FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 3

SARPY COUNTY, NEBRASKA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BELLEVUE, CITY OF	310191
GRETNA, CITY OF	310375
LA VISTA, CITY OF	310192
PAPILLION, CITY OF	315275
SARPY COUNTY, UNINCORPORATED AREAS	310190
SPRINGFIELD, CITY OF	310194

FEMA

PRELIMINARY

02/17/2022

REVISED:

TO BE DETERMINED

FLOOD INSURANCE STUDY NUMBER
31153CV001C
Version Number 2.5.3.6

TABLE OF CONTENTS

Volume 1

Figures

Tables

Volume 2

Tables

Exhibits

Volume 3

Exhibits

Published Separately

FLOOD INSURANCE STUDY REPORT
SARPY COUNTY, NEBRASKA

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built

by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as “Post-FIRM” buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Sarpy County, Nebraska.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) sub-basins affecting each, are shown in Table 1. The FIRM panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

Jurisdictions that have no identified SFHAs as of the effective date of this study are indicated in the table. Changed conditions in these communities (such as urbanization or annexation) or the availability of new scientific or technical data about flood hazards could make it necessary to determine SFHAs in these jurisdictions in the future.

Table 1: Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Bellevue, City of	310191	10230006	31153C0060H, 31153C0070J, 31153C0080G[1], 31153C0085H, 31153C0090J, 31153C0093H, 31153C0095H, 31153C0115H, 31153C0205H, 31153C0206H, 31153C0210H	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (Continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Gretna, City of	310375	10200202, 10230006	31153C0025G, 31153C0036J, 31153C0038J, 31153C0039J, 31153C0041J, 31153C0042J, 31153C0043J, 31153C0044J, 31153C0150G, 31153C0155G	
La Vista, City of	310192	10230006	31153C0055J, 31153C0060H, 31153C0061J, 31153C0062J, 31153C0070J	
Papillion, City of	315275	10200202, 10230006	31153C0044J, 31153C0061J, 31153C0062J, 31153C0063J, 31153C0064J, 31153C0068J, 31153C0069J, 31153C0070J, 31153C0160H, 31153C0200H	
Sarpy County, Unincorporated Areas	310190	10200202, 10220003, 10230006, 10240001	31153C0025G, 31153C0030J, 31153C0035J, 31153C0036J, 31153C0037J, 31153C0038J, 31153C0039J, 31153C0041J, 31153C0042J, 31153C0043J, 31153C0044J, 31153C0055J, 31153C0060H, 31153C0061J, 31153C0062J, 31153C0063J, 31153C0064J, 31153C0068J, 31153C0069J, 31153C0070J, 31153C0085H, 31153C0090J, 31153C0093H, 31153C0095H, 31153C0115H, 31153C0145G, 31153C0150G, 31153C0155G, 31153C0160H, 31153C0165G, 31153C0170G, 31153C0180G, 31153C0190G, 31153C0200H, 31153C0205H, 31153C0206H, 31153C0210H, 31153C0215H, 31153C0220H, 31153C0230H, 31153C0255G	
Springfield, City of	310194	10200202	31153C0160H, 31153C0180G	

[1] Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1-percent-annual-chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater

Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 30, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

  The initial Countywide FIS Report for Sarpy County became effective on 01/19/1995. Refer to Table 27 for information about subsequent revisions to the FIRMs.

- The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/flood-insurance/rules-legislation/community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

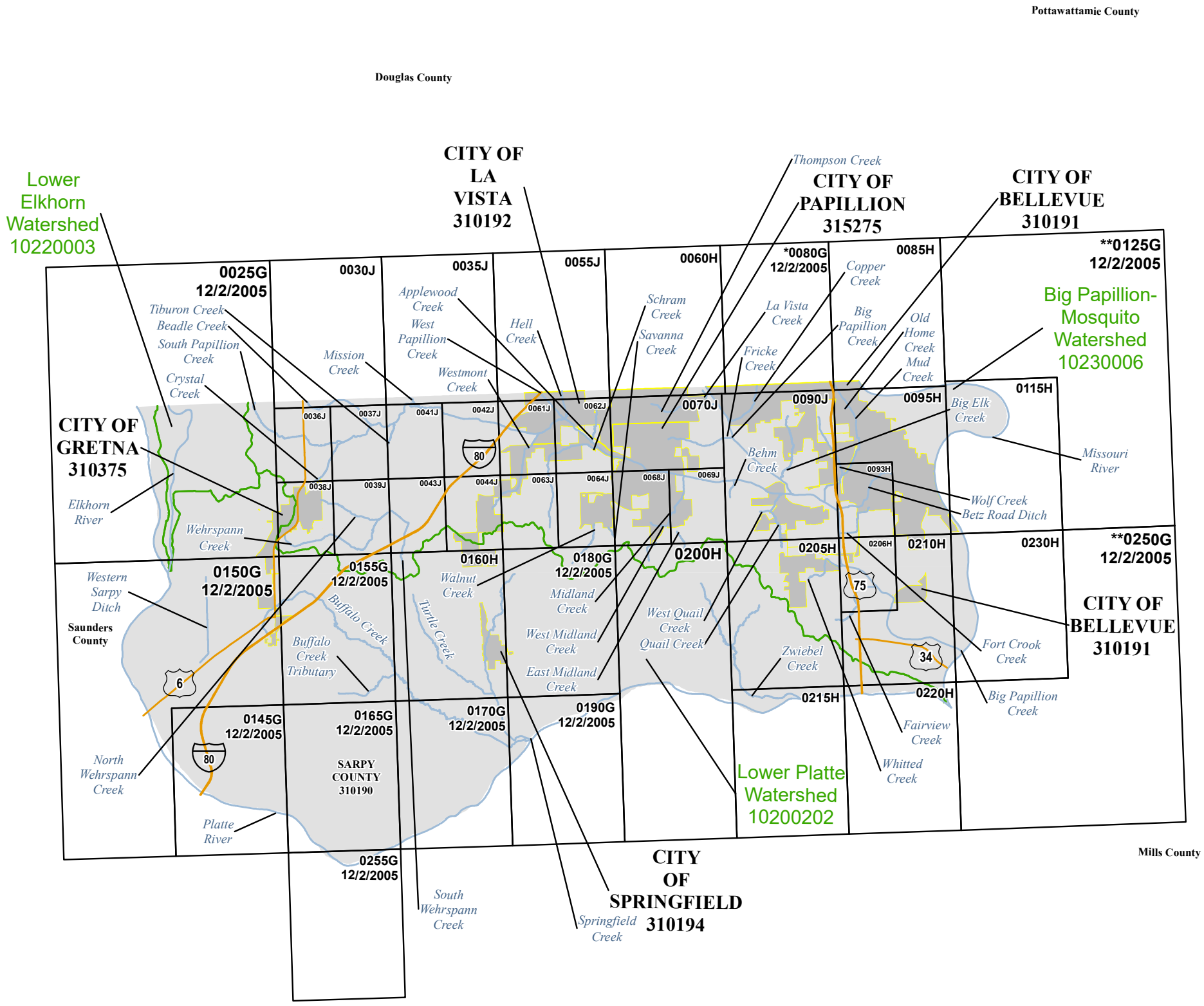
- FEMA does not design, build, inspect, operate, maintain, or certify levees. FEMA is responsible for accurately identifying flood hazards and communicating those hazards and risks to affected stakeholders. FEMA has identified one or more levee systems in this jurisdiction summarized in Table 8 of this FIS Report. For FEMA to accredit the identified levee systems, the levee systems must meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled "Mapping of Areas Protected by Levee Systems."

  Information on the levee systems in this jurisdiction can be obtained from the USACE National Levee Database (https://levees.sec.usace.army.mil/). For additional information, the user should contact the appropriate jurisdiction floodplain administrator and the levee owner or sponsor.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/flood-maps/tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Sarpy County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, flooding sources, watershed boundaries, and USGS HUC-8 codes.

Figure 1: FIRM Index



ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before TBD.

N

1 inch = 19,000 feet 1:228,000

Feet

0 9,500 19,000 38,000

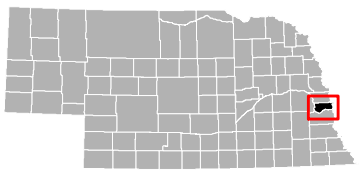
Map Projection:
NAD 1983 UTM Zone 14N;
Western Hemisphere; Vertical Datum: NAD 88

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION
*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
**PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

SARPY COUNTY, NEBRASKA and Incorporated Areas

PANELS PRINTED:
0025, 0030, 0035, 0036, 0037, 0038, 0039, 0041, 0042, 0043, 0044, 0055, 0060, 0061, 0062, 0063, 0064, 0068, 0069, 0070, 0085, 0090, 0093, 0095, 0115, 0145, 0150, 0155, 0160, 0165, 0170, 0180, 0190, 0200, 0205, 0206, 0210, 0215, 0220, 0230, 0255

PRELIMINARY
2/17/2022

FEMA

MAP NUMBER
31153CIND0C

MAP REVISED

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Mapping and Insurance eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 27 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

Figure 2: FIRM Notes to Users (Continued)

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may have reduced flood hazards due to flood control structures. Refer to Section 4.3 "Dams and Other Flood Hazard Reduction Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was Universal Transverse Mercator (UTM) Zone 14. The horizontal datum was the North American Datum of 1983 NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov.

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 30 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided in digital format by the Nebraska Department of Natural Resources for FIRM Panels dated TBD. This information was derived from digital orthophotography at a 1-meter resolution from photography dated 2015. Base map information shown on the FIRM Panels dated 12/02/2005 was derived from aerial photography by Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA) dated 2001 with a pixel resolution of either 1/4 or 1/2 meter. For information about base maps, refer to Section 6.2 “Base Map” in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Figure 2: FIRM Notes to Users (Continued)

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Sarpy County, Nebraska, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 27 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before TBD.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Sarpy County, Nebraska, effective TBD.

NON-ACCREDITED LEVEE SYSTEM: This panel contains a levee system that has not been accredited and is therefore not recognized as reducing the 1-percent-annual-chance flood hazard.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Sarpy County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% 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 hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood 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% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.
	Regulatory Floodway determined in Zone AE.

Figure 3: Map Legend for FIRM (Continued)

OTHER AREAS OF FLOOD HAZARD

Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.

Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.

Area with Reduced Flood Hazard due to Accredited or Provisionally Accredited Levee System: Area is shown as reduced flood hazard from the 1-percent-annual-chance or greater flood by a levee system. Overtopping or failure of any levee system is possible.

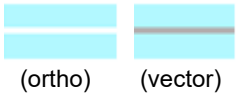
Area with Undetermined Flood Hazard due to Non-Accredited Levee System: Analysis and mapping procedures for non-accredited levee systems were applied resulting in a flood insurance rate zone where flood hazards are undetermined, but possible.

OTHER AREAS

Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

Unshaded Zone X: Areas of minimal flood hazard.

FLOOD HAZARD AND OTHER BOUNDARY LINES



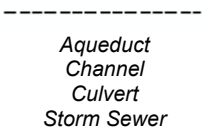
Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)

Limit of Study

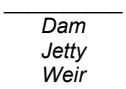
Jurisdiction Boundary

Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet

GENERAL STRUCTURES



Channel, Culvert, Aqueduct, or Storm Sewer



Dam, Jetty, Weir

Levee, Dike, or Floodwall

Figure 3: Map Legend for FIRM (Continued)

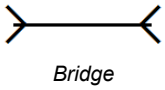
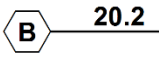
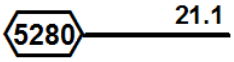
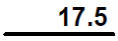
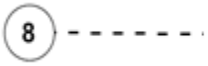
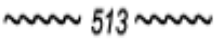
	Bridge
REFERENCE MARKERS	
	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway

Figure 3: Map Legend for FIRM (Continued)

MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}E$	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 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 hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Sarpy County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1-percent-annual-chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 22), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1-percent and 0.2-percent-annual-chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1-percent-annual-chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Sarpy County, respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 12. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1-percent-annual-chance floodplain corresponds to the SFHAs. The 0.2-percent-annual-chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to 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. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Applewood Creek	La Vista, City of; Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 1,195 feet upstream of Giles Road	10230006	0.9		Y	AE	9/15/2018
Beadle Creek	Sarpy County, Unincorporated Areas	Confluence with South Papillion Creek	Approximately 1,173 upstream of S 189th Street	10230006	1.4		Y	AE	9/15/2018
Betz Road Ditch	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 262 feet upstream of Lincoln Road	10230006	2.2		Y	AE	9/15/2018
Big Elk Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 511 feet upstream of Private Drive, near the intersection of Private Drive and South 36th Street	10230006	2.3		Y	AE	9/15/2018
Big Papillion Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Missouri River	Just downstream of Capehart Road	10230006	5.5		Y	AE	9/15/2018
Big Papillion Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Just downstream of Capehart Road	Sarpy/Douglas County Boundary	10230006	6.9		Y	AE	9/15/2018
Buffalo Creek	Sarpy County, Unincorporated Areas	Confluence with the Platte River	Approximately 2,800 feet upstream of Platteview Road	10200202	1.4		Y	AE	March 1978
Crystal Creek	Sarpy County, Unincorporated Areas	Confluence with South Papillion Creek	Approximately 1,653 feet upstream of Cornhusker Road	10230006	1.3		Y	AE	9/15/2018

