

COMPREHENSIVE PLAN OF ANTELOPE COUNTY, NEBRASKA

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The Comprehensive Plan

The future quality of life within Antelope County is dependent on how well the citizens of the County make decisions that will affect the future. Only through sound planning practice can the future quality of life in the communities and rural areas of Antelope County be ensured with any degree of certainty.

"Planning" can be defined as the process in which information on existing physical, social and economic conditions within the County is gathered, future trends are projected, and alternative courses of action are contemplated. These activities of information gathering, projection, and analysis are all part of the process of preparing a plan that is designed to be used by decision-makers to guide the future development of the County. Such a plan is commonly referred to as a Comprehensive Plan.

A Comprehensive Plan is a long-range plan that focuses primarily upon the factors and functions that affect the physical growth and development of a community or region. The Comprehensive Plan is general in scope and is based upon trends of several key factors including population, employment, economic activity, land use, public facility and service and transportation needs and the preferences of citizens involved in the planning process. The Comprehensive Plan outlines future improvements and development that will change a county from its present condition to a desired future state. It also provides the legal foundation for the formulation of zoning regulations, which are designed to assist in implementing the Plan.

The Antelope County Comprehensive Plan includes three distinctive parts. The first is the background analysis, which present the research, both quantitative and qualitative, that are distinctive to Antelope County. This research includes analysis of demographic, economic, land use, and environmental data. This research creates a basis on which projections can be made on future population economic activity, population levels, demographic trends and corresponding development needs. The specific Plan components include:

- (1) An analysis of the population characteristics and demographic trends and analysis of economic trends within the County over the past several decades.
- (2) An analysis of the existing land uses within the County.
- (3) An analysis of the physical and environmental characteristics of the County which identifies areas of environmental sensitivity and how the environment will influence future development in the County.

The second part is the formulation of the goals and objectives of the County with regard to future needs and desires of its citizens. These represent the foundation on which planning components are developed and eventually implemented.

The third part of this Comprehensive Plan is the planning components, which include:

- (1) A future land use plan for the County.
- (2) A plan identifying the future public facility and services needs within Antelope County.
- (3) A plan, which identifies future transportation, facility and service, needs and formulates priorities for roadway and transportation service improvements.

This Comprehensive Plan is meant to be a "working plan" that acts in correlation with the current and anticipated future needs of Antelope County through the "planning period, a time frame of approximately 10 years. As these needs change there will be the need to amend this Comprehensive Plan to properly address the ever-changing issues within the County. Such amendments are allowed and encouraged. Amendments to the Comprehensive Plan must be considered at a public hearing before submitting recommendations to the governing body. As time passes and the County reaches the end of the "planning period", the Comprehensive Plan, including all of its components should be updated.

COMPREHENSIVE PLAN

ANTELOPE COUNTY

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LOCAL ECONOMY AND POPULATION

Introduction

A complete economic and demographic analysis is important to any development plan. First it provides the County with a profile of trends that have evolved over the years. Second, it offers the baseline from which forecasts for the future may be estimated. Finally, an economic and demographic analysis will unveil a variety of potential problems that may face the County in the future.

➤ Employment Trends

To analyze the employment patterns of Antelope County, one has to look at the changes that happen over time in the individual employment sectors. An area's economic base changes and responds to new economic conditions and that these need to be evaluated.

As indicated in Table 1, there has been a slight decline in the numbers of persons of employment age, labor force and those employed. This decrease in the number of persons in the labor force is a result of a decrease in the total population particularly in the rural areas.

	Table 1		
	1980	1990	2000
Person 16 Years and over	6,468	5,774	5709
In labor force	3,437	3,346	3772
Percent in labor force	53.1%	57.9%	66.1%
Civilian labor force	3,427	3,344	3772
Employed	3,372	3,258	3690
Unemployed	65	86	82
Not in labor force	3,044	2,428	1937

Source: US Census Bureau, Profile of General Demographic Characteristics: 2000, American Fact Finder Webpage

The number of employed persons within Antelope County, as indicated in Table 2 and 3, has undergone a small decrease over the last decade and posted an average decrease of 3.3 percent. Growth in employment has, however, occurred in communications, retail trade, finances, insurance and real estate, health services, public administration and other professional and related services.

The occupations of employed persons within Antelope County as indicated by Table 3 indicates declines in executive, administrative and managerial, farming, forestry and fishing and transportation occupations. There as been increases in professional, sales, administrative support such as clerical work, service and handlers and other such laborers. The remaining occupations have either stayed relatively stable or have shown a small increase since 1980.

These statistics document the need to expand local businesses, housing and recruit new businesses to Antelope County and build quality jobs for the current population and future populations, if the local economy is to avoid further reduction.

Table 2			
Basic Employment In Antelope County			
Industry	1980	1990	2000
Employed person 16 years and over	3,372	3258	3690
Agricultural, forestry, and fisheries & Mining	1203	954	903
Manufacturing, durable goods	105	55	253*
Manufacturing, non-durable goods	125	101	*combined in 2000
Construction	176	170	248
Transportation	118	53	173
Communications and other public utilities	58	66	55
Wholesale trade	163	164	117
Retail trade	532	545	461
Finance, insurance, and real estate	103	120	134
Business and repair services	59	90	
Personal services	108	73	^
Health services	249	285	770^
Educational Services	295	290	^
Other professional and related services	54	139	171
Public Administration	84	134	120
Table 3			
Employed person 16 years and over	3,372	3242	3690
Executive, administrative and managerial	246	189	^^
Professional specialty occupations	269	330	1308^^
Technicians and related occupations	46	43	^^
Sales occupations	296	307	763
Administrative support (including clerical)	311	379	Not addressed in 2000
Private household occupations	17	23	Not addressed in 2000
Protective service	12	20	**
Service, except protective and household	347	432	544**
Fanning, forestry and fishing occupations	1145	877	**
Precision production,			

crafts, and repair	339	290	^*
Machine operators, assemblers & inspectors	84	88	434^*
Transportation and moving occupations	148	139	^*
Handlers, equipment cleaners, laborers	124	141	^*

Sources: US Census, Occupations for Antelope County, Nebraska

Agricultural Trends

Information contained in this statistical analysis provides Antelope County a profile on selected agricultural components important to the future economy of Antelope County.

