



Background Information

CHAPTER 2

Geography

Davison County is located in the southeastern quadrant of South Dakota, separated from Hanson County to the east by the James River. The physical area comprises 435.4 square miles of land or just over 277,000 acres. The County's population was 19,890 in the year 2020 which equates to approximately 45.5 persons per square mile. This density decreases to approximately 7.98 (3,457/4,331) when accounting for the 16,047 people residing within the three municipalities lying completely within the County. **Figure 2.1** shows the location of Davison County within the State of South Dakota along with its geographic relationship to comparable counties within the state.

In further describing the geographic site and situation of Davison County, the following three classifications or categories provide additional detail: agricultural, climatic, and physical.

- ✓ Agriculturally, the County is situated near the northeast margin of the winter wheat belt, the western margin of the cornbelt, and the eastern margin of the cattle range.
- ✓ Climatically, Davison County is very close to the boundary dividing the humid and dry regions of the continent, delineated by a north-south line and the warm and cool summer continental climates, an east-west boundary.
- ✓ Physically, the County is also unique in the location and relation to the subdivision of the interior plains within North America. This boundary dividing the Great Plains from the Central Lowlands falls either within or just outside the County's boundaries.

A Brief History of Davison County

The first white settlers in Davison County, according to History, settled in an area called Firesteel Creek. The year was 1871. Herman Cady Greene and John Head settled into the area that would become known as Davison County. A year later, 1872, Greene had lumber hauled from Yankton and built a frame house into which he moved with his wife Frances, daughter Louise and son Theodore.

As other homesteaders came to the area they would gather in a developing community called Firesteel. At Firesteel, a railroad surveyor supposedly saw a piece of driftwood either lodged in a tree or lying on high ground along the creek. According to local legend, that was indication to him that the village was in a flood plain and therefore not suitable for development.



However, evidence of the railroad company's plans should have become obvious on May 5, 1879 when John D. Lawler, son of wealthy bridge builder and Milwaukee Road stockholder, bought some 75 acres two miles west of Firesteel. Undoubtedly he had inside information because his land just happened to encompass much of the site of a new town to be named in honor of Alexander Mitchell, Scotland born president of the C.,M & St.P. and business associate of the younger Lawler's father.

In 1881 the territorial legislature met and considered two bills redefining the boundaries of earlier hastily created counties. As a result, the residents of Hanson and Davison were faced with two choices. The first was to combine the two retaining only the Hanson name, the second was to split them down the middle, after adding four townships on the west, creating, in effect, twin counties of 12 townships each. The people would decide, in a vote, for the latter of the two. The results were especially influenced by the voters of Mitchell and Alexandria, both county seats and one of which would lose the political plus if a single county was formed.



Just who originally applied the name Mount Vernon to the former Arlandton has never been established, although it may have been a Virginian or someone who had memories of George Washington's estate. The town plat was recorded in 1882 at about the same time John Pease established "The Mount Vernon Gazette." By the following year a hardware store, livery stable, lumber yard, drugstore, cigar manufacturer, hotel and several other firms were in business.

Much like the communities of Mitchell and Mount Vernon, the survival of Ethan was largely due to the railroad.

For three decades, Mount Vernon's "Old Settlers Day" was the highlight of the town's year. People came by train, horse and buggy and finally the first sputtering automobiles to enjoy the gala celebration. There were band concerts, shooting matches, greased pig chases, literary recitations, baseball games, parades, speeches, fireworks and a grand ball at the Opera House.

Source: <http://www.davisoncounty.org/home/a-brief-history-of-davison-county/>



James River Valley

All of the above-mentioned boundaries may be related to the climatic differences of the arid western regions and more humid regions lying to the east. The location of Davison County between these two distinct regions results in cyclical weather patterns and difficulty in supporting more intense industrial and agricultural development.

The constant fluctuation of the boundary classifications and subsequent differences are both a strength and weakness. The drought conditions associated with the

arid regions of the west require a long term vision in terms of development whereas the more humid weather patterns of the east provide an opportunity of expansion and enhanced profitability. This cyclical nature forces any development or expansion plans to be well researched and structured for both long and short term returns on the initial investment.

The categories discussed in the earlier paragraphs are evident in the population distribution of the State and region. The physical location of an area is important when examining long range planning goals and objectives. The relative distances to South Dakota's larger cities are illustrated in **Figure 2.2**. Major metropolitan areas and travel distances are shown in **Figure 2.3**.

