FLOOD INSURANCE STUDY

SPOKANE COUNTY, WASHINGTON

AND INCORPORATED AREAS

Community Name	Community Number
*AIRWAY HEIGHTS, CITY OF	530270
CHENEY, CITY OF	530175
DEER PARK, CITY OF	530176
FAIRFIELD, TOWN OF	530177
LATAH, TOWN OF	530178
LIBERTY LAKE, CITY OF	530162
MEDICAL LAKE, CITY OF	530179
MILLWOOD, TOWN OF	530180
ROCKFORD, TOWN OF	530181
SPANGLE, CITY OF	530182
SPOKANE COUNTY UNINCORPORATED AREAS	530174
SPOKANE VALLEY, CITY OF	530342
SPOKANE, CITY OF	530183
WAVERLY, TOWN OF	530184

*NON-FLOODPRONE

Effective: July 6, 2010

Federal Emergency Management Agency

Flood Insurance Study Number
53063CV000A

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 may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Selected Flood Insurance Rate Map panels for the 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:

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X (shaded)
C	X (unshaded)

Part of all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve re-publication or re-distribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

This FIS report was revised on July 6, 2010. User should refer to section 10.0, Revision Descriptions, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this report. Therefore, users of this report should be aware that the information presented in section 10.0 supersedes information in section 1.0 through 9.0 of this report.

Effective Date of Initial Countywide FIS: July 6, 2010

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FLOOD INSURANCE STUDY
SPOKANE COUNTY WASHINGTON 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 Spokane County, including the Cities of Airway Heights, Cheney, Deer Park, Liberty Lake, Medical Lake, Millwood, Spangle, Spokane Valley, Spokane; the Towns of Fairfield, Latah, Rockford, and Waverly; and the unincorporated areas of Spokane County (referred to collectively herein as Spokane 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 City of Airway Heights is non-floodprone. 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.

1.2 Authority and Acknowledgments

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

The hydrologic and hydraulic analyses for the county study were performed by the U.S. Soil Conservation Service (SCS), for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. IAA-H-179, Project Order No. 8. That study was completed in September 1983.

The Spokane River and Forker Draw were studied by the Soil Conservation Service (SCS) which completed work on these two sources in May 1986. The Spokane River was studied from the eastern corporate limits of the City of Spokane to the state boundary with Idaho.

The study on Liberty Lake was taken directly from a report dated March 1990 prepared by James M. Montgomery, Consulting Engineers, Inc. (Reference 1)

The hydrologic and hydraulic analysis for Chester Creek was originally performed by Michael Baker Jr., Inc. and approved by Spokane County in a letter to the Federal Emergency Management Agency dated August 6, 1990. West Consultants, Inc., under FEMA Contract

Number EMS-2001-CO-0068, revised the hydraulic analysis for Chester Creek for the purposes of this study. The Analysis was completed in February 2006 (Reference 2).

An updated hydrologic analysis of the Forker Draw drainage basin was performed by Tetra Tech in October 2007, and an updated hydrologic analysis of the Argonne Drainage basin in Spokane County was performed by Tetra Tech in April 2008 as part of the Federal Emergency Management Agency's (FEMA) Floodplain Map Modernization Program. The purpose of the analysis was to develop updated floodplain mapping data for incorporation into Digital Flood Insurance Rate Maps (DFIRMs) and a Flood Insurance Study (FIS) report for Spokane County.

1.3 Coordination

Spokane County

Streams requiring detailed study were selected and identified at a meeting held December 7, 1978, and attended by representatives of the Spokane County Planning Department, the Spokane County Engineers Office, the Washington Department of Ecology, FEMA, and the study contractor.

The results of the study were reviewed at the final community coordination meeting held on November 27, 1984. The meeting was attended by representatives of FEMA, the study contractor, and Spokane County. All significant issues raised during that meeting have been addressed in this study.

City of Spokane

Streams requiring study were identified at a pre-contract coordination meeting held in Spokane and attended by personnel of the study contractor, the Federal Emergency Management Agency, and the City of Spokane on February 4, 1975. On March 4, 1976, a post- contract coordination meeting was held in Spokane to explain the scope and procedures of the study and the National Flood Insurance Program. On September 9, 1977, an interim coordination meeting was held in Spokane to present preliminary results of the study to Spokane officials and resulted in the following decisions:

1. The possibility of having the elevations referenced to the City of Spokane in parenthesis on maps and profiles would be considered.

2. The possibility of determining 1% annual chance flood elevations for ground-water flooding of pothole areas would be studied by the Federal Emergency Management Agency.

3. Floodway and flood plain boundaries would be reviewed by the city.

Subsequent to the September 1977 meeting, the city officials reviewed the Spokane River floodway and flood plain boundaries and found several discrepancies. Based on their comments and maps, the floodway and flood plain boundaries were revised to reflect the new topographic data, and the maps were accepted by the city at a coordination meeting held at Spokane on April 7, 1978. At this meeting, the Community Coordination Officer advised city officials that 1% annual chance ground-water elevations in various pothole areas in the city could not be determined because the cost of doing so would be prohibitive. Additional coordination in person, by phone, and by mail took place between the study contractor and the following organizations on many occasions during the study:

1. Washington Water Power Company
2. City of Spokane
3. Washington State Library

The results of this study were reviewed at a final community coordination meeting held on July 24, 1979. Attending the meeting were representatives of the Federal Emergency Management Agency, the study contractor, and the city. No problems were raised at the meeting.

Town of Rockford

On September 1982, the Town of Rockford sent a request to the Office of Planning and Development, State of Washington, Department of Ecology (DOE), requesting a detailed hydrologic study of the several streams within the town. The DOE then asked the SCS to perform the study.

Countywide Update

A public community coordination meeting for Spokane County was held on November 6, 2008. This meeting was attended by representatives of FEMA Region X Mitigation Division, Washington State Department of Ecology, TetraTech Inc., West Consultants, Inc. as well as representatives from Spokane County and cities of Spokane Valley, Spokane, Deer Park, and property owners of land therein. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Spokane County, Washington, including the incorporated communities listed in Section 1.1.

The areas studied by detailed methods in the county were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 2007. Descriptions of detailed-study reaches are given in Table 1.

Table 1 - Flooding Sources Studied By Detailed Methods

Flooding Source	Study Area	Length
Argonne Drainage	From Spokane River confluence to Boeing Road	1.3 miles
Chester Creek	From South Sargent Road Upstream to Dishman - Mica Road.	7.2 miles
Country Homes Drainage	From the confluence with Little Spokane River upstream to approximately 0.1 mile above Warn Way	4.5 miles
Forker Draw	From Progress Road to Bigflow Gulch Road	1.0 miles
Hangman Creek	From Spokane River confluence to approximately 0.8 mile above a maintenance road at Hangman Valley Golf Course	6.5 miles
Little Spokane River	From State Highway 291 (Nine Mile Road) upstream to approximately 0.7 mile above Eloika Lake Road	32.4 miles
Mica River	In Town of Rockford from confluence of Rock creek to City of Rockford corporate boundary.	0.5 miles
Saltese Creek	From Steen Road upstream to approximately 0.3 mile above Barker Road	1.67 miles
Rock Creek	Within Town of Rockford.	1.25 miles
Spokane River	From City of Spokane corporate boundary to eastern end of county boundary at I -90.	29.32 miles
Unnamed Tributary to Chester Creek	To private drive approximately 0.5 miles upstream of East 46th Ave. to From the Painted Hills Golf Course	1.6 miles

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1983.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Spokane County. Flooding sources studied in approximate methods are given in Table 2 below.

Table 2 - The Flooding Sources Studied by Approximate Methods

Flooding Source	Study Area
Bear Creek	From the confluence with the Little Spokane River up stream to approximately 1 mile above Deer Park Milan Road
Cable Creek	From the Burlington Northern Railroad just west of the community of Spokane Bridge upstream to the Washington-Idaho State boundary
Deadman Creek	From the confluence with the Little Spokane River upstream to State Route 206, at Peone
Deer Creek	From the confluence with the Little Spokane River up stream to Bruce Road
Hangman Creek	From the upstream Limit of Detailed Study above Hangman Valley Golf Course upstream to the confluence with California Creek
Little Deep Creek	From the confluence with the Little Spokane River up stream to the confluence with North and South Forks at Big Meadows
Little Spokane River	From the upstream Limit of Detailed Study near Eloika Lake Road upstream to the northern county limits at Camden
Marshall Creek	From the intersection of Cheney Spokane Road and Burlington Northern Railroad at Marshall upstream to
Minnie Creek	From the confluence with Marshall Creek upstream to the area in Section 4 (Township 23 North, Range 42 East) southeast of Fish Lake
West Branch	From the confluence with the Little Spokane River, up

City of Spokane

The Spokane River was studied in detail for its length within the city, except for a small portion of the stream where supercritical flow exists. Hangman (also known as Latah) Creek was studied in detail for its entire length within the corporate limits.

Along the small segment of the Spokane River that experiences supercritical flow, flooding of certain potholes from surface water and ground water was studied by approximate methods. The potholes were studied by approximate methods because of their low flood hazard potential.

Town of Rockford

The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

Streams studied by detailed methods are Rock Creek for its entire length within the community, a distance of 1.25 miles. and Mica Creek from its confluence with Rock Creek to the upstream corporate limits. a distance of 0.5 miles.

There were no flooding sources within the Town of Rockford studied by approximate methods.

2.2 Community Description

City of Airway Heights

The City of Airway Heights, Washington was incorporated in 1955. The city is located in Eastern Washington just six miles west of Spokane. According to the year US Census Bureau of Statistics (2007), the population in the city was 5152. The total land area is 4.9 square miles.

City of Cheney

Incorporated in 1883, the City of Cheney is located in Spokane County and is now home to more than 10,435 people (US Census Bureau of Statistics 2007). Cheney is proud of its small town nature, which is enhanced by the diverse influence of Eastern Washington University. The City of Cheney is situated about 17 miles south west of City of Spokane.

Cheney developed into the city now because of its strong ties to education, rail, and agriculture. The total land area is 4.1 square miles.

City of Deer Park

The city of Deer Park is situated some 23 miles north of City of Spokane. Deer Park was officially incorporated on June 24, 1908. Deer Park got its name when railroad surveyors saw deer grazing in the area. Deer Park was settled in 1889 when a railroad siding was built for the Spokane Falls & Northern Railway.

The population per US Census Bureau of Statistics (2007) is 3350. The total land area is 6.4 square miles.

City of Liberty Lake

The City of Liberty Lake is located on the Eastern edge of Washington State, near the Idaho border. Only minutes from Downtown Spokane, Liberty Lake is a family and business friendly community. Officially incorporated in August of

2001, today the City is home to about 6,429 residents (US Census Bureau of Statistics 2007).

The total land area of the city is 5.3 square miles.

City of Medical Lake

The city of Medical Lake is located some 17 miles on south west of City of Spokane. Medical Lake has much to offer; whether it's the scenic lakes, abundant wildlife, warm summers, comprehensive trail system, and close proximity to Spokane. The population according to US Census Bureau of Statistics (2007) is 4,601.

Medical Lake was officially incorporated on June 21, 1880. The total land area of the city is 3.7 square miles.

City of Millwood

The City of Millwood located some 7 miles east of City of Spokane. The City of Millwood has a history that predates to founding as a town in late 1920s. The City of Millwood was incorporated in 1927. The population in the city per US Census Bureau of Statistics (2007) is 1609. The total land area of the city is 0.7 square miles.

City of Spangle

The city of Spangle is located some 18 miles south of City of Spokane. The City of Spangle was incorporated in 1888. The population in the city per US Census Bureau of Statistics (2007) is 234. The total land area of the city is 0.4 square miles.

Spokane County

Spokane County is in the eastern part of Washington and borders Idaho. Spokane County is bordered on the north by Pend Oreille County, on the northwest by Stevens County, on the west by Lincoln County, on the south by Whitman County, and on the east by Bonner and Kootenai Counties of Idaho.

Spokane County has a land area of 1,128,320 acres, or approximately 1,763 square miles, and had a population of 462,677 per US Census Bureau of Statistics (2008).

The channeled scablands in the southwestern part of the county consist of a broad basalt plateau that was stripped of soil by glacial floodwaters. Only small, island like remnants of pre-glacial soils, such as the Lance Hills, were left after the glacial floods. Many channels were cut in the basalt bedrock. The channels run southwesterly. Some channels are now occupied by potholes and lakes. Badger, Williams, Downs, Clear, and Silver Lakes and the Medical Lakes are in this area.

The southeastern part of the county is in the Palouse Hills region, which is characterized by rolling to hilly topography and deep soils that formed in silty material deposited by wind. Basalt is the base rock, but there are a few promontories of quartzite, shale, and sandstone in the region. Tekoa Mountain, the highest part of this region, rises to an elevation of 3,900 feet.

The northern part of the county is in the Okanogan Highlands. This region consists of mountains, foot slopes, glaciated valleys, broad glacial lake terraces, and outwash terraces. It includes Mount Spokane, the highest point in the county, which has an elevation of 5,882 feet NAVD. Glacial scouring and damming by deposits left by glacial meltwater created Newman, Liberty, and Eloika Lakes.

The annual precipitation in Spokane County ranges from 15 to 47 inches, and the amount is greatest on Mount Spokane. Except for increases due to differences in elevation, as on Mount Spokane, the amount of precipitation increases from west to east--from 15 inches in the southwestern part of the county to approximately 25 inches on the Idaho boundary.

Precipitation is lowest in July and August, gradually reaches a maximum in midwinter, decreases in the spring, and increases slightly in May and June. Most winter precipitation is in the form of snow. Warm winds and rain often melt the snow rapidly; if the soil underneath is frozen, much of the moisture is lost by runoff. In general, runoff increases with slope steepness. In most of the county, the average air temperature in January is about 25°F and the average July temperature about 69°F. Most of the precipitation falls during the cooler periods of the year.

During the warmer months, almost all of the soils are dry or nearly so. Consequently, chemical weathering proceeds more slowly than it would if more precipitation fell during the warmer months. Only in old soils, such as those of the Dearyton, Freeman, Garfield, Nez Perce, and Reardan series, has there been appreciable weathering of silt to clay (Reference 4).

The county is drained by two principal streams - the Palouse and Spokane Rivers. All the water ultimately drains into the Columbia River. Approximately 400 square miles of the southwestern part of the county lie within the Palouse River basin. All streams in this part of the county, except North Pine Creek, are intermittent. This area has many lakes and poorly drained depressions.

The Spokane River has only two perennial tributaries - the Little Spokane River from the north and Hangman Creek from the south. The Little Spokane River drains the entire northern part of the county through Dragoon, Deep, Dry, Deer, and Deadman Creeks. Hangman Creek drains all of the southeastern part of the county, but it discharges very little water into the Spokane River except spring runoff from melting snow.

The Spokane River originates in Coeur d'Alene Lake in Idaho, which is fed by the Coeur d'Alene and St. Joe Rivers. The watershed of the Spokane River in Idaho is largely forested mountains. From the Washington-Idaho border, the Spokane River flows westerly across Spokane County through a flat alluvial valley, averaging from 2 to 3 miles in width, to the eastern corporate limits of the City of Spokane. There, it enters a canyon that extends through the city. The tributary area of Coeur d'Alene Lake is approximately 3,700 square miles, and it drains mountainous, forested area with elevations ranging from 2,120 feet at Coeur d'Alene Lake to 6,500 feet at the crest of the Bitterroot Mountains. Coeur d'Alene Lake is a natural lake and has a natural outlet to the Spokane River. Post Falls Dam, approximately 9 miles below the lake outlet, can regulate flows of up to 15,000 cubic feet per second (cfs) at a lake level of 2,131.9 feet NAVD. When the lake stage exceeds 2,131.9 feet NAVD, the control passes from the dam to the natural lake outlet.

Hangman Creek drains an area that is predominantly dry-farmed in wheat on Palouse soils with rolling topography. Its total basin above the confluence with the Spokane River is 689 square miles, of which 203 square miles are in Idaho. It enters Spokane in the southwestern part of the city and flows north-northwesterly to its confluence with the Spokane River.

City of Spokane

Spokane is located in the heart of the Inland Northwest, and it serves as a shopping, entertainment, and medical hub for an area that includes Eastern Washington, Eastern Oregon, North Idaho, Western Montana, and southern portions of Alberta and British Columbia. The Spokane River runs through downtown with spectacular falls on the western end of our city core. Beautiful Riverfront Park also is in the heart of the city.

Spokane's first residents were Native American. Spokane became an incorporated City on Nov. 29, 1881, encompassing 1.56 square miles. Back then, the City was known as Spokan Falls and had 350 residents. The population according to the US Census Bureau of Statistics 2008 is 200,975. The total land area of the city is 58.5 square miles. The "e" was added to Spokane in 1883, and "Falls" was dropped in 1891. The City suffered, perhaps, its biggest setback in 1889, when a fire ravaged downtown destroying 32 blocks.

The city straddles the Spokane River from approximately 2 river miles downstream from its confluence with Hangman Creek to approximately 9 river miles upstream from the confluence. Except for the southernmost part, the city is located almost entirely on the surface of the gravel fill of the Spokane Valley. Most of the city lies at elevations from 1900 to 2100 feet. The City of Spokane consists of rich farmlands, both non-irrigated and irrigated, extensive mineral deposits, and thousands of acres of commercial timber. However, the city is not noted for employment in these fields of activity, but rather the secondary type industries, such as trade, transportation, finance, and services. Historically, these are areas of employment that tend to experience a relatively stable existence. As a result, variations in business activity within Spokane have been less pronounced than elsewhere in Washington. These conditions are expected to continue relatively unchanged.

The climate of the city is similar to that of most of eastern Washington. Temperatures are generally mild, with periodic exceptions in both winter and summer months when continental air masses become predominant, producing temperature extremes in the range from 110°F to -15°F. Generally, summers are characterized by temperatures ranging from 80°F to 90°F during the daytime and from 45°F to 60°F at night. Normal winter temperatures range from 25°F to 40°F during the daytime and from 15°F to 25°F at night. In the vicinity of Spokane, mean annual precipitation varies from approximately 17 inches in the city to 45 inches on Mount Spokane, approximately 35 miles northeast of the city. Most precipitation between December and February occurs as snow, which averages 50 inches per year.

There are seven hydroelectric power plants on the Spokane River, including the previously mentioned Post Falls Dam and three dams in the study area: Spokane Dam, Upper Falls Dam, and Monroe Street Dam. The three dams in the study area are further described below.

The Spokane Dam, located approximately at River Mile 80.2, is also shown as Upriver Dam on some maps. The dam and powerhouse were built in 1937 by the City of Spokane to generate electrical power to drive well pumps of the city water system. The dam is a concrete structure with eight tainter gates filling the 26-foot wide spaces between 3-foot thick concrete piers. The gate sill elevation is 1897.35 feet NAVD, and the normal pool elevation is 1914.35 feet NAVD below the top of the closed gates. Flow in excess of turbine capacity is released by partial opening of one or more gates. When open, the gates are designed to pass a discharge of 62,000 cfs at the upstream water-surface elevation of 1915.03 feet NAVD, the maximum water-surface recorded during the 1933 flood, when the old dam existed. The old dam had a crest elevation of 1903.35 feet NAVD, 4 feet lower than the crest of the new dam.

Two dams on either side of Havermale Island make up the Upper Falls Dam, located between River Miles 74 and 75. The dam across the north channel has an overflow section with 2 60-foot wide by 18-foot high rolling sector gates and 20 7-foot wide lift gates. The dam across the south channel has no overflow provision, containing penstock inlets for the powerhouse. The dams and powerhouse were constructed in 1922 by the Washington Water Power Company. The normal pool elevation is approximately 1874.4 feet. The highest recorded stage was 1878.0 feet, presumably with all gates open, during the December 1933 flood.

The original Monroe Street Dam was the oldest dam on the Spokane River, having been built by the Washington Water Power Company in 1890. It was replaced in 1972 with a concrete overflow structure with the same crest elevation of 1809.9 feet NAVD. The dam serves both as a diversion structure for the Monroe Street powerhouse and a tail water control for the Upper Falls powerhouse.

Hangman Creek drains an area that is predominantly dry-farmed in wheat on Palouse soils with rolling topography. Its total basin above the confluence with the Spokane River is 689 square miles, of which 203 square miles are in Idaho. It enters the Spokane River in the southwestern part of the city and flows north-northwesterly to its confluence with the Spokane River. Flood plain development along the Spokane River consists of single-family residences and industrial buildings. Along Hangman Creek, there are some residential areas, but the area is mostly rural and not as highly developed as the Spokane River flood plain.

City of Spokane Valley

Spokane Valley is located near the eastern border of the State of Washington. The City was newly incorporated on March 31, 2003. With an estimated population of 88,920 (WA State OFM, 2008), Spokane Valley is the 7th largest city in Washington State. The incorporation of Spokane Valley was the largest in the state and the 2nd largest single incorporation in U.S. history at the time.
The incorporated area of Spokane Valley encompasses approximately 38.5 square miles of land area, with room for residential, commercial and industrial expansion.

Town of Latah

The Town of Latah located some 36 miles south east of City of Spokane, close to the state of Idaho border. The Town of Latah was incorporated in 1888. The population in the town per the US Census Bureau of Statistics (2007) is 151. The total land area of the town is 0.3 square miles.

Town of Rockford

The Town of Rockford is located in the eastern portion of Spokane County in northeastern Washington. It is characterized by rolling hills. Slopes range from nearly level to steep. The native vegetation was either grass or open stands of Ponderosa pine and an understory of grass. The elevation ranges from about 2,500 to 4,000 feet (Reference 5).

Rock Creek and Mica Creek which flow through the Town of Rockford are tributaries of Hangman Creek, which is a tributary to the Spokane River.

The main drainage through the Town of Rockford is Rock Creek, which drains an area of 106.2 square miles consisting mainly of cropland with about 15 percent forestland. Approximately 52 square miles in the upper reach of this watershed lie within the State of Idaho. The second stream studied in detail is Mica Creek, which has a drainage area of 22.6 square miles consisting of 80 percent cropland and 20 percent forestland. Rock Creek and Mica Creek have their confluence within the Town of Rockford.

Rockford, with a population of 440 people in 1979, is located approximately 23 miles southeast of the City of Spokane and about 4 miles west of the Idaho border. The mean annual precipitation is about 23 inches. Precipitation is lowest in July and August and gradually reaches a maximum in midwinter and decreases in the spring. Most of the winter precipitation is in the form of snow. The total land area of the city is 0.7 square miles.

Warm winds and rain often melt the snow rapidly and when the ground underneath is frozen causing much of the moisture to be lost as snowmelt runoff. Generally the steeper slopes have greater runoff making water less available for the growing of crops on these slopes.

The average annual air temperature in January is 25° F, and the average July temperature is about 59^0 F. Minimum temperatures of -25° F have been recorded in the area during winter months, while maximum temperatures in excess of 100 Fahrenheit have been recorded during the summer months.

Town of Waverly

The city of Waverly is located some 29 miles south of City of Spokane. The City of Waverly is incorporated in 1907. The population in the city per US Census Bureau of Statistics (2007) is 116. The total land area of the city is 0.4 square miles.

2.3 Principal Flood Problems

The Spokane River, which derives most of its flow from snowmelt in Idaho, is influenced by Coeur d'Alene Lake, resulting in a relatively stabilized flow condition free from the extreme peaks that would result if the lake did not exist; however, damaging floods have occurred. climatologically and stream flow records for the Spokane River basin indicate that the region experiences spring snowmelt and winter rain floods.

Winter rain floods are caused by warm temperatures and rainfalls that accompany intense Pacific Ocean storms which sometimes move eastward across Washington and Idaho. In such cases, rainfall, snowmelt, and occasionally frozen soil conditions combine to produce short-duration, intense runoff. In most cases, peaks on the lower Spokane River are reduced by the large storage volume normally available in Coeur d'Alene Lake. The large size of the upper Spokane River basin also tends to moderate the effect of winter floods. Hangman Creek normally experiences its greatest flood peaks during winter storms.

Statistical analysis of streamflow records shows that the 1% annual chance flood discharge on the Spokane River at Spokane is 52,000 cfs. Several historical floods of record have approached this magnitude, the most recent being the flood of January 1974, which had a peak discharge of 45,600 cfs. The largest flood for which water-surface data are available is the flood of December 1933, which had a peak discharge of 47,800 cfs.

Flooding along the Little Spokane River is similar to that on Hangman Creek. Statistical analysis of the lower gage on the Little Spokane River gives a 1% annual chance flood, flow of 4,355 cfs; flood flow the drainage area covered by this gage of 665 square miles. The flood of record at this gage was recorded on February 17, 1970, and had a peak discharge of 3,170 cfs. The record flow at the gage located further upstream, at Elk, was 205 cfs on January 16, 1974. The drainage area covered by the upstream gage is 115 square miles.

In contrast to the Spokane River, for which there is ample warning time for high flows, extremely high peak flows can be generated on Hangman Creek with little advance warning. The soils in the Hangman Creek valley provide essentially no ground water to sustain flow when there is no precipitation or snowmelt. Also, there are no artificial impoundments. The net result is a stream characterized by extremes. Most of Hangman Creek flows through rural areas where encroachment on the flood plain is minimal.

Flood problems experienced in 1974 are typical of flood damage on Hangman Creek throughout the urban area. Problems in the City of Spokane extended from the vicinity of the 11th Street bridge upstream to a point approximately 1,500 feet south of U.S. Highway 195 and consisted of limited inundation of individual residences and failure of poorly constructed levees subjected to high stream flow velocities. In addition, the Hangman Valley Golf Course, which was constructed with full knowledge of flood problems, suffered extensive damage in 1974. Silt was deposited on fairways, and two pedestrian bridges were destroyed. Flooding problems on Hangman Creek involve bank erosion and undercutting as well as inundation. The flood of record was recorded at 20,600 cfs in February 1963 (Reference 6). Historical floods on Hangman Creek are listed in Table 3.

Several homes lie within the 1% annual chance flood plain of Country Homes Drainage. Most of these are located on the eastern side of the drainage between Holland and Jay Avenues.

Table 3 - Historic Floods

Hangman Creek[1] (Date)	Peak Discharge (cfs)	Recurrence Interval (Years)
February 1963	20,600	37
January 1974	17,700	21
January 1959	16,200	15
December 1965	14,500	10
May 1948	11,900	6
Predicted 100-Year Flood	26,000	100
Spokane River[2] (Date)	Peak Discharge (cfs)	Recurrence Interval (Years)
May 1894	49,000	62
December 1933	47,800	50
January 21 1974	45,600	36
May 1917	41,900	20
January 1918	39,600	14
Predicted 100-Year Flood	52,000	100

[1] U.S. Geological Survey (USGS) Stream Gage, Hangman Creek at Spokane
[2] U.S. Geological Survey (USGS) Stream Gage, Spokane River at Spokane

No long-term gage records exist for Chester Creek. Limited gage measurements of the flow along Chester Creek were made as part of a previous hydrology investigation (HYDMET, 1977). The gage data were collected near the Dishman-Mica Road crossing of Chester Creek from December 1994 through March 1995 and November 1995 through February 1996. No significant flood events occurred during the period of record.

City of Spokane

The Spokane River is generally contained in its channel, with substantial freeboard even at the 1% annual chance flood, except for a few areas as described below.

In Peaceful Valley (River Mile 73.6), the total area potentially affected is approximately 11.7 acres, containing 20 single-family residences and 1 industrial structure. The estimated potential damage resulting from the 1% annual chance flood and the failure of temporary sandbag dikes is street, yard, and basement flooding involving 20 homes, some of which experience first floor damage. The single industrial facility in the area is a casket factory whose concrete floor is above the flood plain, the flood potential being confined primarily to the storage yard. The residences in the area are single-family wood structures, mostly over 40 years old. The 1974 flood, classified as a 36-year event, caused some damage, mainly basement and street flooding.

In River point, the industrial area east of Gonzaga University, River Miles 75.5 to 76.2, the total area affected is approximately 24.2 acres, of which 8.8 acres contain industrial development. The developed area affected is on Columbus Street, between Trent Avenue and Springfield Avenue; Springfield Avenue, from Cincinnati Street to the river; Superior Street, on both sides of Springfield Avenue; the west side of the post office; and the riverside of buildings at the foot of Cincinnati and Columbus Streets. The maximum depth of flooding is estimated to be 3 feet, which would severely restrict access to the post office and many of the industries located in this area, most of which would be able to sustain a flood with little damage other than disruption of operation caused by limited access. Many floor levels are at truck loading dock level. The length of riverbank involved is approximately 1800 feet adjacent to the developed industrial area. Other than the street flooding that limited access to the area, the 1974 flood caused no reported structural damage.

There is also a limited overbank condition at flood flows on the left bank (south side) of the river, opposite the industrial area east of Gonzaga University. The high water observed on the left bank in January 1974 was limited primarily to undeveloped land. Some limited flooding was experienced adjacent to the river, between the upper Trent Avenue bridge and Broadway and at a marina upstream of Division Street.

On Upriver Drive (River Miles 76.8 to 78.0), the area affected on the north bank of the river between the Mission Avenue and Greene Street bridges. In addition to Upriver Drive itself, a house and two apartment buildings are threatened. There was no actual structural damage in this area during the 1974 flood.

Some low-lying areas of the city have a flood problem due to prevailing high water table conditions that are often aggravated by rapid snowmelt and/or runoff situations. The City of Spokane is aware of the general limits of these flood-prone areas although few records are available concerning the specific circumstances and depths of flooding.

Town of Rockford

Most flooding along Rock Creek and Mica Creek has occurred during late winter and early spring from heavy rainfall or snow. These events are often associated with frozen ground conditions which greatly reduce the infiltration of the moisture to the soil. The steep hillsides and stream gradients quickly convey storm runoff to the Town of Rockford. Manmade restrictions such as bridges and road fills restrict the flow.

Local residents report the largest flood in recent times occurred in 1963. There are no gage flow records to indicate the size of this flood. High flows of the 1963 flood caused some damages to area homes and businesses. At this time the US

Army Corps of Engineers constructed a dike upstream of the Emma Street Bridge on the east side of Rock Creek. This dike will provide protection against the 25 year storm event before overtopping.

The January 4, 1903 edition of the Spokesman Review repored one of the heaviest rainstorms ever known, which hit the Town of Rockford and continued uninterrupted for hours. The rain melted about four inches of heavy, wet snow. Creeks flooded covering the town with two to six feet of water. Several homes on Willow Street were flooded and the families evacuated. By early afternoon Rock Creek was a "raging torrent nearly a quarter of a mile wide." The railroad bridge north of town was threatened by the water, though workers managed to stem the flow to some degree by filling the hole with large rocks, timber and debris.

Other historical flooding has occurred in 1910, 1933, 1939, and various other years. Ice jams and sediment bars have added to increased flood elevations during flooding. A large sediment load is carried by the streams in Rockford during flooding (Reference 1).

2.4 Flood Protection Measures

Spokane County

A minimum of flood protection measures have been installed throughout the unincorporated areas of the county. These are individual attempts to protect private property, including rip-rapping of stream banks and flood proofing of residences within the flood plain.

Community and agency concerns about the extent of flooding and uncertainties regarding existing floodplain mapping resulted in the development of a watershed plan for Chester Creek. The goal of that plan was to identify management recommendations for issues of drainage and flooding, water quality, and riparian habitat. Because of that watershed planning effort, projects to construct various improvements along Chester Creek between Thorpe Road and Schaffer Road have been implemented by Spokane County. In 1998, a project to install new culverts and extensive dredging of the channel between Thorpe Road and Schaffer Road was implemented. Additionally, as part of a Spokane County improvement project for Dishman-Mica Road, a large volume borrow pit was constructed to act as a retention and infiltration facility for the floodwaters of Chester Creek.

City of Spokane

Upstream from Coeur d'Alene Lake there are no significant impoundments, so this lake provides the only regulation of the Spokane River as it enters Spokane. Because Coeur d'Alene Lake is held at a constant elevation throughout the summer season, there is essentially no summer regulation; it is lowered prior to the spring snowmelt, so that there is attenuation of peak flows. Therefore, the Spokane River is characterized as an unregulated summer stream, but with significant winter peak attenuation.

The three dams on the Spokane River in the Spokane area have relatively small impoundments, which are operated primarily to create head on the turbines rather than for storage.

Town of Rockford

In 1963, the U.S. Army Corps of Engineers constructed a dike upstream of the Emma Street Bridge on the east side of Rock Creek. This dike will provide protection against the 25-year storm event.

Future flood protection measures, both structural and non structural are evaluated in the Floodplain Management Study for the Town of Rockford, dated October 1984, performed by the SCS (Reference 5).

Recommendations of that report include, but are not limited to, adopting a building permit system, implementing flood proofing for existing buildings, zoning in the floodplains, and adopting the guidelines and requirements of the National Flood Insurance Program.

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 is expected to be equaled or exceeded once on the average during any 10%, 2%, 1%, or 0.02% annual chance 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 annual chance floods, have a 10-, 2-, 1-, and 0.2-percent annual 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 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

Spokane County

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

Three USGS stream-gaging stations in the study area were used to establish the discharge-frequency relationships for the Little Spokane River and Hangman Creek. The gage on the Little Spokane River at Dartford has a period of record from April 1929 to the present, and it covers a drainage area of 665 square miles. A second gage on the Little Spokane River is located at Elk; it covers a drainage area of 115 square miles and has records dating back to 1949. The gage on Hangman Creek has a period of record from April 1948 to the present and is located in the City of Spokane 0.3 mile downstream of Interstate Highway 90. It covers a drainage area of 689 square miles.

The contributing stream flows on Hangman Creek were determined by statistical stream flow correlations and examination of historical flood hydrographs. In general, peak runoff on Hangman Creek occurs approximately 1 week before peak discharge on the Spokane River. When the Spokane River is cresting, Hangman Creek has normally receded to a comparatively low discharge. Coincident discharges on the Spokane River are not particularly important in the case of Hangman Creek, because the gradient of Hangman Creek near the mouth is steep and the profile is minimally affected by Spokane River backwater.

Flood flow-frequency curves were prepared for the stream-gaging stations in the study area following guidelines given in U.S. Water Resources Council Bulletin l7B (Reference 7). Because no stream flow data were available, the hydrology for Saltese Creek, and Country Homes Drainage was analyzed using a synthetic hydrograph method. The method used was the SCS TR-20 computer program (Reference 8), which predicts peak flow at specific locations, based on precipitation, land use, soil type, topography, and unit-hydrograph techniques. This part of the model was verified using USGS Open-File Report 74-336 (Reference 9). Precipitation data were obtained from National Oceanographic and Atmospheric Administration maps using 24-hour storm events. These values were then reduced to an annual series using SCS Technical Note PO-6 (Reference 10). Curve numbers and times of concentration were obtained using procedures dictated by the SCS National Engineering Handbook (Reference 11).

Peak discharge-drainage area relationships for Country Homes Drainage, Little Spokane River, Hangman Creek, and Saltese Creek are shown in Table 4.

Hydrologic computations were performed using the SCS computer program TR-20 (Reference 8) for The Spokane River and Forker Draw. Thirty-six years of gage records were available for comparison of discharges developed for the Spokane River. Values of the discharges for given recurrence intervals are tabulated in the Summary of Discharges (Table 4).

No long-term gage records exist for Chester Creek. Limited gage measurements of the flow along Chester Creek were made as part of a previous hydrology investigation. The gage data were collected near the Dishman-Mica Road crossing of Chester Creek from December 1994 through March 1995 and November 1995 through February 1996. No significant flood events occurred during the period of record.

City of Spokane

Two U.S. Geological Survey stream gaging stations located in the study area were used to establish the discharge-frequency relationship for each stream. The gage on the Spokane River, having a period of record from April 1891 to the present, is located within the City of Spokane, at Cochran Street. It drains an area of 4290 square miles. The flood of record at this gage was recorded in May 1894 at 49,000 cfs. The gage on Hangman Creek has a period of record from April 1948 to present and is also located in Spokane, 0.3 mile downstream of Interstate Highway 90. It drains an area of 689 square miles, and its flood of record was in February 1963 and recorded at 20,600 cfs (Reference 4).

Flood-frequency curves were prepared for the two stream gaging stations in the study area, generally following the guidelines given in Bulletin 17 of the U.S. Water Resources Council (Reference 12), including adjustments for expected probability.

Peak discharge-drainage area relationships for the Spokane River and Hangman Creek are shown in Table 4.

Town of Rockford

No stream gage records exist for Rock Creek near the Town of Rockford. Stream gage data on Hangman Creek near Spokane U. S. Geological Survey (USGS) gage No. 12424000 was utilized for this study. The drainage area at this gage is 689 square miles. The gage has records from April 1948.

A computer hydrology model (TR-20) was utilized to match statistical analysis of flow data gathered at the USGS gage at the mouth of Hangman Creek (Reference 13). The TR20 model uses soils data as published in the Spokane County Soil Survey Report (Reference 14). Land use information gathered from field surveys and precipitation frequency data from NOAA Atlas II published by the U.S. Department of Commerce was also utilized (Reference 15).

Peak discharge-drainage area relationships for Rock Creek and Mica Creek are shown in Table 4.

Analyses were carried out to establish the peak elevation-frequency relationships for flooding on Newman Lake and Saltese Flats.

The hydrologic analysis of Newman Lake, which drains an area of 26.5 square miles, was based on results from an SCS TR-20 computer program run at the lake level regulating structure. Flood elevations were determined for rainfall and snowmelt-type storms and for separate operating conditions during which flood gates remained closed or were opened. Results used in this study assumed the worst-case combination in which snowmelt causes runoff and floodgates are closed. Various lake-surface elevations were assumed prior to 10- and l00-year storm events; thus, a range of peak flood elevations was determined. The beginning water-surface elevation is 2,122.6, which was derived from the water management plan for draining the lake to that elevation in the event of deep snow pack. The operating level is 2,126.0. If water management plans are correctly carried out, the 100-year flood would pass with a maximum elevation of 2,126.4; if not, the 100-year elevation would be 2,127.0.

