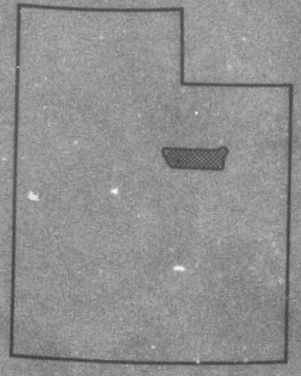
1993

# Flood Insurance Study, City of Price, Utah, Carbon County

Federal Emergency Management Agency

# FLOOD INSURANCE STUDY

## CITY OF PRICE, UTAH
## CARBON COUNTY



REVISED: DECEMBER 3, 1993

Federal Emergency Management Agency

COMMUNITY NUMBER 490036



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.

TABLE OF CONTENTS





TABLE OF CONTENTS (Cont'd)

FLOOD INSURANCE STUDY
CITY OF PRICE, CARBON COUNTY, UTAH

## 1.0 INTRODUCTION

### 1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the City of Price, Carbon County, Utah. This information will be used by the City of Price to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

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 Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The original hydrologic and hydraulic analyses for this study were performed by Nielsen, Maxwell & Wangsgard/Montgomery, for the Federal Insurance Administration (FIA), under Contract No. H-4030. This work, which was completed in October 1977, covered all significant flooding sources affecting the City of Price, Utah.

The hydrologic and hydraulic analyses for this revised study were performed by Love and Associates, for the Federal Emergency Management Agency (FEMA), under Contract No.EMW-90-C-3132. This study was completed in January 1992.

### 1.3 Coordination

For the original study, community base map selection and the identification of streams requiring detailed study were done in a meeting attended by personnel of Nielsen, Maxwell and Wangsgard/Montgomery, the study contractor, the FIA, and an official of the City of Price on August 3, 1976. Hydrologic analyses were coordinated by the study contractor with the U.S. Army Corps of Engineers (COE), the U.S. Geological Survey (USGS), and the Utah Department of Transportation, District No. 4. Regional drainage area-frequency discharge relationships used in Price were coordinated by the study contractor with those developed for similar hydrologic areas in Utah by the COE and USGS.



During the course of the work by the study contractor, flood elevations, flood boundaries, and floodway delineations were reviewed with community officials and with the State Coordinating Agent. The results of the work by the study contractor were reviewed at a final community coordination meeting held on April 11, 1978, which was attended by personnel of the study contractor, the FIA, and community officials.

The initial Consultation and Coordination Officer (CCO) meeting for the restudy was held in December 1989 and attended by representatives of City of Price, Carbon County, FEMA and the study contractor.

Other contacts were made with the COE and the Utah Department of Transportation, for the purpose of acquiring information.

The results of the revised study were reviewed at the final CCO meeting held on December 17, 1992, and attended by representatives of the City of Price, Carbon County, FEMA, and the study contractor. All problems raised at the meeting have been addressed in this study.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Price, Carbon County, Utah. The area of study is shown on the Vicinity Map (Figure 1).

Floods caused by overflow of the Price River and Meads Wash were studied in detail.

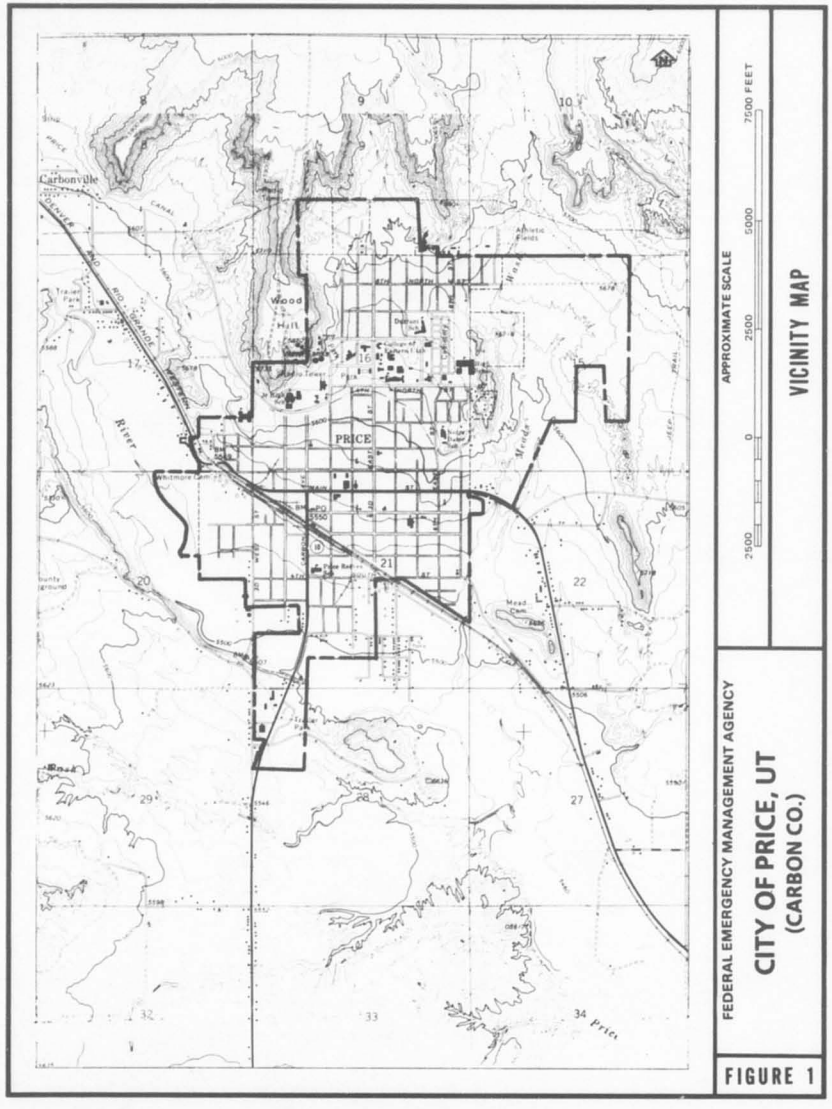
The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction through January 1992.