As indicated by table 4, the number of farms in Antelope County has declined by 270 farms since 1970. This decline constitutes a 22 percent loss of farms in the last 20 years. Since 1990, another 20 farms have been lost in Antelope County; this is according to the 1996-1997 Agricultural Statistics from the Nebraska Department of Agriculture.

As indicated in Table 1, the overall employment decline in Antelope County can be linked directly to the decreasing number of farms in the County. The average size of farms has increased from 435 in 1970 to an average of 549 acres in 1990, an increase of 20 percent or 114 acres. The table also shows an increase in irrigation wells and pivot's, which has enabled area farmers to increase the total acres irrigated by 76 percent or 144,100 acres since 1970.

The table also indicates a significant increase in value of all cattle and all hogs in the County. Since 1970, the value of all cattle has increased 64 percent or by \$31,618,510, though there has been a decrease in the number of cattle in the County. Since 1970, there as been a 15 percent decrease of cattle in the County, from 96,000 head of cattle to 82,000 head in 1990. Although it should be noted that in 1997, the number of all cattle in Antelope County has recovered back to 93,000 head.

Since 1970, the value of all hogs has increased by 74 percent or by \$5,942,050. There was a strong increase in hogs from 1970 to 1980, an increase of 12,600 hogs, or by 13 percent. It remained somewhat constant through the next ten years, slightly decreasing by 2600 hogs. It should be noted that the number of hogs in 1996 for Antelope County has decreased to 88,000 hogs since 1990, a decrease of 7 percent and 7000 hogs.

It is anticipated that the number of farms and ranches will continue to decline through the planning period, but that the value of agricultural products produced will increase slightly. As the number of farms and ranches decline, the number of farm and ranch families will also decline, thus reducing the scale of the County economy. Creation of jobs and entrepreneur opportunities in the non-agricultural sectors of the local economy will be needed to offset those losses if the local economy is to grow.

Table 4

Agricultural Trends				
Antelope County				
Title	1970	1980	1990	2002
Number of Farms	1230	1090	960	792
Land in Farms (acres)	533,439	503,241	489,384	526,896
Total Cropland (acres)	354,371	373,241	367,527	377,533
Average size of farm in acres	435.4	483	549	665
All cattle on Farms	96,000	91,500	82,000	97,532
Value of all cattle (in dollars)	17,417,490	37,698,000	49,036,000~	90,304,000
All hogs on Farms	85,000	97,600	95,000	95,368
Value of all hogs (in dollars)	2,037,950	7,420,700	7,980,000~	17,030,000
Acres of Corn (for all purposes)	165,000	217,000	204,000	158,803
Total acres irrigated	44,900	170,000	189,000	225,403
Irrigation well registered	404*	1266	1475	2183**
Pivot's registered	466^	987	1422^	

Source: Nebraska Agricultural Statistics, Nebraska Department of Agriculture

*Number of well registered to January 1, 1973

^Pivot statistics were recorded through 1975 and ended in 1988

~Value of hogs and all cattle are estimates from value per head in 1990.

**thru 2-26-06

Per-Capita Income

Income Trends

Income measurements are valid indicators of the aggregate economic activity in Antelope County. Historical income data is useful in evaluating the strength of the local economy in terms of growth on a per family and per capita basis.

➤ ***Per-Capita Income***

An economic trend that is important in evaluation of the strength of the local economy is the current economic situation in per-capita income trends. In 1980, the County's per-capita income was \$6,901 (See Table 4a) slightly below the Nebraska average of \$6,936. This difference was more pronounced in 1990 and has continued to increase since 1990 with the County showing a per-capita income of \$9,048 compared to that of the State of Nebraska, which averaged \$12,452.

Table 4a

Year	1980	1990	1994	1997	2003
Antelope County	5560	16,280	18,620	21,713	27,068
State of Nebraska	9160	17,983	20,751	24,061	30,179

Source: Nebraska Agricultural Statistics, Nebraska Department of Agriculture

This increasing disparity between per-capita income in the County and that of the State as a whole indicates that growth of the local economy is considerably less than the State as a whole. This is not atypical for more rural economies, but it is an indication of the need to expand the non-agricultural segments of the local economy.

Since 1990, there has been a percent increase in per capita income from \$9,048 to \$11,461 in 1994, though compared to the State per-capita income in 1994, Antelope County per-capita income is 48 percent lower than the State's per-capita income. This lower figure could indicate lower wages or less total wealth share evenly shared within county residents.

➤ ***Median Income***

As indicated in Table 5, there has been an increase in median family income since 1980. This increase of almost 40 percent reflects both inflationary trends during this time period, as well as real income growth. From 1980, family income has increased \$6,333. Compared to the State median family income in 1990, Antelope County is about 16 percent lower than the State's median family income. This statistic is an indication of the economy in Antelope County is weaker than that of the State and this is a reflection of a declining population.