Table 4 - Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Argonne Drainage					
At North Boeing Road	--[1]	80	140	173	214
At East Upriver Drive	--[1]	102	180	222	274
At Tributary near North Elton Road	--[1]	150	2,654	328	405
Chester Creek					
Near 24th Ave	19.5	14	26	32	44
Near Schafer Road	18.4	113	137	147	169
Near Thorpe Road	12.4	75	104	116	144
Chester Creek Golf Course Overflow					
At Chester Creek	--[1]	30	54	64	88
Chester Creek West of Borrow Pit					
At Chester Creek	--[1]	14	26	32	44
Country Homes Drainage					
At Highland Road At Hawthorne Road	4.62	165	311	370	551
At Hawthorne Road	3.78	138 [1]	249 [1]	293 [1]	349 [1]
At Cascade Way	2.49	142	284	293	408
Hangman Creek					
At USGS Gage	689	14,300	22,200	26,000	36,300
At Hatch Road	582	12,100	18,800	22,000	30,700
Little Spokane River Near Mouth	685	2,366 [2]	3,491 [2]	3,884 [2]	5,009 [2]
At USGS Gage Near Dartford	665	2,589	3,847	4,288	5,563

[1] Decrease Due to Ponding, Pervious Soils, and Storage in Overbanks
[2] Not Calculated
--[1] Not Available

Table 4 - Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Hangman Creek / Little Spokane River Near Mouth – cont'd					
Above Confluence with Deep Creek	638	2,545	3,761	4,194	5,454
Below Confluence with Dragoon Creek	490	2,054	3,011	3,372	4,452
Below Chatteroy	312	1,001	1,436	1,611	2,166
Below Confluence with Eloika Lake	281	892	1,260	1,415	1,917
At Milan	255	727	1,006	1,137	1,590
Saltese Creek					
At Steen Road	24.2	65	215		531
At Baker Road	21.8	31	66		101
Spokane River					
At USGS Gage Near Otis Orchard	3,880	37,500	47,000		65,000
Forker Draw					
At Bigelow Gulch Road	--[1]	49	88	109	135
Below East Jacob Road	--[1]	60	108	134	166
At Chursh Driveway	--[1]	117	209	259	321
Rock Creek					
Below Confluence with Mica Creek	128.8	5,190	9,590	11,500	15,590
Above Confluence with Mica Creek	106.2	4,410	8,060	9,640	12,990
Mica Creek					
At its mouth	22.6	1,190	2,290		3,840
Unamed Tributary to Chester Creek (see next page)					

--[1] Not Available

Table 4 - Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Unnamed Tributary to Chester Creek – cont'd					
At Storage Area	--[1]	10	14	16	20
At Pines Road	--[1]	12	24	30	46
At E. 46th Ave.	--[1]	11	22	28	45
At S. Tolbert Lane	--[1]	7	14	18	28

--[1] Not Available

The Saltese Flats area was included in the SCS TR-20 computer analysis of Saltese Creek. Elevations for floods of the selected recurrence intervals on Newman Lake and Saltese Flats are shown in Table 5.

Table 5 - Summary of Elevations

Flooding Source and Location	Annual Percent Chance Elevation (Feet) NAVD			
	10 Percent Annual Chance	2 Percent Annual Chance	1 Percent Annual Chance	0.2 Percent Annual Chance
Newman Lake	2,129.9	--[1]	2,130.9	--[1]
Saltese Flats				
Above Dike	2,082.3	2,047.5	2,048.9	2,052.2
Below Dike	2,040.3	2,041.6	2,042.0	2,042.6
Stormwater Runoff	--[1]	--[1]	2,005.0	--[1]

--[1] Data Not Available

Revision 1
As part of the FEMA Map Modernization program, following hydrologic studies were conducted. Revised flood flow estimates are included in the table 4.

Chester Creek

A detailed hydrologic analysis of Chester Creek in Spokane County and the City of Spokane Valley, Washington was conducted. The objective of the analysis was to establish flood magnitude-frequency estimates for use in a Flood Insurance Restudy of the watercourse. The analysis was conducted using the Hydrological Simulation Program Fortran (HSPF; EPA, 1997).

The hydrology of Chester Creek was previously analyzed using HSPF by HYDMET (1997) for watershed planning purposes (CH2M Hill, 1997). The model developed for that analysis was refined for use in the current study. The refinements included incorporating more detailed channel survey information, updating the land use to reflect current conditions, including the effects of infiltration from the stream channel and six storage areas identified in the lower reaches of the basin, extending the simulation through year 2002 for a total simulation period of 54-years, and recalibrating the model to recorded stream flow and regional information from adjacent basins.

Argonne Drainage and Forker Draw

Annual instantaneous peak discharges for the 10-, 2-, 1-, and 0.2-percent floods were estimated following FEMA guidelines. In the absence of recorded flows for the basin, regression equations developed by the USGS were used to determine flood flows. The regression equations are described in *Magnitude and Frequency of Floods in Washington* (USGS 2002). The report is the most recently published USGS report for estimating flood magnitude and frequency in the Spokane region of the state (Region 8). The regression equations represent watershed and climate conditions similar to those for the Argonne basin and Forker Draw. Flood flows for the Argonne basin were initially estimated as follows:

- Flows for 10-, 2-, 1-, and 0.2-percent annual chance floods were estimated for the Argonne basin using regression equations published in *Magnitude and Frequency of Floods in Washington* (USGS 2002).

- An unadjusted trend line for flood flows estimated by the regression equations was plotted for a range of drainage areas up to 25 square miles. The trend line illustrates how flood flows vary with drainage area, based on the USGS analysis of regional stream flow gaging stations.

- An adjusted trend line was plotted by adding the standard error of the estimates from the USGS regression equation analysis to the unadjusted values. The adjusted values represent the upper range of flood estimates.

The reasonableness of the regression equation estimates was assessed by comparing them to other flood-flow estimates as follows:

- Flood records from each of the 23 USGS regional gaging stations were analyzed to compare flood estimates at each individual gage with the trend line determined from the regression equations. This exercise compared individual gaging station flood estimates with the regionalized regression equation estimates. A Log Pearson Type III distribution was used to determine the 68-percent confidence limits for the 10-, 2-, 1-, and 0.2-percent annual chance flood from all of the 23 USGS gages in Region 8. The software HEC-FFA was used to perform the analysis.

- Flood estimates from the regression equations were compared to flood estimates based on flow records at two USGS gaging stations in similar basins near the Argonne basin and Forker Draw.

- Flood estimates from the regression equations were compared to flood estimates from recently completed HSPF modeling efforts conducted by Spokane County.

3.2 Hydraulic Analysis

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

Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables 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 in conjunction with the data shown on the FIRM.

Water-surface elevations were established using an SCS backwater computer program (Reference 16). Starting water-surface elevations for the Little Spokane River were taken from data on the Spokane River at Long Lake. Starting water-surface elevations for Hangman Creek were taken from the water-surface profile for the City of Spokane Flood Insurance Study (Reference 17). Starting elevations for Country Homes Drainage were taken from elevations along the Little Spokane River. Starting water-surface elevations for Saltese Creek were taken from estimated elevations of Shellby Lake. Cross sections used in the analysis were field surveyed.

For those reaches of Little Spokane River that were studied in detail, roughness factors (Manning's "n") were based on field observations, aerial photographs (Reference 18), and slope-area computations for stream gages. With adjustments, these roughness values were used to reproduce high-water marks for historical floods. Values for the main channel of the Little Spokane River ranged from 0.03 to 0.04, overbank values ranged from 0.048 to 0.085. For Hangman Creek, roughness values were based on slope- area computations made from the site of the USGS stream gage, aerial photographs (Reference 18), and field observations. The values ranged from 0.028 to 0.035 for the channel and from 0.040 to 0.070 for the overbank areas.

For Saltese Creek, and Country Homes Drainage, "n" values used were as follows:

Overbank area (dense brush)	0.070
Overbank area (dense trees)	0.100
Overbank area (grass)	0.027-0.045
Street (asphalt)	0.013
Channel (dug)	0.025-0.030
Channel (natural)	0.030-0.040
Channel (asphalt)	0.013

River miles shown on profiles and tables in this study were established by prorating map distances between key landmarks (such as bridges) for which the river mile stationing is specified in River Mile Index, published by the Pacific Northwest River Basins Commission in April 1964 (Reference 19). Because of channel changes since the index was established, the measured distances between index stations do not always equal the published distances. In such cases, intermediate river mile stations were located by interpolation. The distances between cross sections shown on the maps were used in the backwater computations.

No allowances were made for possible accumulations of debris at bridges. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Country Homes Drainage is blocked by fill dirt near a baseball field that is approximately 2,000 feet downstream of Pinewood Road. The Spokane County Water District has installed a pipe to convey low flow under the fill (a length of approximately 350 feet). The pipe is not adequate to handle a 1% annual chance flood discharge, and much, of the unstable fill dirt would be washed away in such an event.

Hydraulic analyses for the Spokane River were performed using the SCS computer program WSP-2 (Reference 16).

Profiles were not included for Liberty Lake due to the fact that the elevations for the lake and the adjacent channel remain constant. No floodways were included for Liberty Lake.

The difference in elevation at the Idaho state line is because of updated discharge values used in the revised analysis of the Spokane River west of the state line.

Saltese Creek has been rerouted around the lower part of Saltese Flats. The new channel begins at the west end of the dike dividing Saltese Flats. The diversion channel does not have the capacity to hold the 10% annual chance year flood discharge. Thus, during flood stage, water will spill into the lower area of Saltese Flats and reenter the channel downstream.

Flooding on approximate-study streams was determined by the use of stereo photography (Reference 21) and the study of geomorphological characteristics of the flood plain areas such as old scarps and soil features.

City of Spokane

Analyses of the hydraulic characteristics of streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in the community.

Water-surface elevations were established using a US Army Corps of Engineers backwater computer program (Reference 22). Starting water-surface elevations for the Spokane River were prepared for three backwater models for successive reaches extending from River Mile 66.20 to River Mile 81.52. The starting water-surface elevations for these models were based on rating curves for River Mile 66.20 (Bowl and Pitcher Damsite), Upper Falls Dam, and Upriver Dam. These curves were based on slope-area computations, observations made by Washington Water and Power Company employees during the 1974 flood, and hydraulic computations, respectively. Starting water-surface elevations for Hangman Creek were obtained from its confluence elevations with the Spokane River.

Local inflow on the Spokane River, ranging from 42 to 70 cfs per mile for 10% annual chance and .02% annual chance floods, respectively, was added at the downstream end of each study river reach. Additional assumptions for Spokane River backwater calculations are as follows:

1 All spillway gates at Upper Falls and Upriver Dams are open during major floods.

2 The power diversion at these dams will have negligible effect on the backwater profiles for the main of Spokane River.

3 The water-surface profile is flat in powerhouse intake canals. For Hangman Creek, it was assumed that all flow passed through or over the bridge at Chestnut Street.

Cross sections used in the analysis were field surveyed. 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 is computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map.

For those reaches of Spokane River that were studied in detail, roughness factors (Manning's "n") were based on field observations, aerial photographs (Reference 23), and slope-area computations for stream gage locations. With adjustments, these roughness values were used to reproduce high-water marks for historic floods. Values for the main channel of the Spokane River ranged from 0.041 to 0.048, and overbank values ranged from 0.048 to 0.085. For Hangman Creek, roughness values were based on slope-area computations made from the site of the U.S. Geological Survey stream gage, aerial photographs (Reference 23), and field observations. The values ranged from 0.280 to 0.035 for the channel and from 0.040 to 0.070 for the overbank areas.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals.
For small closed basins within the City of Spokane subject to ground-water flooding, the 1% annual chance flood limits were provided by the city. The areas were estimated by field survey and through use of all available data. For the area of the supercritical flow along the Spokane River, the U.S. Army Corps of Engineers backwater program was used, but only to obtain the 1% annual chance elevation (Reference 22).

Town of Rockford

Analyses of the hydraulic characteristics of flooding from the riverine sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Hydraulic studies were completed using the Soil Conservation Service Water Surface Computer Program (WSP-2) (Reference 16). Field surveys were completed to obtain cross sections which plotted and assigned hydraulic parameters for use in the WSP-2 program. Elevation-discharge-velocity information from the WSP-2 computer program was used to plot rating curves for each cross section. The rating curves were used in peak flow frequency information from the studies and with historic high water information to obtain water surface elevations for the 10% annual chance, 2-, 1-, and .02 annual chance floods at each cross section. The water-surface elevations for these events and the location of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). Selected cross section locations are also shown on the Flood Insurance Rate Map.

The effects of flow blockage by ice or other debris are indeterminate and; therefore, not considered. Such factors as future floodplain scouring or filling, bank erosion and channel degradation also affect the water-surface profiles. Evaluations in this study considered only channel and floodplain features existing at the time field surveys were made.

Roughness factors (Manning's "n") used in the hydraulic computations ranged from 0.035 to 0.05 in the channel and from 0.05 to 0.07 in the overbanks.

Liberty Lake

The data included for Liberty Lake were taken directly from a report dated March 1990 prepared by James M. Montgomery, Consulting Engineers, Inc. (Reference 1) Profiles were not included for Liberty Lake due to the fact that the elevations for the lake and the adjacent channel remain constant. No floodways were included in the revision.

Countywide Revision Updates

Chester Creek

A steady flow model has been developed for Chester Creek and its Unnamed Tributary using HEC-RAS Version 3.1.3 for this study (Reference 20). Though the Chester Creek floodplain extends downstream to 2nd Ave., no defined channel exists for Chester Creek downstream of the Borrow Pit just south of 28th Avenue (Storage Area 2). Downstream of 28th Avenue flood discharges spread across relatively flat fields and pastures and continues downstream to residential and commercial property. The Unnamed Tributary channel terminates in a gravel pit (Storage Area 6) just north of E. 40th Avenue and approximately 1500 feet downstream of the Pines Road crossing. The gravel pit contains flows up to the 25 year event. Small discharges of 2, 4, and 7 cfs overtop the pit for the 50, 100, and 500 yr event, respectively and continue downstream flowing across fields until joining the floodwaters from Chester Creek in the Painted Hills Golf Course (Storage Area 1) where it is expected to pond until it infiltrates.

Channel geometry for Chester Creek was developed from surveys conducted in March 2003. Overbank geometry were developed from topography developed by TerraPoint (2003).

Manning's "n" values were based on a field inspection and aerial photos and are as follows.

Chester Creek Channel	0.040-0.06
Chester Creek Overbanks	0.016-0.10
Unnamed Tributary to Chester Creek Channel	0.040-0.06
Unnamed Tributary to Chester Creek Overbanks	0.016-0.10

Normal depth was specified at the downstream end of Chester Creek based on the ground slope near the downstream end of the model reach. Three reaches end in storage areas modeled in HSPF as part of the hydrologic analysis. The known water surface elevation from HSPF output was used as the starting water surface elevation for these reaches.

Argonne Drainage and Forker Draw

An analysis of the hydraulic characteristics of flooding along the Argonne Drainage study reach were performed using a HEC-RAS (USACE, 2003) water surface profile computer model created for this study. The data, information, and assumptions used to construct the hydraulic model are described below.

Channel and Floodplain Topography - The HEC-RAS model for Argonne Drainage and Forker Draw use cross-sections to represent the channel and floodplain. Cross-sections were developed from a combination of data sources. The floodplain information for each section was developed from Spokane County topographic data; a field survey (October 2006) was used for the channel information.

Dimensions of hydraulic structures were determined during the field survey. Spokane County provided digital topography using aerial photographs taken in 2001. These contours were at 2-foot intervals and provided sufficient detail to estimate the extent of the floodplain.

For Argonne Drainage and Forker Draw, the final Flood Insurance Rate Maps (FIRMs), their base flood elevations (BFEs), and flood profiles are referenced to NAVD 88.

Hydraulic Structures - Numerous culverts are located along the studied reach of Argonne Drainage, primarily at road crossing. All of the culverts identified in the field or from the County's public drainage inventory were coded into the HEC-RAS model. The hydraulic model includes six culverts. Culvert dimensions and elevations were surveyed as part of the October 2006 survey.

Roughness values ('n') used for modeling the culverts were chosen based on field observations and engineering judgment. Values depended on the culvert construction material and ranged from 0.013 for concrete culverts to 0.024 for corrugated metal pipe (CMP) culverts.

Manning's roughness coefficient for channel was estimated to be 0.045 for Argonne Drainage and ranged from 0.045 to 0.055 for Forker Draw, based on field observations and engineering judgment. The overbank roughness values ranged from 0.055 to 0.065.

Starting Water Surface Elevations - The downstream boundary of the Forker Draw study area is the downstream boundary of the alluvial fan. The downstream boundary of the Argonne study area is the point where the creek enters the Spokane River. The starting water surface elevation was assumed to be normal depth for all flood profiles.

Model Calibration - No calibration data was available for the Argonne or Forker model. Interviews with longtime residents provided anecdotal information that was used as a check for the model. Without specific calibration data it is impossible to judge the accuracy of the water surface profiles. However, considerable care was taken to examine the modeling results for reasonableness based on the information that was available.

In general, the HEC-RAS model results came close to reproducing the previously observed flooding problems on the creek. A comparison of actual flood elevations with flood elevations predicted by the model is not possible due to the lack of information. The modeling results confirmed several observed instances of flooding.

Flood Profiles - The flood profiles for the 10-, 2-, 1-, and 0.2-percent chance events for the detailed study reach of Argonne Drainage and Forker Draw are illustrated in Exhibit 1. These profiles represent conditions of unobstructed flow.

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.

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.

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 used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

All previous elevations in Spokane County have been converted from NGVD to NAVD by adding 3.9 feet.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD.

These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey 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. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community 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 topographic maps at a scale of 1:4,800, with a contour interval of 2 feet (Reference 24), and 1:24,000, with contour intervals of ranging from 20 to 40 feet (Reference 25). Flood plain boundaries for Saltese Flats were delineated using a topographic map at a scale of 1:7,900, with a contour interval of 1 foot (Reference 26).

Flood plain boundaries for Chester Creek and Unnamed Tributary to Chester Creek were delineated using 2 foot contour interval maps developed by TerraPoint from LiDAR data.

City of Spokane

Boundaries were interpolated using topographic maps at a scale of 1:4800, with contour intervals of 10 and 20 feet (Reference 27), and maps at a scale of 1:2400, with contour intervals ranging from 5 to 20 feet (Reference 28).

Also useful in establishing flood boundaries was the stereoscopic viewing of aerial photographs (Reference 23) of the January 1974 flood.

In cases where the 1% and .02% annual chance flood boundaries are close together, only the 1% annual chance flood boundary has been shown.

Boundaries for the supercritical flow area of the Spokane River and the various pothole areas studied by approximate methods were delineated on topographic maps at a scale of 1:4800 with contour intervals of 10 and 20 feet (Reference 27).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones [\A, AE, AH, AO, A99, V, and VE), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. 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.

Approximate flood plain boundaries were delineated using topographic maps at a scale of 1:24,000, with contour intervals of 20 and 40 feet (Reference 29). Approximate 1-percent-annual-chance floodplain boundaries in some portions of the study area were taken directly from the Flood Hazard Boundary Map for (Reference 30).

The floodplain boundaries for the 0.1-percent chance and the 0.2-percent chance event under existing development conditions are illustrated on the FIRM. The flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the flood profiles in Exhibit 1. The floodplain limits shown on the FIRM are based on available survey and contour map data in all locations; it is possible that the floodplain may not be delineated correctly in some places. In some locations the field survey identified inaccuracies in the contour mapping. In these instances, the floodplain boundary was mapped according to the survey data; therefore the floodplain elevations may not always match the contour lines.

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 base 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.

The floodways presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (see Table 6, Floodway Data). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

City of Spokane

Floodway limits for the Spokane River and Hangman Creek were established by equal-percent reduction of overbank conveyance. The maximum resultant rise in 1% annual chance water-surface elevation was 0.7 foot for Spokane River and 0.9 foot for Hangman Creek. Criteria used in the floodway determinations were a maximum rise of 1.0 foot in water surface at any cross section and a maximum increase in channel velocity of 15 percent. For the Spokane River, the floodway is generally confined to the river channel. Channel boundaries were initially defined from the geometry at each cross section, but the City of Spokane questioned the channel definition in some areas, claiming they were too wide, thereby unnecessarily removing valuable land from potential development. As a result of these comments, the floodways were revised where hydraulically possible, to match the channel shown on topographic maps provided by the city (Reference 28).

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 water-surface elevation (WSEL) of the base 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.

The 100-year floodway boundaries developed in this study were determined with the HEC-RAS model, with the assumption of equal conveyance reduction from each side of the floodplain (HEC-RAS Method 4). At many locations in the Argonne Drainage model, the floodway boundary coincides with the top of the channel banks, yet a 1-foot rise is not achieved at these sections. As required by FEMA, the floodway cannot encroach into the active channel; therefore, the rise is limited to less than 1 foot.

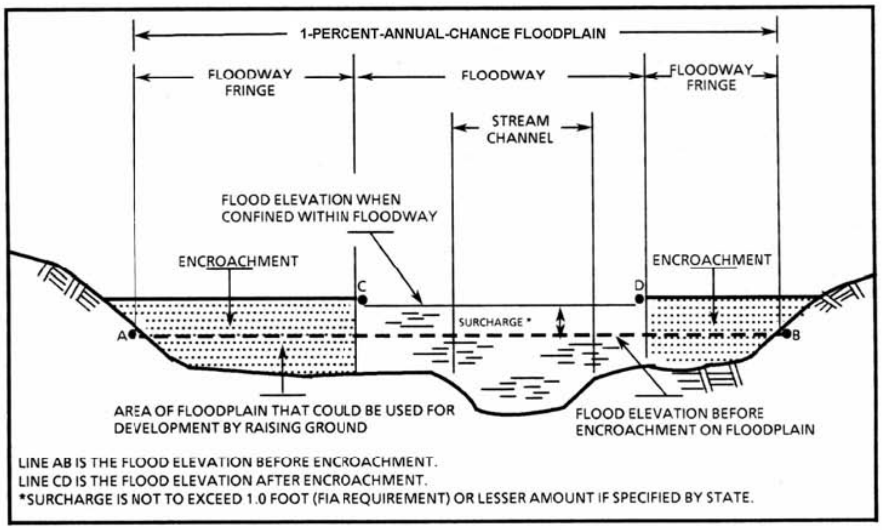

Figure 1 - Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
ARGONNE DRAINAGE								
A	0	15	108	5.5	1,922.60	1,922.60	1,922.60	0.0
B	260	17	177	1.5	1,928.50	1,928.50	1,929.00	0.5
C	615	31	37	6.1	1,932.10	1,932.10	1,932.10	0.0
D	1,146	29	36	6.2	1,946.20	1,946.20	1,946.20	0.0
E	1,401	27	77	3.2	1,961.40	1,961.40	1,962.40	1.0
F	1,993	47	154	1.4	1,961.90	1,961.90	1,962.90	1.0
G	2,414	120	381	0.7	1,962.00	1,962.00	1,963.00	1.0
H	2,640	44	177	1.7	1,964.50	1,964.50	1,965.50	1.0
I	3,294	53	159	1.6	1,964.50	1,964.50	1,965.50	1.0
J	3,640	66	314	0.7	1,968.50	1,968.50	1,969.50	1.0
K	4,138	122	436	0.4	1,968.50	1,968.50	1,969.50	1.0
L	4,571	38	55	3.2	1,969.10	1,969.10	1,969.60	0.5
M	4,806	22	66	7.8	1,972.80	1,972.80	1,973.10	0.3
N	4,891	198	746	0.3	1,976.40	1,976.40	1,976.70	0.3
O	5,278	62	189	0.9	1,976.40	1,976.40	1,976.80	0.4
P	5,353	265	874	0.3	1,976.70	1,976.70	1,977.70	1.0
Q	5,820	104	210	0.8	1,976.80	1,976.80	1,977.80	1.0
R	6,756	105	41	4.2	1,982.30	1,982.30	1,982.30	0.0
S	6,861	22	121	1.9	1,987.10	1,987.10	1,987.10	0.0

[1]Feet above confluence with Spokane River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

ARGONNE DRAINAGE

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK								
A[2]	517	–	–	–	–	–	–	–
B[2]	1,134	–	–	–	–	–	–	–
C[2]	1,714							
D	2,219	32	56	0.6	1,991.50	1,991.50	1,992.10	0.6
E	2,741	30	59	0.6	1,991.90	1,991.90	1,992.50	0.6
F[2]	3,142	–	–	–	–	–	–	–
G[2]	3,554	–	–	–	–	–	–	–
H[2]	4,042	–	–	–	–	–	–	–
I	4,551	38	21	2.3	1,993.80	1,993.80	1,993.80	0.0
J	5,071	44	48	1	1,994.40	1,994.40	1,994.90	0.5
K	5,572	36	27	1.8	1,995.30	1,995.30	1,995.80	0.5
L[2]	6,045	–	–	–	–	–	–	–
M[2]	6,329	–	–	–	–	–	–	–
N[2]	6,574	–	–	–	–	–	–	–
O	7,074	106	43	1.1	1,997.50	1,997.50	1,998.40	0.9
P	10,101	90	352	0.4	2,001.20	2,001.20	2,002.20	1.0
Q	10,522	43	87	1.7	2,001.20	2,001.20	2,002.20	1.0
R	10,829	26	38	3.9	2,002.40	2,002.40	2,003.00	0.6
S	10,897	67	119	1.2	2,002.60	2,002.60	2,003.30	0.7
T	11,021	54	71	2.1	2,003.80	2,003.80	2,003.90	0.1
U	11,071	42	94	1.6	2,003.90	2,003.90	2,004.00	0.1
V	11,519	25	52	2.8	2,004.00	2,004.00	2,004.40	0.4
W	11,754	28	71	2.1	2,004.10	2,004.10	2,004.80	0.7
X	12,195	91	221	0.7	2,004.30	2,004.30	2,005.00	0.7
Y	12,555	49	38	3.9	2,004.50	2,004.50	2,005.00	0.5
Z	12,700	30	41	0.7	2,005.70	2,005.80	2,006.30	0.5

[1]Distance in feet above 8th Avenue

[2] - Floodway not computed

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK								
AA	13,172	24	69	0.8	2,005.9/2,005.9	2,005.90	2,006.40	0.5
AB	13,690	30	87	1.5	2,005.9/2,006.2	2,005.90	2,006.60	0.7
AC	13,931	24	94	1.6	2,006.2/2,006.5	2,006.20	2,006.80	0.6
AD	14,143	31	74	2	2,006.4/2,006.7	2,006.40	2,006.90	0.5
AE	14,668	82	118	1.3	2,006.7/2,007.2	2,006.70	2,007.30	0.6
AF	15,204	91	116	1.3	2,006.7/2,007.8	2,006.70	2,007.60	0.9
AG	15,291	22	64	2.3	2,007.90	2,007.90	2,007.90	0.0
AH	15,337	33	84	1.8	2,007.9/2,008.0	2,007.90	2,008.00	0.1
AI	15,882	30	60	2.5	2,008.1/2,008.6	2,008.10	2,008.60	0.5
AJ	15,931	19	56	2.7	2,008.1/2,008.8	2,008.10	2,008.80	0.7
AK	15,947	29	72	2.1	2,008.1/2,008.8	2,008.10	2,008.80	0.7
AL	15,980	139	114	1.3	2,008.1/2,008.9	2,008.10	2,008.90	0.8
AM	16,374	132	160	0.9	2,008.2/2,009.5	2,008.20	2,009.10	0.9
AN	16,750	21	48	3.1	2,010.10	2,010.10	2,010.10	0.0
AO	16,979	32	105	1.4	2,010.40	2,010.40	2,010.40	0.0
AP	17,041	20	46	3.2	2,010.40	2,010.30	2,010.40	0.0
AQ	17,265	25	58	2.5	2,010.80	2,010.80	2,010.80	0.0
AR	17,499	22	44	3.4	2,011.20	2,011.20	2,011.20	0.0
AS	17,717	26	59	2.5	2,011.80	2,011.80	2,011.80	0.0
AT	17,941	24	63	2.4	2,012.10	2,012.10	2,012.10	0.0
AU	18,093	24	39	3	2,014.70	2,014.70	2,015.20	0.5
AV	18,550	240	329	0.4	2,014.80	2,014.80	2,015.40	0.6
AW	18,857	170	282	0.4	2,014.90	2,014.90	2,015.50	0.6
AX	19,374	64	29	4.1	2,018.50	2,018.50	2,019.50	1.0
AY	19,451	26	39	3	2,020.50	2,020.50	2,021.10	0.6
AZ	19,492	35	49	2.4	2,020.70	2,020.70	2,021.30	0.6

[1]Distance in feet above 8th Avenue

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK								
BA	19,847	25	36	3.2	2,022.90	2,022.90	2,022.90	0.0
BB	20,289	23	36	3.2	2,025.20	2,025.20	2,025.30	0.1
BC	20,830	10	35	4.4	2,028.10	2,028.10	2,028.30	0.2
BD	20,903	28	89	1.8	2,028.60	2,028.60	2,029.00	0.4
BE	20,975	29	35	4.4	2,028.70	2,028.70	2,029.00	0.3
BF	21,368	29	43	3.6	2,031.60	2,031.60	2,032.30	0.7
BG	21,451	17	44	3.5	2,032.10	2,032.10	2,032.80	0.7
BH	21,693	21	45	3.5	2,033.30	2,033.30	2,033.80	0.5
BI	22,184	26	44	3.5	2,036.20	2,036.20	2,036.20	0.0
BJ	22,390	49	415	0.4	2,045.70	2,045.70	2,045.80	0.1
BK	22,626	33	250	0.6	2,045.70	2,045.70	2,045.80	0.1
BL	22,716	35	217	0.7	2,045.70	2,045.70	2,045.80	0.1
BM	23,277	18	36	2.8	2,045.70	2,045.60	2,045.80	0.2
BN	23,716	20	28	3.6	2,049.00	2,049.00	2,049.00	0.0
BO	23,811	60	306	0.3	2,054.70	2,054.70	2,055.70	1.0
BP	23,995	48	186	0.5	2,054.70	2,054.70	2,055.70	1.0
BQ	24,540	16	17	5.9	2,056.90	2,056.90	2,056.90	0.0
BR	24,669	30	72	1.4	2,058.00	2,058.00	2,058.00	0.0
BS	24,764	23	19	5.2	2,059.30	2,059.30	2,059.30	0.0
BT	24,889	18	41	2.5	2,063.10	2,063.10	2,063.10	0.0
BU	25,542	11	15	6.6	2,069.40	2,069.40	2,069.40	0.0
BV	26,082	27	28	3.7	2,079.80	2,079.80	2,079.80	0.0
BW	26,643	12	18	5.7	2,089.00	2,089.00	2,089.00	0.0
BX	26,899	11	22	4.5	2,093.80	2,093.80	2,093.80	0.0
BY	27,068	13	19	5.4	2,096.00	2,096.00	2,096.00	0.0
BZ	27,204	17	30	3.3	2,097.90	2,097.90	2,097.90	0.0

[1]Distance in feet above 8th Avenue

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK								
CA	27,864	16	17	5.9	2,105.00	2,105.00	2,105.00	0.0
CB	28,320	21	29	3.5	2,111.90	2,111.90	2,111.90	0.0
CC	28,932	30	17	5.8	2,126.20	2,126.20	2,126.20	0.0
CD	29,795	10	22	4.6	2,141.60	2,141.60	2,141.70	0.1
CE	30,481	20	21	4.8	2,151.10	2,151.10	2,151.10	0.0
CF	30,997	12	21	4.8	2,159.30	2,159.30	2,159.30	0.0
CG	31,068	8	23	4.3	2,160.60	2,160.60	2,160.60	0.0
CH	31,086	16	26	3.9	2,160.80	2,160.80	2,160.80	0.0
CI	31,690	12	16	6.5	2,170.80	2,170.80	2,170.80	0.0
CJ	32,339	19	21	4.8	2,186.50	2,186.50	2,186.50	0.0
CK	32,813	11	17	5.9	2,195.70	2,195.70	2,195.70	0.0
CL	33,321	12	17	5.9	2,207.10	2,207.10	2,207.10	0.0
CM	33,847	11	20	5.2	2,216.80	2,216.80	2,216.80	0.0
CN	34,227	11	15	6.7	2,224.60	2,224.60	2,224.60	0.0
CO	34,365	13	34	3	2,228.70	2,228.70	2,228.70	0.0
CP	34,418	17	24	4.2	2,228.90	2,228.90	2,228.90	0.0

[1]Distance in feet above 8th Avenue

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK-GOLF COURSE OVERFLOW								
A[2]	0	_	_	_	2,008.10	_	_	_
B[2]	773	_	_	_	2,008.10	_	_	_
C[2]	961	_	_	_	2,008.50	_	_	_
D	1,145	35	41	1.6	2,008.90	2,008.90	2,009.60	0.7
E	1,425	30	50	1.3	2,009.10	2,009.10	2,010.00	0.9
F	1,600	20	28	2.3	2,009.30	2,009.30	2,010.30	1.0
G	1,800	45	86	0.7	2,013.30	2,013.30	2,014.10	0.8
H	2,123	43	81	0.8	2,013.30	2,013.30	2,014.20	0.9
I	2,704	40	67	1	2,013.50	2,013.50	2,014.50	1.0
J	3,144	14	12	5.3	2,014.80	2,014.80	2,015.30	0.5
K	3,287	22	33	1.9	2,015.40	2,015.40	2,016.20	0.8
L	3,387	20	25	2.6	2,015.70	2,015.70	2,016.60	0.9
M	3,721	20	23	2.8	2,018.10	2,018.10	2,019.00	0.9
N	4,318	20	24	2.7	2,023.00	2,023.00	2,023.80	0.8

[1]Feet above Golf Course Storage Area

[2] - Floodway not computed

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK - GOLF COURSE OVERFLOW

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK WEST OF BORROW PIT								
A	344	12	7	4.9	2000.4	2000.4	2000.8	0.4
B	610	21	16	2	2003.7	2003.7	2004.5	0.8
C	808	66	179	0.2	2003.7	2003.7	2004.5	0.8
D	1037	39	90	0.4	2003.7	2003.7	2004.5	0.8
E	1556	42	71	0.5	2003.8	2003.8	2004.6	0.8
F	2053	44	23	1.4	2004.3	2004.3	2004.7	0.4
G	2138	44	44	0.7	2004.6	2004.6	2004.8	0.2
H	2182	43	33	1	2004.7	2004.7	2004.8	0.1
I	2222	45	30	1.1	2004.7	2004.7	2004.9	0.2
J	2362	44	79	0.4	2004.7	2004.7	2004.9	0.2
K	2442	34	102	0.3	2004.7	2004.7	2004.9	0.2
L	2660	32	142	0.2	2004.7	2004.7	2004.9	0.2
M	3094	29	114	0.3	2004.7	2004.7	2004.9	0.2
N	3393	39	27	1.2	2004.7	2004.7	2004.9	0.2
O	3489	15	8	4.2	2006.1	2006.1	2006.1	0.0

[1]Feet above Chester Creek

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK - WEST OF BORROW PIT

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CHESTER CREEK DREDGE CHANNEL								
A	0	91	113	1.1	2,004.80	2,004.80	2,005.60	0.8
B	540	60	85	1.1	2,005.30	2,005.30	2,006.10	0.8
C	1,060	63	160	0.1	2,005.40	2,005.40	2,006.20	0.8
D	1,300	39	96	0	2,005.40	2,005.40	2,006.20	0.8

[1]Feet above confluence with Chester Creek

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK - DREDGE CHANNEL

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COUNTRY HOMES DRAINAGE								
A	1,500	148	143	2.6	1,605.40	1,605.40	1,606.40	1.0
B	2,390	100	93	4	1,651.70	1,651.70	1,652.70	1.0
C	4,660	114	164	2.3	1,721.90	1,721.90	1,722.90	1.0
D	6,285	26	64	5.8	1,765.10	1,765.10	1,766.10	1.0
E	8,060	84	82	4.4	1,829.90	1,829.90	1,830.90	1.0
F	10,310	165	712	0.5	1,888.30	1,888.30	1,889.30	1.0
G	12,125	145	490	0.7	1,918.40	1,918.40	1,919.40	1.0
H	13,305	64	130	2.8	1,925.20	1,925.20	1,926.20	1.0
I	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
J	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
K	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
L	17,925	30	71	4.9	1,951.60	1,951.60	1,952.60	1.0
M	18,570	200	411	0.8	1,961.50	1,961.50	1,962.50	1.0
N	19,870	30	84	4.1	1,965.70	1,965.70	1,966.70	1.0
O	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]	--[2]
P	21,970	30	79	4.4	1,983.20	1,983.20	1,984.20	1.0
Q	22,920	30	81	4.3	1,987.40	1,987.40	1,988.40	1.0

[1]Feet above confluence with Little Spokane River

--[2]- FWDT changed per LOMR 99 -10 -327P. Data not available

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

COUNTRY HOMES DRAINAGE

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FORKER DRAW								
A	0	436	1186	0.2	2,064.30	2,064.30	2,064.30	0.0
B	62	341	460	0.6	2,065.00	2,065.00	2,066.10	1.1
C	194	68	60	4.3	2,066.50	2,066.50	2,066.60	0.1
D	463	15	33	7.8	2,073.20	2,073.20	2,074.20	1.0
E	621	7	33	10.5	2,077.50	2,077.50	2,077.60	0.1
F	669	146	415	0.8	2,086.20	2,086.20	2,087.20	1.0
G	980	11	24	7.4	2,095.40	2,095.40	2,095.40	0.0
H	1,042	65	56	2.5	2,098.80	2,098.80	2,099.80	1.0
I	1,178	6	23	8.9	2,105.00	2,105.00	2,105.00	0.0
J	1,244	123	887	0.2	2,118.00	2,118.00	2,118.70	0.7
K	1,404	55	234	0.6	2,118.00	2,118.00	2,118.70	0.7
L	2,162	15	21	6.4	2,156.90	2,156.90	2,156.90	0.0
M	2,380	84	47	2.9	2,210.00	2,210.00	2,210.00	0.0
N	2,420	65	110	1.2	2,214.60	2,214.60	2,215.00	0.4
O	2,545	62	40	3.4	2,225.60	2,225.60	2,225.60	0.0
P	2,654	66	36	3	2,234.60	2,234.60	2,235.50	0.9
Q	2,748	19	19	5.7	2,241.70	2,241.70	2,241.70	0.0
R	2,863	4	16	9.5	2,247.60	2,247.60	2,247.60	0.0
S	2,926	43	28	3.9	2,255.40	2,255.40	2,255.50	0.1
T	3,073	31	45	2.4	2,257.20	2,257.20	2,257.70	0.5
U	3,295	3	27	10.5	2,269.00	2,269.00	2,269.00	0.0
V	3,515	48	142	0.8	2,281.90	2,281.90	2,282.90	1.0
W	3,842	10	16	7	2,290.90	2,290.90	2,290.90	0.0
X	3,989	64	275	0.4	2,302.20	2,302.20	2,302.20	0.0
Y	4,169	6	85	8.4	2,307.10	2,307.10	2,307.10	0.0
Z	4,594	25	23	4.8	2,315.80	2,315.80	2,315.80	0.0