Flooding on several small drainageways in the city was studied by approximate methods.

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 the study contractor.

### 2.2 Community Description

The City of Price is located in central Utah in the western portion of Carbon County. The city is approximately 120 miles southeast of Salt Lake City, Utah. Price lies on a southward sloping alluvial plain with a hilly section on the north side of the city. Price River passes through a small section of the south side of the city,






and Meads Wash passes through a newly developing residential area on the east side of the city.

The economy of Price is based on coal mining, manufacturing, the College of Eastern Utah, industry, and tourism. The U.S. Census population of Price in 1970 was 6,218, a decrease of 584 below the 1960 population. The Utah Population Work Committee has estimated that the 1975 population of Price was 7,445. The Bureau of Economic and Business Research estimated the January 1, 1976, population to be 7,500. The U.S. Census population of Price in 1990 was 8,712.

The actively developing areas in Price are located on the north, northeast, east, and south sides of the city. Numerous homes in the newly developing area of the northeast section of the city are being built on or near the floodplain of Meads Wash. The commercial and industrial developments on the east and south sides of the city are largely in areas above the floodplains of nearby streams.

### 2.3 Principal Flood Problems

Low-lying areas of Price are subject to periodic flooding caused by overflow of the Price River and Meads Wash, as well as some of the smaller drainage ways within the city. The flooding season is normally during the summer and fall months when cloudburst storms commonly occur. These storms are generally short in duration, but may produce very intense rainfall and "flash flooding". Storm runoff from the north side of the city has caused some street flooding in the past.

### 2.4 Flood Protection Measures

Scofield Dam, located on Price River approximately 30 miles upstream from Price provides some flood protection for the Price area. The dam became initially operational in 1926 and was rebuilt in 1945 after several partial failures of the original dam. Because of its location in the upper watershed of Price River, the dam controls snowmelt floods in Price but does not provide flood protection for the cloudburst floods which commonly occur in the lower watershed.

A levee was constructed along the east bank of Price River from Utah State Highway 6 to First North Street. However, this levee does not provide protection from the 100-year flood.

## 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 which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for

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

## 3.1 Hydrologic Analyses

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

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied in detail in the community.

The principal sources of data used to define discharge-frequency relationships for the rivers were records from two gaging stations on Price River, one located approximately 9 miles upstream from Price near the City of Helper and one approximately 14.5 miles upstream near the former community of Heiner. The Helper gage was established in 1904 and discontinued in 1934. The Heiner gage was established in 1934 and discontinued in 1969. Values of the 10-, 50-, 100-, and 500-year peak discharges were obtained from a log-Pearson Type III distribution (Reference 1) of annual peak flow data using flow data information from both of the gages.

A regional relationship relating basin characteristics to streamflow characteristics was used to define the discharge-frequency data for Meads Wash.

Peak discharge-drainage areas relationships for Price River and Meads Wash are shown in Table 1.

## 3.2 Hydraulic Analyses

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

Water-surface profiles were developed using a HEC-2 computer step-backwater model (Reference 2). Profiles were determined for the 100- and 500-year floods.

Table 1. Summary of Discharges

| Flooding Source and Location | Drainage Area (square miles) | Peak Discharges (cubic feet per second) 10-Year | 50-Year | 100-Year | 500-Year |
|---|---|---|---|---|---|
| Price River | | | | | |
| Above Confluence with Meads Wash | 649.3 | 4,295 | 8,972 | 11,736 | 20,496 |
| Meads Wash | | | | | |
| At Mouth | 6.1 | 287 | 1,147 | 1,848 | 4,520 |

The hydraulic analysis is based upon the construction of Utah State Highway 6 which caused realignment of the river bed. A levee was also constructed along the east bank of the Price River from Utah State Highway 6 to 100 North Street. The 500-year flood significantly overtops the levee but does not overtop Highway 6. Two decks were used to model this split flow situation; therefore two profiles are plotted for the 500-year flood (a "river side" profile and a "city side" profile). Because the levee does not have sufficient freeboard above the 100-year flood elevation required for levee certification, "with levee" and "without levee" profiles for the 100-year flood are included for the levee reach.