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Elkhorn River	Sarpy County, Unincorporated Areas	Confluence with the Platte River	Sarpy/Douglas County Boundary	10200202	5.7		Y	AE	November 2001
Fairview Creek	Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 311 feet upstream of South 17th Street	10230006	1.9		Y	AE	9/15/2018
Fricke Creek	Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 3,222 feet above the confluence with Big Papillion Creek	10230006	0.6		Y	AE	9/15/2018
Giles Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 652 feet upstream of South 48th Street	10230006	0.8		Y	AE	9/15/2018
Hell Creek	La Vista, City of	Confluence with West Papillion Creek	Sarpy/Douglas County Boundary	10230006	1.0		Y	AE	9/15/2018
Midland Creek	Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 85 feet downstream of Shram Road	10230006	1.7		Y	AE	9/15/2018
Midland Creek	Papillion, City of; Sarpy County, Unincorporated Areas	Approximately 85 feet downstream of Shram Road	Approximately 164 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	10230006		0.07	N	AE	9/15/2018

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Midland Creek	Sarpy County, Unincorporated Areas	Approximately 164 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	Approximately 785 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	10230006	0.2		Y	AE	9/15/2018
Midland Creek	Sarpy County, Unincorporated Areas	Approximately 785 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	Approximately 243 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	10230006		0.02	N	AE	9/15/2018
Midland Creek	Papillion, City of; Sarpy County, Unincorporated Areas	Approximately 243 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	Approximately 540 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	10230006	0.1		Y	AE	9/15/2018
Mission Creek	Sarpy County, Unincorporated Areas	Confluence with South Papillion Creek	Sarpy/Douglas County Boundary	10230006	0.5		Y	AE	9/15/2018
Mission Creek Overland	Sarpy County, Unincorporated Areas	Confluence with Mission Creek just downstream of Harrison Street	Sarpy/Douglas County Boundary	10230006	0.1		N	AE	9/15/2018
Missouri River	Bellevue, City of; Sarpy County, Unincorporated Areas	Cass/Sarpy County Boundary	Sarpy/Douglas County Boundary	10230006	14.6		Y	AE	11/25/2003

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Mud Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 1,843 feet upstream of Chandler Road	10230006	3.9		Y	AE	9/15/2018
North Wehrspann Creek	Gretna, City of; Sarpy County, Unincorporated Areas	Confluence with Wehrspann Creek	Approximately 4,363 feet upstream of S 180th Street	10230006	0.9		Y	AE	9/15/2018
Old Home Creek	Bellevue, City of	Confluence with Mud Creek	Approximately 733 feet above the Confluence with Mud Creek	10230006	0.1		Y	AE	9/15/2018
Platte River	Sarpy County, Unincorporated Areas	Confluence with Missouri River	Approximately 4.31 miles upstream of U.S. Route 75	10200202	2.0		Y	AE	11/9/2019
Platte River	Sarpy County, Unincorporated Areas	Approximately 4.31 miles upstream of U.S. Route 75	Sarpy/Douglas County Boundary	10200202, 10240001	6.5		Y	AE	November 2001
Quail Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 1.53 miles upstream of Quail Drive	10230006	2.5		Y	AE	9/15/2018
South Midland Creek	Sarpy County, Unincorporated Areas	At Shadow Lake Dam outlet	Approximately 76 feet downstream of Ponderosa Drive	10230006		0.07	N	AE	9/15/2018
South Midland Creek	Sarpy County, Unincorporated Areas	Approximately 76 feet downstream of Ponderosa Drive	Approximately 1,357 feet upstream of Ponderosa Drive	10230006	0.3		Y	AE	9/15/2018
South Papillion Creek	La Vista, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 1,319 feet upstream of S 204th Street	10230006	9.3		Y	AE	9/15/2018

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
South Papillion Tributary	La Vista, City of; Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with South Papillion Creek	Approximately 2,614 feet above the confluence with South Papillion Creek	10230006	0.5		Y	AE	9/15/2018
South Papillion Tributary	Papillion, City of	Approximately 2,614 feet above the confluence with South Papillion Creek	Approximately 89 feet upstream of S 132nd Street	10230006		0.29	N	AE	9/15/2018
South Papillion Tributary	Papillion, City of; Sarpy County, Unincorporated Areas	Approximately 89 feet upstream of S 132nd Street	Approximately 2,913 feet upstream of NE Highway 370	10230006	0.9		Y	AE	9/15/2018
South Wehrspann Creek	Gretna, City of; Sarpy County, Unincorporated Areas	Confluence with Wehrspann Creek	Approximately 3,803 feet upstream of Interstate 80	10230006	1.1		Y	AE	9/15/2018
Springfield Creek	Sarpy County, Unincorporated Areas; Springfield, City of	Confluence with the Platte River	Approximately 2,200 feet upstream of Fairview Road	10200202	3.5		Y	AE	December 1976
Springfield Creek	Sarpy County, Unincorporated Areas	Approximately 2,200 feet upstream of Fairview Road	Approximately 2,440 feet upstream of Capehart Road	10200202	0.2		N	A	1981
Thompson Creek	La Vista, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 875 feet upstream of Edgewood Boulevard	10230006	1.7		Y	AE	9/15/2018
Thompson Creek	La Vista, City of	Approximately 875 feet upstream of Edgewood Boulevard	Approximately 70 feet downstream of South 84th Street	10230006	0.4		N	A	1981

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Tiburon Creek	Sarpy County, Unincorporated Areas	Confluence with South Papillion Creek	Approximately 2,211 feet upstream of Giles Road	10230006	0.7		Y	AE	9/15/2018
Unnamed Pond on Fricke Creek	Sarpy County, Unincorporated Areas	Approximately 2,060 feet downstream of South 66th Street	Approximately 910 feet downstream of South 66th Street	10230006	0.2		N	A	1981
Unnamed Tributary 1 to Little Papillion Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	At Alberta Avenue	Approximately 670 feet upstream of Alberta Avenue	10230006	0.1		N	A	1981
Unnamed Tributary 2 to Little Papillion Creek	Bellevue, City of	Approximately 1,080 feet downstream of West Chandler Road	At West Chandler Road	10230006	0.2		N	A	1981
Unnamed Tributary to South Papillion Tributary	Sarpy County, Unincorporated Areas	Just downstream of Highway 370	Approximately 3,900 feet upstream of Highway 370	10230006	0.7		N	A	1981
Unnamed Tributary to Springfield Creek	Sarpy County, Unincorporated Areas	Approximately 590 feet upstream of the confluence with Springfield Creek	Approximately 1,025 feet upstream of the confluence with Springfield Creek	10200202	0.1		N	A	1981
Walnut Creek	Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 425 feet upstream of Highway 370	10230006	1.9		Y	AE	9/15/2018
Walnut Creek	Papillion, City of	At the Walnut Creek Dam Outlet	Approximately 982 feet downstream of Schram Road	10230006		0.19	N	AE	9/15/2018

Table 2: Flooding Sources Included in this FIS Report (Continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Walnut Creek	Papillion, City of; Sarpy County, Unincorporated Areas	Approximately 982 feet downstream of Schram Road	Approximately 1,864 Feet upstream of Schram Road	10230006	0.5		Y	AE	9/15/2018
Wehrspann Creek	Gretna, City of; Sarpy County, Unincorporated Areas	At the Werspann Lake Dam outlet	Approximately 500 feet upstream of Highway 370	10230006		0.55	N	AE	9/15/2018
Wehrspann Creek	Gretna, City of; Sarpy County, Unincorporated Areas	Approximately 500 feet upstream of Highway 370	Approximately 839 feet upstream of Iva Street	10230006	4.5		Y	AE	9/15/2018
West Midland Creek	Papillion, City of	Confluence with Midland Creek	Just downstream of South 84th Street	10230006	0.5		Y	AE	9/15/2018
West Papillion Creek	Bellevue, City of; La Vista, City of; Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Sarpy/Douglas County Boundary	10230006	7.9		Y	AE	9/15/2018
West Papillion Tributary	Papillion, City of; Sarpy County, Unincorporated Areas	Confluence with West Papillion Creek	Approximately 1.04 miles upstream of Highway 370	10230006	3.7		Y	AE	9/15/2018
West Quail Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Quail Creek	Approximately 1,915 feet upstream of confluence with Quail Creek	10230006	0.3		Y	AE	9/15/2018
Whitted Creek	Bellevue, City of; Sarpy County, Unincorporated Areas	Confluence with Big Papillion Creek	Approximately 874 feet upstream of South 25th Street	10230006	1.1		Y	AE	9/15/2018
Wolf Creek	Bellevue, City of	Confluence with Mud Creek	Approximately 165 Feet downstream of Cornhusker Road	10230006	0.5		Y	AE	9/15/2018

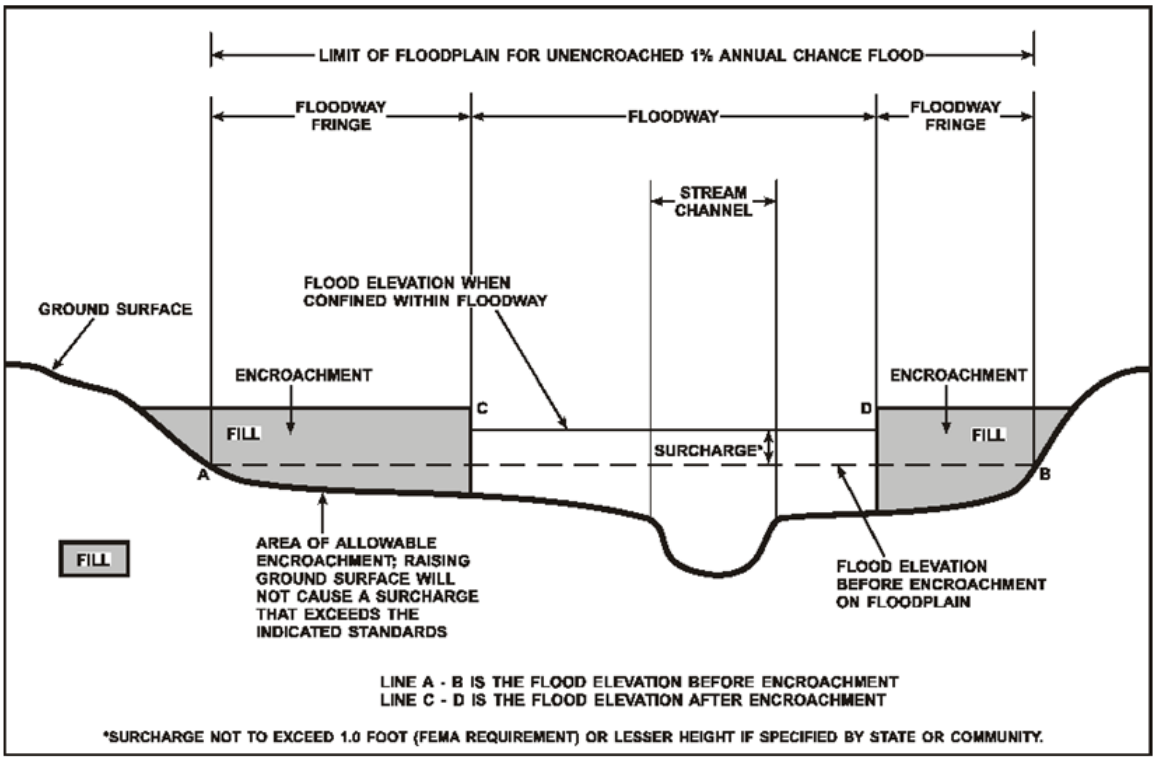
2.2 Floodways

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 balancing floodplain development against increasing flood hazard. With this approach, the area of the 1-percent-annual-chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1-percent-annual-chance flood. The floodway fringe is the area between the floodway and the 1-percent-annual-chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1-percent-annual-chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Nebraska require communities in Sarpy County to limit increases caused by encroachment to 1.0 foot. The floodway widths presented in this FIS Report and on the FIRM within the Big Papillion-Mosquito Watershed (10230006) were based on a computation method set forth by the Papio-Missouri River Natural Resources District (PMRNRD) that considered future conditions hydrology, existing conditions hydrology, and a minimum setback from the river toe (USACE 2009). The setback was calculated by taking a 3:1 slope from the river toe until the location coincident with the natural ground surface and adding a 50-foot or 30-foot buffer as designated in the PMRNRD Master Plan (PMRNRD 2010) to prevent construction in locations with low stability. The analysis consisted of a multiple equal-conveyance reductions based on (1) the 1-percent-annual-chance future conditions discharge, (2) the 1-percent-annual-chance existing conditions discharge, and (3) the 3:1 plus setback. The final floodway was determined at the widest encroachment location at each cross-section from all three scenarios. If the 3:1 plus setback encroachment was wider than the 1-percent-annual chance floodplain extent, the floodway was set to the 1-percent-annual-chance floodplain and ensuring an increase in surcharge no greater than 1.0 feet. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 23, “Floodway Data.”

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The BFE is the elevation of the 1-percent-annual-chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

BFEs are primarily intended for flood insurance rating purposes. Cross sections with BFEs

shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. For example, the user may use the FIRM to determine the stream station of a location of interest and then use the profile to determine the 1-percent annual chance elevation at that location. Because only selected cross sections may be shown on the FIRM for riverine areas, the profile should be used to obtain the flood elevation between mapped cross sections. Additionally, for riverine areas, whole-foot elevations shown on the FIRM may not exactly reflect the elevations derived from the hydraulic analyses; therefore, elevations obtained from the profile may more accurately reflect the results of the hydraulic analysis.