[1]Feet above limit of detailed study, 22ft downstream of Progress road

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

FORKER DRAW

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
FORKER DRAW								
AA	4,977	43	34	3.2	2,324.60	2,324.60	2,325.60	1.0
AB	5,446	38	29	3.8	2,336.00	2,336.00	2,336.10	0.1

[1]Stream Distance in Feet Above a Point 22 Feet Below Progress Road

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

FORKER DRAW

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HANGMAN CREEK								
A	0.07	528	3,719	70	1722.0 [2]	1720.4 [3]	1,720.40	0.0
B	0.37	127	1,441	18.3	1,726.60	1,726.60	1,726.80	0.2
C	0.6	110	1,696	15.3	1,734.40	1,734.40	1,735.10	0.7
D	0.8	290	2,710	9.6	1,740.40	1,740.40	1,740.40	0.0
E	1.14	133	1,817	14.3	1,743.00	1,743.00	1,743.00	0.0
F	1.4	110	1,520	17.1	1,748.70	1,748.70	1,748.90	0.2
G	1.55	340	2,509	10.4	1,756.30	1,756.30	1,756.30	0.0
H	1.8	192	2,341	11.1	1,759.30	1,759.30	1,759.30	0.0
I	1.85	155	1,528	17	1,759.50	1,759.50	1,759.50	0.0
J	1.9	197	2,928	8.9	1,764.30	1,764.30	1,764.30	0.0
K	2.31	175	1,646	15.8	1,769.90	1,769.90	1,769.90	0.0
L	2.77	335	2,593	10	1,779.70	1,779.70	1,779.70	0.0
M	3.2	200	1,623	16	1,785.20	1,785.20	1,785.40	0.2
N	3.35	320	3,427	7.6	1,792.40	1,792.40	1,792.40	0.0
O	3.5	131	2,423	10.7	1,797.20	1,797.20	1,797.20	0.0
P	3.78	192	2,922	8.8	1,799.70	1,799.70	1,799.70	0.0
Q	4.24	128	1,626	13.7	1,802.40	1,802.40	1,802.50	0.1
R	4.63	231	1,885	11.8	1,811.90	1,811.90	1,812.00	0.1
S	5.06	140	1,525	14.6	1,820.50	1,820.50	1,820.50	0.0
T	5.46	437	3,622	6.2	1,827.70	1,827.70	1,827.70	0.0
U	5.91	126	1,688	13.2	1,831.30	1,831.30	1,831.80	0.5
V	6.27	175	2,051	10.9	1,835.90	1,835.90	1,836.80	0.9
W	6.84	134	1,871	11.9	1,842.50	1,842.50	1,842.50	0.0
X	7.18	171	2,969	7.5	1,846.10	1,846.10	1,846.10	0.0
Y	7.52	262	4,753	4.7	1,847.30	1,847.30	1,847.30	0.0
Z	7.8	104	1,873	11.9	1,847.80	1,847.80	1,847.80	0.0

[1] Miles above mouth

[2] - Elevation computed with considering backwater effect from Spokane River

[3] - Elevation computed without considering backwater effect from Spokane River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

HANGMAN CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
HANGMAN CREEK								
AA	0.05	108	1,826	12	1,847.80	1,847.80	1,848.80	1.0
AB	0.31	181	2,579	8.5	1,850.10	1,850.10	1,851.10	1.0
AC	2.64	203	2,978	7.3	1,861.60	1,861.60	1,862.60	1.0
AD	3.77	217	1,712	12.8	1,869.80	1,869.80	1,870.80	1.0
AE	4.78	199	3,332	6.6	1,878.40	1,878.40	1,879.40	1.0
AF	5.67	90	1,507	14.5	1,882.50	1,882.50	1,883.50	1.0
AG	6.02	632	8,254	2.7	1,891.20	1,891.20	1,892.20	1.0
AH	6.45	125	3,117	7	1,891.20	1,891.20	1,892.20	1.0

[1]Miles above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

HANGMAN CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SPOKANE RIVER								
A	1.14	149	1,519	2.6	1,550.70	1,550.70	1,551.70	1.0
B	1.85	722	5,371	0.7	1,550.90	1,550.90	1,551.90	1.0
C	2.56	963	6,270	0.6	1,551.00	1,551.00	1,552.00	1.0
D	3.44	632	3,112	1.3	1,551.30	1,551.30	1,552.30	1.0
E	4.02	671	4,377	0.9	1,551.70	1,551.70	1,552.70	1.0
F	4.4	339	1,725	2.3	1,552.30	1,552.30	1,553.30	1.0
G	5.2	942	2,909	1.3	1,553.30	1,553.30	1,554.30	1.0
H	5.71	407	1,716	2.3	1,554.80	1,554.80	1,555.80	1.0
I	5.99	203	1,181	3.3	1,555.50	1,555.50	1,556.50	1.0
J	6.58	252	1,479	2.6	1,556.80	1,556.80	1,557.80	1.0
K	7.06	345	1,627	2.4	1,558.00	1,558.00	1,559.00	1.0
L	7.41	471	2,427	1.6	1,558.30	1,558.30	1,559.30	1.0
M	8.02	252	1,189	3.3	1,560.00	1,560.00	1,561.00	1.0
N	8.82	477	2,138	1.8	1,562.60	1,562.60	1,563.60	1.0
O	9.44	127	751	5.2	1,565.30	1,565.30	1,566.30	1.0
P	9.77	220	1,044	3.71	1,566.80	1,566.80	1,567.80	1.0
Q	10.41	769	2,735	1.4	1,569.70	1,569.70	1,569.80	0.1
R	10.95	22	398	9.8	1,574.00	1,574.00	1,575.00	1.0
S	11.52	41	595	7.1	1,588.10	1,588.10	1,589.10	1.0
T	12	172	1,644	2.6	1,601.10	1,601.10	1,602.10	1.0
U	12.5	166	1,098	3.9	1,606.00	1,606.00	1,607.00	1.0
V	13.09	310	1,182	3.6	1,614.80	1,614.80	1,615.80	1.0
W	13.59	188	927	4.5	1,618.80	1,618.80	1,619.80	1.0
X	14.41	94	686	6.1	1,626.00	1,626.00	1,627.00	1.0
Y	14.79	420	3,759	1.1	1,629.60	1,629.60	1,630.60	1.0
Z	15.55	184	1,597	2.6	1,630.20	1,630.20	1,631.20	1.0

[1]Miles above confleunce with Spokane River

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LITTLE SPOKANE RIVER								
AA	15.96	336	2,495	1.7	1,633.80	1,633.80	1,634.80	1.0
AB	16.68	89	510	6.6	1,640.10	1,640.10	1,641.10	1.0
AC	17.28	449	2,244	1.5	1,646.10	1,646.10	1,647.10	1.0
AD	18.21	263	1,425	2.4	1,648.90	1,648.90	1,649.90	1.0
AE	18.6	64	588	5.7	1,654.40	1,654.40	1,655.40	1.0
AF	19.3	90	611	5.5	1,659.00	1,659.00	1,660.00	1.0
AG	20.48	64	481	7	1,671.50	1,671.50	1,672.50	1.0
AH	21.28	140	704	4.8	1,676.50	1,676.50	1,677.50	1.0
AI	21.78	59	493	6.9	1,686.10	1,686.10	1,687.10	1.0
AJ	22.21	381	1,785	1.9	1,688.50	1,688.50	1,689.50	1.0
AI	22.9	95	358	4.5	1,690.10	1,690.10	1,691.10	1.0
AL	23.47	191	1,340	1.2	1,701.30	1,701.30	1,702.30	1.0
AM	23.87	420	2,183	0.7	1,701.50	1,701.50	1,702.50	1.0
AN	24.66	423	1,708	0.9	1,701.70	1,701.70	1,702.70	1.0
AO	25.82	121	551	2.9	1,705.10	1,705.10	1,706.10	1.0
AP	26.41	48	354	4	1,707.20	1,707.20	1,708.20	1.0
AQ	27.1	144	558	2.5	1,709.10	1,709.10	1,710.10	1.0
AR	27.8	70	631	2.2	1,714.90	1,714.90	1,715.90	1.0
AS	28.69	68	479	3	1,718.70	1,718.70	1,719.70	1.0
AT	29.67	73	256	5.5	1,726.20	1,726.20	1,727.20	1.0
AU	30.45	175	736	1.9	1,761.00	1,761.00	1,762.00	1.0
AV	30.86	57	308	4.6	1,770.70	1,770.70	1,771.70	1.0
AW	31.26	65	469	3	1,776.90	1,776.90	1,777.90	1.0
AX	31.92	94	295	4.8	1,781.90	1,781.90	1,782.90	1.0
AY	32.63	302	1,053	1.1	1,791.00	1,791.00	1,792.00	1.0
AZ	33.52	131	436	2.6	1,798.70	1,798.70	1,799.70	1.0

[1]Miles above confleunce with Spokane River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SPOKANE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SALTESE CREEK								
A	734	87	158	1.5	2,031.40	2,031.40	2,032.40	1.0
B	2,282	79	344	0.5	2,036.30	2,036.30	2,037.30	1.0
C	6,495	10	42	1.9	2,040.60	2,040.60	2,041.60	1.0

[1]Feet above Steen Road

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

SALTESE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SPOKANE RIVER								
A	67.64	230	4,980	10.6	1,672.20	1,672.20	1,672.20	0.0
B	67.75	331	5,907	8.9	1,672.90	1,672.90	1,673.50	0.6
C	68.13	243	4,674	11.3	1,676.30	1,676.30	1,677.00	0.7
D	68.5	463	9,832	5.3	1,680.60	1,680.60	1,681.00	0.4
E	69.06	274	4,912	10.7	1,684.00	1,684.00	1,684.30	0.3
F	69.44	323	5,975	8.8	1,688.20	1,688.20	1,688.50	0.3
G	69.81	470	7,368	7.1	1,691.40	1,691.40	1,691.70	0.3
H	70.27	438	6,228	8.4	1,695.50	1,695.50	1,695.80	0.3
I	70.66	240	3,931	13.4	1,698.90	1,698.90	1,699.10	0.2
J	71.1	314	5,967	8.8	1,707.80	1,707.80	1,707.80	0.0
K	71.37	344	6,053	8.7	1,710.00	1,710.00	1,710.00	0.0
L	71.78	414	5,656	9.3	1,715.10	1,715.10	1,715.30	0.2
M	72.24	326	4,967	10.5	1,721.10	1,721.10	1,721.30	0.2
N	72.46	364	5,090	10.2	1,724.20	1,724.20	1,724.40	0.2
O	72.8	374	5,397	9.6	1,730.00	1,730.00	1,730.00	0.0
P	73.2	335	5,406	9.6	1,734.30	1,734.30	1,734.30	0.0
Q	73.6	234	4,900	10	1,738.00	1,738.00	1,738.00	0.0
R	73.77	261	4,056	12.8	1,740.00	1,740.00	1,740.20	0.2
S	74	303	4,830	10.8	1,744.40	1,744.40	1,744.50	0.1
T	74.85	480	6,100	8.5	1,875.20	1,875.20	1,875.20	0.0
U	74.9	465	6,039	8.6	1,876.40	1,876.40	1,876.40	0.0
V	75.45	502	12,575	4.1	1,882.10	1,882.10	1,882.30	0.2
W	75.58	398	8,450	6.2	1,882.30	1,882.30	1,882.50	0.2
X	75.6	385	7,787	6.7	1,882.50	1,882.50	1,882.60	0.1
Y	76.02	470	9,110	5.7	1,884.70	1,884.70	1,884.90	0.2
Z	76.09	470	8,196	6.3	1,886.20	1,886.20	1,886.30	0.1

[1]Miles above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

SPOKANE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
SPOKANE RIVER								
AA	76.27	477	9,160	5.7	1,888.30	1,888.30	1,888.40	0.1
AB	76.53	343	8,227	6.3	1,890.30	1,890.30	1,890.50	0.2
AC	76.8	340	8,234	6.3	1,891.40	1,891.40	1,891.50	0.1
AD	77.51	362	7,779	6.7	1,893.70	1,893.70	1,893.80	0.1
AE	77.68	393	7,682	6.8	1,894.20	1,894.20	1,894.30	0.1
AF	78	355	6,707	7.8	1,895.60	1,895.60	1,895.70	0.1
AG	78.32	270	6,600	7.9	1,897.00	1,897.00	1,897.10	0.1
AH	79.1	293	7,004	7.4	1,899.60	1,899.60	1,899.60	0.0
AI	79.49	280	6,370	8.2	1,901.00	1,901.00	1,901.10	0.1
AJ	80.1	510	15,067	3.5	1,903.10	1,903.10	1,903.20	0.1
AK	80.2	718	13,083	4	1,914.40	1,914.40	1,914.40	0.0
AL	80.7	480	7,810	6.7	1,915.20	1,915.20	1,915.20	0.0
AM[2]	–	–	–	–	–	–	–	–
AN	81.14	459	7902	6.6	1,916.60	1,916.60	1,916.60	0.0

[1]Miles above mouth

[2] - Data not available

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

SPOKANE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
UNNAMED TRIBUTARY TO CHESTER CREEK								
A	0	31	128	0	2,008.10	2,008.10	2,009.10	1.0
B	283	21	17	0.2	2,008.40	2,008.40	2,009.10	0.7
C	422	40	69	0.1	2,008.40	2,008.40	2,009.10	0.7
D	836	46	68	0.1	2,008.40	2,008.40	2,009.10	0.7
E	910	40	69	0.1	2,008.40	2,008.40	2,009.10	0.7
F	1,378	102	658	0	2,009.70	2,009.70	2,010.70	1.0
G	1,525	176	2,120	0	2,009.70	2,009.70	2,010.70	1.0
H	1,720	267	3,478	0	2,009.70	2,009.70	2,010.70	1.0
I	1,760	280	3,362	0	2,009.70	2,009.70	2,010.70	1.0
J	1,849	232	1,478	0	2,009.70	2,009.70	2,010.70	1.0
K	1,952	5	7	2.2	2,010.00	2,010.00	2,010.70	0.7
L	2,028	17	7	2.2	2,011.00	2,011.00	2,011.10	0.1
M	2,295	10	13	1.3	2,011.50	2,011.50	2,011.60	0.1
N	2,849	5	4	4.3	2,012.80	2,012.80	2,012.80	0.0
O	2,905	10	18	0.9	2,014.30	2,014.30	2,014.30	0.0
P	2,933	8	12	1.3	2,014.30	2,014.30	2,014.30	0.0
Q	3,339	9	4	3.8	2,019.70	2,019.70	2,019.70	0.0
R	3,485	15	17	1.8	2,020.80	2,020.80	2,020.80	0.0
S[2]	3,509	133	59	0.5	2,019.9/2,020.9	2,019.90	2,020.00	0.1
T[2]	4,040	42	31	1	2,020.8/2,023.4	2,020.80	2,021.80	1.0
U[2]	4,515	67	27	1.1	2,024.3/2,026.2	2,024.30	2,025.20	0.9
V[2]	5,006	169	23	1.3	2,029.0/2,030.7	2,029.00	2,030.00	1.0
W[2]	5,516	62	17	1.8	2,033.5/2,035.1	2,033.50	2,034.50	1.0
X	6,028	8	10	3.1	2,037.70	2,037.70	2,037.70	0.0
Y	6,109	8	20	1.5	2,041.00	2,041.00	2,041.00	0.0
Z	6,155	13	24	1.2	2,041.00	2,041.00	2,041.10	0.1

[1] Stream distance in feet above Golf Course Storage Area

[2] Floodway is based on combination of with and without levee floodway runs due to perched channel. Width is total width of both runs.

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED TRIBUTARY TO CHESTER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
UNNAMED TRIBUTARY TO CHESTER CREEK								
AA	6,570	14	7	4.1	2,043.40	2,043.40	2,043.40	0.0
AB	7,082	19	17	1.6	2,048.10	2,048.10	2,048.20	0.1
AC	7,522	7	5	5.2	2,052.10	2,052.10	2,052.10	0.0
AD	7,645	19	22	1.3	2,054.10	2,054.10	2,054.10	0.0
AE	7,679	11	6	4.4	2,055.70	2,055.70	2,055.70	0.0
AF	7,958	11	8	3.6	2,064.50	2,064.50	2,064.50	0.0
AG	8,491	4	3	5.4	2,083.50	2,083.50	2,083.50	0.0
AH	8,548	4	7	2.7	2,086.00	2,086.00	2,086.00	0.0
AI	8,592	3	5	3.5	2,091.50	2,091.50	2,091.50	0.0
AJ	8,625	6	4	4.7	2,092.40	2,092.40	2,092.40	0.0

[1]Stream distance in feet above Golf Course Storage Area

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED TRIBUTARY TO CHESTER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ.FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
LEFT BANK OVER FLOW CHANNEL								
A_2	0	_	_	_	2,008.10	_	_	_
B_2	283	_	_	_	2,008.50	_	_	_
C_2	422	_	_	_	2,008.60	_	_	_
D_2	836	_	_	_	2,008.60	_	_	_
E_2	1,244	_	_	_	2,008.60	_	_	_
F	1,400	15	8	2	2,008.60	2,008.60	2,009.10	0.5
G	1,487	15	23	0.7	2,008.70	2,008.70	2,009.20	0.5
H	1,623	15	15	1.1	2,008.70	2,008.70	2,009.30	0.6
I	1,649	15	14	1.2	2,008.70	2,008.70	2,009.30	0.6
J	1,755	15	15	1.1	2,008.70	2,008.70	2,009.50	0.8
K	1,856	15	16	1	2,008.70	2,008.70	2,009.60	0.9
L	1,985	15	5	3.3	2,011.20	2,011.20	2,011.50	0.3
M	2,240	15	28	0.6	2,011.30	2,011.30	2,011.80	0.5
N	2,873	15	5	3.3	2,013.80	2,013.80	2,014.20	0.4
O	2,936	15	12	1.3	2,014.10	2,014.10	2,014.60	0.5
P	2,966	15	11	1.4	2,014.30	2,014.30	2,014.70	0.4

[1]Feet above storage area #1

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED TRIBUTARY TO CHESTR CREEK - LEFT BANK OVERFLOW CHANNEL

5.0 INSURANCE APPLICATION

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 rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent-annual-chance) flood elevations (BFEs) or depths are shown within this zone.

Zone AE
Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. 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 rate zone that corresponds to 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 AO
Zone AO is the flood insurance rate zone that corresponds to areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR
Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the base flood event by a flood-control system that was subsequently decertified. Zone AR indicates that the former flood-control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99
Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V
Zone V is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE
Zone VE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. 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 rate 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 (sq. mi.), and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

Zone X (Future Base Flood)
Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D
Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

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 rate 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 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 Spokane 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 (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 7, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
AIRWAY HEIGHTS, CITY OF	N/A	N/A	N/A	N/A
CHENEY, CITY OF	5/21/1976	N/A	11/6/1979	N/A
DEER PARK, CITY OF	4/5/1974	N/A	12/26/1979	N/A
FAIRFIELD, TOWN OF	11/8/1974	N/A	10/16/1979	N/A
LATAH, TOWN OF	12/6/1974	N/A	7/6/2010	N/A
LIBERTY LAKE, CITY OF	7/6/2010	N/A	7/6/2010	N/A
MEDICAL LAKE, CITY OF	7/6/2010	N/A	7/6/2010	N/A
MILLWOOD, TOWN OF	7/6/2010	N/A	7/6/2010	N/A
ROCKFORD, TOWN OF	12/6/1974	N/A	10/2/1979	6/18/1987
SPANGLE, TOWN OF	6/6/1978	N/A	9/18/1979	N/A
SPOKANE COUNTY UNINCORPORATED AREAS	1/17/1975	5/17/1988, 9/30/1992	5/17/1988	9/30/1992
SPOKANE VALLEY, CITY OF	7/6/2010	N/A	7/6/2010	N/A
SPOKANE, CITY OF	5/24/1974	12/21/1982	8/1/1980	10/17/1986
WAVERLY, TOWN OF	7/6/2010	N/A	7/6/2010	N/A

*None-floodprone

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

In 1973, the U.S. Army Corps of Engineers made a 1% annual chance flood level determination for the immediate vicinity of the Spokane Expo 74 site, between the Monroe Street and Division Street bridges, based on a 1972 survey of the area. Surveyed cross sections from the study were incorporated into this Flood Insurance Study (Reference 31).

In 1976, The U.S. Army Corps of Engineers completed a general analysis of flooding of the Spokane River from its confluence with Hangman Creek to the Idaho State line and for the lower 4 miles of Hangman Creek as part of Water Resources Study, Metropolitan Spokane Region (Reference 32). The 1976 study reinforces the City of Spokane Flood Insurance Study; there are no conflicts between the two reports. This study included mapping of flood plain boundaries of the January 1974 flood on the Spokane River, which was useful in delineating the boundaries of the 100- and .02% annual chance floods (Reference 27).

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the 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 Federal Insurance and Mitigation Division, FEMA Region X, Federal Regional Center, 130 228th Street, SW, Bothell, Washington 98021-9796.

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10.0 REVISION DESCRIPTIONS

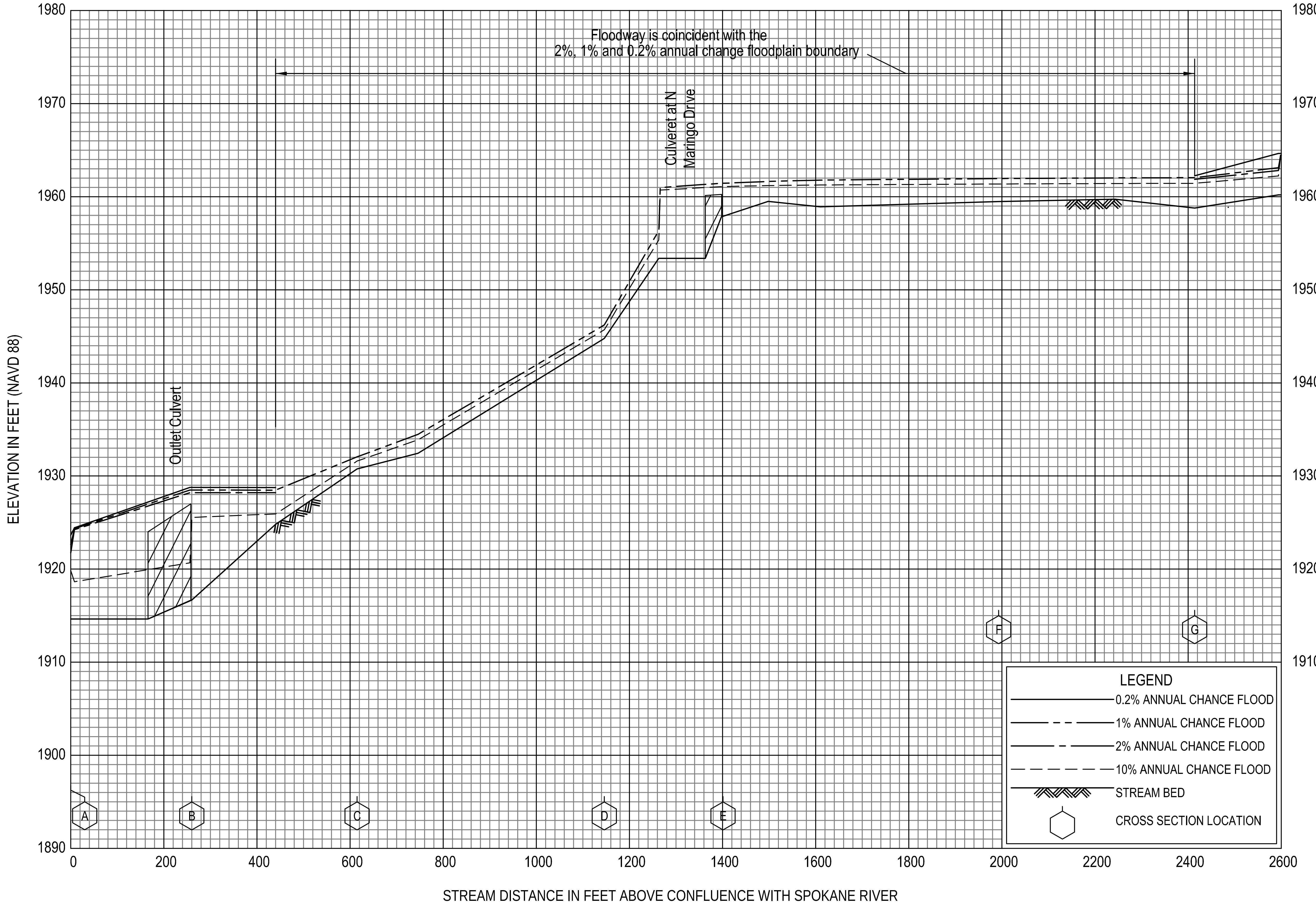
This section has been added to provide information regarding significant revisions made since the original FIS was printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data located at 808 West Spokane Falls Road, Spokane, Washington, 99201.

10.1 First Revision

As part of this initial Countywide DFIRM all effective FIRMS were incorporated, and all elevations have been converted to NAVD88 by adding 3.9'.

New or revised detailed analyses for additional flooding sources affecting Spokane County, were incorporated into this revision. These flooding sources include, Argonne Drainage, Chester Creek, Dredge Channel, Forker Draw, and Unnamed Tributary to Chester Creek, along with various flow paths parallel to Chester Creek and its Unnamed Tributary. Portions of Forker Draw and Chester Creek were previously studied and have been superseded.

As part of this revision, the format of the map panels has changed. Previously, flood-hazard information was shown on both the FIRM and FBFM. In the new format, all BFEs, cross sections, zone designations, and floodplain and floodway boundary delineations are shown on the FIRM and the FBFM has been eliminated. Some of the flood insurance zone designations were changed to reflect the new format. Areas previously shown as numbered Zone A were changed to Zone AE, Zone B was revised to Zone X (shaded), and Zone C was revised to Zone X (unshaded). In addition, all Flood Insurance Zone Data Tables were removed from the FIS report and all zone designations and reach determinations were removed from the profile panels.



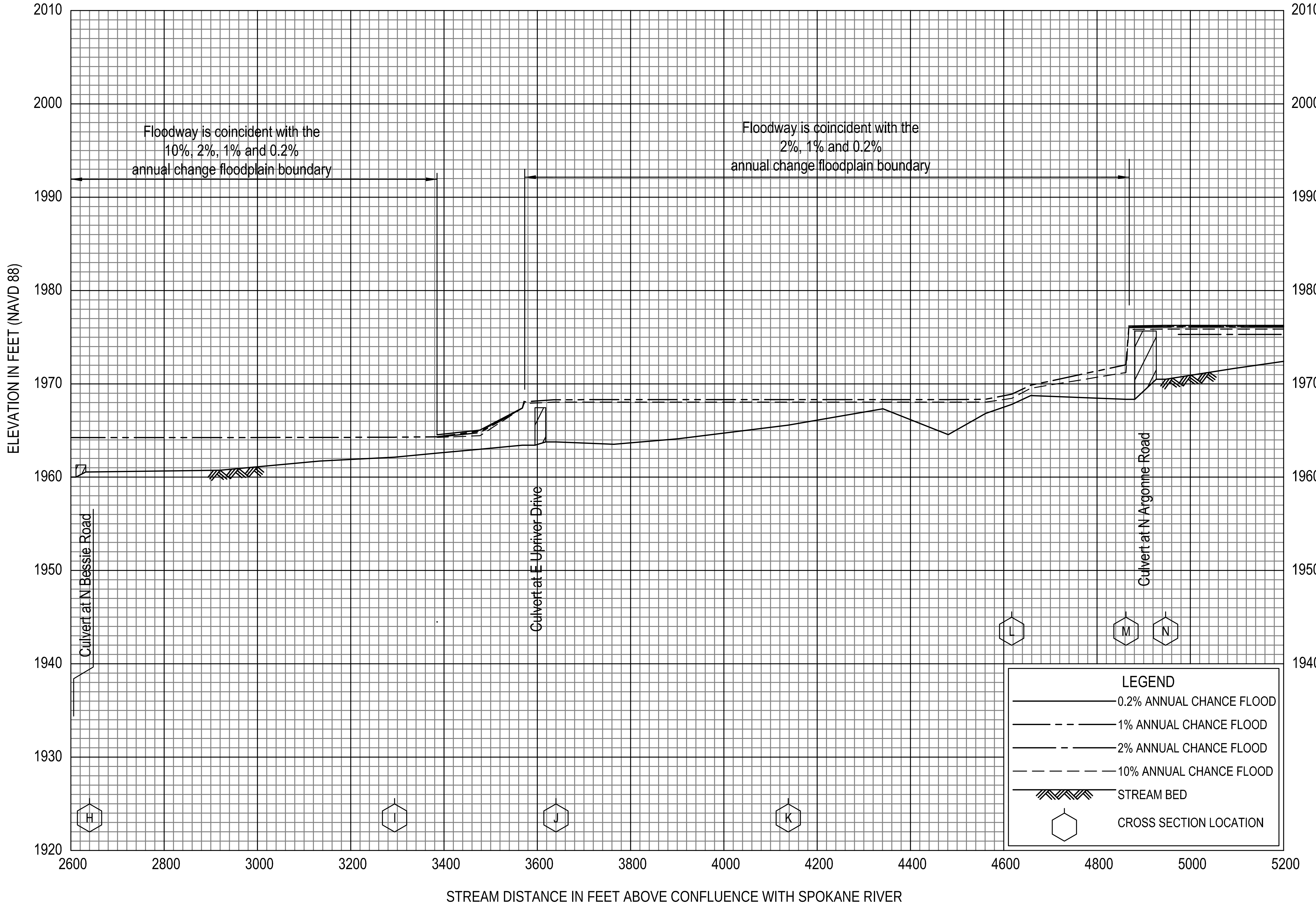
FLOOD PROFILES

ARGONNE DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

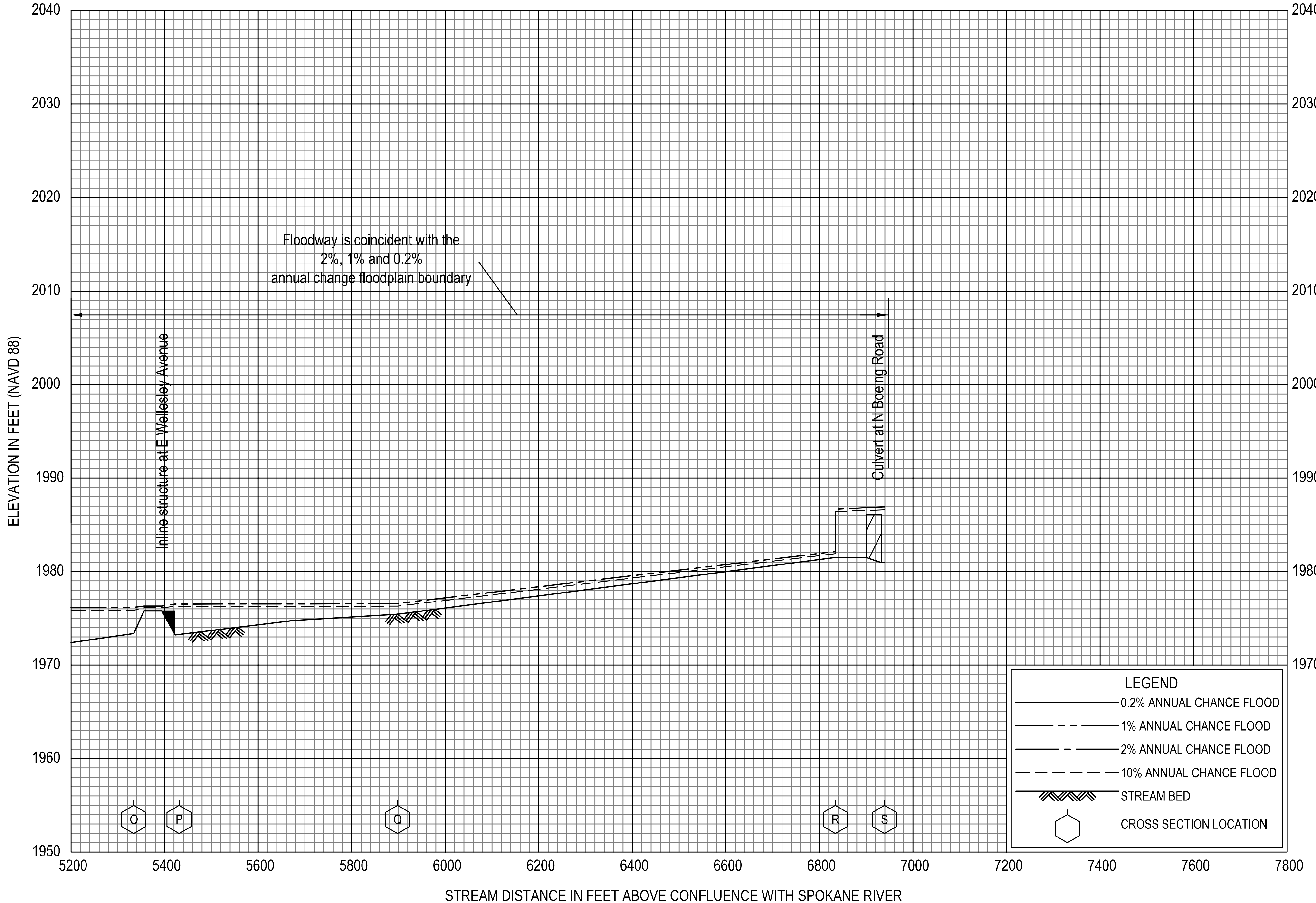
ARGONNE DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

02P



FLOOD PROFILES

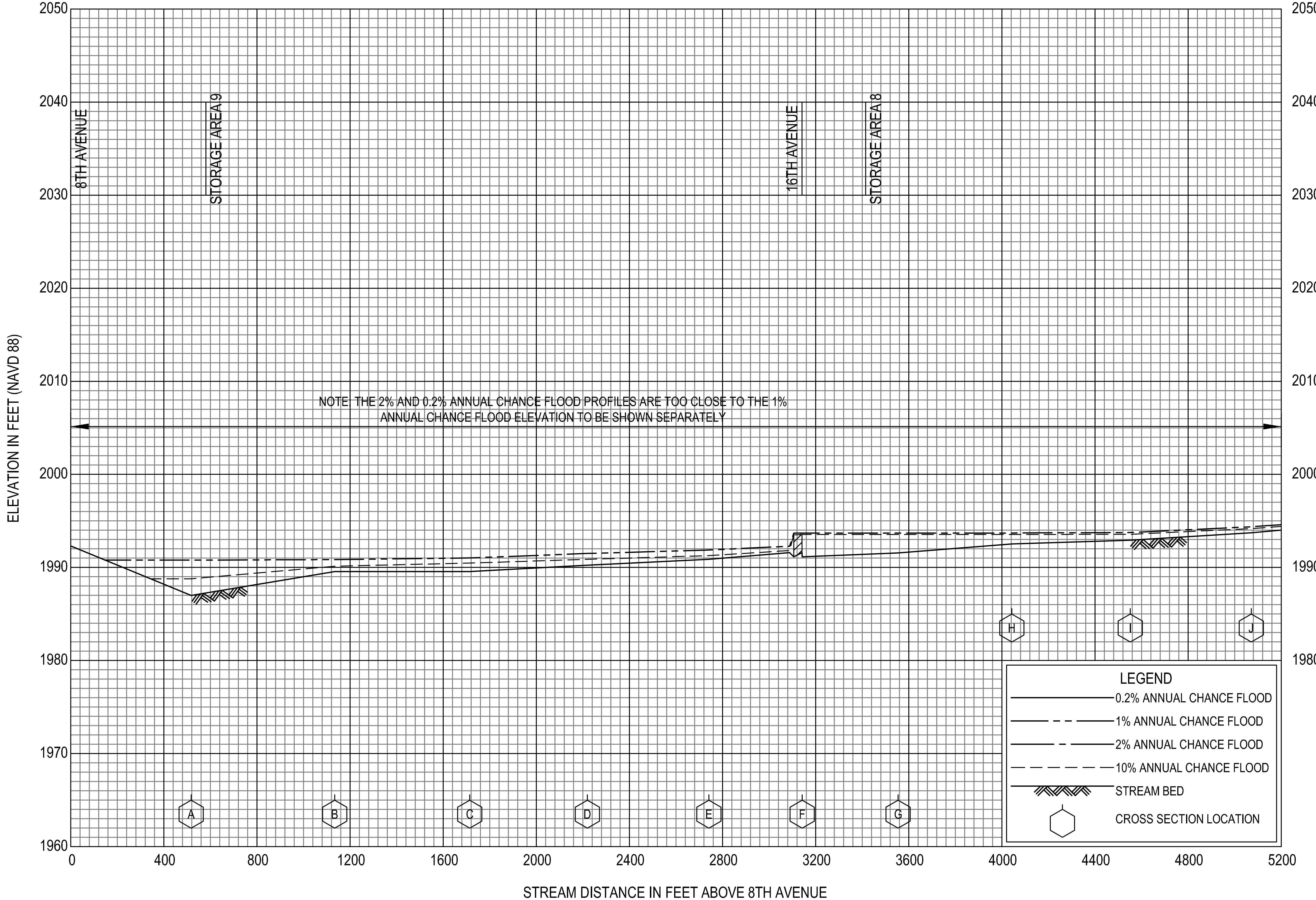
ARGONNE DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

