BELLEVUE & PAPILLION

HOUSING RESILIENCE PLAN

November 4, 2025

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ACKNOWLEDGEMENTS

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Mayor David Black

The Cities of Bellevue and Papillion would like to thank all who shared their time, ideas, experience, and expertise to help shape this plan. This includes City Council members, Planning Commission members, Advisory Committee members, and community members who guided the process along the way.

You played a key role in shaping the plan's recommendations and priorities. Whether your name appears on this list or not, your involvement made a real difference and helped create a stronger, more resilient future for Bellevue and Papillion.

CONSULTANTS:

RDG PLANNING • DESIGN
verdis GROUP
JENSEN HUGHES

EXECUTIVE SUMMARY

The Bellevue-Papillion Housing Resilience Plan marks a historic milestone, one of the first of its kind, and establishes a comprehensive framework to protect, adapt, and strengthen housing in the face of the increasing severity and frequency of natural hazards. The plan and its goals were developed through an inclusive planning process with stakeholders, who included community residents and regional partners. Grounded in data-driven analysis, the plan provides a roadmap for safeguarding homes and their occupants against strong storms, flooding, and extreme temperatures, hazards that threaten the safety, affordability, and long-term viability of the housing stock in Bellevue and Papillion.

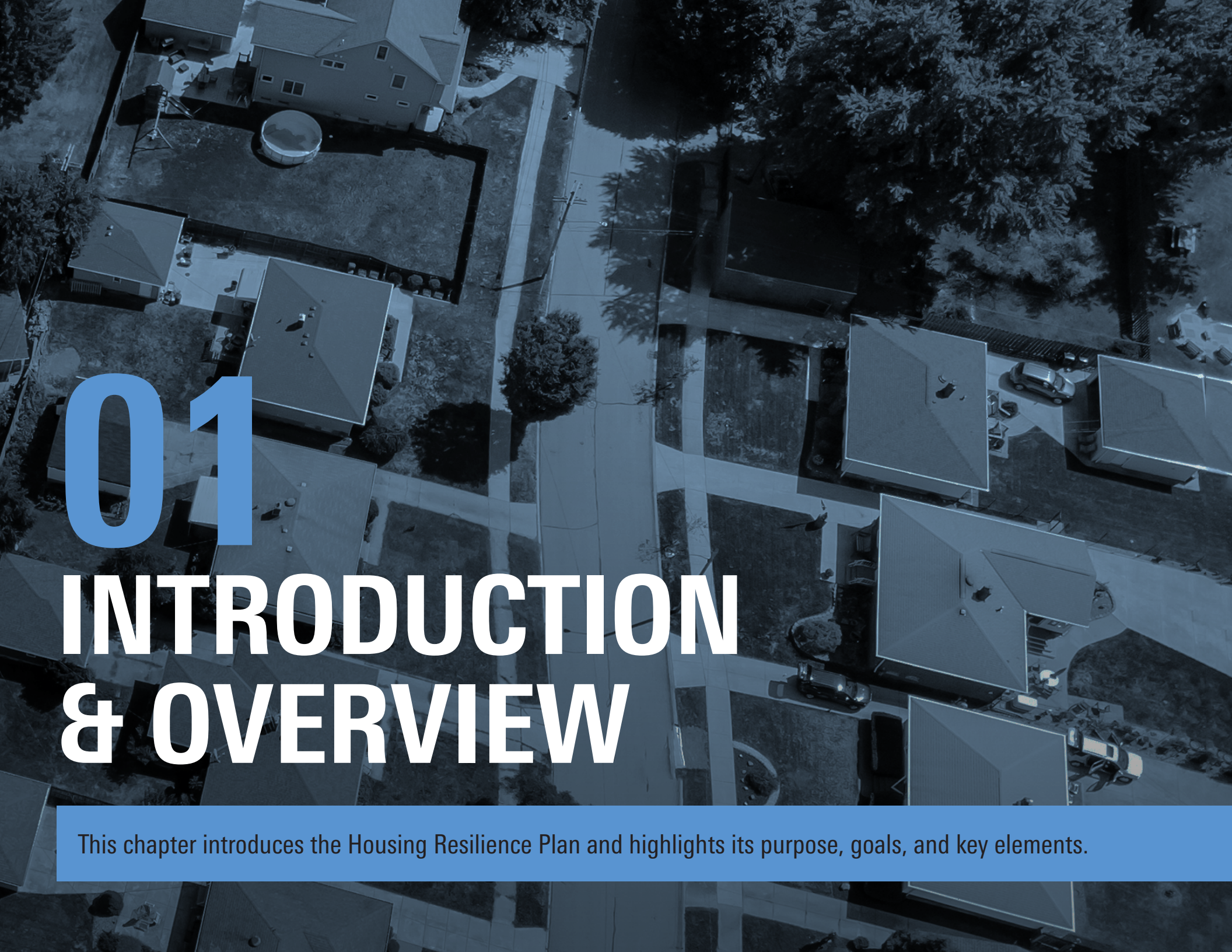
The purpose of the Bellevue-Papillion Housing Resilience Plan is to provide both communities with a coordinated framework for reducing housing-related disaster risks, improving neighborhood stability, and supporting long-term growth.

The plan recognizes that resilient housing is the foundation of resilient communities. By integrating hazard mitigation with housing and land use policy, the plan bridges the gap between emergency management and local planning efforts, ensuring decisions about where and how homes are built and maintained contribute to long-term sustainability and resiliency.

The plan is structured in six chapters that build from analysis to action:

1. Introduction and Plan Overview
2. Existing Housing Assessment
3. Housing Resiliency Policy Map
4. Housing Loss Reduction Plan
5. Community Education Plan
6. Mitigation and Recovery Funding Plan

The Bellevue-Papillion Housing Resilience Plan represents a shared commitment to proactive, forward-looking leadership in the region. It recognizes that resilience extends beyond emergency response, but intentionally shaping stronger, safer, and overall more resilient communities and neighborhoods.



01 INTRODUCTION & OVERVIEW

This chapter introduces the Housing Resilience Plan and highlights its purpose, goals, and key elements.

INTRODUCTION

A home more than just a place to rest one's head—it is often a family's most valuable asset and the foundation of safety and stability.

It should also be where one feels the safest. Over the past twenty years, communities have experienced more frequent and intense extreme weather events. These disruptions affect household safety on physical, financial, social, and psychological levels.

In 2025, the cities of Bellevue and Papillion came together to prepare the Bellevue and Papillion Housing Resilience Plan. The effort reflects the shared commitment to planning for housing supply and affordability challenges that are only intensified by the frequency and severity of weather related disasters. Both cities recognized that forward looking planning is necessary to protect residents, strengthen neighborhoods, and ensure that housing and infrastructure systems are prepared for future disruptions.

This multi-jurisdictional plan was developed with support from the Nebraska Department of Economic Development (NDED) through the Community Development Block Grant – Disaster Recovery (CDBG-DR) program, with funding provided by the U.S. Department of Housing and Urban Development (HUD) in response to the 2019 floods and severe storms.

PURPOSE OF THE PLAN

The purpose of the Bellevue and Papillion Housing Resilience Plan is to provide both communities with a coordinated framework for reducing housing-related disaster risks, improving neighborhood stability, and supporting long-term growth.

As a multijurisdictional effort, the plan responds to federally declared disasters, including the 2019 floods, which exposed vulnerabilities in the housing system and highlighted the need for proactive, collaborative planning.

WHAT IS RESILIENCE?

According to the U.S. Department of Housing and Urban Development (HUD), resilience is defined as “a community’s ability to minimize damage and recover quickly from extreme events and changing conditions, including natural hazard risks.”

In the context of housing, resilience means ensuring that homes and neighborhoods are safe, durable, adaptable, and capable of supporting residents during and after disruptive events.

DISASTER RESISTANT
able to protect people and assets in the face of multiple hazards.

AFFORDABLE
financially accessible for low-to-middle-income households.

SUSTAINABLE
built and/or strengthened through processes that can be scaled and replicated, with minimal environmental footprint.

LOCALLY APPROPRIATE
built using materials, skills, and tools that are appropriate for the culture and the climate.

HEALTH AND SECURE
with adequate water, sanitation, ventilation, light, access, space, and security.

A FINANCIAL ASSET
and/or a place of business that stimulates economic opportunity by being adaptable to multiple uses, and protecting a family's property investment.

ADAPTABLE
can be expanded and adapted to growing population, shifting demographics, and emerging technology.

SCALABLE
capable of adapting to the evolving needs of the population over time through a combination of policy changes and access to financial technology

Source: Adapted from Build Change (2024), "Why Resilient Housing." Retrieved from buildchange.org/why-resilient-housing

WHAT

IS A HOUSING RESILIENCE PLAN?

A housing resilience plan is a strategic, non-regulatory document that evaluates existing housing conditions, identifies vulnerabilities, and recommends policies, programs, and actions that strengthen the housing system against risks such as extreme weather events.

It is both a technical resource and a guidance tool to help communities integrate resilience into housing, land use, and infrastructure decisions.

WHY

A HOUSING RESILIENCE PLAN?

Bellevue and Papillion have experienced multiple federally declared disasters in recent years, exposing vulnerabilities in their housing systems. Following the 2019 floods, the U.S. Department of Housing and Urban Development (HUD) identified parts of Sarpy County as Most Impacted and Distressed (MID), making them priority locations for investment and planning.

This plan responds directly to those conditions by evaluating vulnerabilities in both existing neighborhoods and areas of future growth. It provides a framework for reducing risk while also addressing housing affordability, equity, and long-term sustainability.

By planning jointly, Bellevue and Papillion can align strategies, share resources, and ensure that CDBG-DR investments produce stronger, and lasting resilience outcomes across both jurisdictions.

HOW

WILL THE PLAN BE USED?

The plan will guide staff, elected officials, housing providers, developers, and community partners as they make housing and land use decisions. It will inform land use and housing policies, guide redevelopment and investment priorities, support applications for state and federal funding, and build community awareness of resilience best practices.

While not regulatory in nature, the plan serves as a roadmap for coordinated, forward-looking decision-making across Bellevue and Papillion.

GOALS OF THE PLAN

The plan reflects Bellevue and Papillion's local needs while also aligning with FEMA's National Disaster Recovery Framework, which emphasizes housing that is safe, affordable, sustainable, and less vulnerable to hazards. By grounding local strategies in these national priorities, the plan ensures they are community-driven, aligned with best practices, and positioned to strengthen resilience while improving access to state and federal funding.

Building on this foundation, the plan focuses on five key goals:

1 **Ensure Safe, Resilient, and Affordable Housing**
Create housing options that protect residents from natural hazards, support long-term affordability, and adapt to changing conditions. This means not only protecting existing homes, but also encouraging new development that is built to withstand future risks.

2 **Reduce Community Vulnerability to Disasters**
Identify areas and populations most at risk — including low-income and distressed neighborhoods — and take steps to lessen those vulnerabilities. The goal is to minimize disruptions from floods, storms, or other hazards so residents can recover faster and fully when disasters strike.

3 **Support Informed Decision-Making for Housing and Land Use**
Provide local leaders, developers, and community partners with the data and strategies they need to make smart choices. By tying housing and land use decisions to resilience goals, the plan ensures that growth benefits both current and future residents.

4 **Build Awareness and Collaboration Around Housing Resilience**
Engage the community in understanding resilience best practices, empowering residents to be part of the solution. This also means fostering partnerships between local governments, nonprofits, and the private sector to address housing challenges together.

5 **Strengthen Local Capacity for Funding and Implementation**
Position Bellevue and Papillion to secure state and federal resources, while also equipping city staff with the tools and partnerships needed to put strategies into action. This ensures the plan moves beyond recommendations into real, long-term impact.

NATIONAL DISASTER HOUSING GOALS

1) Support individuals and communities in returning to self-sufficiency as quickly as possible.

2) Define and fulfill fundamental disaster housing responsibilities and roles.

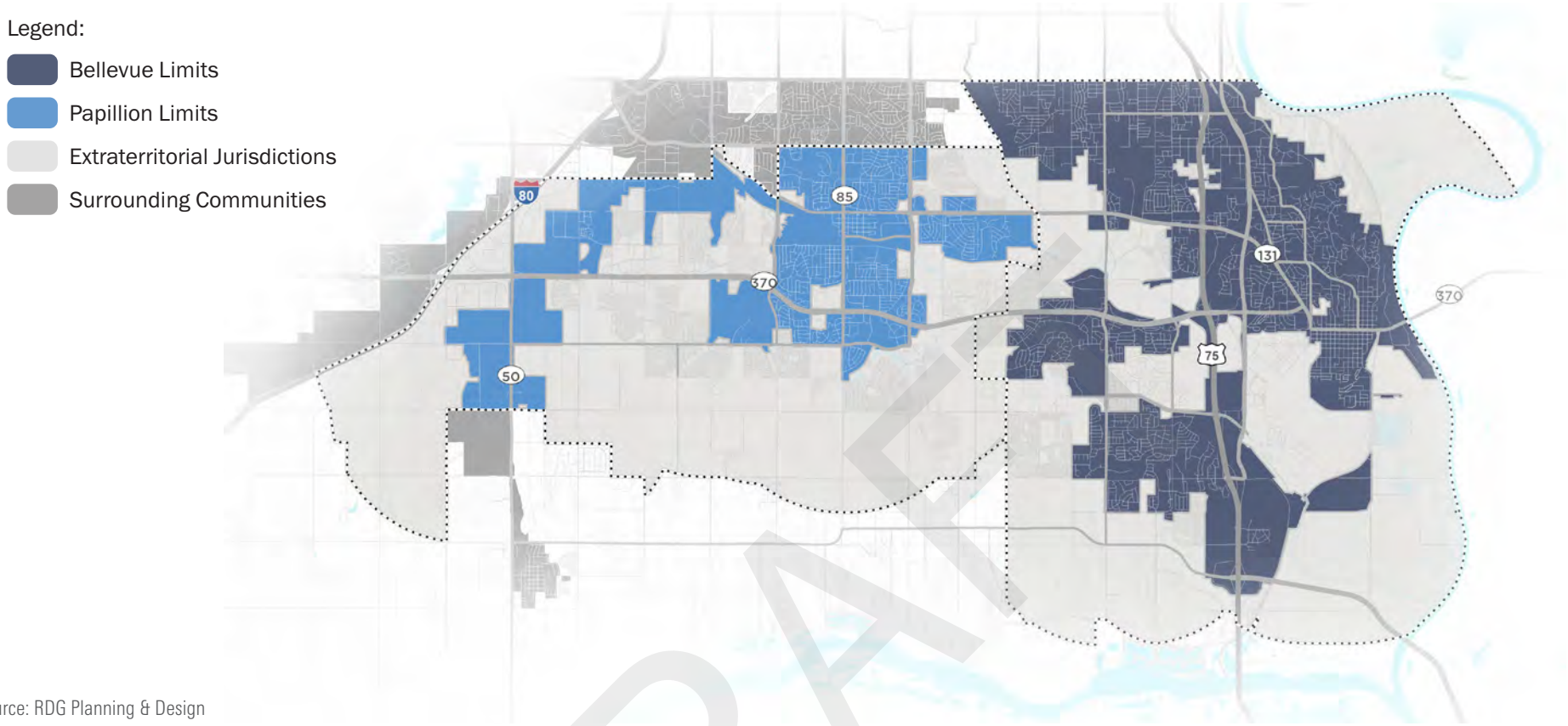
3) Increase our collective understanding and ability to meet the needs of disaster survivors and affected communities.

4) Build capabilities to provide a broad range of flexible housing options, including sheltering, temporary housing, and permanent housing.

5) Better integrate disaster housing assistance with related community support services and long-term recovery efforts.

6) Improve disaster housing planning to better recover from disasters, including catastrophic events.

Source: FEMA; 2009 National Disaster Housing Strategy



Source: RDG Planning & Design

PLAN OVERVIEW

This section provides an overview of the plan's structure and development process, including the study area, key elements, timeline, engagement, and alignment with national goals.

STUDY AREA

The study area includes the Cities of Bellevue and Papillion along with their respective extraterritorial jurisdiction (ETJ) boundaries in Sarpy County, Nebraska. ETJ areas are located outside city limits, but fall under city zoning and subdivision authority, and are home to thousands of housing units in both jurisdictions.

A significant share of future housing growth is expected within the ETJs. Including these areas ensures that resilience strategies and policies address both existing neighborhoods and new development at the urban edge, where today's decisions will shape housing safety, affordability, and sustainability for decades to come.

By covering both city limits and ETJs, the plan captures the full range of existing neighborhoods, redevelopment opportunities, and areas of future growth. The map above shows the corporate boundaries of Bellevue and Papillion, along with their respective ETJ areas.

PLAN ELEMENTS

The plan is organized into five major elements, each developed to support the goals outlined on page 13. Together, they form a comprehensive framework for understanding housing conditions, assessing risks, and creating policies and strategies that reduce disaster impacts and strengthen long-term housing stability in Bellevue and Papillion.

Existing Housing Assessment
This element establishes a baseline of current housing conditions in both communities. It includes a review of local comprehensive and housing plans, demographic and socioeconomic data, building age and type, occupancy patterns, market trends, building codes, and vulnerability indicators such as FEMA flood maps, wind hazard zones, stormwater system capacity, and social vulnerability factors. This assessment also identifies existing strengths in the housing system to build upon.

Housing Resiliency Policy Map
Building upon the housing assessment, vulnerability analysis, community input, and a land use workshop with participation from the plan's Advisory Committee and City Council officials, a Housing Resiliency Policy Map was developed for both cities. The map includes policy areas for areas most at risk from flooding, wind, and other hazards, and identifies where new housing development, redevelopment, or preservation should be prioritized.

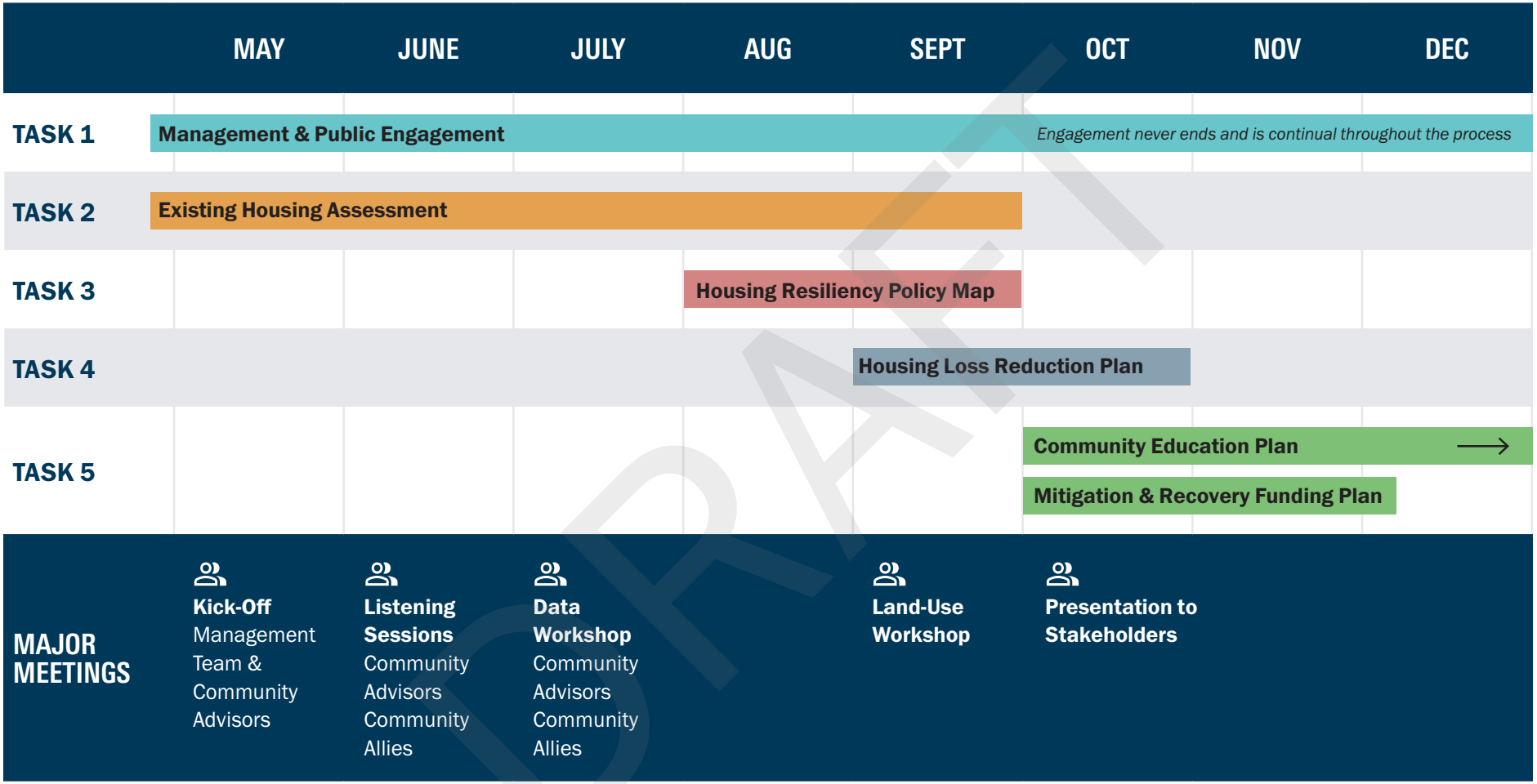
Housing Loss Reduction Plan
Translates findings into policies, strategies, actions and tools for reducing future housing losses. It includes recommendations for land use and zoning, subdivision and building code updates, and integration of FEMA and HUD best practices for disaster housing.

Community Education Plan
Resilience requires awareness and collaboration across the community. The education plan outlines objectives, organizations and audiences, strategies for outreach, and key resilience messages. It emphasizes clear, accessible communication and proposes ongoing outreach activities, such as public open houses, workshops, surveys, and targeted engagement.

Mitigation and Recovery Funding Plan
To ensure strategies can be implemented, this element identifies funding resources and processes available at the local, state, and federal level. It includes interviews with agency representatives, a review of funding programs, and recommendations for how the cities can proactively position themselves to pursue and manage funds. The plan also includes a maintenance component to ensure funding opportunities are monitored and updated over time.

Source: RDG Planning & Design

PLAN TIMELINE



ENGAGEMENT PROCESS

Public engagement is one of the most important pieces of planning, and as such, was carried throughout the entire planning process. Components of the public engagement process included:

Planning Team Meetings

Throughout the process, the planning team (City staff and project consultants) met two to four times per month to discuss project milestones, community engagement techniques, and emerging recommendations.

Advisory Committee Meetings

The Bellevue-Papillion Housing Resilience Plan Advisory Committee was an important team of 18 decision-makers and involved residents focused on improving housing resilience in the communities. The committee met four times throughout the development of the plan, guiding the engagement process, reviewing goals and strategies, and ensuring voices were heard and considered.

Listening Sessions

A diverse range of local subject matter experts were invited to share their perspectives on the past, present, and future of housing resiliency in Bellevue and Papillion. In the spring and summer of 2025, the planning team met with:

- City Staff
- Developers
- Home Builders
- Insurance Professionals
- Realtors
- Service Providers

Major takeaways and themes from these listening sessions include:

- **Education.** Not all residents are aware of their risks, or what they can do to minimize them.
- **Housing Maintenance.** Existing housing requires, or will require, programs and funding strategies to increase resiliency and/or bring buildings back up to code.
- **Insurance Costs.** Insurance costs are rising rapidly, and new policies may not cover all that may be lost in a storm. Some home owners are choosing to forego home insurance all-together to cut costs.
- **Increased strength and frequency of disasters.** As storms become stronger and more common, the ways we prepare and recover are changing. One example discussed multiple times was how longer power outages are becoming more common.

Data Workshop

In July 2025, the Advisory Committee and local officials were invited to a data workshop. At the workshop, participants reviewed collected data on population and demographics and land uses and environmental constraints within the communities. Attendees provided thoughtful feedback on the data and contributed their expertise on how the data should inform plan strategies.

Land Use Workshop

In September 2025, the Advisory Committee and local officials were invited to a land use workshop. The land use workshop focused on locations of existing and future housing to determine resiliency policies and strategies for existing and future housing. The Land Use workshop identified five policy areas for the Housing Resiliency Policy Map.

Community Farmer's Markets

The planning team has attended recent farmer's markets in both Bellevue and Papillion to reach attending residents. People who stop by have been able to participate in activities that add to the data being gathered through the community survey and interactive map.

Project Website and Interactive Map

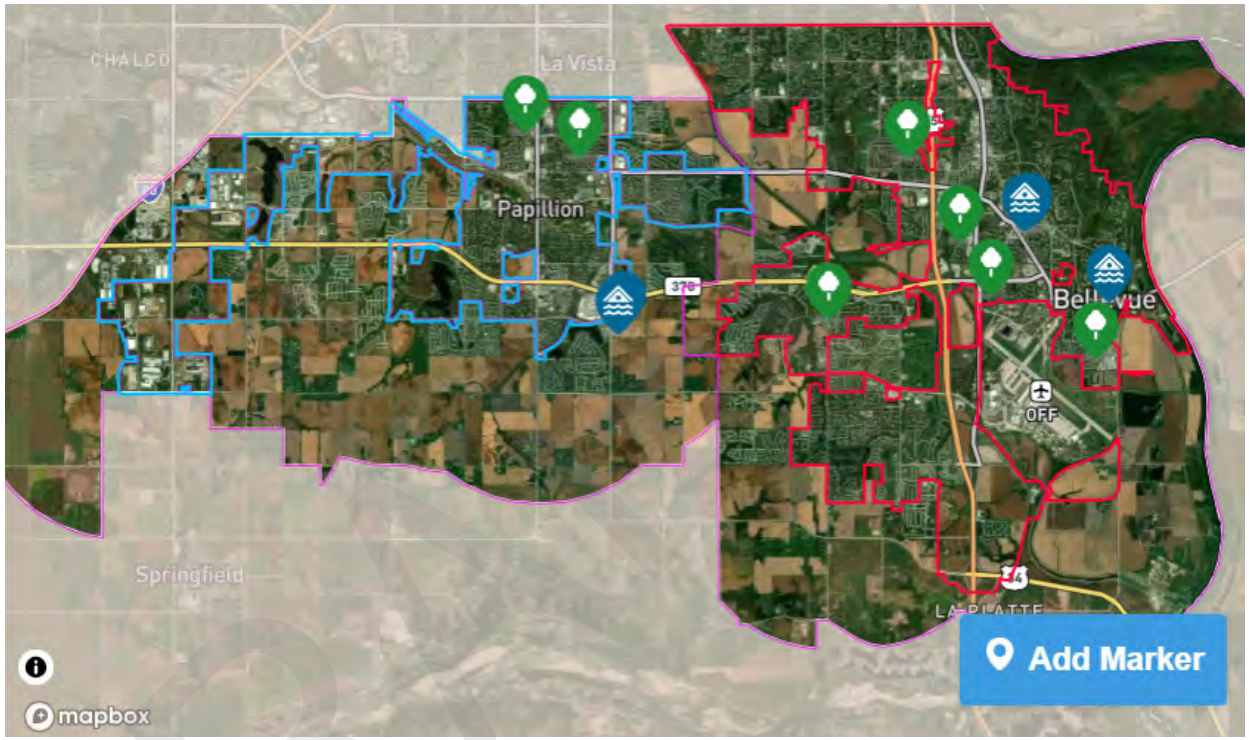
The planning process included the development of a project website as a platform for the project to provide updates on the planning process, and make the process more publicly accessible. The website included an interactive map for people to drop pins sharing where they've seen or experienced flooding, or had concerns about the tree canopy (or lack there-of). The project website received over 1,600 views and the map had 42 pins dropped.

Community Survey

The project website hosted a survey for community members to share their thoughts and experiences on housing resiliency in Bellevue and Papillion. The survey received 270 responses, and key findings include:

- Over 50% of respondents have experienced power outages and wind damage to their home, while 11% have experienced flooding and/or water damage.
- Respondents are more familiar with local government and emergency plans than other types (workplace, school, etc.) but many still don't have plans for their households.
- Over half (55%) of renters struggle with housing affordability, compared to 29% of home owners.

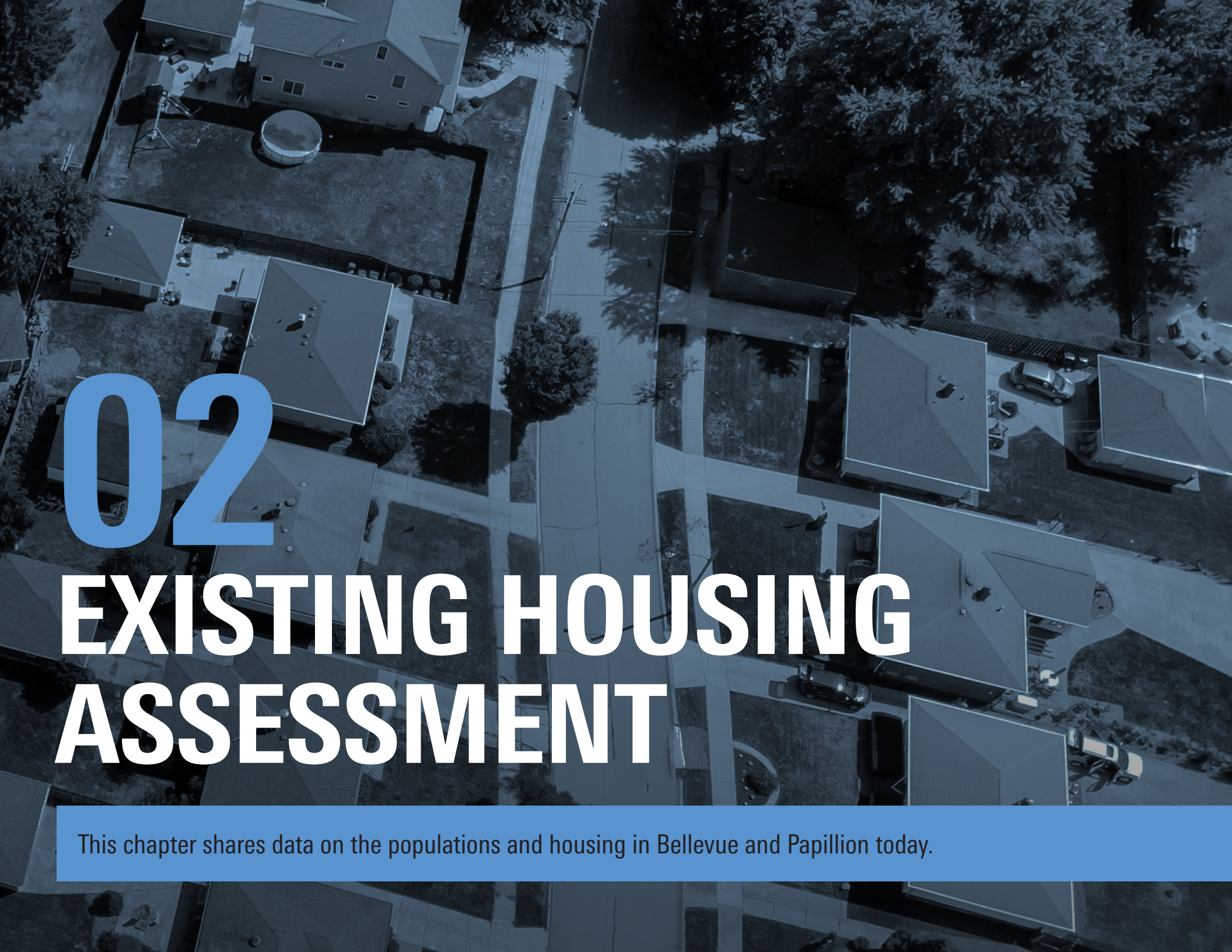
The survey's full results are available in the Appendix.



"High density areas, like multi-family complexes, often lack or have inadequate sized storm shelters."

"On top of some homeowners being uninsured, homeowners that are insured are often under-insured, leading to larger issues if/when there are large needed repairs."

"A rising issue for residents is planning for and being prepared for long power outages (over 24 hours)."



02 EXISTING HOUSING ASSESSMENT

This chapter shares data on the populations and housing in Bellevue and Papillion today.

PREVIOUS PLANNING EFFORTS

In recent years, both Bellevue and Papillion have been hard at work in advancing planning efforts for community improvement. These ongoing efforts are the product of constantly striving for community improvement. The Bellevue and Papillion Housing Resilience Plan is written in a way that complements recent planning efforts and is intended to be implemented alongside them. These plans include:

Bellevue Comprehensive Plan

Our Future View is Bellevue's comprehensive and transportation plan (2024) and provides a long-term vision for the city's growth, guiding land use, housing, economic development, and transportation. It identifies where development and redevelopment should occur, and it aligns infrastructure and public services to support that growth. The plan identifies a vision and goals for the community, and it recommends programs and policies to bring that vision to life.

Papillion Comprehensive Plan

The Papillion Comprehensive Plan (2002) outlines a long-term vision for the city, addressing land use, transportation, community facilities, and infrastructure. It serves as a legal foundation for zoning and subdivision regulations. The plan reflects community input to guide development and maintain a high quality of life amid urban expansion. Since the plan's adoption, it has had multiple updates, including an update to the Downtown chapter in 2012, an update to the Parks and Recreation chapter in 2021, and other map amendments.

Bellevue Affordable Housing Action Plan 2027-2032

The Bellevue Affordable Housing Action Plan (2022) presents statistical analyses and narrative context, outlining past, present, and anticipated housing needs. It sets forth strategies to promote and develop affordable housing in the community. The analysis identifies a total demand of 3,248 additional units at all price points between 2022 and 2032.

Papillion Affordable Housing Action Plan

The Papillion Affordable Housing Action Plan (2023) provides an analysis of current and future needs for affordable, workforce, and other housing options to bridge gaps in housing demand and supply. The analysis identifies a total demand of 6,204 additional units at all price points between 2023 and 2035.

MAPA Heartland 2050 Action Plan

The Heartland 2050 Action Plan (2020) establishes near-, mid-, and long-term goals and strategies across several focus areas to guide regional growth in the Omaha metro area. It centers on reducing disparities in access, opportunity, distance, and funding in the region, intended to steer the work of regional action and implementation.

Sarpy County Emergency Operations Plan

The Sarpy County Emergency Operations Plan (2011) is a comprehensive framework for managing disasters and emergencies across Sarpy County and its cities. It lays out the roles and responsibilities for handling emergencies: how to prevent them, respond to them, recover from them, and reduce future risk.

Bellevue CDBG 2024-2028 Consolidated Plan

The Bellevue CDBG 2024-2028 Consolidated Plan (2025) for the City of Bellevue outlines how it will allocate CDBG funds to meet community development and housing goals. It identifies priority areas such as affordable housing, public infrastructure, economic development, and public services, and selects projects for funding.

POPULATION TRENDS

Understanding demographic and economic trends in both Bellevue and Papillion is the first step to plan for resiliency. Combined, all these trends have a tremendous impact on the local housing market and its resiliency.

Population Growth

Bellevue and Papillion have experienced steady growth alongside Sarpy County since 1960. Bellevue has been the largest community in Sarpy County for the last several decades, accounting for over one third (33.7%) of the county's population in 2020. Papillion's population accounted for 12.7% of the county's population. However, when including the Extraterritorial Jurisdiction, Papillion's population is closer to 47,300, accounting for 24.8% of the county's population. Increased populations mean that the communities have increased housing production and "building booms." As these building booms occur, and are likely to continue with future growing populations, it is important to continue to build housing in a way that is safe and equitable for residents.

Increasing Diversity

Since 2000, Bellevue and Papillion have seen increases in the percentage of their populations identifying as Hispanic or Latino and BIPOC. In Bellevue, nearly 17% of the population is Hispanic or Latino, and over a quarter (28.2%) of the population is BIPOC. In Papillion, 7.6% of the population is Hispanic or Latino, and 15.3% is BIPOC. As the community diversifies, planning and communications must as well. For example, education materials should be available in languages other than English.

FIG. 2.0: HISTORICAL POPULATION CHANGE, 1960-2020 Source: US Census Bureau

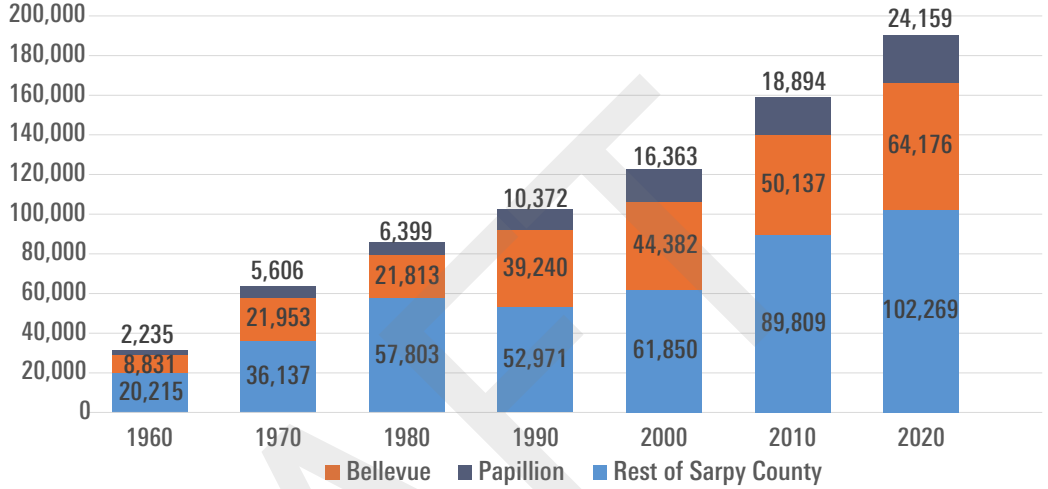
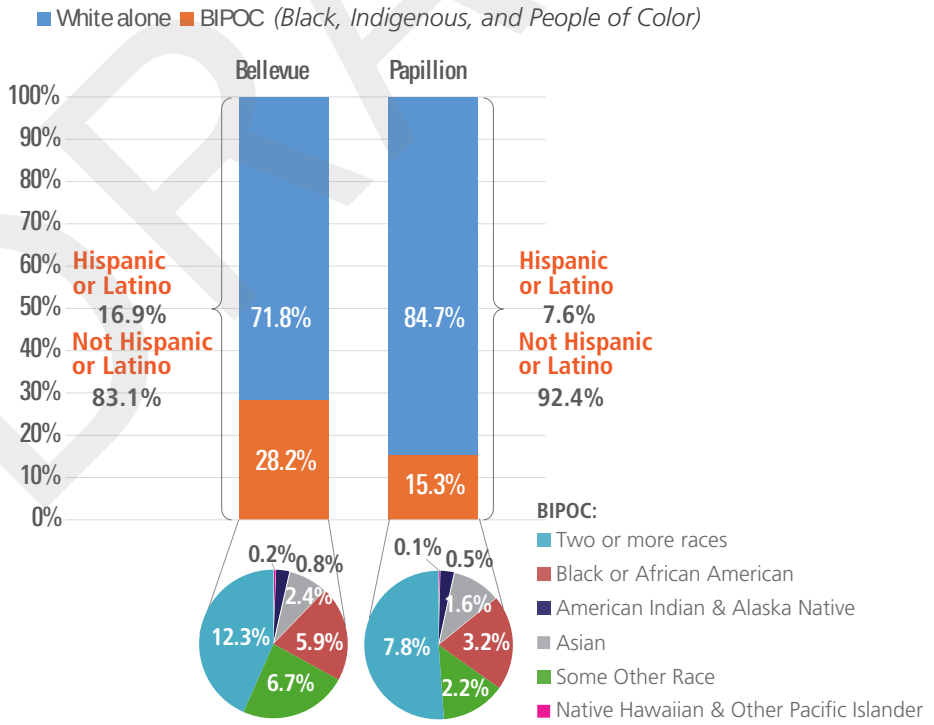


FIG. 2.1: RACE, 2023 Source: American Community Survey (5-Year Estimates)



ECONOMIC TRENDS

Bellevue and Papillion each have their own unique economies along with the commonality of the Omaha metropolitan region.

Income

Between 2010 and 2023, both Bellevue and Papillion experienced faster growth in median household incomes than Sarpy County as a whole (53.0%, 51.0%, and 48.5%, respectively). Papillion has a higher median household income ($109,602) than Bellevue ($87,343). Bellevue's median household income is 86.1% of Sarpy County's, while Papillion's is 108.1%. Both communities have higher median household incomes than Nebraska as a whole ($74,985). Higher incomes may help improve housing resilience in the communities due to home owners having more disposable income to spend on repairs and maintenance. It may also mean higher risks, with higher home and property values if damage occurs.

Education

Higher incomes are often directly tied to educational attainment. Both Bellevue and Papillion surpass the state's educational benchmark: 93.2% of Bellevue residents and 96.0% of Papillion residents have a high school diploma or higher, compared to 91.7% statewide. Similarly, over one third (33.4%) of Bellevue's population and nearly half (48.1%) of Papillion's population has a bachelor's degree or higher, compared to 31.5% statewide.

FIG. 2.2: MEDIAN HOUSEHOLD INCOME, 2010 & 2023 Source: American Community Survey (5-Year Estimates)

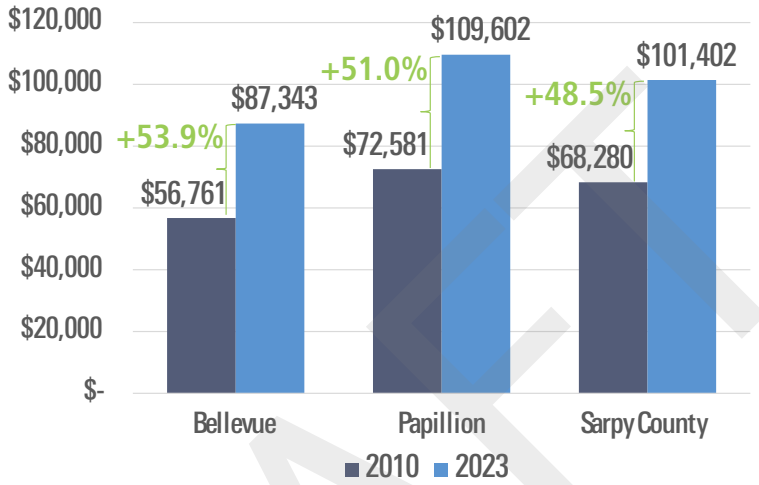


FIG. 2.3: PEOPLE LIVING BELOW POVERTY LEVEL, 2023 Source: American Community Survey (5-Year Estimates)

5.7% Bellevue
2.9% Papillion
3.8% Sarpy County

FIG. 2.4: EDUCATIONAL ATTAINMENT, 2023 Source: American Community Survey (5-Year Estimates)

HIGH SCHOOL DEGREE OR HIGHER

93.2% Bellevue
96.0% Papillion
95.7% Sarpy County

BACHELORS DEGREE OR HIGHER

33.4% Bellevue
48.1% Papillion
41.9% Sarpy County

Employment

Educational services, health care, and social assistance is the largest industry by employment for both Bellevue and Papillion. The second largest industry in Bellevue is professional, scientific, management, administrative, and waste management services while the second largest in Papillion is retail. For both cities, agriculture, forestry, fishing, hunting, and mining are the least common employers for residents. Employment in construction in Bellevue and Papillion accounts for 7.5% and 5.9% of the workforce, respectively. These employers are critical to the construction of new housing, as well as the maintenance of aging or repairs of damaged residences.