Table 5
Median Family Income Trends

	1980	1990	2000
Antelope County	\$15,506	\$21,839	\$30,114
State of Nebraska	\$19,122	\$26,016	\$39,250

Source: US Census Bureau

Net Taxable Sales and Sales Tax

As indicated by Table 6, an analysis of net taxable sales and sales tax will show that Antelope County had a slight increase of 1.8 % in net taxable sales from \$29,633,736 in 1980 to \$30,184,337 in 1990. Compared to the State of Nebraska, Antelope County is not keeping pace with the State's increase in economy. From 1980 to 1990, the State increased 25 percent, compared to 1.8 percent increase in Antelope County. This is an indication of the population decline in the County having an effect on net taxable sales.

Antelope County also had an increase of 33 percent in sales tax from \$889,012 in 1980 to \$1,345,914 in 1990. This increase is a result of the increase in spendable income, as well as limited inflation. Compared to the State sales tax, the State increased its sales tax nearly 50 percent, compared to that of 33 percent in Antelope County. Once again this is an indication of the decreasing population within Antelope County and showing that the local economy is not keeping pace with the State as a whole in both net taxable sales and sales tax.

Table 6
Net Taxable Sales and Sales Tax Trends
(Excluding motor vehicle sales)

	1980	1990	2000
Net taxable sales- Antelope County	\$29,633,736	\$30,184,337	\$26,667,952
State of Nebraska	\$8,193,714,762	\$10,981,034,078	\$17,838,106,268
Sales tax- Antelope County	\$889,012.08	\$1,345,914.55	\$1,339,118.51
State of Nebraska	\$245,811,162	\$495,120,950	\$895,439,036.84

Source: Nebraska Department of Revenue

Population Trends

Historic trends of population growth or decline take an added significance when those trends are linked with economic factors that have affected such trends. The following evaluation of the historic employment trends in Antelope County and past population changes provide a basis for making realistic forecasts of future populations.

As indicated in Table 7 and the following graph, the population of Antelope County has decreased by nearly 13 percent or some 1,173 persons since 1980. From 1990 to 1995, there has been a further 5.4 decrease. In short, there has been a slight decrease in population each year of an average of 106 persons a year since 1990.

Table 7
Population Trends
1980-2000

	1980	1990	2000
Antelope County	8675	7932	7452

Source: Nebraska Department of Economic Development

Population Characteristics

An important way to evaluate the population of Antelope County is to analyze the distribution of the population.

As indicated in Table 8, the 1990 population distribution indicates that the number of young school age children (ages 5-14) has increased over the last decade. There has, however, been a decrease of persons in the 15-19 age group. The increase, in the younger school age group was not enough, however, to offset a 32 percent decline in the high school age population. More importantly, the number of pre-school age children declined by over 10 percent since 1980. This decline is a result of a substantial decline in persons in the younger child bearing age group (age 20-35).

The "Brain Drain," or the loss of persons in the 20-24 age group, is also apparent in Antelope County. The number of persons in this age group declined 53 percent since 1980. This is an indication that a lack of job opportunities in Antelope County for high school and college graduate youth and the migration of these persons out of the County.

The number of women of childbearing age, defined as women between the ages of 15 and 35, has decreased 25 percent since 1980. In 1980, 1,222 women were of child bearing age compared to that of 922 in 1990, a decrease of 300 women. The potential for a larger child population is thus decreasing and this yet is another sign for future population declines in the younger populations and growth of Antelope County.

The number of persons in the working age group (ages 15-64), has also decreased from 5,039 persons in 1980 to 4,337 in 1990. This 14 percent decline is primarily a result of the aging of the local population and the out-migration of younger working age persons.

It should be noted, however, that the population between the ages of the prime working age group increased 13 percent over the same time period, from 551 persons in 1980 to 631 persons in 1990. This increase is a result of the natural aging of the population and the ability of the local agricultural economy to provide farming and ranching opportunities for persons in the age group who are taking over the farms and ranches from their parents.

The number of elderly persons, ages over 65, residing in Antelope County has remained constant since 1980. In 1980, 1,598 elderly persons were in the total population compared to that of 1,556 in 1990, a decrease of 42 persons, or 2 percent. The number indicates that persons in Antelope County who are approaching retirement age are either expiring at a younger retirement age or choosing to retire outside the County.

Table 8
Age/Sex Distribution 1980-2000
Antelope County

1980			1990			2000			% of change		
Male	Female	Total	Male	Female	Total	Male	Female	Total	80-90	90-00	age
382	349	731	349	303	652	209	238	447	-10.81%	-31.44%	0 to 4
366	325	691	375	318	693	258	226	484	0.29%	-30.16%	5 to 9
295	327	622	346	350	696	352	323	675	11.90%	-3.02%	10 to 14
380	384	764	276	242	518	334	293	627	-32.20%	21.04%	15 to 19
272	283	555	126	133	259	139	138	277	-53.33%	6.95%	20 to 24
314	291	605	233	224	457	150	148	298	-24.46%	-34.79%	25 to 29
287	264	551	308	323	631	153	159	312	14.52%	-50.55%	30 to 34
400	391	791	546	475	1021	558	565	1123	29.08%	9.99%	35 to 44
418	433	851	328	356	684	531	477	1008	-19.62%	47.37%	45 to 54
249	231	480	187	197	384	171	188	359	-20.00%	-6.51%	55 to 59
195	247	442	194	187	381	182	177	359	-13.80%	-5.77%	60 to 64
376	468	844	351	425	776	320	361	681	-8.06%	-12.24%	65 to 74
234	347	581	216	357	573	231	326	557	-1.38%	-2.79%	75 to 84
<u>60</u>	<u>107</u>	<u>167</u>	<u>67</u>	<u>140</u>	<u>207</u>	<u>78</u>	<u>167</u>	<u>245</u>	<u>23.95%</u>	<u>18.36%</u>	<u>84 & up</u>
4228	4447	8675	3902	4030	7932	3666	3786	7452	-8.56%	-6.05%	totals

Source: US Census Bureau

School Enrollment Trends

In order to plan effectively for the economic and physical development of any County, it is necessary to look at the school enrollment populations of the County.