03P



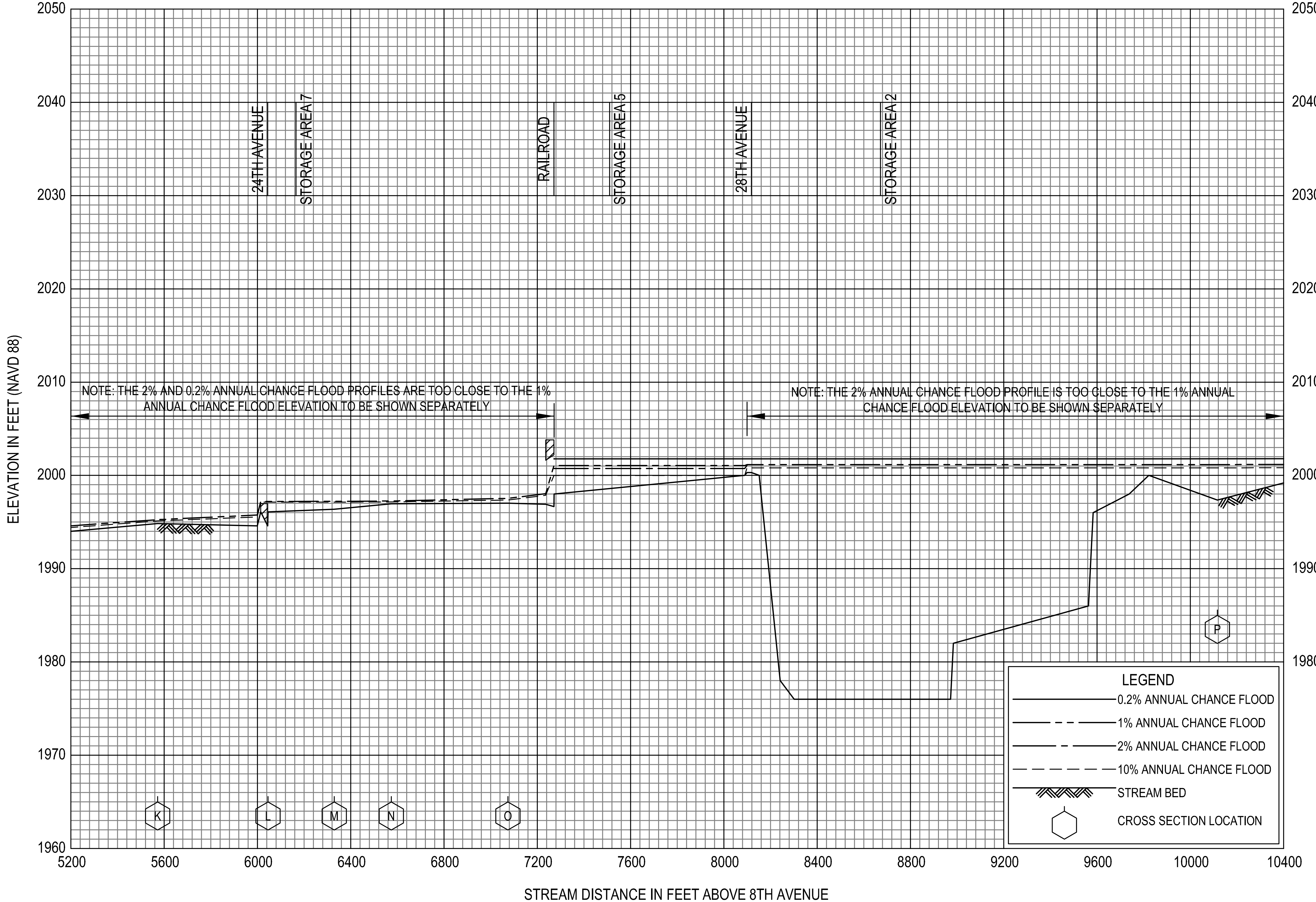
FLOOD PROFILES

CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

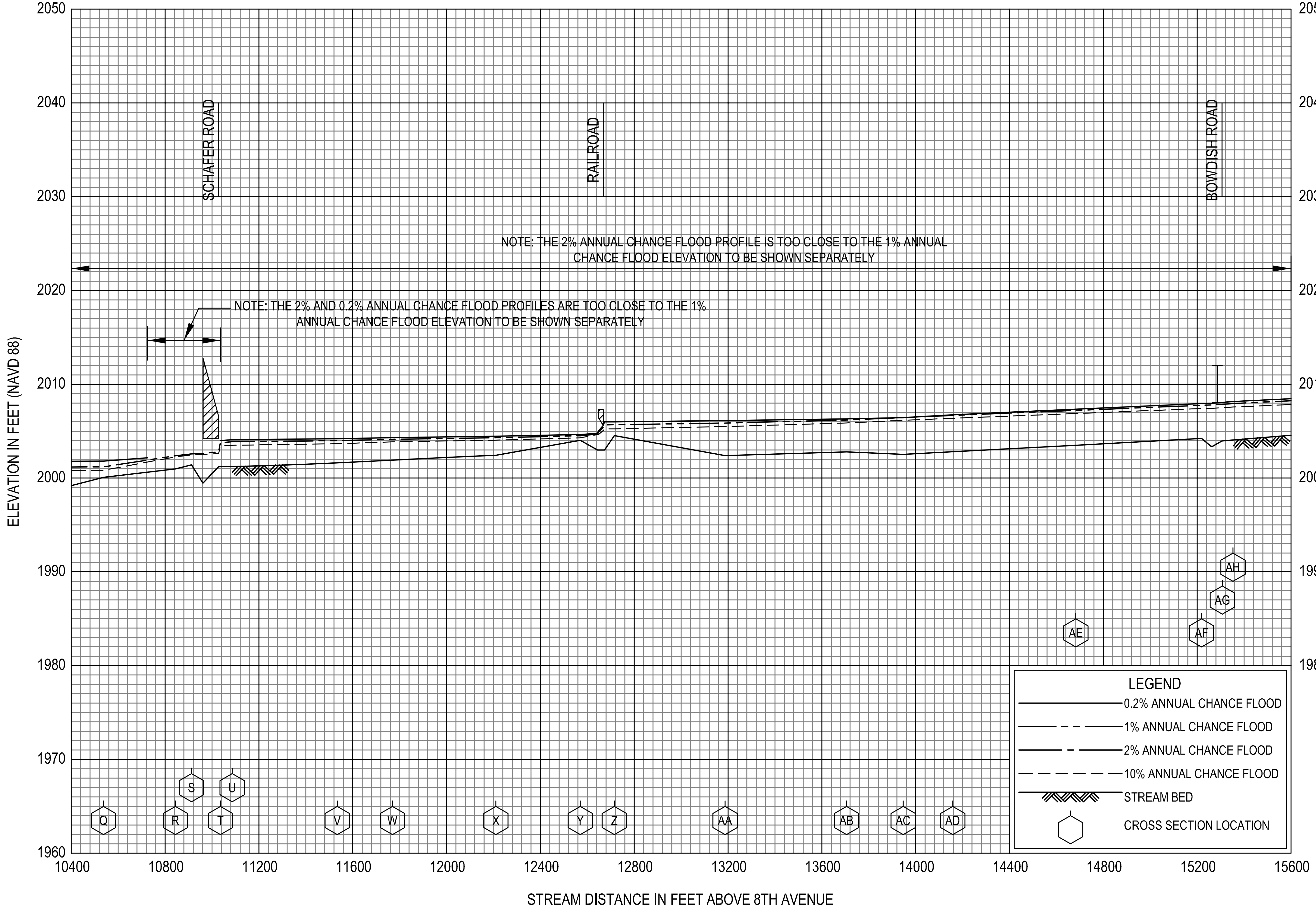
CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

05P



FLOOD PROFILES

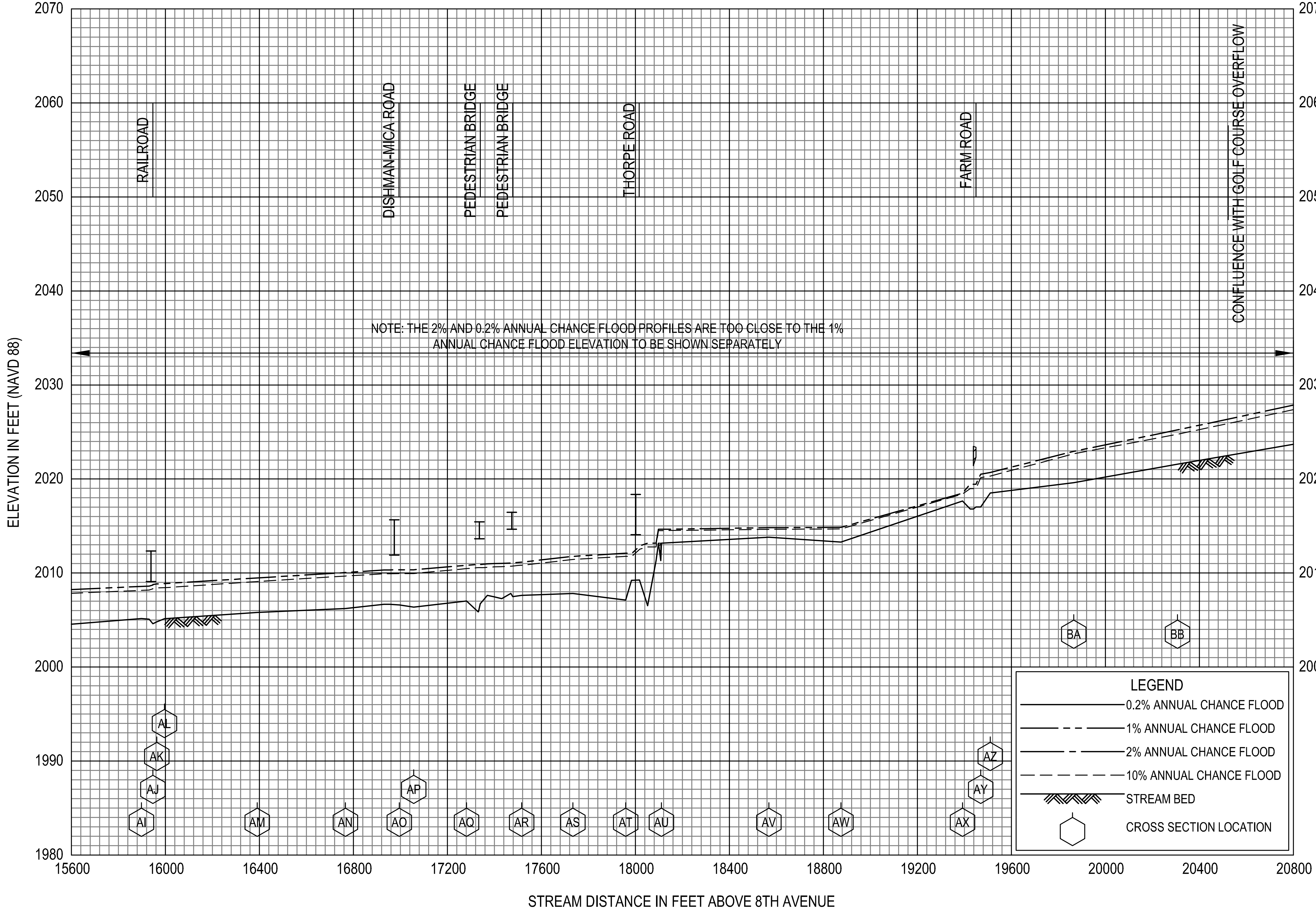
CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

06P



FLOOD PROFILES

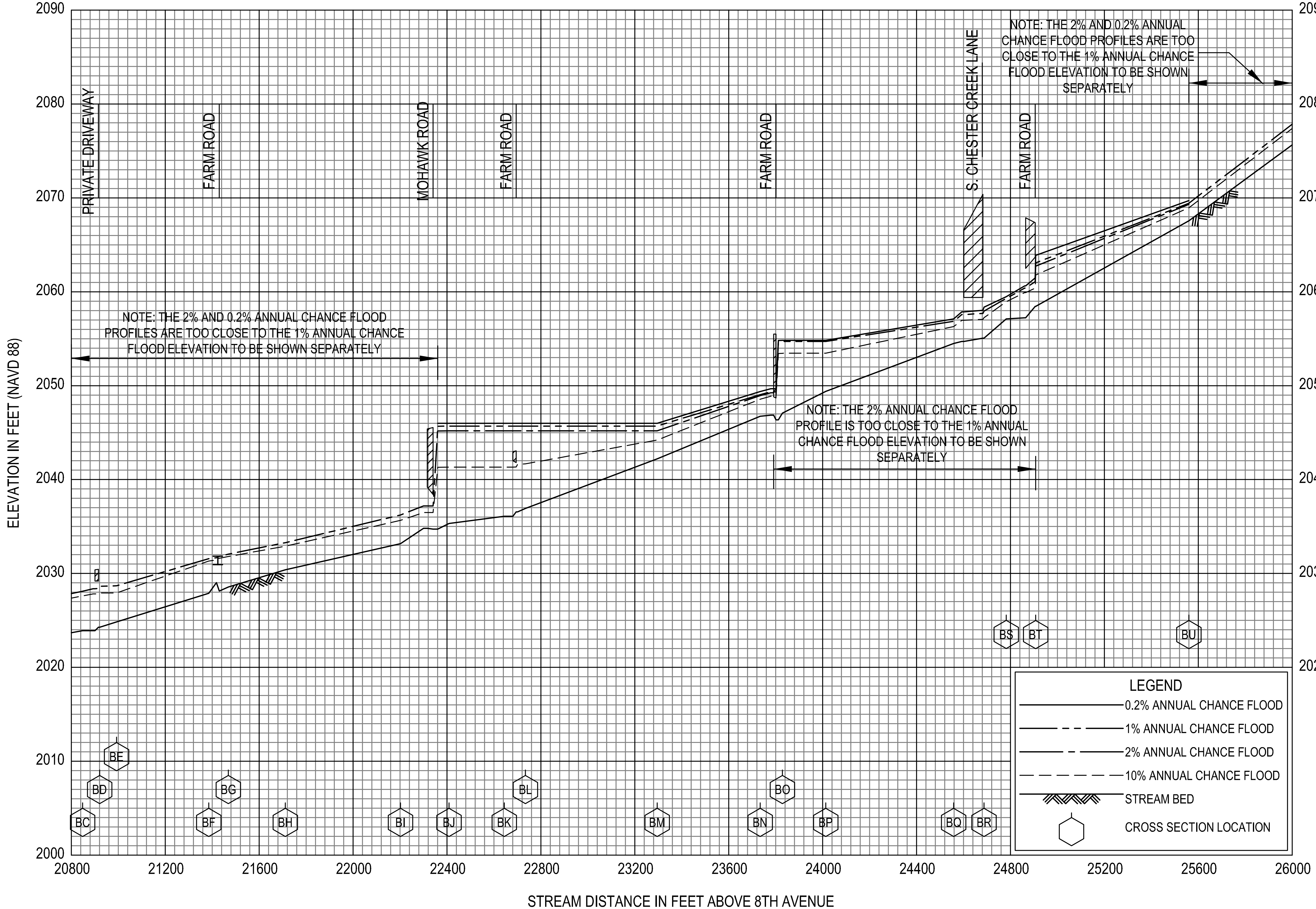
CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

07P



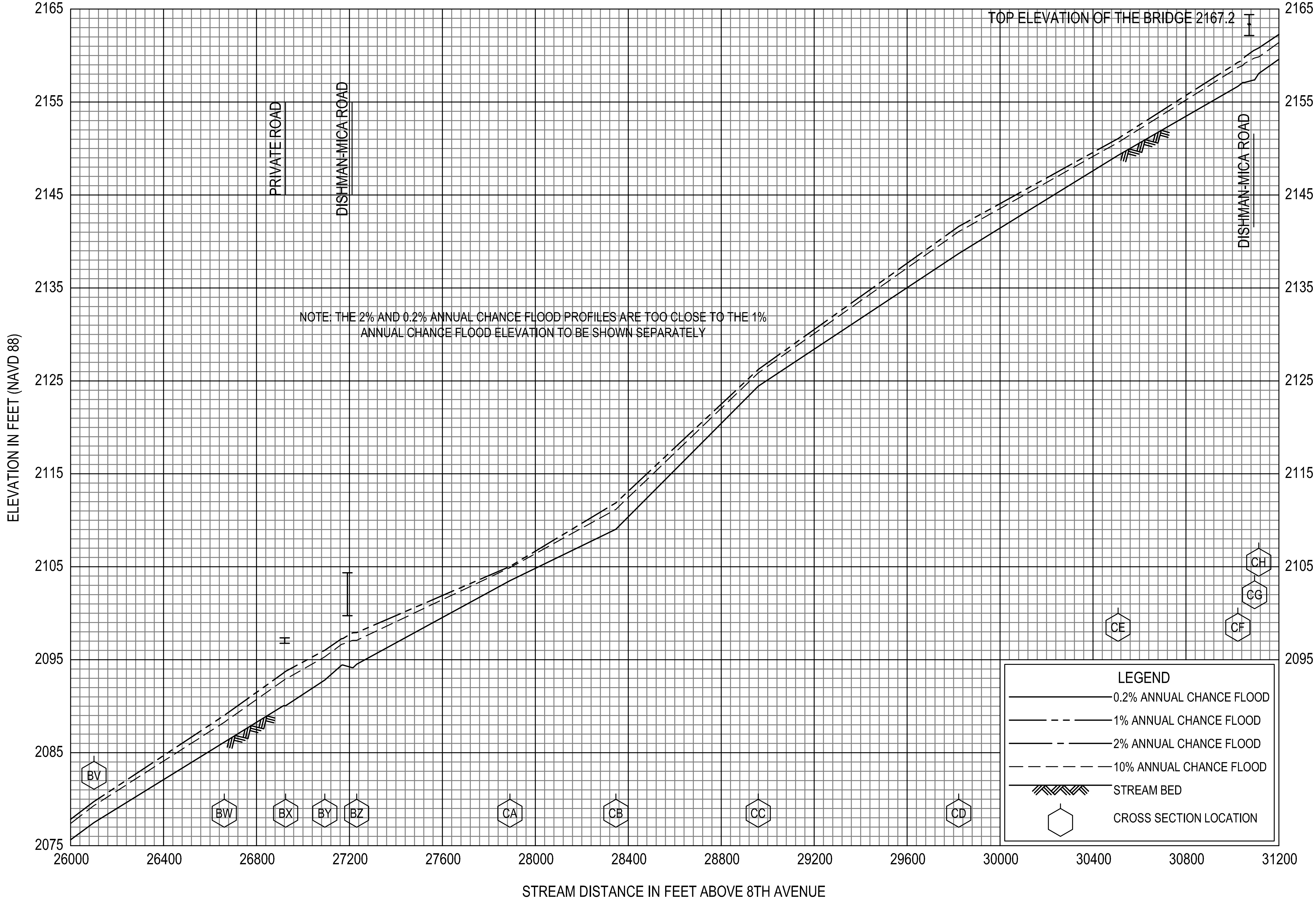
FLOOD PROFILES

CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

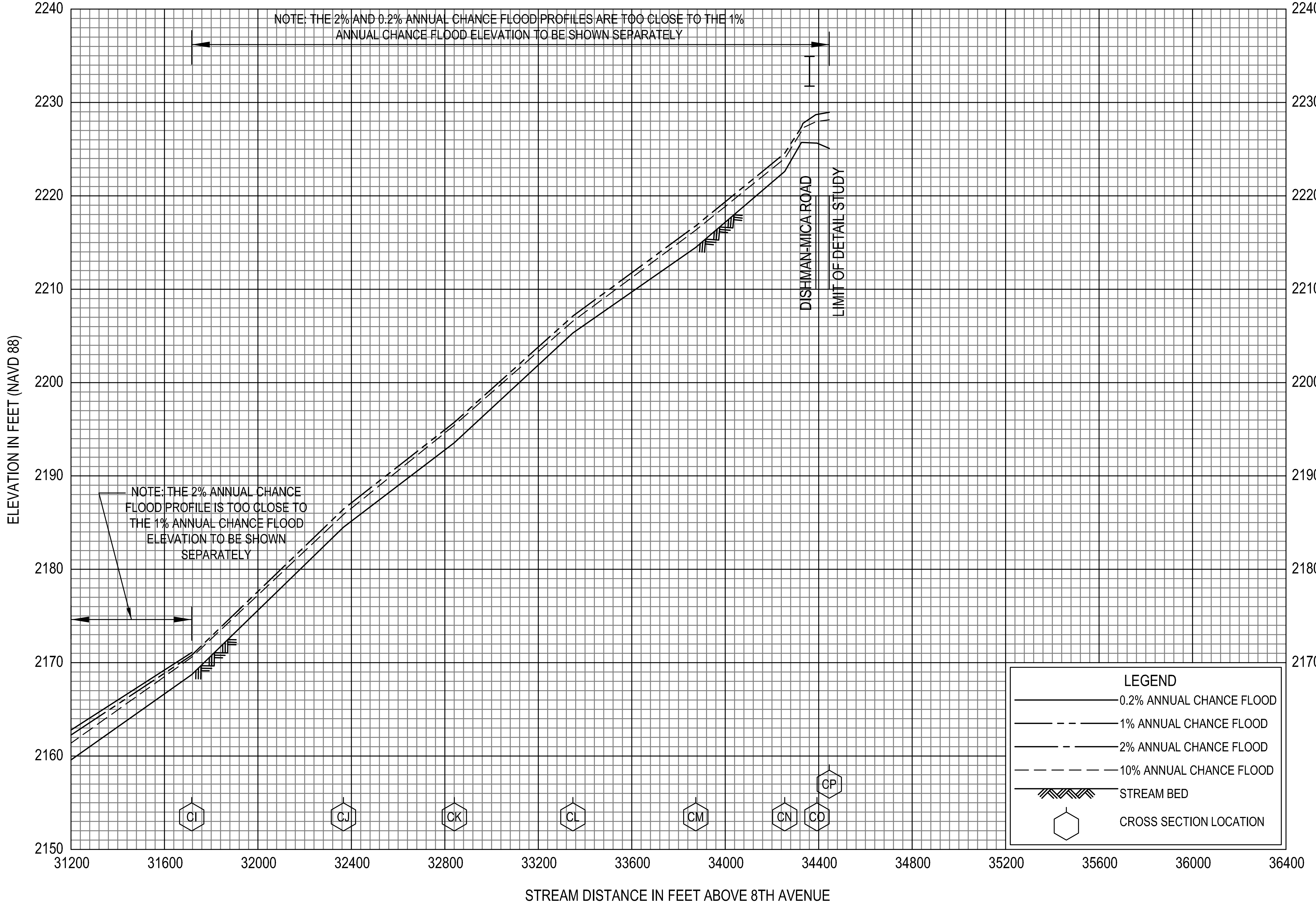
CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