Bellevue and Papillion both have a low unemployment rate of 2.6%, lower than Sarpy County's at 2.8% and Nebraska's at 3.0%.

FIG. 2.5: EMPLOYMENT: CIVILIANS IN LABOR FORCE, 2023

62.9% Bellevue
65.7% Papillion
69.0% Sarpy County

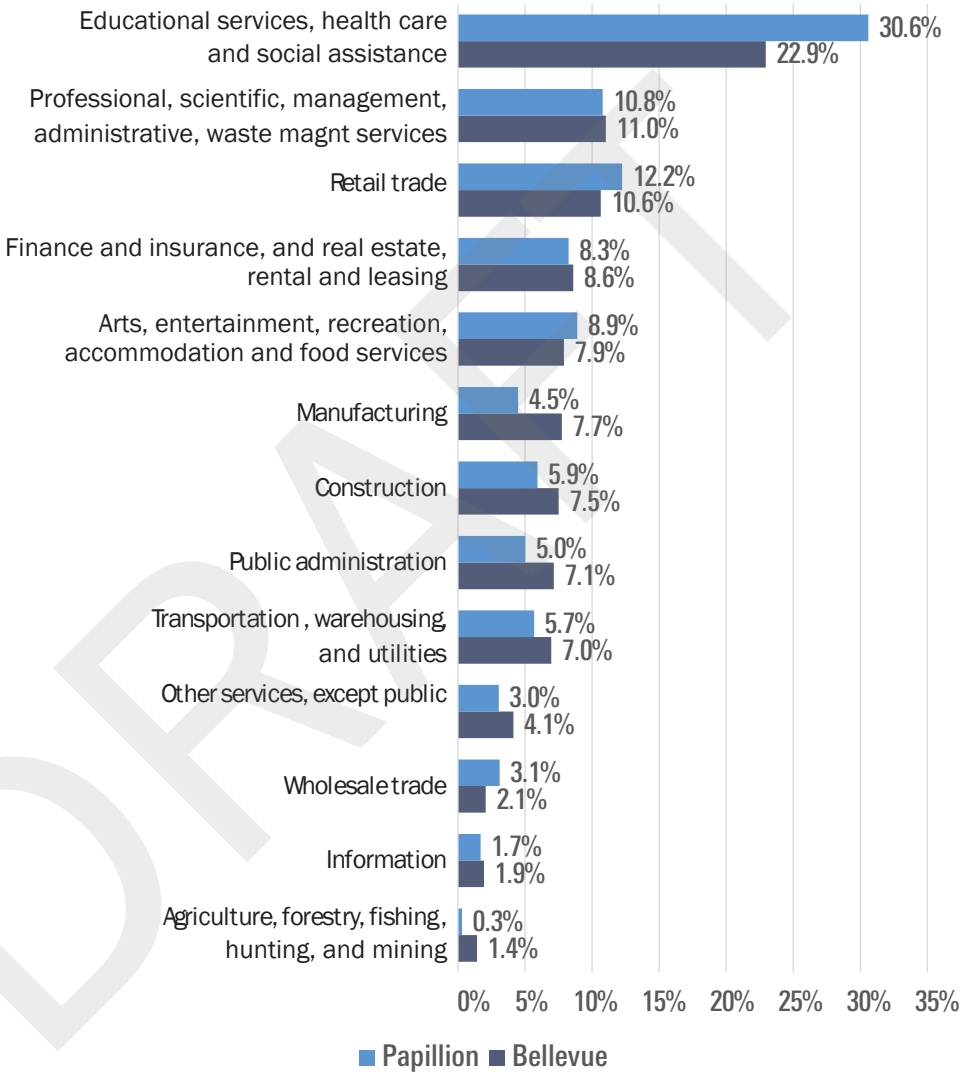
Source: American Community Survey (5-Year Estimates)

FIG. 2.6: UNEMPLOYMENT, 2025

2.6% Bellevue
2.6% Papillion
2.8% Sarpy County

Source: FRED , May 2025

FIG. 2.7: EMPLOYMENT INDUSTRIES, 2023 Source: American Community Survey (5-Year Estimates)



HOUSING TRENDS

Houses and neighborhoods are at the heart of a community's identity. There are 25,080 households in Bellevue, and 9,247 in Papillion, for a total of 34,327 households in the study area.

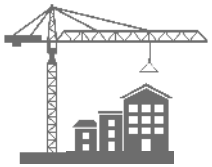
Housing Types

The large majority of households in Bellevue and Papillion live in single-family detached homes (69.2% and 76.7%, respectively). The second most common housing arrangement is larger apartment buildings with 10 or more units, followed by apartment buildings with 5-10 units. Very few households live in duplexes, townhomes, or apartments with less than 5 units, which may be due to a lack of these types of units. As noted in Build Change's definition of housing resiliency (page 11), affordability plays an important role, and increasing stock in different housing styles may also increase affordability across the communities.

Occupancy

Bellevue and Papillion both have higher owner-occupancy rates than renter-occupancy. However, Bellevue's owner-occupancy dropped 3.0 percentage points between 2010 and 2020, while Papillion's rose 1.1 percentage point. In Sarpy County, and statewide, renter-occupancy rose over the same time period. The ownership of units is important to understanding strategies for investing in and maintaining the housing resiliency.

FIG. 2.8: TOTAL HOUSING UNITS



	BELLEVUE	PAPILLION
HOUSING UNITS	26,274	9,509
HOUSEHOLDS	25,080	9,247

FIG. 2.9: HOUSING TYPES

	BELLEVUE	PAPILLION
Single-Family	69.2%	76.7%
Duplex or Townhome	4.3%	2.0%
3-4 Units	1.5%	1.7%
5-10 Units	7.8%	4.8%
10 or More Units	15.1%	14.8%
Mobile Home, Boat, RV, van, etc.	2.1%	0.0%

Source: US Census Bureau

FIG. 2.10: HOUSING OCCUPANCY

OWNER-OCCUPIED

	2010	2020
Bellevue	66.8%	63.8%
Papillion	69.7%	70.8%
Sarpy County	71.2%	69.6%

Source: US Census Bureau

RENTER-OCCUPIED

	2010	2020
Bellevue	33.2%	36.2%
Papillion	30.3%	29.2%
Sarpy County	28.8%	30.4%

Source: US Census Bureau

Housing Costs

In the last decade housing prices have been rising faster than incomes. This can leave households with less disposable income to make improvements that would increase the resilience of a home. In Bellevue, median home prices rose 67.4% between 2010 and 2023, while in Papillion, home values rose 77.4%. Contract rents in Bellevue rose 114% between 2010 and 2023, while in Papillion rents rose 38.7%. Cost burdened households, whether owner or renter, will find it more challenging to recover from weather events that impact their homes.

FIG. 2.11: HOUSING VALUES

MEDIAN VALUE

2010	2023	
$138K	$231K	Bellevue
$164K	$291K	Papillion
$159K	$288K	Sarpy County

Source: American Community Survey (5-Year Estimates)

MEDIAN CONTRACT RENT

2010	2023	
$636	$1,065	Bellevue
$719	$990	Papillion
$702	$1,142	Sarpy County

Source: American Community Survey (5-Year Estimates)

FIG. 2.12: HOUSING AFFORDABILITY

% COST BURDENED HOUSEHOLDS, 2023

RENTERS	OWNERS	
39.6%	16.5%	Bellevue
41.1%	14.3%	Papillion
42.3%	16.2%	Sarpy County

Source: American Community Survey (5-Year Estimates)

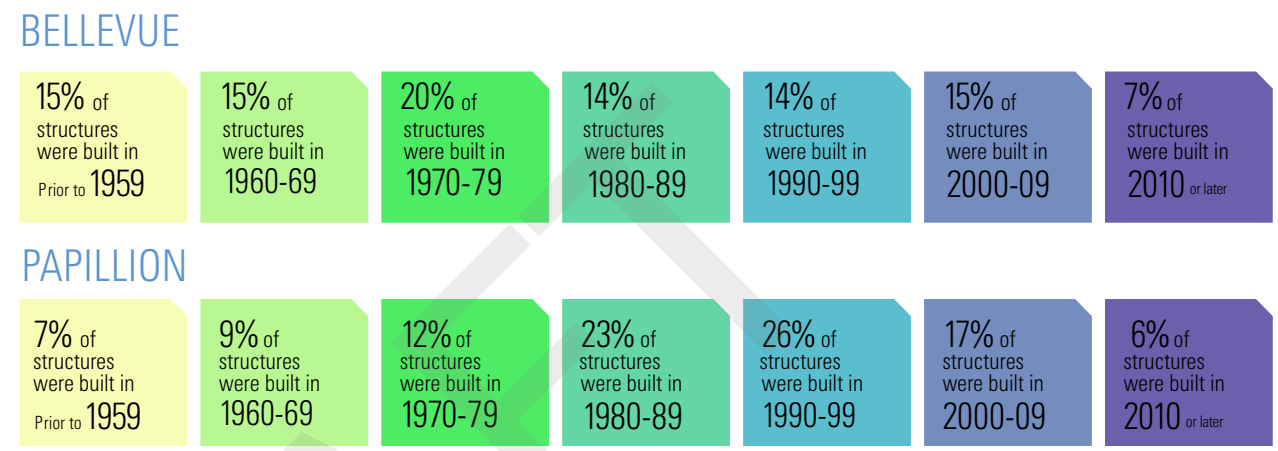
AGE OF EXISTING HOUSING STOCK

Housing Age

The age of housing in Bellevue and Papillion tells an important story. It reflects how and when neighborhoods grew, how building codes and materials have changed, and where challenges might be faced with aging infrastructure or maintenance needs. Older homes are more likely to have less efficient materials, aging foundations, and weaker protection against flooding, high winds, and extreme heat. These homes may also lack updated wiring, insulation, or roof systems that help reduce damage during severe weather. Knowing when homes were built helps identify where safety upgrades and reinvestment are most needed.

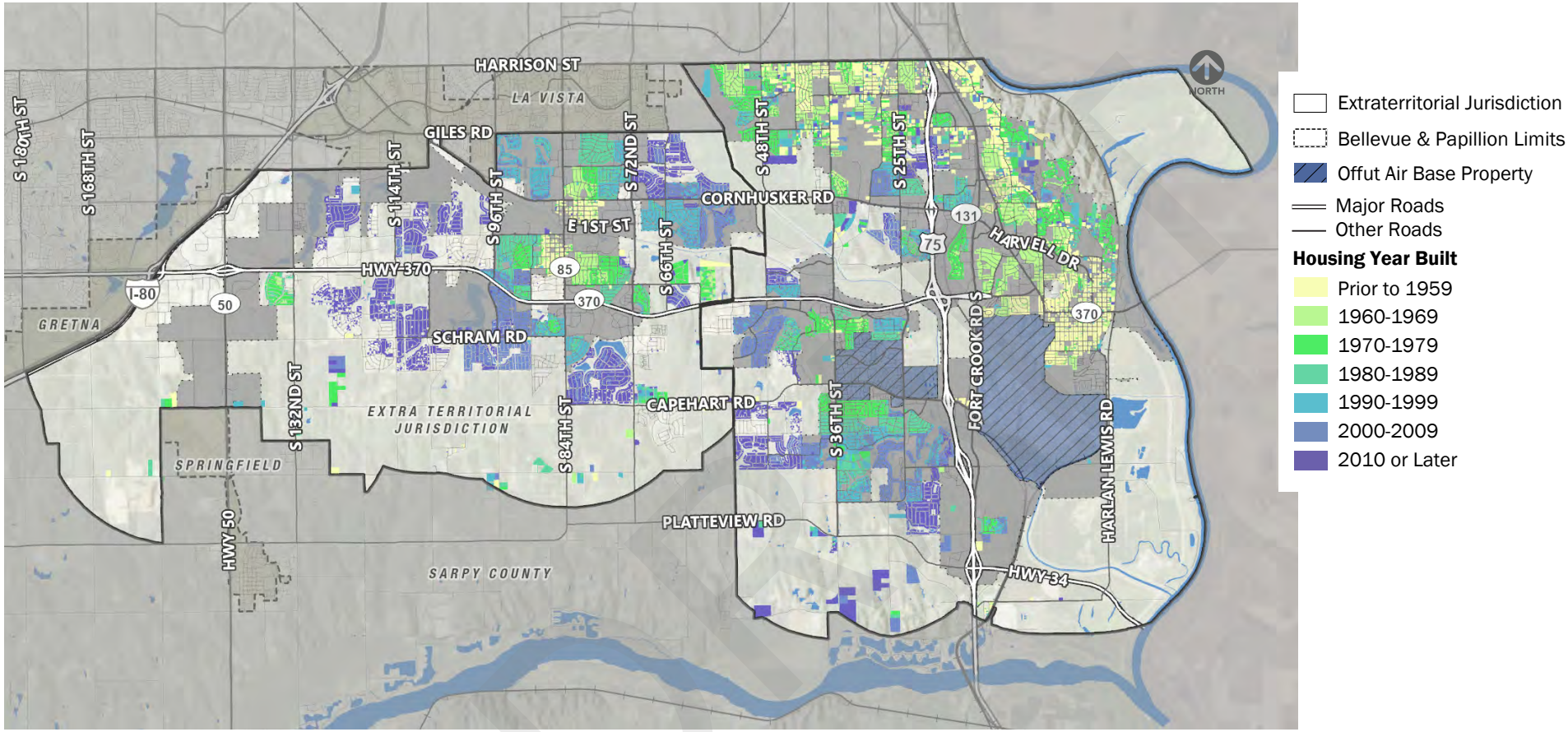
In total, Bellevue has an older housing stock than Papillion, where the oldest homes are located to the north and east. Generally, the newer homes are located to the south and west. Figure 2.13 (right) shares the percentage of housing stock in each community built each decade, and Map 2.0 (page 27) identifies them spatially.

FIG. 2.13: SHARE OF HOUSING BY DECADE BUILT



Source: US Census Bureau

MAP 2.0: HOUSING BY YEAR BUILT



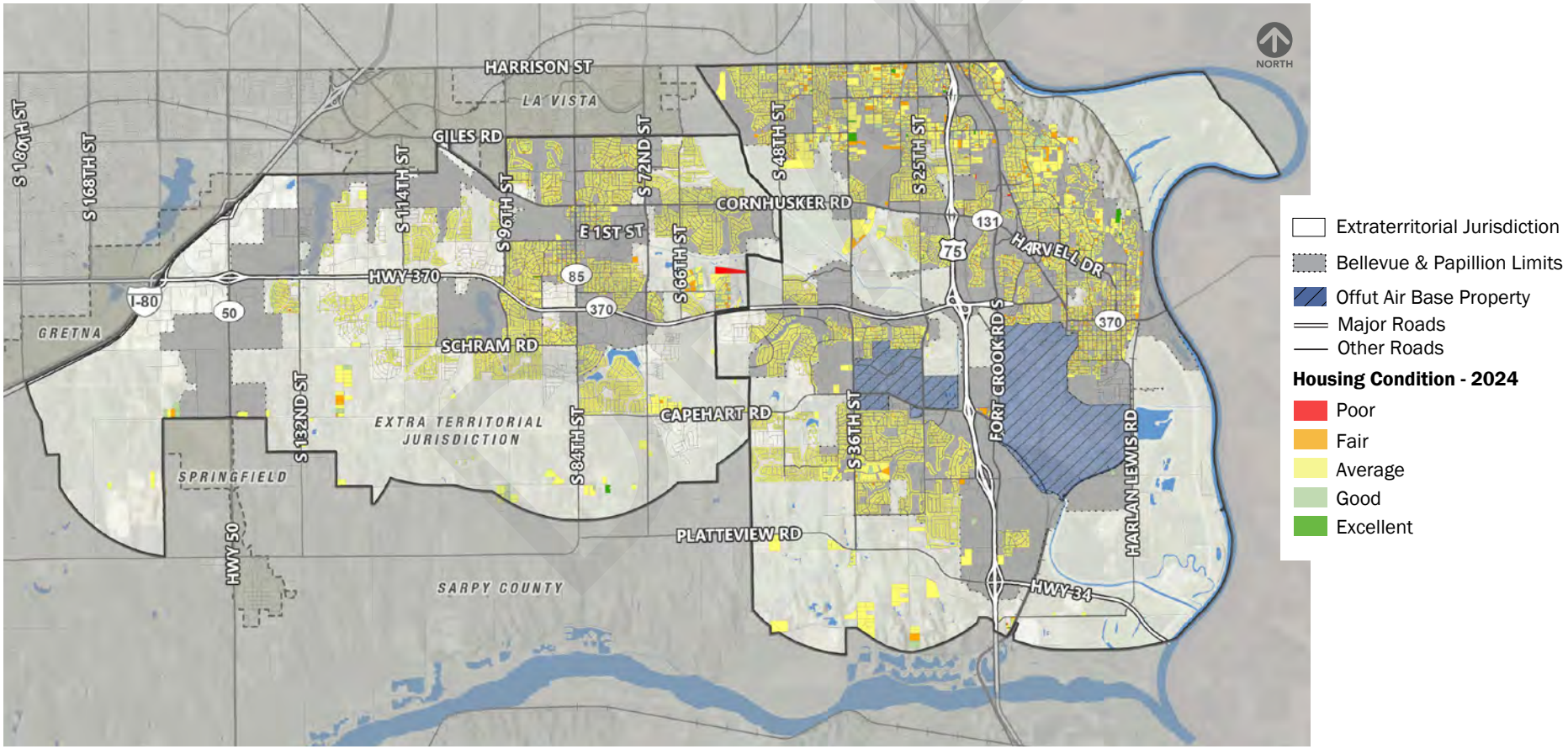
Source: Sarpy County Assessor, 2024; RDG Planning & Design

HOUSING CONDITION AND VALUE

Housing Condition

Similar to housing age, housing condition can help identify neighborhoods and areas that should be targeted for revitalization and reinvestment. Map 2.1 (below) shows housing condition across both Bellevue and Papillion, where, for the vast majority, homes are in average or higher condition, and may be less at risk for issues related to deteriorating conditions. Areas where homes are identified as being in less than average condition may be best suited for targeted maintenance programs to build resilience while maintaining affordability.

MAP 2.1: HOUSING CONDITIONS

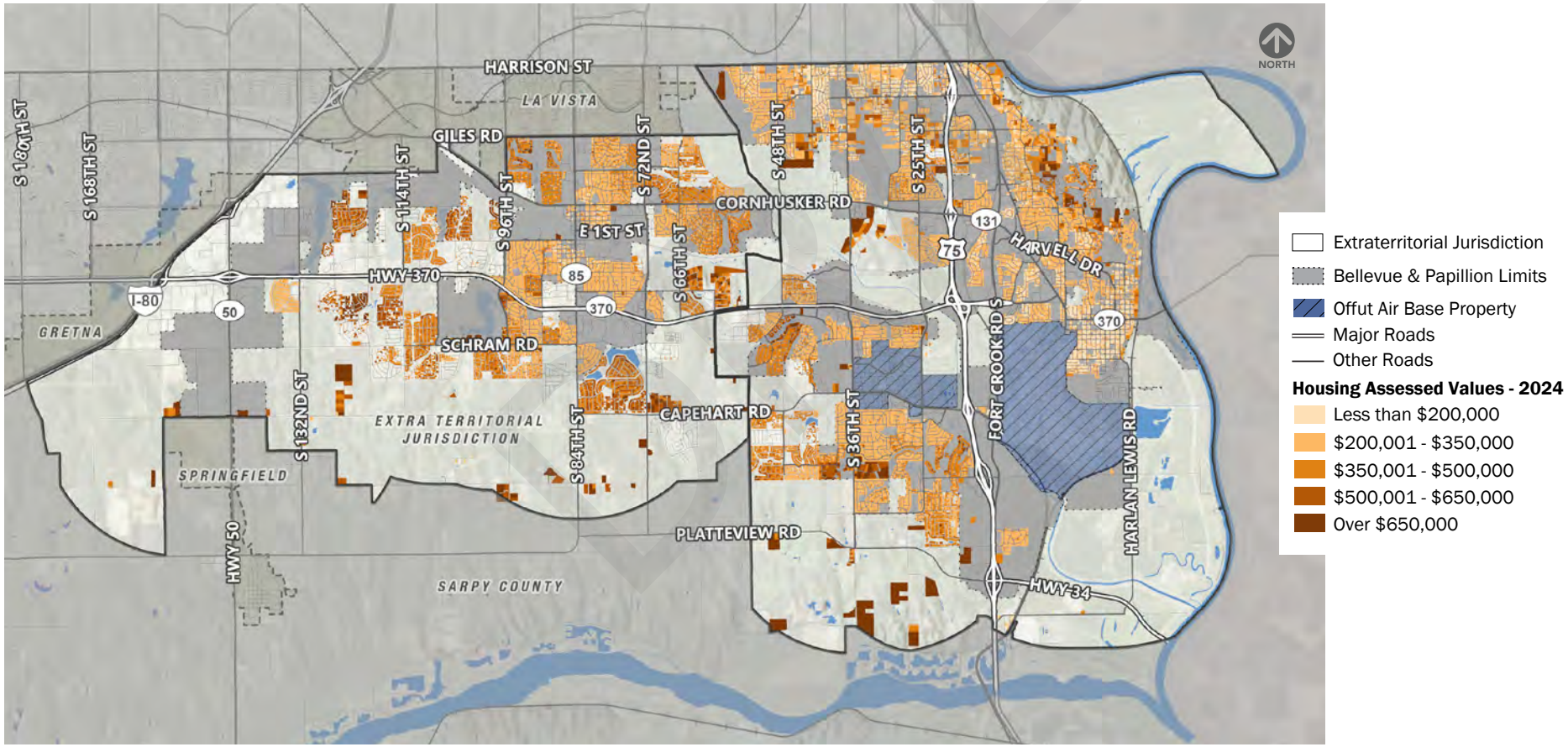


Source: Sarpy County Assessor, 2024; RDG Planning & Design

Housing Values

Housing values are assessed and reported by the Sarpy County Assessor's Office. Map 2.2 (below) displays the housing values throughout both communities, which can be used to understand which areas in the community might be most vulnerable to economic loss after a disaster. It highlights disparities, showing where lower-value housing might indicate older, less resilient structures, or where higher-value homes concentrate financial risk. The areas identified may be used to guide equitable resource allocation and program prioritization.

MAP 2.2: HOUSING VALUES



Source: Sarpy County Assessor, 2024; RDG Planning & Design

VULNERABILITY

Disaster Frequency

Nationally, natural disasters are becoming more extreme and more frequent. This can even be seen at the local level in Bellevue and Papillion, with 16 federally-declared disasters in Sarpy County since 1960, increasing in frequency particularly since 2000. These events have had lasting impacts on homes, infrastructure, and neighborhoods. The timeline below shows these disaster declarations, and gives insight to understanding the vulnerabilities in Bellevue and Papillion, strengthening preparedness, and guiding future housing and land use decisions to build resilience in the communities.

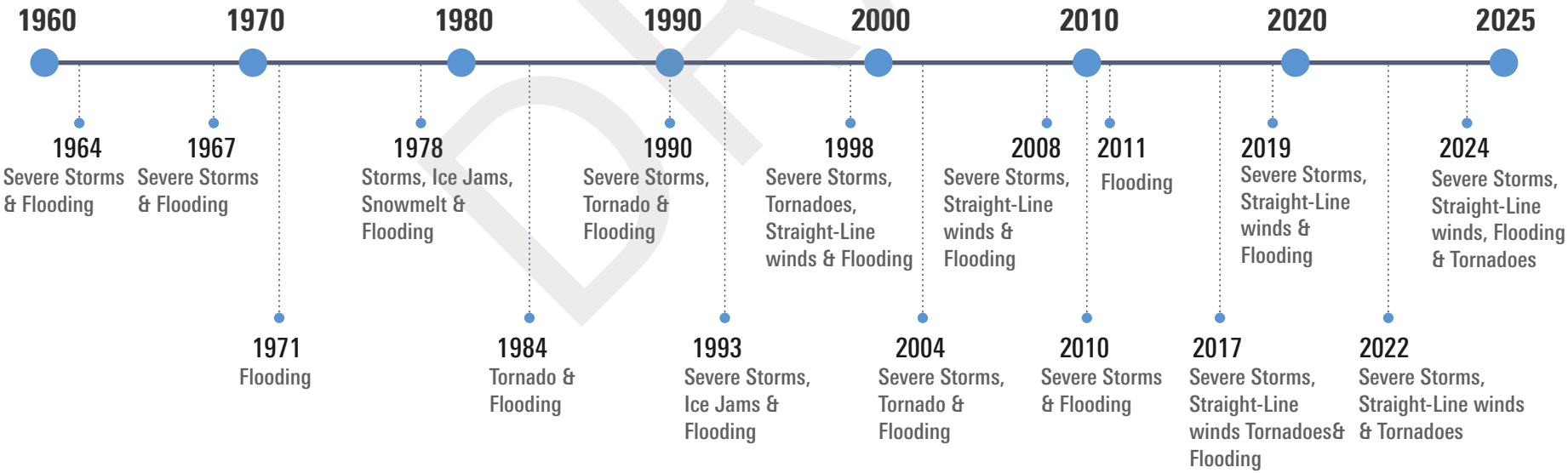
1964 Flood

1993 Flood & Severe Storms

2008 Flood & Severe Storms

2017 Tornado

2019 Flood

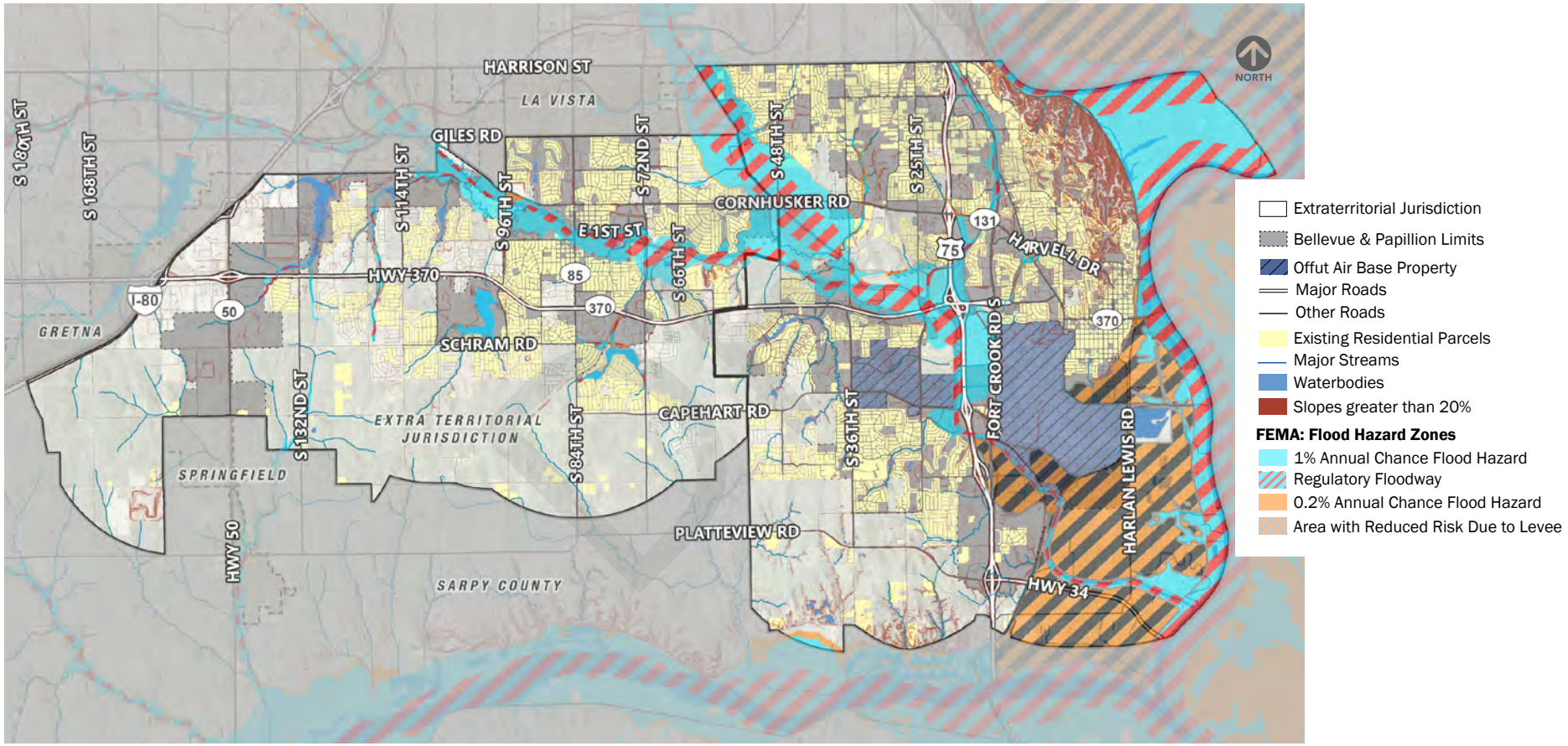


Source: Federal Emergency Management Agency (FEMA), Disaster Declarations Summary, fema.gov

Flood Risk

Bellevue and Papillion are home to two watersheds: The Papio Watershed and the Missouri River Watershed. The river and creeks create a risk of flooding for some local properties, which can be seen in Map 2.3 (below). FEMA-identified floodplains designate areas most at risk of repetitive flooding. The risk is caused by heavy rainfall, either locally or upstream, where water may run downstream and into Bellevue and/or Papillion. Knowing these areas helps guide policy and land use directions, informing development out of the areas most at risk.

MAP 2.3: FLOODPLAIN AND FLOOD RISK

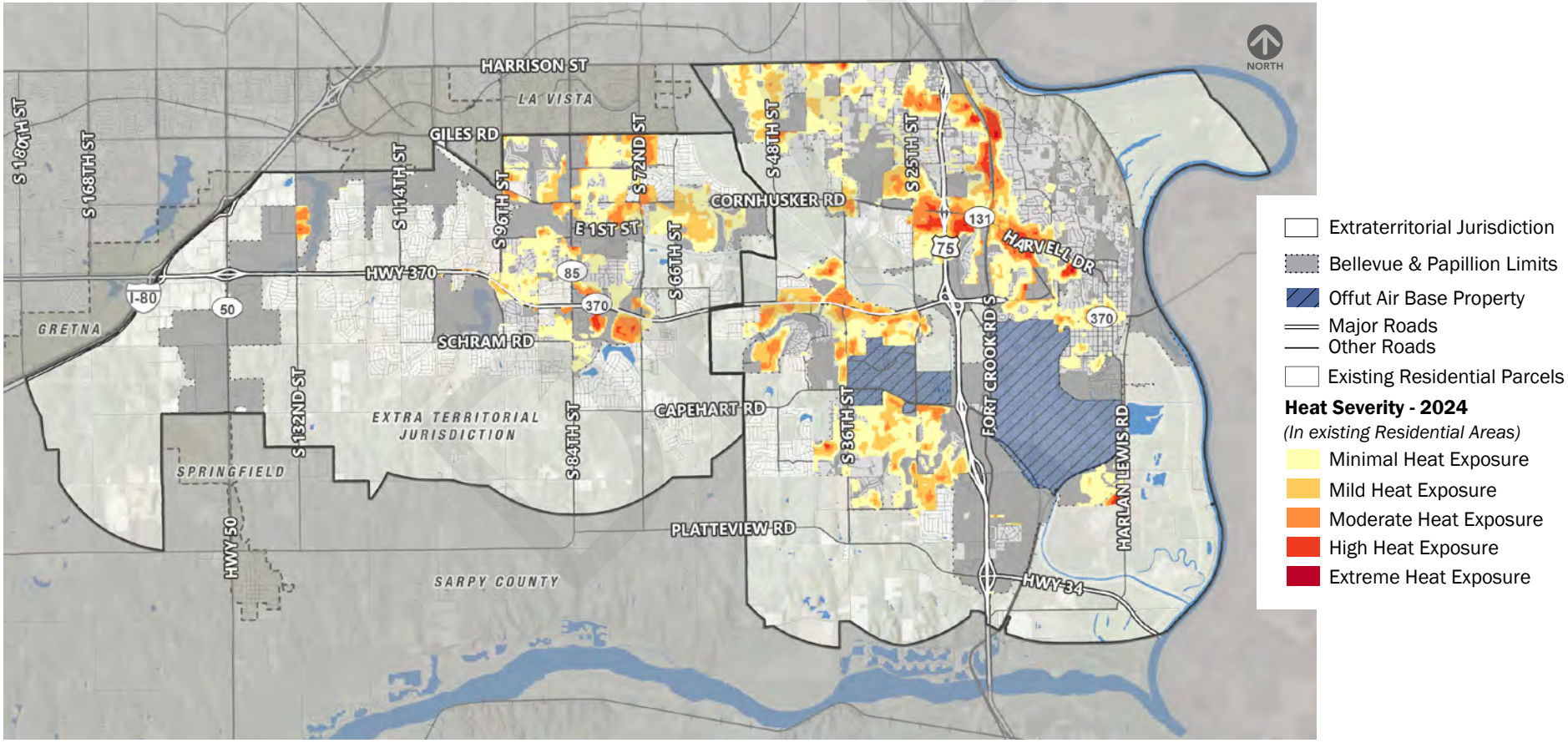


Source: Sarpy County Assessor 2025, Federal Emergency Management Agency (FEMA)

Heat Risk

Extreme heat is one of the fastest-growing climate threats, especially in urban areas like Bellevue and Papillion. Map 2.4 (below) shows the Urban Heat Severity Index (UHSI) isolated to residential areas, which highlights residential areas in Bellevue and Papillion where surface temperatures are significantly higher than surrounding areas. Neighborhoods with more pavement, fewer trees, and older buildings tend to trap the most heat. These urban heat islands can cause health risks, especially for seniors, low-income households, and people without access to air conditioning. This data helps identify where strategies like planting trees, adding shade, or improving building materials can most reduce risk and improve quality of life for residents, especially as extreme heat events worsen and become more frequent.

MAP 2.4: URBAN HEAT SENSITIVITY IN RESIDENTIAL AREAS



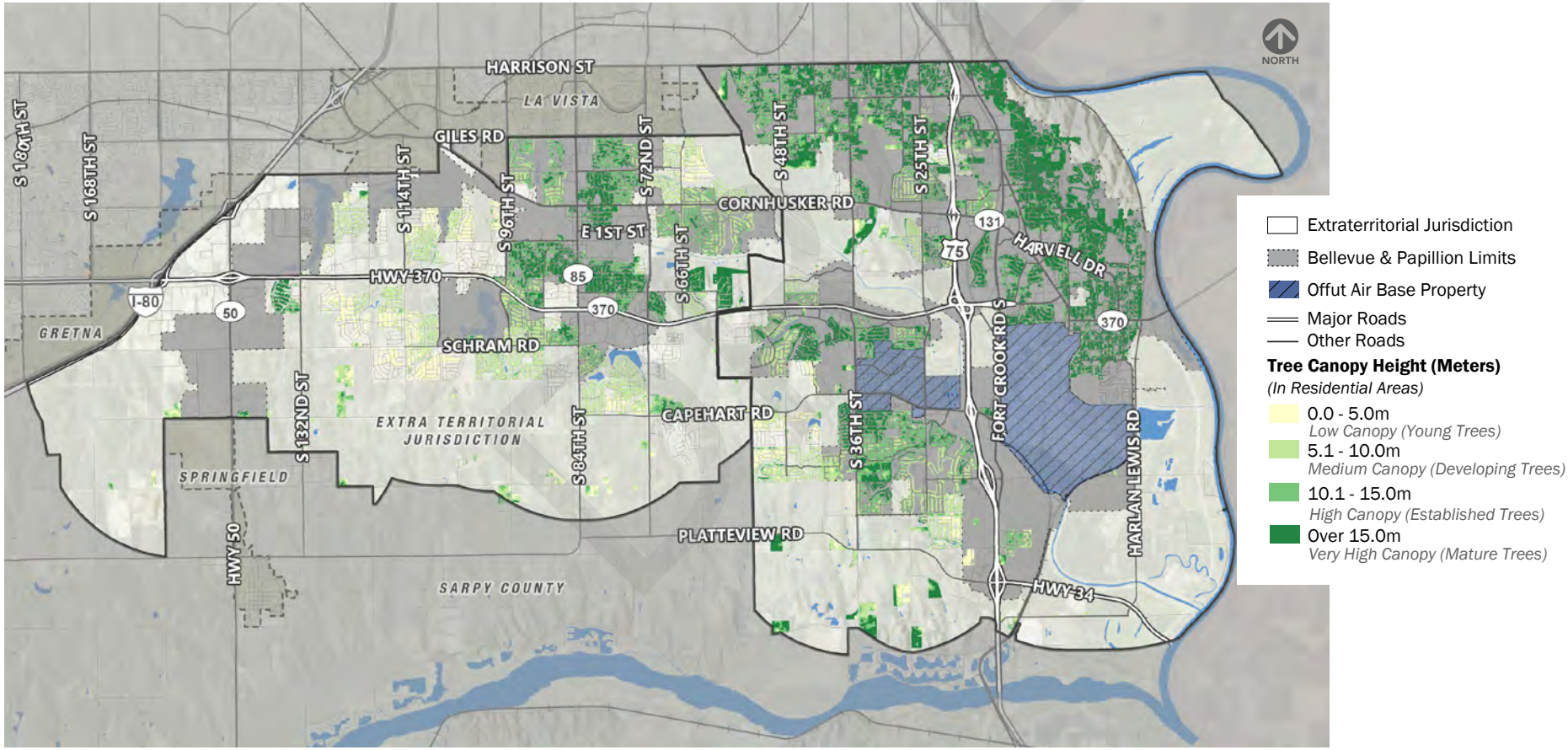
Source: U.S. Geological Survey (USGS), 3D Elevation Program (3DEP). The National Map DEM Data; Sarpy County Assessor data, 2024; RDG Planning & Design

Tree Canopy Height

The height of a community's trees tells a quiet story of time and resilience. Using data from the Global Tree Canopy Height 2020 dataset, Map 2.5 (below) shows the canopy height within existing residential areas of Bellevue and Papillion. Taller trees often signal older, well-established neighborhoods where shade has been growing for decades—cooling streets, softening noise, and catching rainfall before it rushes to the storm drain. Areas with shorter or thinner canopy reflect newer growth or places where trees have been lost over time.

Understanding the relationship between canopy height and age helps identify neighborhoods where tree preservation or additional planting could most effectively enhance comfort, reduce heat exposure, and strengthen environmental resilience.

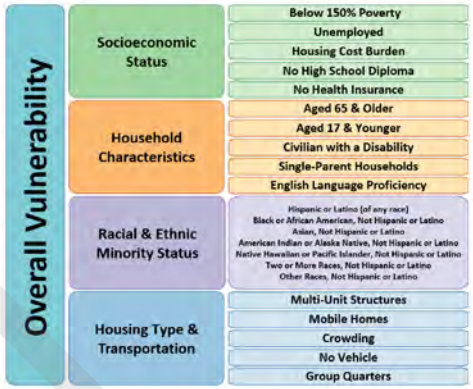
MAP 2.5: TREE CANOPY HEIGHT IN EXISTING RESIDENTIAL AREAS



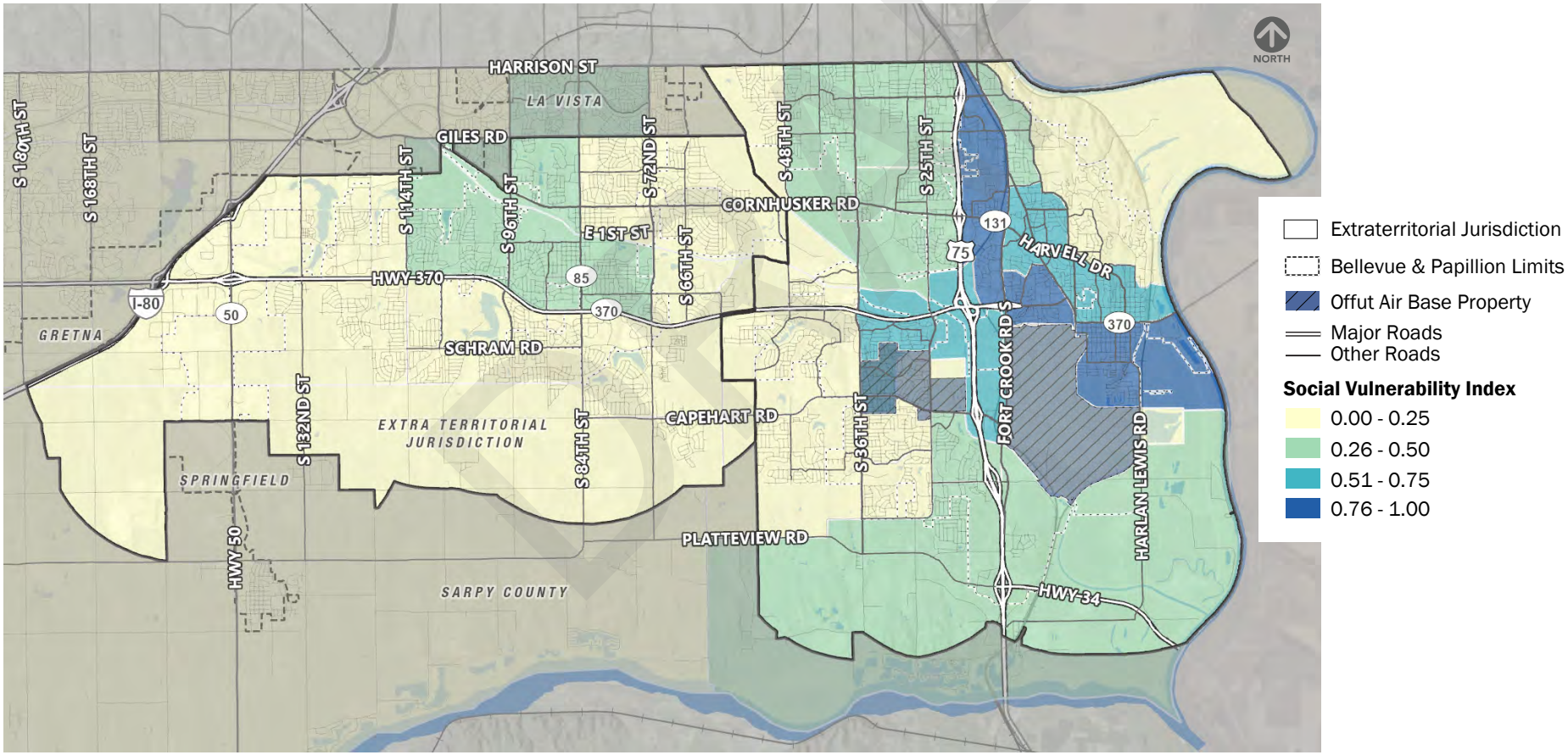
Source: Esri, NASA, and U.S. Geological Survey. (2020). Global Canopy Height 2020 [Raster dataset]. Retrieved October 2025 from ArcGIS Living Atlas of the World

Social Vulnerability Index

Some residents face more challenges during and after disasters, especially those with limited resources or access to support. Map 2.6 (below) shows the Social Vulnerability Index (SVI), which helps identify areas that may need more help when responding to emergencies like floods, heat waves, or storms. The SVI scores census tracts on a scale of 0 (least vulnerable) to 1 (most vulnerable) based on four key items: socioeconomic status, household characteristics, racial and ethnic minority status, and household type and access to transportation. On the map, darker areas have higher vulnerability. By using this data, city leaders can prioritize investments and planning strategies to support neighborhoods that need it most.



