CHAPTER 7:
NATURAL RESOURCES + ENERGY

Natural Resources + Energy Overview

Natural resources include all natural features present in Springfield and its planning boundary that will impact development in Springfield over time. This includes everything from floodplains, to streams, and slopes. A review of the current existing conditions of each major natural feature is provided alongside ideas of how these natural features can best be addressed, protected, or enhanced as Springfield grows. The energy section of the chapter addresses energy infrastructure, use, and conservation practices Springfield should also consider as it grows. Lastly, a set of goals, policies, and action items related to natural resource and energy are provided to help guide decision-making and priorities as Springfield grows.

Existing Natural Resources in the Springfield Area

There are several key natural features that are present in the Springfield planning boundary that will impact how and where Springfield ultimately develops. Most notably, the Platte River south of Springfield has had perhaps the largest impact on the presence of these natural features from the floodplain surrounding the Platte River's tributaries, the associated tree cover near these water bodies, the fertile soil that has led to agricultural activity surrounding the community, as well as the gentle slopes that define the drainage pattern of the area. Each of these natural features and landforms will be discussed in the following pages.

NATURAL RESOURCES IN SPRINGFIELD TODAY

Floodplain

Floodplain is the low-lying land near water bodies that is the first land impacted during high water or rain events.

Streams

Streams are the defining features of the drainage system surrounding Springfield and the Platte River.

Watersheds

Watersheds are the boundaries in which water flows and drains to a common source in an area.

Agriculture

Much of the land near Springfield is used for agriculture - a finite resource important to the economy of Nebraska.

Slope

Areas with steep slopes are vulnerable to erosion and can lead to water quality issues if not properly managed.

Tree Cover

Tree cover provides various environmental and economic benefits to communities.

Wetlands

Wetlands include areas of land that are covered with water during at least part of the year and provide many benefits.

NATURAL RESOURCES EXISTING CONDITIONS

Floodplain

Floodplain generally refers to the flat, low-lying areas surrounding a river or other water body that experience periods of inundation during high water events such as rainfall or snowmelt. Areas within the floodplain are environmentally significant because of the substantial biodiversity of flora and fauna that growth and live within the ecosystem. Floodplain plays an important role in the natural flooding cycles of rivers and it is widely agreed that this land should be left undeveloped to protect the stream and surrounding habitats as well as prevent unnecessary loss of property or life.

Figure 7.1 shows the location of floodway, 100-year floodplain, and 500-year floodplain in Springfield and its immediate planning boundary. Floodway refers to the actual channel of a river and the adjacent land area that must be reserved to discharge base flood levels without increasing the elevation of water in an area. The 100-year floodplain includes land in which the statistical likelihood of a flood in any given year is 1%, or a 1 in 100 chance. The 500-year floodplain is the land in which the likelihood of a flood in any given year is 0.2%, or a 1 in 500 chance.

Currently, Springfield requires that any new or substantially improved residential building located in the flood fringe or floodway must have a lowest floor at least one foot above the base flood elevation. For commercial buildings, the lowest floor must be elevated or floodproofed at least one foot above the base flood elevation.

The City of Springfield should review current regulations and consider strengthening the regulations with a floodplain ordinance that prohibits most development within the 100 and 500-year floodplain in the planning boundary. This will help protect the waterbodies near Springfield and prevent unnecessary flood damage and potential loss of life due to flooding events.