FIGURE 2.1: Davison County's Location in South Dakota

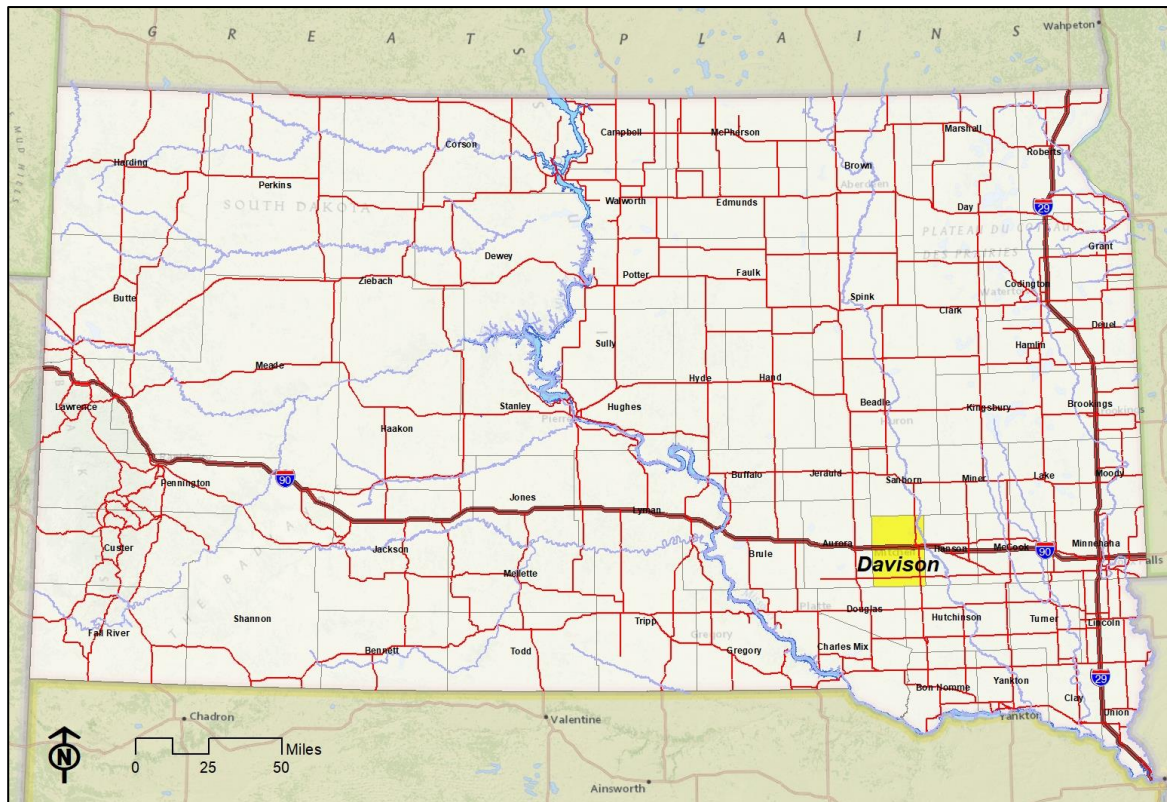


FIGURE 2.2: Cities in South Dakota

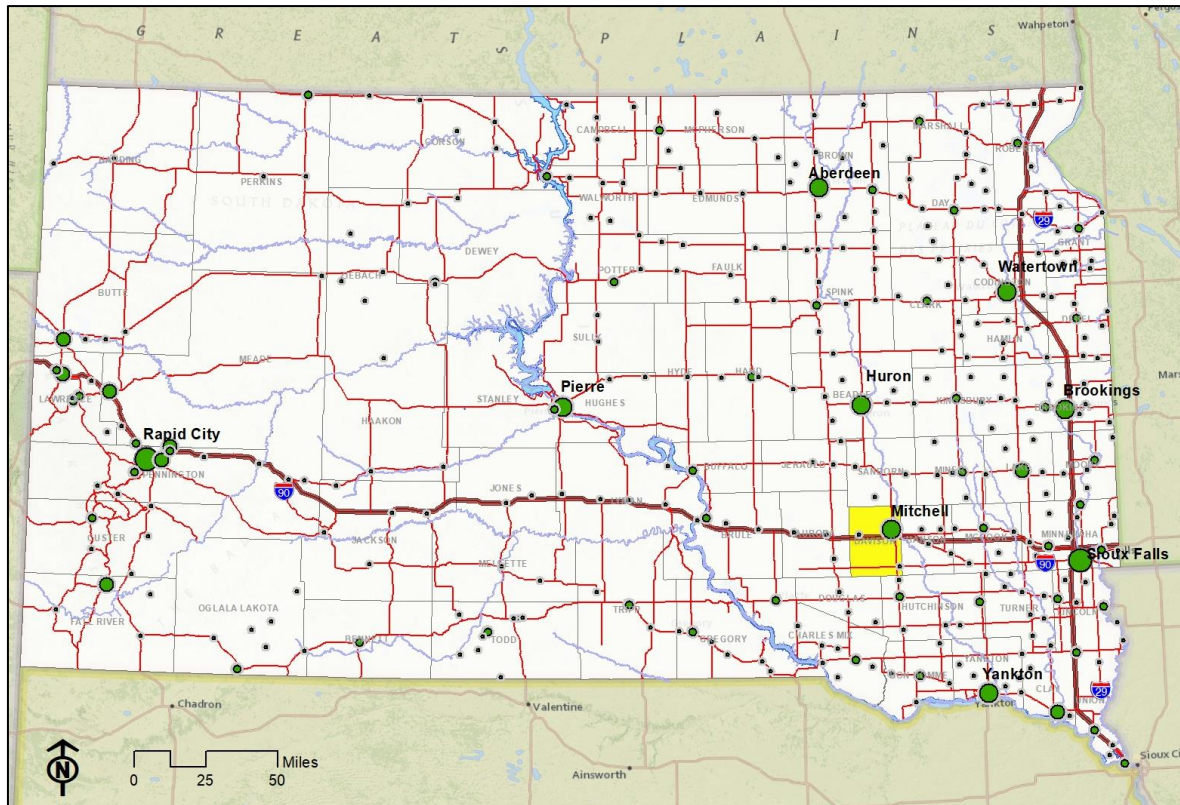
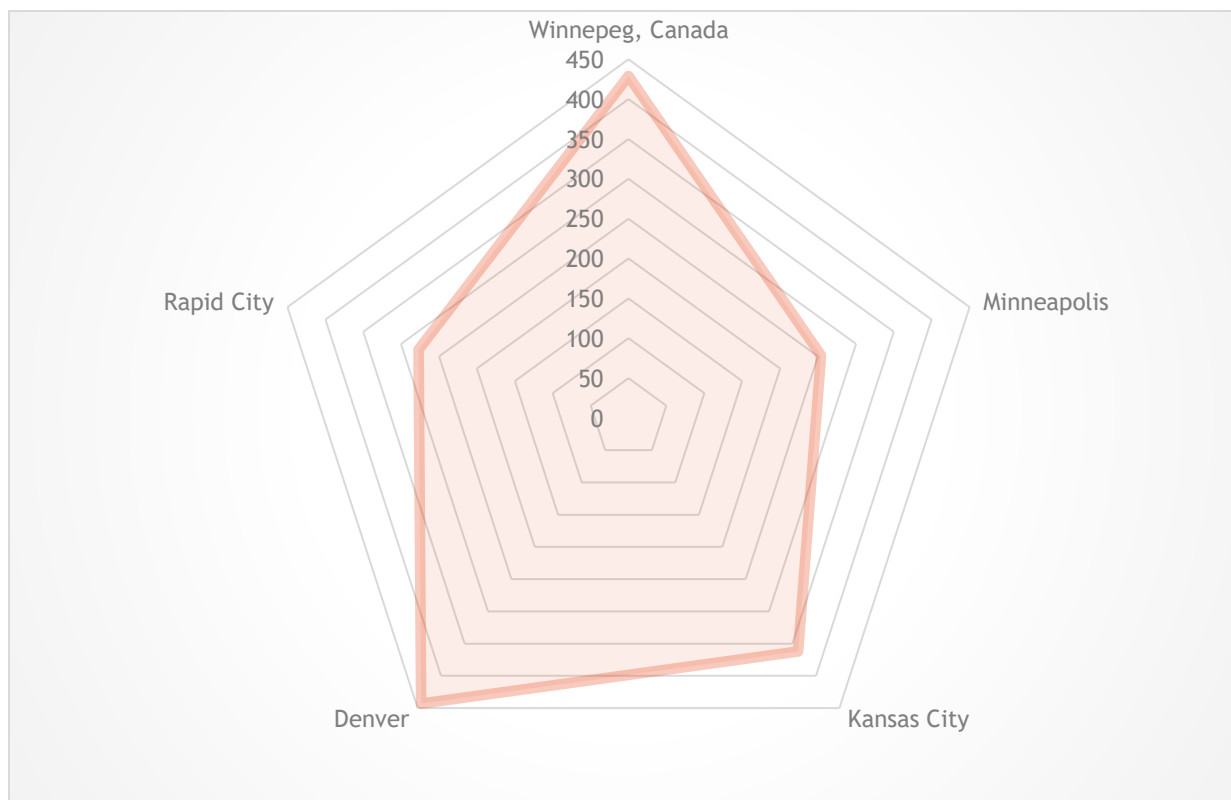