MAP 2.6: SOCIAL VULNERABILITY INDEX



Source: Centers for Disease Control and Prevention / Agency for Toxic Substances and Disease Registry (CDC/ATSDR)

STORMWATER ASSESSMENT

Identifying limitations in the stormwater network is critical to protecting against localized flash flooding. Flood risks along larger streams and rivers are usually identified on FEMA Flood Insurance Rate Maps (FIRMs). Beyond these areas, there are locations where stormwater infrastructure does not meet the demand for large or intense rainfall events, putting specific areas at risk.

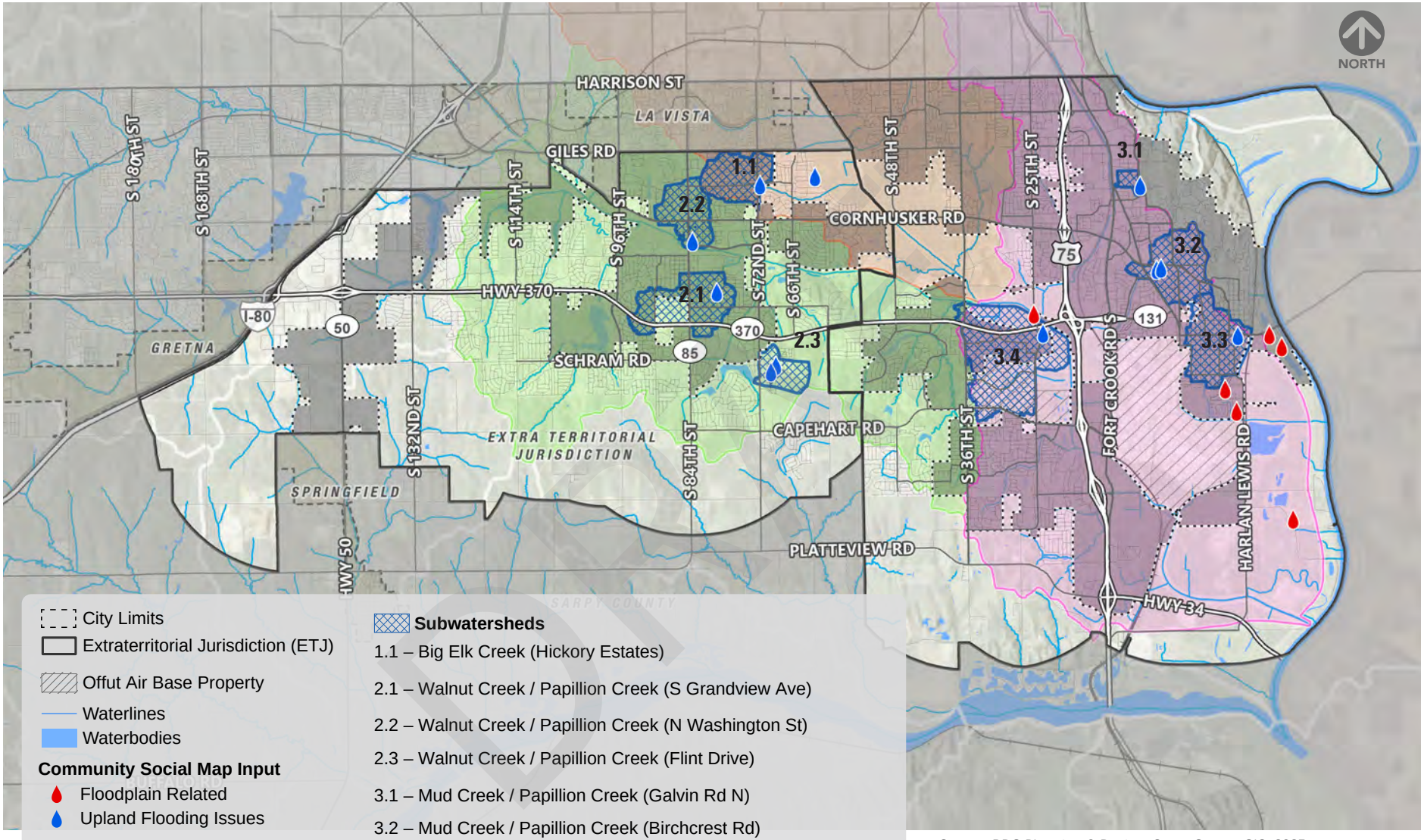
Within Bellevue and Papillion, eight areas of interest at a neighborhood scale were identified based upon community input. The following assessment focused on the areas where upland flooding were reported, rather than points within major stream or river floodplains. The watersheds that drain to the areas of interest were analyzed to determine rough estimates of peak runoff rates expected by 5-year and 100-year rainfall events. These peak flows were compared against the estimated capacities of the stormwater infrastructure. It should be noted that some data on storm sewer sizes, slopes and elevation were not available, requiring this analysis to make educated assumptions when necessary (Appendix A).

The goal of the assessment was to determine if infrastructure limitations were driving localized flooding concerns around Bellevue and Papillion. Areas with limited or no storm infrastructure may contribute to localized flooding. Infrastructure flagged as “under capacity” in the assessment would benefit from further investigation to gather additional information, verify capacity, and ultimately determine if infrastructure upgrades may be necessary to address flash flooding. A few locations without stormwater infrastructure in these neighborhoods were also identified.

These calculations provide an initial “screening-level” assessment to identify potential capacity issues that may contribute to localized flash flooding. Once more accurate pipe elevation data is available, more detailed studies could be completed to better evaluate system capacities and find opportunities for system improvements. The neighborhoods with upland flooding concerns that were assessed for stormwater infrastructure limitations are shown on Map 2.7 on the next page.

STORMWATER ASSESSMENT FINDINGS

MAP: 2.7: RESIDENT IDENTIFIED FLOODING ISSUES & ASSOCIATED WATERSHEDS



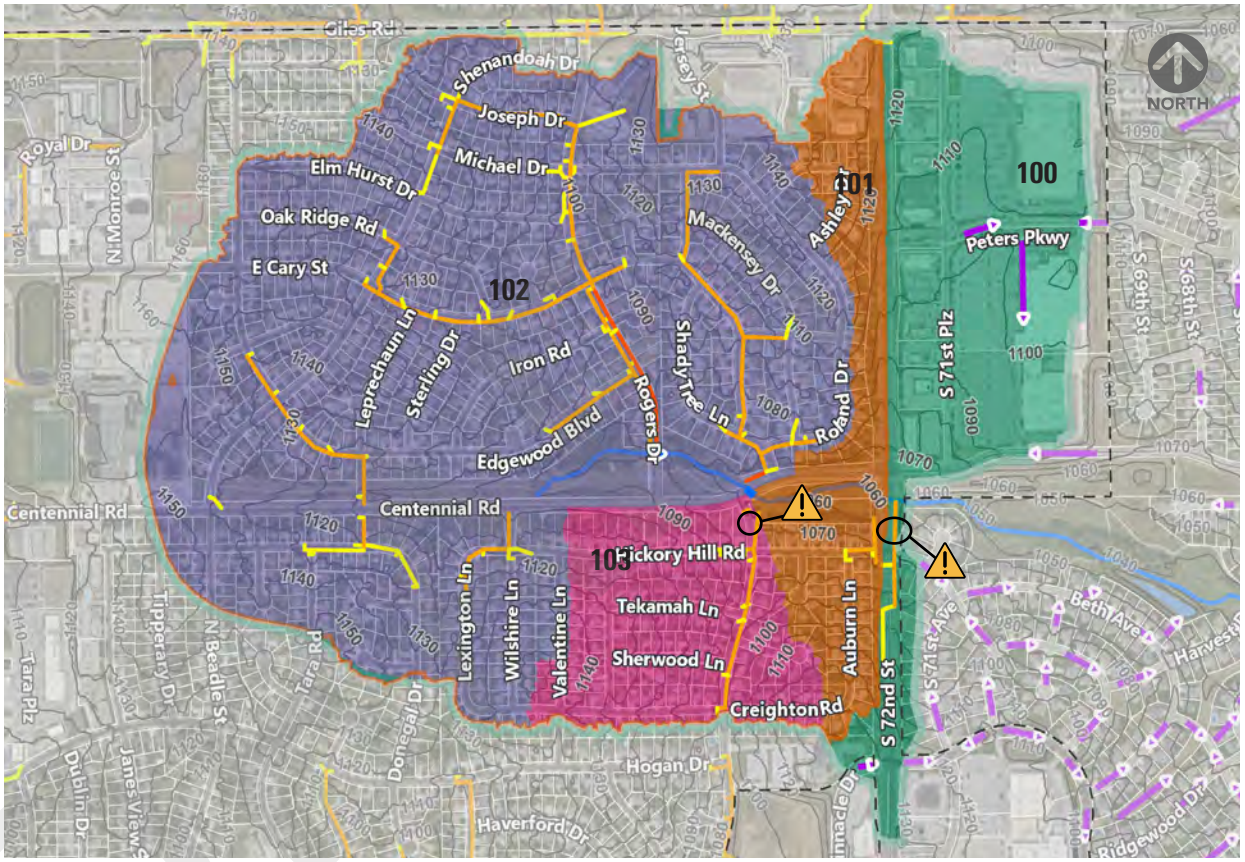
Source: RDG Planning & Design; Sarpy County GIS, 2025

1.1 Hickory Estates Park (Papillion)

Flooding concerns were reported near Hickory Estates Park, just upstream of the culvert under S. 72nd Street. Four watersheds were delineated to assess the capacity of two culverts and one storm sewer gravity main that flow into the area of concern. Subwatersheds 100 and 101 assess the peak runoff to the South 72nd Street culvert and include mostly single-family residential lots and some commercial lots. Subwatershed 102 assesses culvert #2441, which crosses under E. Centennial Road to outlet into Fricke Creek at Hickory Estates Park. Subwatershed 103 assesses storm sewer gravity main #36603, which also outlets into Fricke Creek at Hickory Estates Park. Subwatersheds 102 and 103 are predominantly single-family residential. Information for the S. 72nd Street culvert was not available, therefore, it was assumed to be a 72-inch box culvert with a 2.5% slope. These assumptions were based on images of the culvert and LIDAR elevations (see Appendix A).

Based on this screening-level analysis, both culverts in the area were estimated to be under capacity, but gravity main #36603 is expected to have adequate capacity. The S. 72nd Street culvert may be limiting the capacity for all the contributing subwatersheds and culvert #2441 may also be limiting subwatershed 102. Further investigation into the capacities of these culverts is recommended.

MAP 2.8: SUBWATERSHED 1.1 | HICKORY ESTATES PARK (PAPILLION)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

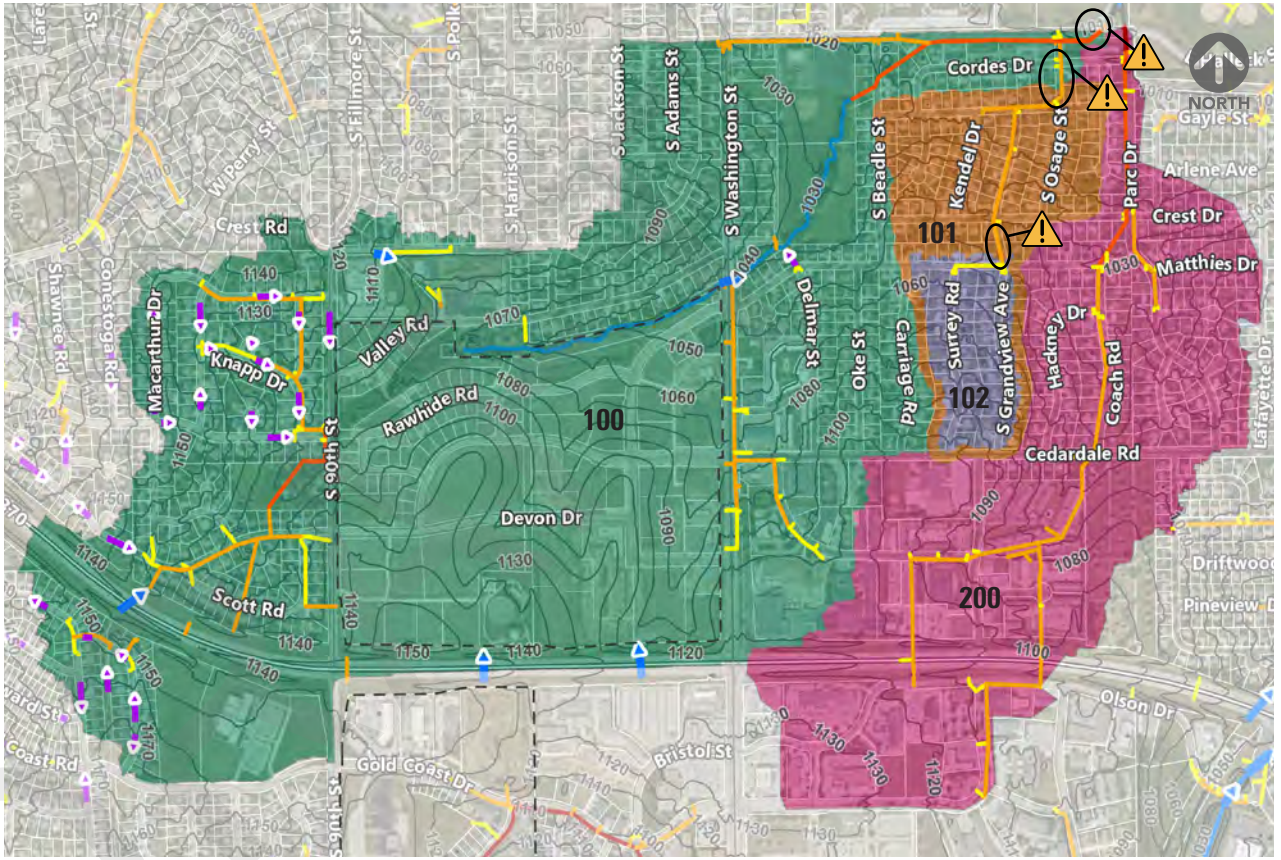
STORMWATER ASSESSMENT FINDINGS

2.1 South Grandview Avenue (Papillion)

Residents noted flooding concerns at the intersection of S. Grandview Ave and Matthies Drive. Four watersheds were delineated to assess the capacity of six gravity mains that impact the identified area. Subwatersheds 100 and 200 assess the peak runoff for two 60-inch storm sewers and two 72-inch storm sewers that cross under E. Halleck Street. Subwatershed 101 assesses a 42-inch gravity main that serves as an outlet for subwatershed 101 and connects to one of the 60-inch mains. Subwatershed 102 flows to a 30-inch gravity main. Subwatersheds 100 and 200 include both single-family residential lots and commercial lots, and 101 and 102 only include single-family residential lots. Slope information for the six storm sewer gravity mains was not available, therefore, pipe slopes were assumed based on LIDAR elevations (see Appendix A).

Based on the screening-level analysis, the two 60-inch mains for subwatershed 100 are estimated to be under capacity and the two 72-inch mains for 200 were projected to have adequate capacity. The two 60-inch mains may be limiting the capacity for the contributing subwatershed 101. The 42-inch main was estimated to be under capacity for subwatershed 101 and the 30-inch main was estimated to have adequate capacity for subwatershed 102. Even if the 30-inch main is adequate, it is possible that the two 60-inch mains and the 42-inch main are contributing to the flooding issues in subwatershed 102. Further investigation into the capacities of these pipes is recommended, particularly the two 60-inch and the 42-inch mains that were estimated to be under capacity.

MAP 2.9: SUBWATERSHED 2.1 | SOUTH GRANDVIEW AVENUE (PAPILLION)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

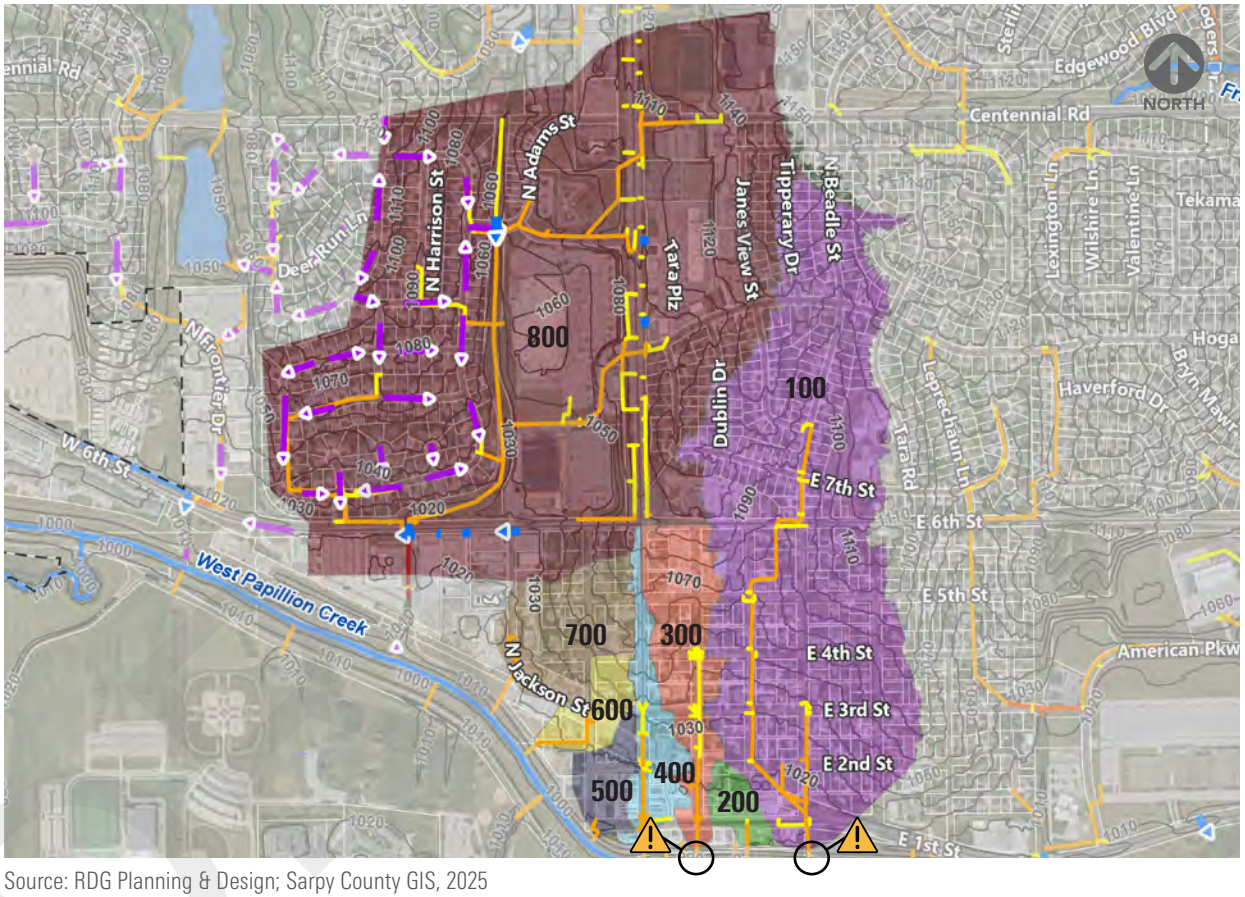
Infrastructure estimated to be under capacity

2.2 North Washington Street (Papillion)

Flooding concerns were reported at the intersection of N. Washington Street and W. 2nd Street. Eight watersheds were delineated to assess the capacity of eight storm sewer gravity mains that outlet into West Papillion Creek. The subwatersheds include a mix of single-family residential lots and commercial lots. Slope information for the gravity mains were not available, therefore, pipe slopes were assumed based LIDAR elevations (see Appendix A). Additionally, the storm sewer information for the subwatershed 400 appeared to be either missing information or included erroneous information.

Based on this screening-level analysis, the eight mains were estimated to be adequate for the 5-year peak runoff rate, however two mains (for subwatersheds 100 and 300) were estimated to be under capacity for the 100-year rate. Further investigation into the capacities of these pipes is recommended, especially the 30-inch main with potentially erroneous data serving as the outlet for subwatershed 400.

MAP 2.10: SUBWATERSHED 2.2 | NORTH WASHINGTON STREET (PAPILLION)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

STORMWATER ASSESSMENT FINDINGS

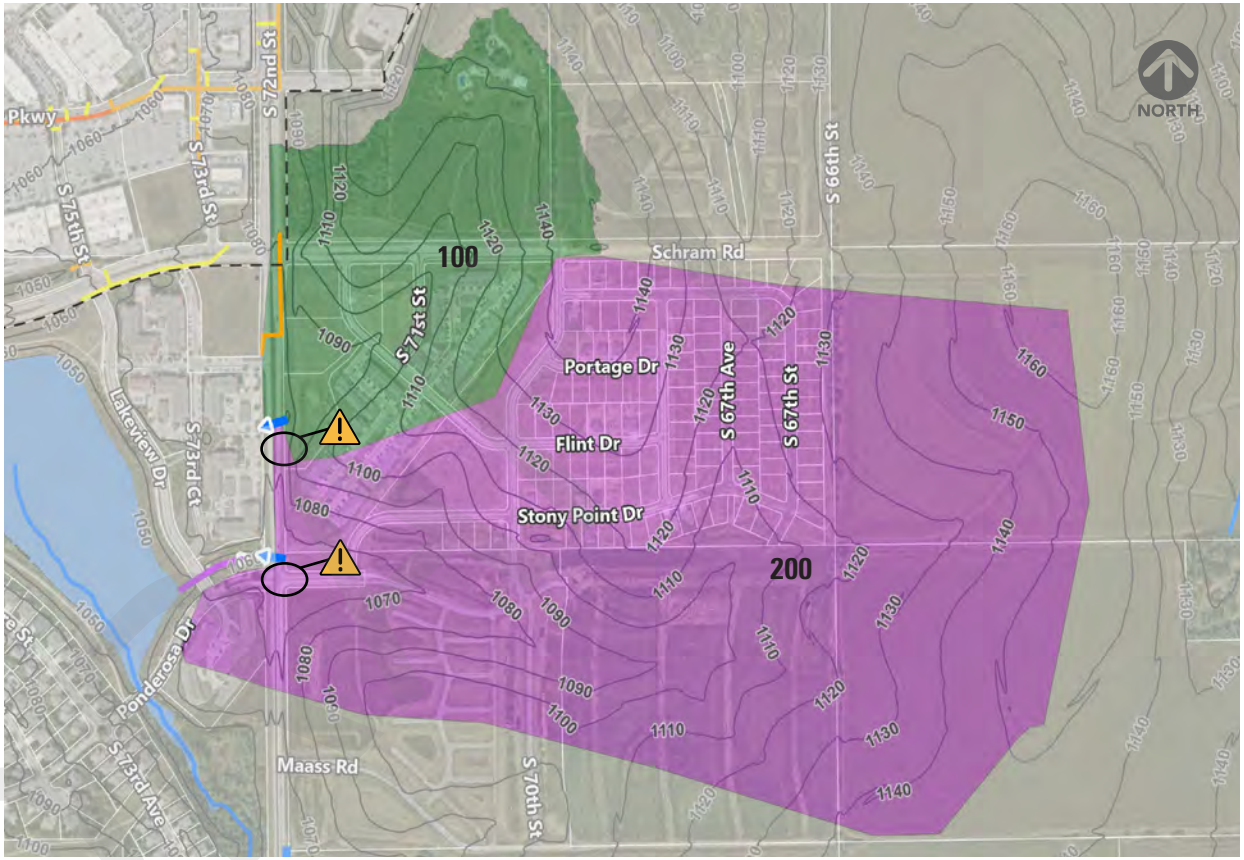
2.3 Flint Drive (Papillion)

Flooding concerns were reported along the upslope side of housing units off Flint Drive. Two watersheds were delineated to assess the capacity of two culverts that carry stormwater from the area of concern under S. 72nd Street to Shadow Lake. This area has recent development and does not yet have up-to-date stormwater network information in the Sarpy County GIS database. With flooding occurring near housing in this area, this area should be prioritized for data collection to assist in investigating the stormwater capacity further.

Subwatersheds 100 and 200 assess capacity for two culverts, estimated to be 60-inch and 72-inch, respectively. The subwatersheds were assumed to include both single-family residential and high-density residential. Slope information for the culverts were not available, therefore slopes were assumed based on LIDAR elevations (see Appendix A). The stormwater assessment for this area uses less precise data, due to the lack of updated impervious cover and topographic information post-development. Depending on the breadth and orientation of the stormwater network within the new developments, the watershed delineations may need significant adjustments.

Based on this screening-level analysis, the two culverts were estimated to be under capacity for the 100-year peak flow rate, and the culvert for subwatershed 200 was also estimated to be under capacity for the 5-year rate. Further investigation into the capacities of these pipes is recommended, especially with the new development and storm network updates in the area.

MAP 2.11: SUBWATERSHED 2.3 | FLINT DRIVE (PAPILLION)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

STORMWATER ASSESSMENT FINDINGS

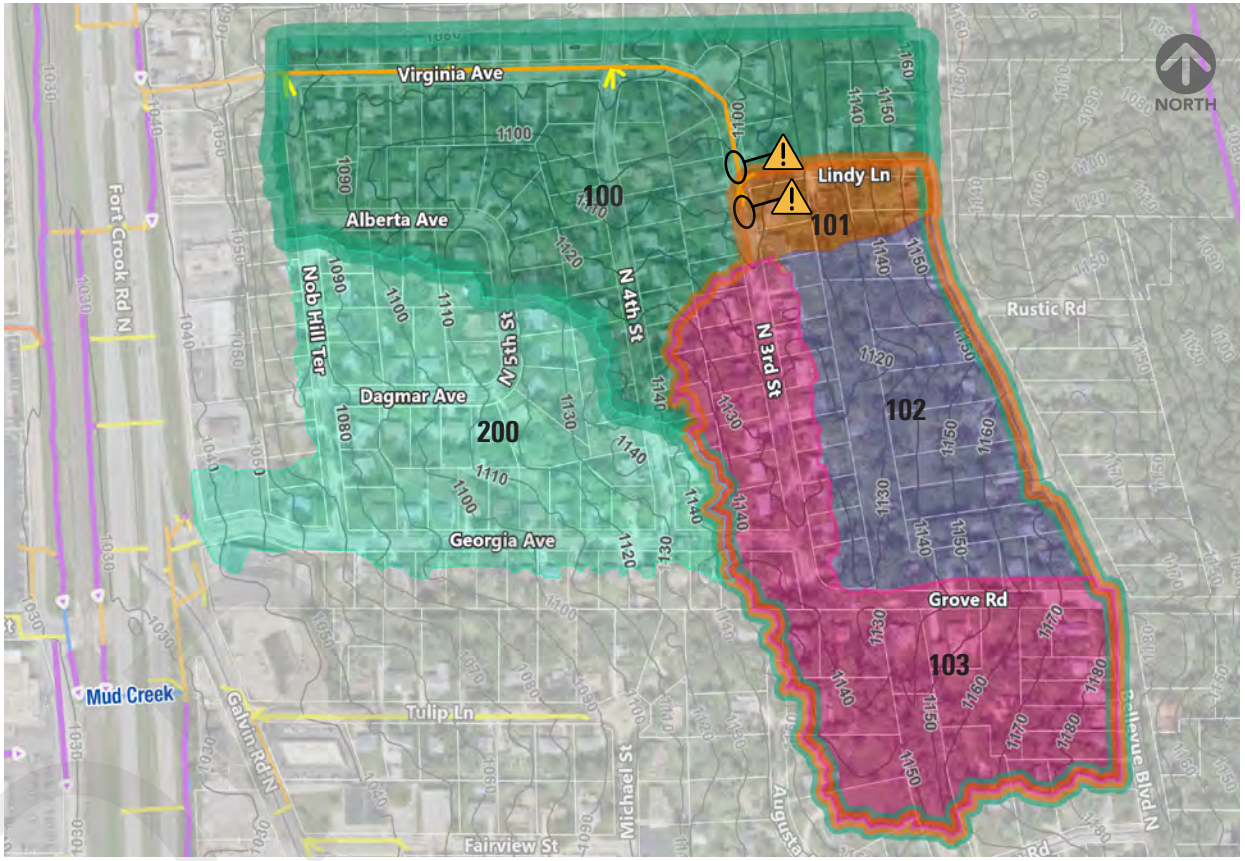
3.1 North Galvin Road (Bellevue)

Residents reported flooding concerns in rear-yards of homes along N. 3rd Street. Five watersheds were delineated to assess the capacity of three existing gravity mains that outlet into the storm network along Fort Crook Road and Galvin Road. The sub-watersheds include mostly single-family residential lots. Slope information for the gravity mains were not available, therefore, pipe slopes were assumed based LIDAR elevations and elevations of adjoining stormwater infrastructure (see Appendix A).

Subwatershed 100 assesses the capacity of a 42-inch storm sewer main that collects stormwater for the neighborhood and 101 assesses the capacity of a 30-inch main that collects stormwater to areas just upslope of where flooding issues were reported. Subwatershed 102 was used to estimate the capacity required to collect the backyard drainage for homes on N. 3rd Street, where flooding concerns were reported. Subwatershed 103 assesses the capacity of the storm sewer extension on N. 3rd Street to collect drainage from potential extensions along adjoining streets. Subwatershed 200 was assessed to determine if improvements in this watershed could take pressure off of subwatershed 100, if installed.

Based on this screening-level analysis, the 42-inch main was estimated to have adequate capacity and the 30-inch was estimated to be adequate for the 5-year peak runoff rate. The 24-inch pipe (stub shown for subwatershed 103) was estimated to be under capacity for both the 5- and 100-year rates. The backyard drainage of subwatershed 102 was estimated to require a 24-inch main, and the neighborhood area of subwatershed 200 was estimated to require a 30-inch main.

MAP 2.12: SUBWATERSHED 3.1 | NORTH GALVIN ROAD (BELLEVUE)



Source: RDG Planning & Design; Sarpy County GIS, 2025

Further investigation into the capacities of these existing and potential pipes is recommended, especially the potential 24-inch main for subwatershed 102 that may alleviate backyard flooding issues.

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

STORMWATER ASSESSMENT FINDINGS

3.2 Birchcrest Road (Bellevue)

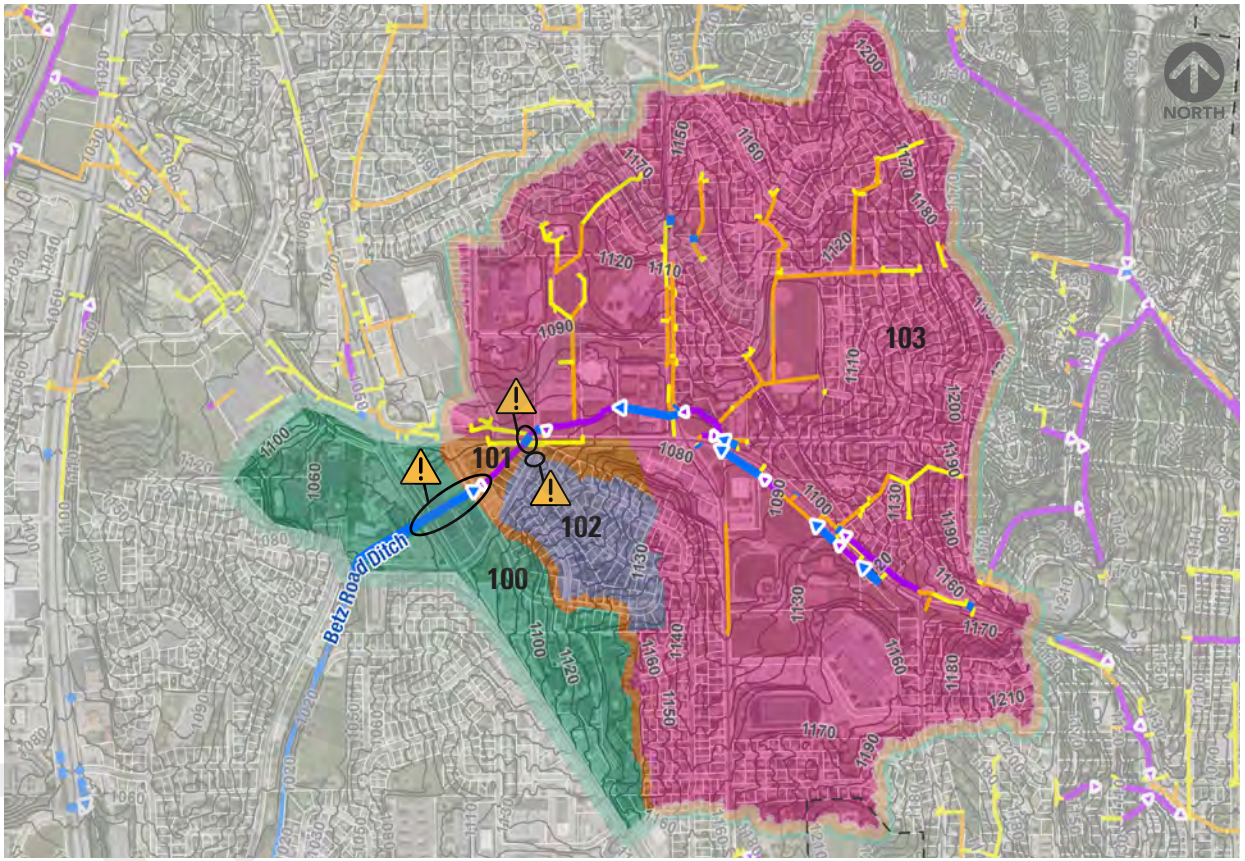
Multiple flooding concerns were reported on Birchcrest Road and from Betz Road Ditch. Four watersheds were delineated to assess the capacity of two culverts and one storm sewer gravity main. The subwatersheds include a mix of single-family residential and commercial lots. Information for the gravity main was not available within the GIS database, therefore, pipe size and slope were assumed based images of the infrastructure, LIDAR elevations and elevations of adjoining stormwater infrastructure (see Appendix A).

Subwatersheds 100 and 101 assess the capacity of the over 1,000-foot long 84-inch culvert (estimate of culvert size) that collects stormwater for the entire watershed and 103 assesses the capacity of a 84-inch culvert (estimate of culvert size) under Harvell Drive that collects stormwater from the upper watershed. Subwatershed 102 assesses the capacity of an unknown storm sewer gravity main (no GIS data available), which was assumed to be a 30-inch pipe.

Based on this screening-level analysis, the two 84-inch culverts and the 30-inch storm sewer gravity main were all estimated to have inadequate capacity for both the 5-year and 100-year peak runoff rate. The inadequate capacity of these culverts and pipe could cause localized flooding in the area.

Further investigation into the capacities of these existing culverts and pipe is recommended, especially to understand the cause of flooding issues in the area.

MAP 2.13: SUBWATERSHED 3.2 | BIRCHCREST ROAD (BELLEVUE)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

3.3 East Mission Avenue (Bellevue)

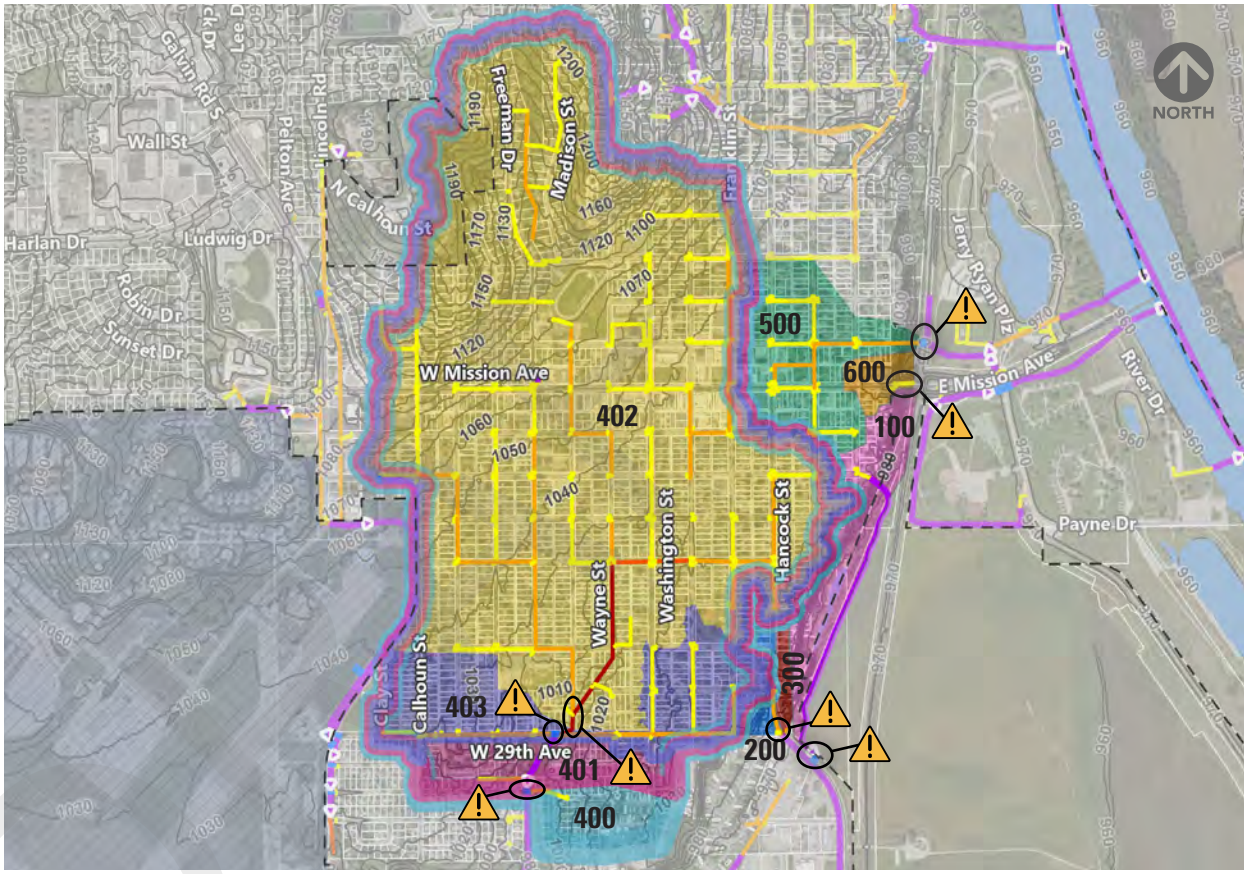
Numerous residents noted flooding concerns at the intersection of Mission Avenue and Hancock Street. Nine watersheds were delineated to assess the capacity of storm sewer gravity mains and culverts in the area. The subwatersheds include a mix of single-family residential and commercial lots. Slope information for some of the pipes and culverts were not available, therefore, pipe slopes were assumed based on LIDAR elevations and elevations of adjoining stormwater infrastructure (see Appendix A).

The 400 subwatersheds assess the capacity of a 72-inch storm sewer main and 72-inch culvert that collect and serve as the main outlet for stormwater for most of the neighborhood, including the intersection with flooding concerns. The 100, 200, 300, 500, and 600 subwatersheds asses the capacity of various pipes and culverts that outlet towards the east side of the intersection with flooding issues.

Based on this screening-level analysis, the storm sewer gravity main outlet for subwatershed 402 and the culverts for subwatershed 401 and 403 are all estimated to be under capacity for both the 5-year and 100-year peak flow rates. These culverts and pipes serve as the main outlet for this area and could be contributing to the localized flooding. Additionally, the outlets assessed to the east were all estimated to be undersized.

Further investigation into the capacities of these systems is recommended, especially the outlets for the 400 subwatersheds.