2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

Figure 5: Wave Runup Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

Figure 6: Coastal Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, “Map Legend for FIRM.” Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Sarpy County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Bellevue, City of	A, AE, X
Gretna, City of	AE, X
La Vista, City of	A, AE, X
Papillion, City of	AE, X
Sarpy County, Unincorporated Areas	A, AE, X
Springfield, City of	AE, X

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 4 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

Table 4: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Big Papillion-Mosquito	10230006	Big Papillion Creek/Missouri River	Encompasses the north and eastern portions of the county. Contains Big Papillion Creek and its tributaries.	1,114

Table 4: Basin Characteristics (Continued)

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Keg-Weeping Water	10240001	Missouri River	Only contains a very small portion of Sarpy County near the confluence of Platte River and Missouri River. This watershed extends into Missouri and Iowa.	838
Lower Elkhorn	10220003	Elkhorn River	Encompasses a small portion of northwestern Sarpy County, where the Elkhorn River flows for just under 6 miles before its confluence with the Platte River.	2,204
Lower Platte	10200202	Platte River	Encompasses southwestern portion of Sarpy County, and the tributaries of Platte River, including Buffalo, Springfield, and Turtle Creeks.	527

4.2 Principal Flood Problems

Table 5 contains a description of the principal flood problems that have been noted for Sarpy County by flooding source.

Table 5: Principal Flood Problems

Flooding Source	Description of Flood Problems
Betz Road Ditch	Betz Road Ditch has experienced flooding in 1967 and 1971. Due to the close proximity of Betz Road Ditch to Mud Creek, the same intense rainfall storm produced floods on both streams. The 1967 flood was the largest flood causing the loss of one life. No estimate of discharge was made.
Big Papillion Creek	Flooding typically occurs from heavy rainfall and normally allows warning prior to the peak. Fragmented flood records date back to 1929, prior to the establishment of the Fort Crook gaging station near Capehart Road by the UACE in 1946. Flooding prior to 1929 has undoubtedly occurred but no records are available.
Buffalo Creek	Flooding source typically occurs from heavy rainfall on a relatively local basis, creating short duration flooding with little warning prior to the peak. Floods have undoubtedly occurred on Buffalo Creek. However, due to the lack of development within the floodplain, little data is available documenting past floods.

Table 5: Principal Flood Problems (Continued)

Flooding Source	Description of Flood Problems
Elkhorn River	Flooding is typically a result of heavy rainfall, snowmelt, or combinations thereof. Ice conditions can also aggravate the flood situation. Flooding on this stream without ice-affected conditions would normally be of relatively long duration with ample warning prior to the peak. Floods occurred in 1944, 1947, 1948, 1949, 1950, 1951, 1960, 1962, 1966, 1967, 1971, 1978, and 1993. Approximately half of the notable floods of the Elkhorn River have occurred due to rapid snowmelt augmented by ice jams. The other half of notable floods have occurred due to heavy rainfall. The 1944 flood was the largest of record, having an approximately recurrence interval of 160 years.
Hell Creek	The Hell Creek floodplain was used primarily only for agricultural purposes until the late 1950s and early 1960s. From this time period to the present, extensive residential development has occurred in portions of the Hell Creek basin and floodplain. Prior to this residential development, damages resulting from Hell Creek floods were relatively low; however, heavy damages occurred along portions of the Hell Creek floodplain as a result of heavy rainfall over the basin during the evening of June 16, 1964. Flooding from this rainfall was in the vicinity of the 0.2-percent-annual-chance flood magnitude.
Missouri River	Flooding is typically a result of heavy rainfall, snowmelt, or combinations thereof. Ice conditions can also aggravate the flood situation. Flooding on this stream without ice-affected conditions would normally be of relatively long duration with ample warning prior to the peak. The Missouri River historically was a major flood problem for Sarpy County, until the construction of six dams and reservoirs on the river. Missouri River Levee Unit R-616 protects the area that is downstream from the City of Bellevue extraterritorial zoning limits to Big Papillion Creek. Missouri River Levee Unit R-613 is located between Big Papillion Creek and the Platte River. Still, areas of Sarpy County and Bellevue riverward of the levee system are subject to flooding, due to tributary inflow downstream from the mainstem dams.
Mud Creek	Flooding due to Mud Creek, can result from heavy rainfall on a relatively local basis creating short duration flooding with little warning prior to the peak. Flooding along Mud Creek occurs relatively frequently. The most recent floods were in 1967 and 1971 because of heavy rainfall. Of these two floods, the 1967 flood was the largest, having an approximate recurrence interval of 25 years.
Platte River	Flooding is typically a result of heavy rainfall, snowmelt or combinations thereof. Ice conditions can also aggravate the flood situation. Flooding on this stream without ice-affected conditions would normally be of relatively long duration with ample warning prior to the peak. Platte River has few flood control measures that reduce flood damages. Since 1940, the Sarpy County area has flooded due to the Platte River on multiple occasions. Floods have occurred in 1944, 1947, 1948, 1949, 1950, 1960, 1962, 1966, 1967, 1971, 1978, and 1993. The largest flood occurred in July 1993, with a discharge of 160,000 cfs. Two other floods of record, in 1960 and 1978, had a discharge of 124,000 and 110,000 cfs, respectively. The majority of floods occur in February and March due to rapid snowmelt and ice jams. Ice jams aggravated the flood situation considerably.
South Papillion Creek	Flooding typically occurs from heavy rainfall on a relatively local basis, creating short duration flooding with little warning prior to the peak.

Table 5: Principal Flood Problems (Continued)

Flooding Source	Description of Flood Problems
Springfield Creek	Flooding typically occurs from heavy rainfall on a relatively local basis, creating short duration flooding with little warning prior to the peak. Floods occurred in 1959, 1964, and 1965. Of these floods, the flood of June 16-17, 1964, was the largest. State Highway 50 was overtopped in places, and several residences and the fairgrounds in the City of Springfield were flooded.
West Papillion Creek	Flooding typically occurs from heavy rainfall on a relatively local basis, creating short duration flooding with little warning prior to the peak. There are very limited flood records for this stream. Floods occurred in 1948, 1950, 1959, 1964, 1965. The largest flood of record occurred in June 1964, having an approximate discharge of 40,800 cfs at the U.S. Army Corps of Engineers (USACE) gaging station, located approximately 7 miles upstream from the mouth at Giles Road, and 31,500 cfs at the mouth. The flood of September 7, 1965, had a discharge of 17,500 cfs at the mouth (USACE 1967b and USACE 1969).

Table 6 contains information about historic flood elevations in the communities within Sarpy County.

Table 6: Historic Flooding Elevations

Flooding Source	Location	Historic Peak (Feet NAVD88)	Event Date	Approximate Recurrence Interval (years)	Source of Data
Platte River	Metal tag on wood post on left bank levee 0.25 mile downstream of Highway 75. Post is part of security gate on levee.	968.69[1]	June 1984	25	USACE
Platte River	Metal tag on wooden pole along Platte River Dr. Pole is across road from first house on right side.	972.32[1]	June 1984	25	USACE
Platte River	Metal tag on electrical pole	969.51[2]	July 1993	50	USACE

[1] Original survey documentation did not include datum. Datum was assumed to be NGVD29 based on event year. Recorded historic peak elevation was converted to NAVD88.

[2] Original survey documentation did not include datum. Datum was assumed to be NAVD88 based on event year.

4.3 Dams and Other Flood Hazard Reduction Measures

Table 7 contains information about non-levee flood hazard reduction measures within Sarpy County such as dams or jetties. Levee systems are addressed in Section 4.4 of this FIS Report.

Table 7: Dams and Other Flood Hazard Reduction Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Big Papillion Creek	Cunningham Dam – Site 1	Dam	Approximately 14 miles upstream of Sarpy County – Douglas County line	Dam is owned by Corps of Engineers Northwestern Division Omaha District (CENWO), completed in 1975 at a height of 67 feet.
Big Papillion Creek	Standing Bear Lake Dam – Site 16	Dam	Approximately 14 miles upstream of Sarpy County – Douglas County line	Dam is owned by CENWO, completed in 1973 at a height of 70 feet.
Midland Creek	Shadow Lake Dam	Dam	Approximately 4,000 feet upstream of Highway 370	Owned by Papio-NRD, completed in 2007 at a height of 41 feet for flood control.
Missouri River	Big Bend Dam	Dam	Fort Thompson, South Dakota	Provides peak discharge reduction at Sarpy County from the Missouri River. This dam became operational in 1964, impounds Lake Sharpe, owned by CENWO.
Missouri River	Fort Peck Dam	Dam	Fort Peck, Montana	Provides peak discharge reduction at Sarpy County from the Missouri River. This dam became operational in 1940, impounds Fort Peck Lake, owned by CENWO.
Missouri River	Fort Randall Dam	Dam	Pickstown, South Dakota	Provides peak discharge reduction at Sarpy County from the Missouri River. This dam became operational in 1953, impounds Lake Francis Case, owned by CENWO.
Missouri River	Garrison Dam	Dam	Riverdale, North Dakota	Provides peak discharge reduction at Sarpy County from the Missouri River. This dam became operational in 1955, impounds Lake Sakakawea, owned by CENWO.
Missouri River	Gavins Point Dam	Dam	Yankton, South Dakota	Provides peak discharge reduction at Sarpy County from the Missouri River. This dam became operational in 1955, impounds Lewis and Clark Lake, owned by CENWO.
Missouri River	Oahe Dam	Dam	Pierre, South Dakota	Operational in 1962, impounds Lake Oahe, owned by CENWO.

Table 7: Dams and Other Flood Hazard Reduction Measures (Continued)

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Walnut Creek	Walnut Creek Lake Dam	Dam	Approximately 1,000 feet upstream of Highway 370	Owned by Papio-NRD, completed in 1996 at a height of 62 feet for flood control.
Wehrspann Creek	Wehrspann Sediment Dam	Dam	Approximately 700 feet upstream of Highway 370	Owned by Papio-NRD, completed in 2000 at a height of 40 feet for flood control.
West Papillion Tributary	S-35	Control Structure	Approximately 2,000 feet upstream of Highway 370	Only impounds during considerable storm events, but not high enough to completely prevent flooding.

4.4 Levee Systems

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces the flood hazard from the 1-percent-annual-chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate flood hazard zone.

Levee systems that are determined to reduce the hazard from the 1-percent-annual-chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with 44 CFR 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee system's accreditation status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system no longer meets 44 CFR 65.10, FEMA will consider the levee system as non-accredited and issue an effective FIRM showing the levee-impacted area as a SFHA or Zone D.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levee systems that exist within Sarpy County. Table 8, "Levee Systems," lists all accredited levee systems, PALs, and non-accredited levee systems shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports. Levee systems identified in the table are displayed on the FIRM with notes to users to indicate their flood hazard mapping status.

Please note that the information presented in Table 8 is subject to change at any time. For that reason, the latest information regarding the levee systems presented in the table may be obtained by accessing the National Levee Database. For additional information, contact the levee owner/sponsor or the local community shown in Table 30.

Table 8: Levee Systems

Community	Flooding Source(s)	NLD Levee System ID	NLD Levee System Name	Levee System Status on Effective FIRM	FIRM Panel(s)	Levee Owner(s) / Sponsor(s)
Bellevue, City of	Big Papillion Creek	4705000128	NEDOUG16 LB & Little Papio LB - L St to Copper Cr	Non-Accredited	31153C0060H, 31153C0070J, 31153C0090J	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek	4705000125	NEDOUG16 - Big Papio LB - Copper Cr to Big Elk Cr	Non-Accredited	31153C0090J	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek	4705000127	NEDOUG16 - Big Papio LB - Betz Ditch to Capehart	Non-Accredited	31153C0093H, 31153C0206H	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek, Mud Creek, Betz Road Ditch	4705000126	NEDOUG16 - Big Papio LB - Mud Creek to Betz Ditch	Non-Accredited	31153C0090J, 31153C0093H	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek	4705000124	NEDOUG16 - Big Papio RB - 36th St to Willow Lakes Golf Course	Non-Accredited	31153C0090J	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek, Whitted Creek	4705000166	NEDOUG16 - Big Papio RB - Willow Lakes Golf Course to Whitted Creek	Non-Accredited	31153C0090J, 31153C0205H, 31153C0206H	Papio-Missouri River Natural Resources District
Bellevue, City of; Sarpy County, Unincorporated Areas	Big Papillion Creek, Missouri River	4705000093	R-616-613 - MO Riv RB & Papillion Cr LB	Non-Accredited	31153C0095H, 31153C0115H, 31153C0206H, 31153C0210H, 31153C0230H	Papio-Missouri River Natural Resources District
Gretna, City of	Elkhorn River	1705000612	Western Sarpy Drainage District Levee 1	Non-Accredited	31153C0025G	Unknown
Papillion, City of	West Papillion Creek	1705990656	LB_Jackson_Adams, West Papillion Creek	Non-Accredited	31153C0070J	Unknown

Table 8: Levee Systems (Continued)

Community	Flooding Source(s)	NLD Levee System ID	NLD Levee System Name	Levee System Status on Effective FIRM	FIRM Panel(s)	Levee Owner(s) / Sponsor(s)
Papillion, City of; Sarpy County, Unincorporated Areas	West Papillion Creek	4705000129	NESARP84 - West Papio RB - 96th-Big Papio	Non-Accredited	31153C0068J, 31153C0069J, 31153C0070J, 31153C0090J	Papio-Missouri River Natural Resources District
Papillion, City of; Sarpy County, Unincorporated Areas	West Papillion Creek, Big Papillion Creek	4705000133	West Papio LB & Big Papio RB	Non-Accredited	31153C0068J, 31153C0069J, 31153C0070J, 31153C0090J	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Big Papillion Creek	4705000123	NEDOUG16 - Big Papio RB - L St to Thompson Cr	Non-Accredited	31153C0060H, 31153C0070J	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Big Papillion Creek	4705000156	NEDOUG16 - Big Papio LB - Big Elk Cr to Mud Cr	Non-Accredited	31153C0090J, 31153C0093H	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Big Papillion Creek, Platte River	4705000090	R-613 - Platte LB & Papillion RB & MO River RB	Non-Accredited	31153C0206H, 31153C0210H, 31153C0220H	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Platte River	1705700612	Western Sarpy Drainage District Levee 3	Non-Accredited	31153C0025G	Unknown
Sarpy County, Unincorporated Areas	Platte River	4705000170	Western Sarpy - Platte River LB	Non-Accredited	31153C0025G, 31153C0150G	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Unnamed Stream	1705700264	MR R-616 Interior Drainage Ditch LB	Non-Accredited	31153C0210H, 31153C0230H	Papio-Missouri River Natural Resources District
Sarpy County, Unincorporated Areas	Unnamed Stream	1705800264	MR R-616 Interior Drainage Ditch RB	Non-Accredited	31153C0210H, 31153C0230H	Papio-Missouri River Natural Resources District

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 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-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 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 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 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.