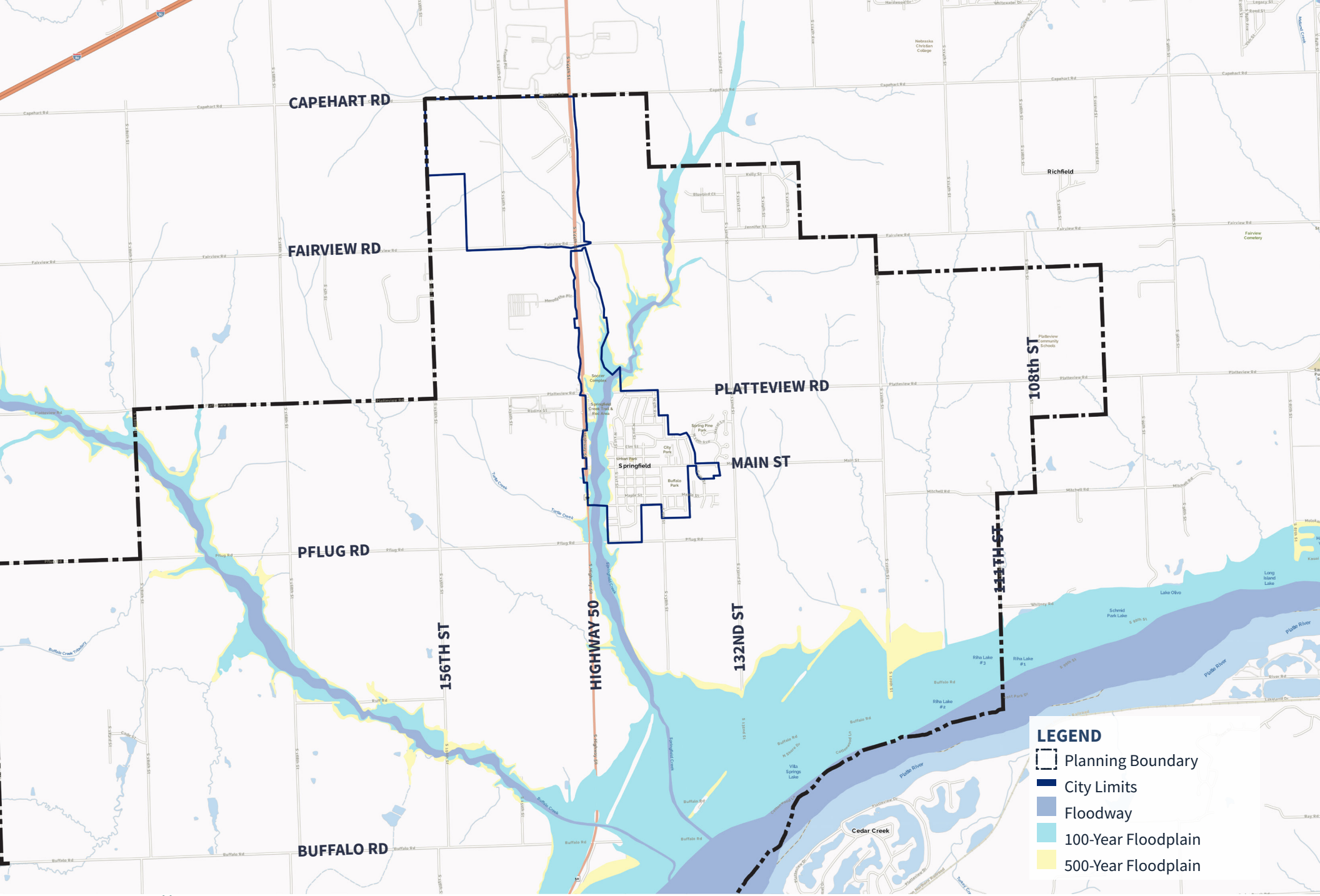


FIGURE 7.1 // EXISTING FLOODPLAIN MAP

SOURCE: SARPY COUNTY WITH INPUTS FROM CONFLUENCE

NATURAL RESOURCES EXISTING CONDITIONS

Streams by Type

There are three main types of streams identified on United States Geological Survey (USGS) maps:

- Type 1 – Perennial Streams
- Type 2 – Intermittent Streams
- Type 3 – Ephemeral Streams

Figure 7.2 shows the location of type 1 and 2 streams in Springfield and the planning boundary.

Type 1 – Perennial Streams

Type 1 – Perennial Streams are streams with a continuous flow of water throughout the year except for in cases of extreme drought. The type 1 streams in Springfield and the planning boundary are shown in dark blue and include Springfield Creek, which runs through the community, and Buffalo Creek to the southwest. Both streams merge with the Platte River in similar locations south of town.

Type 2 – Intermittent Streams

Type 2 – Intermittent Streams are streams that contain water during most of the year, especially in the wet seasons of the year, which in the United States is typically May through October. Type 2 steams are shown in light blue and include streams such as Turtle Creek.

Type 3– Ephemeral Streams

Type 3 – Ephemeral Streams are stream channels formed during or immediately after rainfall or snowmelt, but not occurring under other conditions.

Like floodplain, the area around streams are biodiverse and ecological sensitive areas home to many flora and fauna. The area around streams are susceptible to erosion and can be a first line of defense for water quality control and to prevent the frequency and severity of flooding.

As a member of the South Sarpy Watersheds Partnership (SSWP), Springfield has agreed to follow the policy recommendations outlined in the 2024 watershed management plan. One of these updated policies includes the creation of a green space corridor along all streams equal to three times the channel depth plus 50 feet on both sides of the channel. The policy specifies that the outside 30 feet can be used for passive recreation, such as a trails. Additionally, the watershed management plan requires grade control structures on all streams identified in the watershed management plan to prevent stream bed degradation, for which any construction costs will be reimbursed by the partnership.