As indicated in Table 9, the total enrollment in Antelope County Public Schools has declined 30 percent or a drop of 398 students since 1980 to 1990. Since 1990, the total enrollment in Antelope County Public Schools has declined a further 17 percent, or a drop of 241 students. The largest decline during this period has been in the 9-12 grades, a decline of 211 students or nearly 34 percent since 1980.

Enrollment in grades K-8 has remained constant, though as noted earlier, a decrease of women of child bearing age and persons between the ages of 20-29 may result in a decline of this number of school age children in the future.

Table 9
School Enrollment
Antelope County 1979-2006

<u>Year</u>	<u>PK-6</u>	<u>7-8</u>	<u>9-12</u>	<u>Total</u>
2005-2006	660	186	518	1364
1997-1998	606	169	412	1214
1989-1990	790	213	452	1455
1985-1986	782	224	430	1436
1979-1980	789	200	623	1612

Source: State of Nebraska Department of Education Statistics, 1970-2006

Population Projections

Utilizing past regional population trends with population forecasts for the County supplied by the Nebraska Bureau of Business Research, a series of population forecasts for Antelope County is presented in Table 1(J). Also included are a low, mid-range and high forecast for Antelope County in Table 10, based on the following assumptions:

Low Forecast.Little, if any, new job opportunities in the. Region with no affordable homes being built, the loss of substandard homes currently occupied and no rehabilitation of homes in need of major repair.

Mid-Range ForecastUsing 1970, 1980, 1990 and historical trends.

High Forecast...If Antelope County get aggressive through sponsorship of new homes, rehabilitation of existing homes and the addition of new industry to provide additional employment for the County, a substantial increase in population can occur.

As indicated by the low range projection, if little effort is made to diversity the County economy, the population of Antelope County may decline to 7,057 persons by the year 2000 and 6,300 by the year 2,010.

As indicated by the mid-range projection, a continuation of historic trends, the population of Antelope County can be expected to continue to decline, reaching 7,425 by 2000 and 6,450 by the year 2010. This projection reflects the continued decline in agricultural employment and out migration of younger adults.

Given an active and successful County economic development program and diversification, Antelope County could well reach the levels indicated by the high projections.

Table 10
Population Forecasts
Antelope County Nebraska

Antelope County		1990	1995	2000	2010
Projected population levels	low	-	-	7000	6300
	Mid	7932	7502	7425	6450
	High	-	-	7500	7700

Source: Bureau of Business Research, UNL, 1998 & Stahr and Associates

As indicated by the highlighted section in Table 11, there has been and will continue to be a decrease in young school age children, working age population and those in their child bearing years in Antelope County if little effort is made to diversify the economy. A diverse employment base will provide the County the support for a stronger economy and would provide a basis for future development in the County.

The key to improving the local economy and expanding the population is to create job opportunities which will retain or attract persons in the younger working age group (30-44) and those in their child bearing years (ages 15-35). Improving the local economy and supplying a constant labor force will provide a stronger tax base to support necessary services and facilities to promote growth and development in the County.

Table 11
Age Population & Projections
Antelope County

Age	1980	1990	1995	2000	2010	1990/1980	2000/1990	2010/2000
0-4	729	653	510	397	370	-10.4%	-39.2%	-6.9%
5-9	689	722	648	513	384	+4.8%	-28.9%	-25.3%
10-14	620	673	720	656	416	-8.6%	-2.5%	-36.6%
15-19	1%9	523	566	600	439	-33.3%	+14.8%	-26.9%
20-24	553	268	268	298	301	-51.6%	+11.3%	-1.0%
25-29	603	493	216	219	269	-18.3%	-55.5%	22.7%
30-34	549	580	398	178	207	-50.6%	-69.3%	-16.5

35-39	405	550	561	395	184	-35.7%	-28.1%	-53.5%
40-44	384	455	537	562	180	+18.5%	+23.6%	-68.0%
45-49	396	369	457	546	410	-6.7%	-47.9%	-25.0%
50-54	453	345	368	462	595	-23.9%	-34.0%	-29.0%
55-59	478	367	339	367	570	-23.1%	-0.1%	-55.2%
60-64	440	389	355	332	469	-11.5%	-14.7%	-41.1%
65-69	439	406	372	344	365	-7.4%	-15.3%	-6.0%
70-74	403	366	372	345	316	-9.1%	-5.8%	-8.4%
75-79	343	310	315	324	296	-9.7%	-4.7%	-8.6%
80-84	236	249	244	250	252	+ 5.5%	-0.2%	-1.1%
<u>85-89</u>	<u>166</u>	<u>213</u>	<u>251</u>	<u>267</u>	<u>310</u>	<u>28.4%</u>	<u>25.4%</u>	<u>-16.0%</u>
Total	8,675	7332	7302	7,057	6,333	-8.6%	-11.0%	-10.3%

Source: Bureau of Business Research, University of Nebraska-Lincoln, 1998

It should be recognized in developing these evaluations and projections that a precise prediction of the future economy and population is not possible. Probable high and low extremes can, however, be established for the planning period along with forecast, which represents the most likely possibility. Catastrophes, both natural and human, cannot be foreseen nor can extreme growth pressures brought about by major industrial or technological development. However, long-range trends are observable from past growth and development activity and investigation of such trends is essential to guide Antelope County's future.