Channel migration due to erosion extending now beyond the previous floodway, has also taken place in the Price River.

Flooding occurs on the east side of Utah State Highway 6 from the confluence of Meads Wash to approximately 2,000 feet upstream of Carbon Avenue caused by passage of floodwaters through culverts under the highway, which normally drain the City of Price.

The City Engineer confirmed that there are enough culverts connecting the two sides of the highway that water can back up from the river side and pond on the city side. Therefore, 100-year water-surface elevations are equal on both sides of the highway to account for the ponding effects.

Areas of shallow flooding along the side of State Highway 6 occur from approximately 2,000 feet upstream of Carbon Avenue to the Price River crossing and on the east side of the Price River on the upstream side of 100 North Street.

The starting water-surface elevation for the 100-year flood for Meads Wash was based on the slope area method. The starting-water surface elevation for Price River was obtained from the previous Flood Insurance Study. (Reference 4)

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 Flood Insurance Rate Map.

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

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks and the descriptions of the marks used in this study are shown on the maps.



## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

### 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 100- and 500-year 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 4 feet (Reference 3).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AH); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map.

### 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 100-year 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 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 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 (Table 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year 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 of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

## 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 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations 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 the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

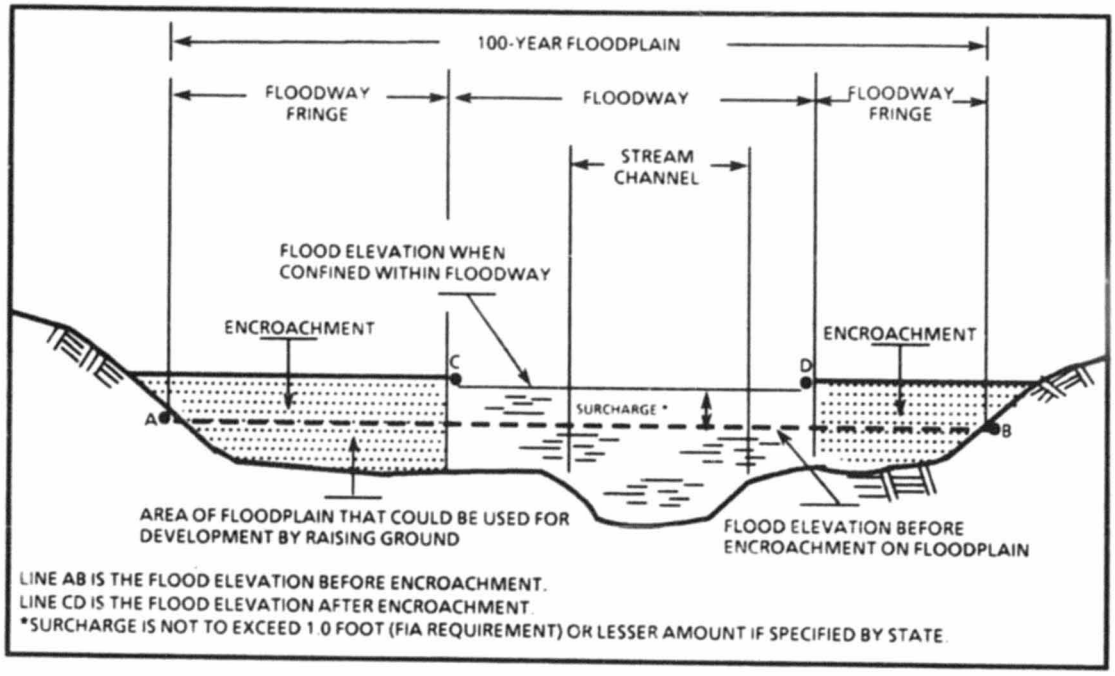



Figure 2. Floodway Schematic

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

## 6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map 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 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations 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 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| | | | | | (FEET NGVD) | | | |
| Price River | | | | | | | | |
| A-F[2] | | | | | | | | |
| G | 8,220 | 85 | 712 | 16.5 | 5,497.8 | 5,497.8 | 5,497.8 | 0.0 |
| H | 8,880 | 104 | 1,126 | 10.4 | 5,504.6 | 5,504.6 | 5,504.6 | 0.0 |
| I | 10,400 | 320 | 3,223 | 3.6 | 5,506.5 | 5,506.5 | 5,507.0 | 0.5 |
| J[2] | 11,700 | 288 | 1,897 | 6.2 | 5,507.2 | 5,507.2 | 5,507.8 | 0.6 |