09P



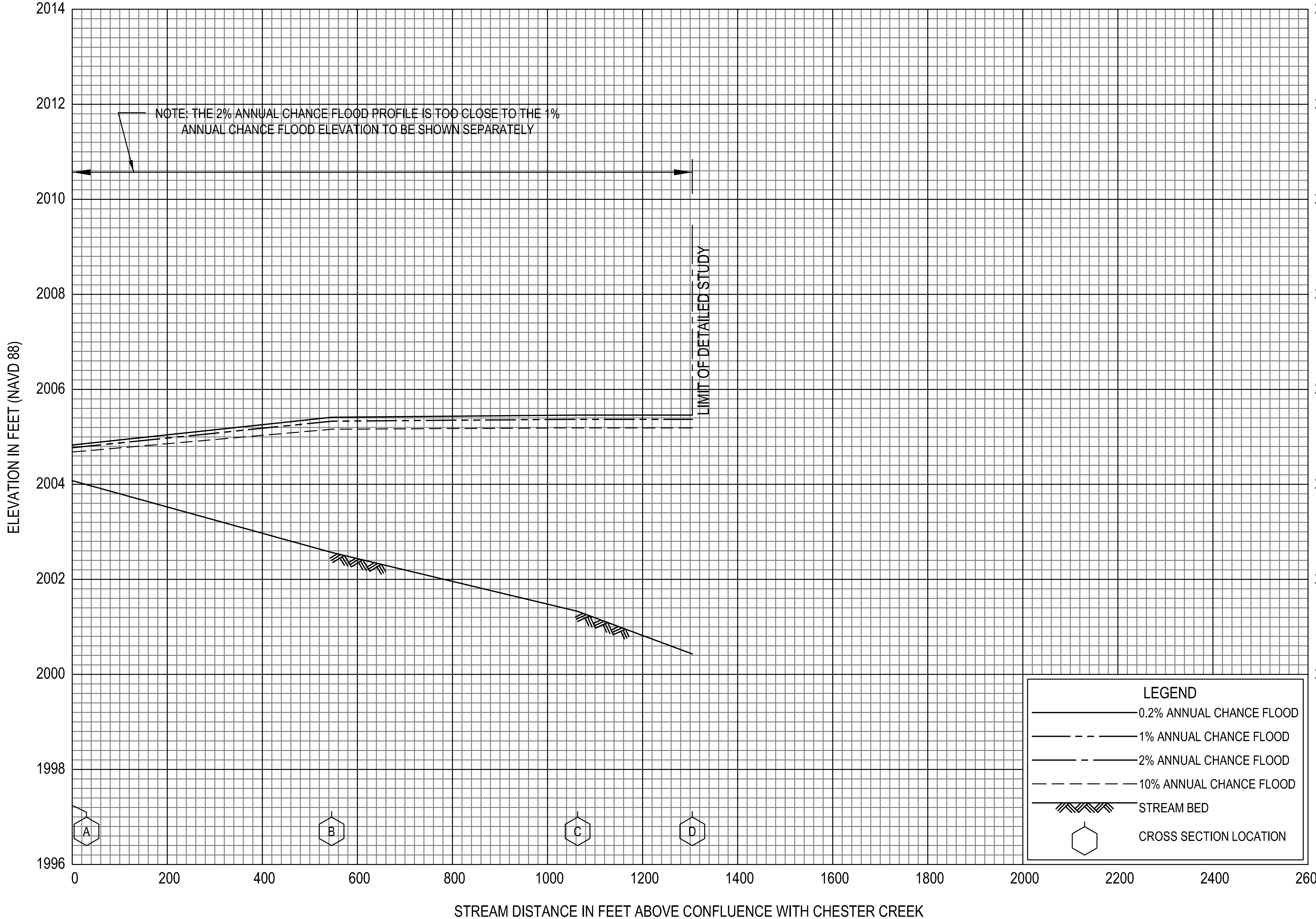
FLOOD PROFILES

CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



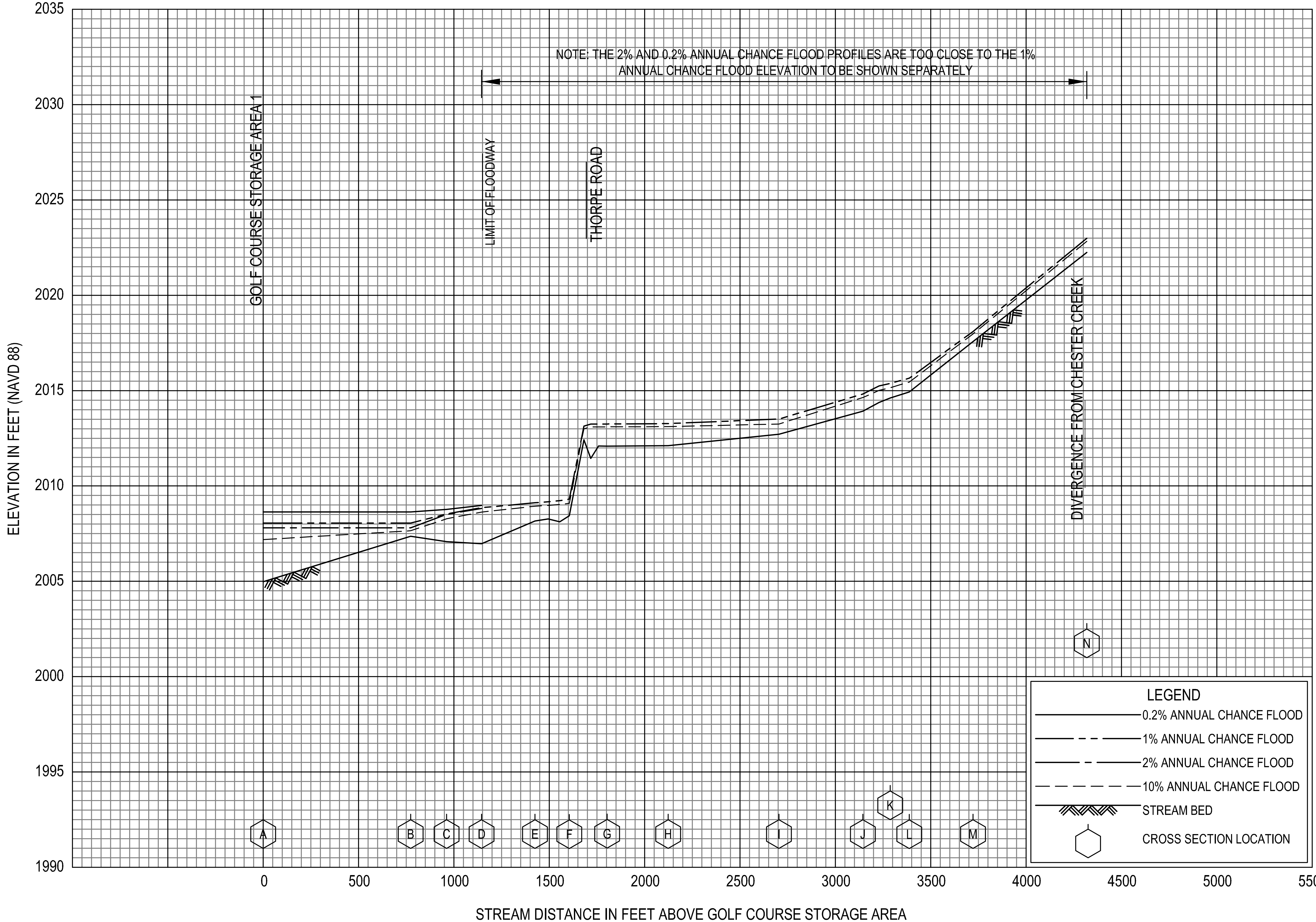
FLOOD PROFILES

CHESTER CREEK - DREDGE CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

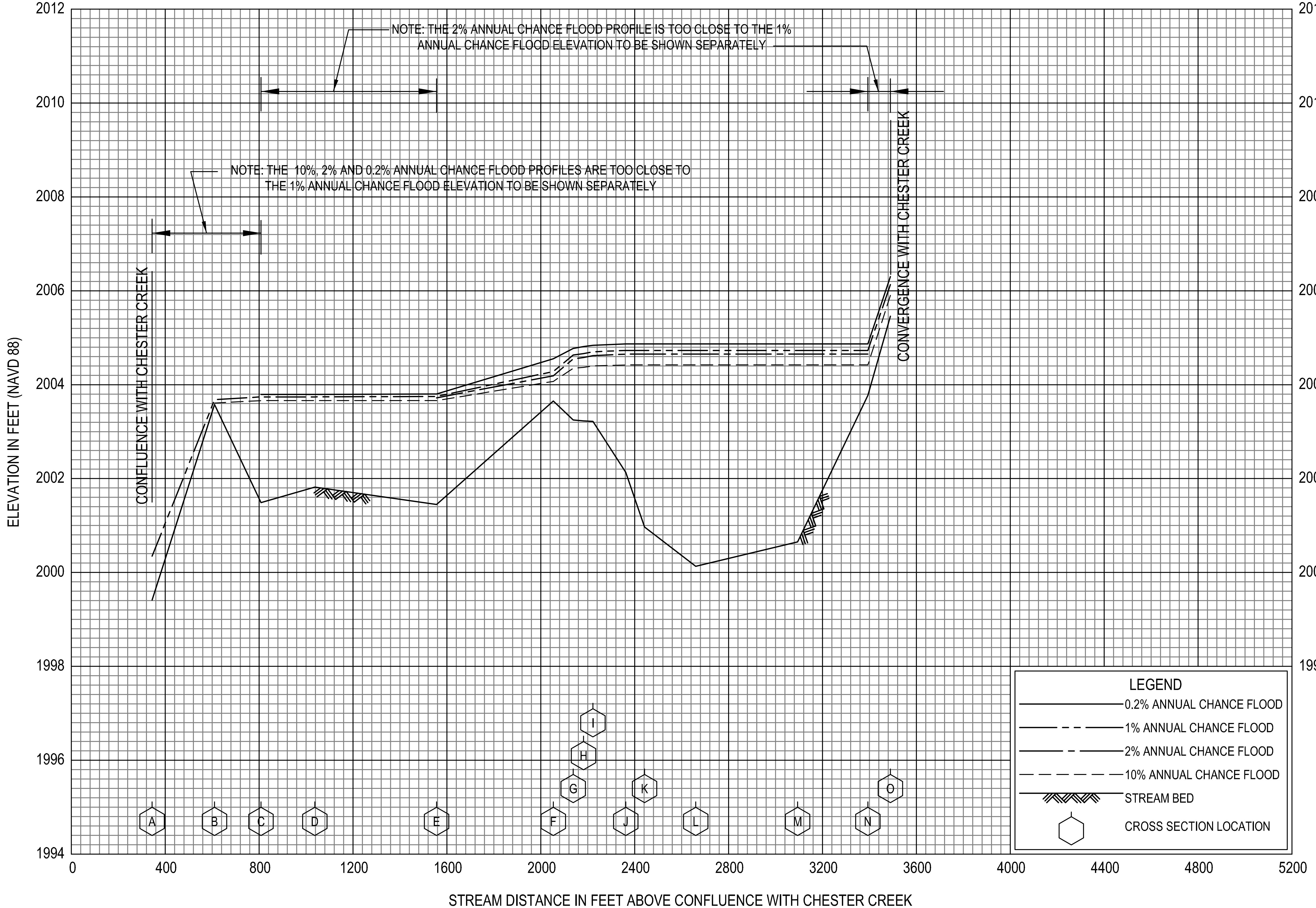


FLOOD PROFILES

CHESTER CREEK - GOLF COURSE OVERFLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA
AND INCORPORATED AREAS



FLOOD PROFILES

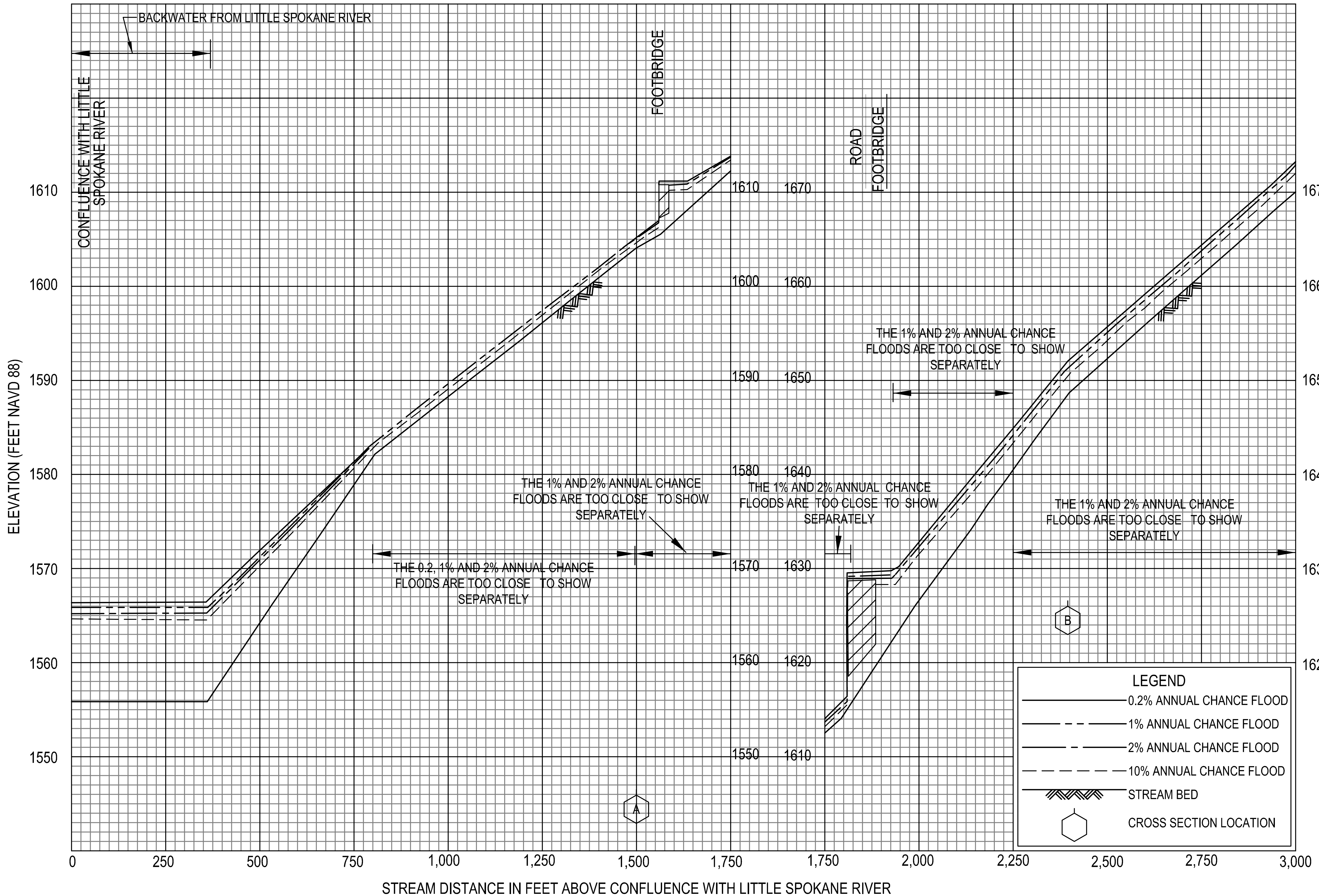
CHESTER CREEK, WEST OF BORROW PIT

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

13P



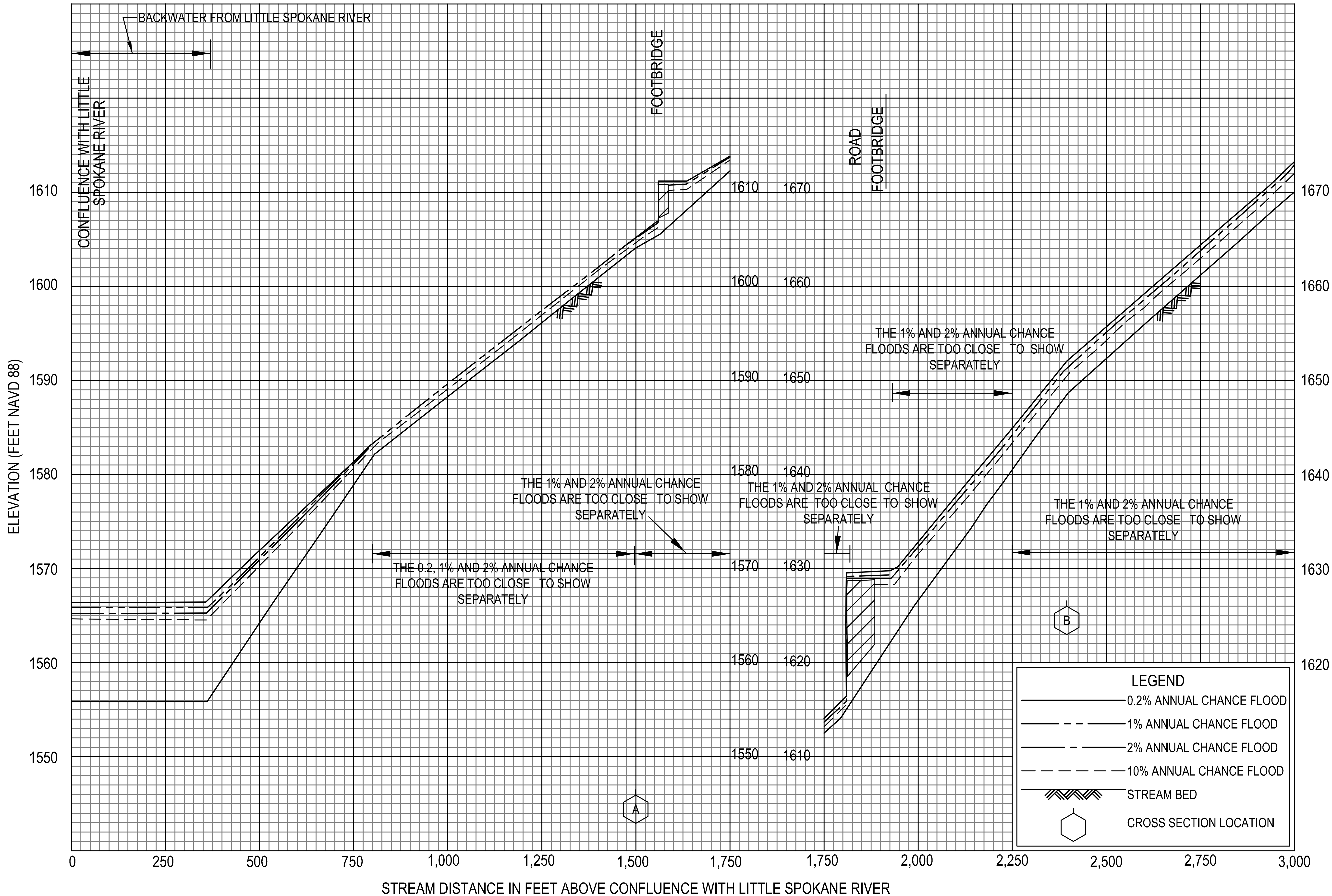
FLOOD PROFILES

COUNTY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



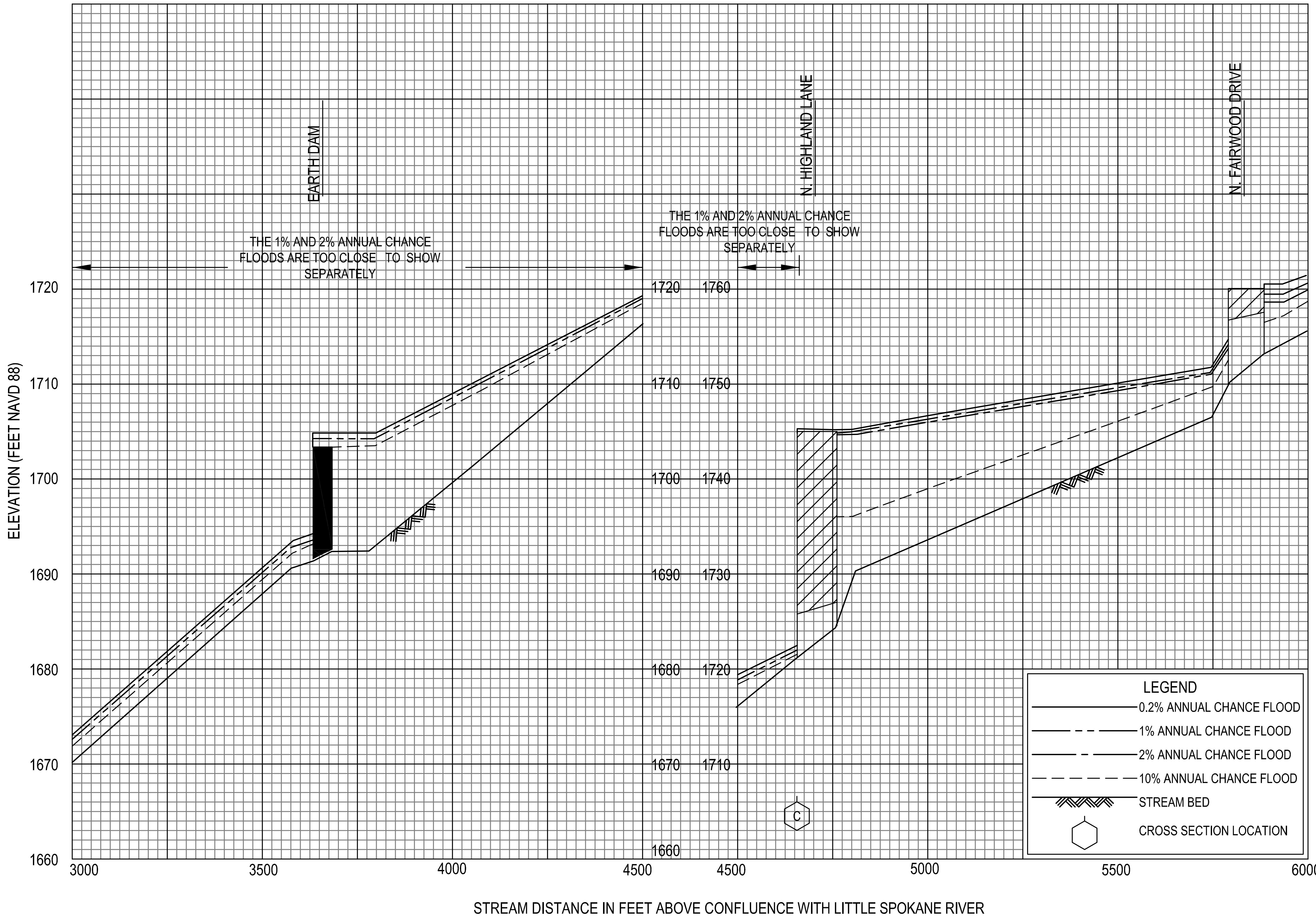
FLOOD PROFILES

COUNTRY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



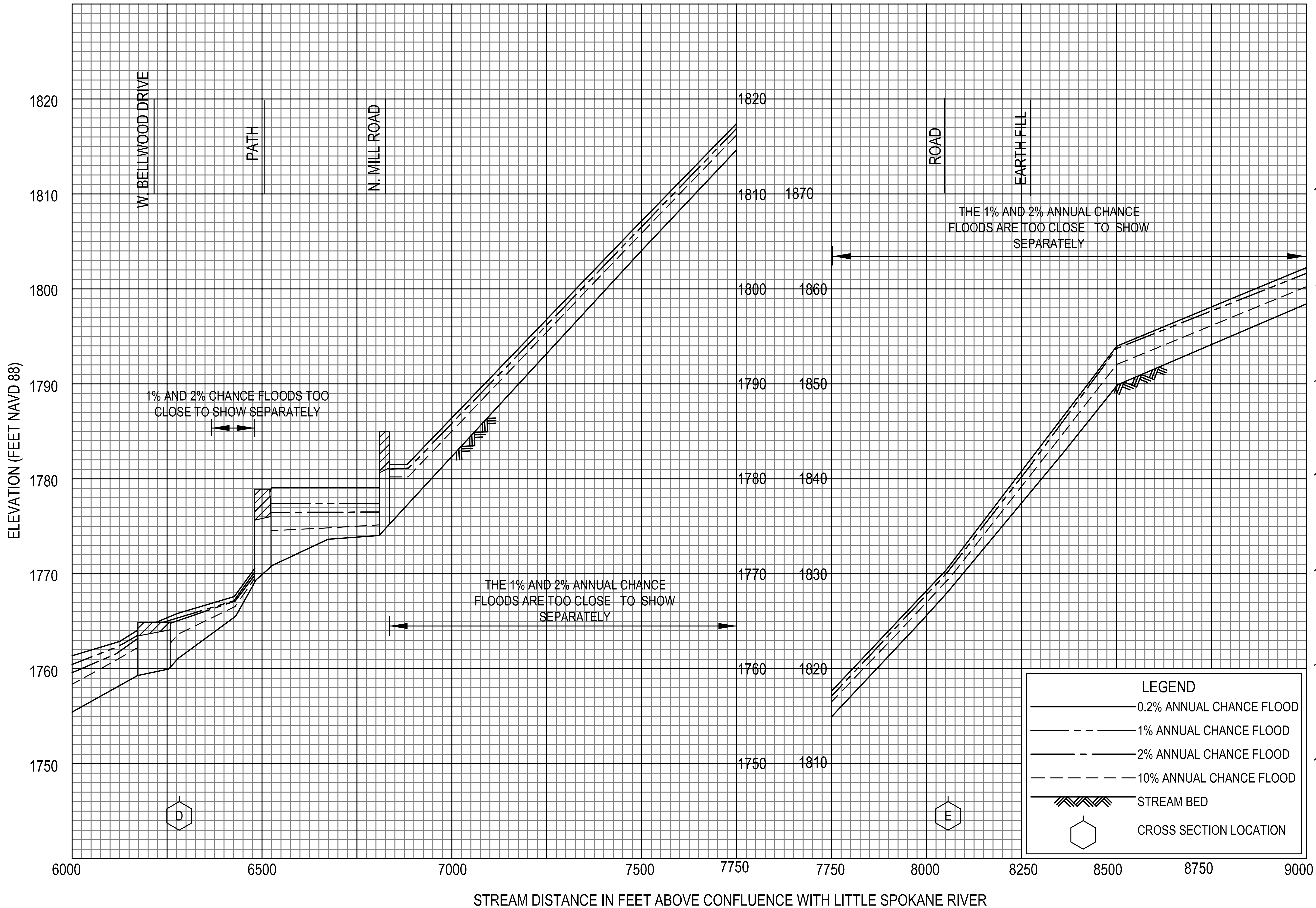
FLOOD PROFILES

COUNTRY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

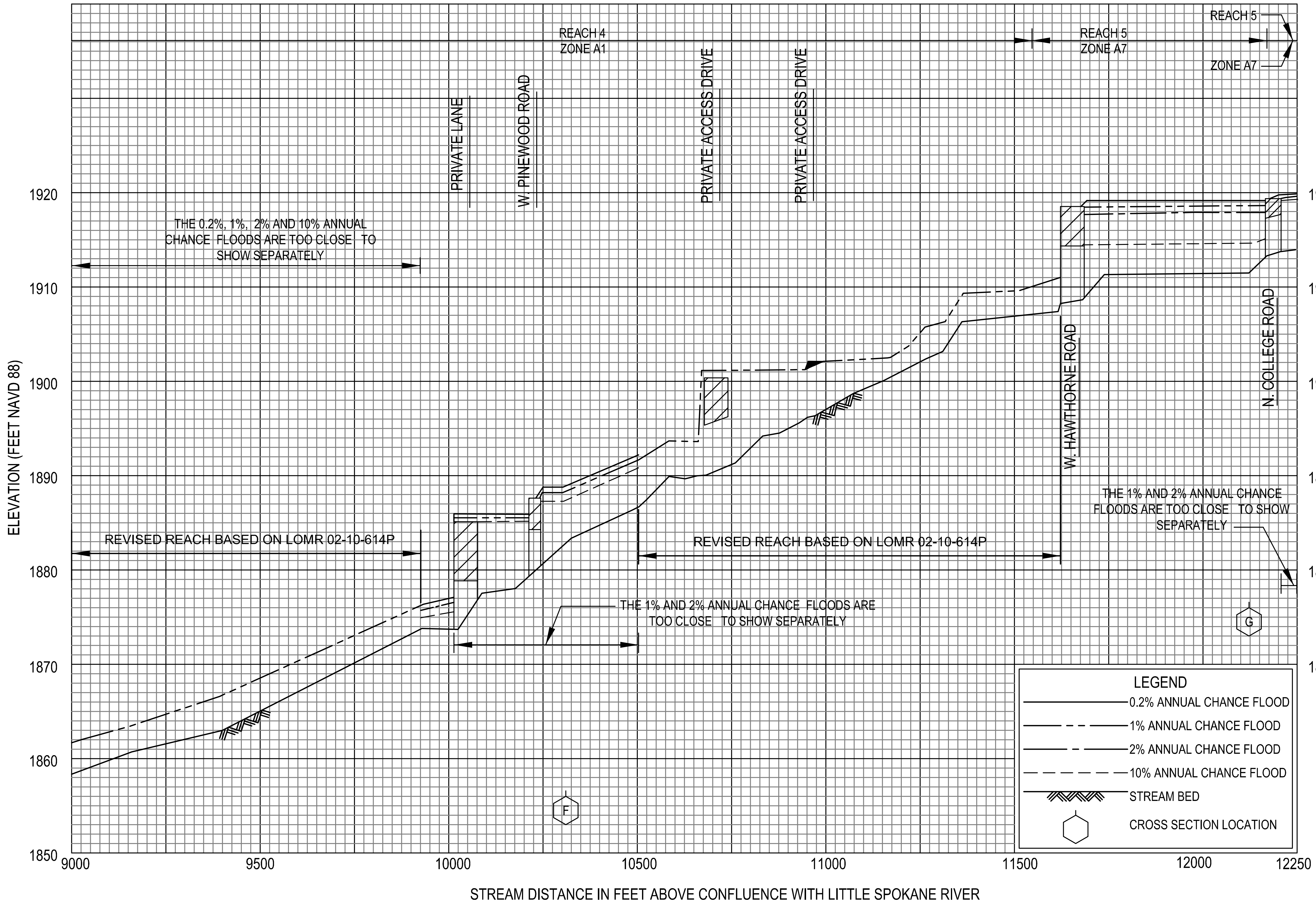
COUNTRY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

16P



FLOOD PROFILES

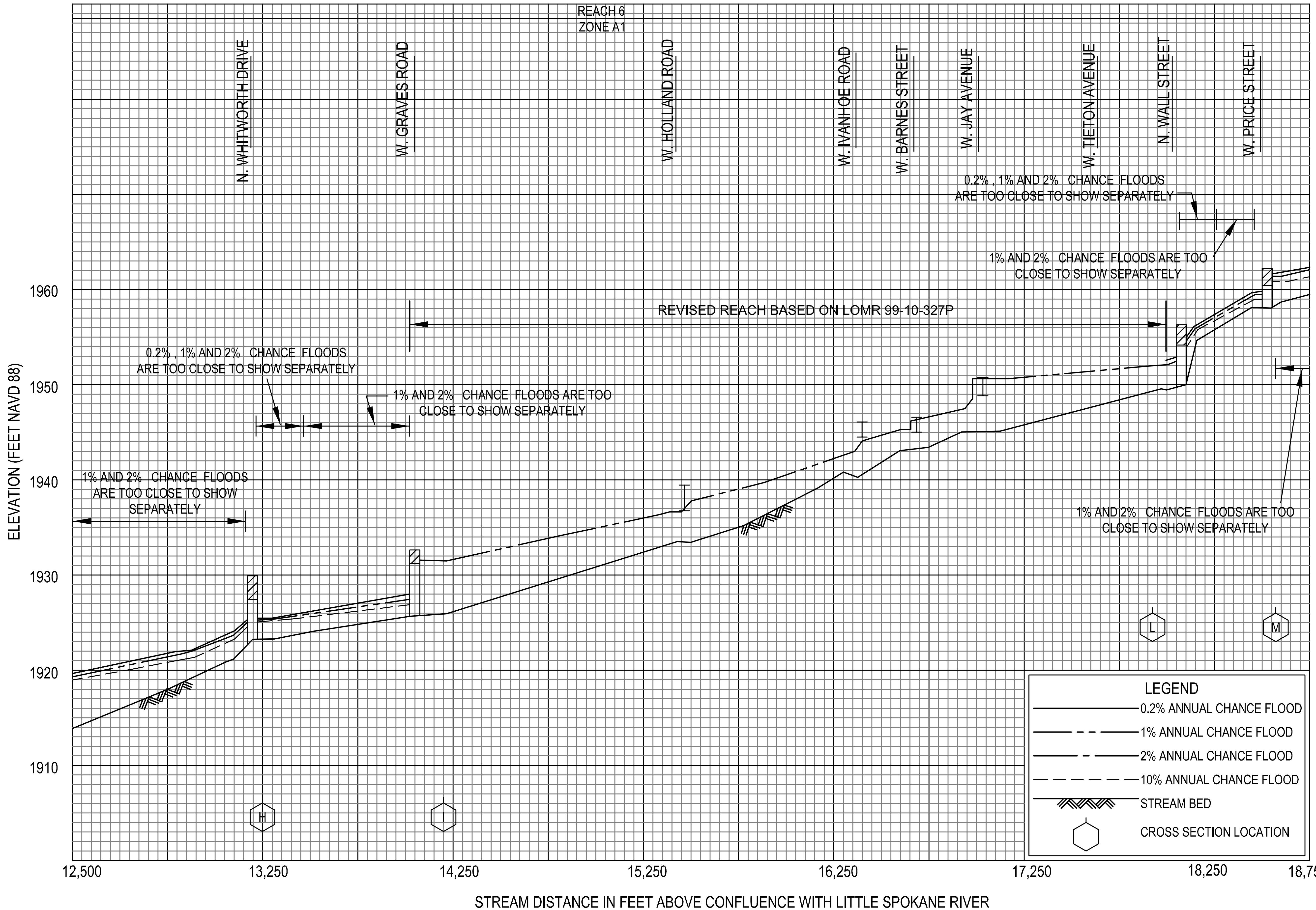
COUNTRY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

17P



FLOOD PROFILES

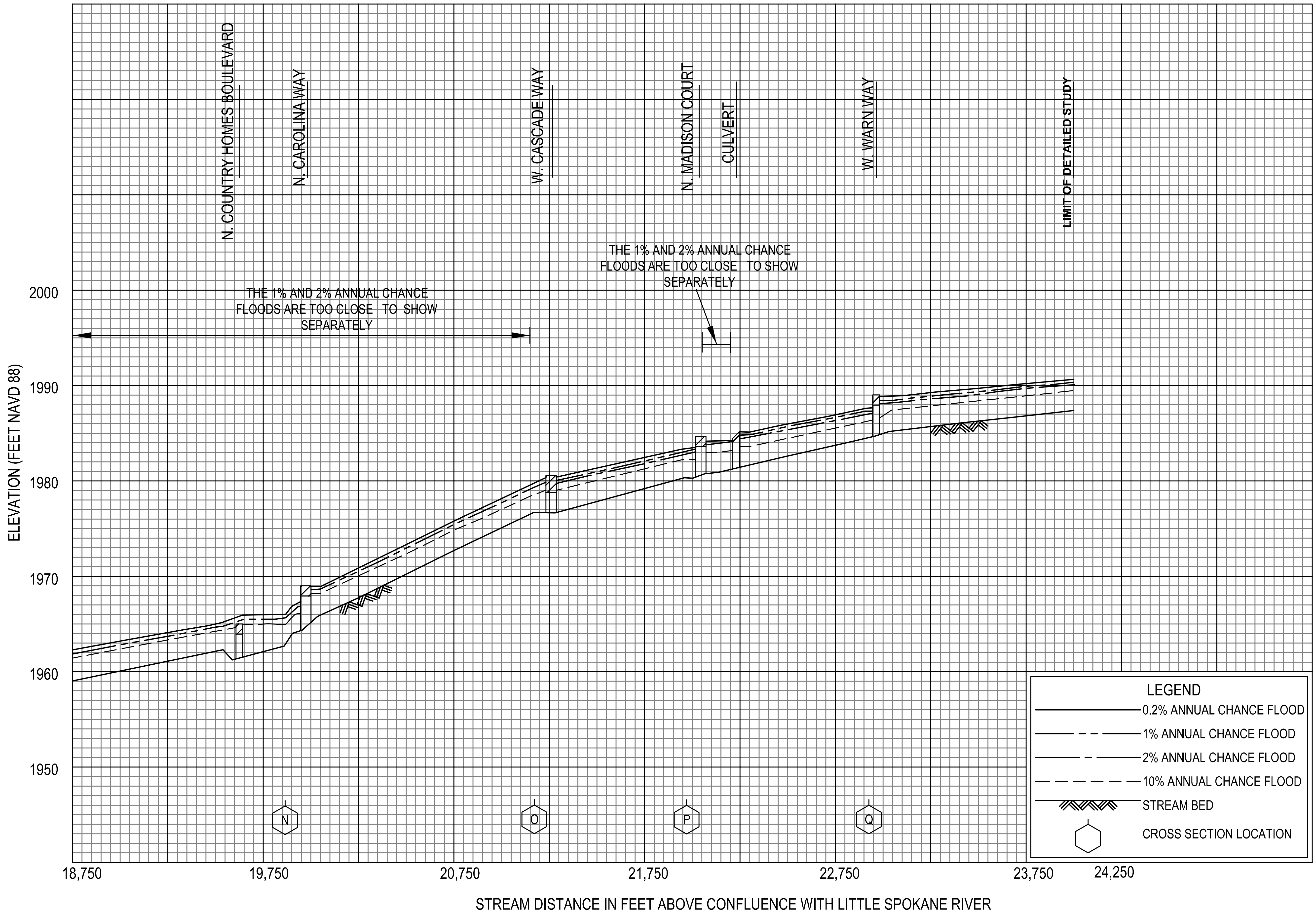
COUNTRY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

18P



FLOOD PROFILES

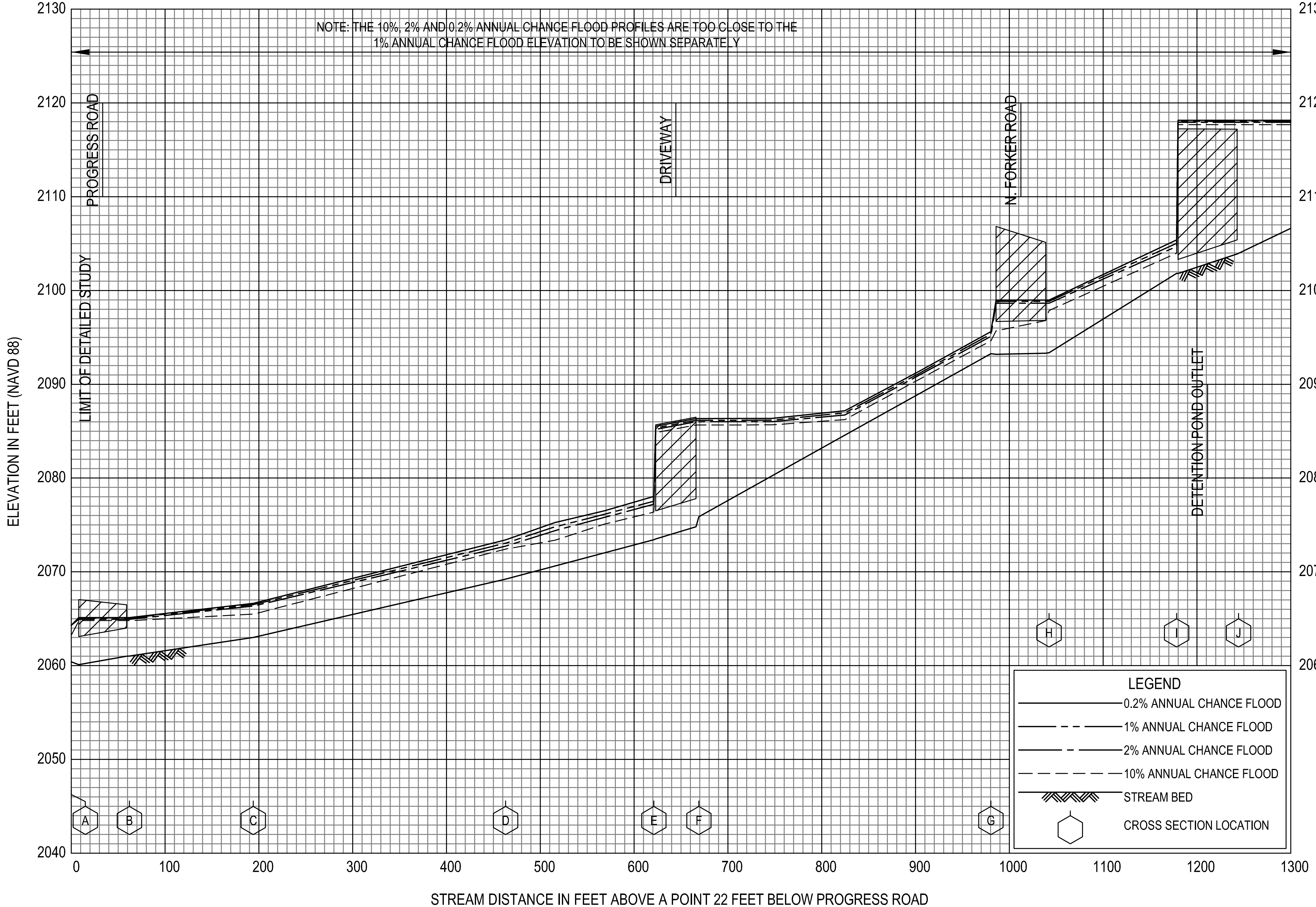
COUNTY HOMES DRAINAGE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

19P



FLOOD PROFILES

FORKER DRAW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

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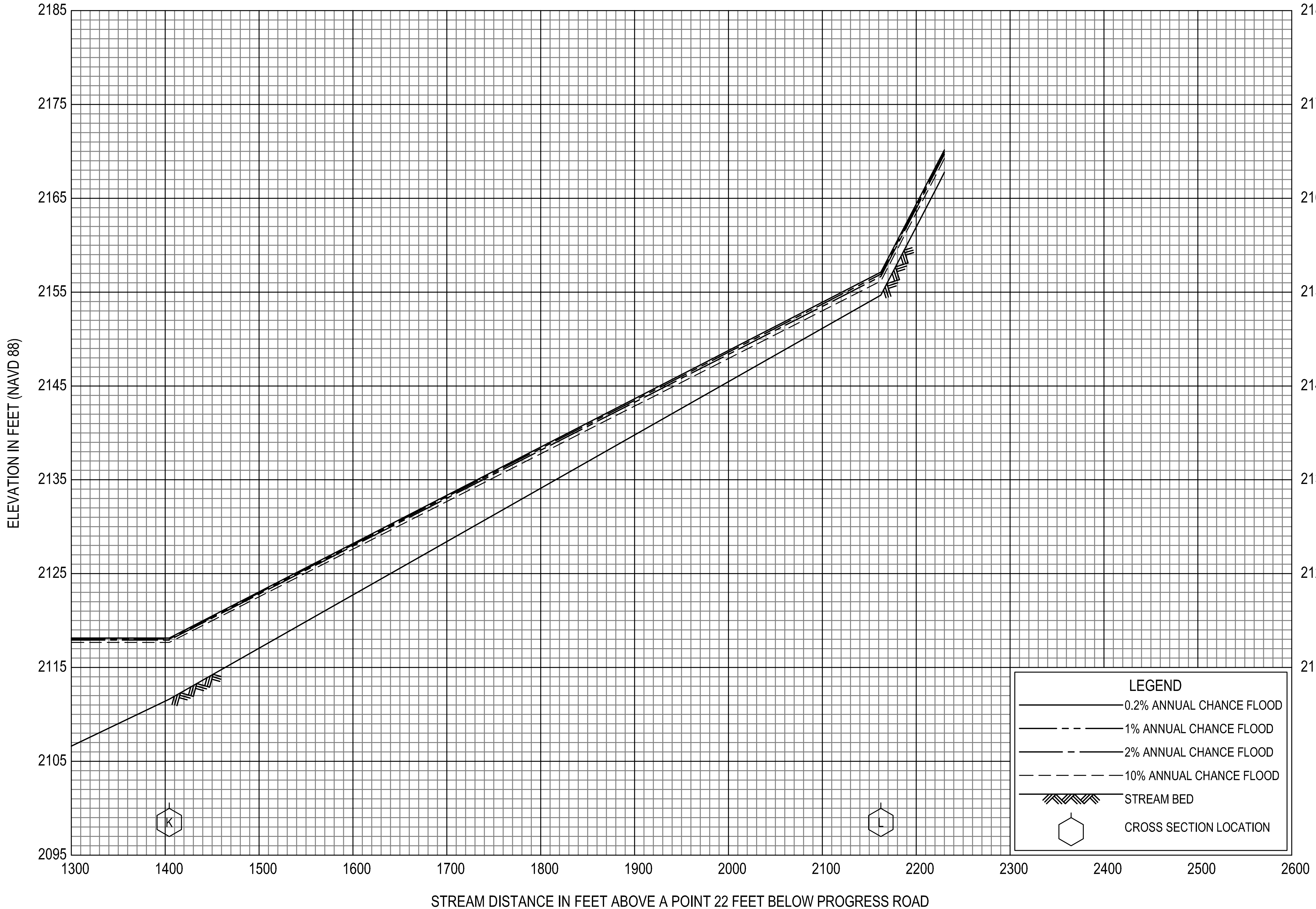


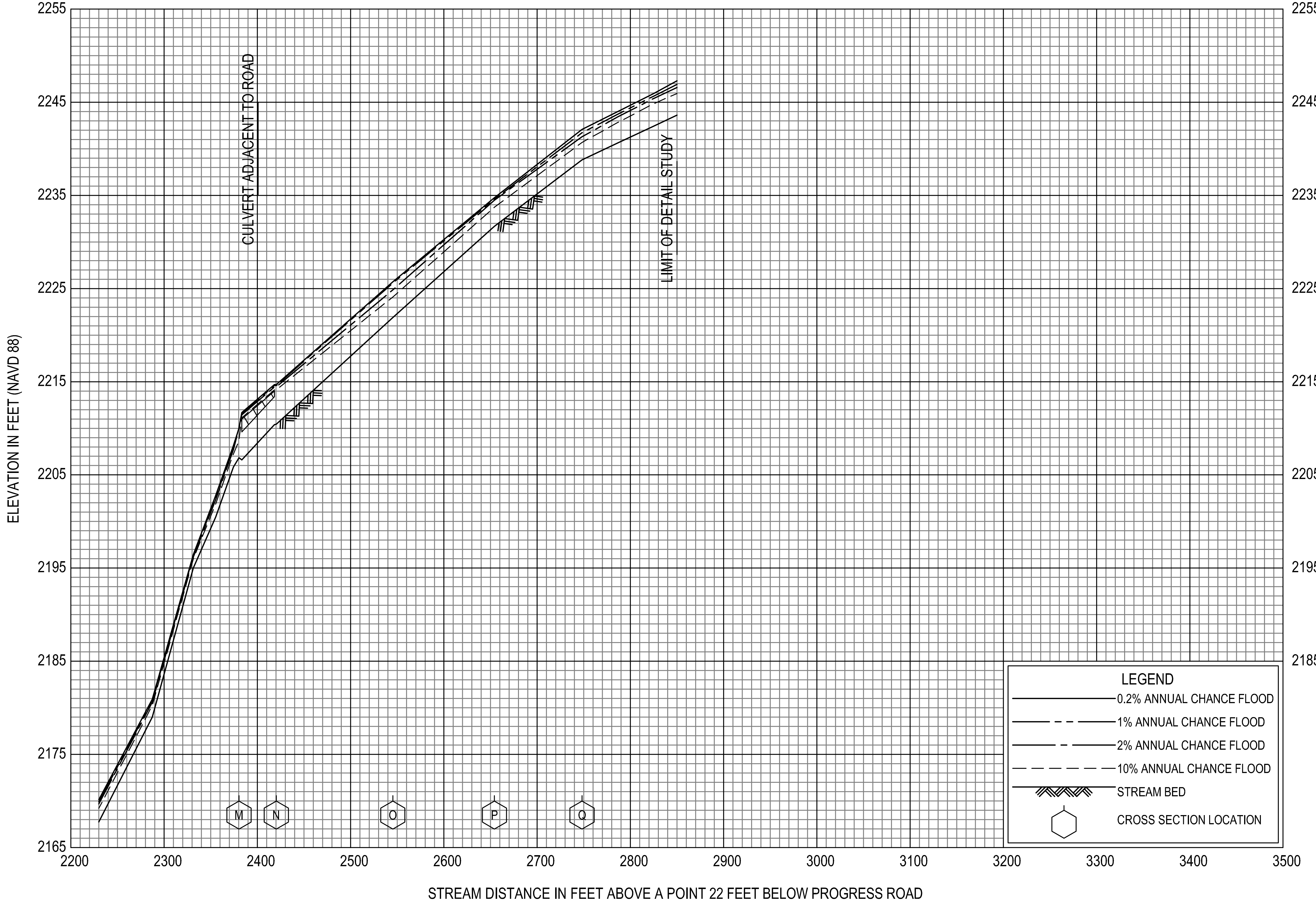
FLOOD PROFILES

FORKER DRAW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



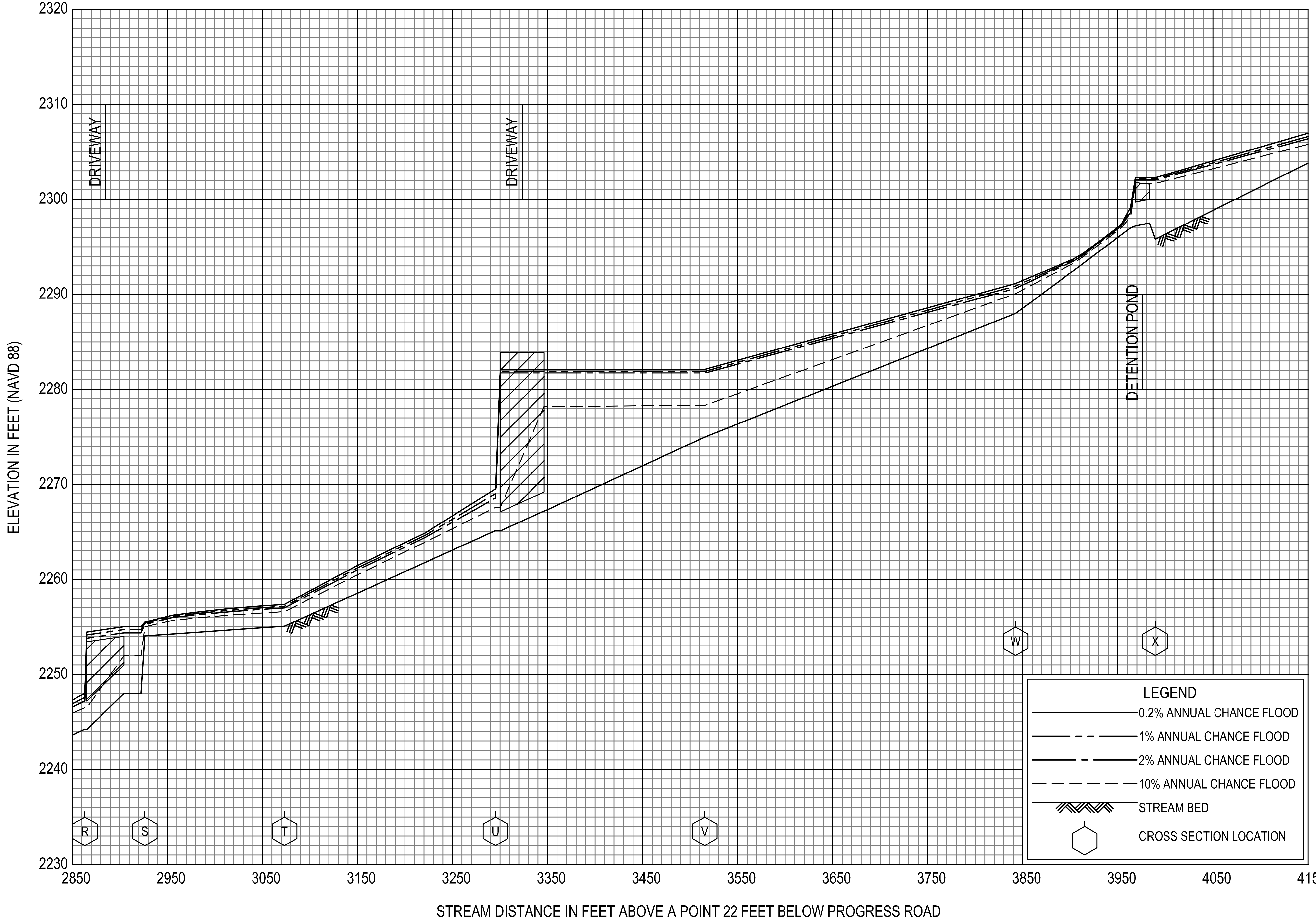
FLOOD PROFILES

FORKER DRAW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

FORKER DRAW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

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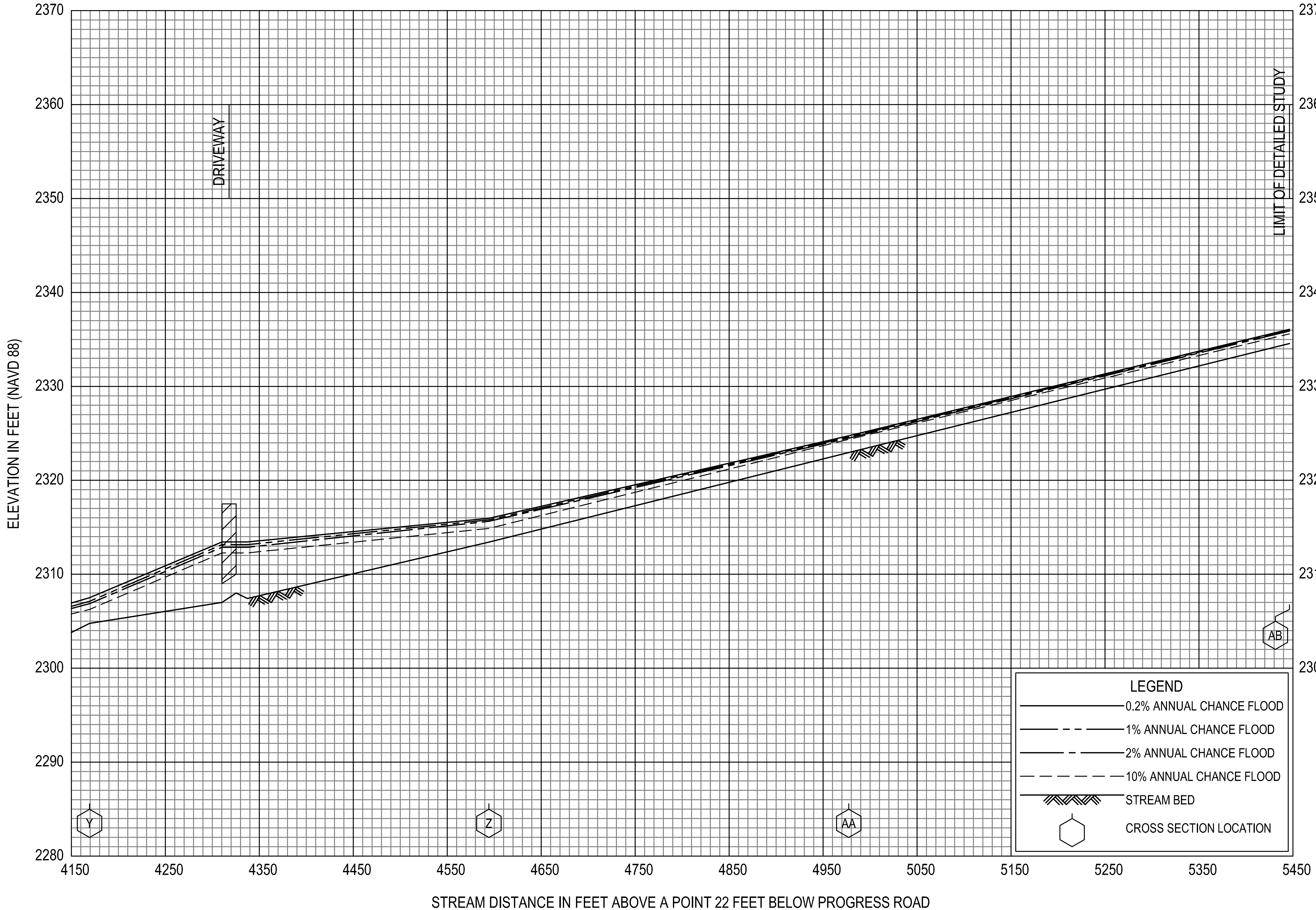