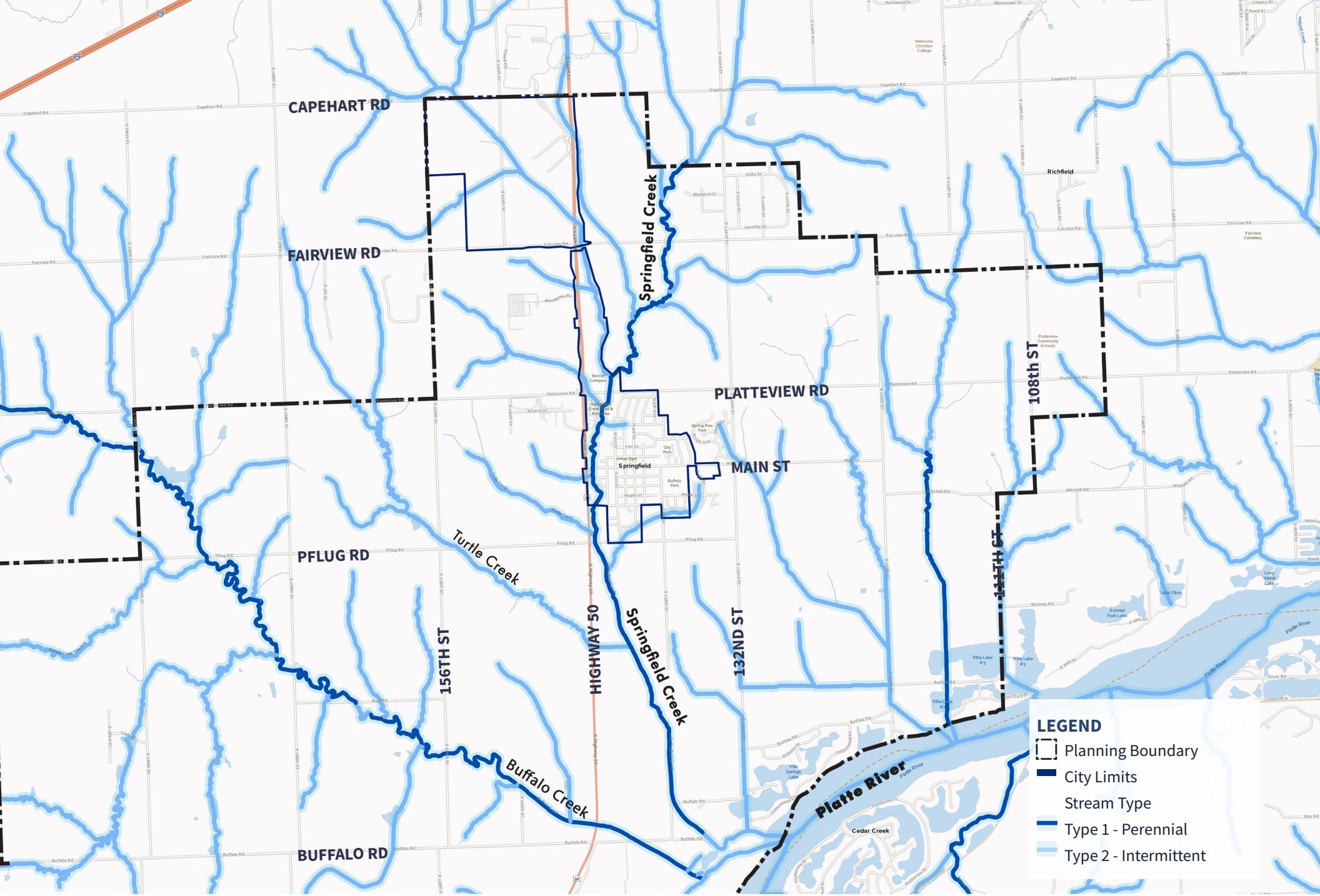


FIGURE 7.2 // EXISTING STREAM TYPES MAP

SOURCE: SARPY COUNTY WITH INPUTS FROM CONFLUENCE

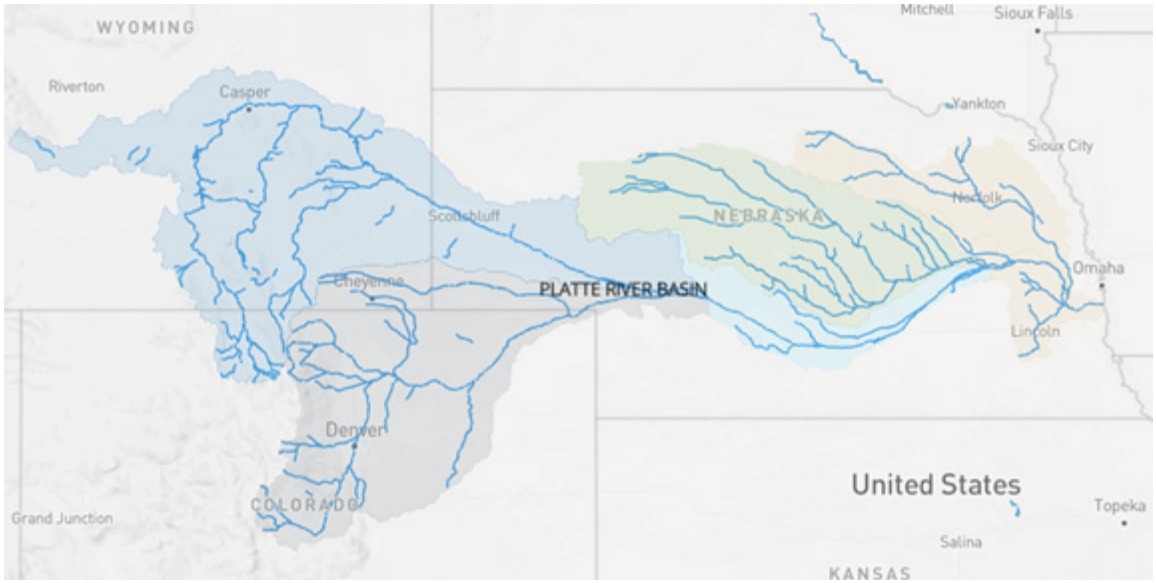
NATURAL RESOURCES EXISTING CONDITIONS

Watersheds

Watersheds refer to the boundaries in which all water flows to a common source or location. There are many levels of watersheds identified by the United States Geological Survey (USGS), which range from large regional basins to subwatersheds. Large regional basins can span multiple states or even countries such as the Missouri River Basin. Subwatersheds are smaller – typically between 5,000 and 45,000 acres. Figure 7.3 shows the subwatersheds in the Springfield planning area.

Most of the Springfield community today falls under the Turtle Creek watershed, but the Buffalo Creek and Turkey Creek-Platte River watersheds are both within the planning area. All of the subwatersheds in the Springfield area are part of the larger Platte River Basin, which covers a large swath of Nebraska as well as portions of Wyoming and Colorado.

Springfield should continue to prioritize being a good regional partner in watershed management. Since 20216, Springfield has been a member of the South Sarpy Watersheds Partnership (SSWP), which adopted a new watershed management plan in 2024. Policies included for the SSWP area stemming from the plan include reducing peak flow maintenance requirements to 2-year and 10-year peak runoff events, creation of a green space corridor along all streams equal to three times the channel depth plus 50 feet, and grade control structures required for all streams identified in the plan. These policies should be followed closely.