| K[2] | 12,150 | 269 | 1,289 | 9.1 | 5,508.1 | 5,508.1 | 5,508.6 | 0.5 |
| L[2] | 13,100 | 414 | 2,176 | 5.4 | 5,511.5 | 5,511.5 | 5,512.5 | 1.0 |
| M[2] | 14,000 | 159 | 939 | 12.5 | 5,513.7 | 5,513.7 | 5,513.9 | 0.2 |
| N | 14,650 | 146 | 963 | 12.2 | 5,518.1 | 5,518.1 | 5,518.3 | 0.2 |
| O | 15,470 | 210 | 1,292 | 9.1 | 5,523.6 | 5,523.6 | 5,523.6 | 0.0 |
| P | 17,040 | 267 | 1,603 | 7.3 | 5,529.0 | 5,529.0 | 5,529.0 | 0.0 |

[1]Feet Above Mouth
[2]Floodway Lies Entirely Outside Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CITY OF PRICE, UT**
**(CARBON CO.)**

**FLOODWAY DATA**

**PRICE RIVER**

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| | | | | | (FEET NGVD) | | | |
| **Meads Wash** | | | | | | | | |
| A-D[2] | | | | | | | | |
| E | 2,630 | 60 | 210 | 8.8 | 5,505.4 | 5,505.4 | 5,506.4 | 1.0 |
| F | 3,020 | 27 | 142 | 13.0 | 5,513.2 | 5,513.2 | 5,513.2 | 0.0 |
| G | 3,250 | 43 | 227 | 8.2 | 5,516.8 | 5,516.8 | 5,516.8 | 0.0 |
| H | 3,760 | 49 | 518 | 3.6 | 5,530.7 | 5,530.7 | 5,530.7 | 0.0 |
| I | 4,220 | 54 | 347 | 5.3 | 5,530.7 | 5,530.7 | 5,530.9 | 0.2 |
| J | 4,700 | 70 | 218 | 8.5 | 5,532.8 | 5,532.8 | 5,533.8 | 1.0 |
| K | 5,150 | 31 | 148 | 12.5 | 5,537.7 | 5,537.7 | 5,538.4 | 0.7 |
| L | 5,590 | 27 | 141 | 13.1 | 5,546.8 | 5,546.8 | 5,546.8 | 0.0 |
| M | 5,910 | 51 | 560 | 3.3 | 5,560.8 | 5,560.8 | 5,560.8 | 0.0 |
| N | 6,330 | 32 | 236 | 7.8 | 5,560.6 | 5,560.6 | 5,560.6 | 0.0 |
| O | 6,710 | 68 | 690 | 2.7 | 5,571.4 | 5,571.4 | 5,571.4 | 0.0 |
| P | 7,210 | 60 | 477 | 3.9 | 5,571.6 | 5,571.6 | 5,571.6 | 0.0 |
| Q | 7,860 | 32 | 150 | 12.3 | 5,579.4 | 5,579.4 | 5,579.4 | 0.0 |
| R | 8,100 | 33 | 420 | 4.4 | 5,594.5 | 5,594.5 | 5,594.5 | 0.0 |
| S | 8,560 | 31 | 234 | 7.9 | 5,594.3 | 5,594.3 | 5,594.5 | 0.2 |
| T | 9,230 | 36 | 156 | 11.9 | 5,601.5 | 5,601.5 | 5,601.5 | 0.0 |
| U | 9,510 | 74 | 210 | 8.8 | 5,610.9 | 5,610.9 | 5,610.9 | 0.0 |
| V | 9,890 | 30 | 146 | 12.7 | 5,614.9 | 5,614.9 | 5,614.9 | 0.0 |
| W | 10,550 | 54 | 241 | 7.7 | 5,621.7 | 5,621.7 | 5,621.7 | 0.0 |
| X | 10,920 | 65 | 534 | 3.5 | 5,634.1 | 5,634.1 | 5,634.6 | 0.5 |
| Y | 11,940 | 39 | 160 | 11.5 | 5,642.0 | 5,642.0 | 5,642.0 | 0.0 |
| Z | 12,350 | 45 | 167 | 11.1 | 5,652.7 | 5,652.7 | 5,653.0 | 0.3 |
| AA | 12,840 | 36 | 167 | 11.1 | 5,658.8 | 5,658.8 | 5,659.3 | 0.5 |

[1]Feet Above Confluence With Price River
[2]Cross Sections Outside Of Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CITY OF PRICE, UT**
**(CARBON CO.)**

# FLOODWAY DATA

**MEADS WASH**

## 7.0 OTHER STUDIES

In 1976, the Sacramento District Office of the COE performed a brief floodplain study on the Price River near Price City (analyses only - no report prepared). The USGS also performed a hydrologic analysis for the same area at the request of the Utah Department of Transportation, District 4 (analyses only - no report prepared). Both the COE and USGS hydrologic analyses were performed using log Pearson Type III procedures. However, due to differences in interpretation of the available data at the two stream gages (i.e., Heiner and Helper), a significant difference in computed flow frequency information resulted.