MAP 2.14: SUBWATERSHED 3.3 | EAST MISSION AVENUE (BELLEVUE)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

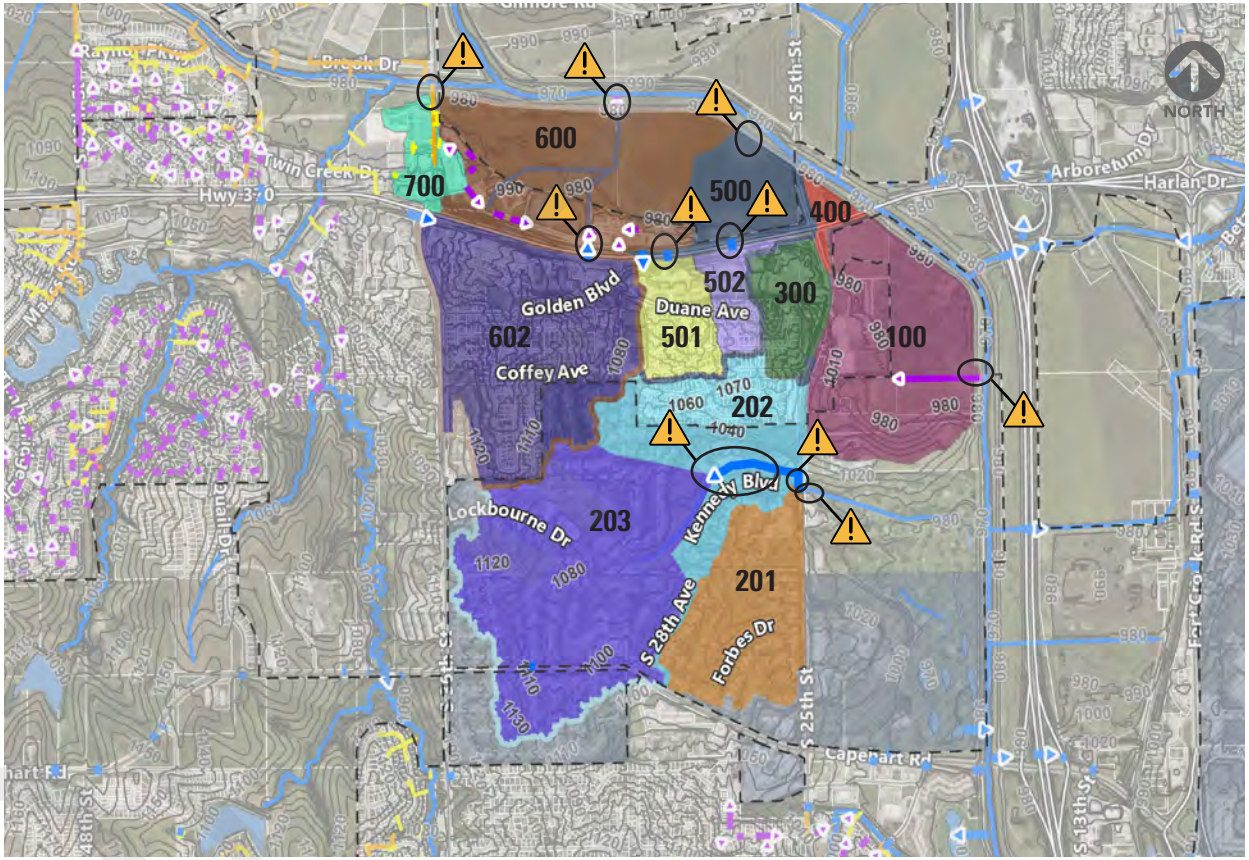
3.4 Highway 370 at Papillion Creek (Bellevue)

Flooding concerns were reported around Highway 370 near Bellevue Medical Center. Fourteen watersheds were delineated to assess the capacity of storm sewer gravity mains and culverts in the area. The subwatersheds include a mix of single-family residential and commercial lots. Slope information for some of the pipes and culverts were not available, therefore, pipe slopes were assumed based on LIDAR elevations and elevations of adjoining stormwater infrastructure (see Appendix A).

Subwatersheds 300 and 400 include the area that drains to the Bellevue Medical Center detention pond and to an outlet point in Papillion Creek. The 500, 600, and 700 subwatershed infrastructure collect and outlet stormwater to an outlet point in Papillion Creek. These areas include drainage from around Highway 370. Subwatershed 100 collects drainage from the area east Bellevue Medical Center and east of S. 25th Street and outlets into Papillion Creek. The 200 subwatersheds assess the capacity of a twin 48-inch culvert, a 40-inch storm sewer main, and a 72-inch culvert (sizes assumed). The 72-inch culvert collects from the overall 200 subwatershed and outlets stormwater for the area south of the area with flooding issues. The 100, 200, 300, 500, and 600 subwatersheds asses the capacity of various pipes and culverts that outlet towards the east side of the intersection with flooding.

Based on this screening-level analysis, nearly all infrastructure in the area was estimated to be under capacity. Further investigation of infrastructure should be done to determine the level of capacity issues in the Highway 370 area.

MAP 2.15: SUBWATERSHED 3.4 | HIGHWAY 370 AT PAPILLION CREEK (BELLEVUE)



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Waterlines
Waterbodies
10ft Contour Lines
Open Drains
Culverts

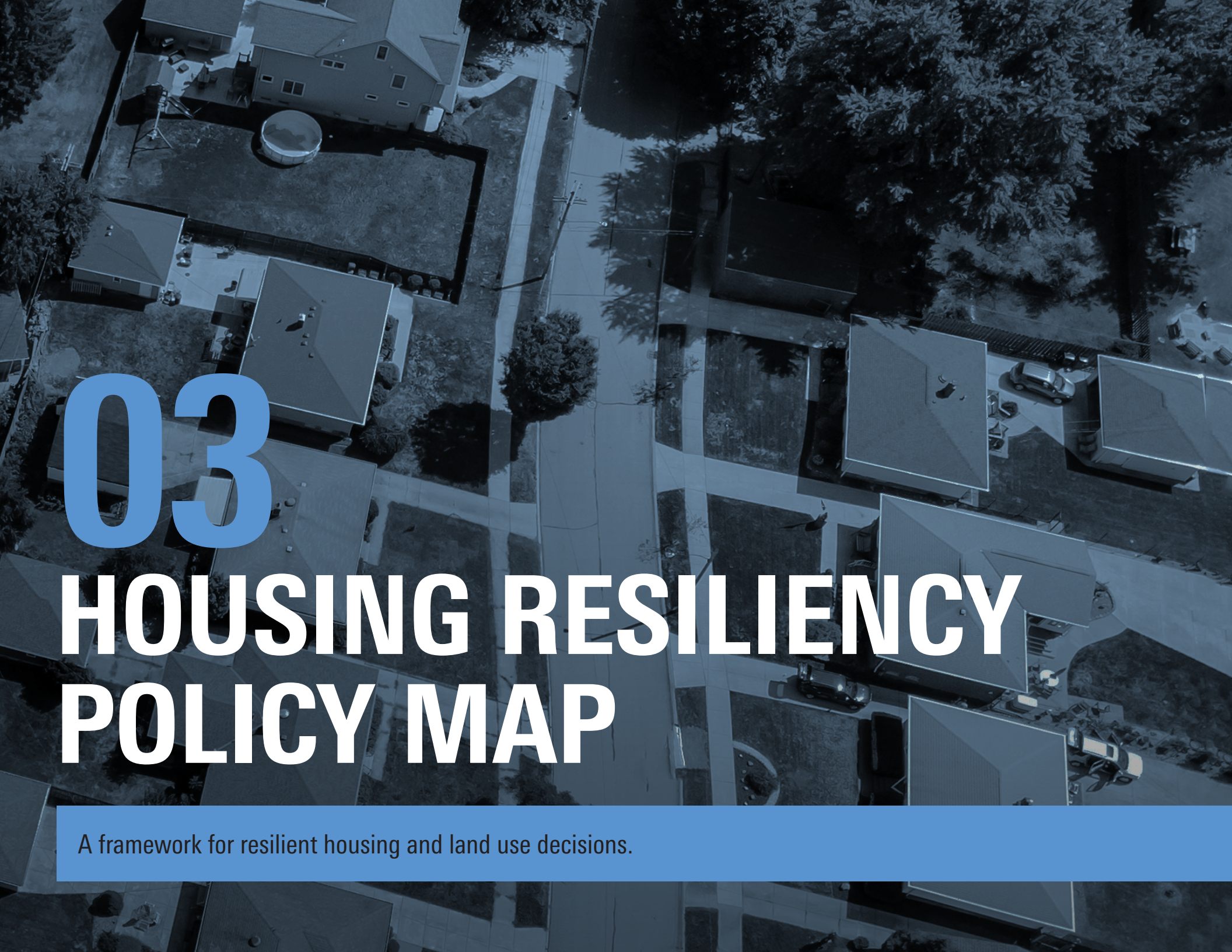
Gravity Mains
Diameter
<=21
<=54
<=60
<=102

Infrastructure estimated to be under capacity

STORMWATER ASSESSMENT FINDINGS

NEXT STEPS

- **Continue data collection and verification across both cities, including gravity main and culvert locations, sizes, elevations (slope), materials, and conditions.**
  - Prioritize the key infrastructure within the eight neighborhoods with known upland flooding concerns.
  - Prioritize larger pipes (>24") and other network elements that have been flagged as potentially "under capacity" in this high-level assessment.
- **Consider taking inventory of already completed stormwater studies, including new development stormwater management plans, across the cities, particularly those in the vicinity of neighborhoods with upland flooding concerns.**
  - There may be valuable information that can be gathered from these studies, including anticipated flow rates within problem areas.
- **After data collection, perform more detailed studies to more precisely evaluate system performance and identify issues contributing to observed flash flooding conditions.**



03

HOUSING RESILIENCY POLICY MAP

A framework for resilient housing and land use decisions.

HOUSING RESILIENCY POLICY MAP

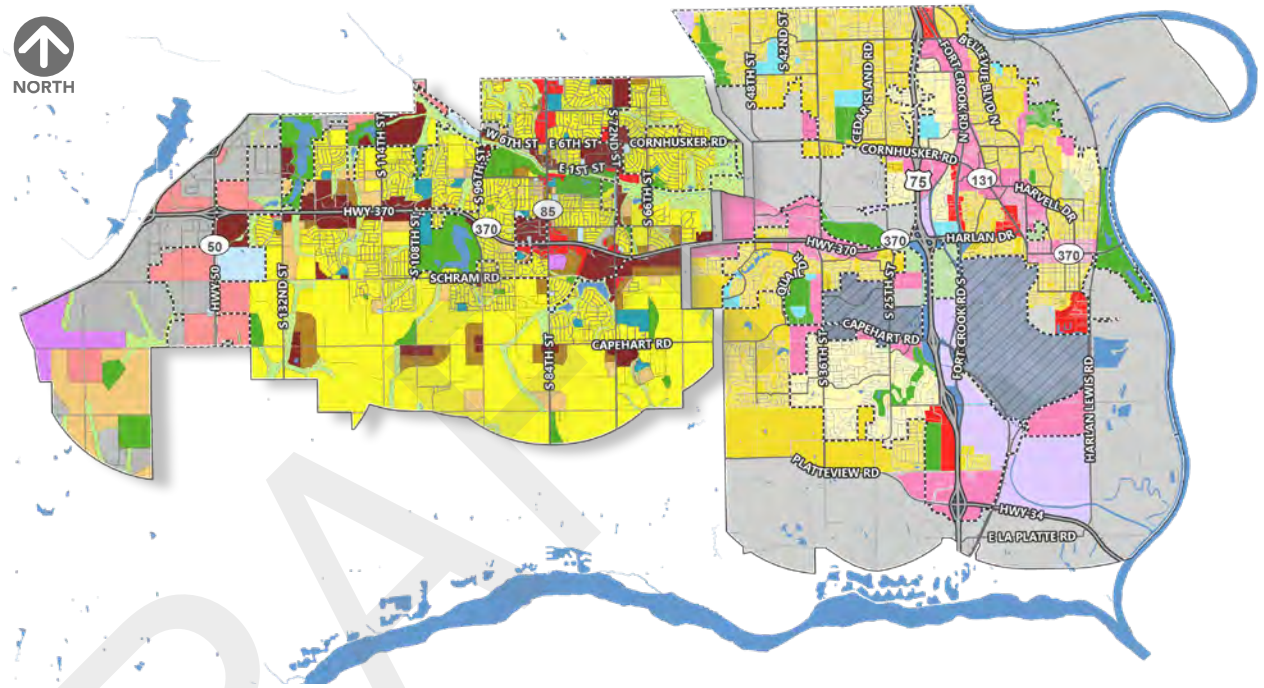
Overview

Every map tells a story, and the Housing Resiliency Policy Map is where the story of resilience in Bellevue and Papillion begins. To understand how these communities can continue to grow and adapt, it is essential to look at how land is used today and how it is planned for the future.

The Comprehensive Plans of Bellevue and Papillion, adopted in 2024 and 2022, respectively and subsequent updates, form the foundation of this analysis. They outline how land is currently being used and where future growth is anticipated across residential, commercial, industrial, and open space areas. These land use maps serve as the base for evaluating how future development patterns intersect with environmental conditions such as flood risk, slope, canopy cover, and heat vulnerability.

The Housing Resiliency Policy Map focuses on existing and future planned residential and mixed-use land uses, building on each city's adopted land use vision to identify where housing may face greater environmental risks and where resilience can be strengthened through thoughtful planning and design. Rather than changing land use designations, the map introduces an overlay framework that indicates the level of care and type of response that should guide future development and redevelopment.

The resulting Policy Area Framework combines data analysis with input from the community, planning team, advisory committee, and community allies. It identifies five distinct Policy Areas, each representing a different relationship between land, risk, and opportunity.



Source: City of Bellevue and Papillion; Sarpy County GIS, 2025

- Extraterritorial Jurisdiction
- Bellevue & Papillion Limits
- Offut Air Base
- Extraterritorial Jurisdiction

Papillion | Future Land Uses Designations

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Downtown
- Business Park
- Commercial
- Mixed Use 1: High Density Residential, Office, and Limited Commercial
- Mixed Use 2: Commercial/Industrial
- Neighborhood Mixed Use: Residential, Limited Commercial and Limited Office
- Industry
- Civic/Public Utilities
- School
- Park/Recreation
- Open Space

Bellevue | Future Land Uses Designations

- Civic Facilities
- Commercial
- Industrial
- Mixed Use
- Open Space
- Parks and Recreation
- Single Family Residential
- Single and Multifamily Residential
- Transportation/Utilities

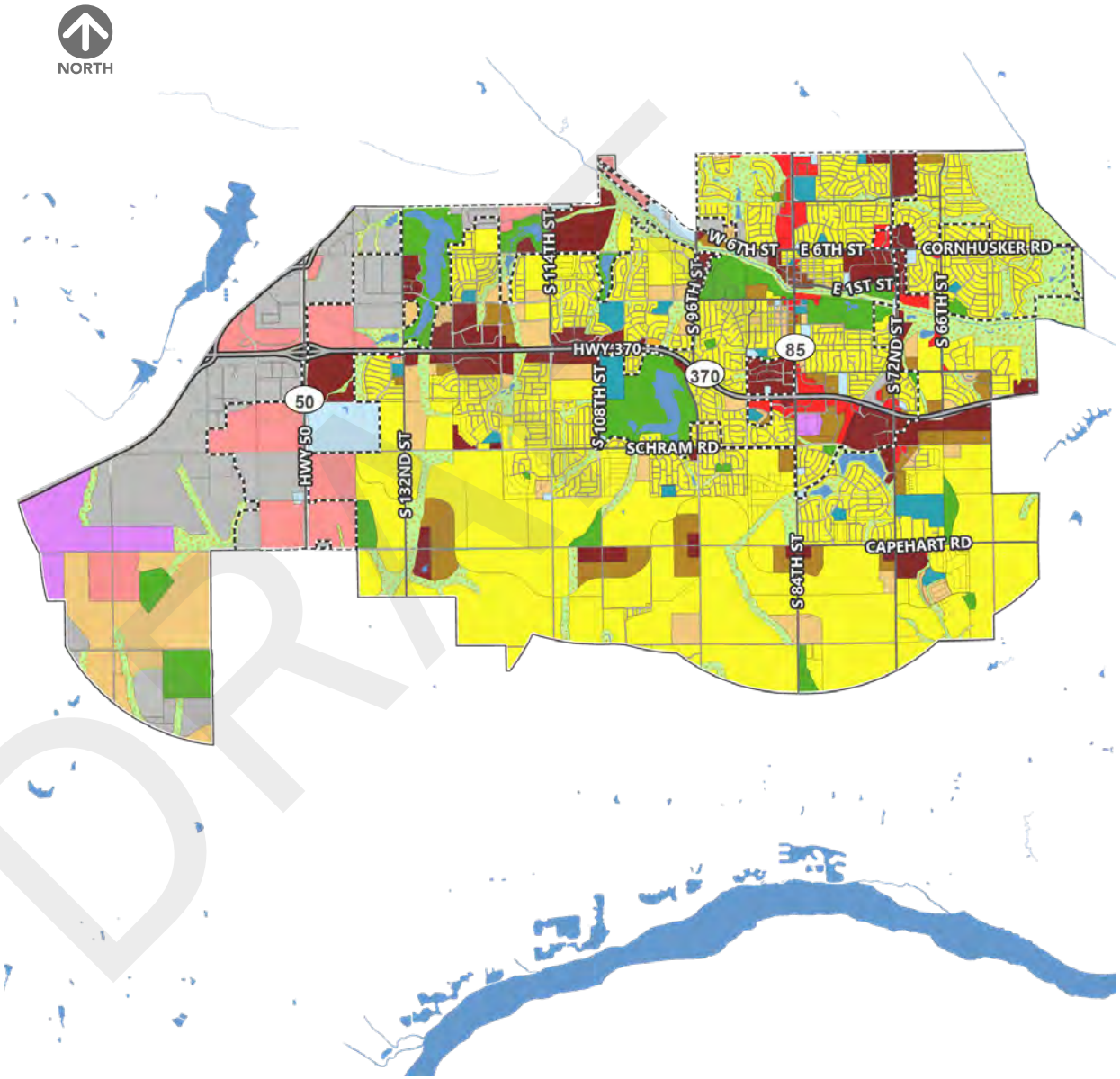
Papillion | Future Land Use Map

Adopted in 2002 as part of Papillion's Comprehensive Plan and updated through 2022, this map illustrates the city's long-term vision for residential, commercial, industrial, and open space development. It provides a foundation for understanding how future growth areas align with environmental and physical conditions across the community.

- Extraterritorial Jurisdiction
- Papillion Limits

Papillion | Future Land Uses Designations

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Downtown
- Business Park
- Commercial
- Mixed Use 1:
  - High Density Residential
  - Office
  - Limited Commercial
- Mixed Use 2: Commercial/Industrial
  - Commercial
  - Industrial
- Neighborhood Mixed Use:
  - Residential
  - Limited Commercial
  - Limited Office
- Industry
- Civic/Public Utilities
- School
- Park/Recreation



Source: City of Papillion; Sarpy County GIS, 2025

HOUSING LAND-USE POLICY MAP

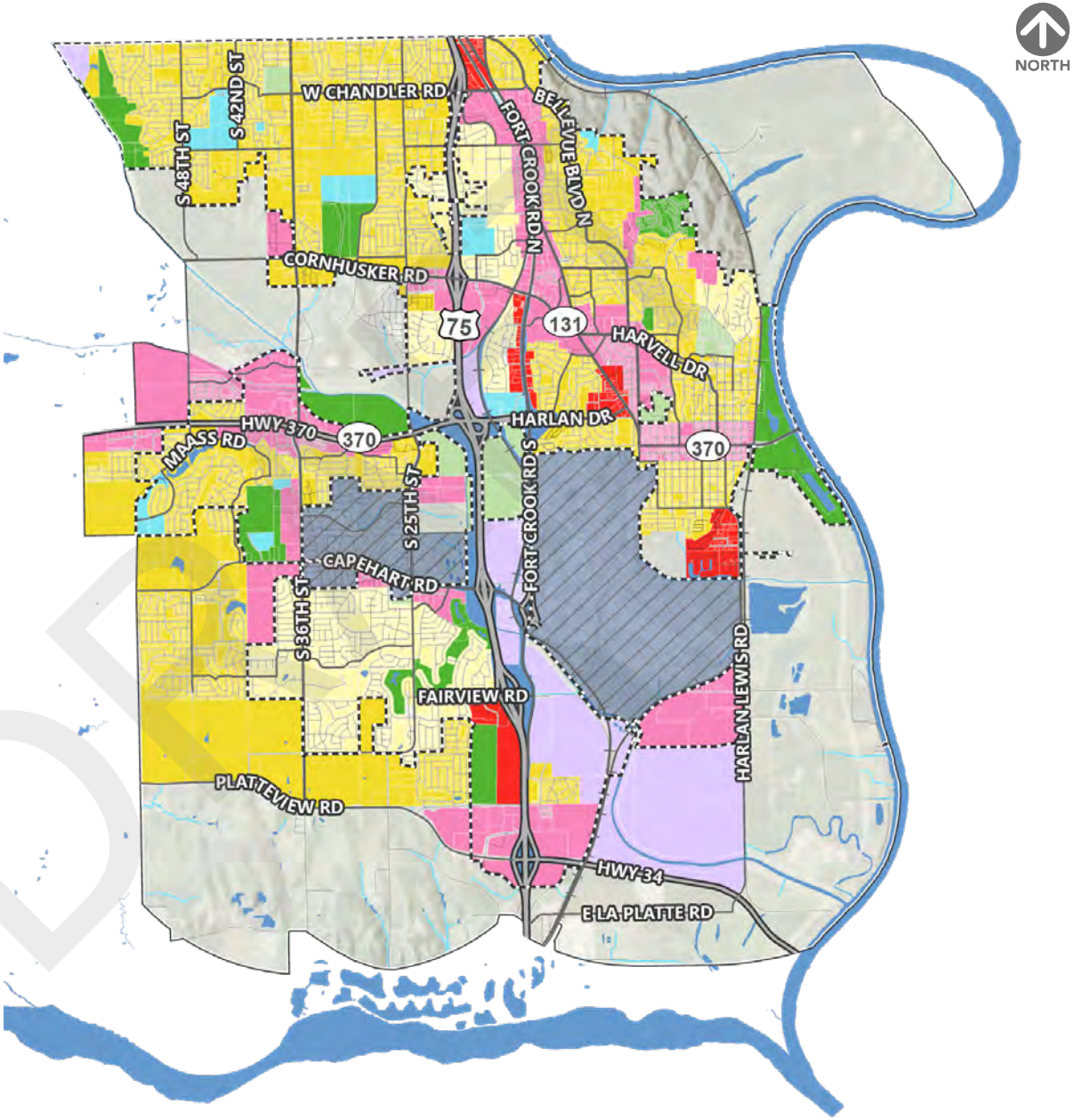
Bellevue | Future Land Use Map

Adopted in 2024 as part of Bellevue's Comprehensive Plan, this map illustrates the city's long-term vision for development and redevelopment across residential, commercial, industrial, and open space areas.

- Extraterritorial Jurisdiction
- Bellevue Limits
- Offut Air Base

Bellevue | Future Land Uses Designations

- Civic Facilities
- Commercial
- Industrial
- Mixed Use
- Open Space
- Parks and Recreation
- Single Family Residential
- Single and Multifamily Residential
- Transportation/Utilities



Source: City of Bellevue; Sarpy County GIS, 2025

Housing Resiliency Policy Areas | Framework

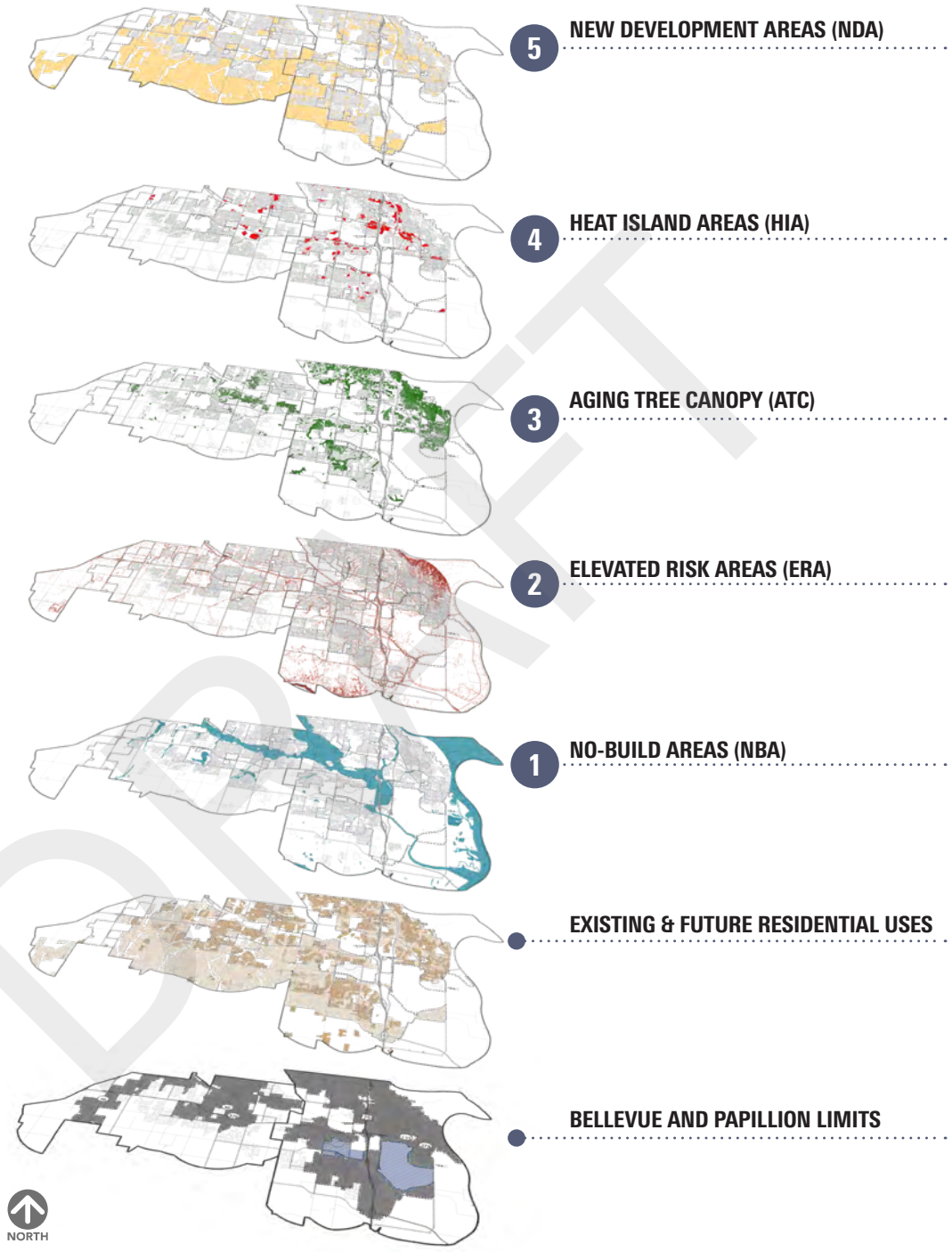
The Housing Resiliency Policy Area Map provides an overlay to the Future Land Use Maps, illustrating how different parts of Bellevue and Papillion should be approached in future development or redevelopment. It combines data and local knowledge to identify where environmental and physical conditions may influence the suitability of existing and future residential and mixed-use areas.

Each Policy Area represents a different level of risk, opportunity, or environmental sensitivity. Together, they help clarify where development should be limited, approached carefully, or supported through mitigation or conservation strategies to enhance long-term housing resilience.

The five Policy Areas include:

- No-Build Areas (NBA)
- Elevated Risk Areas (ERA)
- Heat Island Areas (HIA)
- Aging Tree Canopy Areas (ATCA)
- New Development Areas (NDA)

The Housing Loss Reduction Plan will identify policies and strategies that apply to each of these areas and include specific actions, programs, and potential partnerships to reduce housing loss and strengthen community resilience over time.

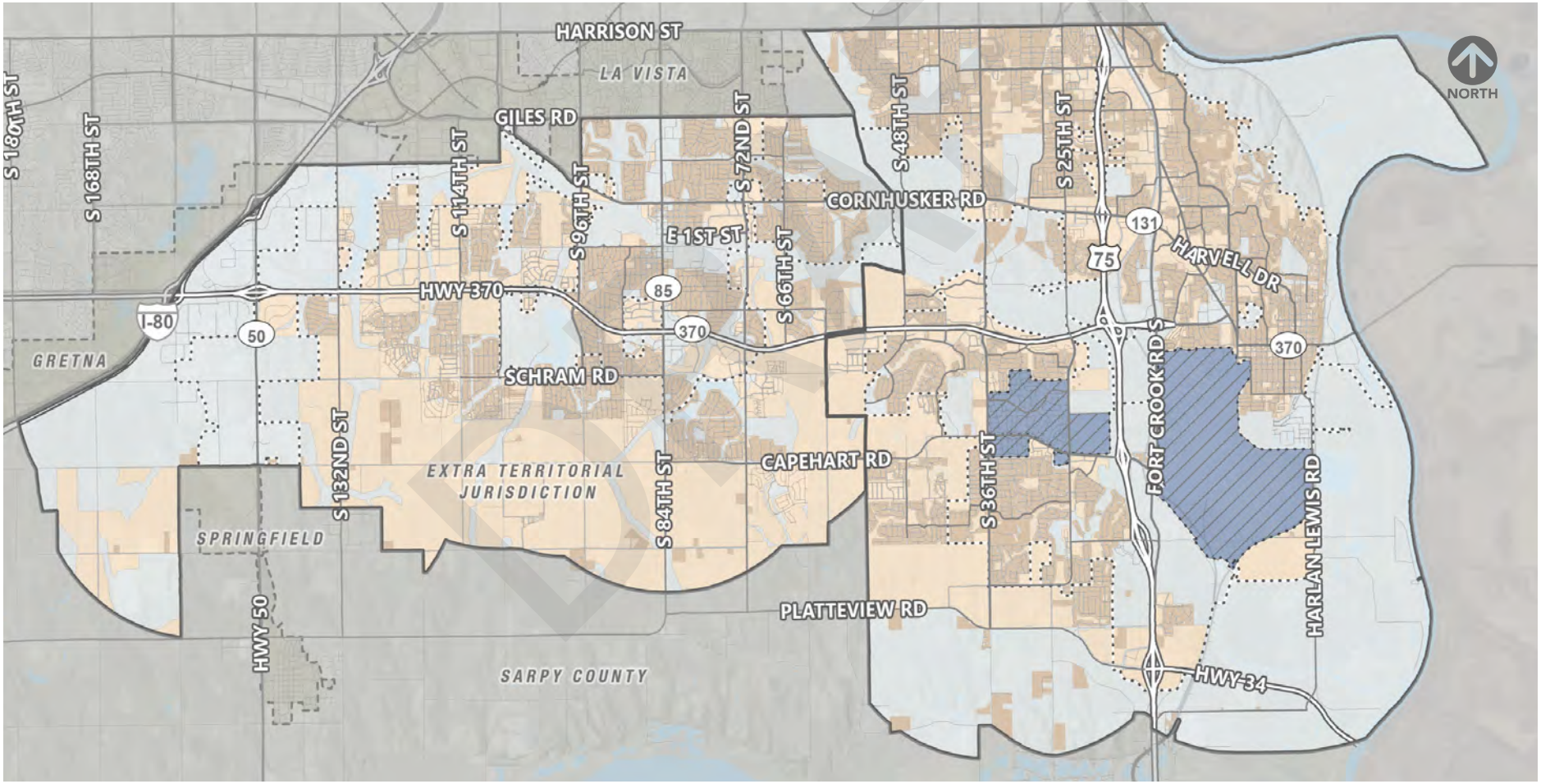


HOUSING RESILIENCY POLICY MAP

Existing & Future Residential Uses

This map highlights existing and future planned residential and mixed-use areas in Bellevue and Papillion, based on each city's adopted Comprehensive Plan. It illustrates where housing is currently established and where new neighborhoods are expected to develop over time.

This map provides base on which environmental and physical conditions such as flood risk, slope, canopy cover, and heat exposure overlap with housing today and in the future. These insights guide the development of the Housing Resiliency Policy Areas, which inform strategies to strengthen housing resilience and manage growth more effectively.



Source: Federal Emergency Management Agency (FEMA), Disaster Declarations Summary, fema.gov

1) No-Build Areas (NBA)

The No-Build Areas (NBA) reflect land identified through the most recent effective FEMA Flood Insurance Rate Maps (FIRMs) for Bellevue and Papillion, dated May 3, 2010, with additional zones from December 2, 2005. These areas are not suitable for development due to high flood potential and ecological sensitivity.

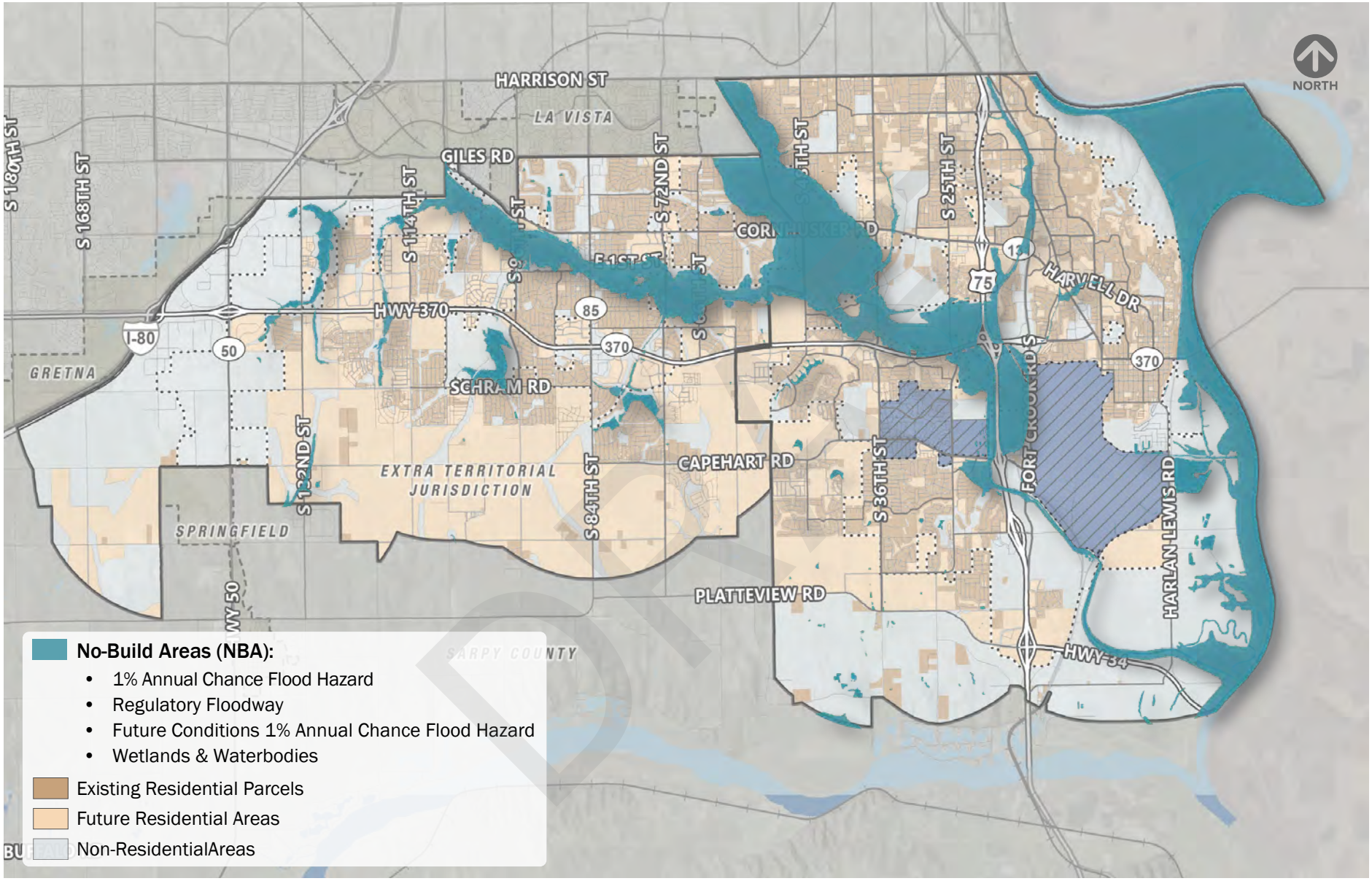
The No-Build Areas include:

- The 1% Annual Chance Flood Hazard (100-year floodplain)
- The Future Conditions 1% Annual Chance Flood Hazard, which accounts for projected precipitation and runoff changes
- The FEMA Regulatory Floodway, where development could obstruct water flow or increase downstream flooding
- Waterbodies and wetlands, which provide natural flood storage, improve water quality, and support ecological diversity

- For Papillion, these effective FIRMs remain the official regulatory standard. Preliminary updated maps for Douglas and Sarpy Counties (released February 2022) and a 2023 U.S. Geological Survey flood-inundation study provide more recent information for the Papillion Creeks and were reviewed to understand potential future changes. Because these datasets remain preliminary, they were not used in this analysis, but the Cities will integrate them into future updates once formally adopted by FEMA.
  For Bellevue, the Flood Insurance Study (FIS) for Sarpy County, which includes the City of Bellevue, also became effective on May 3, 2010. Bellevue continues to manage floodplain development in compliance with local, state, and federal regulations and will incorporate new FEMA data as updates are finalized.

Because floodplain boundaries are periodically revised to reflect new hydrologic modeling and watershed conditions, future versions of the Housing Resiliency Policy Map will align with the most current FEMA datasets to ensure the No-Build Areas accurately represent hazard conditions.

Many of these protections already exist through established regulations. The Policy Map reinforces these limits and ensures they continue to guide local development decisions. Related strategies will be further detailed in the Housing Loss Reduction Plan under the Land Use section.



Source: FEMA Flood Insurance Rate Maps (FIRMs) and Sarpy County Assessor data, 2024.

2) Elevated Risk Areas (ERA)

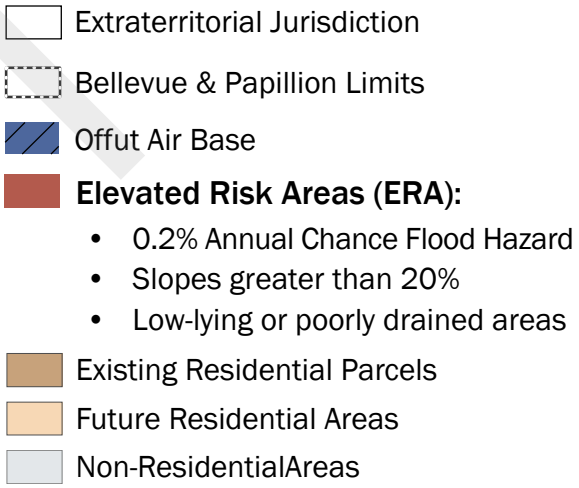
Elevated Risk Areas include land that may already be developed or planned for development but where physical and environmental conditions warrant additional care. These locations are not excluded from future growth but require thoughtful planning, grading, and stormwater management to minimize potential hazards and protect existing development.

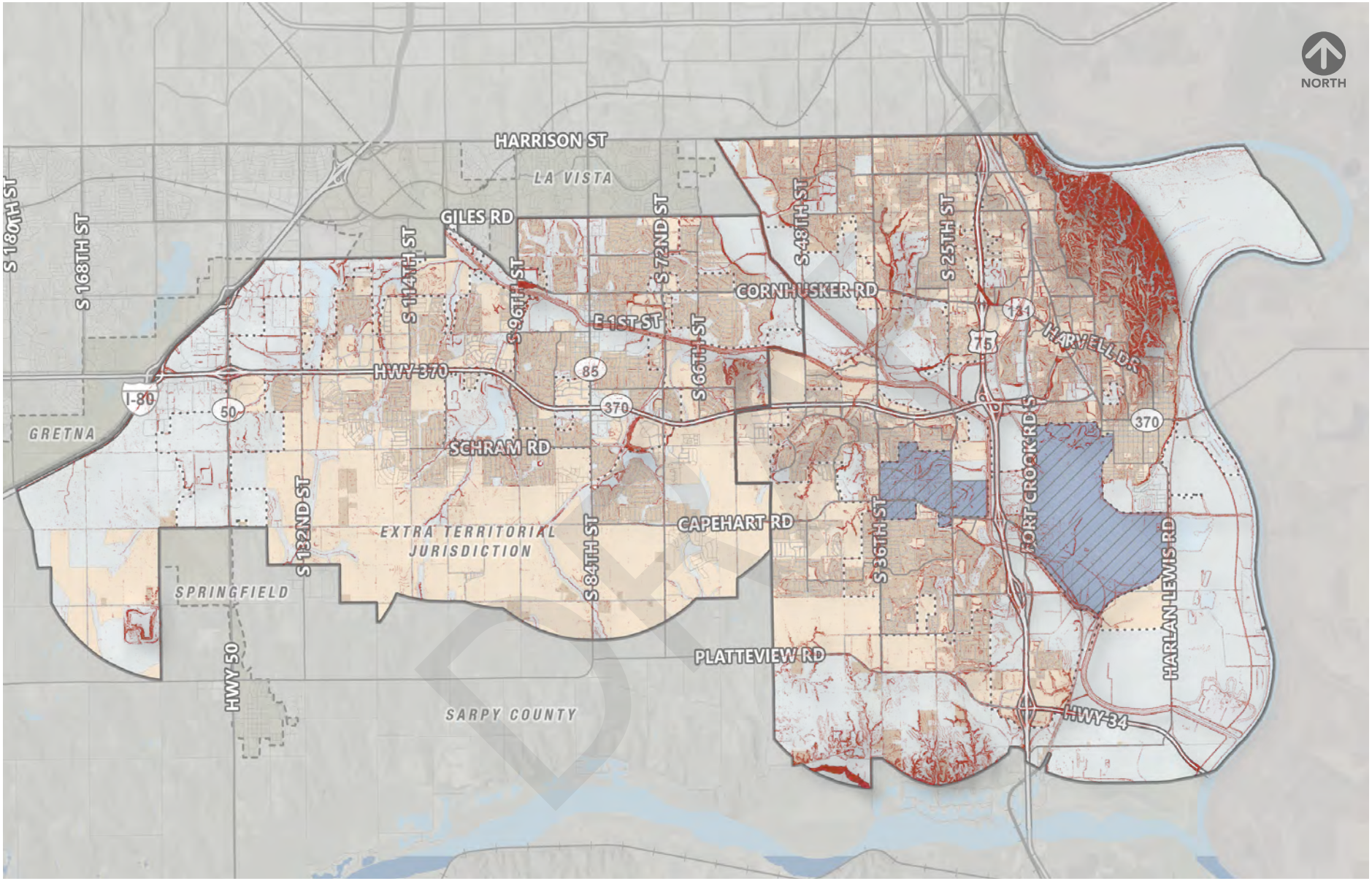
The Elevated Risk Areas include:

- The 0.2% Annual Chance Flood Hazard (500-year floodplain) representing areas with moderate flood potential based on the effective FEMA Flood Insurance Rate Maps (FIRMs) for Bellevue and Papillion (effective May 3, 2010, with additional zones from December 2, 2005)
- Areas with slopes greater than 20%, where soil instability or erosion can increase construction challenges
- Low-lying or poorly drained areas, which may experience surface flooding or ponding during heavy rain events

These areas highlight where new development should incorporate site design, grading, and drainage solutions that reduce runoff, prevent erosion, and manage localized flooding. Policies for Elevated Risk Areas should also promote stormwater infrastructure improvements, resilient site design, and protection of natural drainage systems.

Related strategies will be further detailed in the Housing Loss Reduction Plan, under the Land Use Policy section.