COUNTY PLANNING GOALS

The comprehensive planning goals for Antelope County are based upon establishing several long-range objectives for future development of the County. These goals shall provide the basis for the formulation of the remaining components of this Comprehensive Plan which include the Future Land Use Plan, the Public Facilities and Services Plan and the Transportation Plan.

➤ ***General Goal:***

Promote harmonious development of the entire county including the urban areas of the County, not included in this Comprehensive Plan

Objectives:

- Preserve and enhance the urban communities in the County in order to maintain a mutual support for the rural and urban population of the County.
- Retain, enhance and protect the County's agricultural economic base.
- Promote expansion of agricultural related business and industry, as well as businesses and support services related to serving the rural and urban population of the County.
- Promote the cooperation of local units of government in the implementation of this Plan and in accomplishing these goals and objectives.

➤ **Land Use Goal:**

Maintain a pattern of land uses in the rural areas of the County which are harmonious thereby protecting the agricultural base of the County.

Objectives:

- Strive to keep incompatible land uses in the rural areas of the County separated as much as possible to protect property values and the quality of life in the rural areas of the County.
- Respect the desire to maintain a quality living environment in the urban areas of the County by avoiding development of land uses around the urban areas which would be incompatible.
- Support the development of confined livestock feeding operations in the County in areas of the County where such uses will not present environmental hazards and will not result in land use incompatibilities with existing uses.
- Preserve the areas in the County with historical significance and avoid land use conflicts with such uses.
- Preserve "prime" cropland for use as cropland to assure the ability to maintain a strong agricultural base for the local economy.
- Preserve and protect water quality, wetland and other environmentally sensitive areas within the County.
- Encourage development of additional industries and businesses along the major roadways in or near the urban areas of the County to expand the local economies of these urban areas and to minimize the public cost of providing public services to non-agriculturally developed areas.
- Provide for the improvement of housing conditions throughout the County and for flexibility in the type and density of future housing development.

➤ **Public Facility and Services Goal:**

Provide public and semi-public facilities which will be supportive of both the rural and urban areas of the County at reasonable costs.

Objectives:

- Develop and maintain an adequate level of community protection, education, health services and recreational facilities and services within the County.
- Continue and improve the provision of services for the elderly and disabled throughout the County to allow these persons to remain in the County through their lifetimes.
- Promote improved efficiencies in the provision, operation, maintenance and use of all facilities and services provided to minimize costs while maintaining maximum usage.

➤ **Transportation Facility and Services Goal:**

Provide and maintain a transportation system which provides adequate access to all areas of the County and adequate linkages to the urban areas of the County, as well as the region and the State.

Objectives:

- Maintain and improve County roads through evaluation and implementation of programs and policies which will improve the effectiveness and efficiency of the County road and bridge maintenance efforts in maintaining quality roadways in the County.
- Maintain a basic level of other transportation services including transportation services for the elderly and those with disabilities.

➤ *Economic Development Goal:*

Improve and expand the local County economy through expansion and diversification of the agricultural, business, industrial and tourism sectors of the economy.

Objectives:

- Encourage, through land use and zoning policies, the expansion of the agricultural sector of the economy by preserving "prime" cropland for crop production and the development of livestock production and feeding facilities in areas of the County where such uses will not present environmental hazards and will not negatively impact property values or the quality of life in the rural areas of the County.
- Develop and implement a joint City, Village and County effort to facilitate the expansion of the local market area through use of regional, national and international promotion of the area and its products on the Internet.
- Promote the points of interest, archeological sites, historic sites and recreational opportunities within the County on a regional and national basis to attract tourists and prospective residents to the County.

EXISTING LAND USE ANALYSIS

An evaluation of the land uses which presently exist in the rural unincorporated areas of Antelope County is critical to the formulation of a Comprehensive Plan for the County. It is the type and location of the land uses which presently exist which provides the starting point for the Plan and the basis for formulation of workable zoning regulations to protect the existing uses and encourage additional economic expansion in the County through development of additional land uses which are compatible.

➤ *Agricultural Land Usage*

The physical character of the County varies considerably from one part of the County to another. A major natural feature in the County is the Elkhorn River which extends from west to east through the center of the County and divides the County into two distinct parts. The northern portion is comprised of dissected plains which are generally level and rolling hills. The predominant land use in this area is cropland. An area of escarpments and bluffs in this northern area is used primarily for cropland in the more level areas and for pasture in the areas with more slope.

The Elkhorn River corridor is the primary woodland area in the County with variety of trees situated along its banks. The flood plain area along the River is used primarily for crop production.

The part of the County which is south of the Elkhorn River is comprised mainly of a relatively level dissected plain interspersed with rolling hills and valleys. This area is the predominant crop land area of Antelope County.

The general existing land uses and land use patterns are indicated in Illustration 1. Of the 545,920 acres of land in the County, approximately 367,527 acres, or nearly 67%, is used for crop production with the remaining acreage used for pasture and hay production. The quantity of land in the County which is utilized for crop production has increased since the introduction of pivot irrigation systems over the last 20 years. As of 1995 there were over 1,585 registered wells in the County irrigating over 197,000 acres. The increase in crop production in the County has resulted in economic gains for the area, but has also increased the potential for groundwater contamination, either through direct contamination at the well site or through increased use of pesticides and herbicides.

Agricultural land uses in the County also include a number of confined livestock feeding uses. These uses, which have a wide range of size, are situated primarily in the southern portion of the County where a large quantity of grain for livestock feeding is produced. An important factor related to the existing confined livestock feeding uses is that the majority of these uses are located in areas where there is a moderate to relatively high density of rural residential uses. The intermixing of the confined livestock feeding uses with residential uses has and is resulting in notable land use conflicts in the form of odor, dust, and flies.