Figure 2.3: Distance from Mitchell to Major Areas



Soils and Topography

An examination of the soils within Davison County assists in illustrating those areas best and least suited for different uses or development. Soils can be described as belonging to a “soil association.” A soil association is a unique natural landscape that has a distinct pattern of soils, relief, and drainage. Typically, a soil association consists of one or more major soils and some minor soils.

The soils map shown in **Figure 2.4** illustrates the soil types in the County. Each soil type has special properties. This plan will present only a brief, general discussion of applicable soils in the Davison County area. More specific information is available in the Soil Survey of Davison County, South Dakota, published by the U.S. Department of Agriculture, Soil Conservation Service.

The following soils are most prominent within Davison County:

1. Clarno-Houdek-Betts: Occupies the largest portion of the County and are primarily north and south of the City of Mitchell with fingers reaching to the east and west.
2. Houdek-Prosper-Tetonka: Located in the northern, west central and south central regions of the county with small pockets in the east section of the County.
3. Houdek-Stickney: This soil is found in two distinct areas of the county to include the south central and the far north eastern region of the county. The smallest area of which lies in the northern reaches.

4. Enet-Delmont: Located in a fairly concentrated “fingers” adjacent to Firesteel Creek-Lake Mitchell and a basin lying between Twelve Mile and Enemy Swim Creeks in the eastern section of the county.

The soil data in **Figure 2.4** (page 10) is presented via two methods, color and abbreviations of the individual soil type. The following information ties the various abbreviations to one of the four soil associations identified above.

Due to the vast number of soil types in the county **Table 2.1** illustrates the properties of the first type of soil in each association. Properties listed for each soil discussed are slope, corn suitability, sanitary facilities (septic tanks and absorption fields), sewage lagoons, dwellings, and roads. For sanitary facilities, dwellings, commercial buildings, and roads the soil properties are listed for their suitability for each activity. The potential may be listed as slight, moderate, or severe.

Shrink/swell potential is the potential for volume change in a soil with a loss or gain in moisture. When the shrink/swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures sited within these areas. Special design is often needed. Severe shrink/swell means the soil properties are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance is required. Special feasibility studies may be required where the soil limitations are severe.

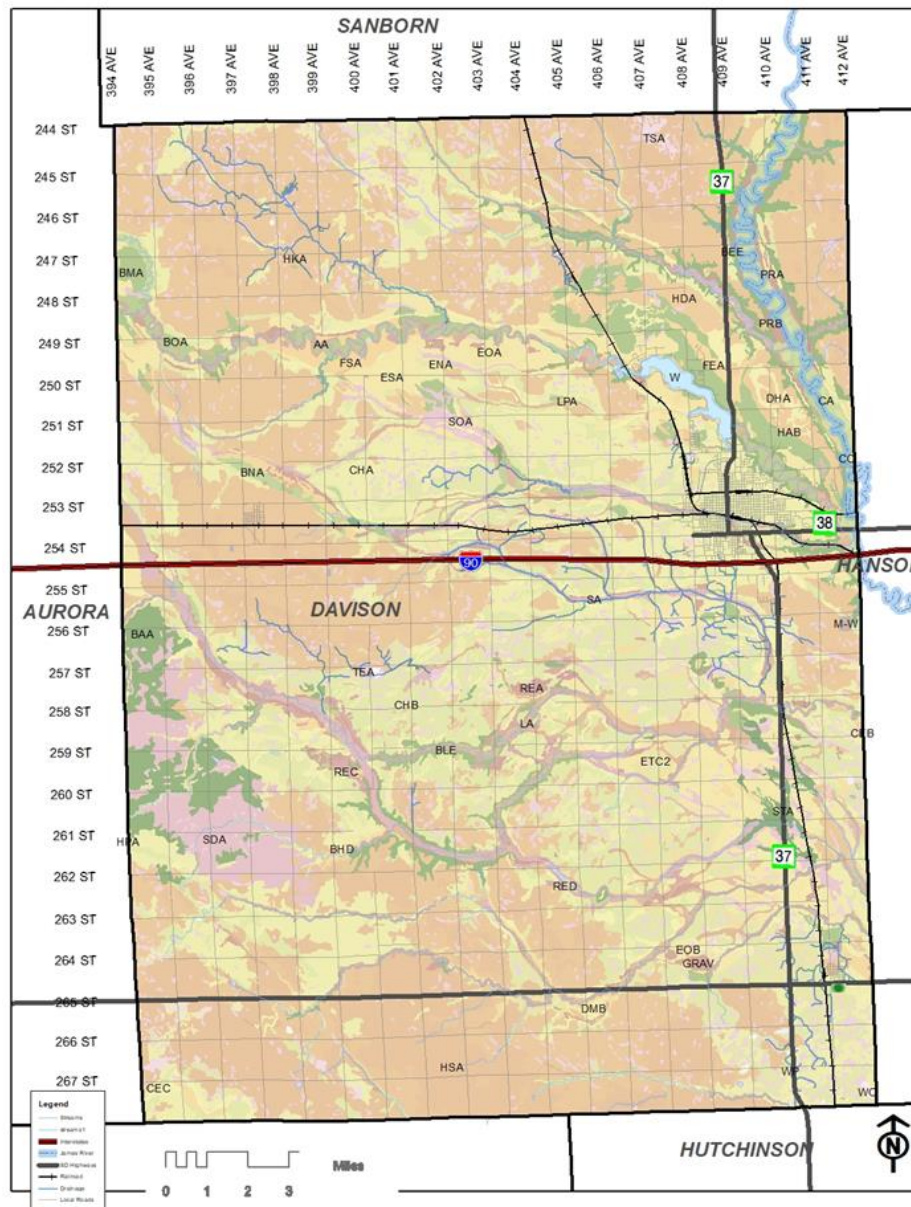
TABLE 2.1
Properties of Common Soils in Davison County