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 10. Stream gage information is provided in Table 11.

Table 9: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Applewood Creek	At the confluence with West Papillion Creek	1.2	711	948	1,164	1,381	1,401	1,979
Applewood Creek	Approximately 700 feet downstream of Giles Road	1.1	690	920	1,130	1,340	1,360	1,920
Beadle Creek	At the confluence with South Papillion Creek	2.3	1,286	1,697	2,049	2,421	2,481	3,435
Beadle Creek	Approximately 500 feet upstream of S 180th Street	2.3	1,280	1,690	2,040	2,410	2,470	3,420
Beadle Creek	Approximately 250 feet upstream of S 189th Street	1.0	540	720	870	1,030	1,060	1,460
Betz Road Ditch	At the confluence with Big Papillion Creek	1.9	560	740	890	1,060	1,060	1,510
Betz Road Ditch	Approximately 300 feet downstream of Lloyd Street	1.2	370	500	600	710	710	1,020
Big Elk Creek	At the confluence with Big Papillion Creek	1.8	420	590	730	900	970	1,330
Big Elk Creek	Approximately 3,300 feet upstream of Cornhusker Road	1.1	290	410	500	610	660	910

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Big Papillion Creek	At the confluence with the Missouri River	395.9	21,410	28,990	31,970	33,970	34,620	37,690
Big Papillion Creek	At Harlan Lewis Road	395.9	21,410	28,990	31,970	33,970	34,620	37,680
Big Papillion Creek	Approximately 5,900 feet upstream of Harlan Lewis Road	393.0	21,410	29,000	31,990	33,990	34,630	37,700
Big Papillion Creek	Approximately 300 feet downstream of Railroad	390.4	21,440	29,030	32,020	34,030	34,650	37,740
Big Papillion Creek	Confluence of Fairview Creek	386.3	21,460	29,050	32,050	34,070	34,680	37,770
Big Papillion Creek	Confluence of Whitted Creek	384.3	21,530	29,150	32,160	34,220	34,880	37,870
Big Papillion Creek	At Capehart Road	384.3	21,550	29,180	32,190	34,270	34,920	37,890
Big Papillion Creek	At the confluence of Fort Crook Creek	384.3	21,580	29,240	32,230	34,340	35,010	38,730
Big Papillion Creek	Confluence of Betz Road Ditch	379.5	21,620	30,010	32,870	34,000	34,370	35,710
Big Papillion Creek	Confluence of Mud Creek	368.7	21,650	31,640	36,410	38,270	38,870	43,930
Big Papillion Creek	At the confluence of West Papillion Creek	367.3	21,800	31,960	39,540	44,100	45,720	51,930
Big Papillion Creek	Upstream of the confluence of West Papillion Creek	232.4	13,090	18,290	20,900	21,500	21,670	26,450
Big Papillion Creek	At the confluence of Big Elk Creek	232.4	13,130	18,380	21,040	21,610	21,770	26,530

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Big Papillion Creek	At Cornhusker Road	228.8	13,220	18,480	21,190	21,760	21,950	27,010
Big Papillion Creek	At the confluence of Fricke Creek	227.9	13,290	18,530	21,340	22,300	22,670	25,870
Big Papillion Creek	Approximately 700 feet upstream of Giles Creek	224.6	13,350	18,580	23,580	25,830	26,620	33,250
Big Papillion Creek	At the confluence of Thompson Creek	224.1	14,070	19,450	24,260	26,160	26,940	37,960
Buffalo Creek	At confluence with Platte River	25.8	11,000	*	17,500	20,600	*	30,000
Buffalo Creek	Approximately 1,200 feet upstream of South 156th Street	22.9	11,200	*	17,800	21,000	*	30,500
Buffalo Creek	Approximately 800 feet upstream of South 156th Street	21.7	11,300	*	18,500	22,000	*	31,000
Buffalo Creek	Approximately 210 feet downstream of Pflug Road	17.1	9,500	*	15,000	17,900	*	26,000
Buffalo Creek	Approximately 200 feet downstream of Pflug Road	14.5	8,000	*	12,900	15,300	*	22,000
Buffalo Creek	Approximately 210 feet downstream of South 180th Street	12.6	7,350	*	12,000	14,300	*	20,700
Buffalo Creek	Approximately 200 feet downstream of South 180th Street	10.3	6,200	*	9,900	11,900	*	17,200

* Not calculated for this Flood Risk Project

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Buffalo Creek	Approximately 1,490 feet upstream of Platteview Road	8.8	5,700	*	9,100	10,800	*	15,700
Buffalo Creek	Approximately 1,500 feet upstream of Platteview Road	4.8	3,000	*	4,900	5,900	*	8,600
Crystal Creek	At S 192nd Street	1.7	1,250	1,640	1,970	2,320	2,390	3,270
Crystal Creek	Approximately 1,000 feet upstream of Cornhusker Road	1.0	710	920	1,110	1,310	1,340	1,840
Elkhorn River[1]	*	*	*	*	*	*	*	*
Fairview Creek	At the confluence with Big Papillion Creek	3.1	1,410	1,900	2,310	2,760	2,960	3,960
Fairview Creek	Approximately 250 feet upstream of Grenoble Drive	1.5	720	970	1,180	1,400	1,480	2,010
Fricke Creek	At the confluence with Big Papillion Creek	1.9	290	400	490	590	610	860
Giles Creek	At the confluence with Big Papillion Creek	1.5	310	410	510	610	620	880
Hell Creek	At the confluence with West Papillion Creek	5.7	2,170	2,900	3,550	4,240	4,350	6,130

* Not calculated for this Flood Risk Project
[1]No flow values documented

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Midland Creek	At the confluence with West Papillion Creek	3.7	530	750	960	1,200	1,330	1,810
Midland Creek	At Highway 370	3.3	440	650	830	1,030	1,150	1,510
Midland Creek	At Shadow Lake	0.9	300	410	510	610	660	900
Midland Creek	At Midlands Lake	0.7	200	280	350	420	460	620
Mission Creek	At the confluence with South Papillion Creek	1.3	947	1,216	1,450	1,707	1,707	2,374
Mission Creek Overland[2]	At the confluence with Mission Creek, just downstream of Harrison Street.	N/A	121	195	283	398	398	836
Missouri River	At the confluence of Platte River	40,8792	123,800	133,300	148,500	175,400	*	249,000
Missouri River	At the confluence of Big Papillion Creek	32,3422	123,700	132,900	148,200	175,000	*	248,400
Missouri River	At the confluence of Mosquito Creek	32,3038	123,600	132,700	147,900	174,700	*	247,900
Mud Creek	At the confluence with Big Papillion	10.8	1,870	2,510	3,060	3,670	3,710	5,320
Mud Creek	At the confluence of Wolf Creek	9.1	1,680	2,240	2,720	3,270	3,310	4,680
Mud Creek	Upstream of Wolf Creek	7.9	1,490	1,980	2,390	2,870	2,900	4,090
Mud Creek	At Kasper Street	7.1	1,310	1,740	2,110	2,520	2,550	3,600

* Not calculated for this Flood Risk Project

[2]See FIS Table 12 special considerations for details about how discharges were determined for this flooding source.

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Mud Creek	At Chandler Road	5.6	1,050	1,380	1,660	1,980	2,000	2,820
North Wehrspann Creek	At the confluence with Wehrspann Creek	1.6	793	1,047	1,271	1,514	1,575	2,155
North Wehrspann Creek	Approximately 750 feet upstream of S 180th Street	1.5	780	1,030	1,250	1,490	1,550	2,120
Old Home Creek	At the confluence with Mud Creek	0.1	73	97	116	138	141	200
Platte River	At confluence with Missouri River	90,000	101,200	136,700	167,500	202,500	*	304,000
Platte River	Approximately 5,150 feet upstream of Interstate Highway 80	89,800	87,000	*	151,000	187,000	*	300,000
Platte River	Just upstream of confluence of Elkhorn River	82,900	62,000	*	106,000	132,000	*	220,000
Quail Creek	At the confluence with West Papillion Creek	4.0	1,071	1,473	1,834	2,215	2,328	3,255
Quail Creek	At the confluence of West Quail Creek	3.8	1,040	1,430	1,780	2,150	2,260	3,160
Quail Creek	Approximately 1,400 feet downstream of Coffey Avenue	2.0	550	760	940	1,150	1,210	1,690

* Not calculated for this Flood Risk Project

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Quail Creek	Approximately 300 feet downstream of Capehart Road	1.4	360	500	620	750	790	1,110
South Midland Creek	At Shadow Lake	0.7	170	240	290	350	370	510
South Papillion Creek	At the confluence with West Papillion Creek	39.4	8,690	11,210	13,750	16,410	17,230	23,960
South Papillion Creek	At the confluence of Westmont Creek	37.9	8,660	11,300	13,830	16,500	17,220	23,990
South Papillion Creek	At Interstate 80	32.8	9,080	11,890	14,530	17,330	18,050	25,090
South Papillion Creek	Approximately 200 feet downstream of S 144th Street	30.5	8,620	11,350	13,790	16,480	17,090	23,730
South Papillion Creek	At S 144th Street	30.5	8,620	11,360	13,800	16,480	17,100	23,740
South Papillion Creek	At the confluence of Wehrspann Creek	28.6	7,640	10,100	12,270	14,660	15,230	21,120
South Papillion Creek	Approximately 1,900 feet upstream of the confluence of Wehrspann Creek	15.4	7,770	10,270	12,500	14,930	15,490	21,500
South Papillion Creek	At S 156th Street	15.4	7,790	10,290	12,520	14,950	15,520	21,540
South Papillion Creek	At the confluence of Mission Creek	13.7	7,340	9,750	11,830	14,070	14,620	20,100
South Papillion Creek	At S 168th Street	12.8	6,770	9,030	10,960	13,050	13,590	18,650

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
South Papillion Creek	At the confluence of Tiburon Creek	11.6	6,220	8,300	10,070	11,990	12,500	17,090
South Papillion Creek	Approximately 2,500 feet downstream of the confluence of Beadle Creek	10.2	5,590	7,450	9,040	10,740	11,180	15,310
South Papillion Creek	Approximately 2,100 feet upstream of Giles Road	7.0	4,200	5,590	6,770	8,050	8,400	11,410
South Papillion Creek	At S 192nd Street	4.3	2,470	3,300	4,010	4,770	5,000	6,780
South Papillion Creek	Approximately 200 feet upstream of S 204th Street	2.7	1,470	1,960	2,380	2,840	2,990	4,050
South Papillion Tributary	At the confluence with South Papillion Creek	5.2	190	250	310	370	390	520
South Papillion Tributary	At S 126th Street	4.9	1,610	2,260	2,830	3,450	3,880	5,090
South Papillion Tributary	At Cornhusker Road	4.3	1,250	1,750	2,180	2,650	3,050	3,920
South Papillion Tributary	At S 132nd Street	2.9	920	1,270	1,580	1,920	2,230	2,820
South Wehrspann Creek	At the confluence with Wehrspann Creek	1.3	870	1,140	1,380	1,650	1,710	2,330
South Wehrspann Creek	Approximately 1,400 feet upstream of Interstate 80	0.7	430	570	690	820	860	1,170

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Springfield Creek	Approximately 8,000 feet upstream of confluence with Platte River	15.8	9,000	*	14,300	17,000	*	24,500
Springfield Creek	Approximately 8,010 feet upstream of confluence with Platte River	12.8	7,300	*	11,800	14,000	*	21,500
Springfield Creek	Approximately 600 feet upstream of Platteview Road	9.8	6,300	*	10,100	11,900	*	18,000
Springfield Creek	Approximately 610 feet upstream of Platteview Road	6.4	3,700	*	6,000	7,100	*	10,700
Springfield Creek	Approximately 2,600 feet upstream of Platteview Road	5.9	3,800	*	6,200	7,400	*	11,100
Springfield Creek	Approximately 2,650 feet upstream of Platteview Road	5.1	3,250	*	5,350	6,400	*	9,400
Springfield Creek	Approximately 1,810 feet downstream of Fairview Road	4.9	3,100	*	5,100	6,100	*	9,000
Springfield Creek	Approximately 1,800 feet downstream of Fairview Road	4.0	2,700	*	4,350	5,200	*	7,000
Springfield Creek	Approximately 1,600 feet upstream of Fairview Road	3.8	3,050	*	4,900	5,900	*	8,600