FLOOD PROFILES

FORKER DRAW

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

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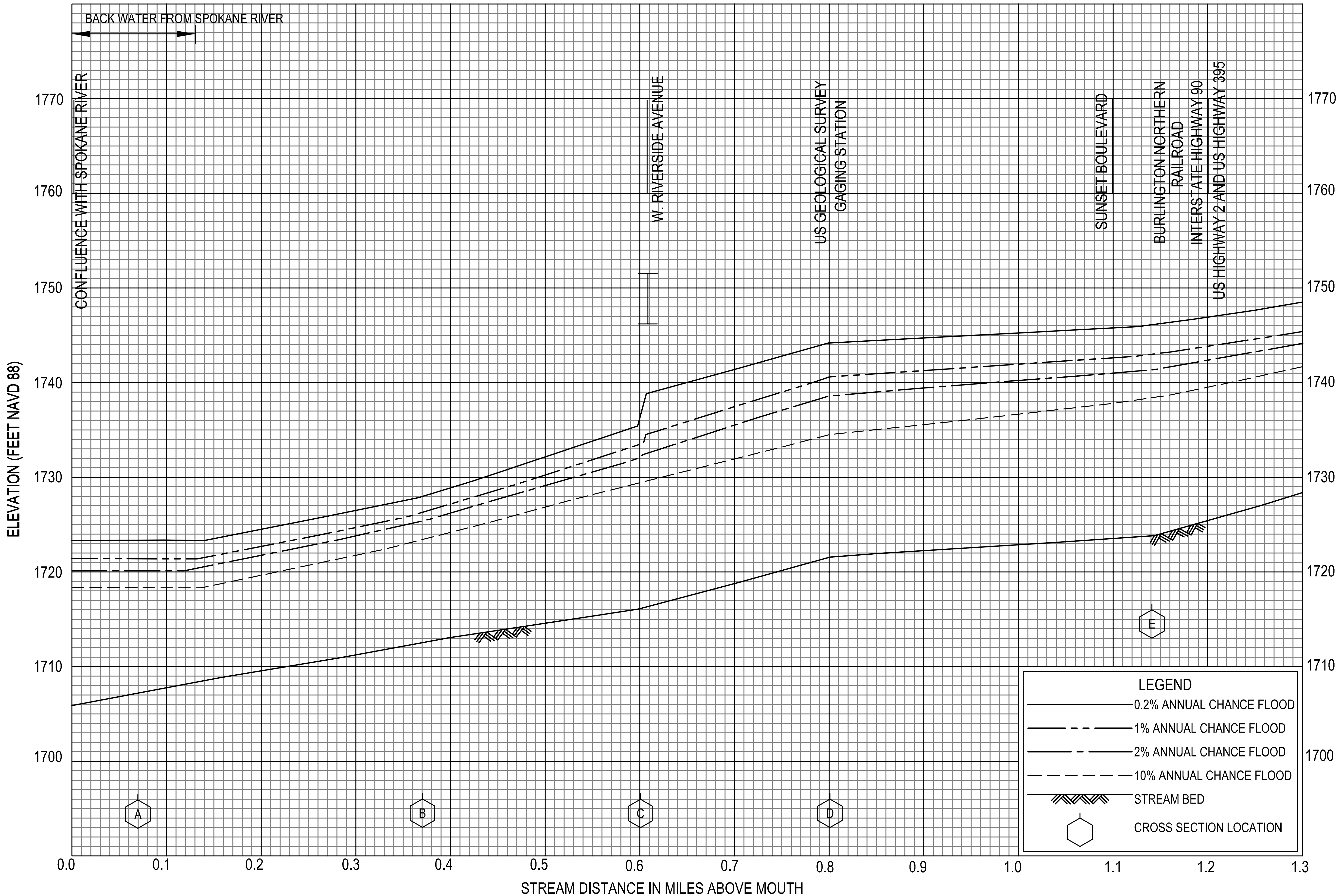


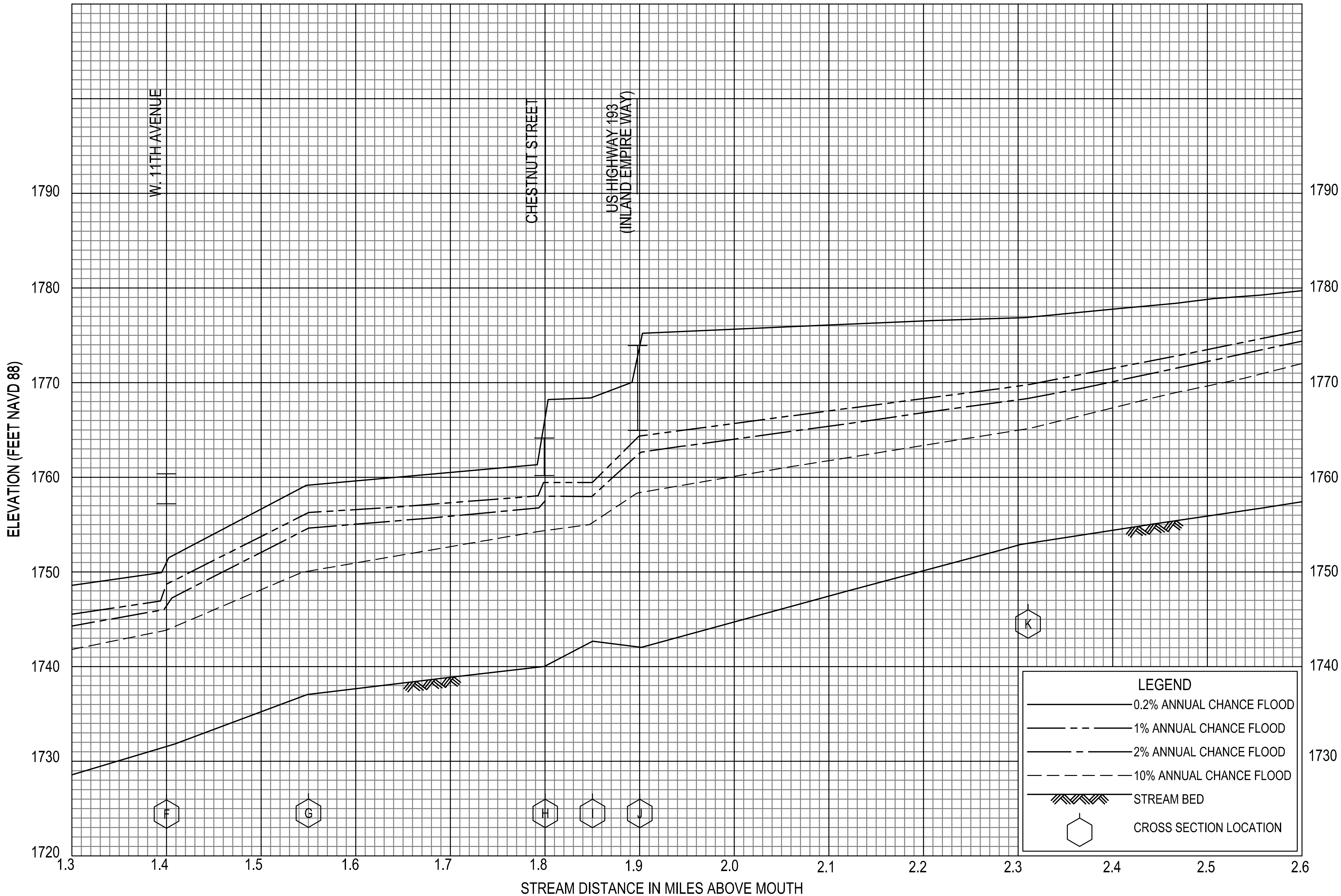
FLOOD PROFILES

HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



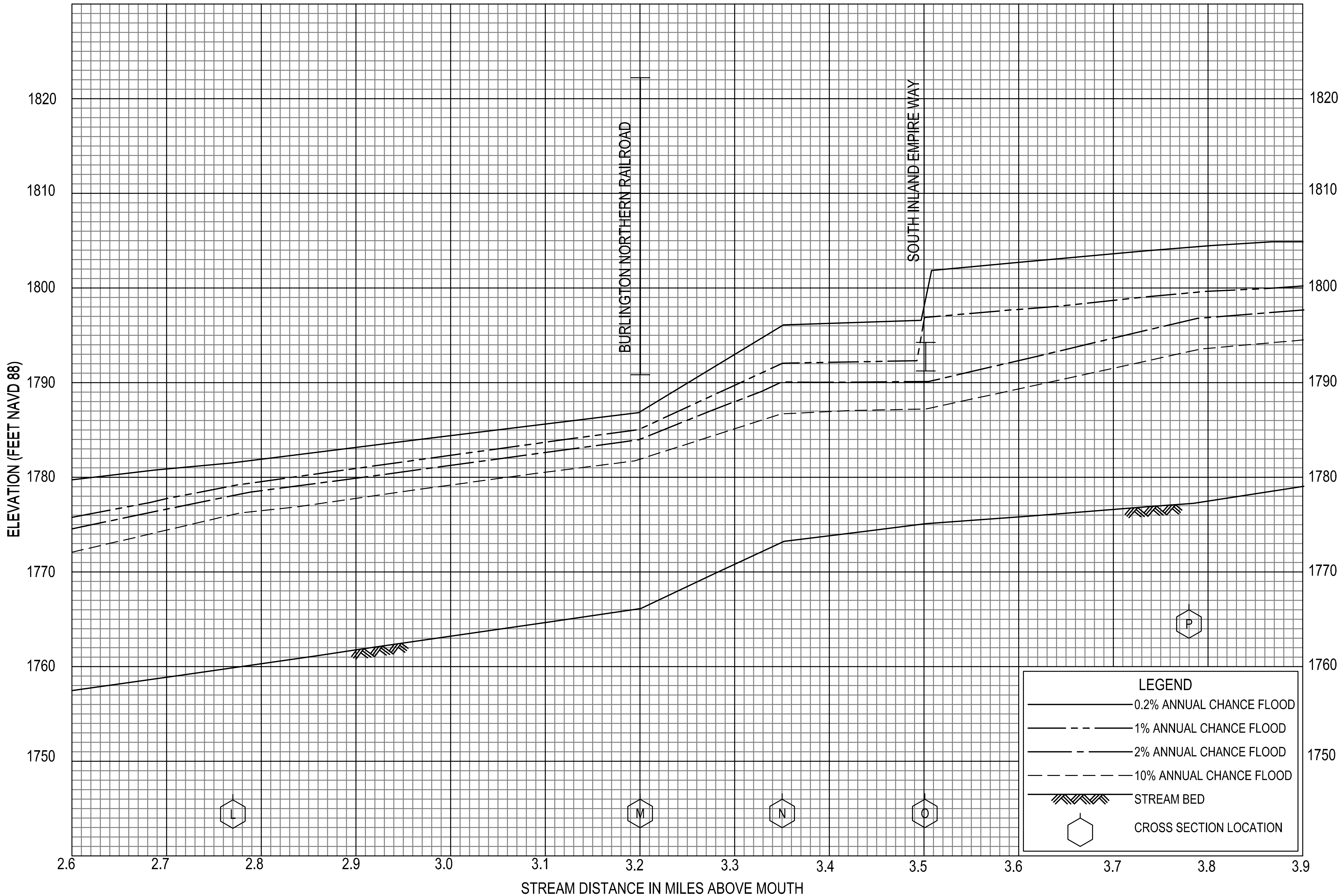
FLOOD PROFILES

HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



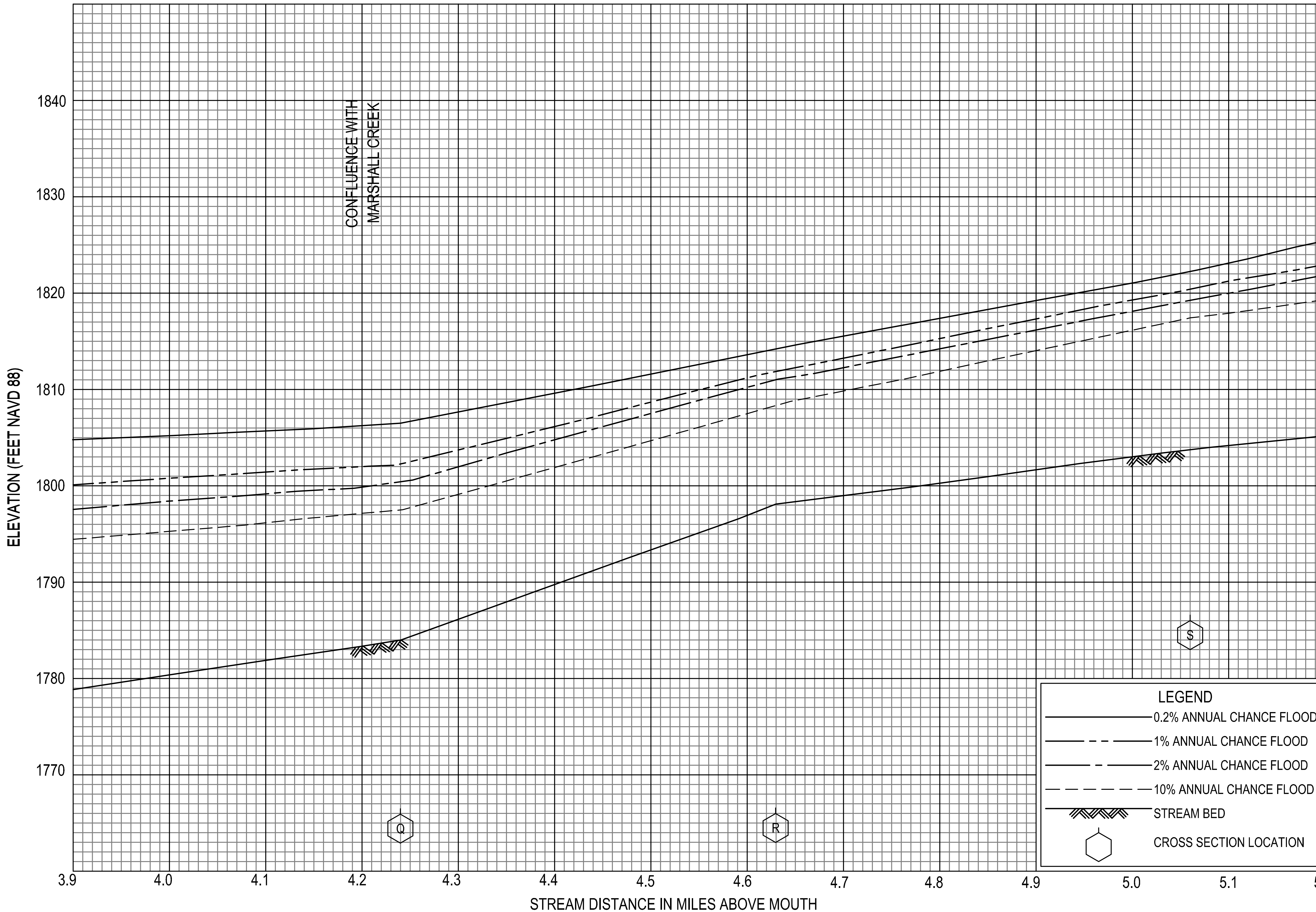
FLOOD PROFILES

HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



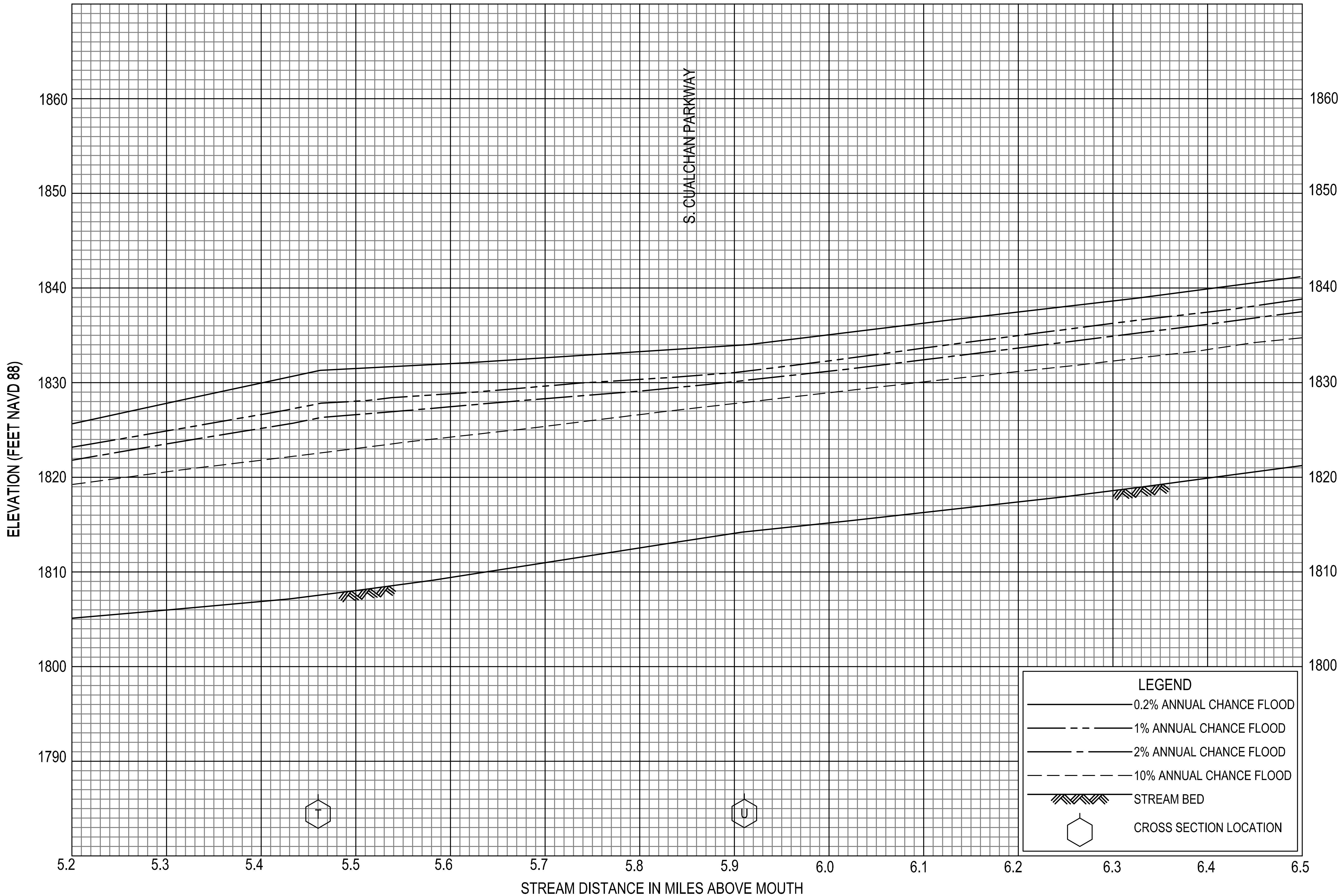
FLOOD PROFILES

HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



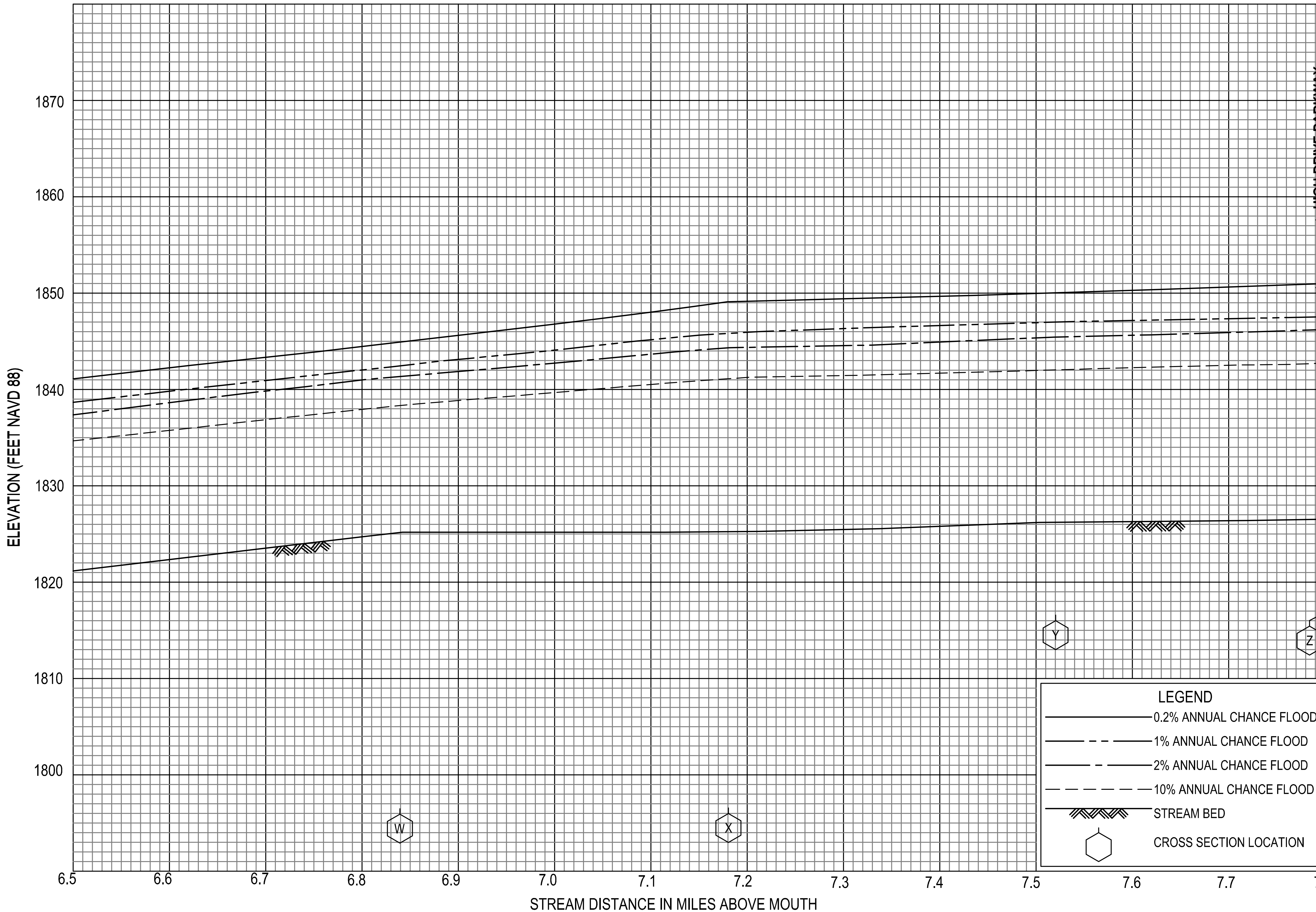
FLOOD PROFILES

HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

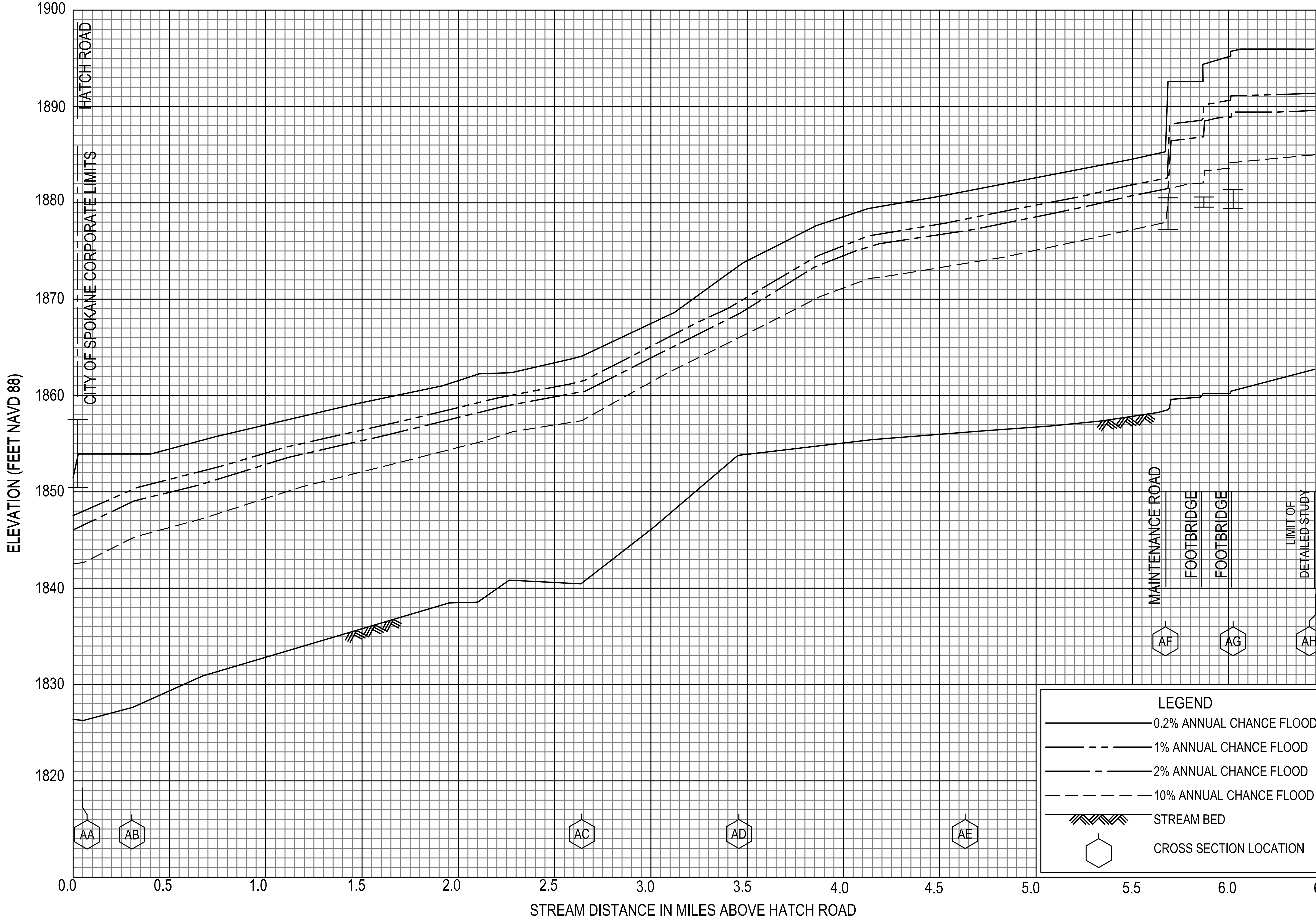
HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

30P



FLOOD PROFILES

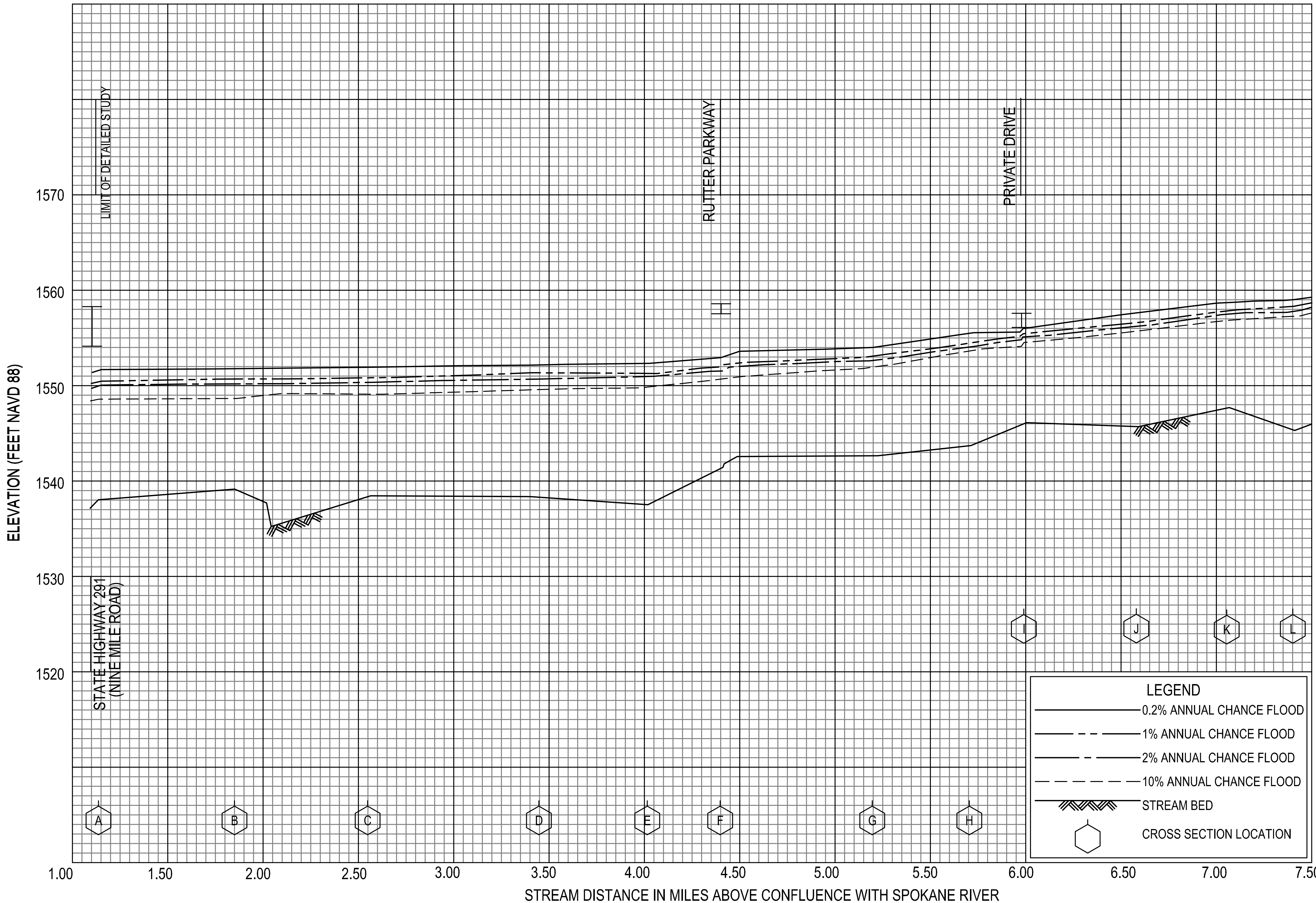
HANGMAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

31P



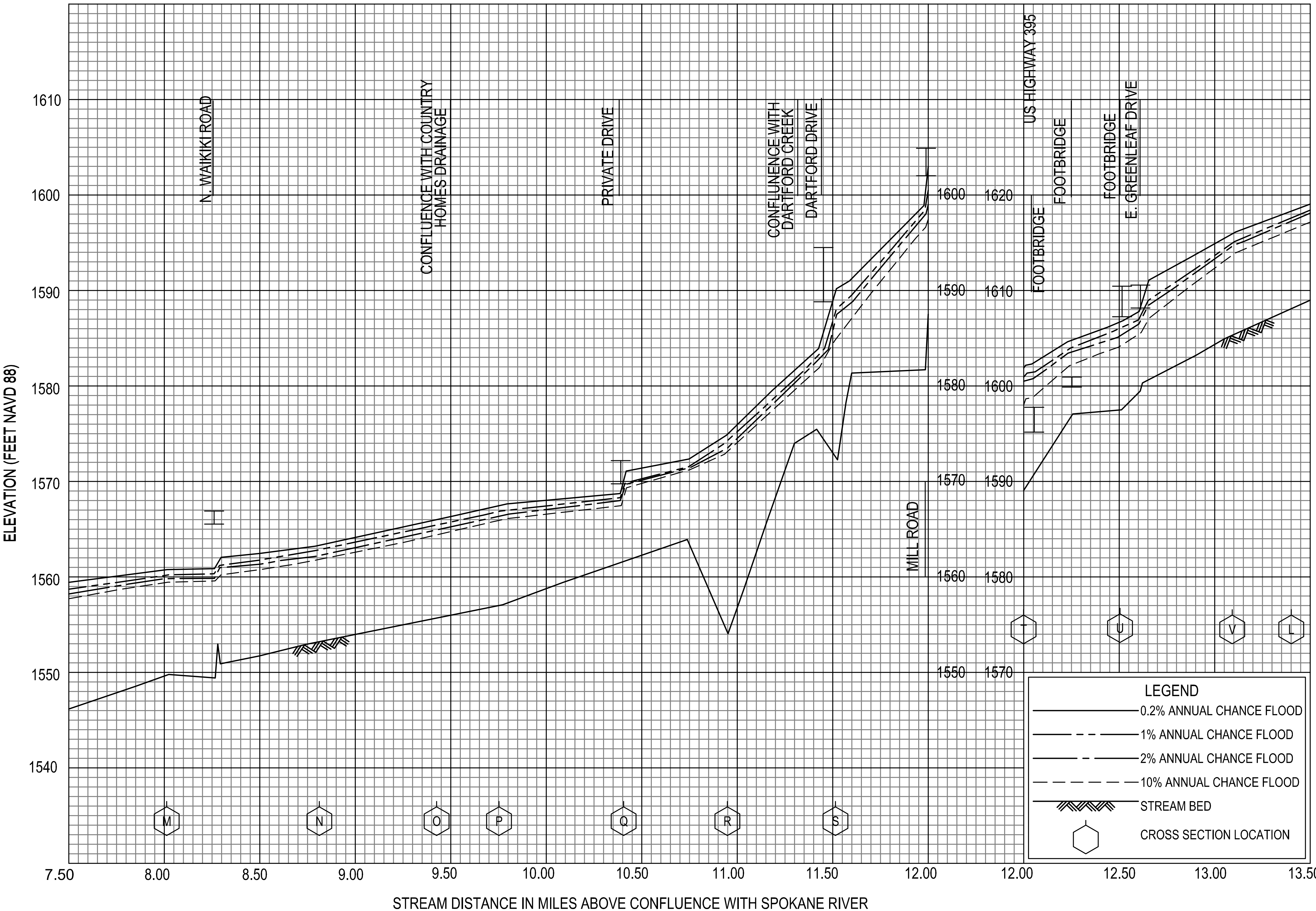
FLOOD PROFILES

LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

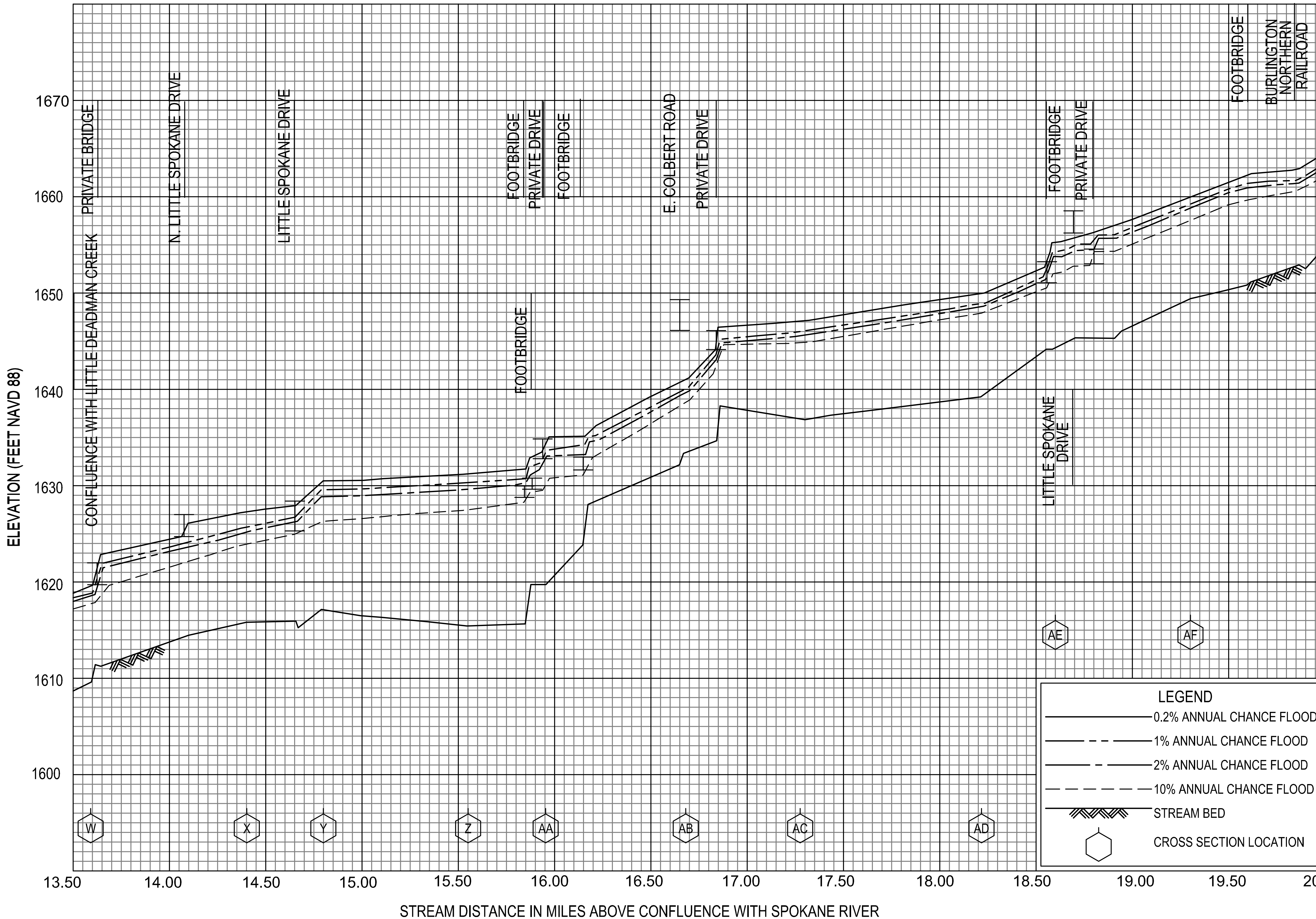
LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