Source: U.S. Geological Survey (USGS), 3D Elevation Program (3DEP). The National Map DEM Data; Sarpy County Assessor data, 2024; RDG Planning & Design

3) Aging Tree Canopy (ATC)

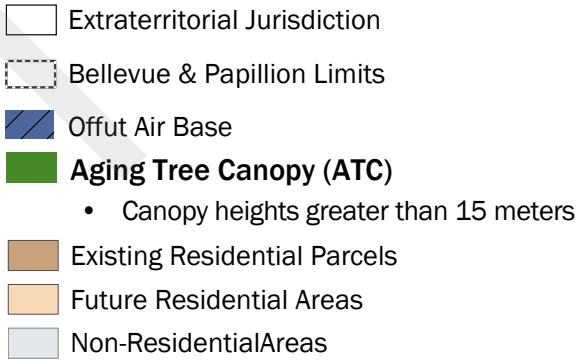
Aging Tree Canopy Areas identify neighborhoods where tree canopy is mature or aging and may be more vulnerable to storm damage or loss. Tree canopy provides critical benefits such as shade, temperature regulation, and stormwater absorption, but older trees can become more susceptible to wind or ice events.

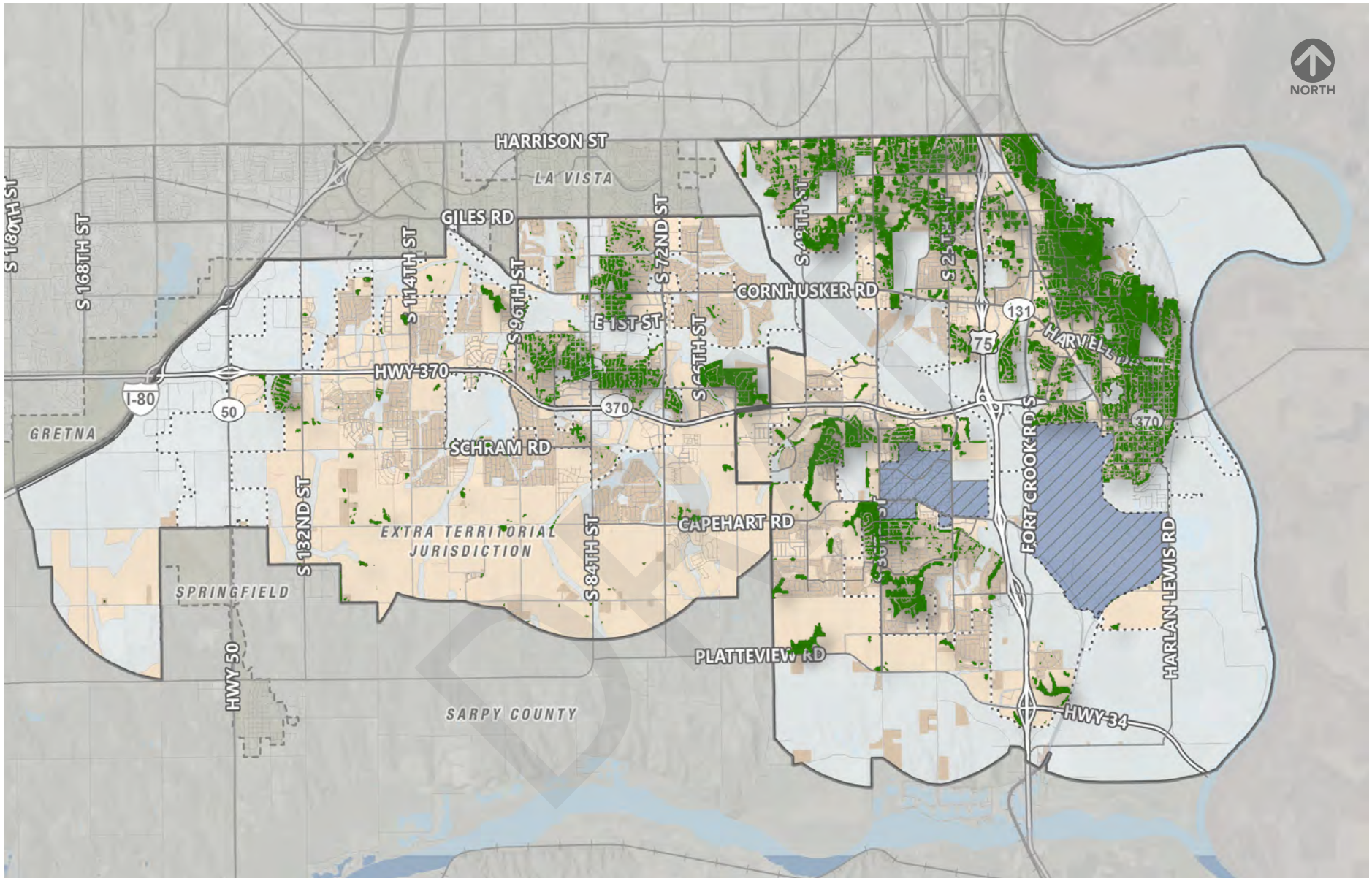
This policy area was developed using data from the Global Canopy Height 2020 dataset, which classifies canopy height to distinguish between different stages of tree growth and maturity.

Canopy classifications used in this analysis:

- 0–5 meters: Low vegetation or grass
- 5–15 meters: Young canopy
- 15–25 meters: Mature canopy
- 25 + meters: Old-growth or aging canopy

The Aging Tree Canopy Areas consider canopy heights greater than 15 meters, representing mature and aging trees that may require proactive management. Policies for these areas should promote tree trimming, removal, and replacement programs, along with species diversity and replanting efforts, to maintain a healthy and resilient canopy over time.





Source: Esri, NASA, and U.S. Geological Survey. (2020). Global Canopy Height 2020 [Raster dataset]. Retrieved October 2025 from ArcGIS Living Atlas of the World

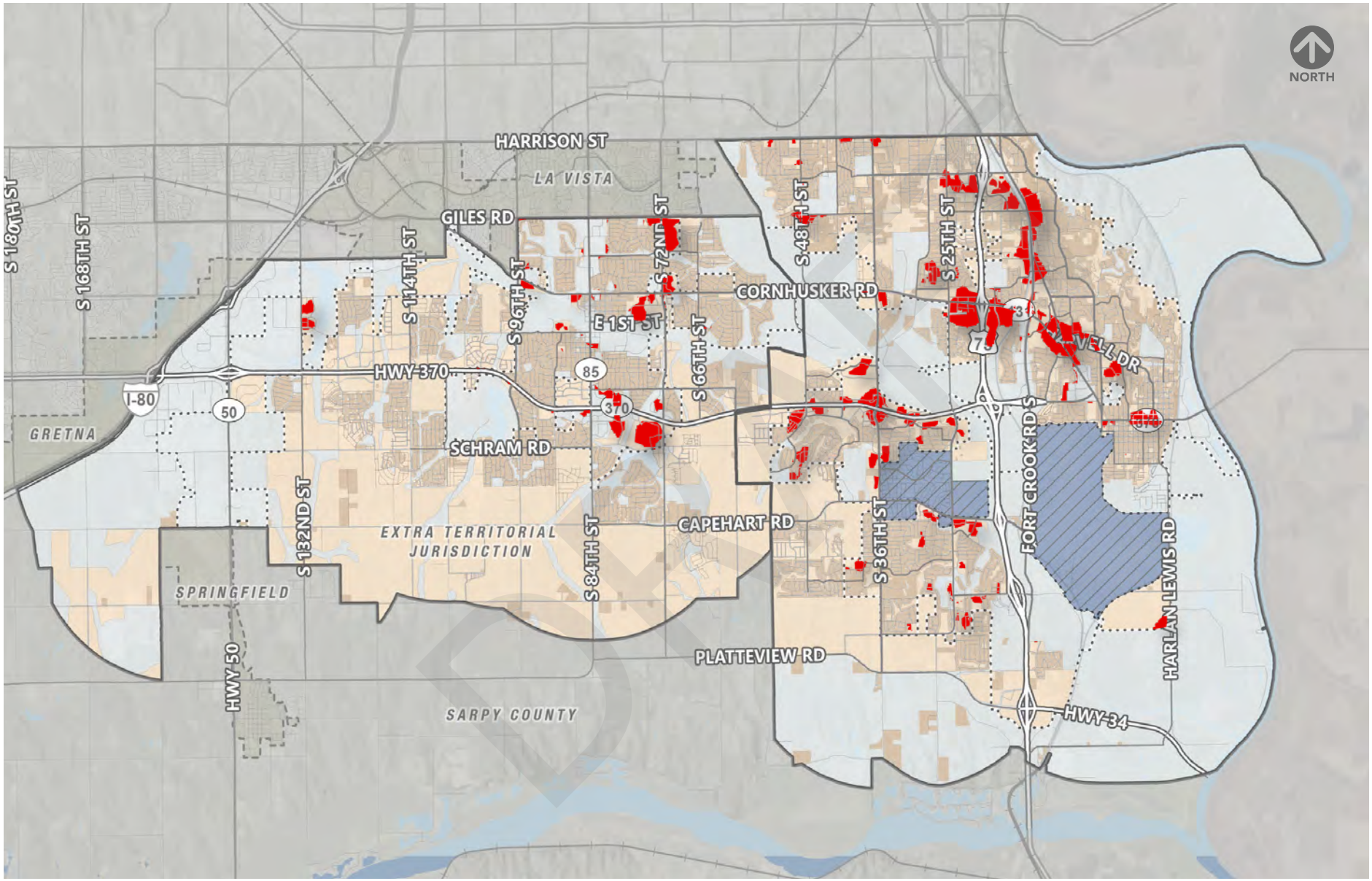
4) Heat Island Areas (HIA)

Heat Island Areas identify residential neighborhoods experiencing higher surface temperatures due to limited vegetation, large areas of pavement, and older development patterns. These conditions can increase energy demand, reduce comfort, and heighten health risks during extended heat events.

This policy area was developed using surface temperature data and heat index classifications ranging from 1 to 5, with indexes 3–5 representing moderate to high heat exposure compared to surrounding areas. Residential zones within these higher index ranges were identified as Heat Island Areas for this analysis.

Reducing heat island effects often goes hand in hand with improving stormwater management. While not always a direct relationship—such as when reflective roofs are used instead of green roofs—many strategies that add vegetation or permeable surfaces can also help reduce runoff and improve water quality.

These areas highlight opportunities to reduce localized heat and improve neighborhood livability through design and landscape interventions. Related policies and strategies will be further detailed in the Housing Loss Reduction Plan, under the Land Use Policy section.



Source: Trust for Public Land. Heat Severity – USA 2024, based on 30-meter Landsat 8 thermal imagery. Published via ArcGIS Online. [Accessed July 2025]

5) New Development Areas (NDA)

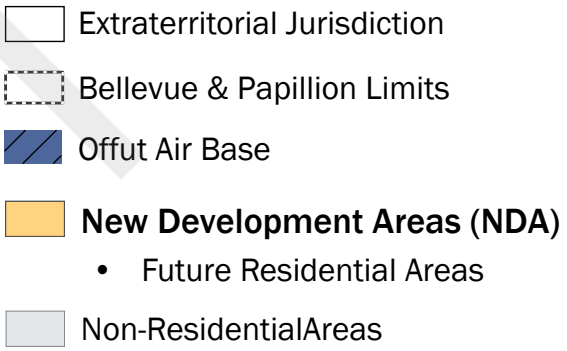
New Development Areas (NDA) represent locations identified for future residential or mixed-use growth based on the adopted Future Land Use Maps for Bellevue and Papillion. These areas are currently undeveloped but are expected to accommodate new housing and neighborhood expansion over time.

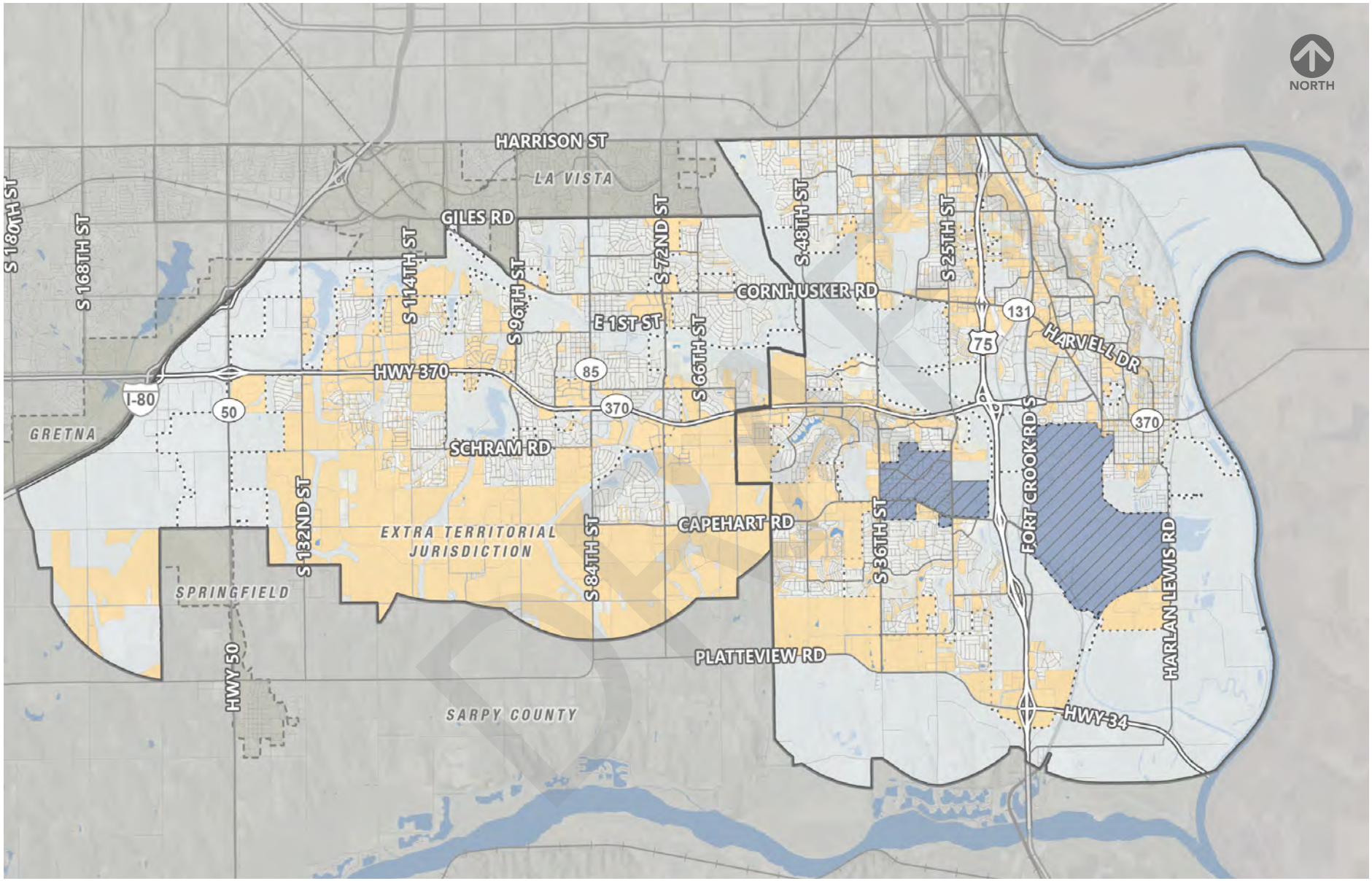
This policy area considers where planned development intersects with environmental and physical conditions, such as flood risk, slope, canopy cover, and heat exposure. Understanding these factors early in the planning process helps inform where and how future development should occur to ensure long-term housing resilience.

New Development Areas include:

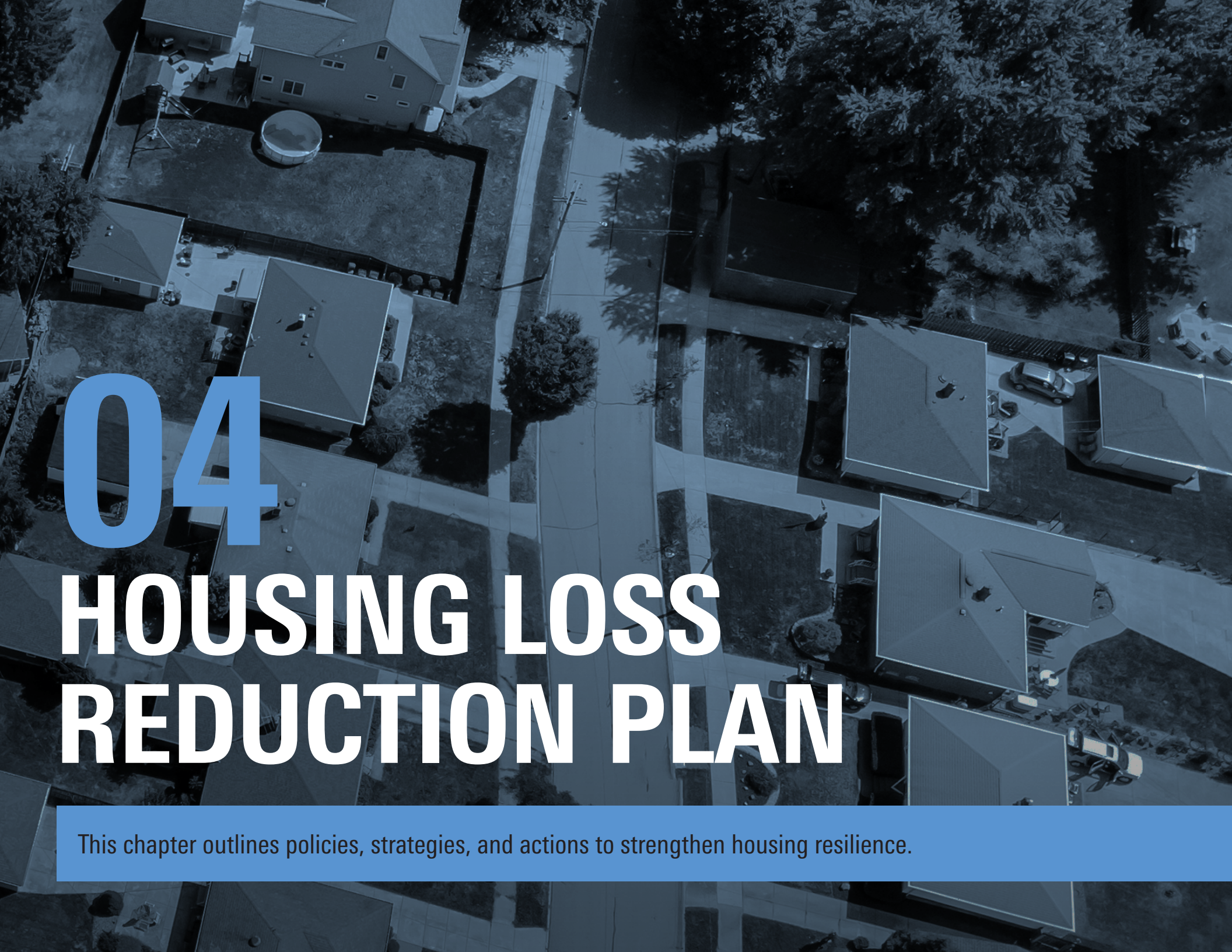
- Parcels designated for future residential or mixed-use development in the adopted Future Land Use maps that are located outside the No-Build Areas policy areas
- Areas that are not currently developed but fall within future growth boundaries or planned service areas

These areas highlight the importance of integrating resilience and environmental awareness into future neighborhood design and infrastructure investment. Related policies and implementation strategies will be further detailed in the Housing Loss Reduction Plan, under the Land Use Policy section.





Source: Bellevue and Papillion Comprehensive Plans; Sarpy County GIS, 2025



04 HOUSING LOSS REDUCTION PLAN

This chapter outlines policies, strategies, and actions to strengthen housing resilience.

HOUSING LOSS REDUCTION

This section considers the ways in which the communities of Bellevue and Papillion can reduce the risks to the housing stock and protect the most vulnerable populations. Traditionally, housing resilience plans focus on reducing risk to flooding. Over the past decades, Bellevue and Papillion have guided development away from high risk flood zones. The 2019 floods impacted hundreds of homes along the Platte River (outside of either cities' jurisdiction) and homes on the far eastern edge of Bellevue. The homes impacted in Bellevue are now protected by an improved levee and therefore, most residents were not as concerned about flooding risk. Residents' biggest concerns in the listening sessions and through the online engagement opportunities focused on:

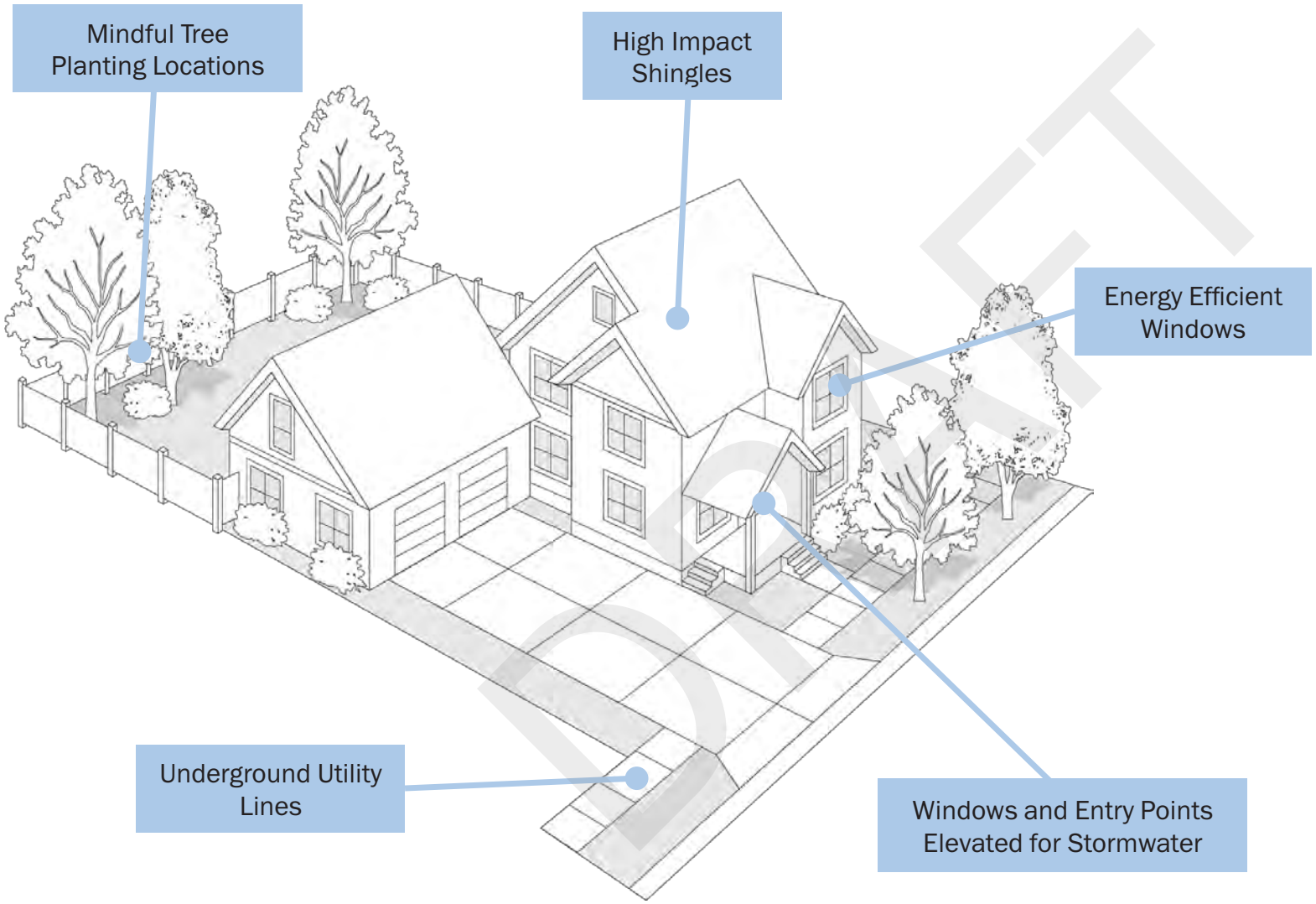
- Flash flooding in targeted locations
- Wind and hail damage caused by the increased frequency of severe storms
- Tornado threats

These types of events tend to result in more localized damage than, say a hurricane, which would affect an entire community. A tornado can destroy housing on one block, while the rest of the neighborhood may experience minor or no damage. This means that recovery plans are varied, providing shelter and assistance rebuilding for some households, while other households will only need assistance with minor repairs. For this reason, the strategies for Bellevue and Papillion go beyond protecting housing against flooding and heavily focus on the impacts and recovery from severe wind, hail, and tornado damage. Tree plantings and urban heat islands are sub areas of concern. Trees are essential for shading and reducing the energy use of a home, not to mention the general quality and feel they provide to a neighborhood, but they can also cause significant damage to homes during high wind events.

The actions, strategies, and policies of the Housing Loss Reduction Plan fall into one of four categories:

- **Protection:** These tend to be defensive measures that mitigate the impact of a severe weather event on housing. These can include levees and regional stormwater systems such as dams. A limited number of strategies will fall into this categories as the system of levees and dams has or is being addressed at both a local and regional level.
- **Accommodation:** These actions focus on altering the design to better prepare a structure or land use for severe weather. Ultimately, accommodation actions allow the structure or land use to remain in place. This may include modifications to roofing, elevating a structure, or planting trees in appropriate locations.
- **Retreat:** Under this action, structures are removed because they cannot be easily protected or accommodated. Examples include housing buyouts in flood prone areas. There is little to no housing in high flood risk areas in Bellevue or Papillion, therefore this type of action will have limited application. It should be noted that this may change if rain events increase in frequency or intensity, resulting in large flood hazard zones.
- **Avoidance:** This action guides development away from high risk areas. This includes prohibiting development in high risk flood zones, considering future elevations, designing developments to preserve low lying areas that may be prone to flash flooding post-development, and planting vegetation in locations that limits the risk to housing.

Figure 4.0: Potential Strategies for Housing Resilience



Source: RDG Planning & Design

HOUSING LOSS REDUCTION PLAN FRAMEWORK

The following matrix identifies strategies, policies, and actions that can reduce the risk to housing and address housing needs in time of emergency. These strategies are correlated to the study's goals and the land use policy areas identified in the previous section. It should be noted that not all of these items would be led by the cities, but may be led or funded by other community partners.

The following table identifies strategies and actions that can reduce the risk to housing and address housing needs in time of emergency. These strategies are correlated to the study's goals and the land use policy areas identified in the previous section.

GOALS

1. Ensure safe, resilient, and affordable housing
2. Reduce community vulnerability to disasters
3. Support informed decision-making for housing and land use
4. Build awareness and collaboration around housing resilience
5. Strengthen local capacity for funding and implementation

LAND USE POLICY AREAS

- NB: No Build Areas
- ERA: Elevated Risk Areas
- UHI: Urban Heat Island Areas
- ATC: Aging Tree Canopy Areas
- ND: New Developing Areas

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Land Use	Coordinate housing and transportation.	1, 4	ALL	This can be an important strategy in both evaluation and decreasing a household's overall housing and transportation costs
Land Use	Prohibit development in high risk flood zones.	1, 2	NB	High risk flood zones (1.0% chance or more of flooding every year) are areas most at risk for flooding now and in the future.
Land Use	Require elevation in low risk flood zones.	1, 2	ERA	Low risk flood zones (0.2% or lower chance of flooding each year) may be more susceptible to flooding in the future based on upstream development and the intensity/frequency of severe weather.
Land Use	Incorporate low lying areas as green space or no build areas in new development.	2, 3	NB, ERA, ND	FEMA estimates that over 20% of all properties with significant flood risk are located outside of these areas identified with significant flood risk on FEMA maps. This may involve the implementation of conservation development or low impact development standards.
Land Use	Incorporate stormwater into the design to create amenities.	2	ND	Stormwater management should protect property and life but also create natural amenities to enjoy.
Land Use	Expand and streamline the process for construction of accessory dwelling units in areas outside of flood risk zones.	1, 2, 3	ND	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Land Use	Amend zoning ordinances to include a disaster-specific section that outlines procedures for temporary waivers of zoning restrictions that are not through a conditional or special use process.	1, 2, 3	ALL	
Land Use	Continue to update the floodplain management regulations to align with any changes in FEMA's standards and qualify to participate in the NFIP.	2	NB, ERA, ND	
Land Use	Integrate findings from local GIS modeling on hazard impacts to guide disaster housing placement during the process to grant emergency zoning waivers post-disaster	2	ALL	
Land Use	Prioritize temporary housing locations near essential services such as schools, health care, and grocery stores.	1, 2	ALL	
Land Use	Create a clear process for transitioning temporary housing units to permanent housing when in agreement with the Comprehensive Plans.	1, 3, 5	ALL	
Land Use	Reference the Housing Resiliency Plan and community Comprehensive Plans in the zoning codes to identify potential temporary housing sites that are outside disaster-prone areas (e.g., vacant lots, excess commercial land/parking lots, institutional facilities, etc.) to establish pre-disaster agreements with private and semi-public property owners for their conditional use in a disaster.	1, 3, 4, 5	ALL	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Land Use	Encourage infill development in locations outside of high risk zones and with easy access to services.	1, 2	ALL	
How We Build	Prioritize amending building codes to include the 2022 American Society of Civil Engineers recommendations (ASCE 7).			Adopting ASCE 7-22 will address resilience related to wind, hail, and roofing materials.
How We Build	Complete the review and approval of the 2024 International Building Code.			This code incorporates ASCE 7-22 and Appendix G address flooding reslience issues.
How We Build	Provide financial assistance to place manufactured homes on permanent foundations with storm shelter spaces.	1, 5	ALL	These types of programs may or may not be funded or managed by the city.
How We Build	Develop pre-disaster agreements, including expedited zoning approval, utility connections, and permitting for temporary housing units.	2, 5	ALL	
How We Build	For Papillion, Establish a maximum time allowed for the City to review and approve building permits and certificates of occupancy.	3, 5	ALL	
How We Build	Include provisions to expedite environmental reviews for disaster housing projects while maintaining compliance with local, state, and federal regulations.	3, 5	ALL	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
How We Build	Allow solar energy systems and wind turbines by-right and construction incentives to create solar ready structures.	2, 3	ND	
How We Build	Apply low impact development and stormwater best management practices as much as possible to temporary housing solutions.	1, 2	ERA, ND	
How We Build	Require electric utilities to be installed underground.	2, 3	ND	
How We Build	Establish tree placement standards for proximity away from structures and utility lines to limit damage if the tree falls.	2, 3	ALL	
How We Build	Require large buildings with flat roofs to use white or more reflective “cool roof” materials to reduce energy use for cooling the building.	2, 3	ALL	
How We Build	Increase landscaping in parking lots and large paved areas to slow runoff and reduce heat islands.	2, 3	ALL	For example, at least 50% vegetated or shaded coverage in parking lots reduces surface and air temperatures (LEED). Ensure at least 300 cubic feet of soil per canopy tree. Current standards equate to under 10% landscaped area in these parking lots.
How We Build	Avoid setting doors, windows, or other points of water entry below downstream surface overflow points to surrounding streets or embankments.	3	ALL	These reduce the chances of water entry into structures if the downstream storm network is blocked or its capacity is exceeded.

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
How We Build	Establish minimum tree planting guidelines.	1, 2, 3	ALL	These may include: • Trees planting per square acre requirement based on development types (industrial, commercial, residential, etc.) with the goal of achieving 30% canopy coverage over time for high intensity use areas • Establish buffer yard requirements requiring trees between incompatible uses i.e. 1 tree per 40 linear feet of buffer yard • Stipulate new residential developments provide a minimum number of general trees along streets or in greenspaces • Stipulate new residential areas to receive 1 front yard tree and 1 rear yard tree prior to receiving a certificate of occupancy or payment of final retainage Establish minimum tree island spacing in parking lots. One tree per 10-12 consecutive parking stalls.
How We Build	Evaluate the need to increase minimum generator requirements for senior housing developments.	2	ALL	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
How We Build	Ensure that temporary housing sites include accessible units or accommodations for individuals with access and functional needs.	1, 3	ALL	
How We Build	Establish a plan for hiring temporary Building Inspectors in cases of major disasters to facilitate building permits and certificates of occupancy more quickly.	4, 5	ALL	
How We Build	Limit/ban HOA restrictions that conflict with the City's resiliency goals.	2, 3, 4	ALL	Examples include HOAs that prohibit rain barrels, rooftop solar panels, and similar functional systems.
Accommodations	Retrofit or remove housing that frequently floods during flash flooding events.	2	ERA	
Accommodations	Within the Subdivision ordinances, create a street section identifying sidewalk width and verge/R.O.W. greenspace distance between back of curb/road and edge of sidewalk, preferably 8 ft. or more for tree planting.	2, 4, 5	ND	Placing trees in the R.O.W. is counter to many public works departments policy but addressing concerns over the proximity of trees to structures versus concerns with underground infrastructure should be investigated.

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Accommodations	Establish public utility location within R.O.W.: sewer, water, electric, gas, fiber, storm, to be located either under the street, sidewalk, or immediately behind the back of curb to allow for tree plantings within the R.O.W.	2, 4, 5	ND	
Accommodations	Establish sidewalk replacement standards adjacent to existing trees.	4, 5	ALL	Standards should limit root pruning and/or bridging over large roots, include structural soil or gravel subbase to minimize heaving, and allow for root growth under sidewalk. All of these help improve the viability and resilience of the tree canopy.
Accommodations	Establish tree preservation and mitigation regulations.	4, 5	ATC, UHI	Regulations may include: • Existing trees over 6' DBH to be identified on any surveys and assigned mitigation dollars/ replanting requirements • Establishing a Grand Tree/Heritage Tree status to be assigned to trees of a size, age, character, species that warrant preservation or additional mitigation requirements. Stipulate that any tree attaining this status scheduled to be removed must be reviewed by the community Tree Board.
Accommodations	Consider imposing fines or penalties to property owners for irrigation systems that run during the highest temperatures times of the day.	4	ALL	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Accommodations	Establish a community tree fund to distribute funds for community tree planting efforts in residential areas.	4, 5	ATC, UHI	These materials are more expensive, but can reduce insurance premiums and significantly extend the life of a roof.
Accommodations	Encourage the use of more building of high impact shingles.	2, 4	ALL	These materials are more expensive, but can reduce insurance premiums and significantly extend the life of a roof.
Accommodations	Establish a Cool Roof incentive program.	2, 5	ALL	For example, Louisville, KY offers a $1/SF rebate for cool roofs installed, up to $2,000 for residential properties and $5,000 for commercial properties.
Accommodations	Complete a public tree inventory including species, diameter at breast height (DBH), condition, location, and hazard zones.	4, 5	ALL	Use the inventory to identify trees that need to be removed and to set diversity and management goals for all public trees.
Accommodations	Establish a Community Forestry Master Plan with actionable, time-bound goals.	4, 5	ALL	Urban Forestry Master Planning is a comprehensive, strategic process that assesses a city's existing tree canopy and establishes strategies to improve it over time.
Accommodations	Do not allow trees to be planted closer than 10 ft. from the foundation of any structure.	1, 2	ALL	This should include education to the general public for private property.
Accommodations	Prioritize planting trees on the N, NW, W, SW, and S sides of structures.	1, 2	ALL	Winds a primarily N, NW, and W.
Accommodations	To reduce the loss from storms/wind damage, prioritize planting trees with good structure and strong woods.	1, 2	ALL	Avoid species that grow with narrow trunks/branch angles. Avoid fast growing species that are known to be weak-wooded. Avoid species that become brittle with age and are more likely to fail.

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

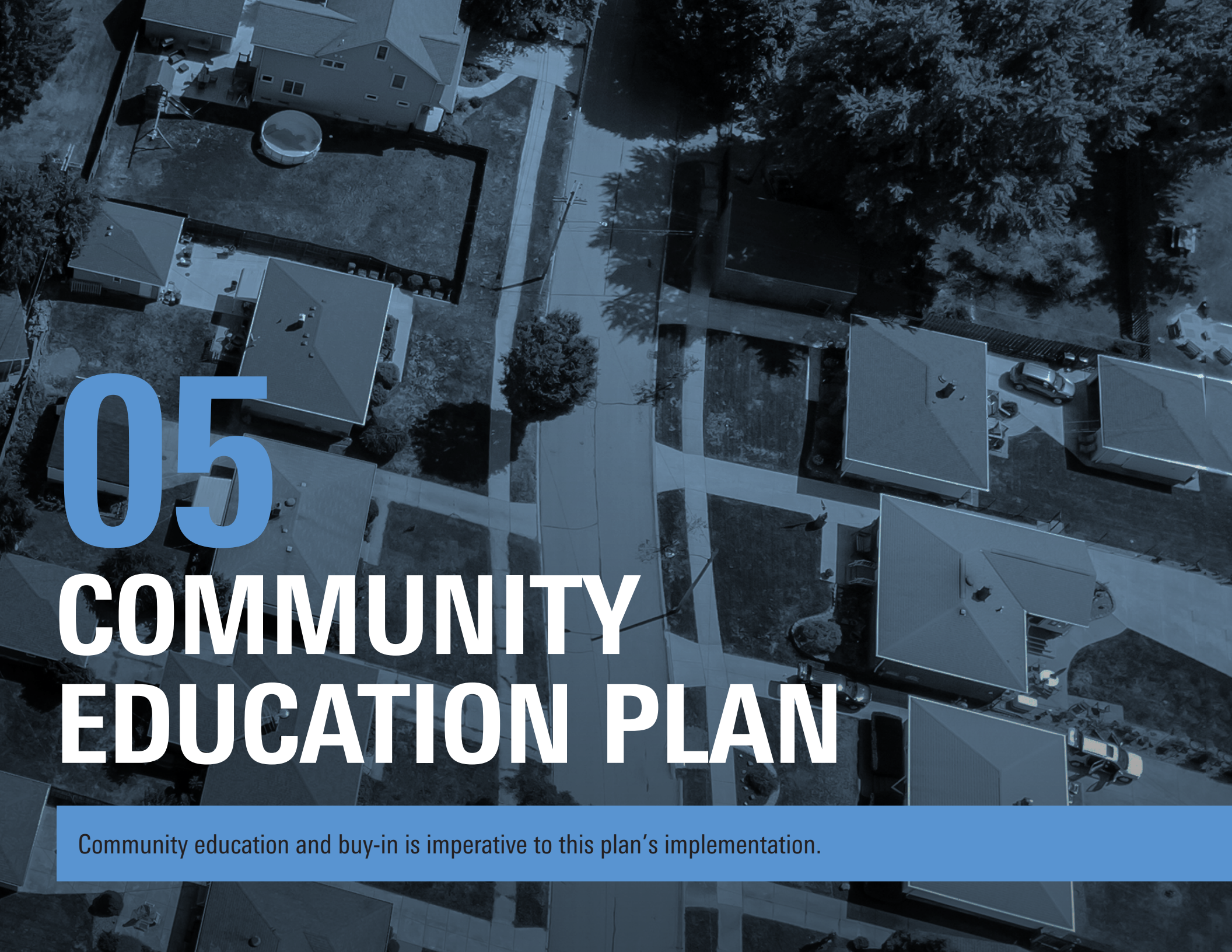
Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Social Vulnerability	Conduct a yearly meeting with first responders, the Housing Authority, local news outlets, faith-based organizations, schools, and other civic organizations to ensure clear procedures for distributing information about evacuations, shelters, and temporary housing.	4, 5	ALL	
Social Vulnerability	Support construction of affordable housing outside of flood zones.	1, 2, 5	ND	
Social Vulnerability	Target HOME and CDBG funds to rehabilitate older housing using building materials and practices that improve resiliency.	1, 2, 5	ALL	This may include the use of high-impact shingles and/or hurricane clips.
Social Vulnerability	Work with local organizations and non-profits to improve roofing on older housing.	1, 2, 5	ALL	
Social Vulnerability	Establish funding sources to assist low-income households with the removal of older trees in danger of causing damage to a home.	2, 5	ATC	
Social Vulnerability	Establish evacuation, relocation, and temporary housing plans for low-income households.	1, 4, 5	ALL	
Social Vulnerability	Create an inventory map of the community's most vulnerable households to identify neighborhoods where assisted evacuations and other strategies may be most needed following a disaster.	2, 3, 4	ALL	These neighborhoods may include those with group homes, day cares, and high percentages of elderly and/or low-income households.

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Social Vulnerability	Establish contracts with local hotels to automatically provide free or discounted room rates for displaced residents.	4, 5	ALL	
Social Vulnerability	Establish agreements with local landlords to offer access to vacant units for displaced residents.	4, 5	ALL	
Social Vulnerability	Establish a mass communication list and use to distribute temporary housing opportunities.	4, 5	ALL	
Stormwater Management	Collect key storm sewer information in local GIS data resources (pipe materials, sizes, slopes, elevations, and structure types).	3	ALL	Data on the entire storm sewer system should be collected. However, initial data collection should be prioritized for larger storm sewer pipes (24" or larger) in areas where flash flooding has been observed.
Stormwater Management	Once storm sewer information is collected, commission detailed studies of the watersheds that drain to the suspected flash flooding areas.	3	ERA	These studies may need to evaluate both pipe flow and surface flow to identify the cause(s) of flash flooding.
Stormwater Management	For pre-application meetings key drainage patterns, identify the size and characteristics of the watershed areas entering and leaving the site.	3, 4	ALL	
Stormwater Management	For pre-application meetings, require an evaluation of open space buffers and greenways along drainage paths with larger watershed areas.	3, 4	ALL	

TABLE 4.0: POTENTIAL HOUSING LOSS REDUCTION STRATEGIES/ACTIONS (cont)

Policy/Strategy Type	Policy/Strategy/Action	Applicable Goal(s)	Applicable Land Use Policy Area(s)	Note
Stormwater Management	Avoid the creation of mid-block low points in streets, which require flow from catastrophic events (or if the storm network is blocked) to pass along the side yards between homes.	2, 3	ND	If mid-block low pints can't be avoided, provide an easement along the side yard(s) to contain the expected surface overflow from the 0.2% chance, 24-hour storm event with at least one foot of vertical freeboard from the expected high-water level to the elevation of the lowest edge of the easement.
Stormwater Management	Develop grading plans which direct larger storm flows to pass along the street right-of-way corridors until they reach an open space, buffer, or greenway.	2, 3	ND	
Stormwater Management	At pre-application meetings, discuss site requirements for stormwater management.	3, 4	ALL	
Stormwater Management	At pre-application meetings, discuss site requirements for stormwater management.	3, 4	ALL	As designs advance, perform preliminary design calculations to reserve the appropriate amount of space for stormwater management, then plan development patterns around those spaces.
Stormwater Management	For pre-application meetings, evaluate if any downstream conditions cause capacity limitations or restrictions that could affect how stormwater is released from the proposed development.	3, 4	ND	



05 COMMUNITY EDUCATION PLAN

Community education and buy-in is imperative to this plan's implementation.