Soil Type	Slope (%)	Corn Suitability (Bu/Ac)	Septic Tanks and Drain Fields	Dwellings (Basements)	Roads and Streets
Clarno-Houdek (ChA)	0-6	34-38	Severe - Moderately Slow Permeability	Moderate: S/S	Severe: S/S & Frost Heave
Houdek-Prosper (HpA)	0-2	40	Severe - Moderately Slow Permeability	Moderate for all slopes High S/S	Severe: Moderate to High S/S
Houdek-Stickney (HsA)	0-2	29-39	Severe - Moderately Slow Permeability	Moderate for all slopes High S/S	Severe: Moderate to High S/S
Enet-Delmont (EoA)	0-3	20-38	Slight	Slight	Slight

Note: S/S = Shrink Swell, F = Flooding, S = Slope, LS = Low Strength, W = Wetness, N/A=Not applicable

Source: USDA-SCS Soil Survey of Davison County South Dakota

Figure 2.4 Soils in Davison County

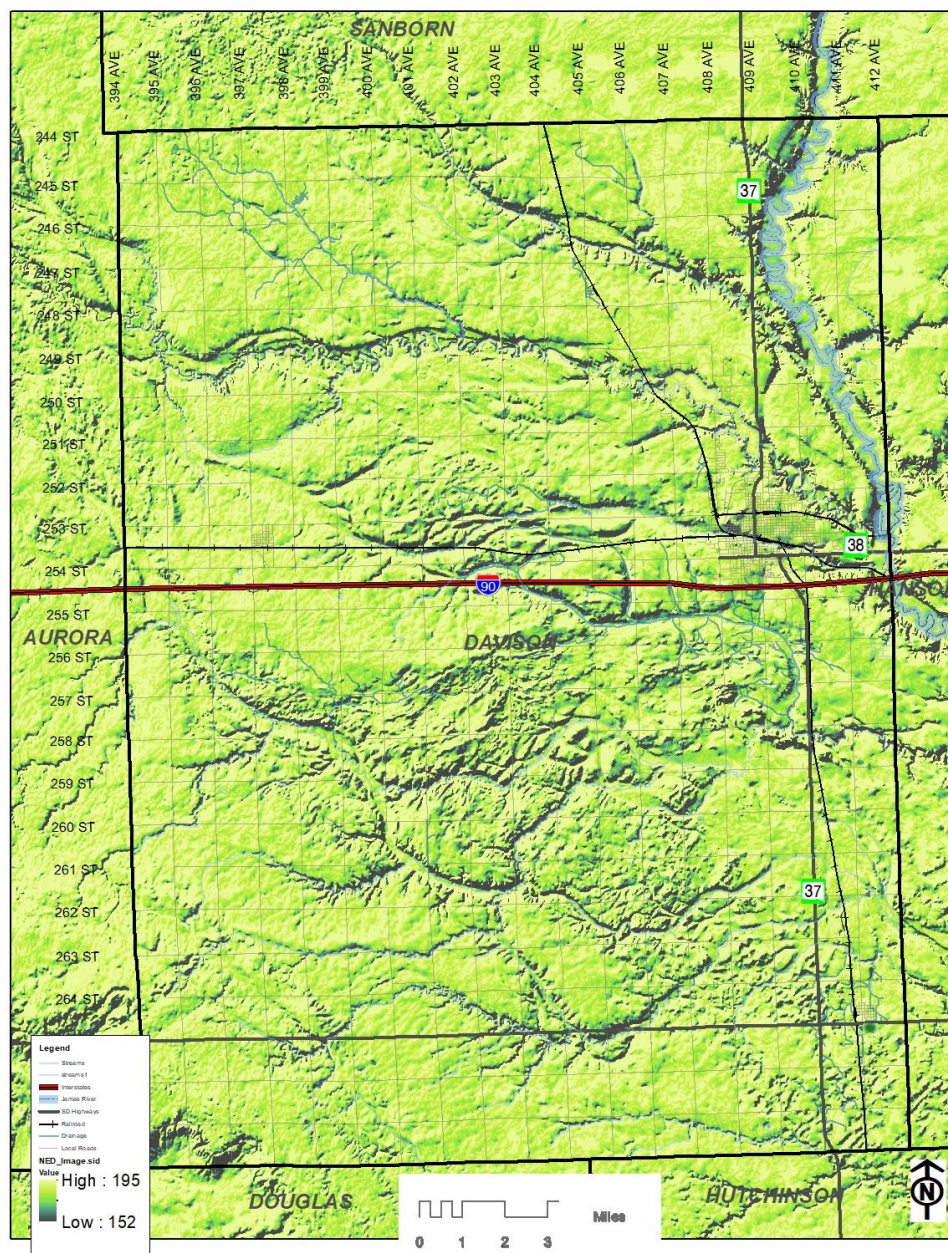


Some soil types should be closely studied prior to building homes and other occupied structures. An area with a high-water table or poorly drained soil will not adequately support a septic tank. A high-water table will allow unfiltered septic tank effluent to contaminate the local ground water. The specific soil type in the development area should be evaluated before development is allowed. Building on inappropriate soils may result in environmental damage and additional public and private expense.

Figure 2.5 shows the terrain of Davison County, where darker shades represent low elevations near streams and creek beds while lighter shades signify higher elevations.