As part of the hydrologic analysis performed in this Flood Insurance Study, a thorough review was made of the COE and USGS analyses. Discussions were held with engineering personnel of the COE, USGS, and the Utah Department of Transportation, District 4. As a result of these discussions, as well as those with engineering personnel of the FIA, a revised discharge-frequency relationship was developed on the basis of realistic, current interpretations of the available data. This revised discharge-frequency relationship for the Price River was utilized in this Flood Insurance Study. No other published studies relative to hydrology or flood profiles for Price River or Meads Wash in Price City are available.

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

## 9.0 BIBLIOGRAPHY AND REFERENCES


1. U.S. Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin No. 17, March 1976

2. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, October 1973

3. Olympus Aerial Surveys, Inc., "Aerial Photographs of Price, Utah", Scale 1:4,800, Contour Interval 4 feet

   Utah Division of Water Resources - U.S. Geological Survey Cooperative Investigations Report No. 11, Cloudburst Floods in Utah 1939-1969, 1972

   Utah State Department of Highways, Review Plan for Proposed State Road, Federal Aid Project, "Blue Cut to East Price"

   U.S. Department of the Interior, Geological Survey, "Methods for Estimating Peak Discharge and Flood Boundaries of Streams in Utah", WRI Report 83-4129, 1983





Utah State Department of Transportation, "Manual of Instruction, Part 4 - Roadway Drainage", 1984

Federal Insurance Administration, Flood Insurance Study, City of Price, Utah, 1978

Nielsen, Maxwell & Wangsgard, Consulting Engineers, and James M. Montgomery, Consulting Engineers, Inc. Reconnaissance Report, Flood Insurance Study for City of Price, Carbon County, Utah, October 1976

Southeastern Utah Association of Governments, Southeastern Utah Housing Element, 1977

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 994, Cloudburst Floods in Utah, 1850-1938, 1946

U.S. Department of the Interior, Geological Survey, Circular 457, Floods in Utah, 1961

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1683, Magnitude and Frequency of Floods in the United States, Part 9, Colorado River Basin, 1966

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1313, Compilation of Records of Surface Waters of the United States through September 1950, Part 9, 1954

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1733, Compilation of Records of Surface Water of the United States, October 1950 to September 1960; Part 9, Colorado River Basin, 1964

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1925, Surface Water Supply of the United States, 1961-1965, Part 9; Colorado River Basin, Volume 2, Colorado River Basin from Green River to Compact Point, 1970

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 2125, Surface Water Supply of the United States, 1966-70, Part 9, Colorado River Basin, Volume 2, Colorado River Basin from Green River to Compact Point, 1973

U.S. Department of the Interior, Geological Survey, Circular 659, Index of Surface Water Records to September 30, 1970, Part 9, Colorado River Basin, 1971

U.S. Department of the Interior, Geological Survey, Water Resources Data for Utah, 1961 through 1964