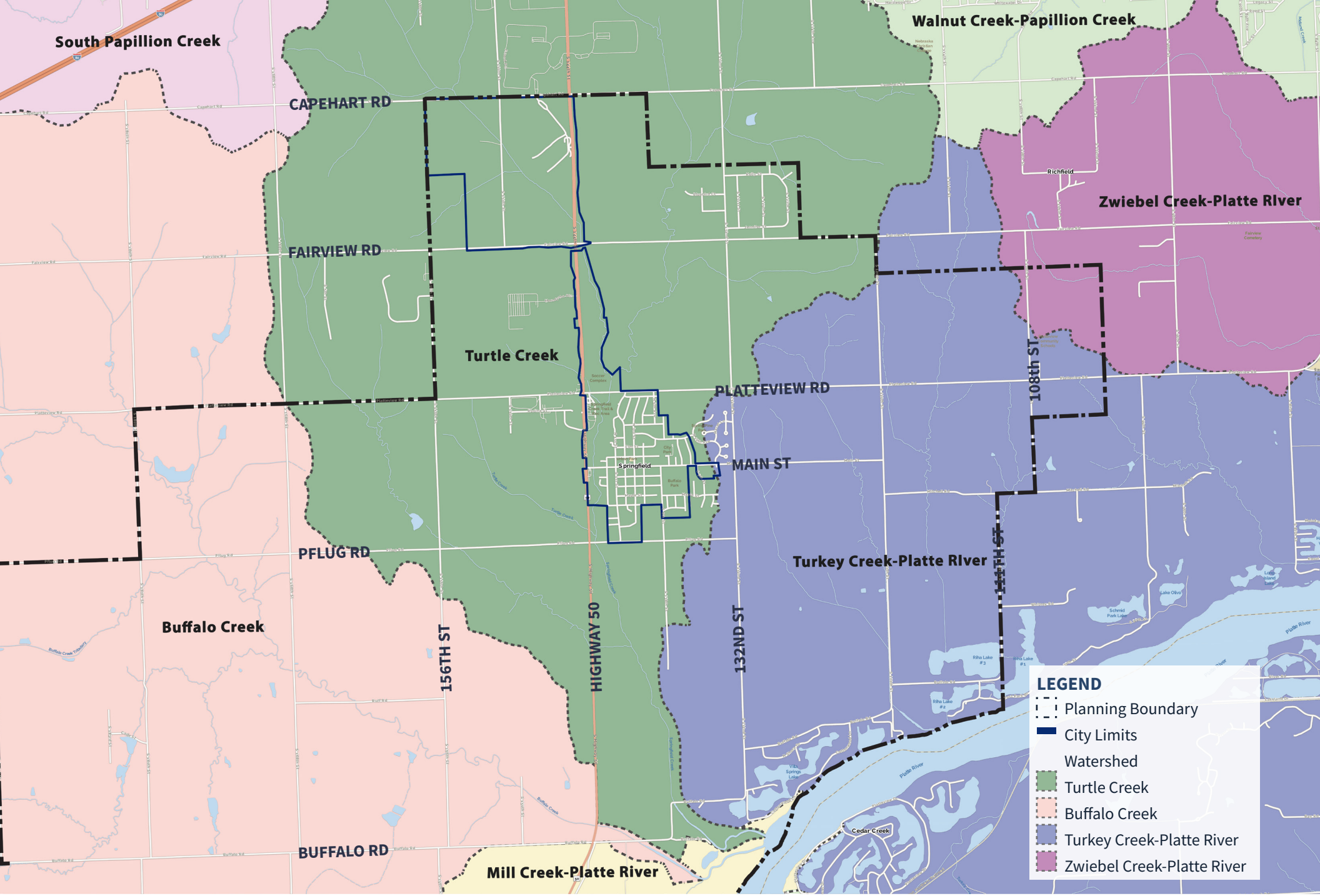


FIGURE 7.3 // SUBWATERSHED BOUNDARIES MAP

SOURCE: CONFLUENCE WITH INPUTS FROM USGS AND SARPY COUNTY

NATURAL RESOURCES EXISTING CONDITIONS

Agriculture

Much of the undeveloped land around Springfield today is used for agricultural purposes. Figure 7.4 shows what land area has a current occupancy or use of agriculture land per Sarpy County parcel data. While not strictly a natural resource, agricultural land is an important environmental consideration for growth in Springfield. Agricultural land plays an important role in our food system and the Nebraska economy overall. Once converted to the built environment it is nearly impossible to add more agricultural land back into an environment. Springfield should discourage the unnecessary conversion of agricultural land to the built environment.