CREATING AN ENVIRONMENT OF RESILIENCE

Effective community engagement must be consistent and ongoing. Sharing information at meetings and events helps embed best practices into the daily lives of members of the community. Every year, Bellevue and Papillion host a range of events that present valuable opportunities for decision-makers to connect with residents, strengthen relationships, and build trust.

The recommendations and goals in the Bellevue-Papillion Housing Resilience Plan rely on the active participation of the community. Numerous stakeholders contributed to this plan, offering valuable insight into identifying policy areas, information networks, and approaches to building trust within the communities.

Effective engagement in resilience planning and recovery requires a consistent and ongoing dialogue between stakeholders. To ensure success, messaging across both communities must remain concise and consistent.

This chapter provides a roadmap for engaging and educating the public to build a more resilient community. This chapter:

- Identifies key organizations for partnership opportunities
- Recommends educational components at events in each community
- Proposes education strategies

The engagement goals align with the goals of the Bellevue-Papillion Housing Resilience Plan identified in Chapter 1, and builds upon them to create a more implementable plan.

ENGAGEMENT PLAN GOALS

1. Keep community leaders, organizations, and decision-makers actively engaged.
2. Share information widely, both in print and online, and in multiple languages where necessary.
3. Ensure open, ongoing communication between officials and stakeholders.
4. Deliver unified messaging across both communities.

Key Organizations for Partnership Opportunities

The cities cannot undertake the implementation of the Bellevue-Papillion Housing Resilience Plan and its education pieces on their own. True integration of this plan into communities will take the work of several partner organizations, who have a wide reach and established trust with residents. Table 5.0 (right) identifies a number of potential organizations that may play key partnership roles.

Table 5.0 (right) breaks down all organizations by category and community. Different categories of organizations will have different audiences, purposes, and even different access to funding:

- Community-Based
- Community Health
- Economic
- Education
- Environmental
- Faith-Based
- Housing
- Insurance
- Military
- Response/Recovery
- Utilities

Utilizing a broad net to make mass connections will make implementation more efficient and effective.

Table 5.0: Key Organizations for Partnership Opportunities

Organization Name	Category	Community
American Red Cross of Nebraska	Response/Recovery	Both
All Seasons Foundation and Church	Faith-Based	Bellevue
Asha's House	Community-Based	Bellevue
Bellevue Fire Department	Response/Recovery	Bellevue
Bellevue Housing Authority	Community-Based	Bellevue
Bellevue Medical Center	Community Health	Bellevue
Bellevue Police Department	Response/Recovery	Bellevue
Bellevue Public Library	Community-Based	Bellevue
Bellevue Public Schools	Education	Bellevue
Bellevue Senior Center	Community-Based	Bellevue
Bellevue Together	Community-Based	Bellevue
Bellevue Tree Board	Environmental	Bellevue
Bellevue University	Education	Bellevue

Table 5.0: Key Organizations for Partnership Opportunities, Continued

Organization Name	Category	Community
Duet Endeavors	Community-Based	Bellevue
Eastern Nebraska Community Action Partnership	Community-Based	Bellevue
Green Bellevue	Environmental	Bellevue
Habitat for Humanity of Omaha	Housing	Both
Healthy Homes Omaha	Housing	Both
Hillcrest Health	Community Health	Both
Lied Activity Center	Community-Based	Both
Lift Up Sarpy County	Community-Based	Both
Metro Omaha Builders Association	Housing	Both
Metropolitan Community College	Education	Bellevue
Nebraska Dept. of Insurance	Insurance	Both

Organization Name	Category	Community
NeighborGood	Community-Based	Papillion
Offut Air Force Base	Military	Bellevue
OPPD	Utilities	Both
Papillion Downtown Business Administration	Economic	Papillion
Papillion Fire Department	Response/ Recovery	Papillion
Papillion Police Department	Response/ Recovery	Papillion
Papillion Public Library	Community-Based	Papillion
Papillion Senior Center	Community-Based	Papillion
Papillion Tree Board	Environmental	Papillion
Papillion Public Library	Community-Based	Papillion
Papillion-La Vista Public Schools	Education	Papillion

Table 5.0: Key Organizations for Partnership Opportunities, Continued

Organization Name	Category	Community
Papio Missouri NRD	Environmental	Both
Project Houseworks	Housing	Both
Sarpy County Chamber of Commerce	Economic	Both
Sarpy County Emergency Management	Response/ Recovery	Both
Sarpy County Health Department	Community Health	Both
Sarpy County Long Term Disaster Recovery Group	Response/ Recovery	Both

Community Events for Education Opportunities

Often times, the best way to reach the widest audience is to meet people in places they already are. For this reason, attending community events and sharing information at them is an efficient way to share important information or host activities. Table 5.1 (right) shares a list of community events hosted regularly or annually in Bellevue and Papillion that may serve as opportunities for educating stakeholders.

Table 5.1: Community Events for Education Opportunities

Event Name	Occurrence	Community
Arrows to Aerospace	Annual	Bellevue
Bellevue Farmer's Market	Weekly: Spring-Fall	Bellevue
Bellevue Rocks Rocks the Riverfront Festival	Annual	Bellevue
Christmas in Olde Towne	Annual	Bellevue
Heritage Days	Annual	Bellevue
Papillion Art Show	Annual	Papillion
Papillion Days Festival	Annual	Papillion
Papillion Farmer's Market	Weekly: Spring-Fall	Papillion
Sarpy County Fair	Annual	Both
Summer Concert Series	Weekly: Summer	Both
Winter Wonderland	Annual	Papillion

Education Strategies

To support community education on the items included in the plan and more, the list below provides a list of potential activities. This list is not intended to be comprehensive or exhaustive, but rather a starting point to engage with stakeholders and lead both communities to a more resilient future.

Conduct regular community surveying. Consider surveying on a regular basis (e.g. bi-annually) to determine how perceptions, priorities, and education have changed over time in each community. Include incentives and partner with organizations to increase participation. Share the results of the survey with the community alongside other educational and engagement activities.

Engage through neighborhood associations. Partner with neighborhood associations, homeowners' associations, civic groups, and church communities to deliver short resilience briefings or mini-trainings during their regular meetings.

Establish recurring communications with key parties. Create a newsletter, email list, or other communications channel(s) where community members can receive regular updates on progress towards the plan, resources, and engagement opportunities.

Host a "Resilient Homes" workshop series. Offer free, seasonal workshops on topics such as strengthening roofs, floodproofing, reducing insurance costs, and preparing emergency kits. Partner with local builders, insurance representatives, and emergency managers.

Host pop-up events related to resilience and emergency management. Join already-existing events pop-up style, which may vary in activities from building emergency kits to learning generator safety.

Implement a housing resilience rewards program. Reward homeowners, landlords, and tenants for implementing resilient strategies with a badge program. Participants could earn tiered recognition levels, such as bronze, silver, and gold, based on the number and impact of resilience measures they adopt.

Include resilience in the building permit process. Provide homeowners and builders with educational brochures or brief consultations when homeowners apply for renovation or new construction permits, ensuring resilience measures are a part of early planning. Some resilience factors may come with incentives such as tax abatements or allowing increased density. Incentives will be determined by the City.

Integrate resilience education in schools. Collaborate with local schools to teach students about natural hazards and how strong, well-prepared homes keep families safe. This education may also teach children how to create a household disaster plan. Both Bellevue and Papillion have strong school systems with high graduation rates. Leverage existing partnerships with these schools and build programs at different grade levels to integrate resilience education for all ages.

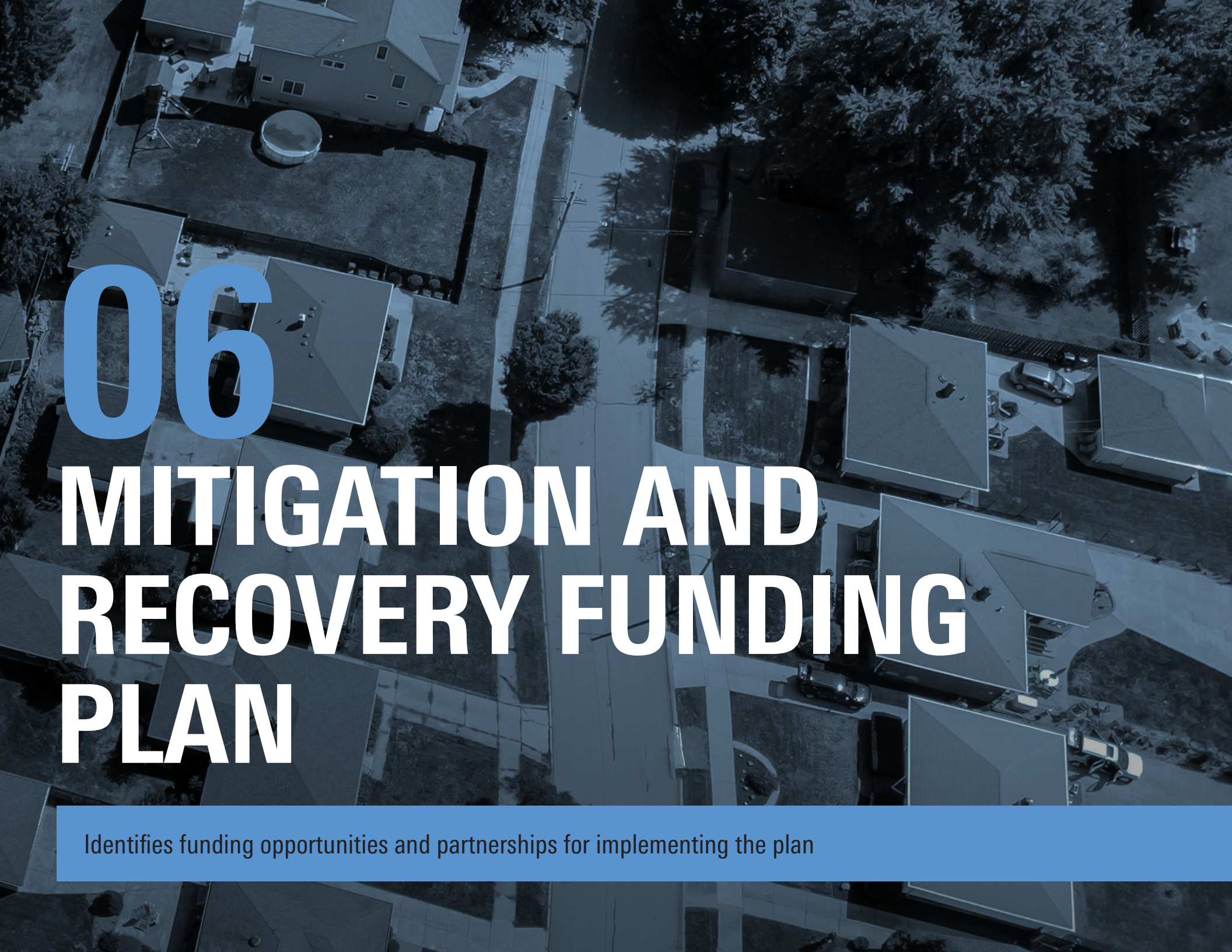
Maintain an engagement database. Maintain a database of key organizations, events, as well as lessons learned and best practices within the communities. This will allow for a single place for organizing engagement opportunities and have events reflect the needs of the community.

Promote storytelling and local champions. Share the stories of residents who have improved their homes and recovered from disasters through online and physical media. Peer examples help promote proactive action.

Publish a housing resilience progress and resource website. Host a website that is dedicated to updating community members on progress made towards the plan and resources for community members to support action and education themselves. The website may also store all information and forms related to resilient housing. The site may include flood maps, building code resources, and grant/loan programs for mitigation work and repairs.

Run a "Know Your Risk" campaign. Launch a multi-media outreach effort including online and physical media explaining local hazards (flood, wind, heat) and how housing design and maintenance can reduce an individual's risk.

Run annual campaigns about specific disruptions. Consider running annual campaigns on specific disruptions, such as heat mitigation or home winterization, so that community members can be reminded of best practices and resources to stay safe during disruptions common during certain seasons of the year.



06 MITIGATION AND RECOVERY FUNDING PLAN

Identifies funding opportunities and partnerships for implementing the plan

FUNDING FUTURE RESILIENCE

The cities of Bellevue and Papillion cannot bring to life the goals of this plan on their own, it will require the partnership of many people and organizations, and funding from a variety of sources. Table 6.0 shares potential funding sources that may be available for projects related to housing resilience.

Table 6.0: Potential Funding Sources

Funding Program	Funding Agency	Description
Assistance for Governments and Private Non-Profits After a Disaster	FEMA	This program provides funding to eligible entities for emergency or permanent construction projects that address buildings, public works systems, equipment, or natural features in disaster-effected areas.
Building Resilient Infrastructure and Communities (BRIC)	FEMA	The program supports eligible entities that have experienced a declared major disaster within the past seven years by helping them reduce risks from extreme weather and future disasters. It prioritizes projects that strengthen public infrastructure and essential community lifelines.
Clean Water State Resolving Fund (CWSRF)	EPA	This program supports eligible entities in improving water quality by offering low-cost financing for infrastructure projects. Previous investments have supported stormwater management, non-point source pollution control, and the development of green infrastructure.
Community Development Block Grants (CDBG)	HUD	The program provides funding to eligible entities to enhance residents' quality of life, leverage resources to build community assets, and effectively implement local programs.

Table 6.0: Potential Funding Sources, continued

Funding Program	Funding Agency	Description
Community Development Block Grants-Disaster Recovery (CDBG-DR)	HUD	This program supports eligible entities in facilitating long-term community recovery by addressing unmet needs. It provides funding for activities that plan and execute recovery programs, remediate disaster impacts, and mitigate for future risks. Priority is given to infrastructure restoration and recovery efforts after declared disasters.
Disaster Recovery Supplemental	EDA	The program offers financial assistance to eligible entities for the implementation of projects, including construction, that promote sustained economic recovery. Eligibility requires a recent federally-declared disaster.
Economic Adjustment Assistance (EAA)	EDA	This program helps communities in regions affected by major economic changes, including those caused by natual disasters, by funding infrastructure projects. The funding may be used for technical assistance or planning, public works projects, or infrastructure-related investments.
Emergency Watershed Protection Program	USDA	The program supports eligible entities in recovering from natural disasters by addressing watershed impairments. Funding may also be used for resilience measures, including floodplain easements or conducting property buy-outs.
Flood Mitigation Assistance (FMA)	FEMA	This program helps eligible communities develop and implement projects aimed at flood and risk mitigation. Funding may be used to support long-term protection measures for structures covered by the National Flood Insurance Program (NFIP).
Hazard Mitigation Grant Program (HMGP)	FEMA	The program provides assistance to eligible entities for the creation of hazard mitigation plans and the execution of risk management projects, encompassing infrastructure initiatives.
Post-Disaster Recovery Grants	EDA	This program supports eligible entities for the creation of disaster recovery strategies and the execution of recovery projects, including improvements to make infrastructure more resilient.
Pre-Disaster Mitigation Grant Program (PDM)	FEMA	The program provides eligible entities with support in developing and implementing cost-effective measures to reduce disaster risks and enhance community resilience. Its primary goal is to decrease future dependence on federal disaster funding.

Table 6.0: Potential Funding Sources, continued

Funding Program	Funding Agency	Description
Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Program (PROTECT)	DOT	This program provides funding to eligible entities to mitigate disaster-related risks to transportation and promote resilience. Funding may be used for planning efforts or implementing resilience improvements.
Public Assistance Program (PA)	FEMA	The program offers financial assistance to eligible entities following a delcared disaster to support emergency response and infrastructure repair, including the implementation of cost-effective hazard mitigation for affected facilities.
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	DOT	This program offers financial assistance to eligible entities to develop and rehabilitate critical infrastructure systems, encompassing multi-modal and multi-jurisdictional initiatives.
Regional Catastrophic Preparedness Grant Program (RCPGP)	FEMA	This program helps communities implement the National Preparedness System by addressing gaps in housing, logistics, and supply chain capabilities. It encourages a regional approach to disaster preparedness efforts that builds upon already-existing infrastructure and programs.
Section 40101(D) Formula Grants to States and Indian Tribes	DOE	This program is intended to be used to improve grid resilience in eligible communities. The funding may be targeted at existing and/or future needs.
AmeriCorps State and National Grants	AmeriCorps	These programs offer financial assistance to eligible entities for the preparation, response, and mitigation of disaster impacts.
Development and Preservation Fund	Front Porch Investments	This program supports aims to finance new and affordable mixed-income housing and enhance and maintain existing housing. Most projects using this program are multi-family projects.
Innovation Fund	Front Porch Investments	This program incentivizes new ideas and practices to address challenges in affordable housing by funding research to discover new, innovative techniques, technologies, and materials for affordable housing construction and maintenance.
Nebraska Environmental Trust (NET) Grants	NET	This program funds projects related to habitat, surface and ground water, waste management, air quality, and soil management

Table 6.0: Potential Funding Sources, continued

Funding Program	Funding Agency	Description
Greener Together Program	OPPD	This grant program funds renewable energy, environmental sustainability, or community betterment/education projects. A partnership with a non-profit, educational institution, or health and human services organization is required for application.
Trees for Nebraska Towns Program	Nebraska State Arboretum	This effort provides free, high-quality trees to public-oriented projects in Nebraska communities.
Urban and Community Forestry Grants	Nebraska State Arboretum	This program bolsters Nebraska's community forestry efforts by providing support for tree care, removal, planting, and the development of forestry professionals. Projects must take place within designated eligible areas as outlined on the Nebraska Forest Service map and should focus on public tree initiatives.
Greener Towns Program	Nebraska State Arboretum	This initiative provides funding, resources, and educational opportunities to help Nebraska communities enhance and safeguard their green infrastructure.
Nebraska's Water Resources Cash Fund	Nebraska Department of Natural Resources	This funding supports conservation projects related to water in any area of the state that has implemented an integrated management plan.
Site and Building Development Fund (SBDF)	Nebraska Department of Economic Development	This program provides funding for projects related to infrastructure development and improvements.
Civic and Community Center Financing Fund (CCCFF)	Nebraska Department of Economic Development	A funding initiative aimed at projects that enhance economic prospects and improve the quality of life in communities.
Nebraska Affordable Housing Trust Fund (NAHTF)	Nebraska Department of Economic Development	This program provides funding to safe, affordable housing development projects.
Community Development Assistance Act (CDAA)	Nebraska Department of Economic Development	This is a tax credit opportunity for projects that enhance resident capacity, provide essential services to low- and moderate-income individuals, or foster lasting community partnerships.

Table 6.0: Potential Funding Sources, continued

Funding Program	Funding Agency	Description
Community Development Block Grants	Nebraska Department of Economic Development	This grant allocates funding to initiatives for safe, hygienic housing and economic opportunities.
Disaster Relief Mini Grants	Nebraska Museums Association	This grant requires a partnership with a local museum to conduct disaster preparedness and response.
Cooper Foundation Grants	Cooper Foundation	This grant requires a partner and funds projects focusing on civic engagement, community engagement, education, and the environment.
The Land and Water Conservation Fund	Nebraska Game and Parks	This is a program that funds the renovation of parks, recreation areas, and public lands.
Nebraska Water Sustainability Fund	Department of Natural Resources	Funding program for water sustainability programs, projects, or activities initiated within the state.
Community for Housing (C4H)	NIFA	A funding and cohort program to fund resilient housing projects.
NIFA Urban Workforce Housing Match Program (NUW-HOM)	NIFA	This funding program requires a non-profit partnership and supports workforce housing development.
Source Water Protection Program	NDWEE	This program provides funding for water-quality, restoration, conservation, contamination, drinking water, and education programs.
Nonpoint Source Water Quality Grants (Section 319)	NDWEE	A grant program for water pollution, water quality, and water management planning.

APPENDICES

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

APPENDIX B | GIS DATA GAP ANALYSIS

APPENDIX C | COMMUNITY SURVEY RESULTS

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

STORMWATER ASSESSMENT METHODS

The USGS (United States Geological Survey) organizes watersheds by Hydrologic Unit Codes (HUCs). The smallest watersheds mapped in the HUC system are identified by a 12 digit code (HUC-12s). This assessment required even smaller subwatersheds to be mapped that drain to a specific street, storm sewer or culvert. Within this study, assessment areas were divided into three groups, based on the HUC-12 that they fall within. Group 1 includes one neighborhood (1.1) within the Big Elk Creek-Papillion Creek HUC-12, group 2 includes three neighborhoods (2.1, 2.2, 2.3) within the Walnut Creek-Papillion Creek HUC-12, and group 3 includes four neighborhoods (3.1, 3.2, 3.3, 3.4) within the Mud Creek-Papillion Creek HUC-12.

STORMWATER INFRASTRUCTURE DATA

The stormwater assessment included an analysis of existing stormwater infrastructure, including storm sewer pipes, referred to as "gravity mains" in the Sarpy County GIS database, and culverts. Key infrastructure that serves as outlets and are likely to control the effectiveness of the stormwater network for the watersheds were included in the assessment and those that were estimated to be under capacity are pointed out in the individual neighborhood analysis maps.

The stormwater network dataset within the Sarpy County GIS database includes valuable information for evaluating stormwater system capacities. There are, however, numerous essential values missing within the dataset which make it difficult to make accurate estimates of stormwater network capacity. Out of a total of around 13,200 storm sewer pipe and culvert entries (roughly 1.38 million feet in length total), around 35% are missing pipe diameter information. Of the entries listed with pipes or culverts greater than 24-inches in diameter, around 45%, or 1,650 pipes and culverts, are missing data to calculate pipe slope. Eventually, missing data should be collected for all storm sewer pipes and culverts. However, it is recommended to prioritize data collection for these larger pipes and culverts when updating the GIS stormwater database (Appendix B). Pipe and culvert slope, or upstream and downstream elevations, are major data points needed to assess the capacity of the stormwater system.

For this study, assumptions had to be made for the missing pipe and culvert slope data in the neighborhoods of interest. LIDAR ground elevations at points where the pipe flowline is at ground elevation (intake and outlet points) was used to estimate pipe slope. In a few cases, assumptions of appropriate pipe depth had to be made to calculate pipe capacity. Because these assumptions were used in many cases, the actual capacity of the pipe or culvert may be much different than this assessment estimated, depending on the actual pipe conditions measured in the field. Assumptions made in the assessment are reported in Table A1.

Pipe capacity was calculated using Manning's equation for pipe flow and AutoCAD Civil 3D Hydraflow Express was used to calculate culvert capacity. Further studies or assessments will likely need to consider site conditions, including tailwater conditions, or water elevation at culvert inlets and outlets, to update capacity calculations.

These calculations are meant to provide an initial "screening-level" assessment of capacity to identify potential capacity issues that may be contributing to localized flash flooding. Once more accurate pipe elevation is available, more detailed studies could be completed to better evaluate system capacities and find alternatives for system improvements.

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

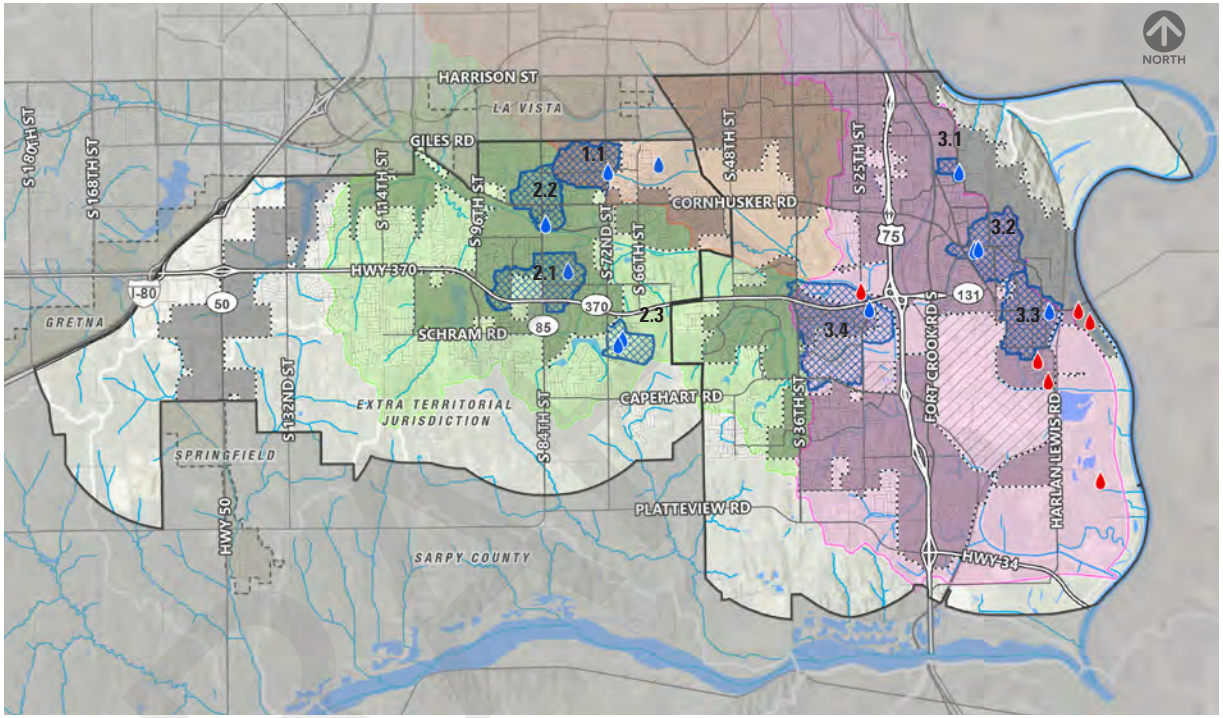
HYDROLOGIC MODELING

Hydrologic modeling included the Rational Method to calculate peak runoff flow rate for watersheds smaller than about 125 acres. The NRCS Technical Release 55 (TR-55) was used to calculate peak runoff flow rate for larger watersheds. The study utilized the 5-year and 100-year peak runoff rates.

Assumptions made regarding watershed hydrology and regarding pipe and culvert flow calculations are provided in Tables A2 and A3. An additional important assumption is that no stormwater detention effects were considered in the analysis.

This study identified several areas where storm sewer infrastructure may not have the capacity to convey the 5-year or 100-year design storms. However, as noted previously, these areas would need to be studied in greater detail when more complete information is available.

MAP: A1: RESIDENT IDENTIFIED FLOODING ISSUES & ASSOCIATED WATERSHEDS



Source: RDG Planning & Design; Sarpy County GIS, 2025

City Limits
Extraterritorial Jurisdiction (ETJ)
Offut Air Base Property
Waterlines
Waterbodies

Community Social Map Input
Floodplain Related
Upland Flooding Issues

Watersheds (HUC12)
Big Elk Creek-Big Papillion Creek
Mud Creek - Papillion Creek
Walnut Creek - Papillion Creek

Subwatersheds
1.1 – Big Elk Creek (Hickory Estates)
2.1 – Walnut Creek / Papillion Creek (S Grandview Ave)
2.2 – Walnut Creek / Papillion Creek (N Washington St)
2.3 – Walnut Creek / Papillion Creek (Flint Drive)
3.1 – Mud Creek / Papillion Creek (Galvin Rd N)
3.2 – Mud Creek / Papillion Creek (Birchcrest Rd)
3.3 – Mud Creek / Papillion Creek East (Mission Ave)
3.4 – Mud Creek / Papillion Creek (Highway 70 at Papillion Creek)
HUC12 - Watersheds

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A1. Subwatershed information, including outlet ID# and assumptions made regarding pipe conditions.

Neighborhood#	Subwatershed#	Outlet_ID#	Assumptions
1.1	100	UNKNOWN CULVERT	NO CULVERT INFO; SLOPE (LIDAR)
1.1	101	UNKNOWN CULVERT	NO CULVERT INFO; SLOPE (LIDAR)
1.1	102	CULVERT #2441	SLOPE (LIDAR)
1.1	103	MAIN #36603	GOUND SLOPE
2.1	100	MAINS #37575 & #37577	SLOPE (LIDAR AT OUTFALL)
2.1	101	MAIN #37551	GOUND SLOPE
2.1	102	MAIN #37485	GOUND SLOPE
2.1	200	MAINS #37651 & #37653	SLOPE (LIDAR AT OUTFALL)
2.2	100	MAIN #36933	SLOPE (LIDAR AT OUTFALL)
2.2	200	MAIN #36865	SLOPE (LIDAR AT OUTFALL)
2.2	300	MAIN #36877	SLOPE (LIDAR AT OUTFALL)
2.2	400	MAIN #36799	SLOPE (LIDAR AT OUTFALL); MISSING AND POTENTIALLY ERRONEOUS INFORMATION
2.2	500	MAIN #36757	SLOPE (LIDAR AT OUTFALL)
2.2	600	MAIN #36747	SLOPE (LIDAR AT OUTFALL)
2.2	700	MAIN #36735	SLOPE (LIDAR AT OUTFALL)
2.2	800	MAIN #36703	SLOPE (LIDAR AT OUTFALL)
2.3	100	CULVERT #1369	SLOPE (LIDAR); RECENTLY DEVELOPED AREA WITHOUT UPDATED STORMWATER INFO
2.3	200	CULVERT #1368	SLOPE (LIDAR); RECENTLY DEVELOPED AREA WITHOUT UPDATED STORMWATER INFO

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A1. Subwatershed information, including outlet ID# and assumptions made regarding pipe conditions, continued

Neighborhood#	Subwatershed#	Outlet_ID#	Assumptions
3.1	100	MAIN #34403	DOWN SLOPE (INLET INV 1034.8, RIM 1038)
3.1	101	MAIN #34120	
3.1	102	NONE CURRENTLY	ESTIMATE PIPE SIZE NEEDED (USED DOWN MH-70 INV)
3.1	103	MAIN #34229	STUB PIPE SHOWN ON GIS
3.1	200	NONE CURRENTLY	ESTIMATE PIPE SIZE NEEDED (USED DOWN INLET #12039 INV)
3.2	100	CULVERT #138	SLOPE (LIDAR)
3.2	101	CULVERT #138	SLOPE (LIDAR)
3.2	102	UNKNOWN MAIN	ESTIMATE INFO
3.2	103	CULVERT #2407	SLOPE (LIDAR)
3.3	100	CULVERT #1981	SLOPE(LIDAR)
3.3	200	MAIN #3012	
3.3	300	MAIN #3329	
3.3	400	CULVERT #1993	SLOPE(LIDAR)
3.3	401	CULVERT #1993	SLOPE(LIDAR)
3.3	402	MAIN #2982	SLOPE(LIDAR)
3.3	403	CULVERT #1988	SLOPE(LIDAR)
3.3	500	CULVERT #1967	SLOPE(LIDAR)
3.3	600	PIPE #2690	SLOPE(LIDAR)

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A1. Subwatershed information, including outlet ID# and assumptions made regarding pipe conditions, continued.

Neighborhood#	Subwatershed#	Outlet_ID#	Assumptions
3.4	100	DISCHARGE POINT #3388	SLOPE(LIDAR)
3.4	200	CULVERT #105	SLOPE(LIDAR)
3.4	201	UNKNOWN MAIN	NO PIPE INFO; SLOPE (LIDAR+NEIGHBORING PIPES)
3.4	202	CULVERT #104	SLOPE(LIDAR)
3.4	203	CULVERT #104	SLOPE(LIDAR)
3.4	300	DETENTION POND	
3.4	400	DISCHARGE POINT #263	NO PIPE INFO; SLOPE (LIDAR)
3.4	500	DISCHARGE POINT #312	NO PIPE INFO
3.4	501	CULVERT #56	SLOPE (LIDAR) AND SIZE
3.4	502	CULVERT #67	SLOPE (LIDAR) AND SIZE
3.4	600	DISCHARGE POINT #311	SLOPE (LIDAR) AND SIZE
3.4	601	DISCHARGE POINT #311	SLOPE (LIDAR) AND SIZE
3.4	602	CULVERT #78	SLOPE (LIDAR) AND SIZE
3.4	700	MAIN #30525	SLOPE (LIDAR@OUTFALL)

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A2. Hydrology assumptions made for each subwatershed.

#	Subwatershed#	Area_acres	Impervious_%*	C5	CN	Tc (min)	5-YR Rainfall in/hr	100-YR Rainfall in/hr
1.1	100	380	35%	0.63	86	24	3.3	6.0
1.1	101	314	35%	0.63	86	24	3.3	6.0
1.1	102	241	35%	0.63	86	20	3.6	6.6
1.1	103	38	35%	0.63	86	17	3.8	7.0
2.1	100	448	50%	0.70	89	38	2.6	4.8
2.1	101	41	35%	0.63	86	14	4.2	7.6
2.1	102	15	35%	0.63	86	10	4.9	8.9
2.1	200	157	50%	0.70	89	16	3.9	7.1
2.2	100	101	50%	0.63	86	22	3.5	6.3
2.2	200	3	85%	0.63	86	6	6.3	11.5
2.2	300	17	70%	0.63	86	10	4.9	8.9
2.2	400	9	85%	0.63	86	11	4.7	8.6
2.2	500	5	85%	0.63	86	6	6.3	11.5
2.2	600	5	70%	0.63	86	11	4.7	8.6
2.2	700	15	50%	0.63	86	14	4.2	7.6
2.2	800	212	50%	0.63	86	27	3.1	5.7
2.3	100	48	65%	0.63	86	13	4.3	7.9
2.3	200	171	65%	0.63	86	26	3.2	5.8

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A2. Hydrology assumptions made for each subwatershed, continued.

#	Subwatershed#	Area_acres	Impervious_%*	C5	CN	Tc (min)	5-YR Rainfall in/hr	100-YR Rainfall in/hr
3.1	100	45	35%	0.63	86	17	3.8	7.0
3.1	101	25	35%	0.63	86	12	4.5	8.2
3.1	102	9	35%	0.63	86	12	4.5	8.2
3.1	103	14	35%	0.63	86	12	4.5	8.2
3.1	200	15	35%	0.63	86	11	4.7	8.6
3.2	100	524	50%	0.63	86	28	3.0	5.5
3.2	101	446	50%	0.63	86	25	3.3	5.9
3.2	102	26	50%	0.63	86	15	4.0	7.2
3.2	103	410	50%	0.63	86	22	3.5	6.3
3.3	100	29	50%	0.63	86	35	2.7	5.0
3.3	200	9	50%	0.63	86	18	3.8	6.8
3.3	300	3	50%	0.63	86	19	3.7	6.7
3.3	400	463	50%	0.63	86	31	2.9	5.2
3.3	401	442	50%	0.63	86	31	2.9	5.2
3.3	402	380	50%	0.63	86	29	3.0	5.4
3.3	403	426	50%	0.63	86	29	3.0	5.4
3.3	500	40	50%	0.63	86	10	4.9	8.9
3.3	600	6	50%	0.63	86	11	4.7	8.6

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A2. Hydrology assumptions made for each subwatershed, continued.

#	Subwatershed#	Area_acres	Impervious_%*	C5	CN	Tc (min)	5-YR Rainfall in/hr	100-YR Rainfall in/hr
3.4	100	156	35%	0.63	86	35	2.7	5.0
3.4	200	456	35%	0.63	86	34	2.8	5.0
3.4	201	110	35%	0.63	86	15	4.0	7.2
3.4	202	346	35%	0.63	86	34	2.8	5.0
3.4	203	233	35%	0.63	86	29	3.0	5.4
3.4	300	43	50%	0.63	86	17	3.8	7.0
3.4	400	12	35%	0.63	86	13	4.3	7.9
3.4	500	124	35%	0.63	86	23	3.4	6.2
3.4	501	42	50%	0.63	86	12	4.5	8.2
3.4	502	23	50%	0.63	86	12	4.5	8.2
3.4	600	339	35%	0.63	86	36	2.7	4.9
3.4	601	154	35%	0.63	86	25	3.3	5.9
3.4	602	185	45%	0.63	86	20	3.6	6.6
3.4	700	28	85%	0.63	86	13	4.3	7.9

* Assumed based on land uses

Rainfall intensities based on NOAA Atlas 14 rainfall data for system Time of Concentration.

Source: RDG Planning & Design;

Table A3. Pipe and culvert flow assumptions made for each subwatershed.

#	Subwatershed#	Pipe Diameter/ Width (in)	Flow Area (sf)	Hydraulic Radius (ft)	Manning's Roughness (n)	Slope (%)	Downstream Invert (ft)*	Culvert Length (ft)*	Road Crest Elevation (ft)*	Road Crest Width (ft)*
1.1	100	72	28.3	1.5	0.013	2.5	1050.0	200	1066.0	80
1.1	101	72	28.3	1.5	0.013	2.5	1050.0	200	1066.0	80
1.1	102	72	28.3	1.5	0.013	3.2	1062.0	63	1068.5	60
1.1	103	48	12.6	1.0	0.013	2.4				
2.1	100	2-60	19.6	1.3	0.013	2.7				
2.1	101	42	9.6	0.9	0.013	0.2				
2.1	102	30	4.9	0.6	0.013	1.4				
2.1	200	2-72	28.3	1.5	0.013	2.8				
2.2	100	48	12.6	1.0	0.013	8.8				
2.2	200	24	3.1	0.5	0.013	12.5				
2.2	300	30	4.9	0.6	0.013	6.1				
2.2	400	30	4.9	0.6	0.013	5.9				
2.2	500	48	12.6	1.0	0.013	4.6				
2.2	600	24	3.1	0.5	0.013	11.2				
2.2	700	36	7.1	0.8	0.013	5.0				
2.2	800	96	50.3	2.0	0.013	2.1				
2.3	100	60	19.6	1.3	0.013	2.6	1067.0	115	1074.5	60
2.3	200	72	26.7	1.5	0.013	4.6	1058.0	110	1066.0	70

Source: RDG Planning & Design;

Table A3. Pipe and culvert flow assumptions made for each subwatershed, continued

#	Subwatershed#	Pipe Diameter/ Width (in)	Flow Area (sf)	Hydraulic Radius (ft)	Manning's Roughness (n)	Slope (%)	Downstream Invert (ft)*	Culvert Length (ft)*	Road Crest Elevation (ft)*	Road Crest Width (ft)*
3.1	100	42	9.6	0.9	0.013	9.5				
3.1	101	30	4.9	0.6	0.013	3.1				
3.1	102	24	3.1	0.5	0.013	2.5				
3.1	103	24	3.1	0.5	0.013	2.5				
3.1	200	30	4.9	0.6	0.013	2.5				
3.2	100	84	8.7	0.8	0.013	1.3	1030.0	1210	1054.0	40
3.2	101	84	8.7	0.8	0.013	1.3	1030.0	1210	1054.0	40
3.2	102	30	4.9	0.6	0.013	2.5				
3.2	103	84	26.7	1.5	0.013	1.1	1048.0	95	1057.0	70
3.3	100	24	3.1	0.5	0.013	0.5	962.2	67	968.5	30
3.3	200	24	3.1	0.5	0.013	0.7				
3.3	300	24	3.1	0.5	0.013	1.9				
3.3	400	72	28.3	1.5	0.013	1.9	980.3	57	989.0	35
3.3	401	72	28.3	1.5	0.013	1.9	980.3	57	989.0	35
3.3	402	72	28.3	1.5	0.013	1.5				
3.3	403	84	38.5	1.8	0.013	11.5	988.0	56	998.0	25
3.3	500	24	3.1	0.5	0.013	8.3	966.0	60	972.0	30
3.3	600	18	1.8	0.4	0.013	0.7				

Source: RDG Planning & Design;

Table A3. Pipe and culvert flow assumptions made for each subwatershed, continued

#	Subwatershed#	Pipe Diameter/ Width (in)	Flow Area (sf)	Hydraulic Radius (ft)	Manning's Roughness (n)	Slope (%)	Downstream Invert (ft)*	Culvert Length (ft)*	Road Crest Elevation (ft)*	Road Crest Width (ft)*
3.4	100	40	8.7	0.8	0.013	2.3				
3.4	200	72	28.3	1.5	0.013	7.6	989.0	118	1008.0	35
3.4	201	40	8.7	0.8	0.013					
3.4	202	48	12.6	1.0	0.013	1.3	998.0	1530	1026.0	45
3.4	203	48	12.6	1.0	0.013	1.3	998.0	1530	1026.0	45
3.4	300	DETENTION POND			0.013					
3.4	400	42	9.6	0.9	0.013	5.9				
3.4	500	40	8.7	0.8	0.013	2.8				
3.4	501	24	3.1	0.5	0.013	2.5	992.0	158	1000.0	100
3.4	502	24	3.1	0.5	0.013	3.6	989.0	166	1000.0	100
3.4	600	60	19.6	1.3	0.013	3.7				
3.4	601	60	19.6	1.3	0.013	3.7				
3.4	602	48	12.6	1.0	0.013	1.7	992.0	182	1007.0	110
3.4	700	42	9.6	0.9	0.013	13.4				

*Used for culvert calculations.

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A4. Peak design flow rate and outlet capacity for each subwatershed with the capacity flagged as "UNDER" for both 5-year and 100-year peak design flow rates.

Neighborhood #	Subwatershed#	Peak Design Flow Rate		Outlet Capacity	UNDER CAPACITY?	UNDER CAPACITY?
		5-YR (cfs)	100-YR (cfs)	(cfs)	5YR	100YR
1.1	100	901	2148	484	UNDER	UNDER
1.1	101	745	1775	554	UNDER	UNDER
1.1	102	651	1545	250	UNDER	UNDER
1.1	103	92	167	225		
2.1	100	893	2016	859	UNDER	UNDER
2.1	101	107	194	45	UNDER	UNDER
2.1	102	47	85	49		UNDER
2.1	200	519	1159	1411		
2.2	100	245	445	427		UNDER
2.2	200	19	35	80		
2.2	300	65	118	101		UNDER
2.2	400	37	67	100		
2.2	500	29	53	307		
2.2	600	20	37	76		
2.2	700	42	77	150		
2.2	800	537	1209	1313		
2.3	100	161	293	290		UNDER
2.3	200	473	1009	294	UNDER	UNDER

Source: RDG Planning & Design;

APPENDIX A | STORMWATER ASSESSMENT ASSUMPTIONS AND CALCULATIONS

Table A4. Peak design flow rate and outlet capacity for each subwatershed with the capacity flagged as "UNDER" for both 5-year and 100-year peak design flow rates, contiued.