* Not calculated for this Flood Risk Project

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Springfield Creek	Approximately 1,610 feet upstream of Fairview Road	3.5	2,750	*	4,450	5,350	*	8,000
Springfield Creek	Approximately 2,600 feet upstream of Fairview Road	3.3	2,700	*	4,350	5,200	*	7,800
Springfield Creek	Approximately 2,650 feet upstream of Fairview Road	2.7	2,260	*	3,600	4,300	*	6,400
Thompson Creek	At the confluence with Big Papillion Creek	1.8	300	400	490	580	580	840
Tiburon Creek	At the confluence with South Papillion Creek	1.5	690	930	1,140	1,360	1,420	1,950
Walnut Creek	At the confluence with West Papillion Creek	4.4	710	950	1,160	1,390	1,480	2,040
Walnut Creek	At Highway 370	3.3	110	110	110	120	120	120
Walnut Creek	Approximately 600 feet downstream of Schram Road	1.1	520	730	900	1,090	1,190	1,600
Wehrspann Creek	At Highway 370	9.4	4,040	5,460	6,600	7,820	8,160	11,120
Wehrspann Creek	At the confluence of South Wehrspann Creek	7.6	3,310	4,340	5,230	6,230	6,530	8,960

* Not calculated for this Flood Risk Project

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Wehrspann Creek	Approximately 500 feet upstream of S 168th Street	6.3	2,840	3,730	4,520	5,370	5,620	7,710
Wehrspann Creek	At the confluence of North Wehrspann Creek	5.0	2,230	2,980	3,620	4,310	4,490	6,150
Wehrspann Creek	At S 180th Street	3.4	1,460	1,960	2,380	2,830	2,950	4,050
Wehrspann Creek	At S 192nd Street	1.9	940	1,250	1,510	1,800	1,850	2,560
Wehrspann Creek	At Iva Street	1.1	450	600	730	870	890	1,230
West Midland Creek	At the confluence with Midland Creek	0.7	270	370	450	540	570	780
West Papillion Creek	At the confluence with Big Papillion Creek	134.8	14,980	20,520	24,920	29,410	31,210	39,960
West Papillion Creek	Approximately 230 feet upstream of the confluence with Big Papillion Creek	134.8	14,990	20,530	24,930	29,420	31,210	39,960
West Papillion Creek	At the confluence of Quail Creek	134.1	14,890	20,380	24,790	29,230	31,000	39,680
West Papillion Creek	Approximately 1,200 feet upstream of Raynor Parkway	130.3	14,430	19,640	24,050	28,260	29,900	38,220
West Papillion Creek	Approximately 2,700 feet upstream of S 48th Street	129.1	14,330	19,450	23,880	28,010	29,590	37,840
West Papillion Creek	Approximately 2,200 feet downstream of S 66th Street	129.1	14,360	19,470	23,930	28,030	29,610	37,880

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
West Papillion Creek	Approximately 600 feet downstream of S 66th Street	127.1	14,140	19,130	23,580	27,580	29,110	37,200
West Papillion Creek	Approximately 800 feet downstream of S 72nd Street	127.1	14,180	19,160	23,640	27,620	29,130	37,270
West Papillion Creek	At the confluence of Midland Creek	124.9	13,890	18,770	23,210	27,090	28,580	36,480
West Papillion Creek	Approximately 1,800 feet downstream of S Washington Street	121.2	14,730	19,750	23,900	27,640	29,030	37,110
West Papillion Creek	Approximately 500 feet downstream of S Washington Street	121.2	14,760	19,790	23,920	27,660	29,050	37,150
West Papillion Creek	At the confluence of Walnut Creek	118.4	14,450	19,690	23,780	27,400	28,740	36,770
West Papillion Creek	At the confluence of West Papillion Tributary	114.1	14,450	19,690	23,710	27,300	28,620	36,670
West Papillion Creek	Approximately 400 feet upstream of the confluence of West Papillion Tributary	110.4	14,140	19,300	23,260	26,770	27,990	36,020
West Papillion Creek	At the confluence of Applewood Creek	109.3	14,040	19,300	23,230	26,720	27,910	35,930
West Papillion Creek	Approximately 500 feet upstream of the confluence with South Papillion Creek	63.1	7,980	10,610	11,680	13,920	15,380	22,670

Table 9: Summary of Discharges (Continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
West Papillion Tributary	At the confluence with West Papillion Creek	3.7	820	1,160	1,440	1,730	1,900	2,440
West Papillion Tributary	Approximately 900 feet downstream of Cornhusker Road	2.0	750	1,060	1,320	1,610	1,890	2,380
West Papillion Tributary	At Highway 370	0.9	410	570	720	870	980	1,270
West Quail Creek	At the confluence with Quail Creek	1.8	490	680	840	1,010	1,050	1,480
West Quail Creek	At Lakewood Villages	0.9	280	380	460	560	570	810
Whitted Creek	At the confluence with Big Papillion Creek	2.0	980	1,280	1,550	1,830	1,850	2,580
Wolf Creek	At the confluence with Mud Creek	1.2	240	330	400	480	480	690

* Not calculated for this Flood Risk Project
[1]No flow values documented
[2]See FIS Table 12 special considerations for details about how discharges were determined for this flooding source.

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this Flood Risk Project]

Table 10: Summary of Non-Coastal Stillwater Elevations

Flooding Source	Location	Elevations (feet NAVD88)					
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Midland Creek	Midlands Lake on Midland Creek at Ponderosa Drive	1,071.8	1,072.3	1,072.6	1,073.0	1,073.2	1,074.1
Midland Creek	Shadow Lake on Midland Creek and South Midland Creek upstream of Schram Road	1,052.5	1,053.3	1,053.9	1,054.9	1,055.6	1,058.4
South Papillion Tributary	Reservoir WP-5 on South Papillion Tributary within the City of Papillion	1,078.1	1,079.3	1,080.4	1,081.6	1,082.8	1,084.4
Walnut Creek Lake	Walnut Creek Lake on Walnut Creek approximately 1,000 feet upstream of Highway 370 within the City of Papillion	1,079.2	1,080.4	1,081.4	1,082.5	1,083.2	1,085.1
Wehrspann Creek	Wehrspann Lake on Wehrspann Creek approximately 1,500 feet upstream of Giles Road	1,102.0	1,103.8	1,105.2	1,106.6	1,107.3	1,110.3

Table 11: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Platte River	06805500	USGS	Platte River at Louisville, Nebraska	85,370	1954[1]	1994[1]
					1953[2]	2011[2]
Platte River	06801000	USGS	Platte River near Ashland, Nebraska	83,600	1929	1960
					1989	1994
Platte River	06796000	USGS	Platte River at North Bend, Nebraska	70,400	1950	1994

[1] Period of record is associated with the 2001 Platte River Study

[2] Period of record is associated with the 2019 Platte River Study

5.2 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. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS 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.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed in Table 23, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 12: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Applewood Creek	Confluence with West Papillion Creek	Approximately 1,195 feet upstream of Giles Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Beadle Creek	Confluence with South Papillion Creek	Approximately 1,173 upstream of S 189th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Betz Road Ditch	Confluence with Big Papillion Creek	Approximately 262 feet upstream of Lincoln Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	The culvert at Galvin Road is overtopped for all analyzed flood flows along Betz Road Ditch. Overland flooding across this culvert was manually delineated using aerial imagery and topographic data to capture the flood risk in this area based on the overtopping model elevations at the upstream and downstream face of the long culvert.
Big Elk Creek	Confluence with Big Papillion Creek	Approximately 511 feet upstream of Private Drive, near the intersection of Private Drive and South 36th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	Formerly Squaw Creek in past Sarpy County Flood Insurance Study documents. It has since been renamed to Big Elk Creek.

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Big Papillion Creek	Confluence with Missouri River	Just downstream of Capehart Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	Formerly known as Papillion Creek in past Sarpy County Flood Insurance Study documents. Floodplain extents landward of Levee System ID 4705000093 were determined with a 2-D natural valley levee analysis and mapping procedure (STARR II 2018). This area is also affected by the Missouri River.
Big Papillion Creek	Just downstream of Capehart Road	Sarpy/Douglas County Boundary	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	Formerly known as Papillion Creek in past Sarpy County Flood Insurance Study documents.
Buffalo Creek	Confluence with the Platte River	Approximately 2,800 feet upstream of Platteview Road	Stormwater Management Model (USEPA 1971)	HEC-2 (USACE 1972)	March 1978	AE w/ Floodway	Rainfall data utilized were derived from U.S. Weather Bureau Technical Paper No. 40 (USDC 1961). Cross section data for Buffalo Creek was determined by photogrammetric methods utilizing aerial photographs taken in 1973 for for Buffalo Creek (Hoskins 1973). Starting Water Surface Elevations were based upon stage-discharge relationships developed for the Platte River. (FEMA 2010).
Crystal Creek	Confluence with South Papillion Creek	Approximately 1,653 feet upstream of Cornhusker Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Elkhorn River	Confluence with the Platte River	Sarpy/Douglas County Boundary	USACE HEC-FFA, Version 3.0 (USACE 1992)	HEC-2 (USACE 1990)	November 2001	AE w/ Floodway	Percent-annual-chance floods were developed through analysis of records from USGS stream gage stations 06801000 and 06796000. (FEMA 2010). Peak flows developed for the Ashland gage (USGS gage 06801000) were used from upstream of Salt Creek to the Elkhorn River. Because the Elkhorn River and the Platte River have a common floodplain from the confluence to the upstream boundary of Sarpy County, the Ashland gage peak flows were used at that location. For the small portion of Sarpy County upstream from where the Elkhorn River flows combines with the Platte River, the peak flows computed for the North Bend gage (USGS Gage 06796000) were used there.
Fairview Creek	Confluence with Big Papillion Creek	Approximately 311 feet upstream of South 17th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Fricke Creek	Confluence with Big Papillion Creek	Approximately 3,222 feet above the confluence with Big Papillion Creek	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Giles Creek	Confluence with Big Papillion Creek	Approximately 652 feet upstream of South 48th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Hell Creek	Confluence with West Papillion Creek	Sarpy/Douglas County Boundary	HEC-HMS (USACE ND1)	HEC-RAS 4.1.0 (USACE 2010)	9/15/2018	AE w/ Floodway	
Midland Creek	Confluence with West Papillion Creek	Approximately 85 feet downstream of Shram Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Midland Creek	Approximately 85 feet downstream of Shram Road	Approximately 164 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	HEC-HMS (USACE ND1)	Not Applicable	9/15/2018	AE	This reach is also known as Shadow Lake.
Midland Creek	Approximately 164 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	Approximately 785 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Midland Creek	Approximately 785 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 79th Avenue	Approximately 243 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	HEC-HMS (USACE ND1)	Not Applicable	9/15/2018	AE	This reach is also known Midlands Lake.

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Midland Creek	Approximately 243 feet downstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	Approximately 540 feet upstream of Ponderosa Drive, near the intersection of Ponderosa Drive and South 81st Avenue	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Mission Creek	Confluence with South Papillion Creek	Sarpy/Douglas County Boundary	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Mission Creek Overland	Confluence with Mission Creek just downstream of Harrison Street	Sarpy/Douglas County Boundary	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE	The flow input for overland flow model is assumed to be equal to the weir flow component at the Monroe Street culvert as estimated by the Mission Creek main model. Starting Water Surface Elevations were used as the downstream boundary condition.
Missouri River	Cass/Sarpy County Boundary	Sarpy/Douglas County Boundary	Other (see special considerations)	Other (see special considerations)	11/25/2003	AE w/ Floodway	Floodplain extents landward of Levee System IDs 4705000093 and 4705000090 were determined with a natural valley levee analysis and mapping procedure (STARR II 2018). Floodway analysis was performed by the USACE under the UMRSFFS study (USACE 2003). Additional information on the Missouri River modeling is described in the Special Considerations for the Missouri River section following Table 12. Refer to Section 6.1 of the FIS for information on the vertical datum conversion.