Slope data is based upon the vertical rise in relation to the run or horizontal distance. A 10% slope is equal to a 10 foot rise in elevation in a distance of 100 feet.

Figure 2.5
Graphic Relief Map of Davison County



Slope Categories

Davison County terrain includes slopes from each of the identified ranges.

The slope of an area or location may dictate which type of activities or development can reasonably be expected to “perform” well.

Planning the Built Environment by Larz T. Anderson provides guidelines for developing upon the variety of slopes identified within **Figure 2.6**.

Under ½% Slope:

Almost no land uses are feasible because of the problems associated with surface drainage of rain. Some exceptions would include: rice paddies, flooded orchards, and flood control basins.

½ to 1% Slope:

Conducive to large-scale, linear industrial production uses and for recreation uses such as picnics and informal, small-group field sports. Generally not conducive for commerce, residences, roads, and airports due to drainage problems. Can be dangerous due to standing water, fog, and ice.

1 to 3% Slope:

Generally good and favorable for all types of development due to good drainage, easy slopes and easy truck and auto access. May need a 2% minimum grade in areas where ground frost is probable.

3 to 5% Slope:

Small-scale industry and commerce, trucking access becomes difficult and parking areas must be terraced. Roads, airports, and railroads must run parallel or diagonal to the contours. Suitable for playgrounds, playfields, picnic areas, informal field sports, camping, golf courses, nature trails, hiking areas, and general farming practices.

5 to 10% Slope:

Industry and Commerce: Intensive, small-scale industry and commerce possible with truck access becoming difficult and expensive over 7%.

Residential: Detached, single-family, townhouses, and multifamily residences are

all feasible, but parking lots must be terraced, or parking garages provided.

Roads: Truck and high-speed roads must run parallel with or diagonal to the contours. Road routing is dictated by the terrain in areas over 8%, and can create access problems due to cutting and filling of the roadway.

Airports: Usually economically impractical, unless there is a long ridge top that parallels the prevailing wind direction, and can be leveled without excessive expense.

Railroads: Must run virtually parallel with the contours, but even then creates serious embankment problems and high costs.

Recreation: Suitable for golf course, picnicking, camping, and hiking. Large level fields may be expensive to construct and environmentally damaging.

Agriculture: General farming but care must be taken for erosion control.

10 to 15% Slope:

Industry: Economically impractical.

Commerce: Economically impractical, except for unusual, specialized shopping areas to serve “planned unit developments.” Parking areas must be terraced or in structures.

Residential: Hillside subdivision for single-family homes which take special design if terrain is not graded to form building pads. Townhouse construction is economically impractical. Apartment construction is often feasible, especially when a “cluster design” is utilized.

Roads: Any road design takes special care in this terrain. All types of roads can be constructed, but at greater economic and ecological cost.

Railroads: Same as in category 5 to 10%, more severe problems.

Airports: Economically impractical.

Recreation: Suitable for hiking, camping, and picnicking but sports which require level playing fields are economically impractical. Golf courses are unplayable.

Agriculture: Pastures and forests are most appropriate. Cultivation should be avoided due to erosion problems.

15 to 30% Slope:

Industry: Economically impractical.

Commerce: Economically impractical.

Residential: Single-family home subdivisions are possible with special care in the design of access roads and location of septic tanks. Townhouse construction is usually economically impractical, and apartments are possible on special sites only if access roads, parking areas, water, and sewer is carefully planned (usually expensive).

Roads: Similar to the 10 to 15% slope, except problems with cutting and filling are more extreme. May be so extensive that it would be damaging to the local ecology.

Recreation: Trails and camping only. No uses which require a level playing field or concentration of people are possible.

Agriculture: Pasture, forest, and vineyards that do not involve substantial grading are suitable.

Over 30%:

Urban uses: All urban uses which require the construction of roads and the provision of utilities are both prohibitively expensive and extremely damaging to the terrain. As a general rule, land with a slope over 30% should not be disturbed. If it is determined that development is necessary, the project must be planned with extreme care.

Recreation: Trails are suitable, but too steep for camping.

Agriculture: Uncultivated pastures and forests.

