



9. Shape Resources



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The Big Sioux River valley, outside of Sioux Falls to the east. The City has developed nature parks just to the west of this area as residential areas expand in this direction.

Environmental Stewardship Plan

Overall Intent: Conserve and protect important environmental, human, and economic resources through sustainable practices.

Strategy: Protect the environment through the identification of resources, protection through land use ordinances and land purchases, and develop other sustainable implementation strategies.

Implementation: Subdivision ordinance, CIP, Zoning Overlay Districts, and Resource Master Plans.

The environment should not only be considered as a constraint and as something to mitigate, but also as an opportunity to enhance and to improve the quality of life of the citizens. Shape Resources, from Chapter 1: “Shape Community,” addresses the objective below within the **goal of improving the sustainability of the community:**

OBJECTIVE 3A: Environmental Stewardship—Attain an aesthetically attractive urban development which is compatible and sustainable with the ecological systems of the areas, and that maintain air and water quality standards as well as area historic, cultural, and natural resources.

Through environmental stewardship practices, the City of Sioux Falls has plans that take a more proactive approach to environmental stewardship, including the Greenway Plan, the Parks and Recreation System Plan, and the Sioux Falls Master Plan for Stormwater Best Management Practices (this approach is to address both water quality and flood control). In the future, the City should also look at other master plans to further the environmental stewardship objective, including a Sustainability Master Plan.

Environmental Assets

An evaluation of environmental factors and the physical characteristics of the growth areas was made to ensure that future

development of Sioux Falls and the outlying areas will be environmentally compatible. Typically, the terrain of the planning area is gently rolling. The physical and environmental **assets** of the Sioux Falls area are shown on Map 9.A: “Critical Open Space and Environmental Assets.” A description of the Sioux Falls area environmental assets are below:

Steep Slope Areas

Exceptions are the nearly level river bottom land along the Big Sioux River and its tributaries, and the steep hills on either side of the Big Sioux River in the northeast sector of the planning area. These hills have slopes ranging in excess of 70 percent, and are prone to severe erosion when stripped of ground cover. The difficulty of building on these hills, combined with their erosion problems and the environmental need to preserve their character, create a significant barrier to development. While some lowlands are prone to shallow flooding, the topography itself presents few physical constraints on development in the remainder of the planning area. Limit these land areas through utility hookups.

Wetlands

Numerous small wetlands and potholes are found adjacent to the southwest part of the city growth area, with the large majority being shallow and intermittent in nature. Wetlands and water bodies are designated from base maps developed through the National Wetlands Inventory and other data sources. These natural resources provide a number of functions that are important to the health and welfare of the com-