33P



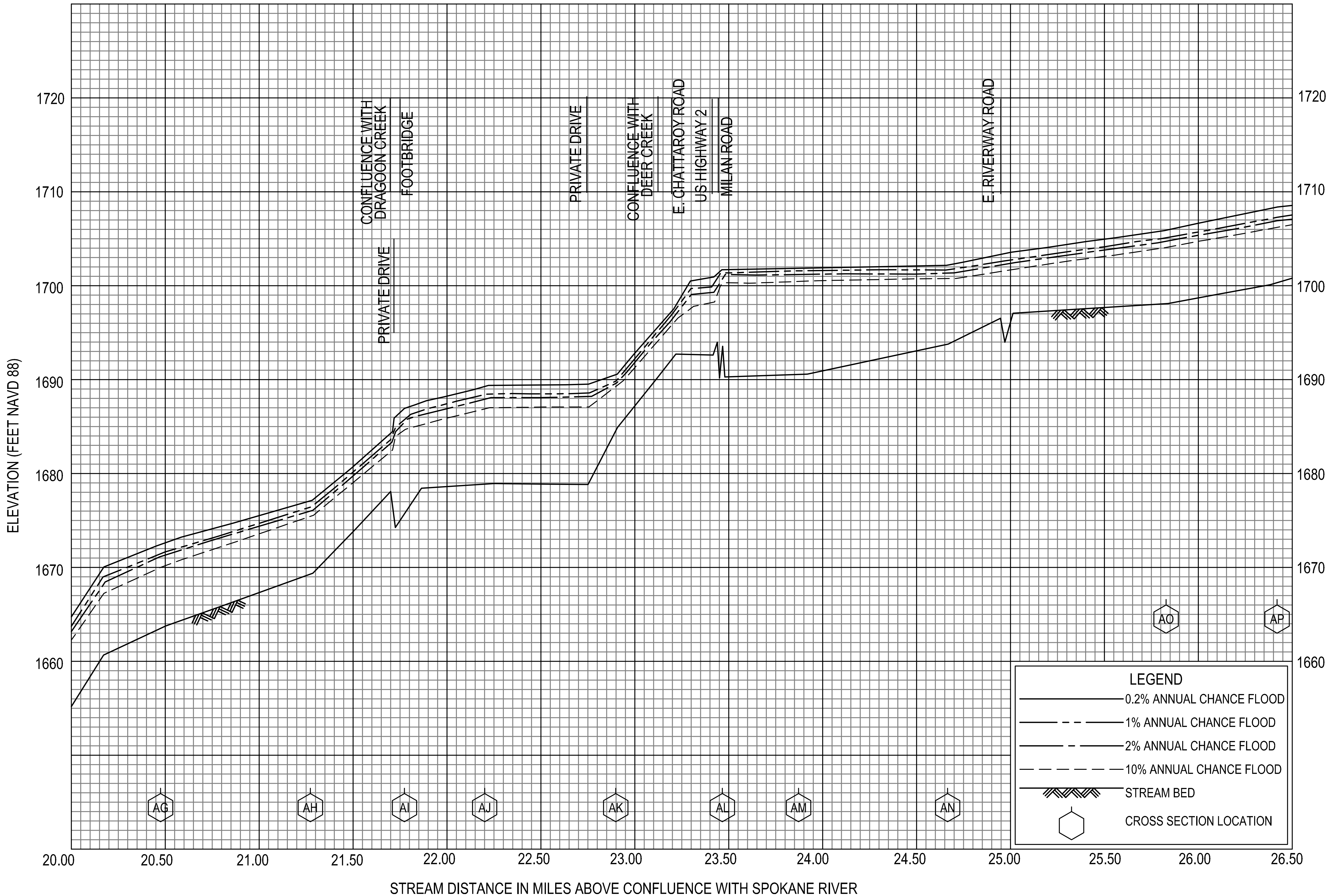
FLOOD PROFILES

LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



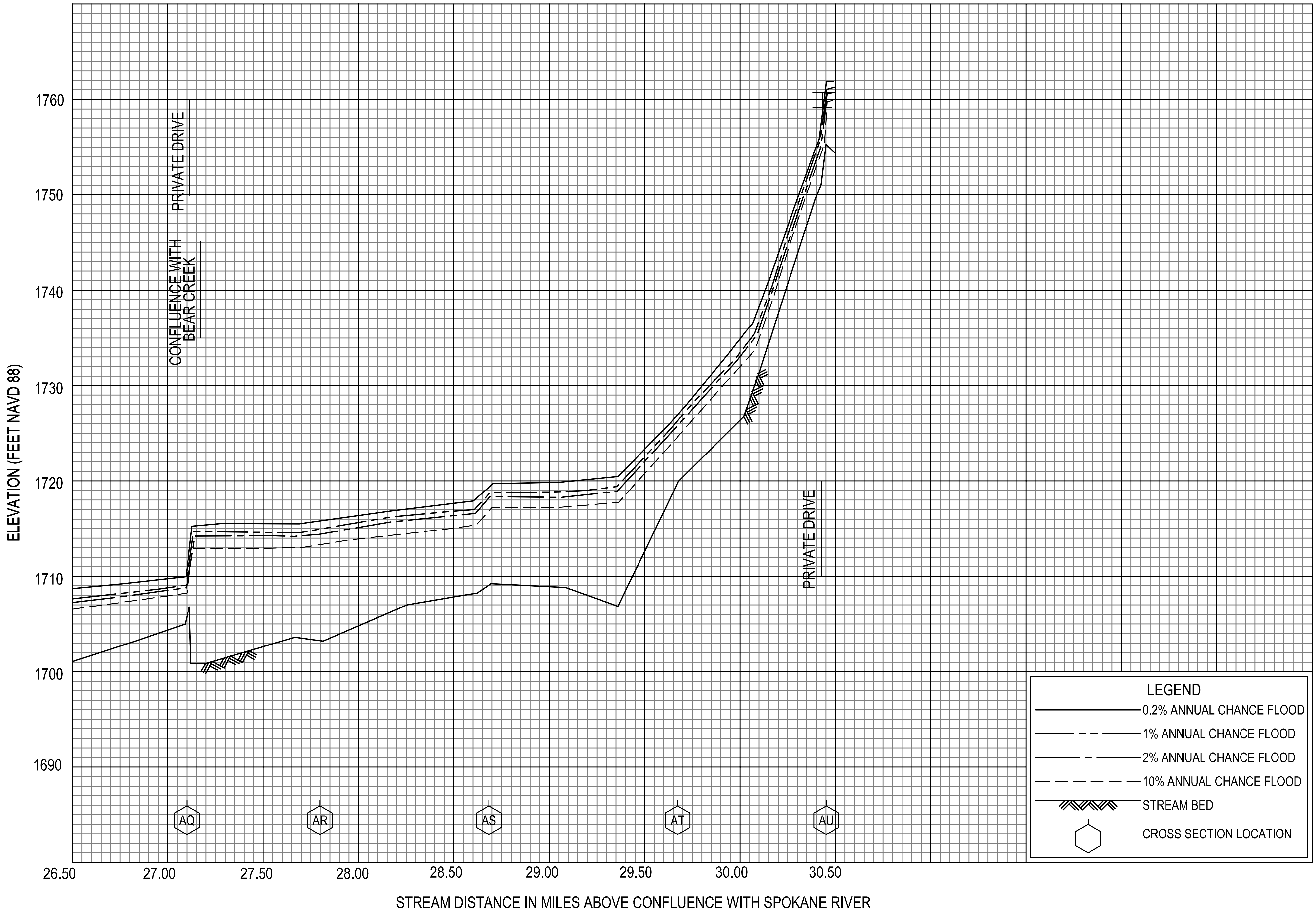
FLOOD PROFILES

LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



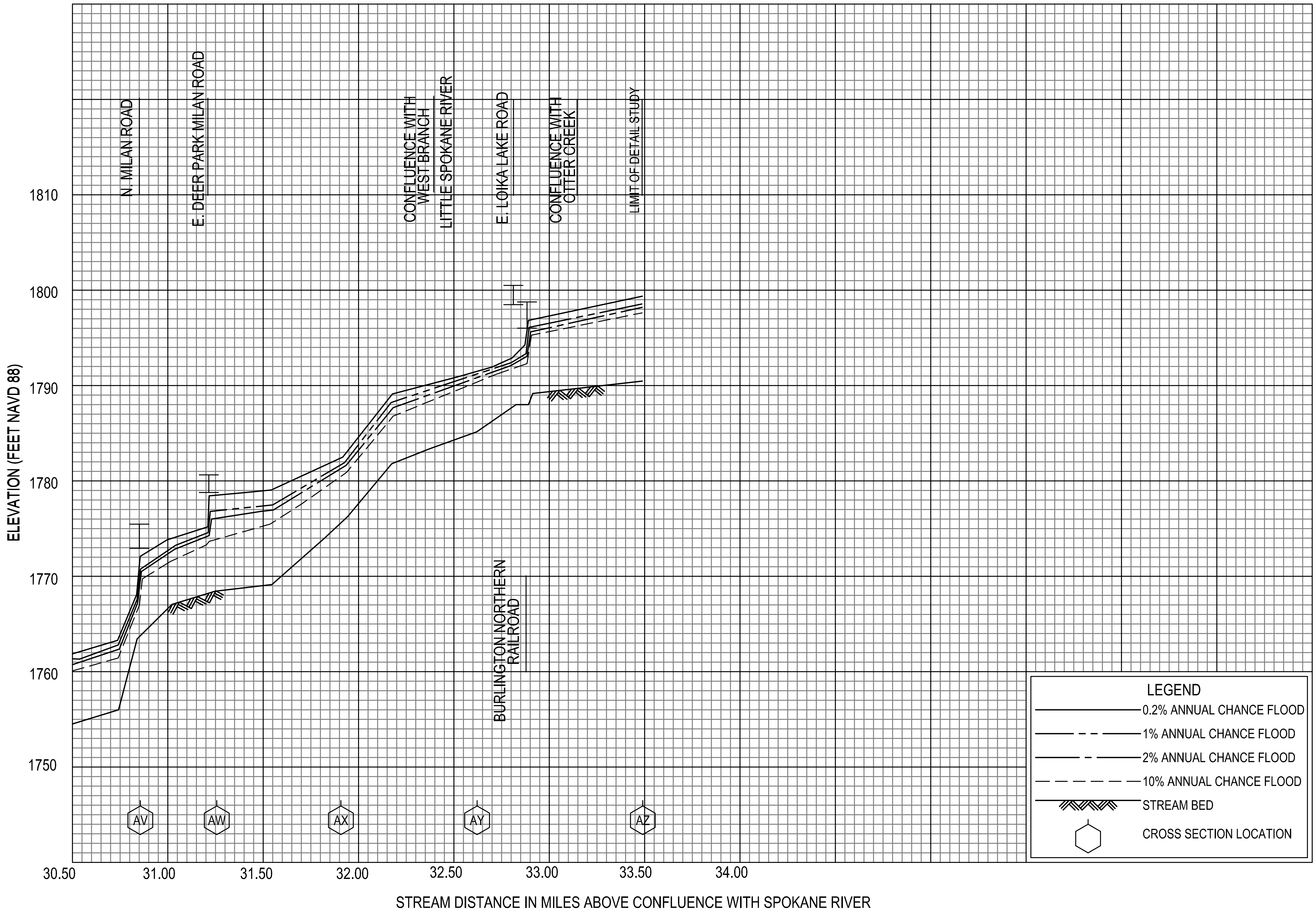
FLOOD PROFILES

LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



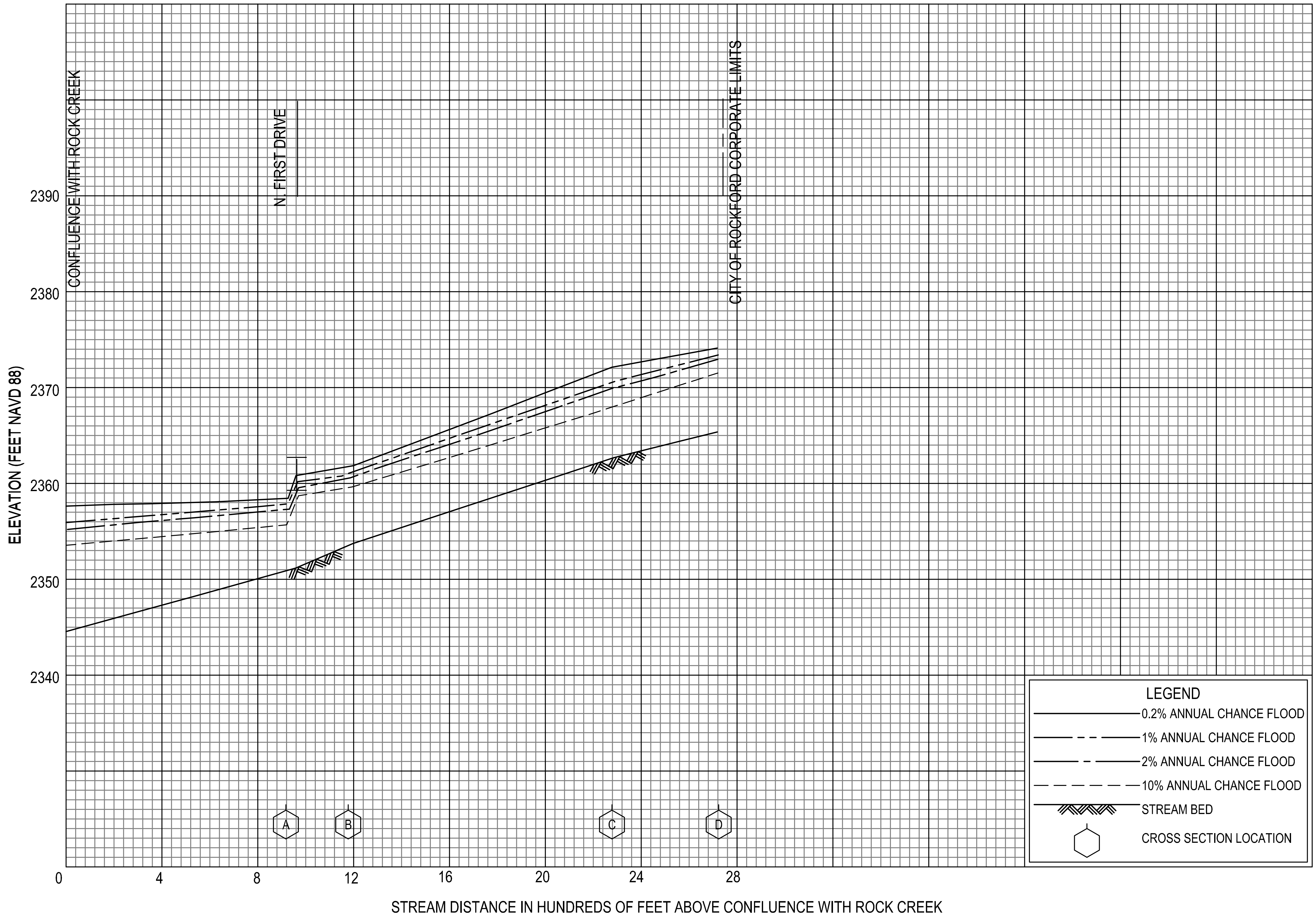
FLOOD PROFILES

LITTLE SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

MICA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

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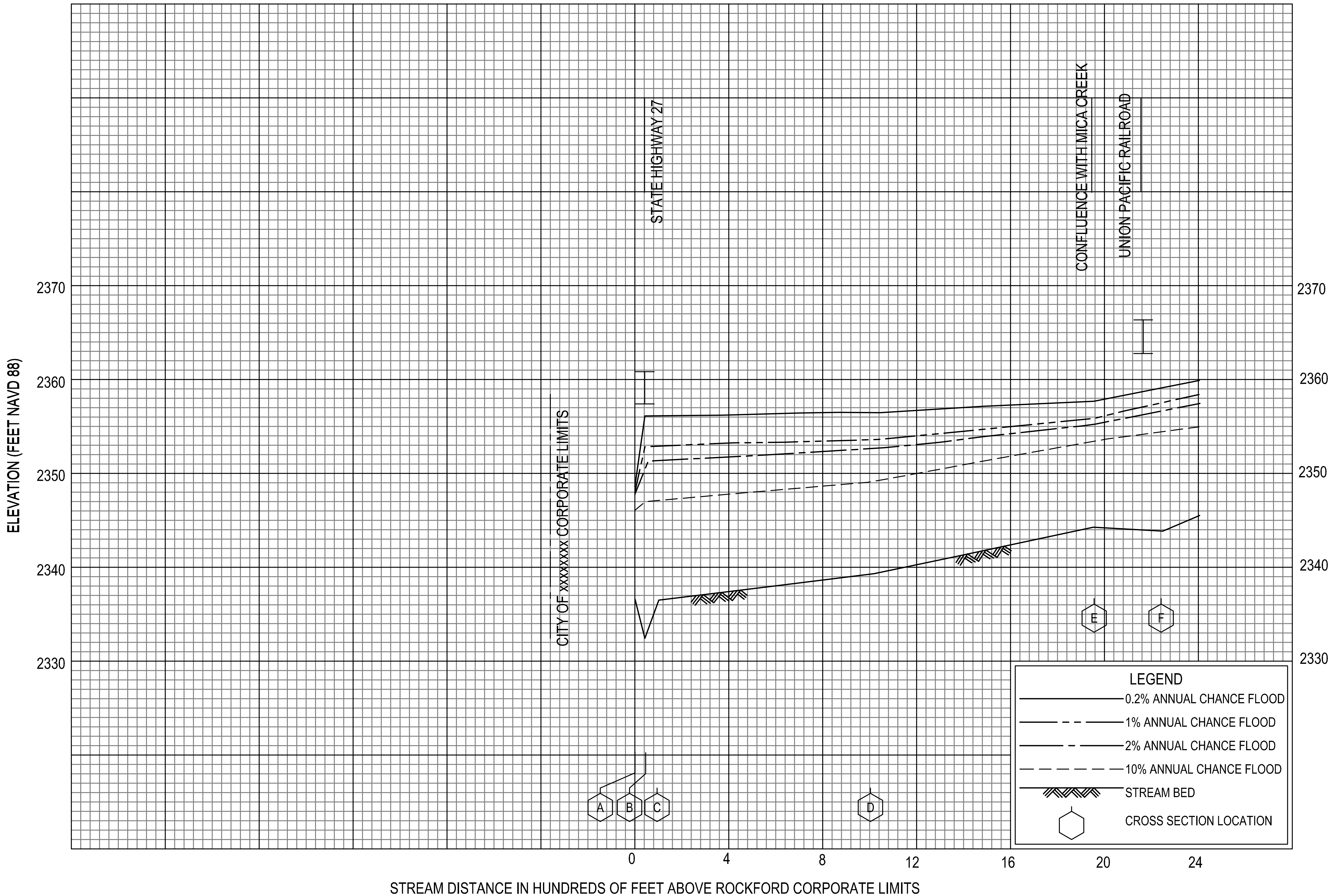


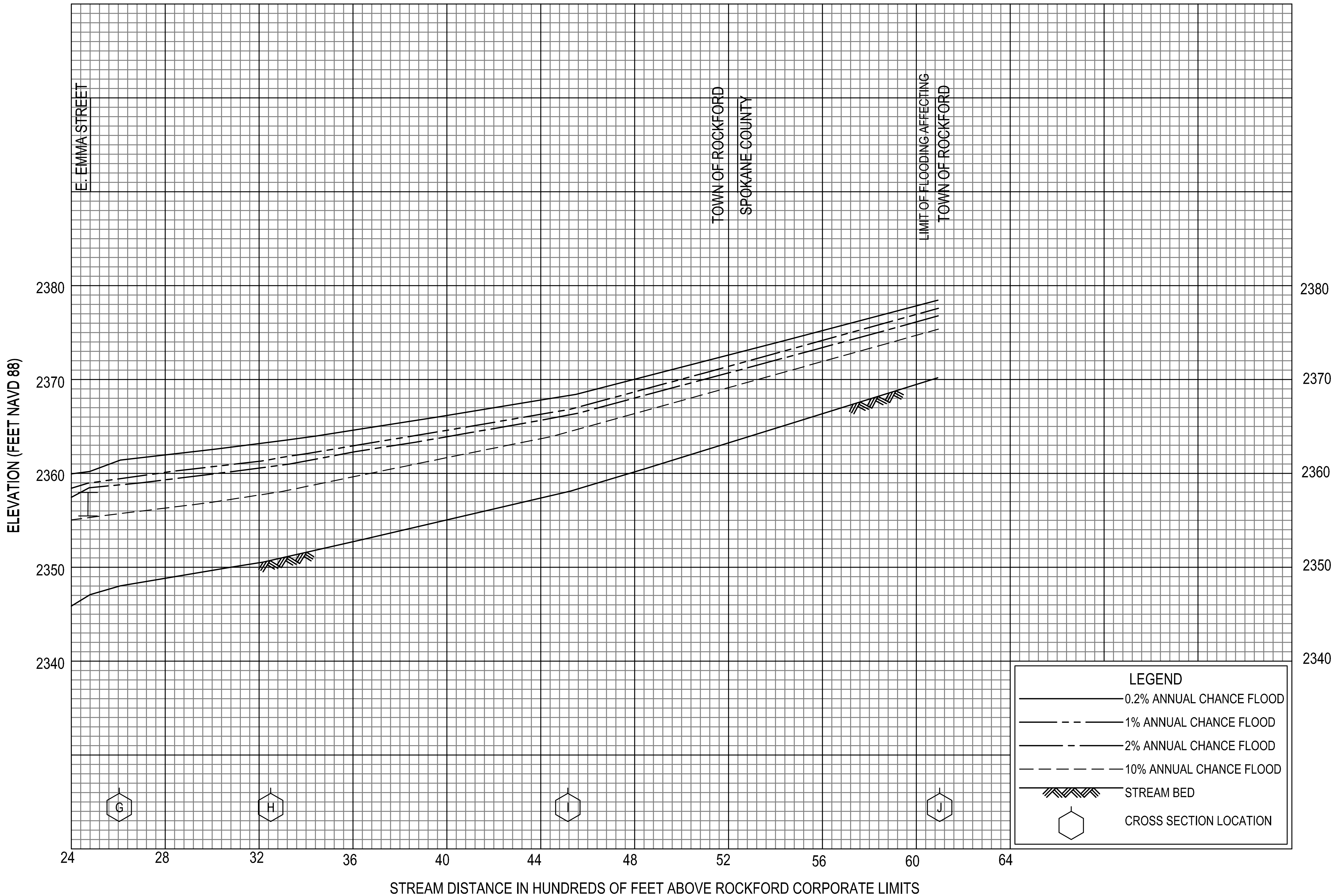
FLOOD PROFILES

ROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



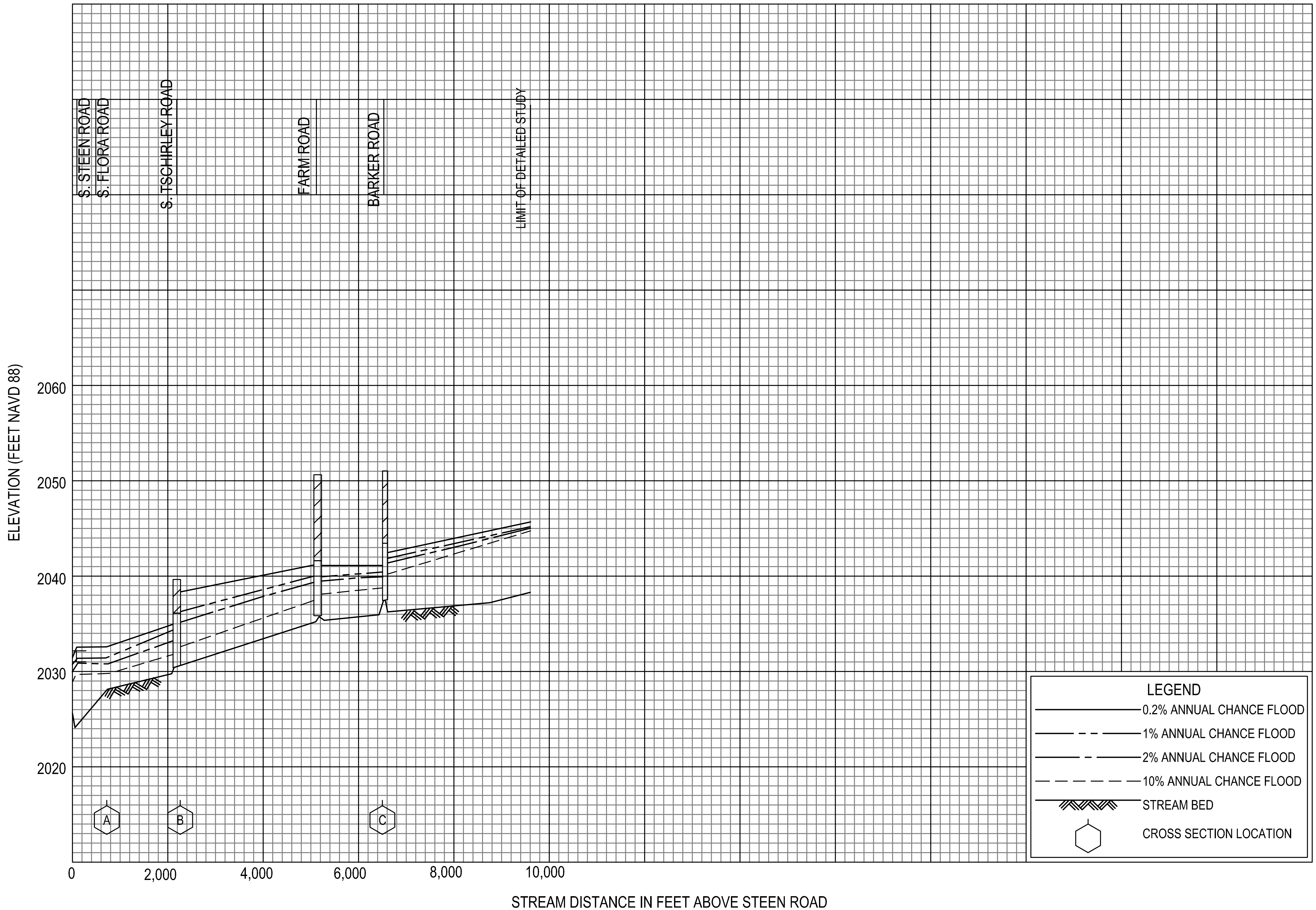
FLOOD PROFILES

ROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



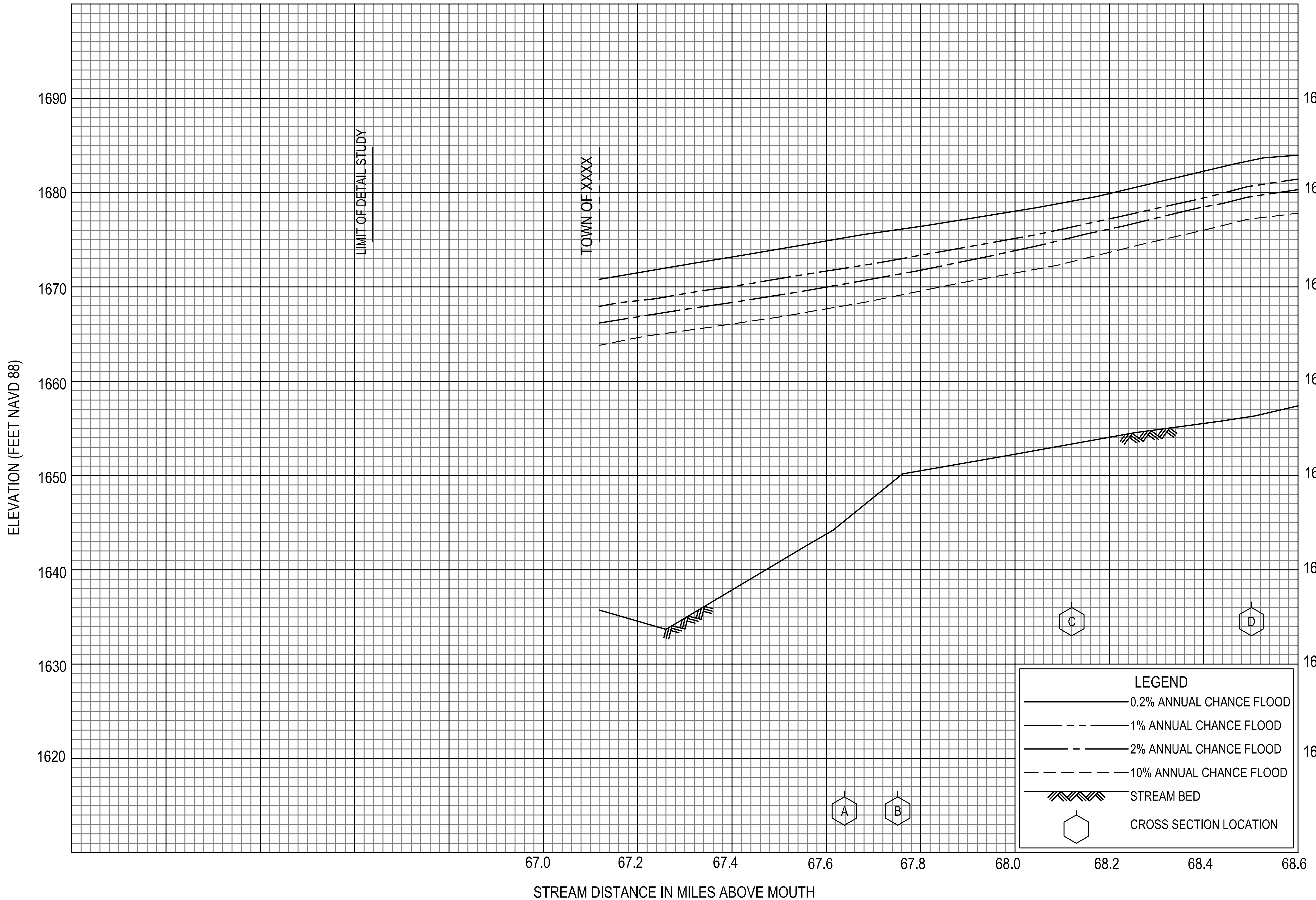
FLOOD PROFILES

SALTESE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



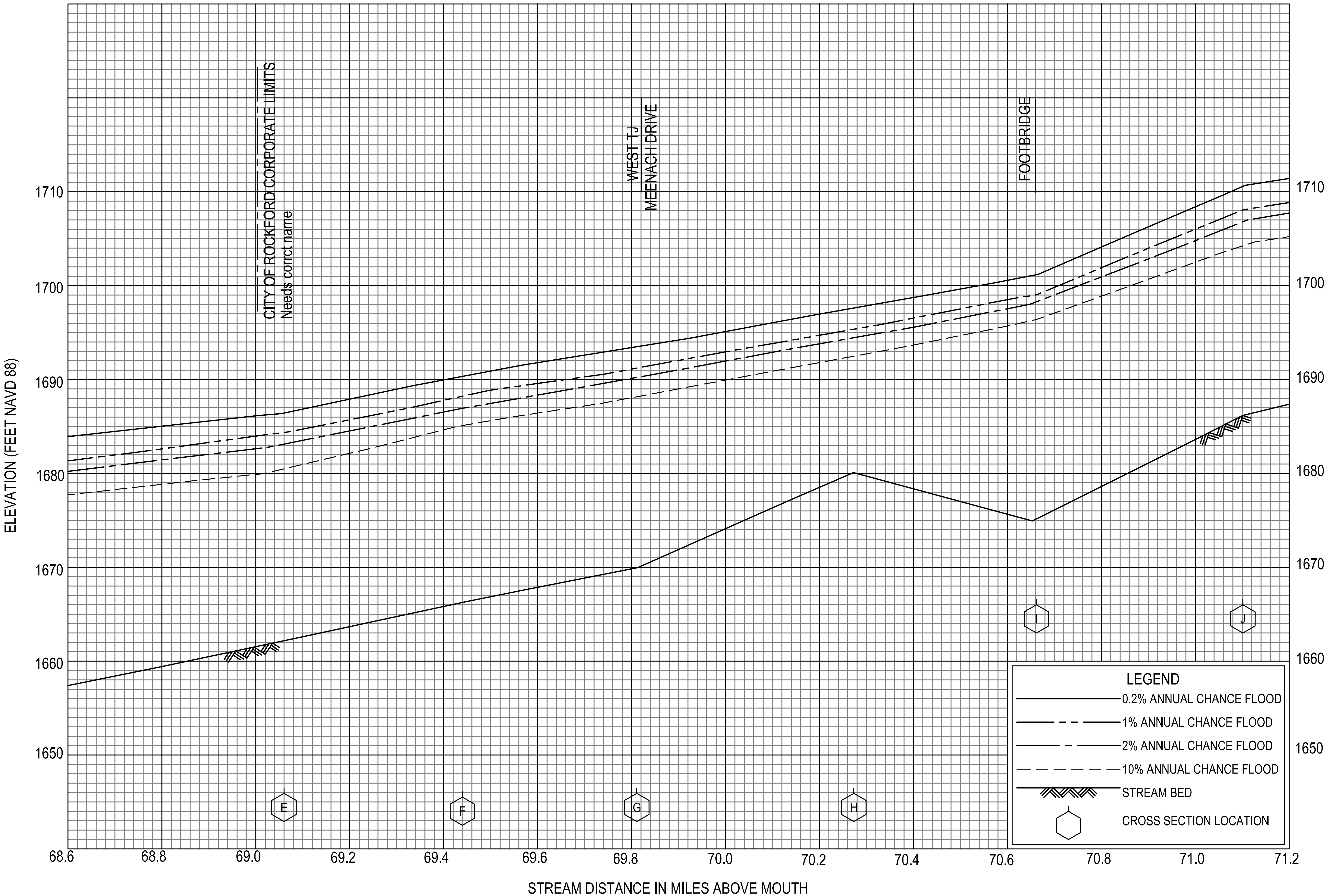
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



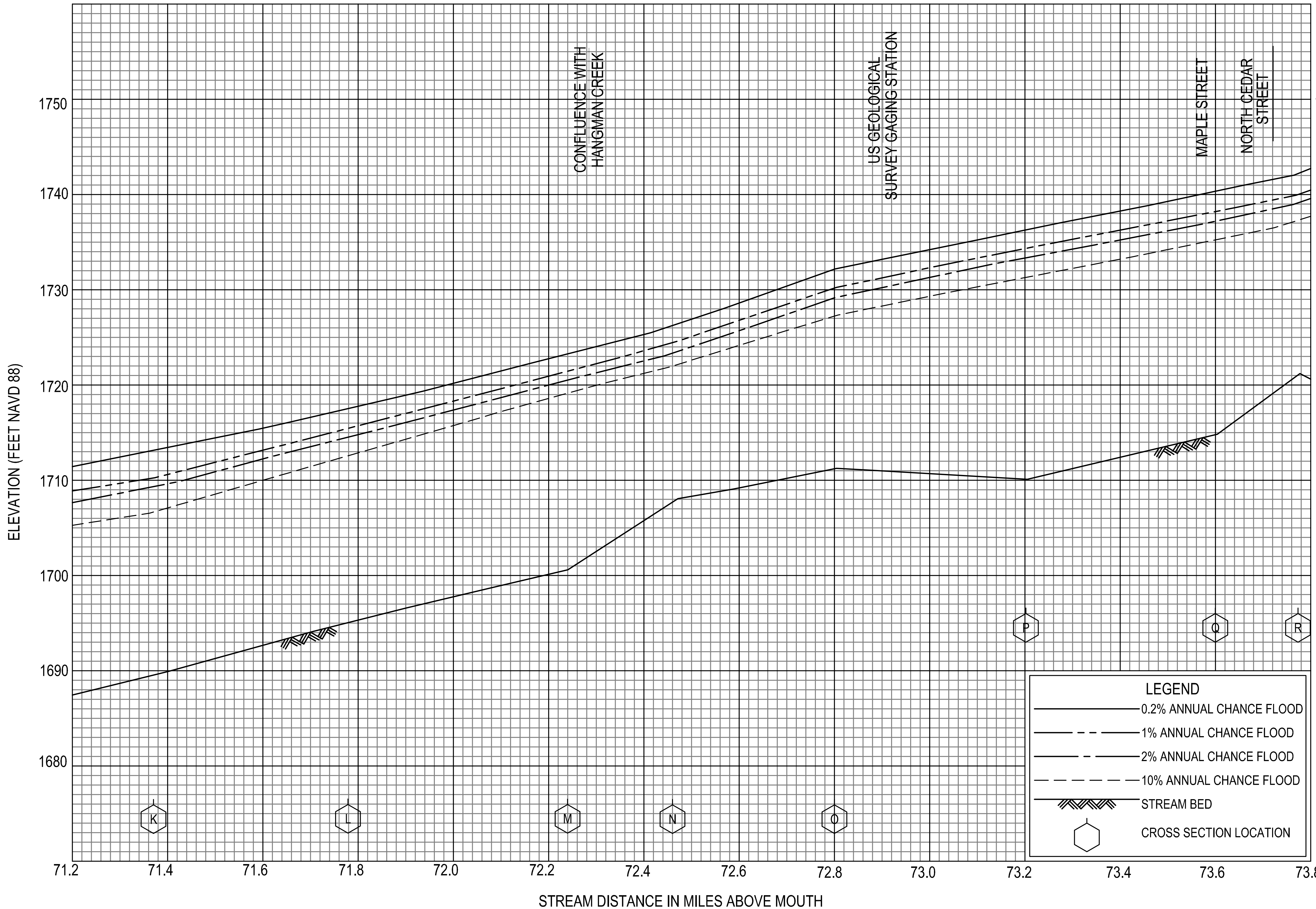
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