Figure 2.6, Slope Examples

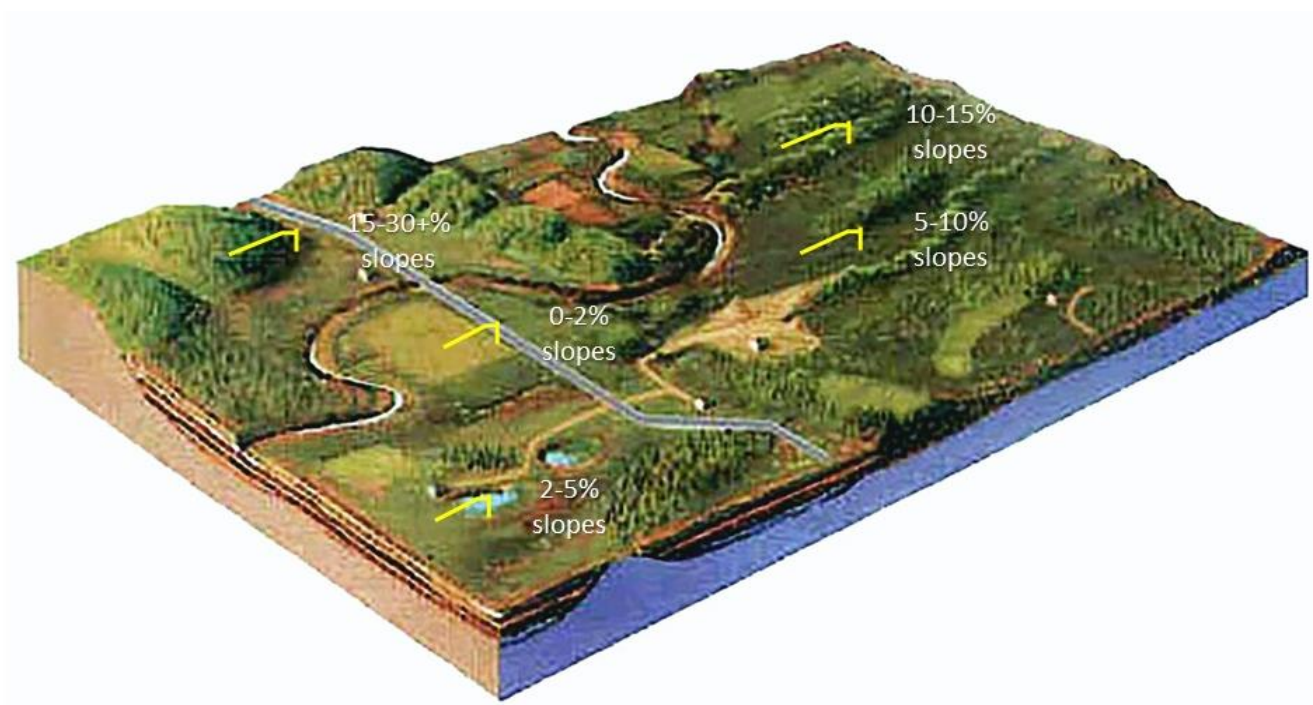
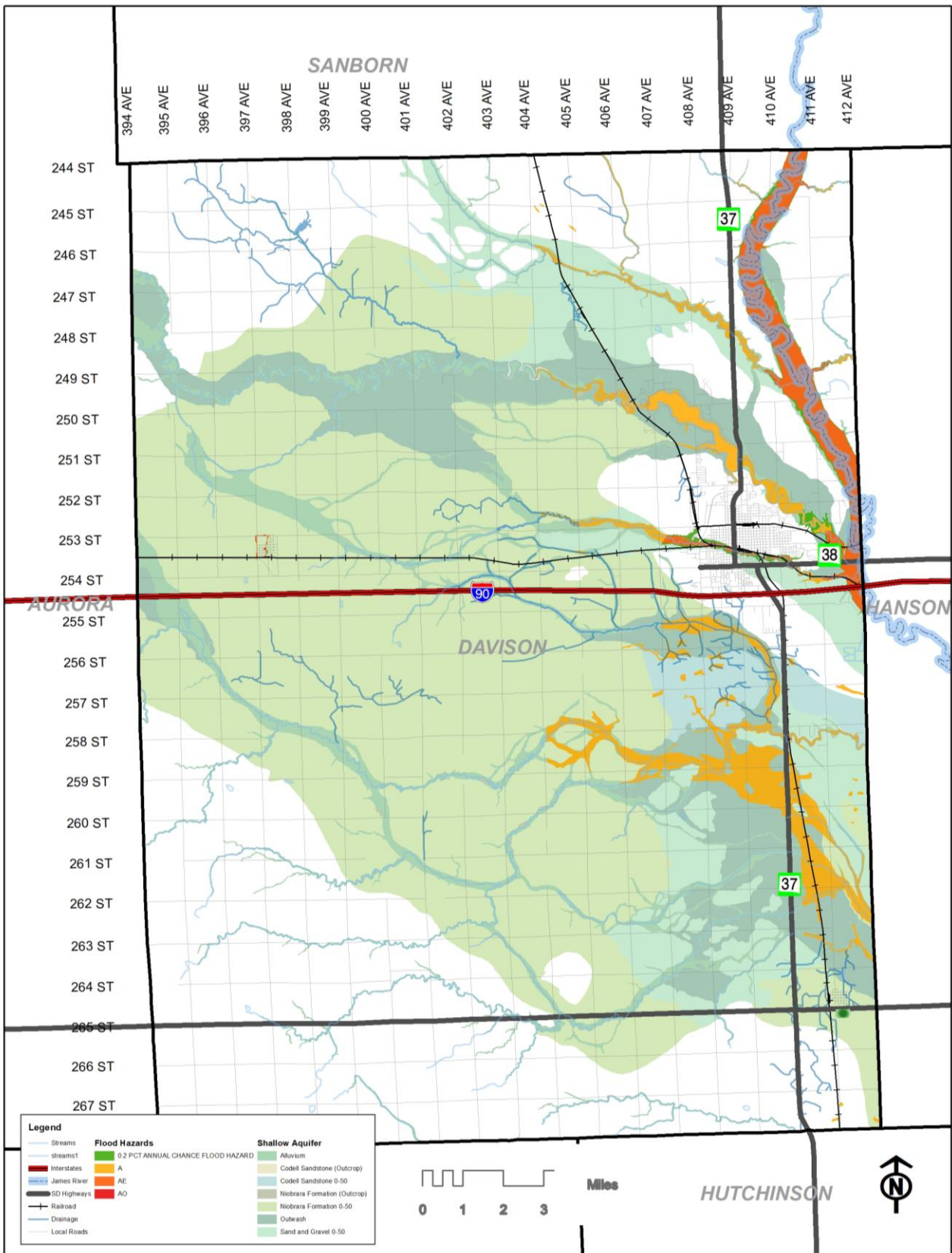