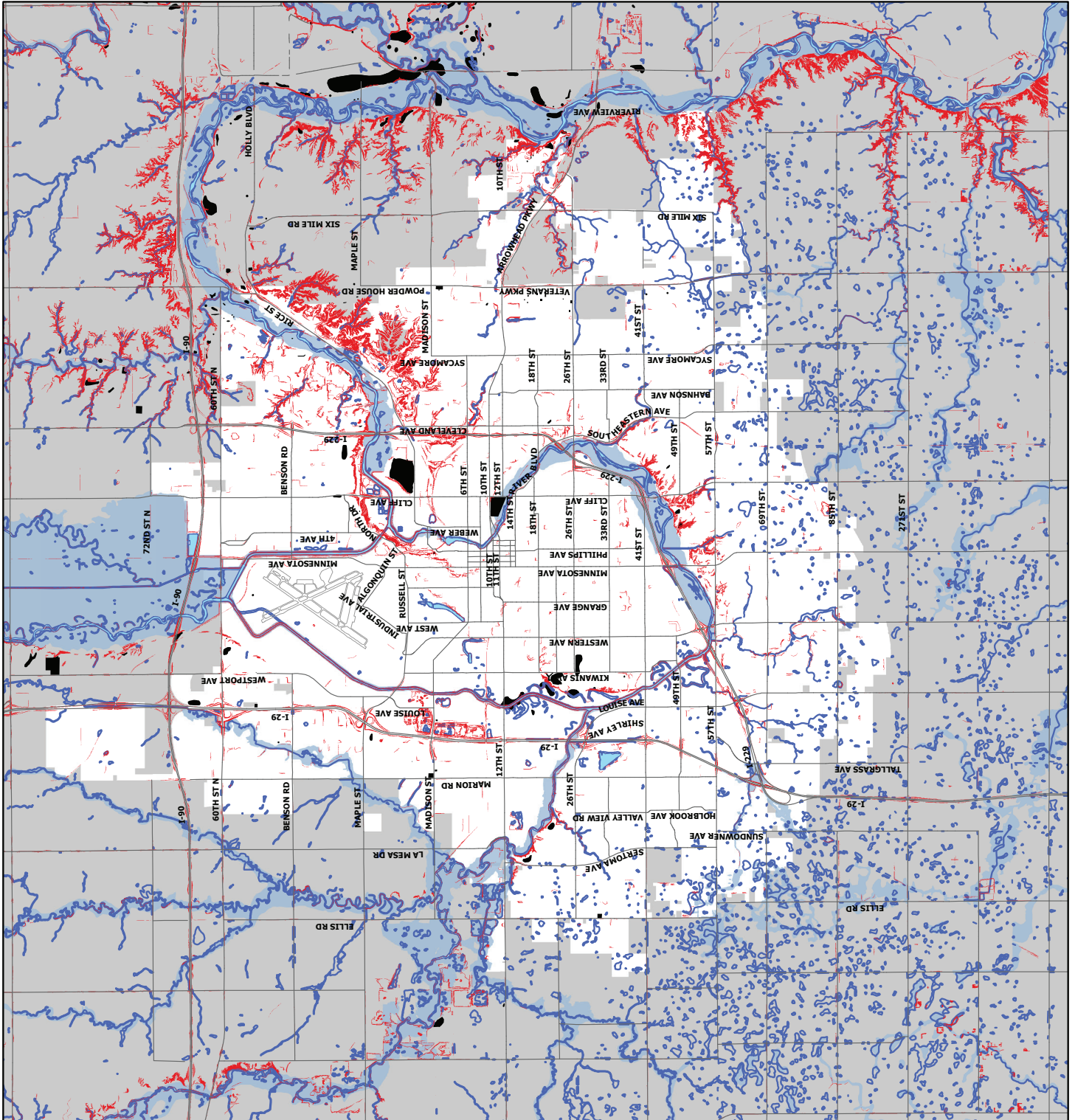
munity. They provide storage for stormwater, help to control flooding, provide wildlife habitat, improve water quality, and they can provide recreational opportunities. The purpose here is to improve, restore, and maintain the water quality of the city’s lakes, streams, wetlands, and ground water in partnership with citizens.

Rivers and Floodplains






Major surface drainage features found within the planning area are the Big Sioux River and its tributaries, all parts of the Missouri River system. The Big Sioux River flows south, loops through the city in a northerly direction, and bends northeasterly out of the city toward Brandon. It then continues south until it joins the Missouri River. Tributaries to the Big Sioux within the area include Skunk, Split Rock, Beaver, and Four Mile Creeks.

Because Sioux Falls lies partially within the floodplains of Skunk Creek and the Big Sioux River, rapid snowmelt, heavy rainfall, or combinations of both can cause flooding in the area. Normally, floods on these streams are of a relatively long duration and occur due to snowmelt runoff. An Army Corps of Engineers flood control project, completed in 1965, has prevented severe flooding of the Sioux Falls area. Features of the project include a diversion channel to bypass Big Sioux River flows around the north and east sides of the city, and levees along the Big Sioux River on the west side of the city. Due to more accurate and recent hydrological data, the Corps has updated the boundaries of the Skunk Creek and Big Sioux River 100-year floodplains, along with raising levees and other flood control modifications to the exist-

Map 9.A: Critical Open Space and Environmental Assets



Critical Open Space and Environmental Assets

- Environmental Factors**
-  Archaeological Sites
 -  Land with 20% Slope or Greater
 -  1% Annual Chance Floodplain
 -  Rivers, Lakes, and Streams
 -  Wetlands



ing levee and diversion channel structures to improve future flood protection.