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mud Creek	Confluence with Big Papillion Creek	Approximately 1,843 feet upstream of Chandler Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
North Wehrspann Creek	Confluence with Wehrspann Creek	Approximately 4,363 feet upstream of S 180th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Old Home Creek	Confluence with Mud Creek	Approximately 733 feet above the Confluence with Mud Creek	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Platte River	Confluence with Missouri River	Approximately 4.31 miles upstream of U.S. Route 75	HEC-HSSP (USACE ND2)	HEC-RAS 5.0.3 (USACE 2016) HEC-RAS 5.0.6 (USACE 2018)	11/9/2019	AE w/ Floodway	Natural Valley analysis performed using a 2D modeling approach. Please see the Flood Insurance Rate Map for Regulatory Water Surface Elevations landward of levee. An updated Bulletin 17B analysis was performed on the Louisville, NE stream gage (USGS gage 06805500). The analysis included gage records from 1953 to 2011 (FYRA 2018). Multiple profile hydraulic analysis was computed using HEC-RAS 5.0.3 and the floodway analysis was computed using HEC-RAS 5.0.6 Data is not available for levee failure analysis upstream of US Highway 6

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Platte River	Approximately 4.31 miles upstream of U.S. Route 75	Sarpy/Douglas County Boundary	USACE HEC-FFA, Version 3.0 (USACE 1992)	HEC-2 (USACE 1990)	November 2001	AE w/ Floodway	Water Resources Council Bulletin 17B was used to calculate flood frequency using the Louisville Gage (USGS gage 0680550) and were applied on the Platte River from the Missouri river to the confluence of Salt creek.
Quail Creek	Confluence with West Papillion Creek	Approximately 1.53 miles upstream of Quail Drive	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
South Midland Creek	At Shadow Lake Dam outlet	Approximately 76 feet downstream of Ponderosa Drive	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE	This reach is also known as Shadow Lake.
South Midland Creek	Approximately 76 feet downstream of Ponderosa Drive	Approximately 1,357 feet upstream of Ponderosa Drive	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
South Papillion Creek	Confluence with West Papillion Creek	Approximately 1,319 feet upstream of S 204th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
South Papillion Tributary	Confluence with South Papillion Creek	Approximately 2,614 feet above the confluence with South Papillion Creek	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
South Papillion Tributary	Approximately 2,614 feet above the confluence with South Papillion Creek	Approximately 89 feet upstream of S 132nd Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE	This reach is also known as Reservoir WP-5

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
South Papillion Tributary	Approximately 89 feet upstream of S 132nd Street	Approximately 2,913 feet upstream of NE Highway 370	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
South Wehrspann Creek	Confluence with Wehrspann Creek	Approximately 3,803 feet upstream of Interstate 80	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Springfield Creek	Confluence with the Platte River	Approximately 2,200 feet upstream of Fairview Road	Stormwater Management Model (USEPA, 1971)	HEC-2 (USACE 1972)	December 1976	AE w/ Floodway	Starting water surface elevations were based upon stage-discharge relationships developed for the Platte River.
Springfield Creek	Approximately 2,200 feet upstream of Fairview Road	Approximately 2,440 feet upstream of Capehart Road	Unknown	Unknown	1981	A	
Thompson Creek	Confluence with Big Papillion Creek	Approximately 875 feet upstream of Edgewood Boulevard	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Thompson Creek	Approximately 875 feet upstream of Edgewood Boulevard	Approximately 70 feet downstream of South 84th Street	Unknown	Unknown	1981	A	
Tiburon Creek	Confluence with South Papillion Creek	Approximately 2,211 feet upstream of Giles Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Unnamed Pond on Fricke Creek	Approximately 2,060 feet downstream of South 66th Street	Approximately 910 feet downstream of South 66th Street	Unknown	Unknown	1981	A	
Unnamed Tributary 1 to Little Papillion Creek	At Alberta Avenue	Approximately 670 feet upstream of Alberta Avenue	Unknown	Unknown	1981	A	
Unnamed Tributary 2 to Little Papillion Creek	Approximately 1,080 feet downstream of West Chandler Road	At West Chandler Road	Unknown	Unknown	1981	A	
Unnamed Tributary to South Papillion Tributary	Just downstream of Highway 370	Approximately 3,900 feet upstream of Highway 370	Unknown	Unknown	1981	A	
Unnamed Tributary to Springfield Creek	Approximately 590 feet upstream of the confluence with Springfield Creek	Approximately 1,025 feet upstream of the confluence with Springfield Creek	Unknown	Unknown	1981	A	
Walnut Creek	Confluence with West Papillion Creek	Approximately 425 feet upstream of Highway 370	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Walnut Creek	At the Walnut Creek Dam Outlet	Approximately 982 feet downstream of Schram Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE	This reach is also known as Walnut Creek Lake
Walnut Creek	Approximately 982 feet downstream of Schram Road	Approximately 1,864 Feet upstream of Schram Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Wehrspann Creek	At the Werspann Lake Dam outlet	Approximately 500 feet upstream of Highway 370	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE	This reach is also known as Wehrspann Lake
Wehrspann Creek	Approximately 500 feet upstream of Highway 370	Approximately 839 feet upstream of Iva Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
West Midland Creek	Confluence with Midland Creek	Just downstream of South 84th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
West Papillion Creek	Confluence with Big Papillion Creek	Sarpy/Douglas County Boundary	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	The floodway run was computed without the consideration of levees. The floodway elevations in the Floodway Data Tables are reported as computed in the HEC-RAS model and were not updated to correct dips in the water surface elevations. Portions of cross-sections A through G left of levee are not shown on the FIRM for clarity.
West Papillion Tributary	Confluence with West Papillion Creek	Approximately 1.04 miles upstream of Highway 370	HEC-HMS (USACE ND1)	HEC-RAS 4.1.0 (USACE 2010)	9/15/2018	AE w/ Floodway	

Table 12: Summary of Hydrologic and Hydraulic Analyses (Continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
West Quail Creek	Confluence with Quail Creek	Approximately 1,915 feet upstream of confluence with Quail Creek	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	
Whitted Creek	Confluence with Big Papillion Creek	Approximately 874 feet upstream of South 25th Street	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	1D natural valley analysis was performed for the portion of the stream that is behind the levee
Wolf Creek	Confluence with Mud Creek	Approximately 165 Feet downstream of Cornhusker Road	HEC-HMS (USACE ND1)	HEC-RAS 5.0.3 (USACE 2016)	9/15/2018	AE w/ Floodway	Formerly Unnamed Tributary 1 to Mud Creek in past Sarpy County Flood Insurance Study documents. It has since been renamed to Wolf Creek.

Special Considerations for the Missouri River

The hydrologic and hydraulic analyses for the Missouri River were performed by the US Army Corps of Engineers as part of the Upper Mississippi River System Flow Frequency Study (UMRSFFS) (USACE 2004). This study was a collaboration of effort between the Rock Island, St. Louis, Kansas City, Omaha, and St. Paul districts and was completed in 2003. The 1-percent-annual-chance flood water surface profile and floodway computations on the Missouri River were performed within the USACE's Hydrologic Engineering Centers River Analysis System (HEC-RAS) for the Federal Emergency Management Agency (FEMA) under Interagency Agreement No. HSFE07-06-X-0012 by the Kansas City and Omaha districts and were completed in 2007.

The hydrologic analysis for the UMRSFFS utilized a combination of the following methods and approaches to determine discharge-frequency relationships: 100 years of record from 1898 to 1998; the log-Pearson Type III distribution for unregulated flows at gages; main stem flows between gages determined by interpolation of the mean and standard deviation for the annual flow distribution based on drainage area in conjunction with a regional skew; flood control reservoir impacts defined by regulated versus non-regulated relationships for discharges; extreme events determined by factoring up major historic events; HEC-HMS and/or HEC-1 models for the main tributaries; and the UNET unsteady flow program (USACE 1997) to address hydraulic impacts.

In situations where historic records were not adequate or appropriate to develop discharge-frequency relationships or to verify the results, hydrologic modeling was used to create synthetic flows based on rainfall.

The computation of unregulated flow frequency relationships on the Missouri River upstream of the Kansas River required special consideration due to the combination of the two historic peak flow periods consisting of the plains snowmelt of the early spring and the mountain snowmelt and plains rainfall of the late spring/early summer. An additional concern related to the Missouri River was flow depletion due to irrigation and reservoir evaporation. Historic depletions were added to the observed flow record to help obtain unregulated flows, while historic depletions were adjusted to present level depletions for computation of the regulated flow record. The result of the hydrologic aspects of the study was a discharge and related frequency of occurrence for stations or given cross section located along each of the principle main stem rivers. The main hydraulic tool used to determine flood elevations along the Missouri River was the UNET unsteady flow computer modeling program (USACE 1997). Included in the UNET model were the main stem of the Mississippi River, several of its main tributaries, navigation dams, and the levees and levee systems. Hydrographic surveys were assembled from navigation channel maintenance surveys, dam periodic inspection surveys, and environment management project surveys.

These surveys date from 1997 or later. For areas where no digital hydrographic surveys were available, such as in some side channels and chutes, depths were estimated from the most current printed surveys available. Bluff-to-bluff digital terrain data collected in 1995 and 1998 were used to supplement the channel survey data (Earthdata 1998).

Model development consisted of constructing HEC-RAS models from the original cross-sections, adding in ineffective flow areas or obstructions as necessary, and then converting the models to UNET. The UNET model was calibrated to reproduce recorded flood hydrographs for a selected period of record. The UNET model was calibrated to both stage and discharge at gaging locations primarily by adjusting roughness coefficients and estimated lateral inflows. Annual peak flows

and peak stages from the period of record run of the calibrated UNET model were used to develop rating curves for each cross section location. Using these station rating curves and the station frequency flows developed during the hydrology phase, frequency elevation points were obtained for each cross section location. Connecting the corresponding points resulted in flood frequency profiles. These profiles were coordinated among the computational teams and appropriate adjustments were made to assure consistency.

Some special considerations and techniques were required to address especially complex flow reaches. The confluences of the Missouri and Illinois Rivers with the Mississippi relied primarily on development of graphical stage-probability relationships for backwater-impacted cross sections. These were created using a graphical Weibull approach. The graphical period-of-record stage-probability curves were combined to blend a consistent and reasonable profile for each probability flood. Confluences of many other smaller streams with the main stem also exhibited backwater effects resulting in discontinuities in the profiles. A computer routine was developed to smooth the profile in these reaches so as to form a consistent, reasonable transition through the zone of backwater.

The 1-percent-annual-chance water surface elevation profile was calculated using the HEC-RAS 3.1.3 computer program (USACE 2005). Upon completion of the Upper Mississippi River System Flow Frequency Study (UMRSFFS) (USACE 2004), FEMA funded the Corps of Engineers to compute a floodway for the studied reach of the Missouri River. This floodway determination consisted of converting the hydraulic data from UNET to HEC-RAS, calibrating the HEC-RAS steady-state models to the UMRSFFS results for the 1-percent-annual-chance profile, and performing the floodway computations.

The 1-percent-annual-chance elevations from this calibrated HEC-RAS model were used as the basis to delineate the associated 1-percent-annual-chance floodplain and correspond to the base flood elevation shown on the maps. The 10-, 2-, and 0.2-percent-annual-chance elevations shown on the flood profiles were plotted using the original UNET elevation.

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Applewood Creek	0.033 - 0.045	0.025 - 0.050
Beadle Creek	0.035 - 0.055	0.035 - 0.055
Betz Road Ditch	0.020 - 0.030	0.015 - 0.040
Big Elk Creek	0.035	0.015 - 0.060
Big Papillion Creek (1D)	0.030	0.032 - 0.090
Big Papillion Creek (2D Natural Valley)	N/A[1]	0.013 - 0.120
Buffalo Creek	*	*
Crystal Creek	0.040 - 0.055	0.040 - 0.055
Elkhorn River	0.035	0.080 - 0.120
Fairview Creek	0.045	0.030 - 0.050
Fricke Creek	0.035	0.025 - 0.045
Giles Creek	0.045	0.030 - 0.090

* Data not available

[1] Channel "n" values not applicable for 2D Natural Valley calculations.

Table 13: Roughness Coefficients (Continued)

Flooding Source	Channel “n”	Overbank “n”
Hell Creek	0.040 - 0.050	0.040 - 0.100
Midland Creek	0.030 - 0.040	0.030 - 0.080
Mission Creek	0.040	0.040 - 0.045
Mission Creek Overland	0.055	0.055
Missouri River[2]	0.024	0.024 - 0.990
Mud Creek	0.013 - 0.040	0.030 - 0.080
North Wehrspann Creek	0.035 - 0.045	0.035 - 0.060
Old Home Creek	0.045	0.050 - 0.090
Platte River (2001 analysis)	0.017 - 0.025	0.050 - 0.095
Platte River (2019 analysis)	0.017	0.050 - 0.070
Platte River (2D Natural Valley)	N/A[1]	0.013 - 0.120
Quail Creek	0.045	0.045 - 0.090
South Midland Creek	0.030 - 0.040	0.035
South Papillion Creek	0.040 - 0.055	0.030 - 0.120
South Papillion Tributary	0.050 - 0.055	0.030 - 0.100
South Wehrspann Creek	0.035 - 0.045	0.035 - 0.050
Springfield Creek	0.030 - 0.045	0.050 - 0.100
Thompson Creek	0.035	0.025 - 0.040
Tiburon Creek	0.050	0.035 - 0.055
Walnut Creek	0.040 - 0.050	0.040 - 0.080
Wehrspann Creek	0.035 - 0.050	0.035 - 0.060
West Midland Creek	0.040 - 0.050	0.016 - 0.360
West Papillion Creek	0.028 - 0.050	0.028 - 0.100
West Papillion Tributary	0.011 - 0.058	0.040 - 0.080
West Quail Creek	0.017 - 0.040	0.030 - 0.090
Whitted Creek	0.035 - 0.090	0.035 - 0.090
Wolf Creek	0.014 - 0.035	0.014 - 0.040

* Data not available

[1] Channel "n" values not applicable for 2D Natural Valley calculations.

[2] The USACE HEC-RAS model used high Manning's "n" values to replicate the UNET derived water surface elevations.

5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

Table 14: Summary of Coastal Analyses

[Not Applicable to this Flood Risk Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas

[Not Applicable to this Flood Risk Project]

Table 15: Tide Gage Analysis Specifics

[Not Applicable to this Flood Risk Project]

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters

[Not Applicable to this Flood Risk Project]

Figure 9: Transect Location Map

[Not Applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 17: Summary of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]

Table 18: Results of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]

SECTION 6.0 – MAPPING METHODS

6.1 Vertical and Horizontal Control

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 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov.

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 archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please visit the NGS website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Sarpy County are provided in Table 19.

Table 19: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Ashland East	SE	40.999	96.250	0.322
Gretna	SE	41.124	96.125	0.341
Omaha South	SE	41.124	95.875	0.312
Ralston	SE	41.124	96.000	0.331
Springfield	SE	40.999	96.125	0.318
Wann	SE	41.124	96.250	0.361
Average Conversion from NGVD29 to NAVD88 = +0.331 feet				

A countywide conversion factor could not be generated for three flooding sources within Sarpy County because the maximum variance from average exceeds 0.25 feet. Calculations for the vertical offsets on a stream by stream basis are depicted in Table 20.