FIGURE 2.8
Flood Zones and Shallow Aquifers

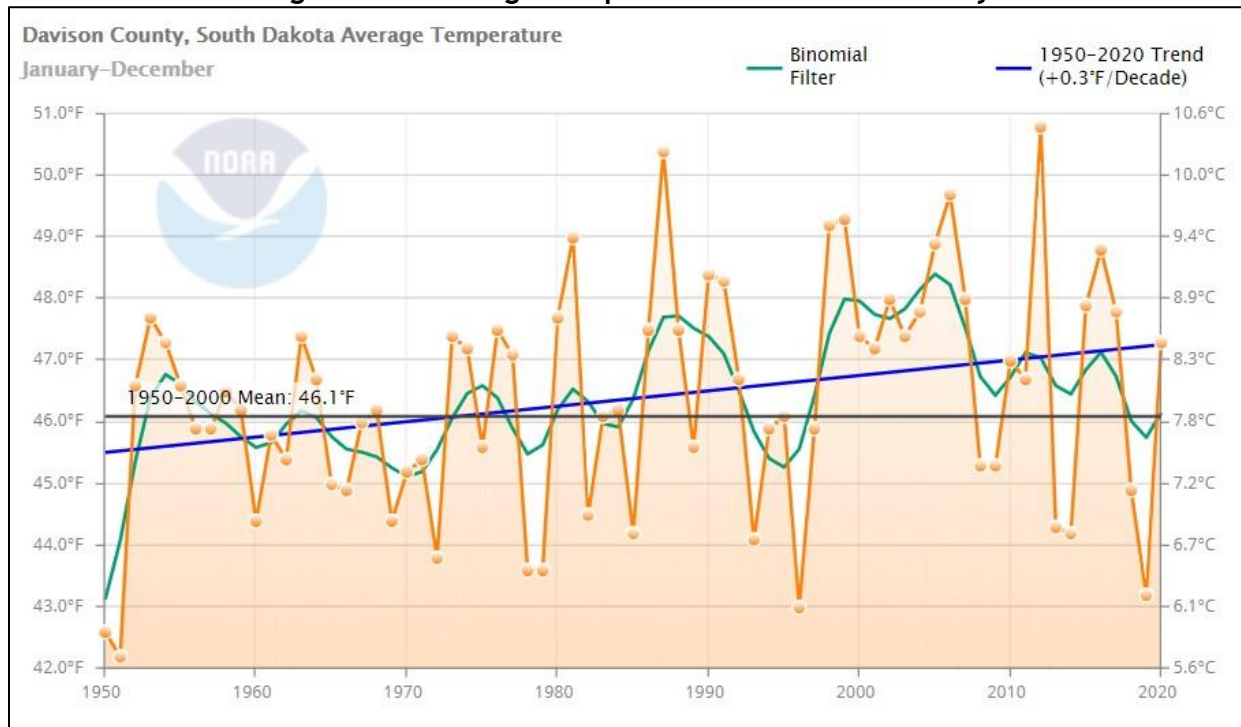


Climate

Climate conditions can affect local development in a variety of ways. The amount of insulation required for houses and buildings is affected by temperature extremes. The amount of rainfall dictates the size of drainage pipes and culverts needed to prevent flooding. Prevailing wind patterns should be taken into consideration when developing industry that may emit smoke and/or odors. **Figures 2.9 and 2.10** present the average temperature and precipitation for Davison County.

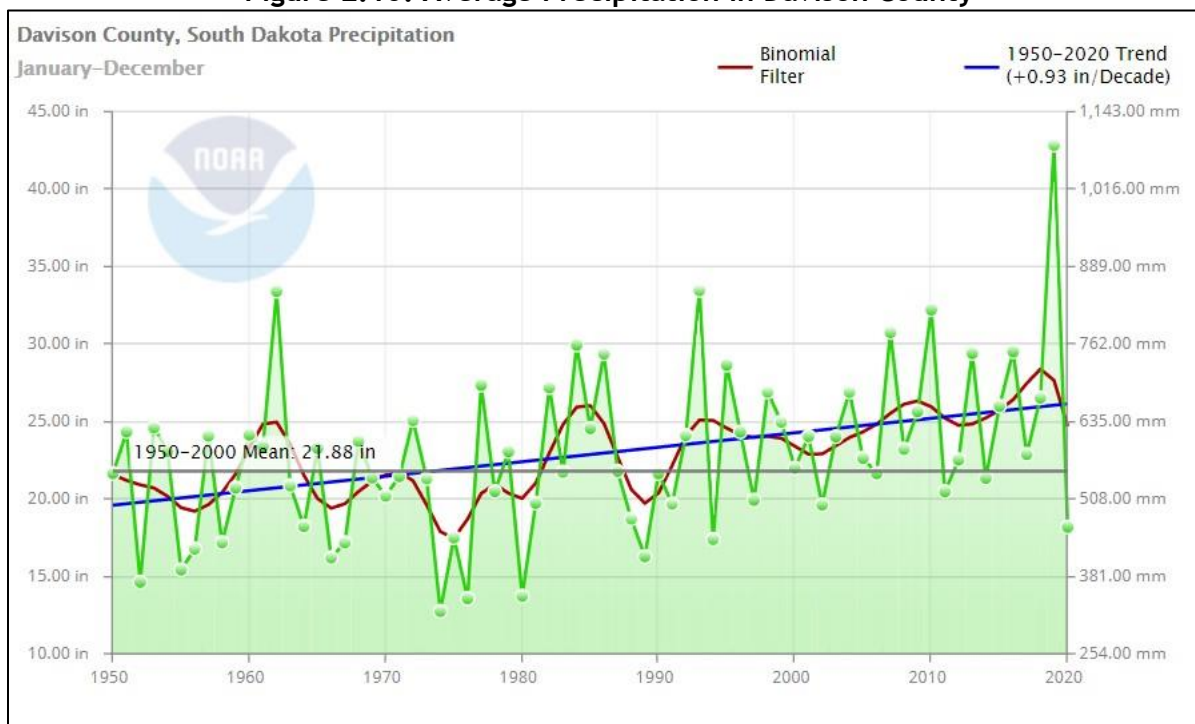
When reviewing climatic data, historical trends need to be reviewed to offer the broadest perspective and identify the cyclical weather patterns faced by an area's population. Davison County experiences a wide range in temperatures from summer to winter and in daily maximum and minimum temperatures during most of the year. Temperatures on some occasions rise to more than 100 degrees in summer and fall to minus 30 degrees or lower in winter.

Figure 2.9: Average Temperatures in Davison County



The level of precipitation and weather patterns a region receives impacts the local economy, infrastructure development, and demographic. The growing season is best explained as a period between April and September and is further defined by the dates of “killing” freezes. This season within Davison County is limited by the last spring freeze which generally occurs before May 6th and the first fall freeze that usually occurs after September 30th.

Figure 2.10: Average Precipitation in Davison County



The importance of reviewing historical trends versus a snap shot or single year becomes evident in presenting annual growing season precipitation in Davison County. In 2019 the County received approximately 43 inches of precipitation. A historical analysis of the same months over a seventy year period (1950-2020) found that the County received an average of 21.88 inches of precipitation as shown in the gray line in the figure above. The blue line in the graph illustrates the trend in precipitation between 1950 and 2020. It shows that the precipitation that the County has received has increased about 1 inch per decade.

Wind direction and intensity can vary within short distances as a result of terrain, vegetation, and buildings. Wind speed and direction can also change greatly during the day and shifts with the seasons of the year. Mean values for wind direction show the prevailing winds to be from the northwest in winter (November through April) and from the south in summer (May through October). **Figures 2.11 and 2.12** illustrate the prevailing wind direction and speeds over a fifty year period between 1972 and 2022 as well as peak wind gusts in the area for 2020.