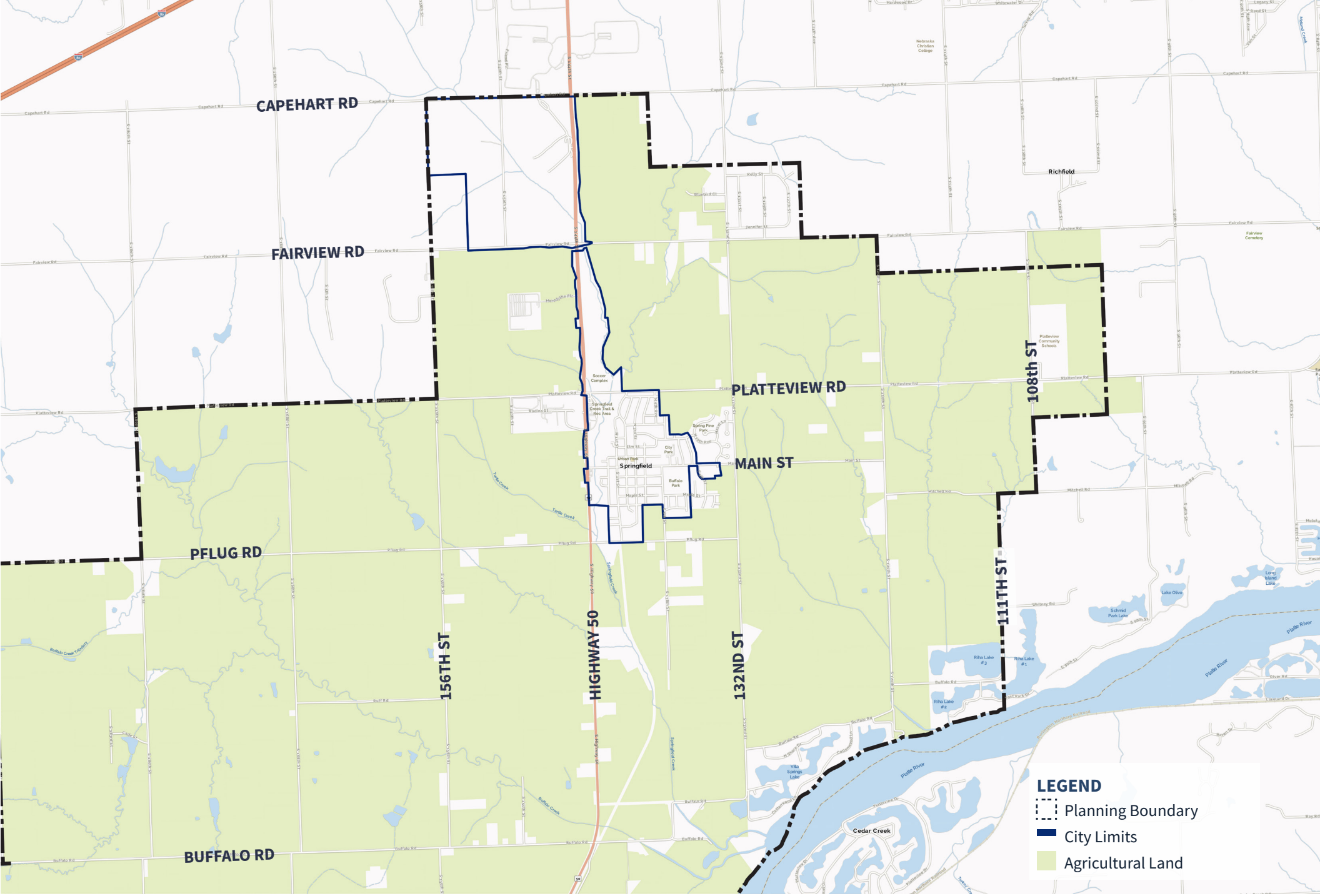


FIGURE 7.4 // EXISTING AGRICULTURAL LAND

SOURCE: CONFLUENCE WITH INPUTS FROM SARPY COUNTY

NATURAL RESOURCES EXISTING CONDITIONS

Slope

The percentage slope of the Springfield area is shown in Figure 7.5. The darkest green shows slopes of 5% or less. Light green shows those slopes between 5 and 10%. Yellow is intermediate and shows slopes between 10 and 15%. The steepest slopes are shown in orange and red, which represent slopes of 15 to 20% and 20% and above, respectively. Generally, the slopes in Springfield follow the drainage pattern of the area with the steepest slopes occurring near bodies of water or stream beds. South of Springfield as land approaches the Platte River the land becomes very flat and likely shows where the floodplain and floodway of the Platte River has shifted over time. Areas with steep slopes are sensitive natural features that are vulnerable to erosion of topsoil. The erosion of topsoil into streams can negatively impact water quality also. The South Sarpy Watersheds Partnership 2024 watershed management plan requires all streams within the partnership area, including Springfield, to have grade control structures installed on all streams identified in the plan to prevent stream bed degradation in excess of four feet. The construction costs are reimbursed by the partnership. This policy should continue to be enforced to prevent areas with sensitive slope in the planning boundary.