The land use pattern in the rural portions of the County has and should continue to be influenced by the location of soil types which are the most productive with regard to crop production. These soils which are classified as "prime" farm land consist of those soils which have a Class I or II capability rating according to the Antelope County Soil Survey, comprise nearly 128,000 acres, or nearly one-fourth, of all the land area of the County. If these prime productive crop lands are to be preserved in order to maintain and maximize overall crop production in the County, the issue of how to avoid the use of the prime soils areas for other uses will need to be effectively addressed both in the Future Land Use Plan and zoning regulations for the County.

➤ **Non-Agricultural Land Usage**

The remainder of the land in the County is utilized for farm and non-farm residential uses which occur throughout the rural areas of the County at varying densities, for the residential, commercial and industrial uses within the villages of Tilden, Orchard, Clearwater and Oakdale and the cities of Neligh and Elgin and for various public uses, including water areas, recreational uses, churches, schools, cemeteries, and highway, county road and railroad rights-of-way.

The public use areas, consisting of the hunting and fishing areas around Grove Lake, the Ashfall Fossil Beds State Park, near the Village of Orchard, the Red Wing and Hackberry Wildlife Management Areas, located along the Elkhorn River west of the City of Neligh, Flobert Springs,

the Elkhorn River and a small lake northeast of the City of Elgin in the south-central portion of the County.

Rights-of-way for highways, county roads and railroads, comprise the second largest land use in the County. The majority of this land use is in the form of county road rights-of-way. Combined, these rights-of-way and the other non-agricultural land uses comprise approximately 6% of the total land area in the County.

The farm and non-farm residential uses in the rural areas of the County relate directly to the productivity of the land. The areas where soils which are capable of producing crops, particularly those areas where crops are irrigated are the most densely settled, while the areas where the sandy soils which are used for pasture and hay production occur have only limited residential densities. In the higher productivity areas of the County, residential densities range from 2 to 4 dwellings per section with an average of just over 2 dwellings per section. This compares to an average of less than 1/4 dwelling per section in the sandy areas of the County.

The existing land use pattern in rural Antelope County will have several implications with regard to development of future confined livestock feeding uses. First, as noted in the Physical and Environmental Analysis component of this Comprehensive Plan, the areas which are the most environmentally suitable for the development of these types of uses are also the areas where residential densities are the highest. Second, agricultural production, including livestock feeding, is a critical component of the County's economy and its growth should be encouraged. The question of how to allow and encourage such land uses while at the same time avoiding development of additional land use conflicts or environmental degradation will be a critical challenge which must be effectively addressed in the Future Land Use Plan component of this Comprehensive Plan and the associated zoning regulations.

The relatively low density of the land uses in the rural areas of Antelope County is not likely to change appreciably through the planning period. One objective of the Comprehensive Plan and the associated zoning regulations should thus be to provide basic land use conflict and liability protection for those uses, both residential and agricultural which now exist by avoiding development of new land uses which would result in additional conflicts.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

In order to prepare a plan for the future physical development of Antelope County, it is necessary to identify the natural environs and man-made features that have and will continue to influence the directions of physical growth within the county.

The purpose of the analysis is thus to identify what characteristics of the county will encourage or discourage development. The analysis will also evaluate growth patterns of the county itself to ascertain what man-made features will influence future physical growth.

This analysis is structured into two major parts; natural environmental conditions and man-made features. Under the heading of natural environment conditions will include soils, topography and drainage, flood-plains and water supply. Under the heading of man-made features the characteristics of the present man-made developments including past growth direction trends, the transportation systems, land use and public facility location patterns will be evaluated.

NATURAL ENVIRONMENTAL CONDITIONS

Soils

Antelope County is in north central Nebraska and extends 36 miles from north to south and 24 miles from east to west. It covers an area of 853 square miles, or 545,920 acres. The upland landscape in Antelope County is one of rolling loess hills, rising sand hills, a rolling transition zone between the loess hills and the sand hills, and deeply divided uplands in the northwestern part of the county. The Elkhorn River Valley, which is about 2 miles wide, crosses the county from east to west.

Soils of Antelope County vary widely in their characteristics as indicated by Illustration 2 . Nora, Croften and Moody soils are the main soils in the loess uplands. Valentine and Thurman soils are the main soils in the sand hills. Thurman and Boelus soils are the principle soils in the transitional uplands. The loamy Brunswick soil is in the divided uplands. Ord and Elsmere soils are on the bottomland in the Elkhorn River Valley. Cozad and Hord soils are on stream terraces and foot slopes in the Elkhorn River Valley as well.

The Nora, Croften and Moody soils in the loess uplands are all deep, well drained soils, meaning water is removed from the soil readily, but not rapidly and have formed into a loess, meaning silt-size particles deposited by wind. These soils range from gently sloping to very steep in the uplands. They are weakly developed. All three soils have moderate permeability, meaning the quality of the soil to transmit water or air through the soil is at 0.6 to 2.0 inches per hour. They also have a high available water capacity.

Croften soils are suited to cultivated crops and to windbreaks. These soils are suited to both dryland and irrigated crops where slope is less than 15 percent. All Croften soils are suited to grass, wildlife habitat and recreation. Moody soils are suited to both dryland and irrigated cultivated crops. They are also suited to grass, trees, shrubs, wildlife habitat and recreation. Nora soils are suited to the commonly grown cultivated crops. Steep soils are better suited to less intensive uses. All Nora soils are suited for grass, trees and shrubs, wildlife habitat and recreation as well.