Figure 2.11: Wind Rose Data for Mitchell, SD (Annual Average, 1972-2022)

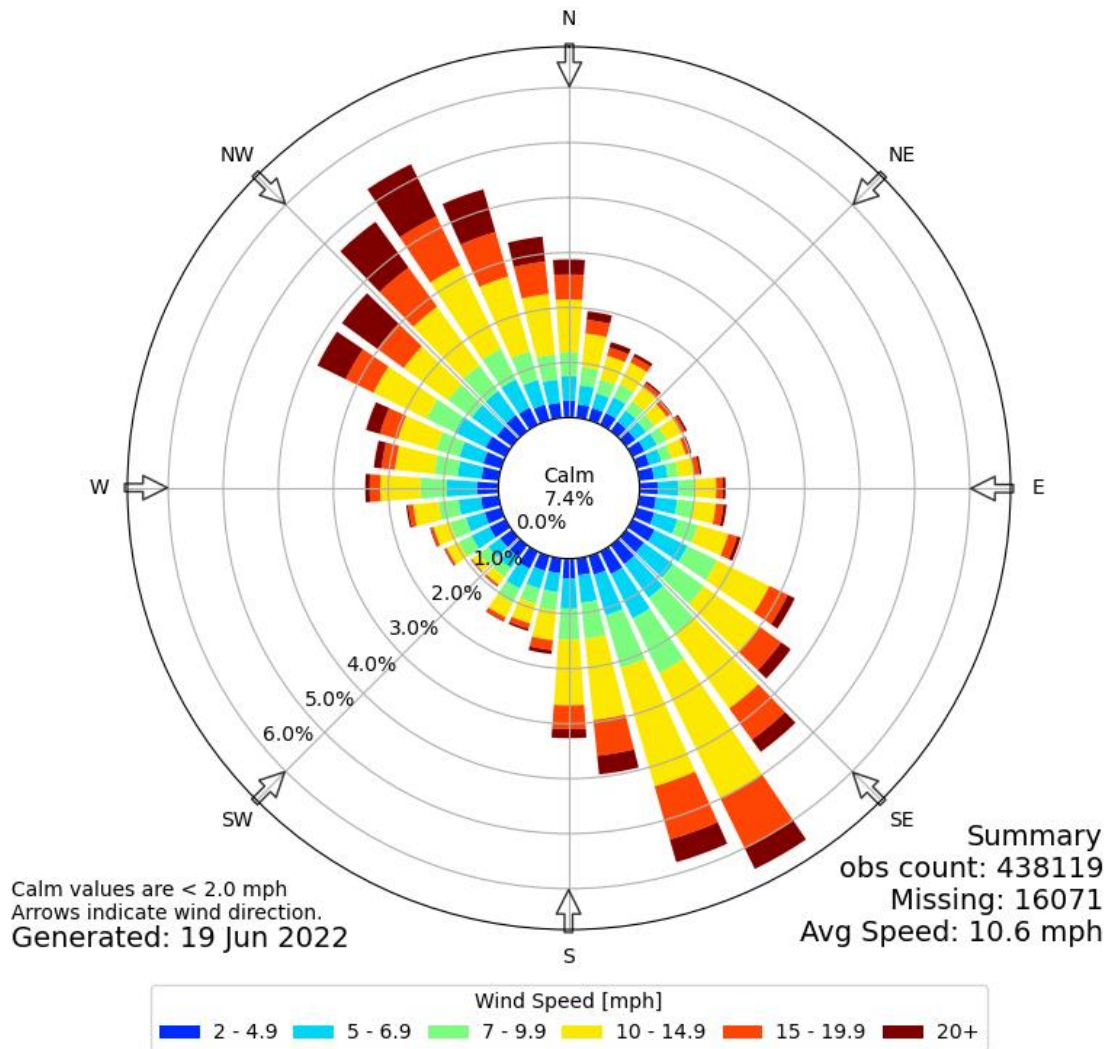
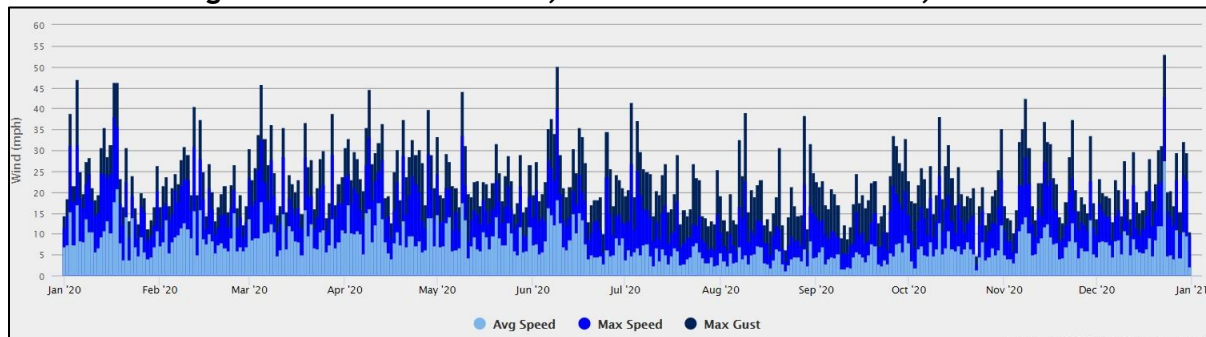


Figure 12: 2020 Wind Data, SDSU Mesonet White Lake, SD Station



<https://climate.sdstate.edu/archive/>

PLANNING CONSIDERATIONS**County Planning Challenges**

The following environmental related challenges are expected to be encountered by Davison County over the next 20 years:

- ✓ Development pressures in areas with environmental limitations such as steep slopes, poor drainage, and flood hazard potential; and
- ✓ A continued emphasis on “water oriented” development (views or access) which could present conflicts with recreational or agricultural land uses.

Policy Recommendations

In addressing the challenges, the Davison County Commission should consider the following recommendations.

- 1) Development should be discouraged from areas having obvious environmental limitations;
- 2) State and federal agencies should be utilized for their expertise in protecting environmental resources whenever a development proposal has the potential for conflict; and
- 3) County environmental assets should be clearly identified and monitored to better inform the public and developers about sensitive areas.