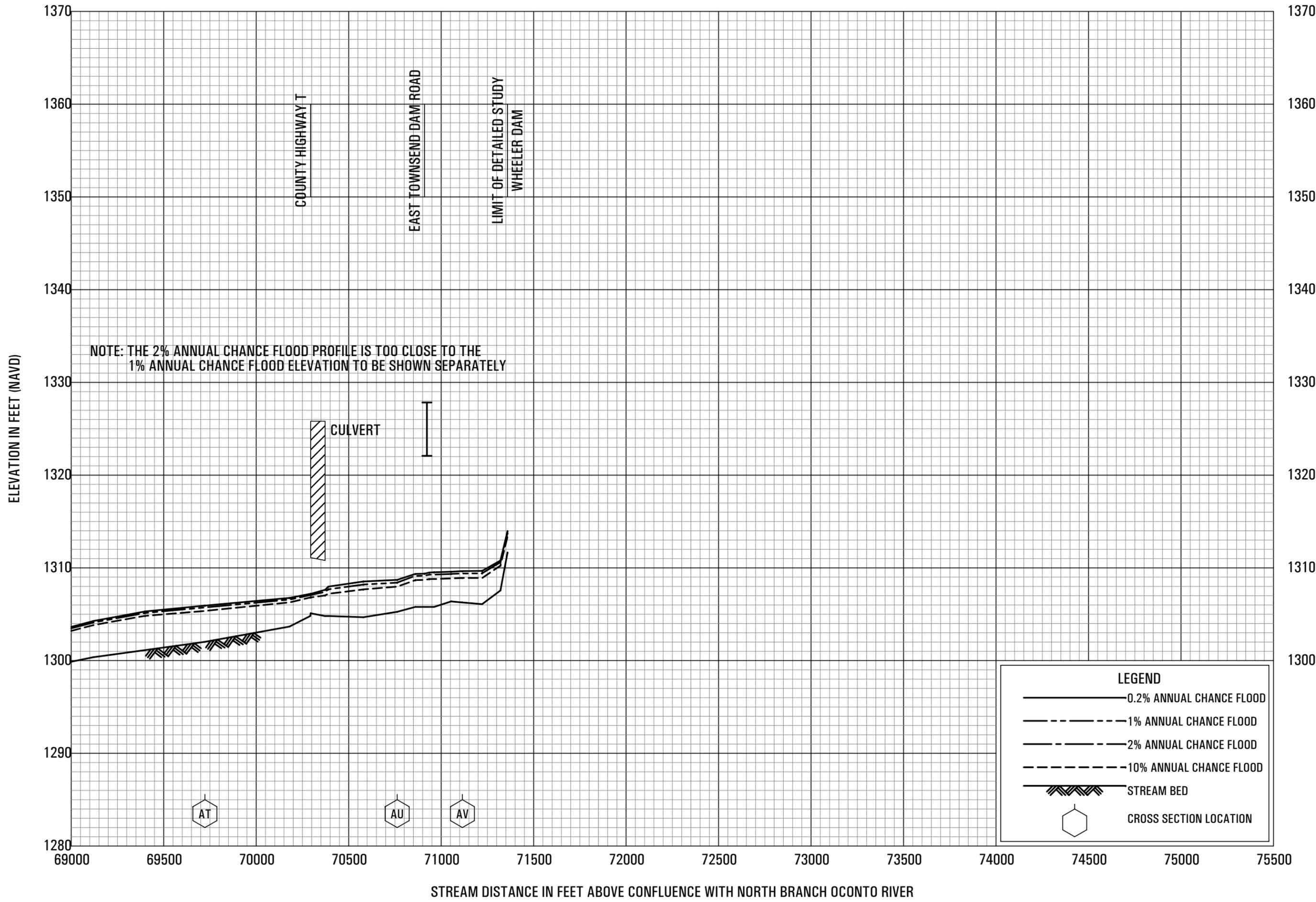
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FLOOD PROFILES

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