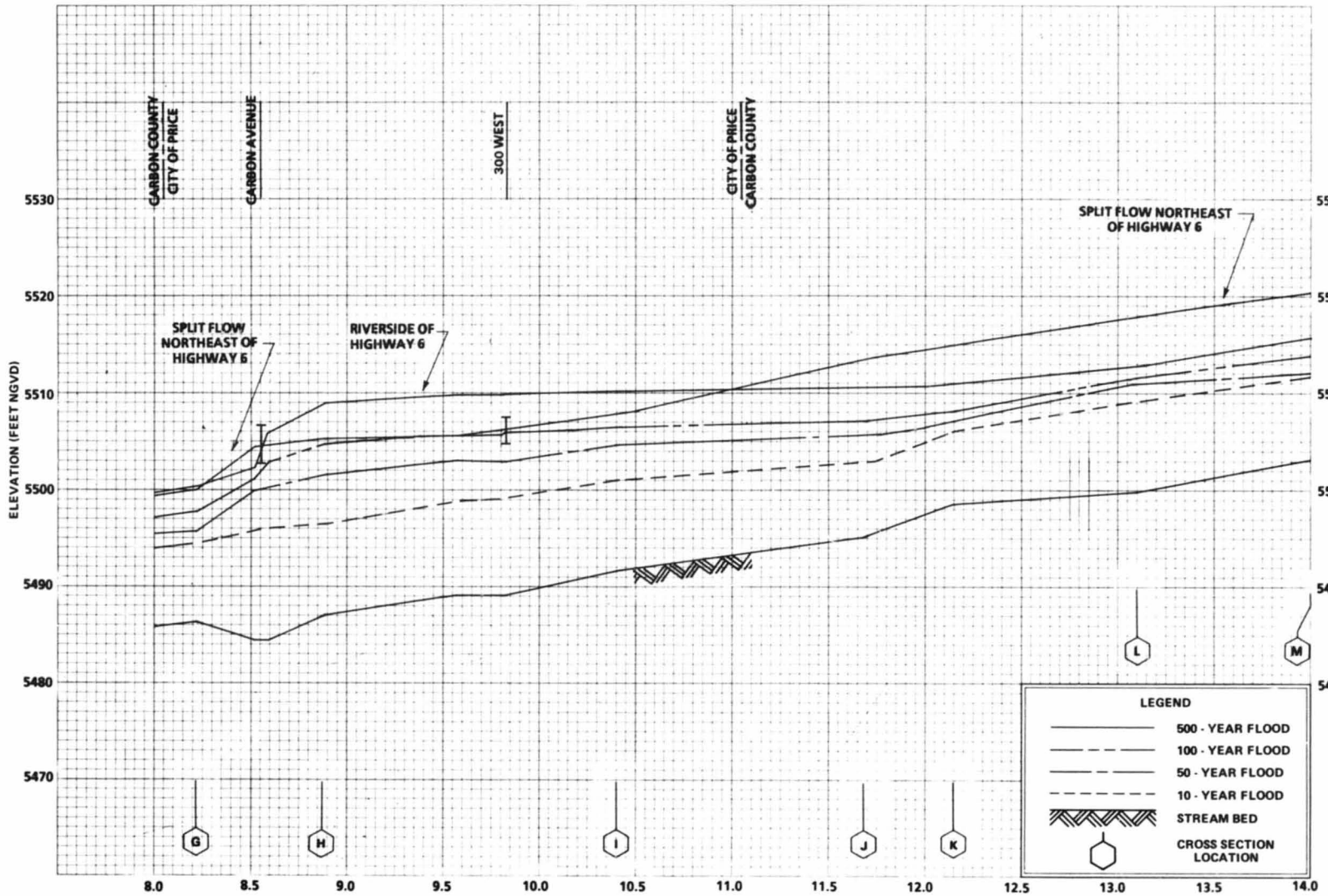
U.S. Department of the Interior, Geological Survey, Water Resources Data for Utah; Part 1, Surface Water Records, 1965 through 1974

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1260-E, Floods of April - June 1952 in Utah and Nevada, 1957

U.S. Department of the Interior, Geological Survey, Water Resources Data for Utah, 1975