Valentine and Thurman soils are the main soils in the sand hills of Antelope County. Thurman soils consist of deep, well-drained soils that have formed in sandy alluviums, meaning material consisting of sands, silt or clay deposited on land by streams. Valentine soils are excessively drained soils, meaning water is removed from the soil very rapidly. Both soils are nearly level to steep soils on uplands and stream terraces. Both soils have a rapid permeability at 6 to 20 inches per hour through the soil.

Most areas of Thurman soils are suited to both dryland and irrigated cultivated crops. The strongly sloping to steep soils is not suited to cultivation. These areas would be better suited for native grasses and trees. All the Thurman soils provide wildlife habitat and recreation areas. Valentine soils are suited to both dryland and irrigated crops. The gently sloping soils are suited to cultivated crops only under irrigation. All Valentine soils are suited to grass, trees and shrubs, wildlife habitat and recreation.

The Boelus soils are the principle soil in the transitional uplands and the Brunswick soil is in the divided uplands of Antelope County. Both are well-drained soils. The Boelus soils are nearly level to gently sloping on the uplands and stream terraces. The Brunswick soils are moderately steep to steep soils on the uplands. Boelus soils have a rapid permeability in the surface layer and moderate in the subsoil layer. Brunswick soils have a moderate rapid permeability at 2.0 to 6.0 inches per hour.

Boelus soils are suited to both dryland and irrigated cultivated crops. They are also suited to grass, trees, wildlife habitat and recreation. Brunswick soils are suited to grass and trees. They are too steep and dry for cultivated crops. They do provide for wildlife habitat and recreation areas.

The Elsmere and Ord soils are on the bottomland in the Elkhorn River Valley. Both Elsmere and Ord soils are poorly drained soils; meaning water is removed slowly that the soil is saturated for long periods of time. These are nearly level soils on stream terraces and high bottomland. In most years, the seasonal water table is at a depth of about 2-5 feet in spring and at a low of about 6 feet in summer.

Elsmere soils have a rapid permeability and low available water capacity. Ord soils have a moderate permeability and a moderate available water capacity. Elsmere and Ord soils are suited to both dryland and irrigated cultivated crops. They are also suited for grass, trees, wildlife habitat and recreation.

Cozad and Hord soils are on the stream terraces and slopes of the Elkhorn River Valley. Both soils consist of deep, well-drained soils that have formed into silty alluvium or loess soils. These soils are nearly level to gently sloping on stream terraces and foot slopes within the river valley. Both soils have moderate permeability and a high available water capacity. Cozad and Hord soils are suited to both dryland and irrigated cultivated crops. They are also suited to grass, trees and shrubs, wildlife habitat and recreation.

Limitations of Soils

Nora, Croften and Moody soils have a moderate to high shrink-swell potential, meaning the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks when dry or swells when wet.

This may affect dwellings with or without basements and local roads and streets. Limitations to local roads and streets are moderate where slopes are less than 15 percent, severe where slopes are more than 15 percent. Therefore, the soil properties may be unfavorable in certain areas and may be overcome or modified by special planning or design.

Water erosion is another main hazard with these soils. Lack of adequate rainfall commonly limits the production of dry farmed crops. Maintaining fertility and preventing runoff are concerns on the cultivated soils.

Valentine and Thurman soils have a slight limitation to dwellings with or without basement, local roads and streets where the slopes are less than 8 percent. Slight limitations meaning that the soil properties are generally favorable for the use and those limitations are minor and are easily overcome. Where slopes are from 8 to 15 percent, the limitations are moderate and severe where slopes are more than 15 percent. Severe limitations indicate soil properties are unfavorable and so difficult to overcome that major soil reclamation, special design or intensive maintenance is required.

Boelus soils have a moderate shrink-swell potential on dwellings with or without basements and a moderate shrink-swell potential for local roads and streets below the depth of 19 inches. Brunswick soils have a moderate effect for dwellings with or without basements where the slope is 15 percent; severe where the slope is more than 15 percent. For local roads and streets, Brunswick soils have a moderate limitation where slopes are less than 15 percent and severe where slopes are more than 15 percent.

Elsmere and Ord soils have a moderate to severe limitations on dwellings with or without basements and local roads and streets due to the high water table. Roadsides may hollow out and sink in or down due to the high water tables or from frost action.

Cozad soils have a severe limitation on both dwellings with or without basements and local roads and streets due to rare flooding. Hord soils have a moderate shrink-swell potential on dwellings with or without basements and a moderate shrink-swell potential for local roads and streets.

As indicated in Table 12, this section is useful to those who need information about soils that have slight, moderate or severe limitation on foundations upon all livestock sewage lagoons currently in operation and future developments. In this table, Slight means that soil properties are generally favorable for the rated use or in other words, limitations are minor and are easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. Severe indicates soil properties are unfavorable and difficult to correct or overcome and that major soil reclamation, special designs or intensive maintenance is required.

It is important to understand the concern when locating sewage lagoons for livestock confinement areas. Impervious soils, or incapable of passing through, is required to minimize seepage and contamination of local ground water.

Soils that are severe may mean they have very rapid permeability, or high organic matter, stones or boulders that are undesirable for such lagoons. Unless the soil has a very slow permeability, contamination of local groundwater is a hazard in areas where seasonal high water tables is above the level of the lagoon floor.

Also affecting the location of sewage lagoons in Antelope County is slope, depth to bedrock, and susceptibility to floodplains. Table 12 indicates soils that have rapid permeability and those soils that are applicable for locating a livestock sewage lagoon.