The studied reach of Missouri River spans multiple counties in multiple states and the river forms the actual border between adjacent counties. The Upper Mississippi River System Flow Frequency Study (UMRSFFS) (USACE 2003) was originally performed using the NGVD29 vertical datum. Applying an average countywide datum shift to convert to NAVD88 would have resulted in a mismatch of elevations between counties. Therefore, in order to perform the most accurate vertical datum conversion possible, and to maintain consistency in approach across county lines, the datum conversion for the Missouri River was performed on a cross-section by cross-section basis, rather than by applying an average county-wide or stream-wide value.

Table 20: Stream-Based Vertical Datum Conversion

Flooding Source	Average Vertical Datum Conversion Factor (feet)
Elkhorn River	0.4
Missouri River	Varies by Cross Section (see text above)
Platte River	0.4

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM Database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/flood-maps/guidance-partners/guidelines-standards.

Base map information shown on the FIRM was derived from the sources described in Table 21.

Table 21: Base Map Sources

Data Type	Data Provider	Data Date	Data Scale	Data Description
8 Digit Watershed Boundary Dataset	USGS	2019	1:24,000	For FIRMs dated TBD, HUC8 Outlines for Subbasin Layer (USGS 2019)
Aerial Photo Index	Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA)	2001	1:24,000	For FIRMS dated 12/02/2005 basemap imagery (MAPA 2001)

Table 21: Base Map Sources (continued)

Data Type	Data Provider	Data Date	Data Scale	Data Description
County Boundaries, PLSS, and Transportation	Sarpy County GIS	2014	*	For FIRMs dated TBD, spatial and attribute information for political boundaries, public land survey system information, and roads (SGIS 2014)
Imagery	Nebraska Department of Natural Resources (Nebraska DNR)	2015	*	For FIRMs dated TBD, Spatial and attribute information for aerial imagery (NDNR 2015)
Municipal Limits	Sarpy County GIS	2015	*	For FIRMs dated TBD, spatial and attribute information for political boundaries (SGIS 2015a)
National Levee Dataset - Levee Centerlines	USACE	2020	*	For FIRMs dated TBD, Spatial and attribute information for levees (USACE 2020)
National Geodetic Survey (NGS) Benchmarks	National Geodetic Survey	1985	1:12,000	For FIRMS dated 12/02/2005 and TBD, spatial and attribute information for benchmarks
Political Boundaries	Nebraska DNR	2002	1:24,000	For FIRMS dated 12/02/2005, spatial and attribute information for political boundaries (NDNR 2002)
Public Land Survey System	USGS	2001	1:12,000	For FIRMS dated 12/02/2005, spatial and attribute information for public land survey system polygons and lines (USGS 2001b)
Streets	Sarpy County, Nebraska	2004	1:12,000	For FIRMs dated TBD, spatial and attribute information for roads (SARPY 2004)
Waterbodies and Waterlines	Sarpy County GIS	2015	*	For FIRMs dated TBD, spatial and attribute information for water polygons and lines (SGIS 2015b)

* Data Not Available

6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 22.

In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM 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. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 23, “Floodway Data.”

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Bellevue, City of; Gretna, City of; La Vista, City of; Papillion, City of; Sarpy County	Applewood Creek, Beadle Creek, Betz Road Ditch, Big Elk Creek, Big Papillion Creek (1D & 2D Natural Valley), Crystal Creek, Fairview Creek, Fricke Creek, Giles Creek, Hell Creek, Midland Creek, Mission Creek, Mission Creek Overland, Missouri River, Mud Creek, North Wehrspann Creek, Old Home Creek, Platte River (2019 analysis and 2D Natural Valley), Quail Creek, South Midland Creek, South Papillion Creek, South Papillion Tributary, South Wehrspann Creek, Thompson Creek, Tiburon Creek, Walnut Creek, Wehrspann Creek, West Midland Creek, West Papillion Creek, West Papillion Tributary, West Quail Creek, Whitted Creek, Wolf Creek	Nebraska Department of Natural Resources Bare Earth Terrain	0.36m at the 95% confidence level	1.04m at the 95% confidence level	Merrick 2011
Sarpy County, Unincorporated Areas	Buffalo Creek, Springfield Creek	USACE, Topographic Mapping, Scale 1:4,800, Contour Interval 4 feet	Unknown	Unknown	USACE 1976
Sarpy County, Unincorporated Areas	Elkhorn River and Platte River (2001 analysis)	USGS 7.5 Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 feet	Unknown	Unknown	USGS Various 1, USGS Various 2, & USGS Various 3
Bellevue, City of; City of; La Vista, Sarpy County, Unincorporated Areas	All Zone A streams	USGS 7.5 Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 feet	Unknown	Unknown	USGS 1968

BFEs shown at cross sections on the FIRM represent the 1-percent-annual-chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report.

Table 23: Floodway Data

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	211	30	124	11.1	1,021.3	1,007.9[2]	1,007.9	0.0
B	967	43	248	5.6	1,021.3	1,019.9[2]	1,019.9	0.0
C	1,109	84	398	3.9	1,032.7	1,032.7	1,033.3	0.6
D	1,381	105	405	3.8	1,033.1	1,033.1	1,033.7	0.6
E	2,403	99	189	7.7	1,038.5	1,038.5	1,038.5	0.0
F	3,617	12	86	15.6	1,043.7	1,043.7	1,043.7	0.0
G	3,942	100	945	1.4	1,054.4	1,054.4	1,054.4	0.0
H	4,934	124	441	3.0	1,054.5	1,054.5	1,054.5	0.0

[1] Feet above confluence with West Papillion Creek

[2] Elevation computed without considering the backwater effects from West Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: APPLEWOOD CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	118	52	270	9.0	1,117.7	1,101.2[2]	1,101.2	0.0
B	839	82	697	3.5	1,121.3	1,121.3	1,121.5	0.2
C	1,064	63	731	3.3	1,121.4	1,121.4	1,121.6	0.2
D	1,836	34	308	7.8	1,121.6	1,121.6	1,121.8	0.2
E	2,767	26	167	14.5	1,129.7	1,129.7	1,129.7	0.0
F	3,238	208	543	4.4	1,135.7	1,135.7	1,135.7	0.0
G	3,946	91	290	8.3	1,138.7	1,138.7	1,139.3	0.6
H	4,330	77	293	8.2	1,140.7	1,140.7	1,141.1	0.4
I	5,000	105	336	7.2	1,147.4	1,147.4	1,147.6	0.2
J	5,824	113	461	5.2	1,152.2	1,152.2	1,152.5	0.3
K	6,215	117	807	3.1	1,155.7	1,155.7	1,156.0	0.3
L	6,824	66	238	4.3	1,156.0	1,156.0	1,156.6	0.6
M	7,262	59	146	7.1	1,158.7	1,158.7	1,158.7	0.0

[1] Feet above confluence with South Papillion Creek

[2] Elevation computed without considering the backwater effects from South Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BEADLE CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	260	51	268	4.0	988.7	966.2[2]	966.2	0.0
B	303	39	150	7.1	988.7	973.4[2]	973.4	0.0
C	394	40	112	9.4	988.7	973.7[2]	973.7	0.0
D	2,499	66	164	6.4	988.7	984.2[2]	984.2	0.0
E	3,360	63	210	5.1	988.7	985.9[2]	985.9	0.0
F	3,568	51	121	8.9	992.8	992.8	992.8	0.0
G	3,616	50	121	8.8	993.9	993.9	993.9	0.0
H	3,691	49	120	8.9	994.5	994.5	994.5	0.0
I	4,005	54	215	4.9	998.8	998.8	998.8	0.0
J	4,642	45	219	4.9	999.9	999.9	999.9	0.0
K	4,967	52	145	8.2	1,000.7	1,000.7	1,000.7	0.0
L	5,374	41	161	6.6	1,002.7	1,002.7	1,002.7	0.0
M	5,842	38	120	8.8	1,006.7	1,006.7	1,006.7	0.0
N	5,926	40	112	9.5	1,009.3	1,009.3	1,009.3	0.0
O	6,075	39	138	7.7	1,013.6	1,013.6	1,013.6	0.0
P	7,023	32	103	10.3	1,016.5	1,016.5	1,016.5	0.0
Q	7,041	38	135	7.9	1,017.4	1,017.4	1,017.4	0.0
R	7,496	41	205	5.5	1,018.9	1,018.9	1,018.9	0.0
S	7,610	33	104	10.2	1,020.6	1,020.6	1,020.6	0.0
T	8,335	33	126	5.8	1,033.8	1,033.8	1,033.8	0.0
U	9,582	90	205	3.5	1,054.2	1,054.2	1,054.4	0.2

[1] Feet above confluence with Big Papillion Creek

[2] Elevation computed without consideration of backwater effects from Big Papilion Creek

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	10,070	36	106	6.7	1,054.5	1,054.5	1,054.6	0.1
W	10,233	88	253	2.8	1,056.2	1,056.2	1,056.5	0.3
X	10,298	84	206	3.5	1,056.3	1,056.3	1,056.6	0.3
Y	10,939	29	82	8.7	1,057.3	1,057.3	1,057.4	0.1
Z	11,485	88	259	3.0	1,072.9	1,072.9	1,073.1	0.2

[1] Feet above confluence with Big Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BETZ ROAD DITCH

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	3,220	117	219	4.1	995.3	990.5[2]	990.5	0.0
B	3,503	172	352	2.6	995.3	992.7[2]	992.7	0.0
C	3,999	36	141	6.4	995.3	992.9[2]	992.9	0.0
D	4,811	47	253	3.6	997.6	997.6	997.6	0.0
E	5,297	28	116	7.7	997.9	997.9	997.9	0.0
F	5,815	28	122	7.4	999.5	999.5	999.5	0.0
G	5,889	75	136	6.6	1,006.8	1,006.8	1,006.8	0.0
H	6,983	50	162	5.6	1,012.7	1,012.7	1,012.7	0.0
I	7,718	60	173	5.2	1,016.0	1,016.0	1,016.0	0.0
J	8,479	90	218	4.1	1,018.2	1,018.2	1,018.2	0.0
K	8,745	37	109	8.2	1,018.4	1,018.4	1,018.4	0.0
L	9,097	109	272	3.3	1,020.5	1,020.5	1,020.5	0.0
M	9,438	39	123	7.3	1,020.9	1,020.9	1,020.9	0.0
N	9,782	47	165	3.7	1,022.5	1,022.5	1,022.5	0.0
O	10,709	105	1,014	1.1	1,036.2	1,036.2	1,036.2	0.0
P	11,421	27	67	9.1	1,038.6	1,038.6	1,038.6	0.0
Q	11,480	53	326	1.9	1,049.9	1,049.9	1,049.9	0.0
R	11,947	109	1,329	0.5	1,049.9	1,049.9	1,049.9	0.0

[1] Feet above confluence with Big Papillion Creek

[2] Elevation computed without consideration of backwater effects from Big Papillion Creek

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,500	317	3,349	10.1	970.1	962.3[2]	962.6	0.3
B	2,000	324	4,122	8.2	970.1	963.5[2]	963.8	0.3
C	2,500	312	3,431	9.9	970.1	963.7[2]	963.9	0.2
D	4,000	328	4,006	8.5	970.1	965.6[2]	965.8	0.2
E	5,681	245	3,729	9.1	970.1	966.8[2]	967.1	0.3
F	5,838	238	3,701	9.2	970.1	967.1[2]	967.5	0.4
G	6,000	291	4,516	7.5	970.1	967.8[2]	968.1	0.3
H	9,000	296	4,518	7.5	970.1	969.9[2]	970.1	0.2
I	12,000	267	3,970	8.6	971.4	971.4	971.6	0.2
J	12,500	261	4,355	7.8	972.1	972.1	972.3	0.2
K	14,500	265	4,880	7.0	973.4	973.4	973.7	0.3
L	17,095	297 / 208[3]	4,691	7.2	974.5	974.5	975.0	0.5
M	17,734	225 / 0[3]	3,833	8.9	975.3	975.3	975.7	0.4
N	18,855	266 / 100[3]	3,779	9.0	976.1	976.1	976.5	0.4
O	19,246	256 / 118[3]	4,162	8.2	977.1	977.1	977.4	0.3
P	19,807	239 / 62[3]	3,832	8.9	977.6	977.6	977.8	0.2
Q	20,127	257 / 86[3]	4,117	8.3	978.1	978.1	978.3	0.2
R	20,742	345 / 102[3]	5,166	6.6	979.1	979.1	979.1	0.0
S	24,210	296 / 98[3]	4,424	7.7	980.2	980.2	980.5	0.3
T	24,812	325	5,025	6.8	981.2	981.2	981.8	0.6
U	26,169	308	5,085	6.7	981.8	981.8	982.6	0.8

[1] Feet above confluence with Missouri River

[2] Elevation computed without consideration of backwater effects from Missouri River

[3] Total floodway width / width within jurisdiction

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BIG PAPILLION CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	26,540	308	5,766	5.9	982.5	982.5	983.2	0.7
W	27,798	298	4,654	7.4	982.7	982.7	983.4	0.7
X	30,846	289	4,403	7.8	985.4	985.4	985.8	0.4
Y	31,713	303	4,620	7.4	985.9	985.9	986.3	0.4
Z	35,947	342	5,643	6.0	988.7	988.7	988.7	0.0
AA	37,588	472	6,599	5.2	989.6	989.6	990.0	0.4
AB	38,893	761	9,745	6.1	990.5	990.5	991.4	0.9
AC	41,674	1,418	25,965	4.3	991.9	991.9	992.6	0.7
AD	45,452	571	6,145	3.7	994.2	994.2	994.7	0.5
AE	46,152	276	4,059	5.4	994.5	994.5	994.8	0.3
AF	46,581	290	4,648	4.6	995.2	995.2	995.2	0.0
AG	53,400	870	10,231	3.8	996.9	996.9	997.3	0.4
AH	59,760	520	5,323	6.4	998.5	998.5	999.4	0.9
AI	64,404	266	3,241	8.3	1,001.4	1,001.4	1,001.9	0.5