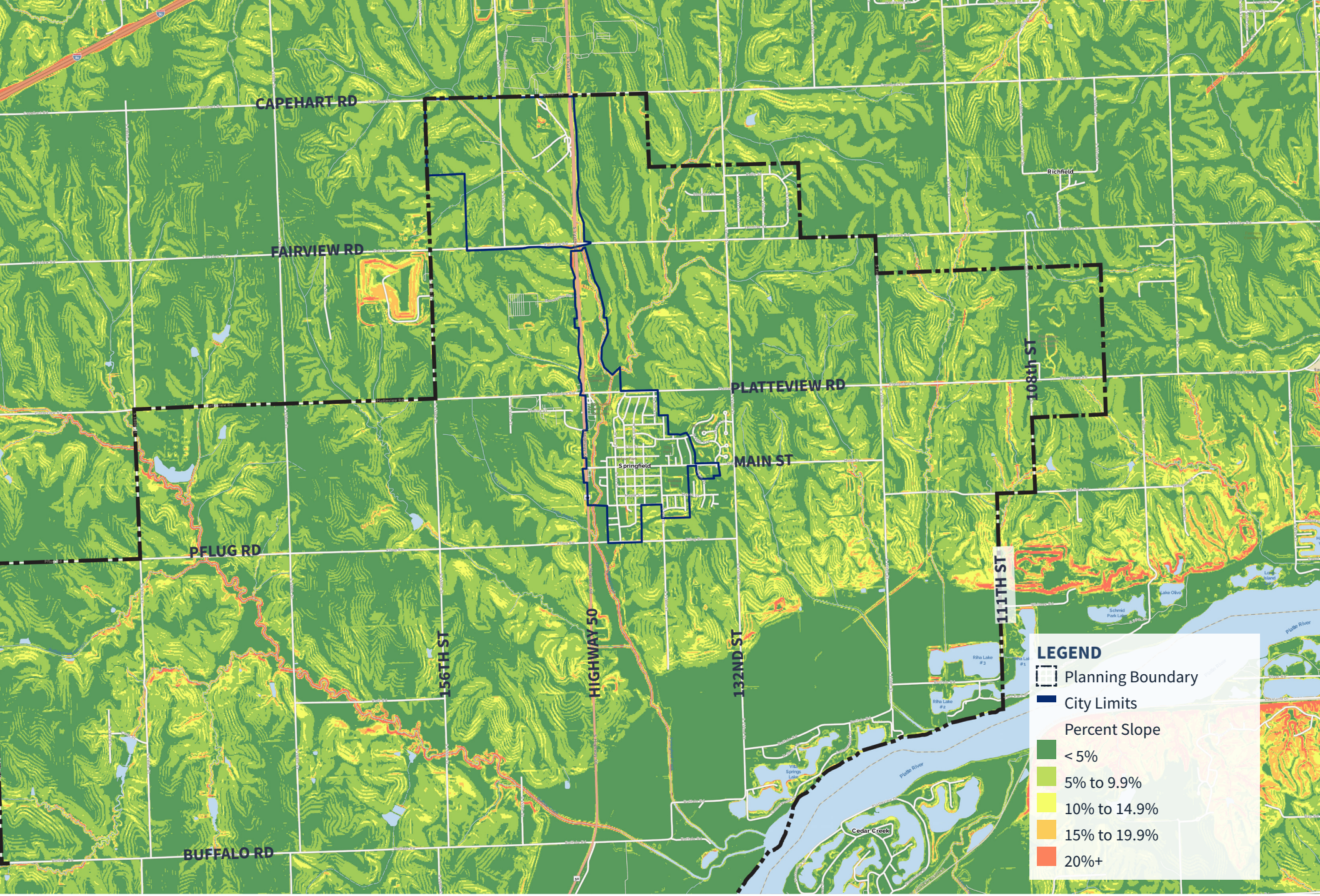


FIGURE 7.5 // SLOPE ANALYSIS

SOURCE: CONFLUENCE WITH INPUTS FROM USGS + SARPY COUNTY

NATURAL RESOURCES EXISTING CONDITIONS

Tree Cover

Trees provide numerous environmental and economic benefits, including lowering surface air temperature because of the shade they provide. This cooling effect reduces the need for energy use by buildings. Trees help to absorb and slow floods and filter water to help improve water quality and stormwater management. Trees also help improve air quality by capturing carbon dioxide and other pollutants. Lastly, trees improve property values and the overall quality of life all while creating a habitat for local wildlife.

Due to the agricultural nature of much of the land use surrounding Springfield, there is not a significant amount of tree cover in the city or planning boundary. Where tree cover does occur currently mainly follows the stream system along Springfield Creek and Turtle Creek. The existing tree cover should be preserved as the community develops as open space, greenway, or trail land.

Tree cover expansion should be a priority for Springfield as the community grows outward. In an urbanized area, this can be accomplished most easily through the addition of street trees, the planting of tree cover in parks and other public spaces, as well as encouraging private property owners to plant new trees on their property.

Wetlands

Wetlands are areas where water covers the soil at least part of the year or all year. These sensitive ecological areas provide food and habitat for flora and fauna, help to absorb and slow down flood water, and filter pollutants out of water. Wetlands include marshes, lakes, river and streams, oxbows, wet meadows, fens, forested swamps, and seeps. The State of Nebraska maintains a Wetland Program Plan, which aims to protect, restore, and manage wetlands in the state.

The Nebraska Game and Parks Commission (NGPC) has a variety of wetland resources available for viewing and use online. According to the NGPC, there are five main wetlands found in Nebraska:

- Playa Wetlands – mostly circular, rain-filled basins.
- Sandhill Wetlands – formed where sandy soils are dominant along the Loup and Platte River sandhills.
- Saline and Alkaline Wetlands – wetlands filled with salty waters tied back to minerals in the area.
- Riverine Wetlands – found at the edges along rivers and river floodplains, including small streams and creeks.
- Urban Wetlands – found in urban areas, including marshes, stream edges, wooded floodplains, or constructed ponds and reservoirs.

Riverine wetlands are the main types found in the immediate planning boundary, but there are some freshwater emergent wetlands and ponds as you extend outward. The most significant wetland area near Springfield is the Platte River area where there is significant amounts of riverine, lakes and ponds, forested/shrub wetlands, and emergent wetlands.

Wetlands should be preserved and protected whenever possible to prevent flooding, promote water quality, and provide habitat for local wildlife. Springfield should work with regional agencies and groups to protect this resource.

NATURAL RESOURCE KEY CONSIDERATIONS

There are several other key considerations the City of Springfield should consider when addressing natural resources in the growth and development of the community. Below are four key future considerations.