Neighborhood #	Subwatershed#	Peak Design Flow Rate		Outlet Capacity	UNDER CAPACITY?	UNDER CAPACITY?
		5-YR (cfs)	100-YR (cfs)	(cfs)	5YR	100YR
3.1	100	107	195	311		
3.1	101	71	128	72		UNDER
3.1	102	25	46	36		UNDER
3.1	103	40	72	36	UNDER	UNDER
3.1	200	44	80	65		UNDER
3.2	100	1270	2859	480	UNDER	UNDER
3.2	101	1171	2633	480	UNDER	UNDER
3.2	102	71	130	65	UNDER	UNDER
3.2	103	1116	2508	430	UNDER	UNDER
3.3	100	56	102	45	UNDER	UNDER
3.3	200	23	41	19	UNDER	UNDER
3.3	300	8	15	31		
3.3	400	1051	2370	325	UNDER	UNDER
3.3	401	1004	2263	325	UNDER	UNDER
3.3	402	891	2008	511	UNDER	UNDER
3.3	403	999	2251	803	UNDER	UNDER
3.3	500	138	250	27	UNDER	UNDER
3.3	600	19	34	9	UNDER	UNDER

Source: RDG Planning & Design;

Table A4. Peak design flow rate and outlet capacity for each subwatershed with the capacity flagged as "UNDER" for both 5-year and 100-year peak design flow rates, contiued.

Neighborhood #	Subwatershed#	Peak Design Flow Rate		Outlet Capacity	UNDER CAPACITY?	UNDER CAPACITY?
		5-YR (cfs)	100-YR (cfs)	(cfs)	5YR	100YR
3.4	100	290	715	133	UNDER	UNDER
3.4	200	872	2089	449	UNDER	UNDER
3.4	201	274	498	0	UNDER	UNDER
3.4	202	661	1583	294	UNDER	UNDER
3.4	203	493	1178	294	UNDER	UNDER
3.4	300	114	207			
3.4	400	32	58	245		
3.4	500	264	480	148	UNDER	UNDER
3.4	501	132	240	75	UNDER	UNDER
3.4	502	73	133	120		UNDER
3.4	600	630	1510	500	UNDER	UNDER
3.4	601	366	873	500		UNDER
3.4	602	655	1318	490	UNDER	UNDER
3.4	700	106	192	369		

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size).

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1059	394	235	34535	42	92	878	30	56	1274	24	186
33671	100	34	34403	42	346	879	30	245	1280	24	87
34290	100	119	34174	42	43	899	30	30	1287	24	103
34460	100	33	24902.5	42	66	901	30	184	1291	24	26
102	72	633	35314	42	21	994	30	83	1293	24	270
2982	72	1744	36	40	134	1008	30	64	1296	24	101
2107	72	642	19876	40	158	1009	30	79	1300	24	131
192	66	113	19877	40	128	1030	30	182	1304	24	206
25	60	422	31	36	98	1036	30	150	1305	24	141
27	60	463	53	36	88	1048	30	165	1309	24	315
30	60	382	75	36	111	1056	30	41	1311	24	380
99	60	92	76	36	129	1073	30	528	1320	24	71
100	60	373	77	36	96	1146	30	206	1326	24	89
101	60	360	81	36	260	1148	30	171	1358	24	115
284	60	67	83	36	344	1160	30	50	1364	24	52
287	60	64	109	36	66	1162	30	25	1375	24	130
388	60	284	186	36	42	1163	30	171	1376	24	28

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
444	60	58	187	36	176	1190	30	199	1377	24	598
473	60	176	209	36	667	1225	30	171	1378	24	179
789	60	151	210	36	8	1250	30	269	1385	24	75
1395	60	712	228	36	57	1261	30	53	1390	24	178
23549	60	18	282	36	66	1262	30	181	1392	24	202
23550	60	53	324	36	150	1275	30	86	1400	24	30
24438	60	18	326	36	20	1281	30	226	1402	24	133
24439	60	53	327	36	534	1282	30	61	1404	24	138
24824	60	60	355	36	13	1294	30	264	1410	24	26
24825	60	348	356	36	28	1321	30	62	1411	24	41
3035	60	299	357	36	22	1372	30	170	1412	24	49
34423	60	252	365	36	206	1413	30	19	1418	24	165
34313	60	504	366	36	31	1414	30	46	1421	24	14
34492	60	605	405	36	161	1473	30	93	1422	24	114
23973	60	158	406	36	34	1484	30	376	1437	24	36
23975	60	68	411	36	138	1485	30	121	1438	24	101
163	54	41	436	36	80	1490	30	249	1439	24	22

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
165	54	83	464	36	148	1493	30	180	1454	24	75
241	54	116	501	36	238	1542	30	156	1456	24	388
283	54	66	646	36	128	1544	30	172	1464	24	169
684	54	27	648	36	120	1547	30	210	1466	24	162
685	54	281	650	36	33	1630	30	138	1478	24	146
769	54	46	792	36	295	1631	30	199	1495	24	139
770	54	91	809	36	252	1638	30	242	1514	24	116
1013	54	111	987	36	117	18281	30	14	1515	24	34
1039	54	368	995	36	37	18287	30	286	1518	24	98
1040	54	175	1019	36	200	19786	30	32	1534	24	25
1185	54	275	1023	36	216	19787	30	169	1537	24	121
1467	54	74	1024	36	162	19788	30	96	17696	24	16
19886	54	278	1028	36	213	19789	30	145	18231	24	18
19887	54	281	1035	36	179	19790	30	96	18277	24	132
19888	54	198	1058	36	72	19791	30	86	18323	24	174
19889	54	279	1147	36	212	19792	30	320	18335	24	18
19890	54	355	1164	36	394	19793	30	32	19703	24	86

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
19891	54	145	1181	36	124	19794	30	188	19704	24	178
19892	54	229	1191	36	203	19795	30	203	19705	24	140
19893	54	176	1192	36	197	19796	30	266	19706	24	266
23386	54	69	1210	36	177	19797	30	176	19707	24	254
23389	54	311	1211	36	95	19798	30	301	19708	24	62
23500	54	335	1214	36	40	19799	30	345	19709	24	50
24184	54	120	1215	36	149	19800	30	276	19710	24	74
24185	54	122	1226	36	232	19801	30	33	19711	24	73
24346	54	335	1242	36	128	19802	30	167	19712	24	44
2288	54	297	1295	36	211	19803	30	69	19713	24	369
3178	54	261	1322	36	165	19804	30	55	19714	24	191
34400	54	40	1324	36	146	19805	30	414	19715	24	59
35	50	157	1335	36	123	19806	30	119	19716	24	151
126	48	114	1397	36	21	19807	30	249	19717	24	338
189	48	318	1406	36	184	19808	30	145	19718	24	353
198	48	160	1415	36	77	19809	30	35	19719	24	237
199	48	85	1425	36	105	19810	30	73	19720	24	216

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
211	48	297	1429	36	209	19811	30	54	19721.5	24	94
286	48	66	1440	36	35	19812	30	212	19722	24	46
345	48	580	1441	36	200	19813	30	160	19723	24	260
359	48	62	1468	36	189	19814	30	137	19724	24	515
445	48	214	1469	36	105	19815	30	483	19725	24	208
471	48	629	1470	36	22	19816	30	199	19726	24	98
472	48	94	1471	36	29	23324	30	8	19727	24	66
680	48	166	1472	36	105	24373	30	25	19728	24	171
682	48	194	1483	36	50	3025	30	185	19729	24	59
708	48	390	1488	36	265	2093	30	23	19730	24	264
805	48	89	19821	36	285	2984	30	62	19731	24	181
806	48	48	19822	36	114	2896	30	100	19732	24	60
910	48	351	19823	36	420	2094	30	225	19733	24	547
957	48	297	19824	36	137	2070	30	173	19734	24	624
965	48	33	19825	36	253	2281	30	257	19735	24	61
966	48	82	19826	36	70	2768	30	75	19736	24	108
967	48	270	19827	36	72	2208	30	63	19737	24	128

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
968	48	95	19828	36	633	2069	30	143	19738	24	66
999	48	93	19829	36	73	3594	30	139	19739	24	265
1012	48	93	19830	36	286	3103	30	42	19740	24	222
1041	48	229	19832	36	231	3097	30	160	19741	24	140
1184	48	302	19833	36	202	3191	30	97	19742	24	27
1346	48	185	19834	36	298	3321	30	175	19743	24	155
1348	48	100	19835	36	109	3412	30	265	19744	24	47
1349	48	159	19836	36	228	3095	30	87	19745	24	279
1367	48	118	19837	36	190	3187	30	173	19746	24	163
1370	48	101	19838	36	270	31801	30	42	19747	24	110
1450	48	362	19839	36	45	31799	30	159	19748	24	252
1523	48	401	19840	36	183	33526	30	68	19749	24	294
1525	48	24	19841	36	84	33200	30	95	19750	24	178
1530	48	304	19842	36	125	33360	30	25	19751	24	117
1532	48	456	19843	36	622	33527	30	188	19752	24	345
1533	48	186	19844	36	660	32994	30	69	19753	24	260
1632	48	127	19845	36	75	33647	30	164	19754	24	73

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1633	48	294	19846	36	32	33359	30	238	19755	24	25
1634	48	48	19847	36	5	33529	30	132	19756	24	159
1636	48	203	19848	36	712	32848	30	250	19757	24	187
1637	48	283	19849	36	324	34200	30	101	19758	24	43
19878	48	182	19850	36	199	34495	30	31	19759	24	214
19879	48	267	19851	36	233	34345	30	90	19760	24	77
19880	48	62	19852	36	112	34517	30	55	19761	24	91
19881	48	51	19853	36	178	34248	30	82	19762	24	86
19882	48	191	19854	36	208	34302	30	44	19763	24	102
19883	48	52	19855	36	49	34288	30	105	19764	24	28
19884	48	86	19856	36	80	34102	30	155	19765	24	37
19885	48	218	19857	36	123	34260	30	144	19766	24	96
23999	48	166	19858	36	204	34208	30	39	19767	24	382
24114	48	332	19859	36	211	34338	30	57	19768	24	42
24294	48	164	19860	36	161	34017	30	21	19769	24	58
2907	48	73	19861	36	58	34437	30	53	19770	24	52
2364	48	411	19862	36	92	34526	30	70	19771	24	119

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
2903	48	20	19863	36	199	34422	30	59	19772	24	253
2970	48	754	19864	36	352	34262	30	193	19773	24	205
2668	48	304	19865	36	109	34366	30	41	19774	24	94
2590	48	427	19866	36	487	34380	30	36	19775	24	86
2174	48	150	19867	36	132	23685	30	36	19776	24	39
2426	48	369	19868	36	125	23684	30	39	19777	24	157
2484	48	368	19869	36	320	23686	30	19	19778	24	68
3168	48	22	19870	36	197	23695	30	76	19779	24	686
3183	48	87	19871	36	42	19785	28	99	19780	24	38
33438	48	140	19872	36	181	998	27	62	19781	24	32
33591	48	228	19873	36	91	1045	27	198	19782	24	78
33590	48	203	19874	36	72	32938	27	27	19783	24	299
33536	48	472	19875	36	151	33593	27	42	23339	24	23
34429	48	47	23365	36	65	34443	27	63	23343	24	20
34368	48	20	23366	36	20	19784	26	140	23374	24	60
34440	48	147	23373	36	30	7	24	212	23385	24	61
23712	48	108	23652	36	293	10	24	282	23569	24	76
23713	48	108	24103	36	105	49	24	133	24458	24	76

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
23977	48	145	24392	36	196	55	24	30	24617	24	44
23978	48	185	24541	36	293	56	24	27	24686	24	139
34525	45	377	24888	36	58	57	24	35	24890	24	34
44	42	75	24889	36	242	58	24	168	24891	24	143
50	42	156	2901	36	240	68	24	288	2677	24	173
161	42	84	2878	36	71	72	24	260	2749	24	193
162	42	143	2898	36	156	144	24	287	2836	24	32
164	42	163	3062	36	43	146	24	163	2051	24	111
166	42	71	2151	36	43	200	24	435	2627	24	27
168	42	435	2152	36	20	201	24	119	2737	24	285
169	42	324	2586	36	74	205	24	182	2676	24	141
239	42	110	2156	36	98	216	24	93	2624	24	83
317	42	189	2085	36	221	225	24	40	2114	24	6
335	42	105	2932	36	103	236	24	451	2632	24	88
337	42	198	3215	36	29	240	24	180	2983	24	218
339	42	89	3517	36	360	249	24	59	2279	24	115
340	42	89	3076	36	184	250	24	126	2902	24	52
399	42	370	3107	36	26	251	24	180	2830	24	551

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
401	42	31	3216	36	52	315	24	217	2068	24	7
402	42	222	3179	36	51	320	24	197	2899	24	19
403	42	264	3169	36	58	332	24	68	2841	24	16
408	42	220	3130	36	134	334	24	302	2076	24	33
442	42	178	30125	36	353	380	24	41	3198	24	149
446	42	161	31811	36	166	391	24	30	3155	24	51
468	42	63	32997	36	448	392	24	32	3562	24	47
469	42	429	33588	36	66	410	24	109	3515	24	300
475	42	159	33572	36	129	438	24	13	3201	24	142
497	42	173	33710	36	313	448	24	31	3301	24	61
499	42	245	33708	36	41	456	24	32	3194	24	170
510	42	36	32968	36	193	457	24	34	3193	24	95
511	42	44	32955	36	49	477	24	400	3342	24	178
513	42	306	33528	36	76	492	24	45	3196	24	159
514	42	93	33437	36	302	506	24	163	3530	24	46
519	42	322	33516	36	54	507	24	148	3531	24	441
520	42	191	33566	36	222	512	24	166	3441	24	42
808	42	75	33439	36	163	517	24	24	3200	24	282

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
880	42	293	33586	36	30	523	24	209	3202	24	239
970	42	165	34137	36	92	524	24	24	3082	24	21
983	42	130	34483	36	8	564	24	30	3177	24	84
996	42	108	34489	36	30	565	24	94	3218	24	61
997	42	68	34283	36	119	569	24	148	3214	24	102
1011	42	58	34502	36	30	634	24	172	3158	24	267
1034	42	110	34217	36	79	653	24	316	3433	24	116
1042	42	247	34215	36	37	655	24	72	3182	24	55
1182	42	535	34415	36	20	701	24	230	3564	24	52
1193	42	200	34165	36	56	775	24	70	3199	24	149
1194	42	201	34325	36	283	794	24	62	31322	24	116
1297	42	26	34453	36	76	796	24	46	31321	24	34
1298	42	169	34511	36	26	800	24	187	31795	24	187
1327	42	185	34919	36	221	801	24	133	31796	24	127
1329	42	129	31811.5	36	76	866	24	52	33580	24	43
1331	42	286	19817	32	76	867	24	117	33357	24	213
1332	42	138	19818	32	134	873	24	39	33505	24	46

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1337	42	246	19819	32	224	882	24	658	33364	24	354
1343	42	111	19820	32	54	905	24	155	32995	24	31
1365	42	167	1	30	59	907	24	148	33537	24	117
1393	42	316	3	30	50	912	24	146	33546	24	20
1394	42	103	4	30	114	945	24	60	33231	24	32
1444	42	113	6	30	200	984	24	25	33582	24	254
1446	42	181	32	30	38	1001	24	76	33545	24	255
1447	42	21	33	30	86	1005	24	76	33361	24	215
1448	42	73	34	30	288	1007	24	52	33646	24	111
1459	42	134	45	30	108	1014	24	54	32944	24	191
1521	42	74	47	30	26	1016	24	179	33467	24	252
1522	42	303	51	30	153	1017	24	165	33233	24	368
23605	42	570	52	30	130	1020	24	170	34153	24	18
23897	42	198	73	30	260	1021	24	191	34030	24	100
24494	42	570	74	30	346	1022	24	38	34274	24	47
24782	42	38	79	30	261	1025	24	314	34031	24	99
24887	42	146	104	30	179	1026	24	327	34187	24	20

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
24893	42	119	110	30	158	1027	24	35	34530	24	23
24898	42	151	112	30	101	1032	24	168	34250	24	45
24902	42	208	147	30	133	1033	24	135	34391	24	19
24905	42	58	148	30	86	1037	24	114	34282	24	32
2917	42	69	151	30	36	1038	24	218	34296	24	135
2317	42	164	152	30	61	1044	24	16	34175	24	13
2319	42	381	203	30	113	1047	24	26	34505	24	40
2415	42	392	204	30	10	1054	24	125	34533	24	79
2352	42	588	252	30	299	1055	24	76	34152	24	366
2619	42	50	321	30	321	1057	24	355	34082	24	41
2947	42	79	322	30	26	1144	24	27	34108	24	33
3518	42	40	323	30	126	1145	24	71	34226	24	58
3519	42	183	343	30	40	1168	24	35	34457	24	28
3204	42	161	348	30	147	1169	24	249	34229	24	54
3520	42	263	349	30	161	1188	24	34	34449	24	45
3203	42	47	350	30	104	1195	24	390	34220	24	251
30525	42	88	407	30	136	1201	24	94	34199	24	24

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B1. Sarpy County GIS database Gravity Main data filtered to include around 1,000 pipes with missing slope information and diameter larger than 24-inches (sorted by pipe size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
33408	42	153	434	30	38	1207	24	27	34520	24	186
33639	42	817	437	30	236	1227	24	15	34084	24	123
33638	42	812	443	30	32	1228	24	37	34299	24	69
33394	42	83	449	30	214	1230	24	24	34180	24	49
33322	42	336	451	30	20	1232	24	63	34033	24	160
33315	42	48	458	30	41	1240	24	26	34209	24	27
33421	42	40	461	30	235	1241	24	263	34508	24	61
32796	42	58	502	30	202	1247	24	28	34532	24	165
33515	42	651	515	30	268	1248	24	54	34450	24	40
34503	42	94	521	30	183	1251	24	42	34207	24	36
34339	42	266	649	30	92	1253	24	10	34218	24	65
33892	42	314	675	30	60	1254	24	49	34150	24	43
34261	42	550	795	30	27	1264	24	36	19721	24	93
34529	42	124	797	30	23	1265	24	27	35290	24	14
34493	42	118	798	30	21	1268	24	125	35289	24	15
34237	42	581	810	30	305	1273	24	238	23979	24	36

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size).

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1988	84	56	500	36	46	945	30	43	966	24	65
403	72	126	508	36	77	1008	30	37	976	24	73
427	72	86	516	36	75	1010	30	44	989	24	69
495	72	71	517	36	127	1012	30	114	998	24	67
499	72	72	518	36	107	1029	30	91	1002	24	78
557	72	39	541	36	55	1039	30	49	1003	24	49
560	72	47	542	36	30	1079	30	114	1007	24	51
561	72	79	549	36	81	1090	30	90	1009	24	51
584	72	66	570	36	84	1092	30	48	1014	24	84
585	72	63	571	36	72	1101	30	62	1023	24	76
586	72	59	577	36	115	1115	30	28	1035	24	58
606	72	223	580	36	46	1158	30	36	1038	24	44
615	72	64	583	36	52	1218	30	59	1040	24	101
616	72	67	589	36	18	1219	30	55	1044	24	60
628	72	96	590	36	31	1230	30	96	1051	24	83
630	72	151	596	36	47	1251	30	53	1054	24	82
709	72	51	603	36	104	1254	30	124	1060	24	49

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
739	72	52	612	36	26	1280	30	86	1061	24	35
751	72	85	617	36	51	1341	30	45	1062	24	170
933	72	88	618	36	85	1388	30	35	1063	24	143
1043	72	69	619	36	67	1390	30	52	1069	24	34
1052	72	265	622	36	53	1412	30	40	1080	24	58
1189	72	108	632	36	72	1413	30	36	1081	24	40
1480	72	154	640	36	98	1425	30	62	1086	24	46
1535	72	89	649	36	51	1483	30	95	1091	24	58
510	66	62	678	36	27	1485	30	56	1093	24	50
511	66	58	682	36	53	1510	30	50	1095	24	44
599	66	44	683	36	57	1519	30	24	1096	24	43
1366	66	73	712	36	42	1581	30	119	1098	24	76
1477	66	187	738	36	27	1605	30	53	1100	24	131
1478	66	185	747	36	56	1633	30	98	1108	24	118
1635	66	92	756	36	49	1657	30	55	1109	24	151
422	60	112	762	36	74	1688	30	59	1112	24	96
424	60	144	763	36	66	1689	30	32	1121	24	168

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
426	60	77	770	36	33	1691	30	49	1122	24	43
476	60	28	775	36	46	1710	30	84	1123	24	146
479	60	61	779	36	66	1714	30	42	1130	24	60
483	60	186	783	36	116	1718	30	51	1135	24	51
485	60	39	791	36	226	1743	30	110	1144	24	76
488	60	53	794	36	36	1744	30	114	1164	24	43
489	60	54	795	36	71	1760	30	37	1168	24	91
490	60	61	797	36	64	1763	30	31	1170	24	44
491	60	55	800	36	71	1775	30	23	1171	24	39
493	60	47	843	36	59	1799	30	35	1176	24	102
504	60	53	851	36	390	1803	30	147	1184	24	78
538	60	62	852	36	128	1822	30	56	1190	24	32
539	60	63	909	36	72	1853	30	75	1198	24	216
562	60	40	910	36	103	1859	30	35	1206	24	48
608	60	119	913	36	76	1872	30	70	1210	24	30
651	60	193	919	36	54	1898	30	51	1211	24	78
726	60	78	920	36	52	1913	30	54	1214	24	53

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
732	60	100	928	36	52	1960	30	29	1221	24	106
736	60	47	932	36	49	1961	30	28	1226	24	56
740	60	32	975	36	54	1964	30	82	1228	24	62
768	60	60	996	36	108	2397	30	126	1229	24	127
798	60	60	997	36	88	2399	30	55	1239	24	105
838	60	57	1013	36	69	464	24	40	1241	24	50
947	60	30	1015	36	85	467	24	33	1242	24	41
984	60	42	1019	36	114	472	24	30	1245	24	27
985	60	47	1047	36	105	487	24	39	1246	24	43
1028	60	131	1053	36	90	498	24	41	1247	24	68
1071	60	56	1057	36	51	503	24	56	1253	24	84
1286	60	47	1099	36	88	514	24	24	1261	24	310
1358	60	168	1116	36	100	520	24	56	1262	24	468
1359	60	114	1119	36	64	521	24	23	1263	24	76
1361	60	282	1120	36	61	522	24	21	1283	24	86
1405	60	99	1137	36	82	523	24	33	1285	24	83
1482	60	165	1138	36	45	525	24	67	1288	24	41

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1663	60	137	1150	36	66	555	24	72	1290	24	61
1857	60	60	1154	36	52	556	24	52	1291	24	63
1865	60	46	1166	36	60	563	24	51	1314	24	122
1876	60	74	1180	36	86	565	24	28	1315	24	104
1949	60	408	1181	36	45	567	24	50	1317	24	60
1987	60	35	1182	36	33	569	24	40	1318	24	92
1977	60	51	1183	36	33	573	24	46	1319	24	108
2385	60	117	1204	36	77	576	24	73	1320	24	92
559	54	73	1227	36	53	587	24	38	1322	24	186
670	54	138	1281	36	48	592	24	63	1337	24	27
805	54	44	1282	36	95	594	24	45	1338	24	21
867	54	81	1289	36	31	609	24	59	1339	24	29
1070	54	41	1292	36	41	620	24	52	1340	24	34
1124	54	80	1293	36	41	629	24	55	1354	24	32
1195	54	39	1294	36	60	634	24	42	1355	24	35
1235	54	101	1300	36	39	635	24	55	1363	24	72
1236	54	96	1311	36	73	636	24	61	1370	24	31

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1695	54	43	1312	36	41	641	24	93	1381	24	24
478	48	80	1316	36	87	642	24	72	1387	24	57
480	48	75	1373	36	74	643	24	51	1395	24	42
481	48	60	1394	36	44	650	24	95	1401	24	46
506	48	50	1424	36	48	663	24	33	1409	24	36
509	48	83	1461	36	41	672	24	91	1410	24	33
550	48	72	1487	36	41	680	24	25	1416	24	21
552	48	60	1508	36	55	681	24	18	1459	24	28
554	48	89	1511	36	126	690	24	27	1506	24	46
578	48	73	1512	36	62	691	24	43	1507	24	66
582	48	29	1513	36	27	692	24	64	1509	24	67
588	48	61	1514	36	26	694	24	49	1518	24	71
611	48	84	1520	36	81	695	24	74	1522	24	55
639	48	52	1521	36	89	698	24	61	1549	24	27
659	48	76	1579	36	95	711	24	27	1551	24	21
674	48	111	1580	36	233	715	24	59	1590	24	70
675	48	124	1582	36	162	718	24	269	1601	24	40

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
677	48	35	1583	36	54	720	24	81	1604	24	45
737	48	38	1584	36	48	721	24	31	1628	24	94
761	48	114	1592	36	83	723	24	39	1630	24	28
789	48	73	1594	36	44	731	24	48	1637	24	34
806	48	50	1595	36	46	752	24	71	1639	24	51
827	48	83	1596	36	48	755	24	95	1660	24	98
848	48	95	1602	36	27	758	24	39	1670	24	33
876	48	60	1634	36	129	764	24	37	1672	24	66
893	48	68	1648	36	60	773	24	52	1673	24	29
894	48	60	1649	36	81	774	24	64	1678	24	39
907	48	55	1730	36	47	776	24	42	1682	24	48
924	48	76	1748	36	34	777	24	51	1683	24	54
958	48	53	1750	36	74	787	24	48	1684	24	17
959	48	53	1751	36	29	788	24	58	1690	24	48
960	48	65	1754	36	44	792	24	91	1692	24	47
968	48	91	1755	36	67	807	24	25	1715	24	51
1020	48	178	1756	36	108	808	24	41	1722	24	95

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1072	48	59	1787	36	32	809	24	43	1724	24	17
1128	48	45	1836	36	106	810	24	29	1725	24	54
1169	48	65	1837	36	167	811	24	32	1726	24	102
1192	48	47	1838	36	68	818	24	66	1727	24	37
1205	48	53	1877	36	36	819	24	70	1739	24	32
1225	48	21	1880	36	76	823	24	38	1745	24	127
1255	48	54	1885	36	32	824	24	32	1757	24	61
1284	48	50	1886	36	37	830	24	44	1758	24	65
1309	48	74	1893	36	68	834	24	40	1761	24	37
1310	48	51	1894	36	68	836	24	38	1764	24	103
1313	48	171	2419	36	75	837	24	51	1768	24	34
1325	48	106	417	30	71	839	24	54	1774	24	37
1326	48	133	433	30	97	847	24	68	1783	24	143
1327	48	40	572	30	45	849	24	108	1785	24	34
1365	48	64	581	30	34	855	24	31	1804	24	48
1374	48	37	595	30	68	858	24	26	1805	24	30
1457	48	54	613	30	42	859	24	43	1809	24	60

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
1546	48	55	621	30	84	863	24	79	1821	24	59
1577	48	123	631	30	68	864	24	55	1829	24	90
1578	48	121	633	30	81	868	24	83	1839	24	32
1609	48	49	665	30	54	885	24	36	1841	24	70
1654	48	44	686	30	25	889	24	66	1850	24	55
1664	48	37	688	30	47	895	24	63	1860	24	272
1713	48	45	689	30	44	896	24	57	1861	24	37
1819	48	47	741	30	43	897	24	52	1863	24	34
1820	48	46	742	30	24	898	24	40	1864	24	18
1845	48	51	757	30	32	899	24	38	1866	24	31
1856	48	50	769	30	34	911	24	49	1870	24	65
1878	48	56	796	30	57	912	24	32	1882	24	48
1892	48	103	828	30	49	921	24	25	1883	24	42
1986	48	99	841	30	50	925	24	54	1884	24	77
1985	48	66	842	30	40	927	24	47	1895	24	68
2420	48	74	844	30	41	931	24	49	1900	24	26
2396	48	381	845	30	42	935	24	54	1912	24	53

Source: RDG Planning & Design;

APPENDIX B | GIS DATA GAP ANALYSIS

Table B2. Sarpy County GIS database Culvert data filtered to include around 640 pipes with missing slope information and diameter larger than 24-inches (sorted by culvert size), continued.

FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH	FACILITY-ID	DIAMETER	SHAPE LENGTH
482	42	72	902	30	69	938	24	73	1956	24	54
1126	42	64	904	30	80	939	24	63	1957	24	47
1505	42	25	908	30	69	941	24	86	1958	24	20
1591	42	80	918	30	56	946	24	40	1959	24	44
1984	42	59	940	30	117	961	24	30	1962	24	77
2418	42	74	942	30	36	962	24	64	2424	24	34

Source: RDG Planning & Design;

APPENDIX C | COMMUNITY SURVEY RESULTS

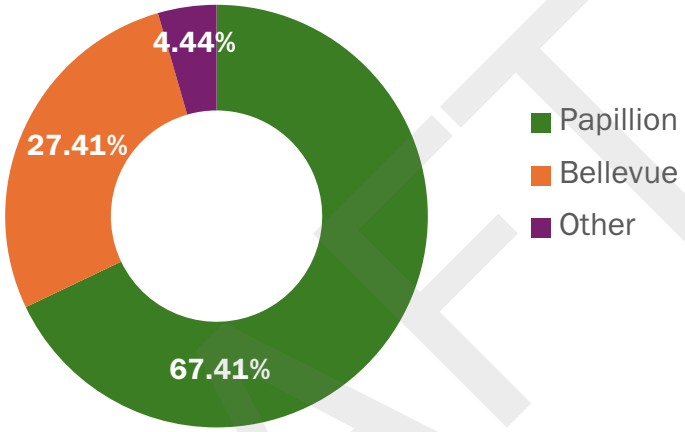
Community Survey

To hear directly from residents, the planning team launched an online survey on the project website (BPHRP.com). From early June through August 31, 2025, 270 community members shared their experiences and ideas about housing resiliency in Bellevue and Papillion.

This appendix (Appendix C) highlights every survey question and all the responses collected.

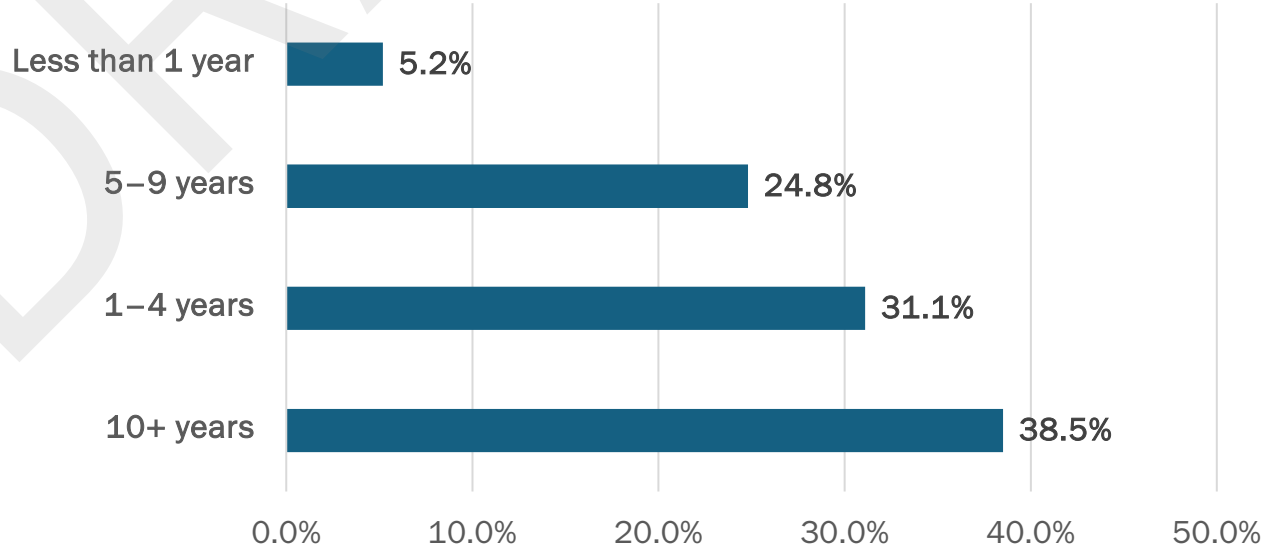
1) Where do you live?

Answered: 268 Skipped: 2



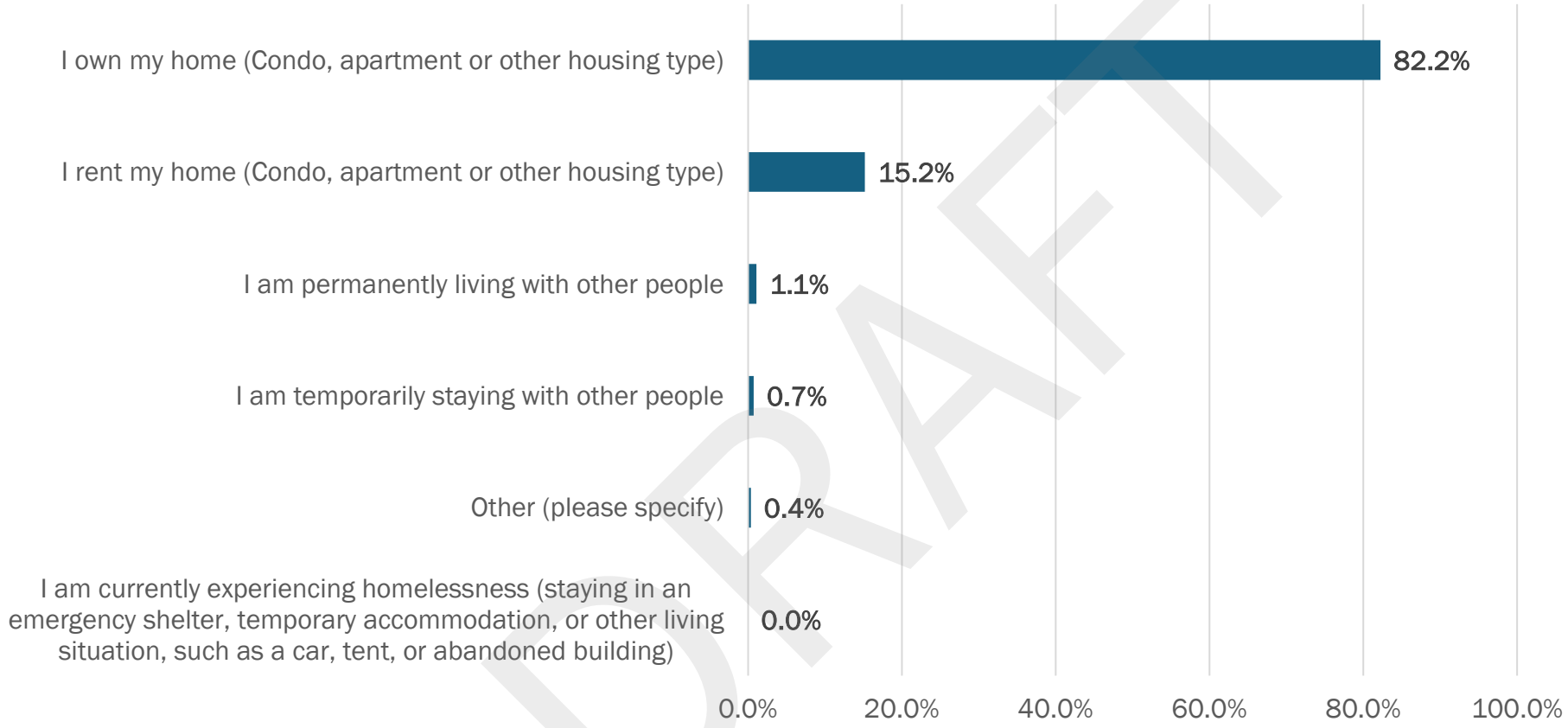
2) How long have you lived in your current housing?

Answered: 269 Skipped: 1



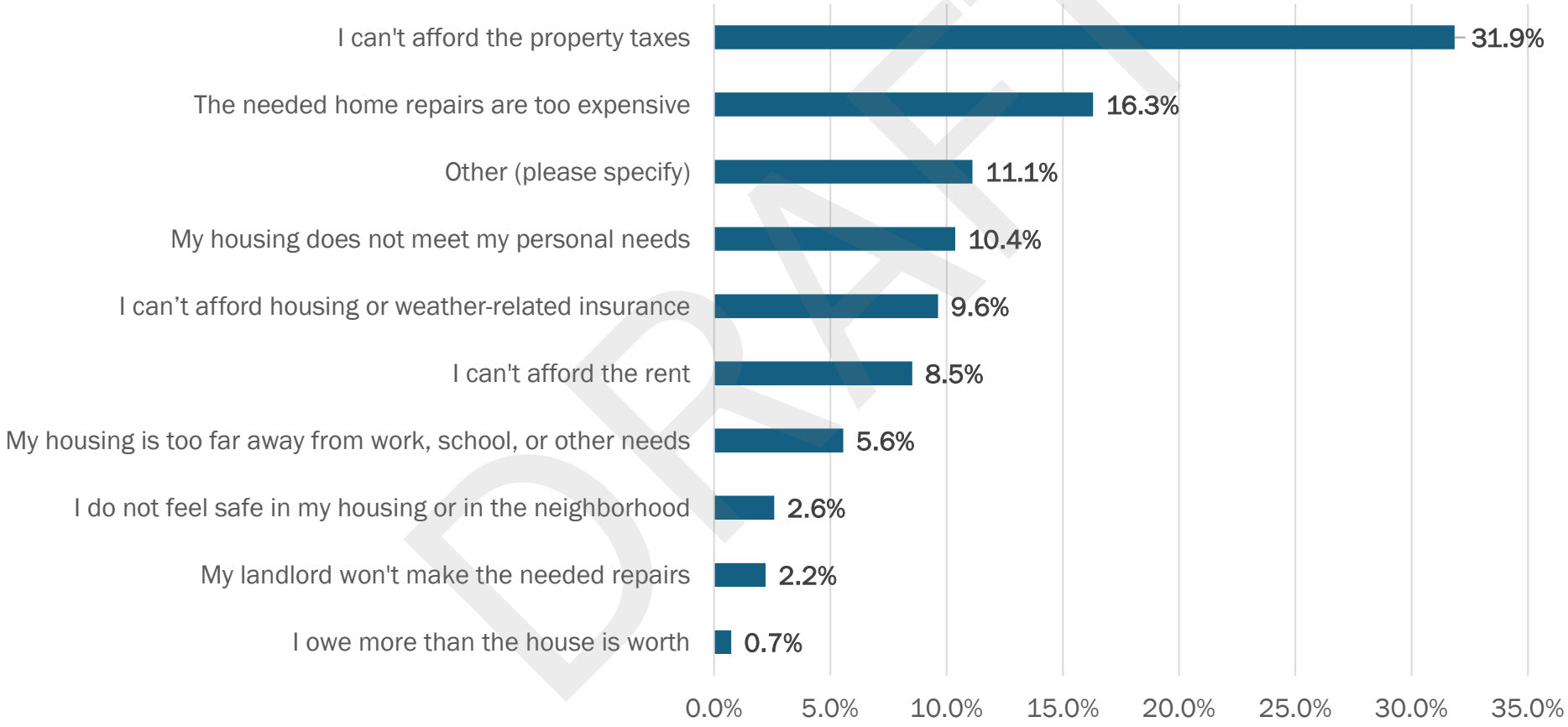
3) What best describes your current housing situation?

Answered: 269 Skipped: 1



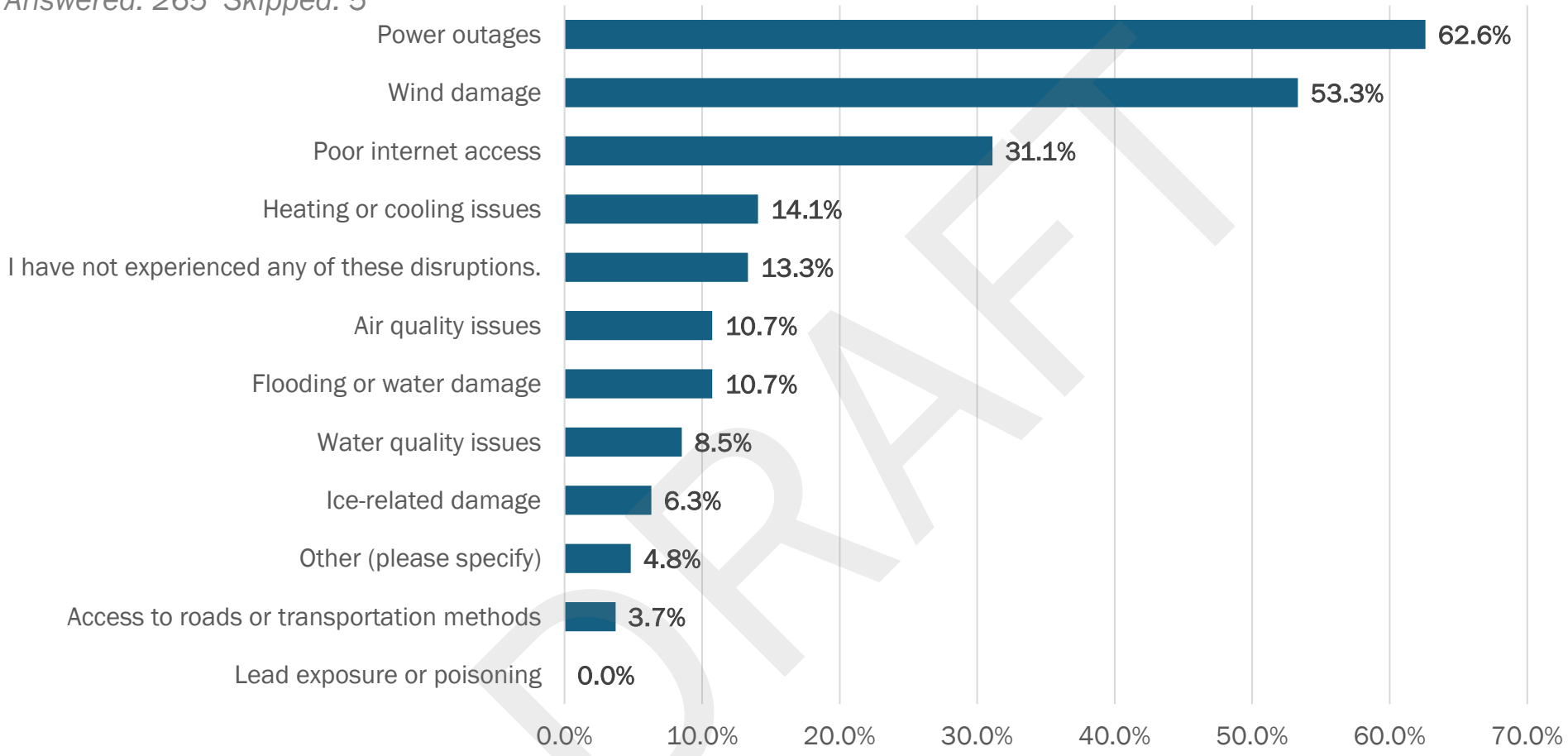
4) Are you having any of the following issues with your current housing? (Select all that apply)

Answered: 174 Skipped: 96

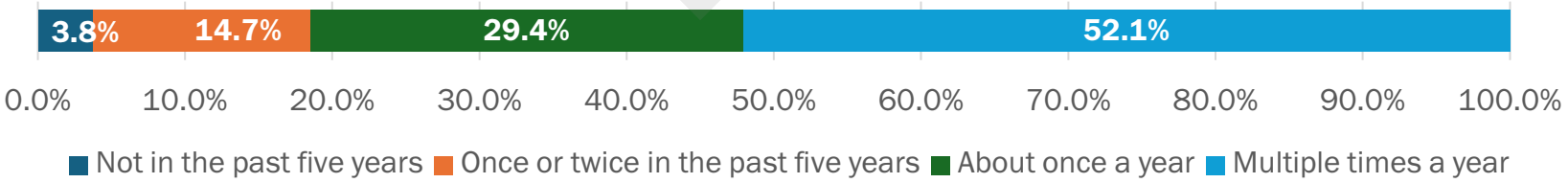


5) Have you experienced any of the following disruptions to your housing or neighborhood? (Select all that apply)

Answered: 265 Skipped: 5

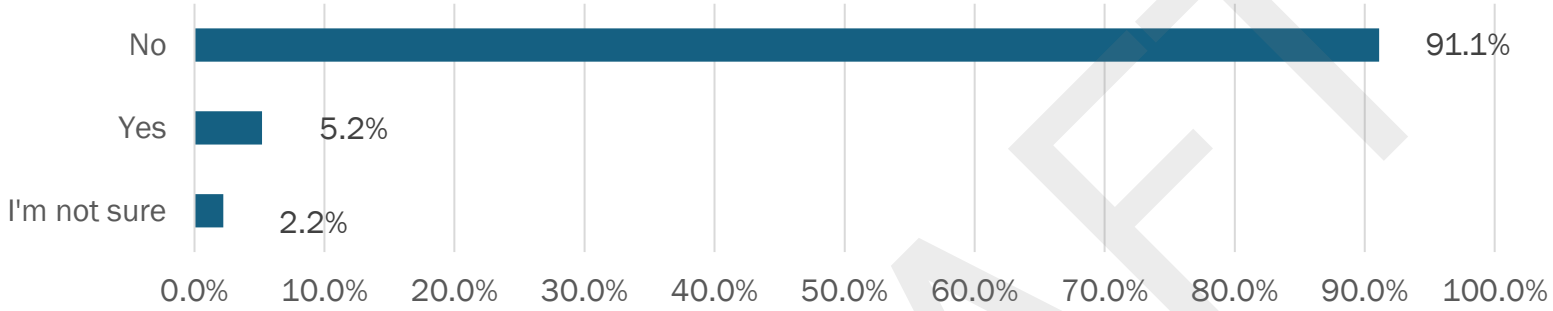


6) If yes, how often do you experience these challenges?