[1] Feet above confluence with Missouri River

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUFFALO CREEK								
A	9,082	350	2,865	7.3	1,031.2	1,031.2	1,032.1	0.9
B	9,502	200	2,322	9.0	1,031.8	1,031.8	1,032.8	1.0
C	9,952	289	2,934	7.2	1,033.6	1,033.6	1,034.2	0.6
D	10,542	154	1,867	11.2	1,034.2	1,034.2	1,034.8	0.6
E	11,652	279	4,106	5.1	1,037.3	1,037.3	1,038.3	1.0
F	12,342	150	2,168	9.7	1,037.7	1,037.7	1,038.7	1.0
G	13,232	168	2,440	8.6	1,039.9	1,039.9	1,040.5	0.6
H	13,352	168	2,471	8.5	1,040.1	1,040.1	1,040.6	0.5
I	13,542	213	3,697	5.7	1,042.0	1,042.0	1,042.5	0.5
J	15,102	330	2,151	9.8	1,042.7	1,042.7	1,043.3	0.6
K	16,122	205	2,269	9.3	1,045.7	1,045.7	1,045.9	0.2
L	16,902	150	1,940	10.8	1,046.7	1,046.7	1,047.3	0.6
M	17,382	150	2,309	9.1	1,048.2	1,048.2	1,049.1	0.9
N	17,912	150	1,892	11.2	1,050.1	1,050.1	1,050.8	0.7
O	18,252	177	2,528	8.4	1,052.3	1,052.3	1,052.8	0.5
P	18,472	239	2,836	7.8	1,054.3	1,054.3	1,054.8	0.5
Q	18,612	232	2,816	7.8	1,054.5	1,054.5	1,055.0	0.5

[1]Feet above confluence with Platte River

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUFFALO CREEK (Continued)								
R	19,832	196	2,362	9.1	1,056.3	1,056.3	1,057.0	0.7
S	20,932	274	2,326	9.3	1,058.0	1,058.0	1,058.8	0.8
T	21,852	262	2,372	9.2	1,060.1	1,060.1	1,061.1	1.0
U	22,062	500	4,501	4.9	1,062.9	1,062.9	1,063.9	1.0
V	23,422	672	4,716	4.6	1,064.5	1,064.5	1,065.2	0.7
W	23,812	576	4,146	4.3	1,065.3	1,065.3	1,066.0	0.7
X	24,542	548	2,603	6.9	1,066.4	1,066.4	1,067.0	0.6
Y	25,112	525	3,218	5.6	1,067.7	1,067.7	1,068.7	1.0
Z	25,932	628	4,015	4.5	1,069.7	1,069.7	1,070.5	0.8
AA	26,902	431	3,088	5.8	1,071.0	1,071.0	1,071.7	0.7
AB	27,932	162	2,134	8.4	1,072.4	1,072.4	1,073.1	0.7
AC	28,302	164	1,753	10.2	1,073.0	1,073.0	1,073.6	0.6
AD	28,842	328	2,262	6.8	1,074.5	1,074.5	1,075.3	0.8
AE	29,032	150	2,100	7.3	1,076.0	1,076.0	1,076.9	0.9
AF	29,392	150	1,912	8.0	1,076.3	1,076.3	1,077.2	0.9
AG	29,812	230	1,735	8.8	1,077.2	1,077.2	1,077.9	0.7

[1]Feet above confluence with Platte River

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUFFALO CREEK (Continued)								
AH	30,382	380	2,822	5.4	1,079.0	1,079.0	1,079.8	0.8
AI	30,832	324	1,961	7.7	1,079.9	1,079.9	1,080.6	0.7
AJ	31,402	373	3,349	4.2	1,082.3	1,082.3	1,083.2	0.9
AK	32,182	168	1,706	8.3	1,083.0	1,083.0	1,083.8	0.8
AL	32,732	150	1,358	10.5	1,083.8	1,083.8	1,084.7	0.9
AM	34,002	348	2,476	5.8	1,088.3	1,088.3	1,088.5	0.2
AN	34,322	354	2,604	5.5	1,088.6	1,088.6	1,088.9	0.3
AO	34,512	174	1,744	6.8	1,090.5	1,090.5	1,090.8	0.3
AP	34,842	203	2,159	5.5	1,090.8	1,090.8	1,091.3	0.5
AQ	35,312	187	1,617	7.4	1,091.1	1,091.1	1,091.6	0.5
AR	36,222	150	1,479	8.0	1,092.6	1,092.6	1,093.5	0.9
AS	36,792	154	1,364	8.7	1,093.9	1,093.9	1,094.7	0.8
AT	37,282	150	1,290	9.2	1,095.1	1,095.1	1,095.8	0.7
AU	37,902	152	1,547	7.2	1,097.5	1,097.5	1,098.0	0.5
AV	37,952	152	1,573	6.9	1,097.7	1,097.7	1,098.2	0.5
AW	38,132	240	1,507	7.2	1,100.2	1,100.2	1,101.2	1.0
AX	38,752	270	2,275	4.7	1,102.0	1,102.0	1,103.0	1.0

[1]Feet above confluence with Platte River

Table 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE
AND INCORPORATED AREAS

FLOODWAY DATA

BUFFALO CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
BUFFALO CREEK (Continued)								
AY	39,342	252	1,932	5.6	1,102.8	1,102.8	1,103.5	0.7
AZ	40,032	220	1,805	5.9	1,103.5	1,103.5	1,104.4	0.9
BA	40,562	252	979	6.0	1,104.4	1,104.4	1,105.3	0.9
BB	40,852	159	1,035	5.7	1,105.6	1,105.6	1,106.1	0.5

[1]Feet above confluence with Platte River

Table 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE
AND INCORPORATED AREAS

FLOODWAY DATA

BUFFALO CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,500	55	377	6.2	1,143.4	1,143.3[2]	1,143.3	0.0
B	1,775	53	299	7.8	1,143.8	1,143.8	1,143.8	0.0
C	2,124	55	268	8.6	1,146.7	1,146.7	1,146.7	0.0
D	2,387	59	316	7.4	1,148.5	1,148.5	1,148.5	0.0
E	3,196	46	334	6.9	1,155.4	1,155.4	1,155.4	0.0
F	3,831	41	379	6.1	1,157.7	1,157.7	1,157.7	0.0
G	4,432	28	183	12.7	1,158.9	1,158.9	1,158.9	0.0
H	4,762	50	306	7.6	1,162.5	1,162.5	1,162.5	0.0
I	5,133	35	188	12.3	1,164.3	1,164.3	1,164.3	0.0
J	5,382	33	194	12.0	1,167.6	1,167.6	1,167.6	0.0
K	6,000	56	426	5.4	1,173.1	1,173.1	1,173.1	0.0
L	6,794	46	295	4.4	1,178.3	1,178.3	1,178.3	0.0

[1] Feet above confluence with South Papillion Creek
[2] Elevation computed without consideration of backwater effects from South Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE
AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: CRYSTAL CREEK

Table 23: Floodway Data (continued)

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2,3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY[4] (FEET NAVD)	WITH FLOODWAY[4] (FEET NAVD)	INCREASE (FEET)
ELKHORN RIVER								
AH	3,028	10,890/5,650	49,506	3.8	1,087.1	1,083.1[5]	1,084.1	1.0
AI	7,766	10,800/5,650	56,963	3.3	1,091.1	1,087.7[5]	1,088.6	0.9
AJ	11,215	9,300/4,170	53,761	3.5	1,093.8	1,090.3[5]	1,091.3	1.0
AK	15,267	5,237/4,290	30,219	6.2	1,096.3	1,094.0[5]	1,094.6	0.6
AL	18,338	5,807/4,300	34,714	5.4	1,098.1	1,096.9[5]	1,097.4	0.5
AM	24,352	9,061/7,300	41,086	4.6	1,100.7	1,099.9[5]	1,100.2	0.3

[1]Feet above confluence with Platte River
[2]Combined floodway width of Platte River and Elkhorn River
[3]Total width/width within Sarpy County
[4]Elevation computed including ice jam effects
[5]Elevation computed without consideration of flooding controlled by effects from Platte River

Table 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE
AND INCORPORATED AREAS

FLOODWAY DATA

ELKHORN RIVER

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	272	195	1,494	2.1	981.2	981.2	981.2	0.0
B	3,453	240	1,505	1.8	984.4	984.4	984.6	0.2
C	3,713	120	738	3.7	984.5	984.5	984.7	0.2
D	4,020	122	864	3.2	986.2	986.2	986.9	0.7
E	5,293	106	549	5.0	990.0	990.0	990.0	0.0
F	6,504	39	320	8.6	995.8	995.8	995.8	0.0
G	7,132	62	465	5.9	999.5	999.5	999.5	0.0
H	7,182	52	433	6.4	1,000.3	1,000.3	1,000.3	0.0
I	7,978	87	459	3.3	1,008.2	1,008.2	1,008.2	0.0
J	10,127	36	129	10.8	1,015.3	1,015.3	1,015.3	0.0
K	10,231	33	176	8.0	1,017.5	1,017.5	1,017.5	0.0

[1] Feet above confluence with Big Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: FAIRVIEW CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,692	34	90	6.6	997.3	996.0[2]	996.0	0.0
B	3,031	36	102	5.8	997.9	997.9	997.9	0.0

[1] Feet above confluence with Big Papillion Creek

[2] Elevation computed without consideration of backwater effects from Big Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: FRICKE CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	329	30	119	5.1	998.2	982.0[2]	982.0	0.0
B	1,502	29	86	7.1	998.2	989.2[2]	989.2	0.0
C	2,500	33	132	4.6	998.7	998.7	998.7	0.0
D	3,490	38	107	5.9	1,008.8	1,008.8	1,008.8	0.0
E	3,644	32	124	4.9	1,012.3	1,012.3	1,012.3	0.0
F	4,212	33	113	5.4	1,018.4	1,018.4	1,018.4	0.0

[1] Feet above confluence with Big Papillion Creek

[2] Elevation computed without consideration of backwater effects from Big Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: GILES CREEK

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	136	79	588	7.2	1,029.5	1,018.2[2]	1,018.2	0.0
B	237	78	486	8.7	1,029.5	1,029.0[2]	1,029.0	0.0
C	2,468	110	847	5.0	1,036.3	1,036.3	1,036.3	0.0
D	2,697	50	486	8.7	1,037.3	1,037.3	1,037.3	0.0
E	3,821	75	756	5.6	1,041.2	1,041.2	1,041.2	0.0
F	3,984	80	790	5.4	1,042.0	1,042.0	1,042.0	0.0
G	5,221	74	537	7.9	1,044.4	1,044.4	1,044.4	0.0

[1] Feet above confluence with West Papillion Creek

[2] Elevation computed without consideration of backwater effects from West Papillion Creek

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	3,065	32	130	9.2	1,007.5	1,002.8[2]	1,002.8	0.0
B	3,699	54	230	5.2	1,007.5	1,007.2[2]	1,007.2	0.0
C	4,150	37	197	6.1	1,008.6	1,008.6	1,008.6	0.0
D	5,499	73	148	8.1	1,014.8	1,014.8	1,014.8	0.0
E	5,614	74	348	3.4	1,024.8	1,024.8	1,024.8	0.0
F	5,837	90	375	3.2	1,028.0	1,028.0	1,028.0	0.0
G	6,391	94	564	2.1	1,028.5	1,028.5	1,028.5	0.0
H	6,776	70	463	2.6	1,030.5	1,030.5	1,030.5	0.0
I	7,065	98	698	1.7	1,032.1	1,032.1	1,032.1	0.0
J	8,238	77	398	2.6	1,032.3	1,032.3	1,032.3	0.0
K	9,314	61	204	5.0	1,033.1	1,033.1	1,033.1	0.0
L	9,667	50	121	8.5	1,037.0	1,037.0	1,037.0	0.0
M	11,755	141	357	1.7	1,054.9	1,054.9	1,054.9	0.0
N	11,969	83	559	1.9	1,060.8	1,060.8	1,060.8	0.0
O	12,462	82	391	1.6	1,060.9	1,060.9	1,060.9	0.0
P	14,428	51	119	3.5	1,073.8	1,073.8	1,073.8	0.0
Q	14,540	42	62	6.9	1,077.1	1,077.1	1,077.1	0.0
R	14,707	49	94	4.4	1,079.7	1,079.7	1,079.7	0.0
S	15,010	24	50	8.3	1,081.7	1,081.7	1,081.8	0.1

[1] Feet above confluence with West Papillion Creek

[2] Elevation computed without consideration of backwater effects from West Papillion Creek

Table 23: Floodway Data (continued)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	618	38	231	7.4	1,089.4	1,076.5[2]	1,076.5	0.0
B	2,000	35	172	9.9	1,090.7	1,082.6[3]	1,082.6	0.0
C	2,925	54	326	5.2	1,095.6	1,095.6	1,095.6	0.0

[1]Feet above confluence with South Papillion Creek

[2]Elevations computed without consideration of flooding effects from South Papillion Creek

[3]Elevations computed without consideration of backwater effects from South Papillion Creek

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

SARPY COUNTY, NE

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: MISSION CREEK