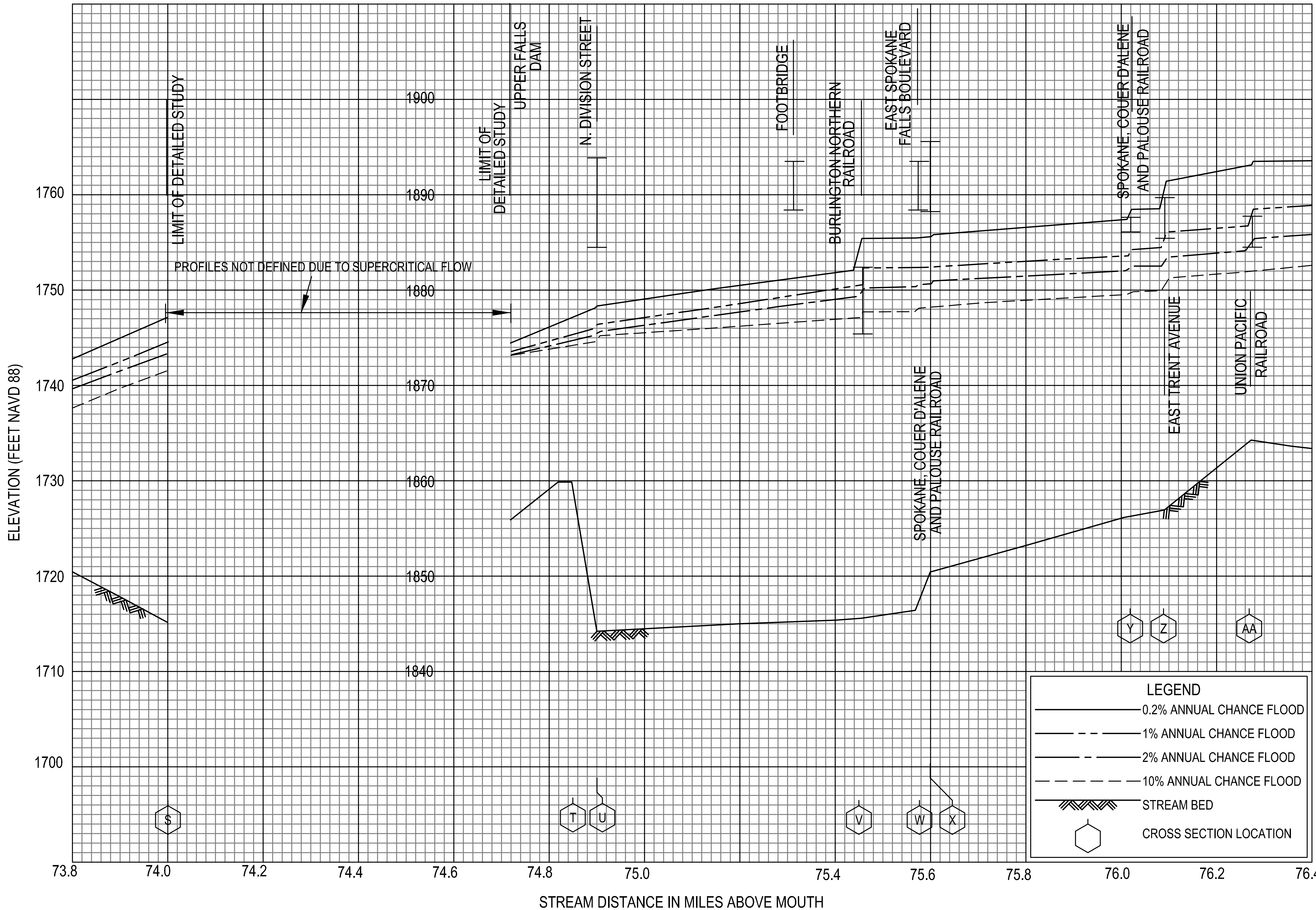
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



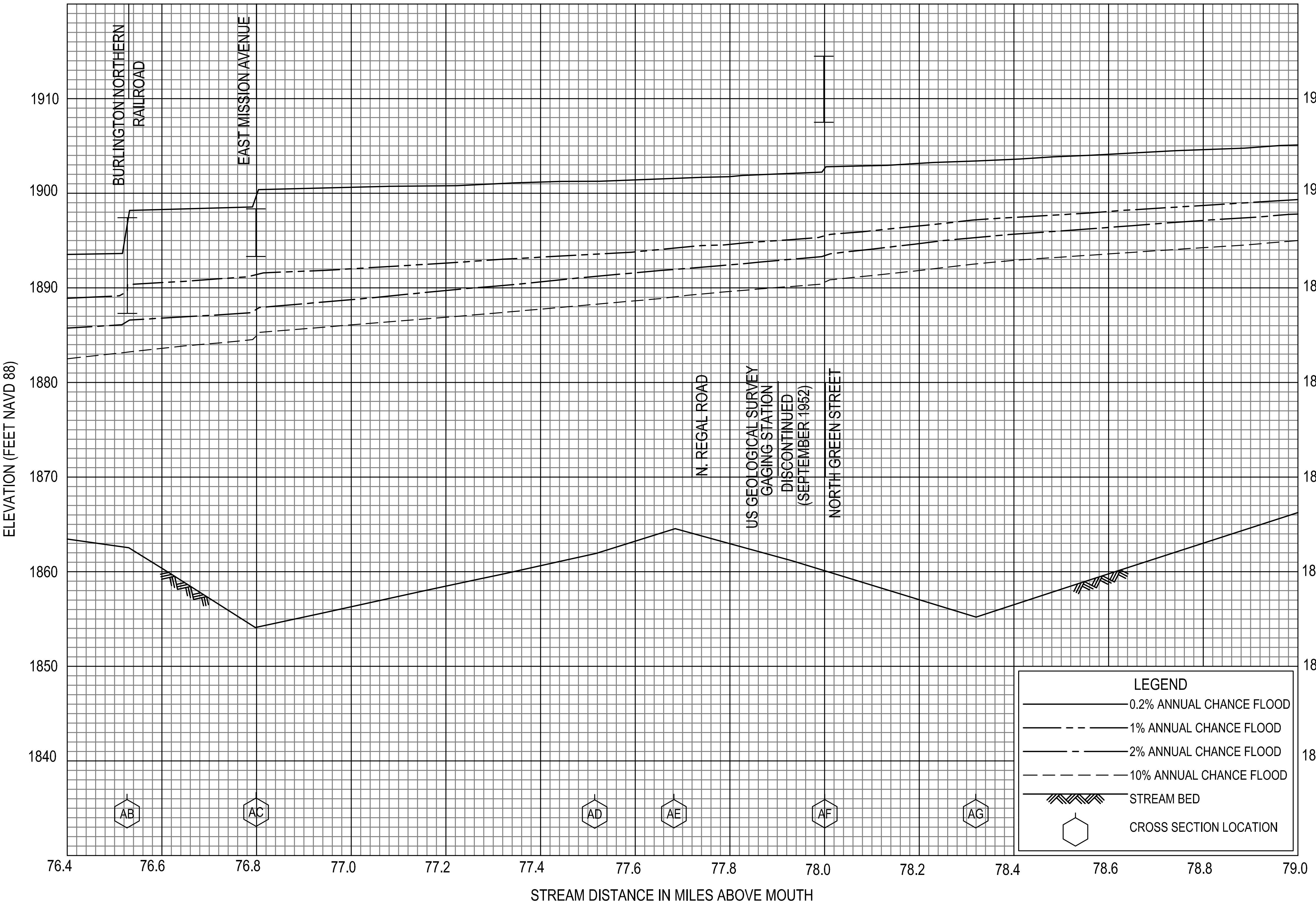
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



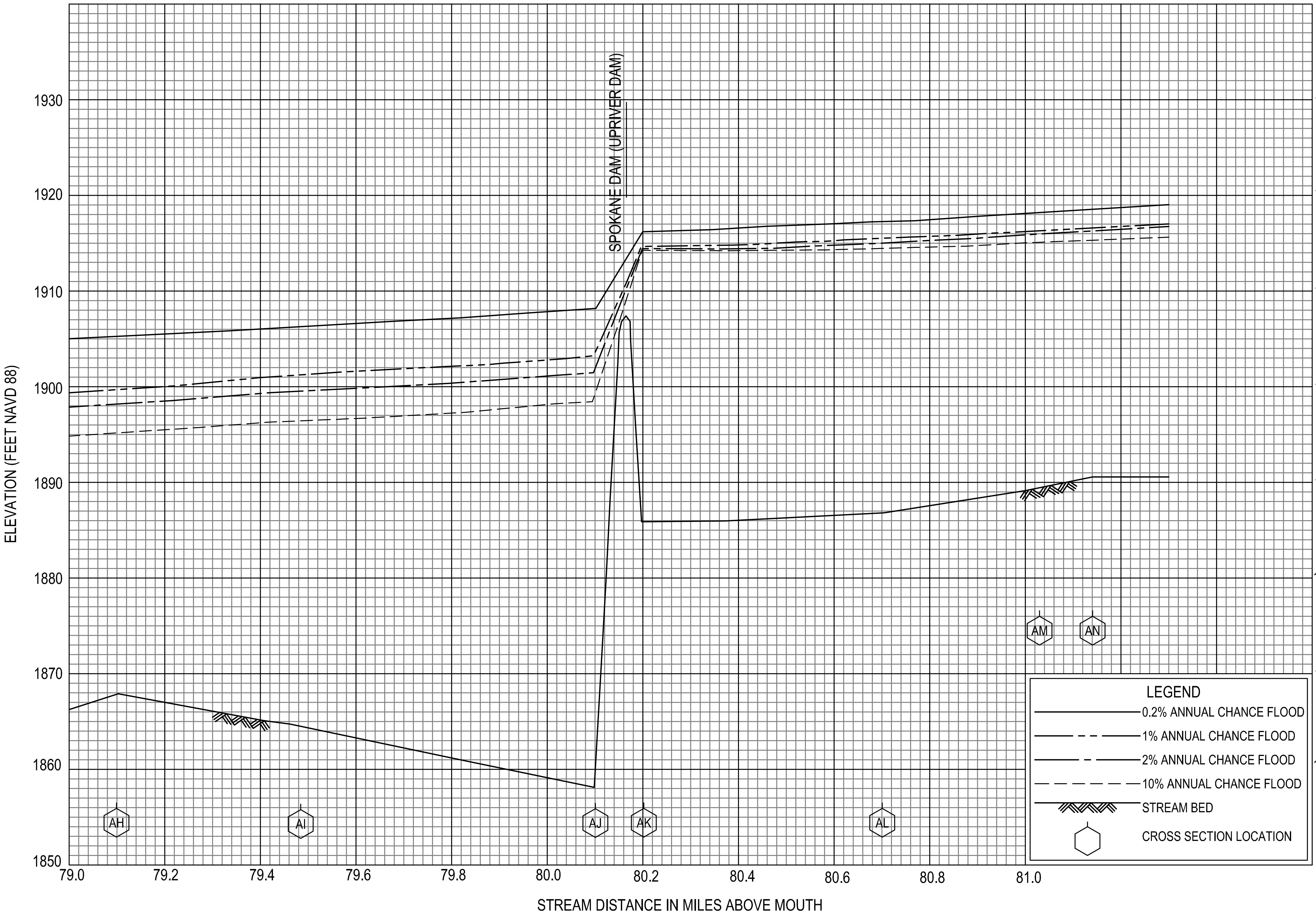
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



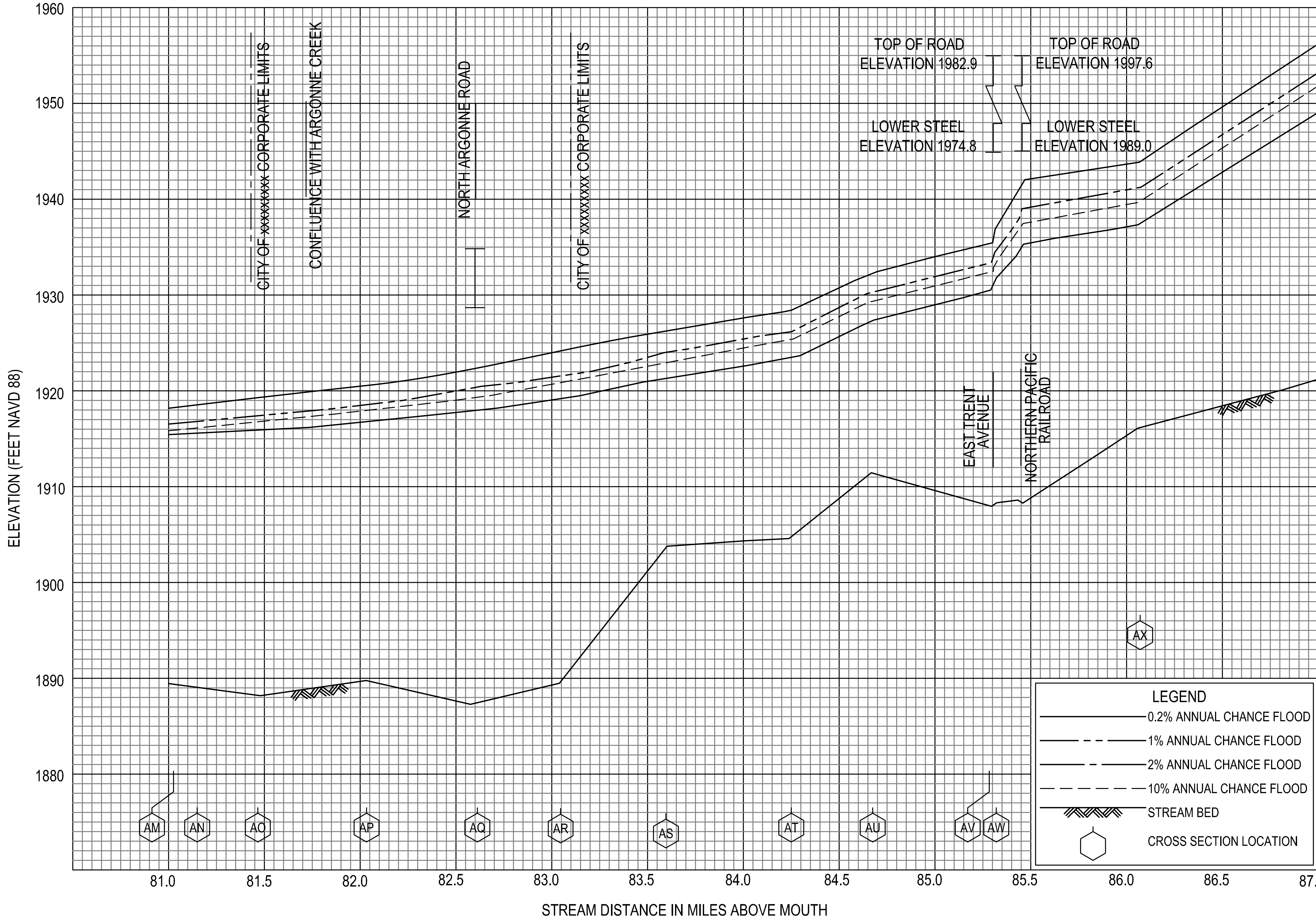
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS

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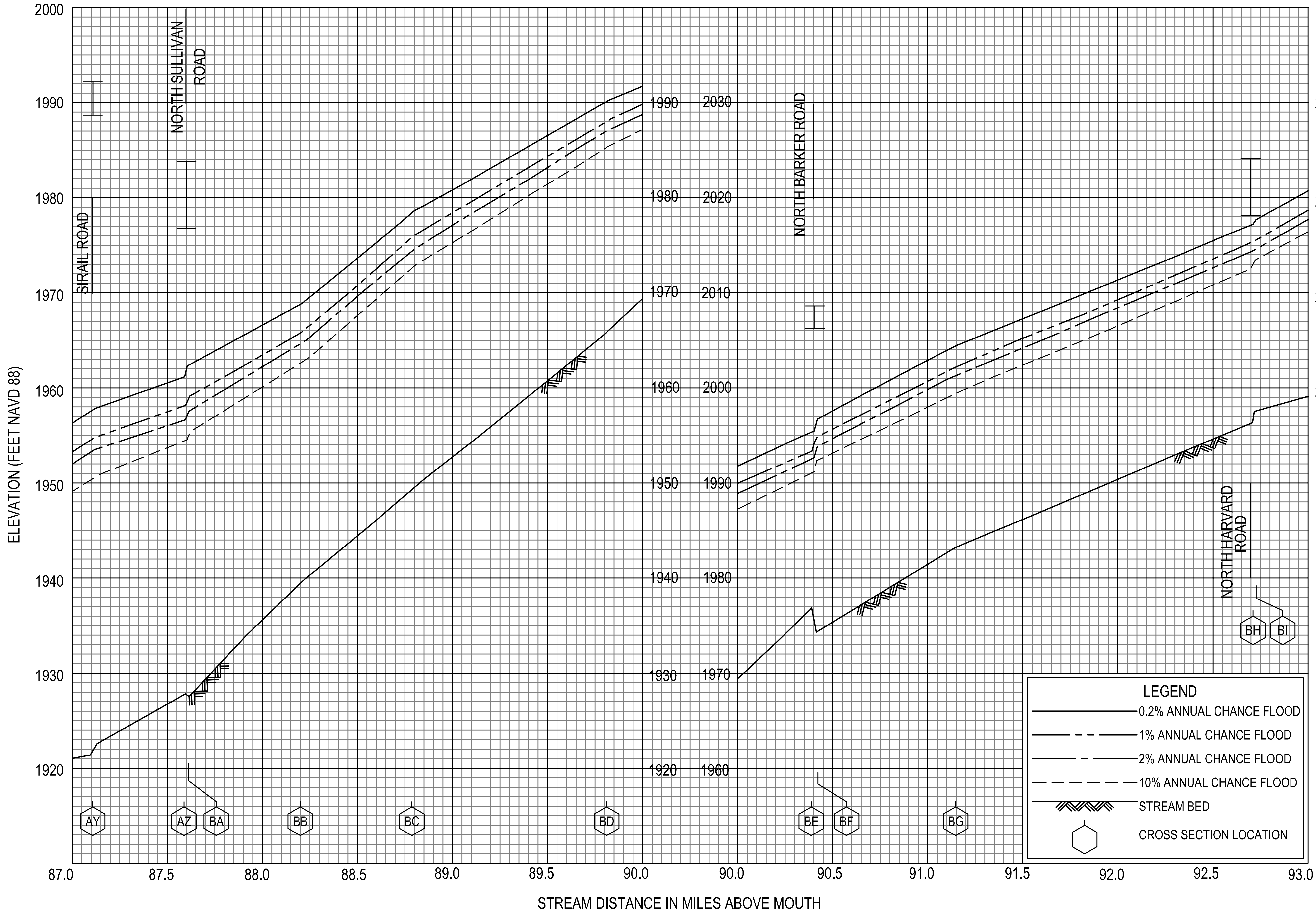


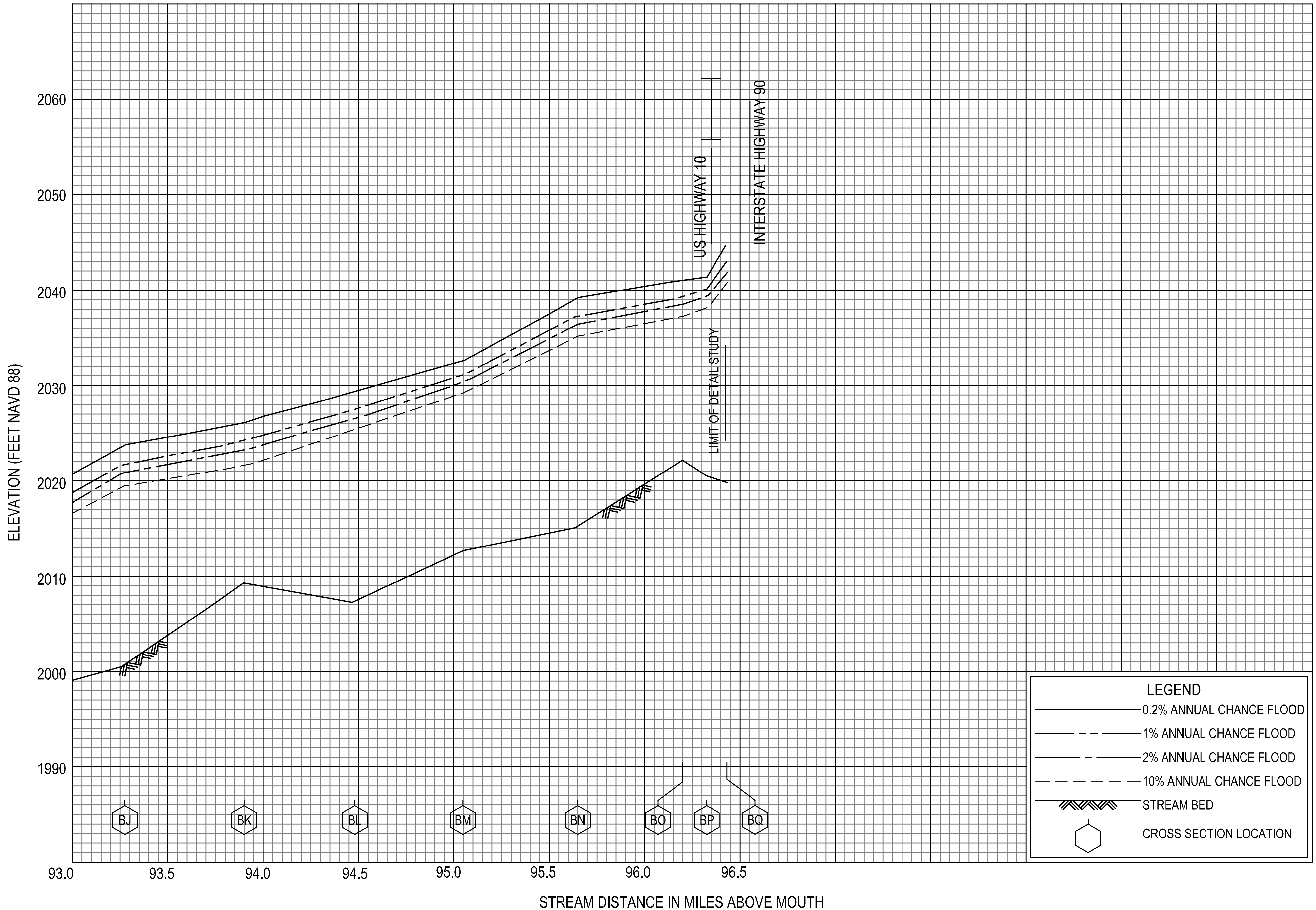
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



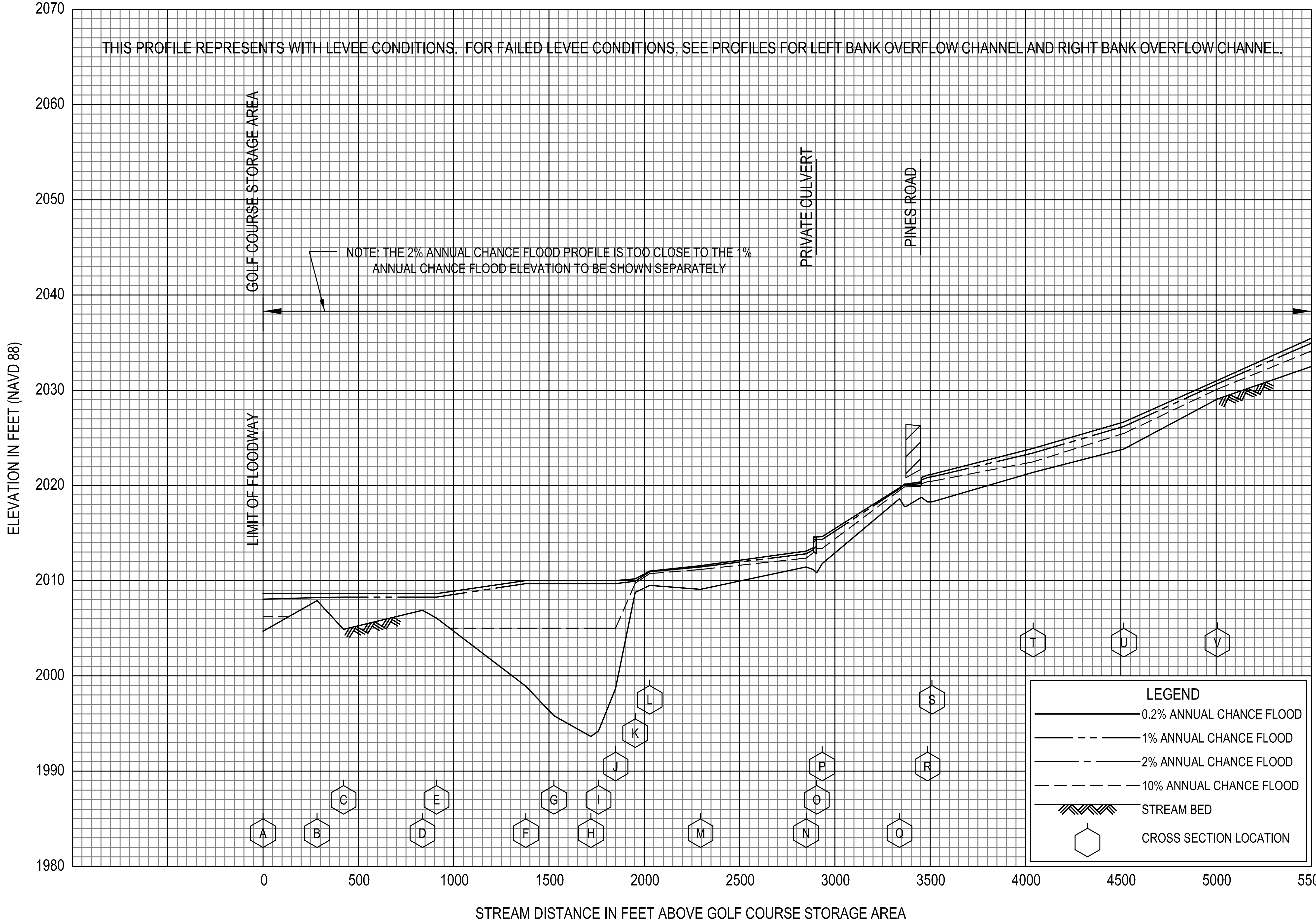
FLOOD PROFILES

SPOKANE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



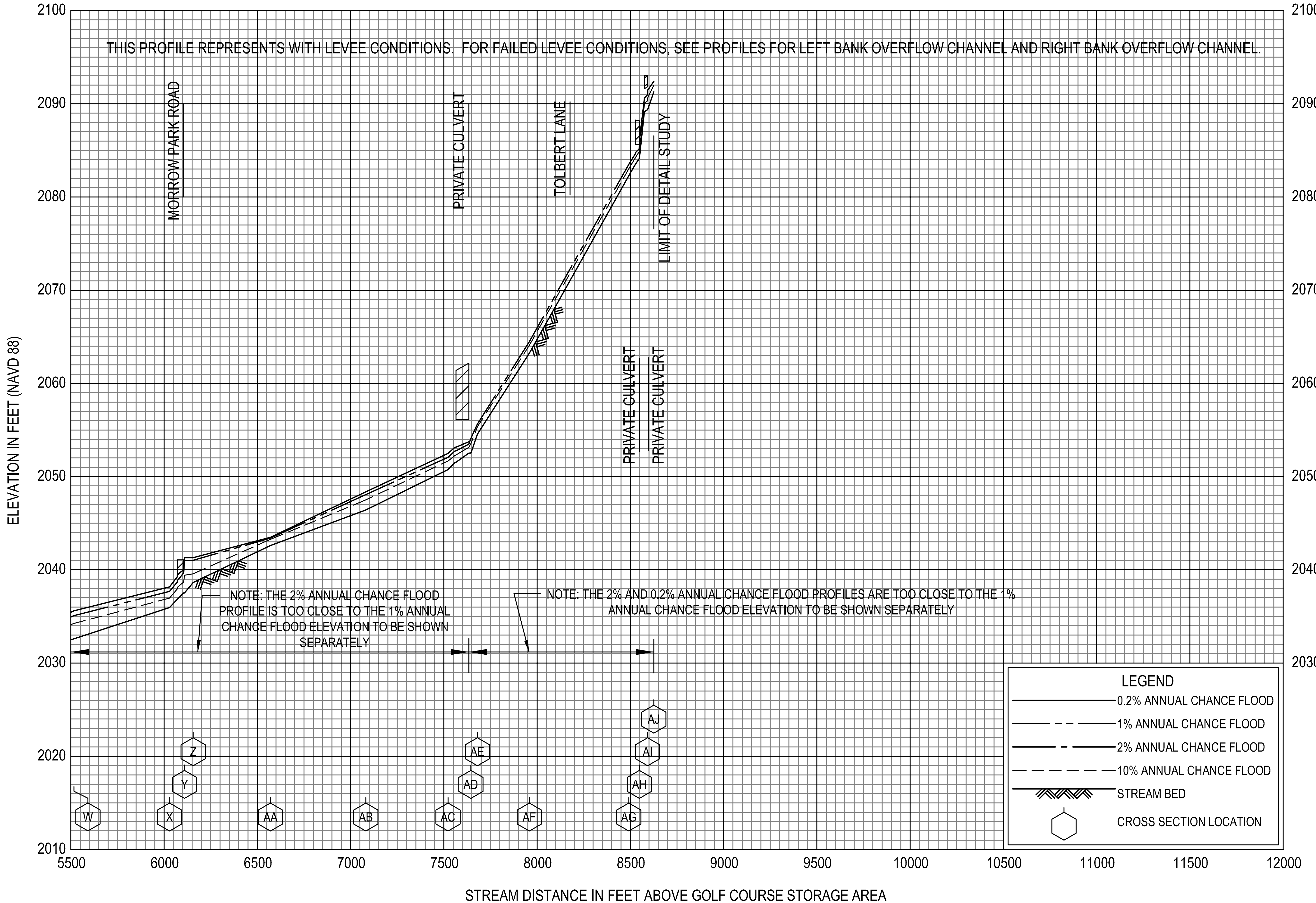
FLOOD PROFILES

UNNAMED TRIBUTARY TO CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



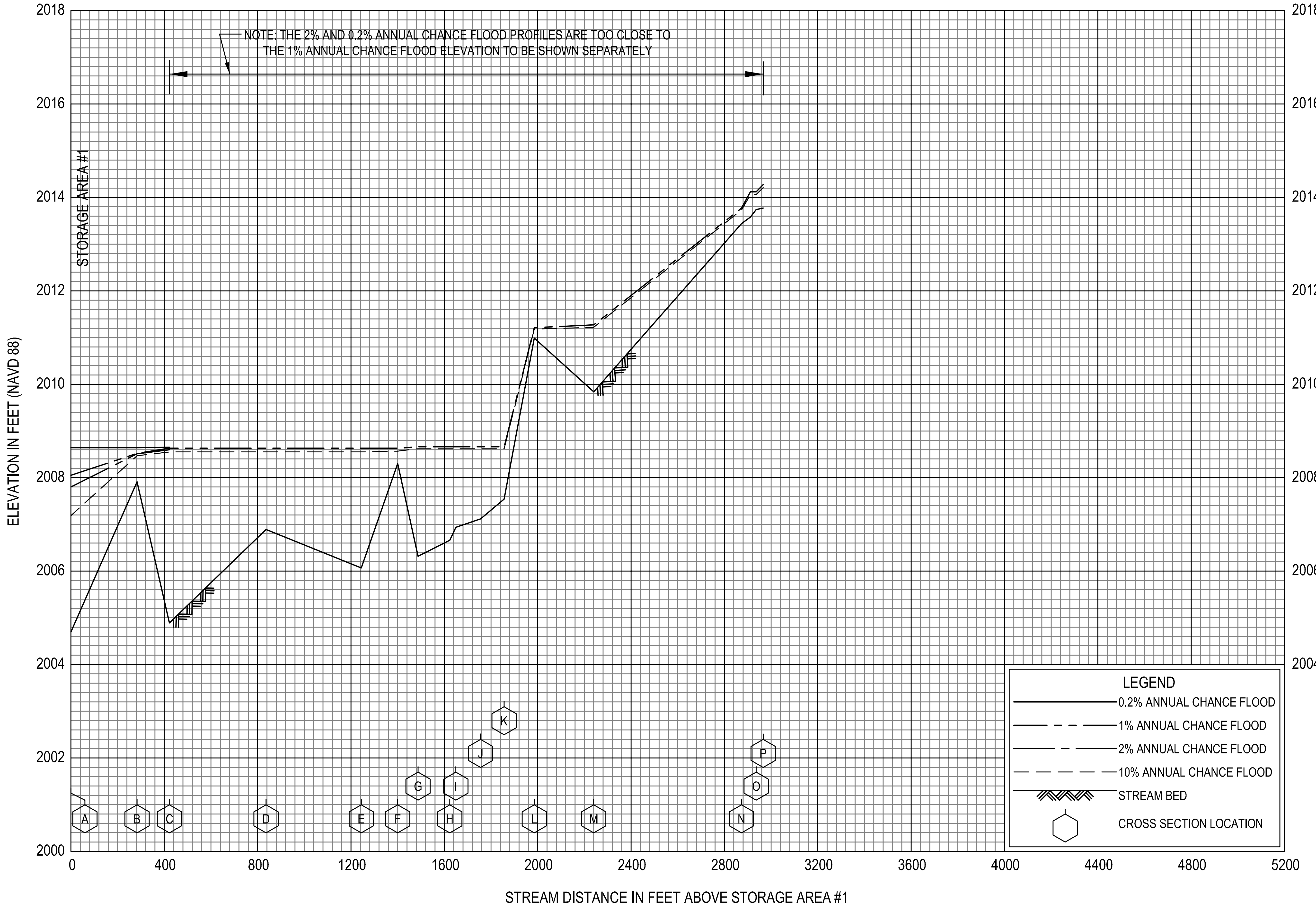
FLOOD PROFILES

UNNAMED TRIBUTARY TO CHESTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



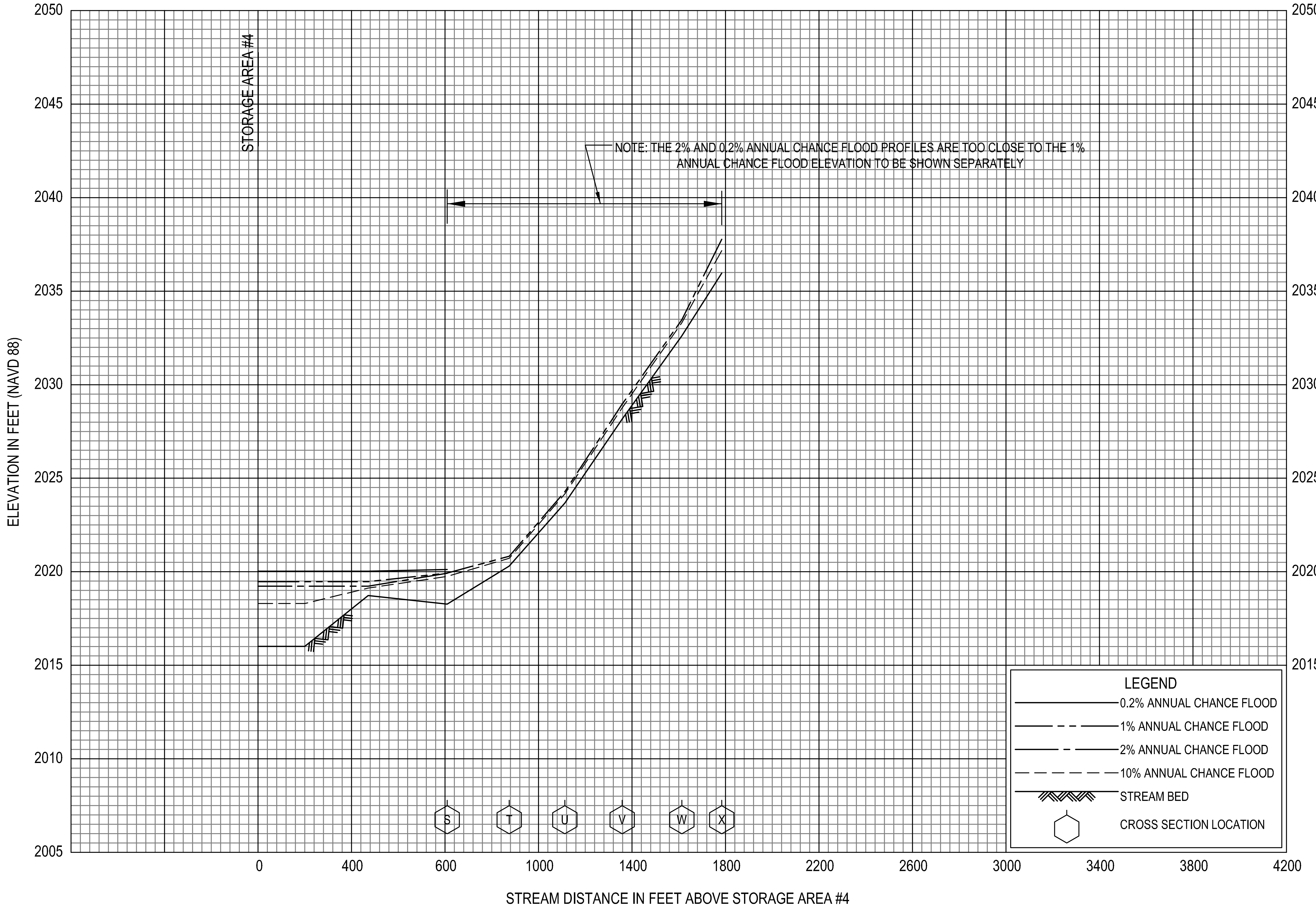
FLOOD PROFILES

UNNAMED TRIBUTARY TO CHESTER CREEK (LEFT BANK OVERFLOW CHANNEL)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA

AND INCORPORATED AREAS



FLOOD PROFILES

UNNAMED TRIBUTARY TO CHESTER CREEK (RIGHT BANK OVERFLOW CHANNEL)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPOKANE COUNTY, WA
AND INCORPORATED AREAS