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1526, Hydraulic and Hydrologic Aspects of Flood-Plain Planning, Wiitala, et al, 1961

U.S. Department of the Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 feet: Price, Utah, 1972




FLOOD PROFILES

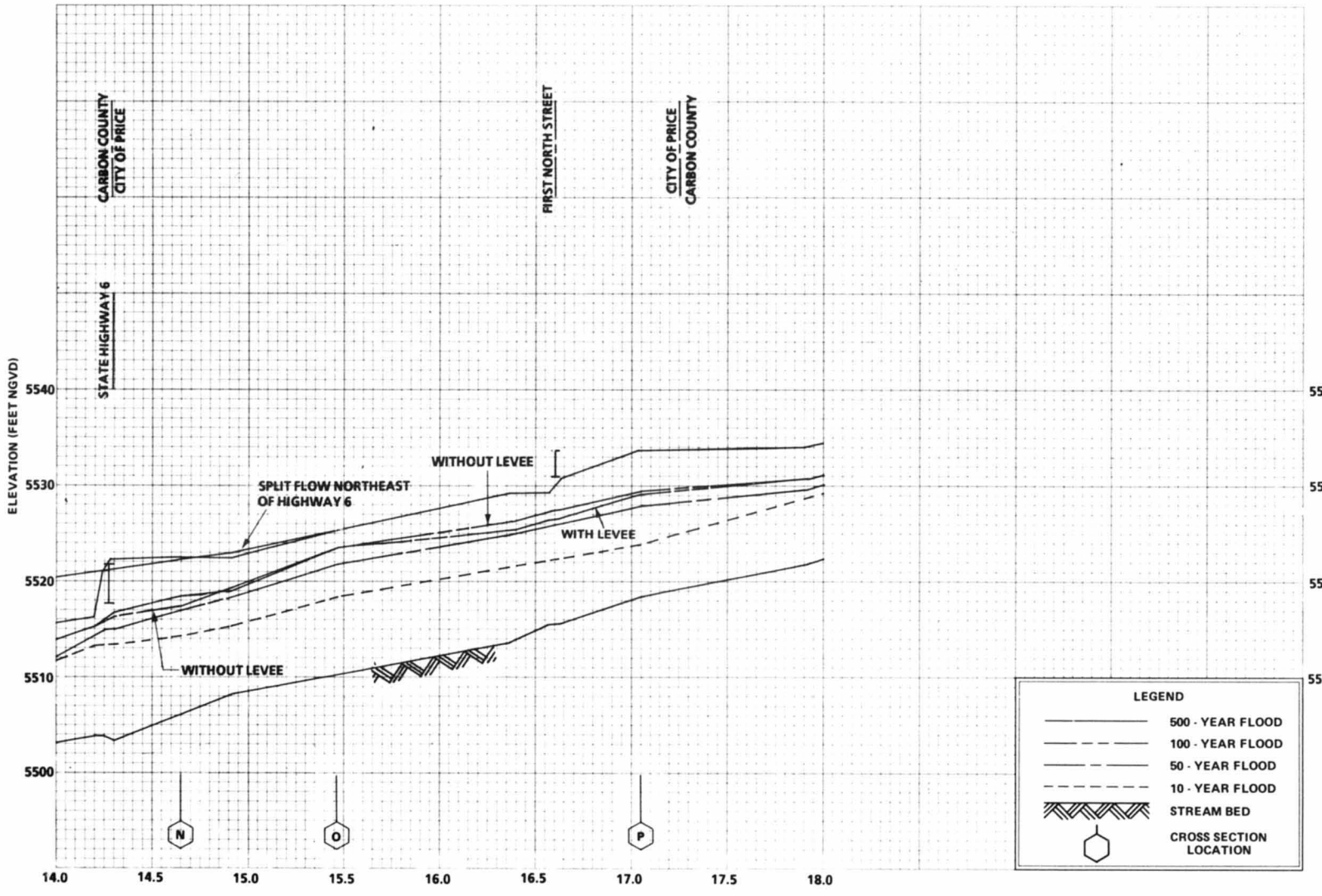
PRICE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF PRICE, UT
(CARBON CO.)