Threatened and Endangered Species

There is a diversity of plant and animal life adjacent to the Big Sioux River. Habitat along the river provides various waterfowl, song-birds, game birds, and large and small mammals with a suitable living environment. Tree cover adjacent to the river includes pioneer tree species such as soft maple, green ash, cottonwood, and willow, as well as selected areas of mature forest which include oak, elm, and hard maple. Also found by the Big Sioux River are areas of native prairie grass. Many of the grasses and wildflowers found in the native prairie areas are on the national endangered plants list, making them of primary concern in preservation efforts.

Listed below are the nine endangered or threatened wildlife species that reside in South Dakota. Only one of the species, the Topeka Shiner, has been known to, or potential occupies, streams in the Sioux Falls area. Bald eagle nests have been found sporadically in the area.

South Dakota Federally Endangered and Threatened Species

(E)–Endangered, (T)–Threatened

- American Burying Beetle (E), invertebrate
- Bald Eagle (T), bird
- Black-Footed Ferret (E), mammal
- Eskimo Curlew (E), bird
- Dakota Skipper (T), invertebrate
- Gray Wolf (E, Statewide), mammal
- Higgins Eye (E), invertebrate
- Interior Last Tern (E), bird
- Leedy’s Roseroot (T), plant

- Least Tern (E, interior continent population), bird
- Northern Long-Eared Bat (T), mammal
- Pallid Sturgeon (E), fish
- Piping Plover (T, except in the Great Lakes watershed), bird
- Poweshiek Skipperling (E), invertebrate
- Rufa Red Knot (T), bird
- Scaleshell (E), invertebrate
- Shovelnose Sturgeon (T), fish
- Topeka Shiner (E), fish
- Western Prairie Fringed Orchid (T), plant
- Whooping Crane (E), bird
- Additional specials have been identified by the State of South Dakota. Information is available via: <http://gfp.sd.gov/wildlife/threatened-endangered/threatened-species.aspx>

Soils

While the soils found in the Sioux Falls planning area are excellent for agricultural purposes, their engineering properties present some limitations for urban development. Soil types found in many areas have moderate to severe limitations for various aspects of development, including roads and streets and dwellings with basements. These limitations are largely due to unfavorable shrink-swell characteristics, poor bearing capacity when wet, susceptibility to frost action, and/or a seasonally high water table. While these limitations do not rule out development, they do require compensating construction techniques and soil modification. Although soils with a specific engineering limitation may be more prevalent in some areas of the planning jurisdiction than others, soil types with a variety of limitations are found generally across the

area. It is recommended that developers research site soils through soils and soil testing before building to ensure best construction standards are followed.

Topsoil is a gigantic reservoir for water storage. Natural topsoil depths allow plant roots to penetrate deeply and help sustain them through dry periods. Topsoil soaks up rainfall and snowmelt and allows recharging of our groundwater systems. Natural topsoil depths reduce runoff of nonpoint source pollution of fertilizers, herbicides, and pesticides. Natural topsoil also allows greater diversity and improved health of trees.

Cultural and Archeological Resources

The archeological assets within the Sioux Falls growth area are important and should be preserved, although it is very difficult to identify areas prone to have archeological or cultural significance. Typically, more archaeologically sensitive areas in the Sioux Falls area tend to occur along and within river and stream floodplains. There are many areas along the Big Sioux River that have archaeological significance. These areas should be considered for (a) future passive park areas with some limited development, or (b) active park activities with more careful review by the State Historic Preservation Office.

Critical Open Space

Many of the areas that have historical, cultural, and environmentally sensitive resources have been identified. Critical open spaces are important resources to preserve as the city of

Sioux Falls grows. Open space areas that should be preserved—based upon opportunities for purchase, dedication, easements, and zoning restrictions—are identified as a part of the Parks Facilities plan in Chapter 7: “Shape Facilities.” These lands shall be considered as conservation and nature areas as described there.

“Treat the Earth well.
It was not given to you
by your parents.
It was loaned to you
by your children.”
– Kenyan Proverb

Urban Forests

Urban forests are important to create an attractive image of the city. They enhance city gateways, promote energy conservation, reduce “heat island effects,” and reduce wind extremes. The Shape Sioux Falls 2035 visual listening survey found that street trees and other green landscaping were very highly valued by citizens. Therefore, an urban forestry program and landscape regulations are very cost-effective ways to improve and maintain the urban forests of the city.