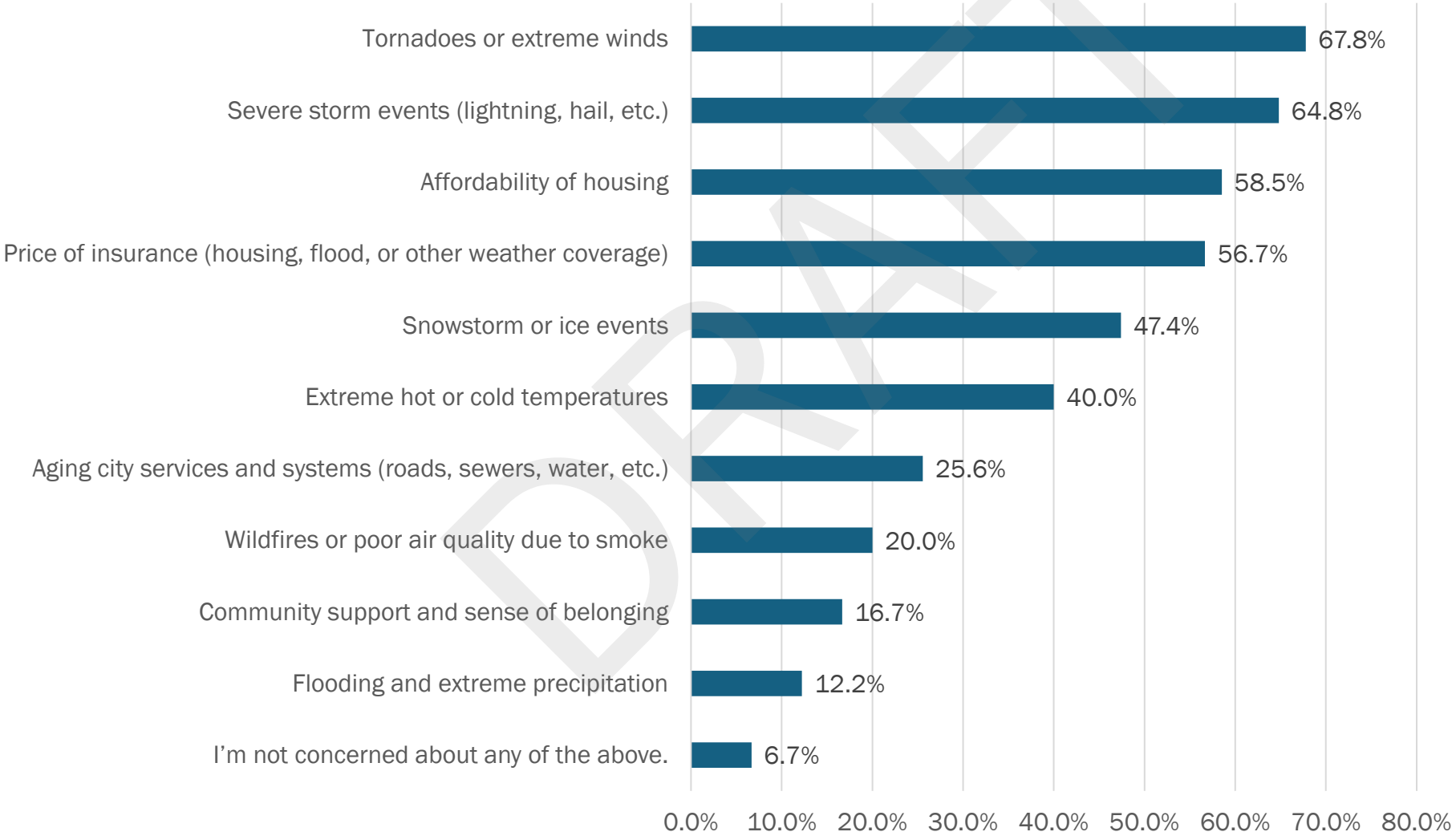
7) Has flooding or standing water in your neighborhood ever caused you to change your planned routes for travel?

Answered: 266 Skipped: 4



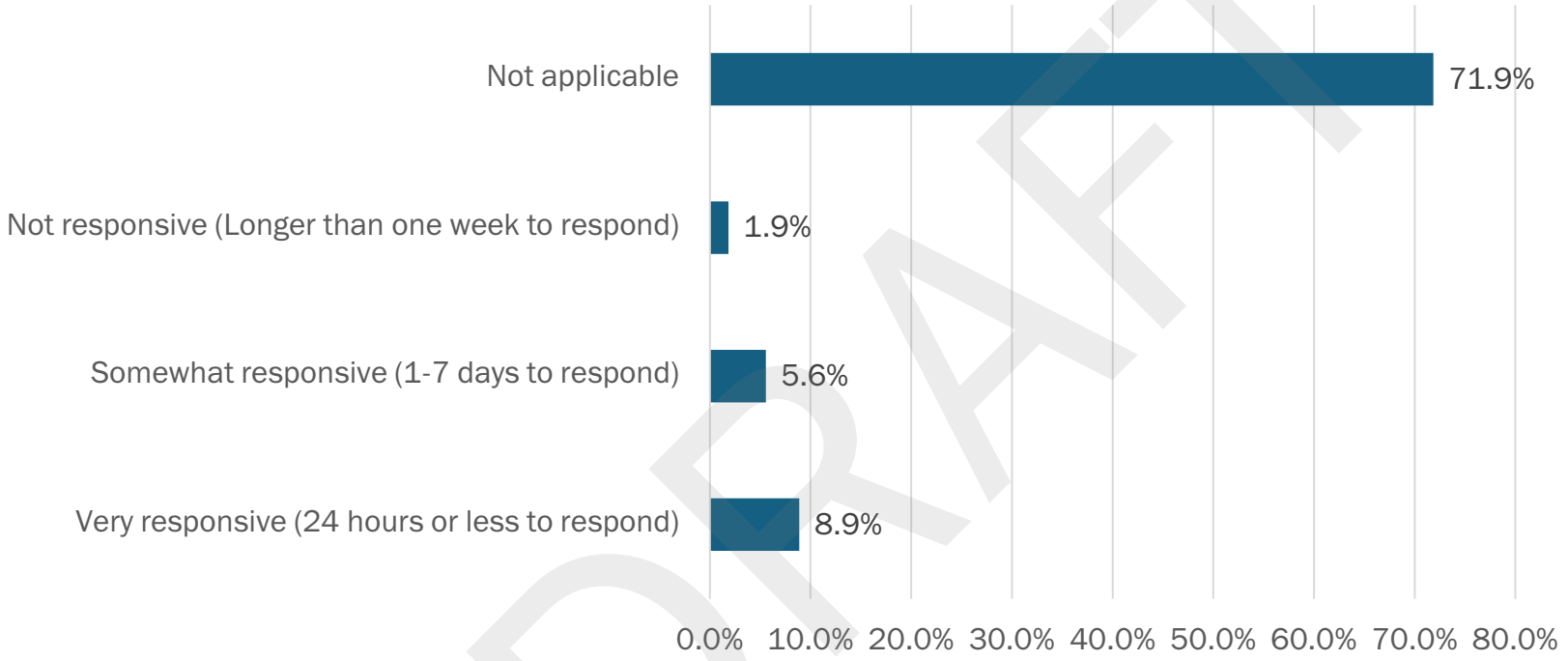
8) Within the next five years, are you concerned about any of the following affecting your housing or neighborhood? Select all that apply.

Answered: 266 Skipped: 4



9) If you rent your home, how responsive is your landlord or property manager to repair needs?

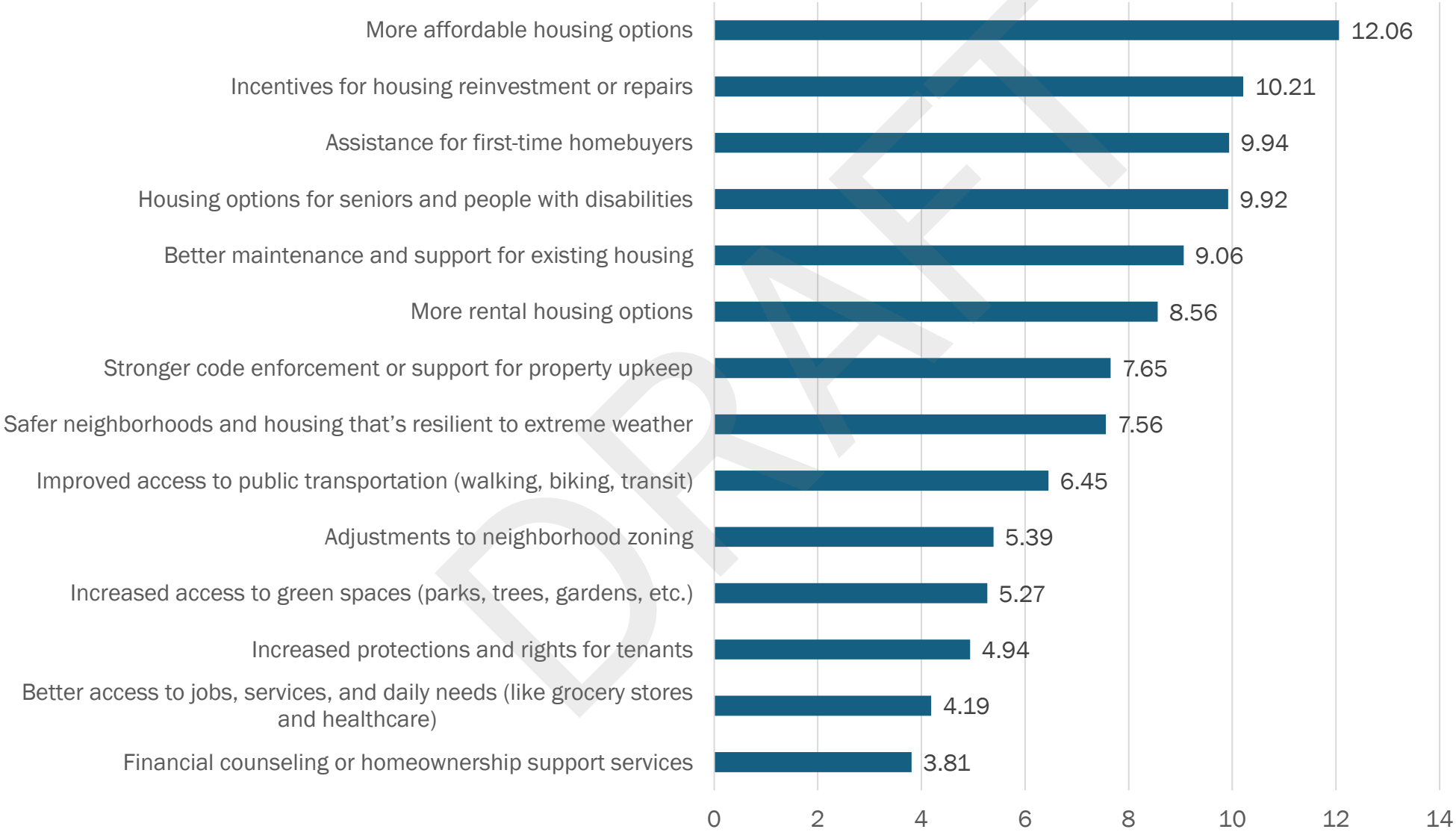
Answered: 238 Skipped: 32



Source: RDG Planning & Design;

10) In your opinion, what would most improve housing in your neighborhood?

Answered: 239 Skipped: 31



10) In your opinion, what would most improve housing in your neighborhood?

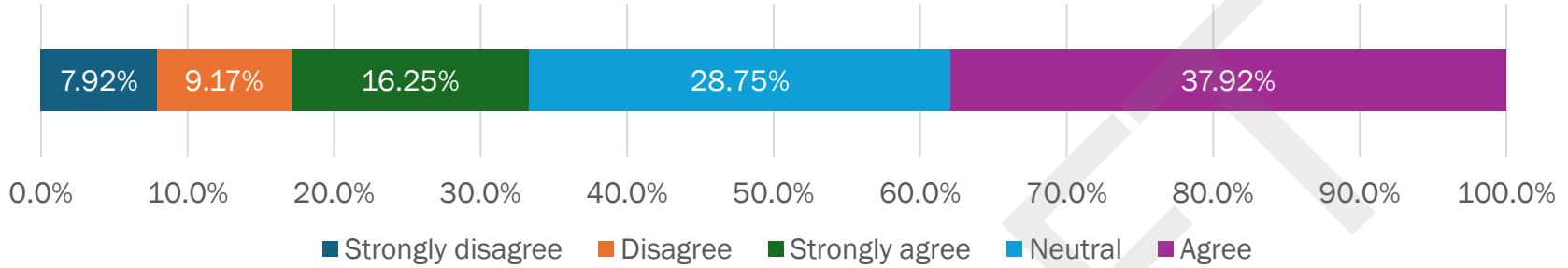
Other (please specify)

Responses:

- "We need starter homes that are not almost half a million dollars."
- "Townhouses second, in a nice 55 & older community with amenities."
- "There needs to be more guidelines so we don't have so many slumlords."
- "Sarpy County needs to understand that homelessness is an issue and transitional housing is needed for these individuals."
- "Please finally develop that parcel downtown on Mission Ave."
- "Multi-generational homes."
- "More affordable senior independent living homes in good, safe neighborhoods."
- "Lower taxes."
- "I'm retired and live in a 4-bedroom house with a full yard to care for. I would love to find a 'garden home' or a condo/townhomewhere all the yard work and snow removal are taken care of. I need to stay in my home because these options don't exist."
- "If affordable means that developers and builders can't price gouge, then rank it higher. If it's meant to be housing set aside specifically for low-income families, then the ranking is accurate."
- "I do not think it is the city's job to invest in housing. We live in Papillion because of the current structure of residential zoning and I'm not interested in my neighborhood having mixed uses."
- "Houses on larger lots, acreages."
- "Better mixed-use property development — apartments and businesses in the same building on multiple levels. Smaller homes for first-time homebuyers that are newer would be beneficial. Most existing cheaper homes are too old and costly to maintain."
- "Accessible housing for people with disabilities. Unfortunately, I couldn't move this to the top because the queue doesn't work properly."

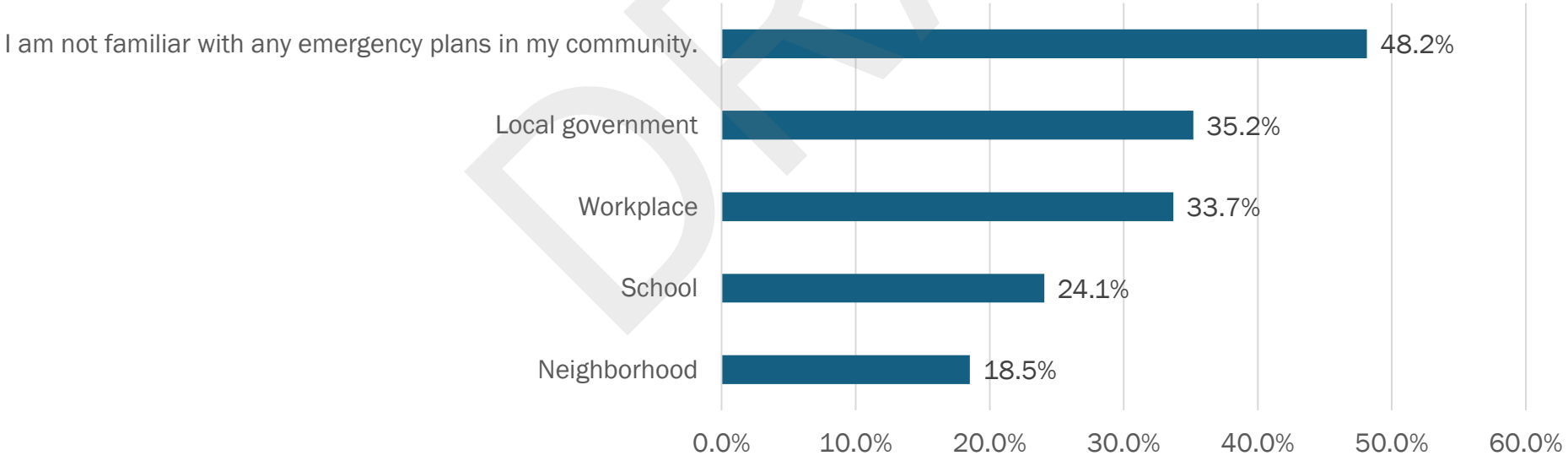
11) I feel my community is prepared to handle a major emergency.

Answered: 240 Skipped: 30



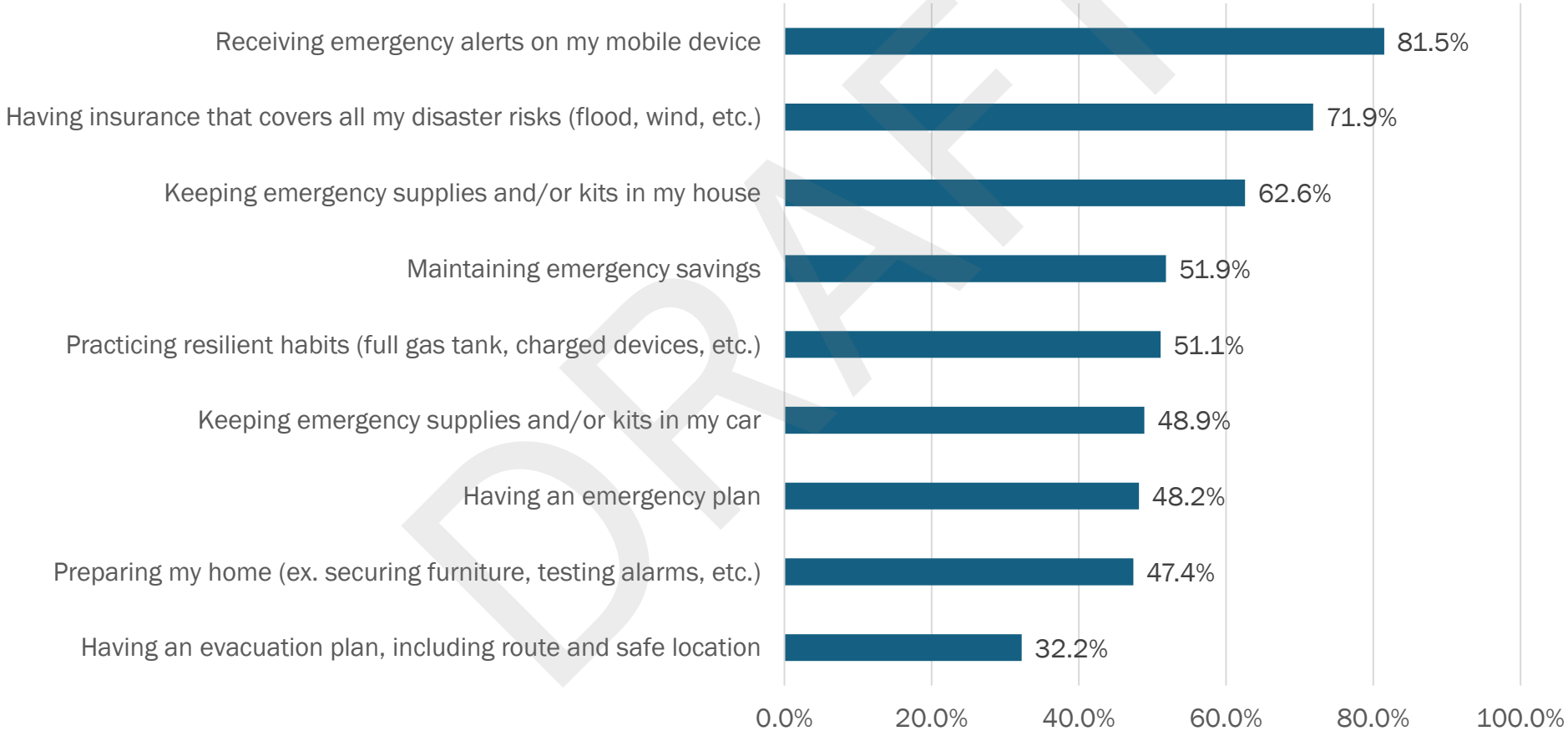
12) I am familiar with the following emergency plans in my community (select all that apply):

Answered: 267 Skipped: 3



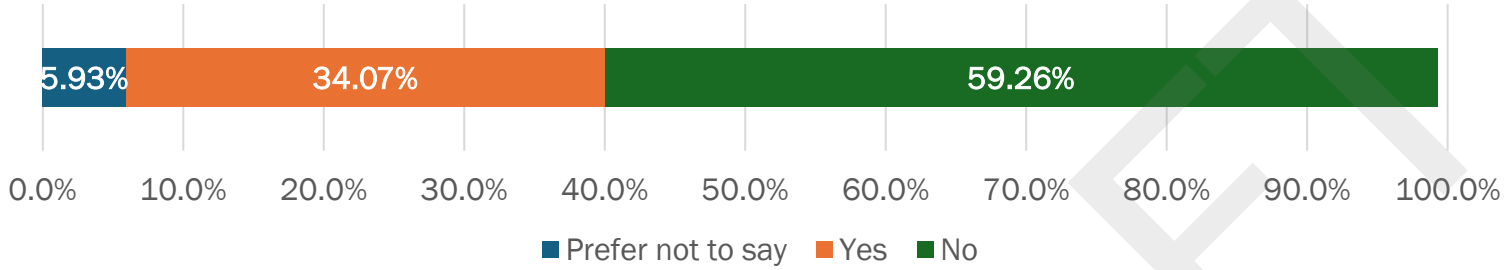
13) I have prepared my household and/or my housing for disruptions by (select all that apply):

Answered: 256 Skipped: 14



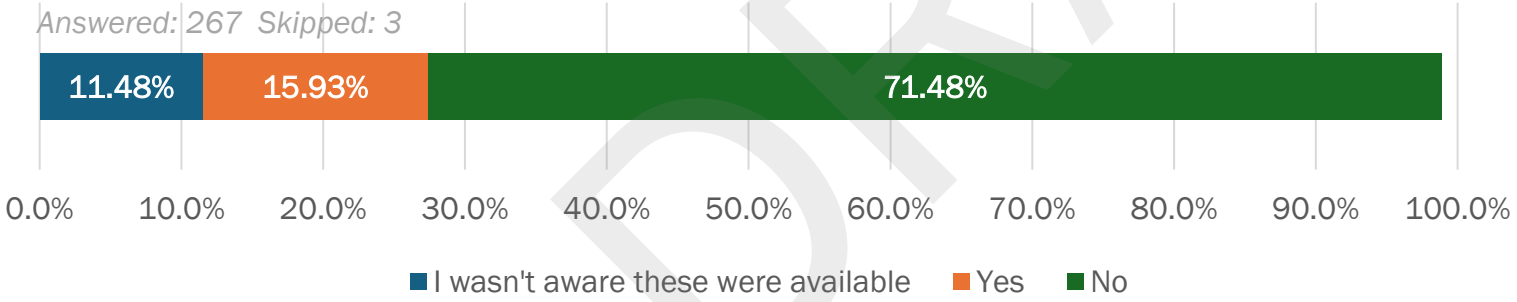
14) In the past year, have you or someone in your household struggled to afford housing?

Answered: 268 Skipped: 2



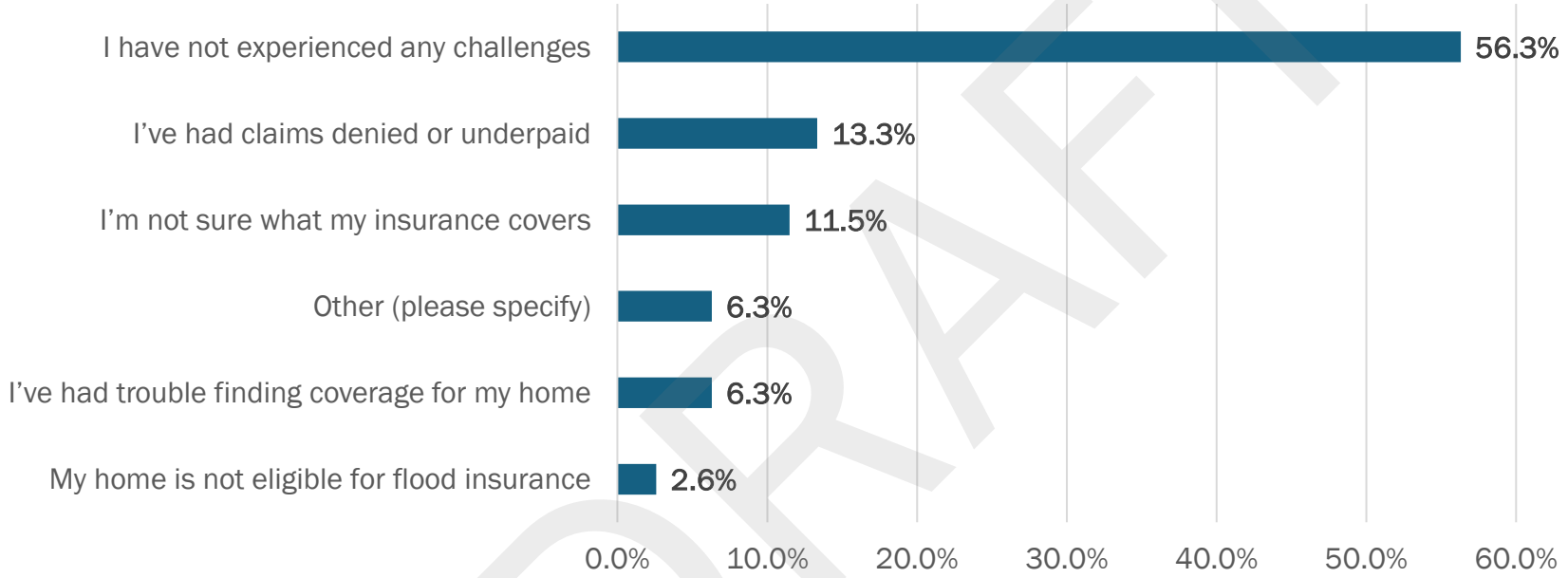
15) Have you or someone in your household ever used or needed housing support services (like rental assistance, home repair programs, or legal aid)?

Answered: 267 Skipped: 3



16) In the past five years, have you experienced challenges related to housing insurance? (Select all that apply)

Answered: 251 Skipped: 19



17) List any community projects, organizations, or group activities that have helped you or your neighbors prepare for emergencies:

Answered: 51 Skipped: 219

- "Lift Up Sarpy County"
- "The gas company and the power company email lists for preparing for weather events."
- "The base is good about sending out alerts."
- "Scouting America"
- "Sarpy County CERT"
- "Papillion Fire and Police, Papillion Landing, and Red Cross, Papillion Library."
- "Our HOA and SID."
- "Other than severe weather warnings, I'm not aware of emergency plans in my community."
- "None. We have not received any publication or advertisement regarding emergency preparedness or services in the Papillion area."
- "Neighbors helping each other."
- "National Weather Service"
- "NA. I didn't know there were some."
- "My family has learned some preparedness from Church of Jesus Christ of Latter-day Saints and the Military."
- "Make an emergency plan."
- "Lift Up Sarpy, All Seasons Foundation, Bellevue Together, Neighbor Good."
- "Lift Up Sarpy, Overland Hills Church."
- "Just neighbors looking out for one another like a neighbor should. Maybe create a program that teaches people how to have pride in ownership and not trash their property."
- "Just neighbors helping others cut grass or shovel snow. But our neighborhood isn't very tight knit. People rarely venture outside."
- "I'm not aware of any at this time (but would be interested in being part of/contributing to this)."
- "-I work at Papillion Landing and they are great about distributing their emergency policies & having them printed/easy to access and leaf through quickly, hanging in various locations in the building. -City of Papillion's website and Facebook page are great about posting updates related to safety/inclement weather and their related supportive resources. -'Let's Talk Papillion' Facebook group for locals is a very supportive network — I've seen a lot of people post in there needing help or offering help in times of weather-related emergencies."
- "I can't name any. I don't know since I moved to Nebraska a year ago, but to Papillion area only 9 months, and I haven't had any idea about an emergency plan."
- "I believe the Fire Department has hosted events helping community members know what to do in case of a fire and how to test fire alarms."
- "Emergency Management and Sarpy County putting out info."
- "Church program."
- "Church organizations have helped give some information. Sarpy/Cass Health Department."
- "Church of Jesus Christ of Latter-day Saints."
- "Church."
- "BRIDGE Family Resource Connector Network."
- "Boy Scouts."
- "American Red Cross."

18) List any lessons you have learned about your community from current or past disaster experiences that can help your community prepare for future emergenciess:

Answered: 50 Skipped: 220

- "We knew that electricity interruption was likely due to overstretched infrastructure, so we included a natural gas whole home generator in the build process of this house."
- "We had our power out for 8 days. Having a generator is crucial!"
- "Tree removal services was a debacle that last major storm event. City promised assistance in removing curb side debris in a week and it took over a month. Proof that City resources are not capable of most disaster assessment and/or recovery."
- "Tree maintenance can help to avoid damage during storms."
- "To not build in flood plains unless the site is raised ABOVE base floor elevation. Levee's are not guaranteed protection as proven in 2019 in Bellevue and in Kansas City in 1993, Texas recently showed the same issue which cost lives."
- "There is not enough affordable/LITCH inventory in Papillion."
- "The local police, fire, etc. are well prepared to handle issues that come up. Bellevue was one of the last cities during a large wind storm to do curb side pickup of debris - it seemed to be slow in decision making and unable to move at the same speed as neighboring and comparable cities who made decisions to do this almost immediately. This was frustrating since I transported a large amount of tree debris to a drop off site with another person's vehicle and did not have an adequate way to transport it and then the city later decided to do pickup which the other cities were already providing."
- "Summer 2024 storm left me without power for 4 days in 90 degree temps. It was brutal. The city of Papillion stepped up to clear debris well. I wish there was a better way to get updates on cooling centers, etc. for those seniors and others that were on medical treatments. And not to sound ungrateful because I appreciated a few meals, but Hot Meals USA helped provide meals for those without power but they served HOT meals like a mashed potato chicken pot pie on a nearly 100 degree day, in the sun, and many like myself just could not consume a hot meal. A cold sandwich option would have been nice. But in general the severe weather event was well managed. I have a personal plan now because of that event."
- "Prepare the roads, alert citizens, and shut down businesses in unsafe weather conditions."
- "Papillion, just being developed, is extremely windy. Developments are getting away with construction that is not sufficient for the resilience needed in this area. Soffit, roofing, siding, fencing, signage, and more are constantly flying around, facing the wrong direction, and laying around. My biggest concerns are the contractors who aren't from Papillion and disrespect our communities by speeding through our residential streets to the job site where their construction has consisted of half the materials it should be. Our homes would rip apart in seconds if a tornado were to come through. Papillion is doing great, I know it's fast and hard to keep up with, but I cannot stress enough how important code enforcement pre-, during, and post-development are here. Bellevue, I grew up there and have seen more floods than I can count. However, I lived on the west end. I think Bellevue has done a really good job ensuring flood damage was mostly limited to the park, until 2011."
- "Papillion is resilient, and when people need help from neighbors, etc., we are there for each other."
- "Papillion does a fantastic job - so grateful to live in a forward-thinking community that is safe."

18) List any lessons you have learned about your community from current or past disaster experiences that can help your community prepare for future emergenciess:

Answered: 50 Skipped: 220

CONTINUED

- "Overland Hills tends to have power when other nearby neighborhoods don't."
- "Neighbors that are hoarders won't clean up storm debris."
- "Need to get more homeowners to cut the trees back from the power lines. The city needs to assist them or provide the branch removal free of charge. Nearly every outage we've had in my part of Papillion has been due to a single small area on Cedardale across from the cemetery, where tree branches routinely take down the power lines during high winds. There should not be ANY overhanging trees on Cedardale."
- "My husband and I lived through many disasters in Oklahoma and we bring that experience to living here."
- "Lower taxes."
- "Keeping drinkable water, a 72-hour emergency kit, and knowing what to have in a severe weather kit for home vs. car."
- "Keep several bags of ice on hand. Maintain batteries, keep prepared food and ample water for 1 week."
- "It would be helpful to have a local place, such as the library, that could be run on solar power so that when the power goes out from storms, residents could use it as a safe haven. Too many times the power goes out from storms and there are few places to go that are convenient."
  "In flood emergencies, it's important to know how to prepare for evacuation. What documents should be taken? What emergency supplies should be packed? What can we do with our pets?"
- "I think the city has handled all weather events well since we have lived in Papillion."
- "I have the names of tree services and have used them to prevent limbs from falling and after they've fallen during storms. I keep solar charging equipment charged always. And we have a generator."
- "I have not had any lessons learned about my community."
- "I feel pretty cared for by City of Papillion I was so touched that last time there was a huge windstorm that resulted in a ton of tree debris all over the streets, they planned a 'debris pick up' truck for Papillion residents and had a debris drop off site also available. I've also seen them provide support for people without power via food and temperature-controlled shelter/outlets for use, etc., at Papillion Landing."
- "I don't know. I haven't had a chance to hear anything about this."
- "High winds."
- "Get RID of the trees!!! Have we not realized that so much of our weather damage comes from trees getting blown down or blown into neighbors' homes or property??"
- "Get rid of overhead utility infrastructure and replace with underground."
- "Flooding from the river — why are they being allowed to rebuild in the old Paradise Lakes area? If a levee breaks, it floods again (yes, I know it was a 100- or 500-year flood event, and at the time my family home was flooded and destroyed on the Iowa side)."
- "City leadership is ignorant when it comes to the aftermath and cleanup of disaster events. Poor communication, lack of cohesive planning, and a general misunderstanding of the required Incident Command Systems Protocols mandated by the federal government after 9/11 have hampered the efforts of citizens when trying to recover from disaster experiences in Papillion. Community leadership has made numerous poor decisions in the past, particularly after the 2017 extensive storm damages."
- "Churches have been at the forefront with helping and Lift Up."

18) List any lessons you have learned about your community from current or past disaster experiences that can help your community prepare for future emergenciess:

Answered: 50 Skipped: 220

CONTINUED

- "Cell coverage for emergency weather info when primary Internet services are unavailable is a gap in my neighborhood (Shadow Lake). We encountered this during a middle-of-the-night storm last year and luckily we had a radio to get severe weather alerts."
- "Buy a generator."
- "Burying power lines would help immensely with storm-related power outages. I was disappointed when the power lines on Giles were put back up in the air after the winter storm this year."
- "Better deployment of generators and having a set plan for emergency shelters."
- "Bellevue did an excellent job managing power outages and damages from the wind storm last year and also loved that tree dump was offered for months after that happened. I feel city leadership communicates and also appreciate that OPPD cut down low-hanging trees that overhung from city property onto mine to reduce the likelihood of trees damaging power lines during winds. This was paramount and I love that the city/OPPD was preventative about this."
- "Be prepared."
- "Appreciate how prepared Papillion is."
- "Always have batteries and flashlights. Keep devices charged and have backup chargers. Have phone setup for emergency alerts. Keep a small shovel in your car to dig your car out in heavy snowfall."
- "Always have a go bag and waterproof packaging on any food that sits on the ground. Always bring more than just for your own family."
- "Have an emergency kit, get a generator, be prepared for the worst, contact your neighbors."

19) Is there anything else you'd like to share about housing needs or priorities in Bellevue or Papillion?

Answered: 103 Skipped: 167

- "We really need to get quality housing for folks that can't afford 400,000+ homes. We are in the sub-400 range but can't afford an upgrade. We would move if we were given an incentive to free up a 'starter home.' I would be much more likely to lower the price because I would have what I needed for a down payment."
- "We need to figure out a way to curb the 'investors' snapping up nearly every new listing to flip and immediately resell. It's driving up home prices and preventing first-time homeowners from finding starter homes."
- "We need to encourage better self-reliance through community gardens and backyard chickens."
- "We need green spaces, not more apartments."
- "We need emergency shelters, especially for families. Work with landlords to encourage renting to low-income, disabled, poor credit/evictions, etc."
- "We need a variety of developments. We do a very poor job with green space and designing spaces for families and children.
- "We are tired of having to pay a tree arborist to take care of our neighbor's trees! Because of ridiculous laws that say if their tree blows over into my property and causes damage, we are responsible. If the leaves from their trees clog our drains and cause flooding in our basement, we can't file a claim. We have to pay our hard-earned money to take care of not only our property but our neighbor's as well. This is not right!"
- "We are getting to the point of needing a homeless/emergency shelter rather than sending people to Omaha."
- "Until recently, I received an OWH paper every Thursday that covered Sarpy County — this would be a great source to share some of these success stories — not sure why this subscription stopped."
- "Truthfully, we have not searched for housing for seniors. When we do, we're hoping that there are several to look at."
- "Transitional housing."
- "Too expensive for young people to live here. Outrageous that an apartment costs over $2K. Our kids moved to La Vista though they wanted to stay in Papillion."
- "There needs to be more sustainable, safe, affordable, and accessible housing that accepts housing vouchers/Section 8 for those with disabilities and the elderly."
- "There is senior housing in these towns, but they are so expensive. Not everyone can afford granite countertops and wood floors. We want to be able to pay our bills and have enough left over to enjoy the restaurants and stores that are all around us."
- "There is poverty in our neighborhoods. There is lack of public transportation. There are people sleeping in alleys. There are homeless people in our neighborhood."
- "There is a severe shortage of affordable housing for various demographics. Seniors living on social security alone cannot afford to live here unless there is subsidized housing. There is also a lack of resources for folks in poverty. With no public transportation, it limits where people can work, live, and send their kids to school."
- "There are too many apartments being built."
- "There are always huge apartment complexes being built, while small starter homes are very hard to find."
- "The taxes are astronomical and the housing is unaffordable."

19) Is there anything else you'd like to share about housing needs or priorities in Bellevue or Papillion?

Answered: 103 Skipped: 167

CONTINUED

- "The property taxes are outrageous and something needs to be done. There is no way we will retire here."
- "The price of housing is too high and the property taxes are too high for the city."
- "The number one priority should be smaller or more affordable homes for young people. The same small starter homes could work for older people when they're empty-nesters."
- "Taxes are so high — it's getting harder to keep housing affordable."
- "Stop with all the apartment complexes and car washes! We need affordable single-family housing and lower property taxes."
- "Stop building and taking away green space. Offer affordable housing."
- "Some smaller homes like cottages integrated into neighborhoods (kind of like old Papillion has). Also, some smaller nice villas for seniors."
- "Smaller affordable housing for seniors and first-time home buyers! No more apartments or huge houses!"
- "Rapidly rising valuations and property taxes are pricing people out of homes they could afford just a few years ago."
- "Quit building apartments on every square inch of land."
- "Property taxes are ridiculously expensive. We moved from one of the most expensive counties in Colorado, and our current property taxes are significantly higher in Sarpy. On a fixed income, it's not maintainable."
- "Please continue to pursue affordable building options for first-time buyers in both cities."
- "Papillion's housing is growing rapidly. As someone born and raised here, I worry that it will impact the small-town feel that makes this place so special."
- "Papillion has almost no affordable housing — people that are starting out in life and grew up in Papillion can't live in the community they love."
- "Love Papillion."
- "Affordable housing is non-existent. If you look at Lincoln, there are reasonable housing options there. Here in Bellevue, they have disappeared. I have to work 2.5 jobs to stay afloat because my rent is $2,700. It's hard to even get approved anywhere because landlords have unrealistic expectations about making 3x the rent. Lenders say I can't buy, yet somehow I pay $2,700 a month in rent. Something has to give."