01P

16



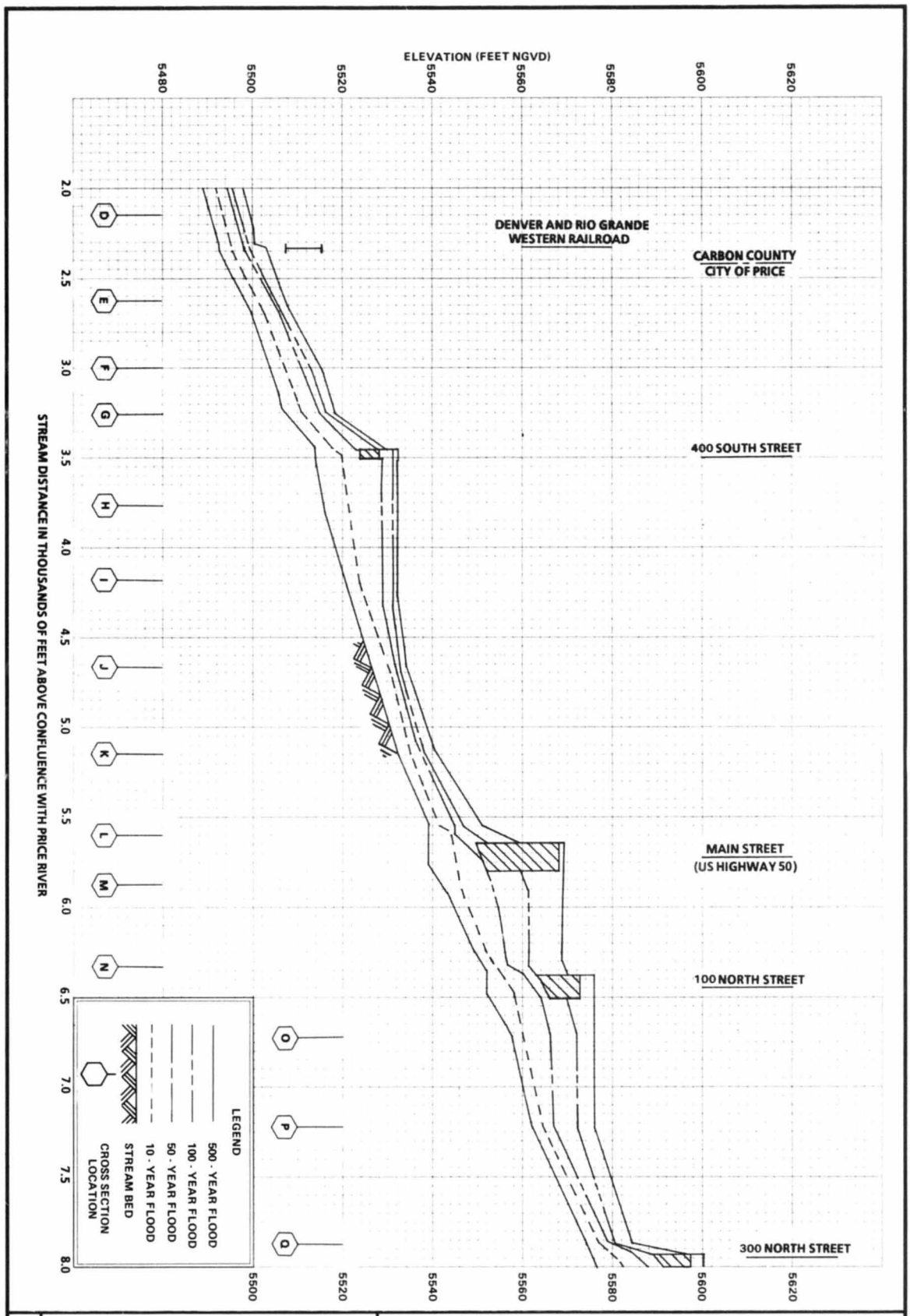

FLOOD PROFILES

PRICE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF PRICE, UT
(CARBON CO.)

02P



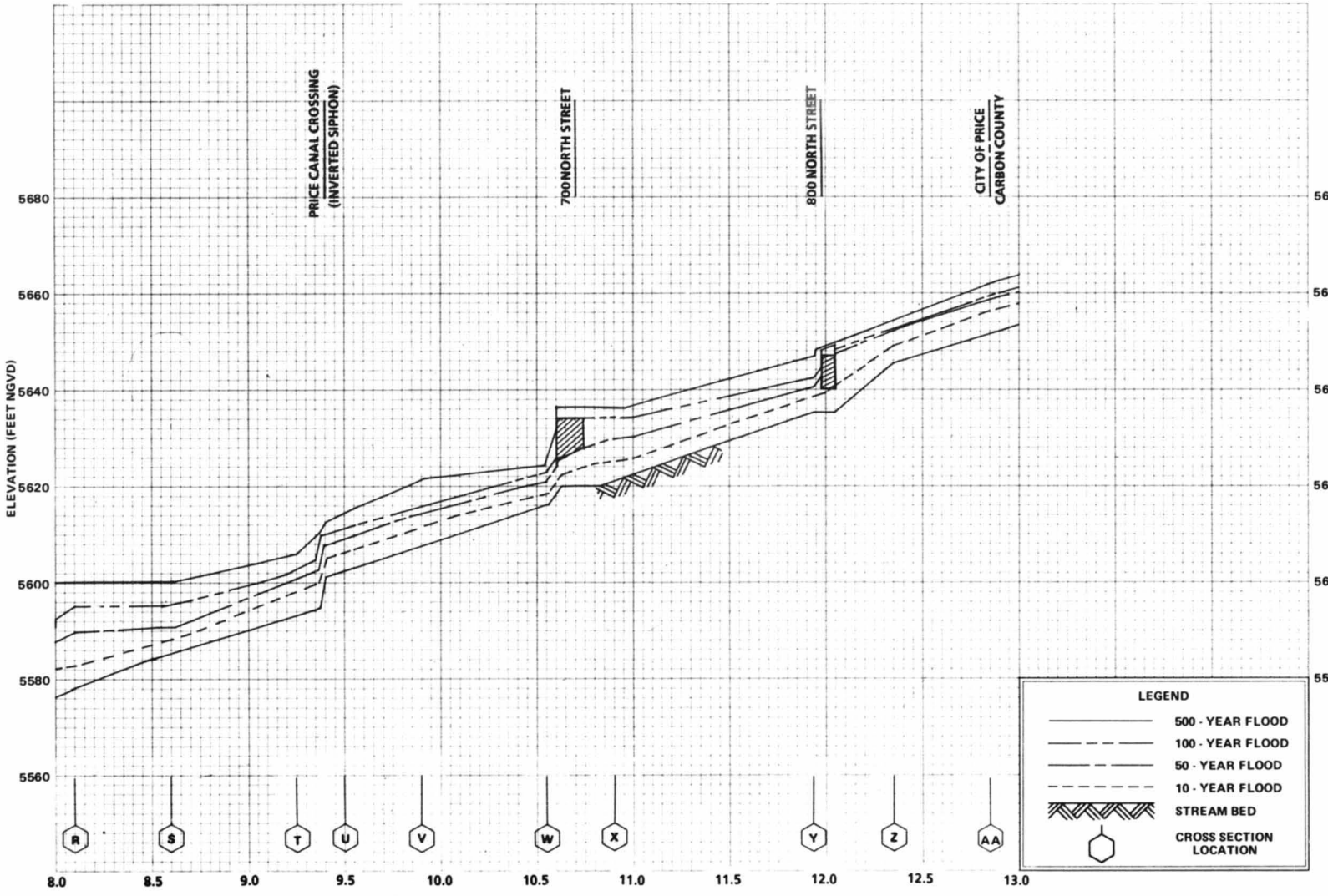

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CITY OF PRICE, UT**
**(CARBON CO.)**

**FLOOD PROFILES**

**MEADS WASH**

03P




FLOOD PROFILES

MEADS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF PRICE, UT
(CARBON CO.)

04P

19