PROPOSED FUTURE LAKE PROJECT

The area south of Springfield has been identified by the Statewide Tourism and Recreational Water Access and Resource Sustainability (STARWARS) Committee as a potential location for a large recreational lake. While the likelihood of this is unknown, the City should be prepared for the impact this will have on drainage patterns, floodplain, etc.

GREEN INFRASTRUCTURE EXPANSION

Green infrastructure, such as rain gardens, rain barrels, or permeable pavement, should be integrated onto public property such as parks, the new city hall, and other existing/future facilities. The City should also encourage residents to add green infrastructure onto their property or business. This could include offering financial incentives or lower cost rain barrels.

STORMWATER MANAGEMENT BEST PRACTICES

Springfield is one of several Sarpy County communities that is a participating member of the South Sarpy Watersheds Partnership (SSWP). The SSWP was formed in 2016 through an interlocal cooperation act agreement and developed a comprehensive Watershed Management Plan that was adopted in 2024. The SSWP collects stormwater fees and enforces stormwater management policies for the area. Springfield should continue to implement and adopt new policies that adhere to the recommendations of the watershed management plan

GREENWAY EXPANSION

Springfield should take advantage of the floodplain that runs along Springfield Creek to expand its greenway network. This expanded greenway could serve as additional recreation space as well as enhance the floodplain and stream bank's ability to reduce severity of flooding and improve water quality, etc. These recommendations have been built into the Future Land Use and Community Identity Chapters as well.

ENERGY COMPONENT

State Energy Requirements

As of 2010, the State of Nebraska began requiring comprehensive plans to include an element regarding energy. This section is required to address three components:

1. **Energy infrastructure and energy use by sector, including residential, commercial, and industrial sectors.**
2. **Utilization of renewable energy sources.**
3. **Energy conservation measures that benefit the community**

Omaha Public Power District

Energy Infrastructure + Springfield

The City of Springfield is a retail customer of the Omaha Public Power District (OPPD), a public electric utility wholly owned by the State of Nebraska and controlled by a special district. OPPD serves over 855,000 people in the Omaha region and surrounding counties.

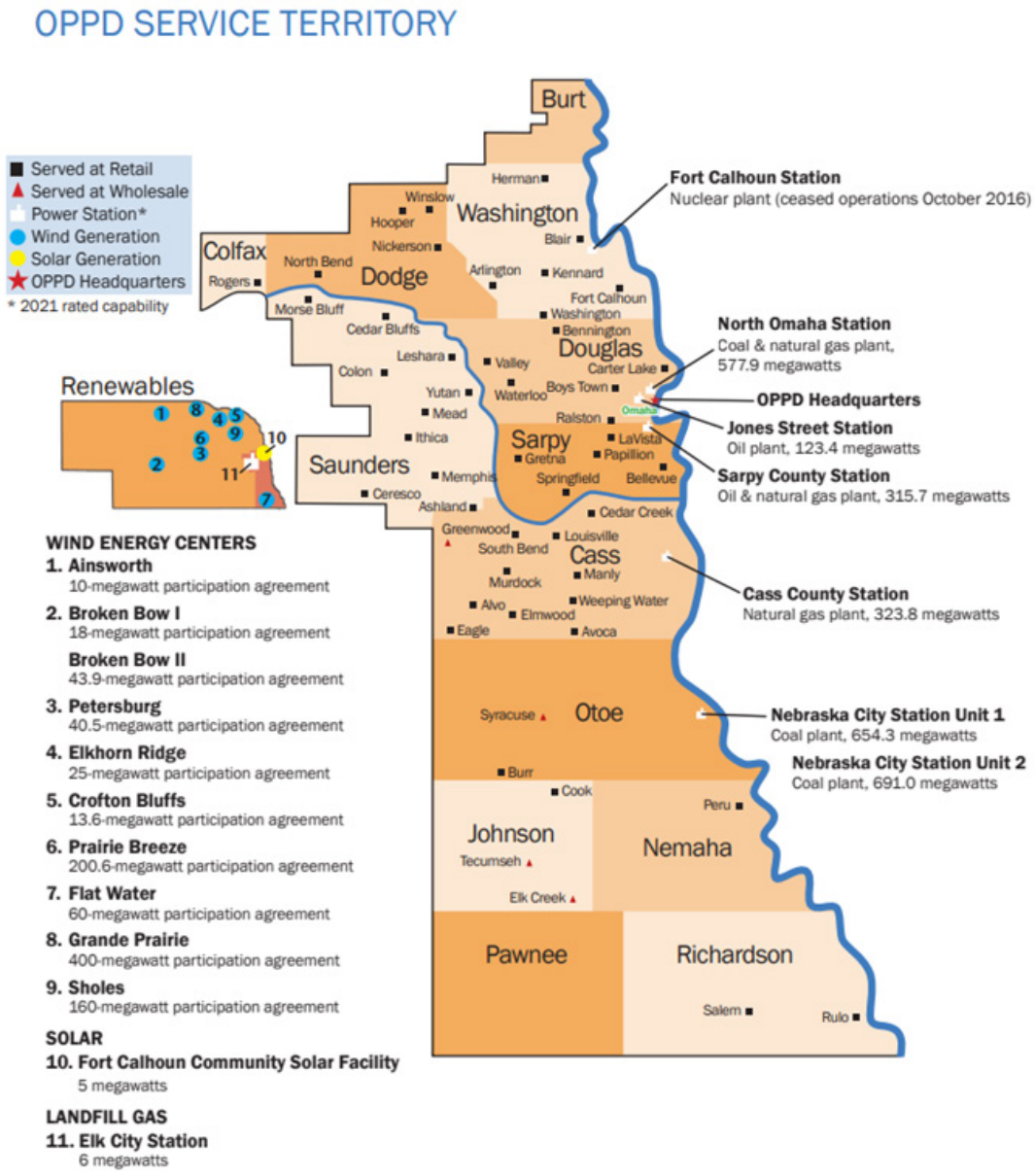
OPPD's current fuel sources for generation include:

- Low-sulfur coal
- Wind*
- Solar*
- Landfill gas
- Natural gas and fuel oil
- Hydroelectric*

OPPD formerly utilized nuclear energy at Fort Calhoun Nuclear Station, however, operations ceased in 2016, and the facility is in the decommissioning process.

The image on the right shows the location of OPPD's service territory and the approximate location of different energy facility types. Within Sarpy County, the closest facility to Springfield is the Sarpy County Station, an oil and natural gas plant with an overall generation of 315.7 megawatts.

** Renewable energy sources*



ENERGY COMPONENT

Energy Use by Sector in Springfield

The table below shows the 2024 energy use by sector for Springfield, Nebraska. The sectors include commercial, residential, and street lights. Currently, 92% of energy use is consumed by the commercial sector. Table 7.1 below also shows how energy consumption rates compared in the previous comprehensive plan in 2013-2014.

Overall, there has been a significant increase in commercial energy use in Springfield in the past decade. In fact, there has been a nearly 3,000% percent increase. This is mainly due to the addition of a data center in Springfield.

Not only is commercial energy usage significantly higher than residential energy usage, residential and street light energy usage has actually decreased over the past decade despite an overall increase in the number of premises, or customers. This is likely due to increases in efficiency in appliances, light bulbs, etc.

Sector	Total 2024 (KWH)	Share (%) 2024	Premise Count 2024	Total 2013 (KWH)	Premise Count 2013	% Change (KWH) 2013-2024
Commercial	97,128,494	92%	293	3,332,732	171	2,814.4%
Residential	8,716,885	8%	650	9,162,649	617	-4.9%
Street Lights	91,218	0%	N/A	232,724	N/A	-60.8%
TOTAL	**105,936,597**	**0**	**943**	**12,758,105**	**788**	**+ 730.3%**

TABLE 7.1 // ENERGY USE BY SECTOR

Energy Infrastructure + Springfield

There are several options the City of Springfield could consider when identifying ways to conserve energy usage as a community.

- Promoting energy conservation programs and education through OPPD, Nebraska Energy Office, and the U.S. Department of Energy
- Energy conservation measures on public buildings
- Consider adding solar panels on new city hall
- Encouraging recycling and composting to reduce energy needed to extract new raw materials
- Tree planting to reduce urban heat island and reduce cooling costs/demand
- Limiting the number of high energy users in the commercial sector while also encouraging existing/ new commercial industries to do more with energy conservation and requirements.

Each of these potential ideas have pros and cons that will need to be weighed from a budget, staff resource, and economic development perspective.

GOALS, POLICIES, AND ACTION ITEMS

GOAL NE-9: PROTECT SPRINGFIELD'S NATURAL FEATURES, RESIDENTS, AND PROPERTIES THROUGH THE PRESERVATION OF NATURAL RESOURCES.

Policies

P-9.1	Discourage development and/or introduction of new impermeable surfaces in the floodway, floodplain, or stream buffer areas.
P-9.2	Encourage high quality wetlands be incorporated as a site amenity for aesthetics and on-site flood control.
P-9.3	Promote the preservation of any existing tree cover in the planning boundary.
P-9.4	Participate in any existing or additional regional watershed management planning studies or organizations like the South Sarpy Watersheds Partnership (SSWP).
P-9.5	Discourage the unnecessary conversion of agricultural land into the built environment to reduce sprawl and preserve farmland.
P-9.6	Continue to integrate stormwater management best practices into construction and development in Springfield following the recommendations of the South Sarpy Watersheds Partnership watershed management plan.
P-9.7	Educate Springfield residents and businesses on stormwater management best practices such as water conservation and water quality through pollution prevention.
P-9.8	Integrate green infrastructure on public properties and encourage private property owners to add green infrastructure such as rain gardens or rain barrels.
P-9.9	Promote energy efficiency for residential and commercial properties by sharing resources such as links to Omaha Public Power District (OPPD) energy efficiency programs.
P-9.10	Support regional efforts for renewable energy generation and consumption.

GOAL NE-9: PROTECT SPRINGFIELD'S NATURAL FEATURES, RESIDENTS, AND PROPERTIES THROUGH THE PRESERVATION OF NATURAL RESOURCES.

Action Items

AI-9.1	Explore the creation of a sustainability grant to help financially incentivize homeowners to increase energy efficiency of homes or add on-site green infrastructure installations.
AI-9.2	Enhance the floodplain ordinance in Springfield to discourage or prohibit new development in the floodplain.
AI-9.3	Add low-impact trails along any newly created greenway stream buffer corridors.
AI-9.4	Consider adopting a slope preservation ordinance to prevent erosion and promote water quality.
AI-9.5	Create a plan to accommodate for a potential future lake project in Springfield planning boundary.
AI-9.6	Install energy efficient upgrades to all city properties and structures to promote energy conservation.
AI-9.7	Consider adding solar panels to existing or new city facilities and structures.