- The scope and condition of a community’s trees, and, collectively, its urban forest, are usually the first impression a community projects to its visitors. A community’s urban forest is an extension of its pride and community spirit.

- Trees lower local air temperatures by transpiring water and shading surfaces. Because they lower air temperatures, shade buildings in the summer, and block winter winds, they can reduce building energy use and cooling costs.

Conserving Resources

Sustainability is a desire to pass on a world that is as good as, if not better than, we found it for our children and our children’s children. The Shape Sioux Falls 2040 Comprehensive Plan has the following goals for conserving resources. These strategies will be the guide for City actions, furthered by a sustainability master plan.

Conservation Strategies

- A. Cleanliness—Reduce litter, continued usage of Projects NICE and KEEP.
- B. Pollution Prevention—Reduce greenhouse gas emissions, improve water quality, reduce risks of release/exposure to hazardous materials, and improve health of indoor environments.
- C. Resource Conservation—Encourage more recycling, reduce energy consumption, reduce water consumption, including incentives for adaptive and native landscaping, reuse of water, minimizing production of waste.
- D. Greening—Increase urban forest, including incentives for street trees, work toward recreational space within one-half mile, and protect the area’s ecology and biodiversity with greenway conservation areas. Public composting and urban gardens should be considered within the city, and standards determined. Strongly encourage plant diversity in order to not leave landscape areas vulnerable to disease. (See Chapter 5: “Shape Places,” section A. Streetscape.)
- E. Alternative Transportation—Improve transit options, including more frequent stops and broader coverage; improve bicycle and pedestrian conditions. (See Chapter 5: “Shape Places,” section C. Multi-Modal Access.)
- F. Alternative Energy—Encourage the use of wind power and solar energy by providing standards within the zoning ordinance that allow their use in most, if not all zoning districts. Also, encourage the development of renewable fuel infrastructure and other alternative fuels.
- G. Land—Encourage the conservation of land consumption by adding incentives to redevelop in existing city limits, and to add density options within the zoning ordinance.
- H. Green Buildings—Encourage green building standards and LEED certification through incentives, including site standards, water use, energy efficiency, indoor air quality, and impact on atmosphere and resources. All City buildings should be LEED-certified. (See Chapter 5: “Shape Places.”)
- I. Leading Green—Initiative by the City to encourage “green” options.

Man-Made Development Constraints

Airport

Airport noise and height restrictions can affect land development decisions and is a consideration for future development patterns. An airport impact area was developed in 2008 based upon the Sioux Falls Regional Airport's adopted master plan and the Land Use Compatibility Study. The Airport area was rezoned to AP (Airport Zoning District) to differentiate from the previous classification of AG (Agricultural). An overlay district was developed to protect the community based upon airport effects such as noise, dust, and fumes. The overlay limits the habitable residential uses within the boundary and includes some of the height restrictions associated with the airports runway approach zones.

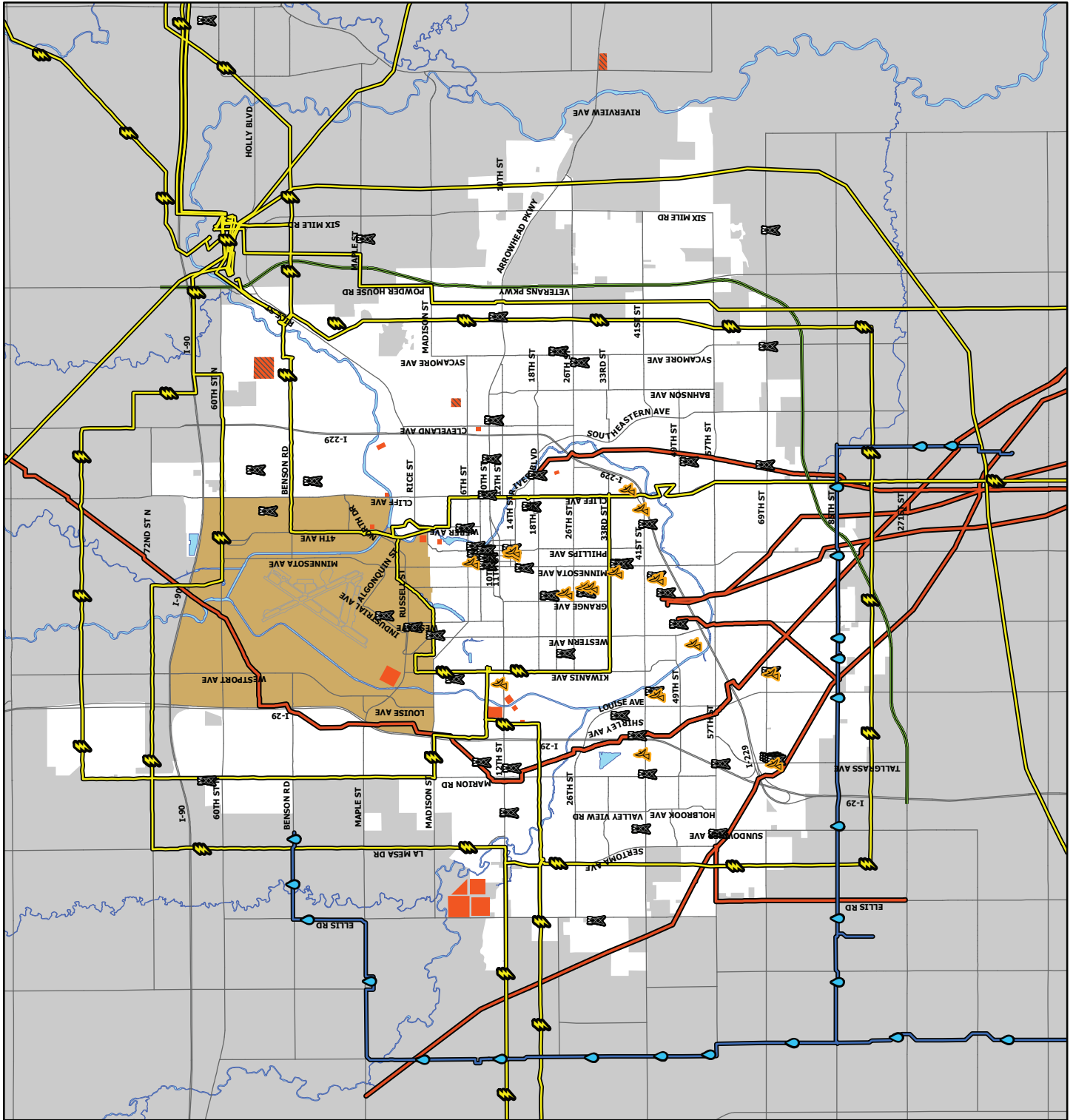
Pipelines and Other Constraints

The buried major pipelines of private enterprises can also impact the development potential of affected lands and have an impact on the arrangement of land uses. Many main lines exist in the growth area, including those of Amoco, Northern Natural Gas, Northern States Power (gasoline), and the Magellan Pipeline Company. The water source protection overlay zones adopted by the City and Minnehaha County require additional safeguards and contain restrictions for new developments within the zones, which may present a contamination risk for the municipal water supply. A special review process and zoning provisions are used to determine the extent of additional risk-reduction measures. The requirements can affect development and are an additional consideration.

Environmental land use control overlay districts (floodplain and water source protection districts) were adopted because Sioux Falls recognized that there are numerous constraints within and near Sioux Falls. In order to lessen the impacts on development, the environmental land use control district helps to ensure the safety in known impacted sites with established procedures and criteria for reviewing and restricting land uses.










The physical and environmental constraints of the Sioux Falls area are shown on Map 9.B: "Man-Made Development Constraints." The map also includes the locations of power lines, telecommunications towers, broadcast towers, and the future Veterans Parkway alignment.

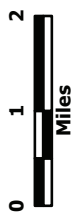
Map 9.B: Man-Made Development Constraints



Man-Made Development Constraints

Constraints

-  Broadcast Tower
-  Telecommunications Tower
-  Major Gas Pipeline
-  Lewis & Clark Water Pipeline
-  Electric Transmission Line
-  Veterans Parkway Alignment
-  Airport Overlay District
-  Decommissioned Landfill
-  Privately Owned Landfill



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