Table 12
Soil Limitations on Sewage Lagoons in Antelope County

Soil Series	Sewage Lagoon	Permeability
Bazile	Severe	
Blendon	Severe	Moderately-rapid
Blownout	Severe	Rapid
Boelus	Moderate	Moderate below 1.5 feet
Brunswick	Severe	Moderately-rapid
Cass	Severe	Moderately-rapid
Crofton	Moderate >7% slope	Moderate
Doger	Severe	Rapid
Elsmere	Severe	High water table at depths of 2-3 feet
Gibbon	Severe	High water table at depths of 2-3 feet
Hord	Moderate	Moderate
Loretto	Slight	Ok
Longford	Slight	Ok
Meadin	Severe	Very rapid permeability
Nora	Moderate	Moderate, severe where slopes more than 7%
O'Neil	Severe	Very rapid
Ord	Severe	High water table at depth of 2-3 feet
Ortello	Severe	Moderately rapid
Paka	Moderate	Moderate
Simeon	Severe	Rapid
Thurman	Severe	Rapid
Trent	Severe	Rare flooding

Source: U.S. Department of Agricultural Soil Conservation Service, 1978

Capability of Soils for Agricultural Production

Most soils of Antelope County are fertile and well suited to farming. The principle problems and hazards are flooding, water erosion, and damage to soil and crops from blowing soil and loss of fertility through erosion and leaching. Though with good management practices by agricultural farmers and ranches, many of the soils can and will continue to be well suited for cultivated crops and pasture lands.

Soils are broken down into Capability Classes I through VIII. Each numeral indicates progressively greater limitations and narrower choices for use of the land. Class I, II and III soils are considered prime for crop production.

As indicated in Table 12, soils of Antelope County vary widely and many of the soils have good potential for crop and pasture production. This table enables agricultural users to see the soils of the County, which are favorable for cropland under irrigation or dryland.

Looking at the table, soils nearly level, well drained, surface layer of loam, silt loam or sandy loam and have capability classes of I, II or III. These soils have few restrictions in irrigated areas. The main concern for both dryland and irrigated land is maintaining the organic matter content, fertility and erosion control.

Table 13
Capability of soils
Class I-III
Antelope County

Soil Series	Slope %	Capability class & subclass
Bazile loam	0-2	IIs-dryland, I-irrigated
Bazile complex	0-3	IIIe-dryland & irrigated
Blendon fine sandy loam	0-2	IIE & IIIe-dryland & irrigated
Boelus loamy fine sand	0-6	IIE & IIIe-dryland & irrigated
Cass fine sandy loam	0-2	IIs-dryland & irrigated
Cass loam	0-2	I-dryland & irrigated
Cozad silt loam	0-2	I-dryland
Fillmore silt loams	0-1	IIIw-dryland & irrigated
Gibbon silt loam	0-2	IIw-dryland & irrigated
Hord silt loam	0-2	I-dryland & irrigated
Hord silt loam	2-6	IIE dryland, IIIe-irrigated
Longford loam	1-4	IIIe dryland & irrigated
Loretto sandy loam	0-3	IIE-dryland & irrigated
Loretto loam	0-2	I-dryland & irrigated
Loretto loam	2-6	IIE-dryland, IIIe-irrigated
Moody silt clay loam	0-2	I-dryland & irrigated
Moody silt clay loam	2-6	IIE-dryland, IIIe-irrigated
Nora silt loam	0-2	I-dryland & irrigated
Nora silt loam	2-6	IIE-dryland, IIIe-irrigated
Nora silt loam	6-11	IIIe-dryland
O'neil sandy loam	0-2	IIIe-dryland & irrigated
O'neil loam	0-2	II-dryland & irrigated
Ord fine sandy loam	0-2	IIw-dryland & irrigated
Ord loam	0-2	IIw-dryland & irrigated
Ortello fine sandy loam	0-2	IIE-dryland & irrigated
Ortello fine sandy loam	2-60-2	IIIe-dryland & irrigated
Ortello loam	0-2	I-dryland & irrigated
Paka loam	0-2	I-dryland & irrigated
Paka loam	2-6	IIE-dryland & irrigated
Paka loam	6-11	IIIe-dryland
Paka complex	0-3	IIE-irrigated, IIIe-dryland
Paka complex	3-6	IIIe-dryland & irrigated

Source: U.S. Department of Agricultural Soil Conservation Service, 1978

Topography and Drainage

A natural characteristic closely related to soils is the topography relief in Antelope County and the resulting drainage patterns.

Antelope County is within the High Plains of the Great Plains. The landscape is an east sloping plain that has been divided by water erosion and wind. Slopes are long and gentle throughout most of the county. Sharp drainage with steep sides is in both the southeastern and northwestern parts of the county.

The Elkhorn River Valley, nearly 2 miles wide, is nearly three-fourths the county's drainage basin, which flows east to southeast. Clearwater and Cedar Creeks are the principle tributaries of the Elkhorn River within the county. The northern part of the county is in the drainage basin of Verdigris and Bazile Creeks, which flow northward. The southwestern part of the county is in the drainage basin of the southeast-flowing Beaver Creek, and a small area west of the southeast corner of the county is the drainage area of the southeast-flowing Shell Creek.

Clearwater Creek has a perennial flow, meaning throughout the whole year, throughout its length in Antelope County. Cedar Creek has a perennial flow only near its mouth. Bazile Creek and the headwater tributaries of Verdigris Creek flow throughout the year where they cross in the north border of the county. Most other streams in the county generally stop flowing in dry weather. The dry weather flow of all the perennial streams is maintained by seepage of groundwater into the stream channel.

The highest point in the county is at the southwest corner at an altitude of 2,162 feet. The lowest point at 1,645 feet is at the east border of Antelope County. Relief, meaning raised areas of different heights of landforms, along the west border is a little more than 300 feet and along the east border is a little less than 150 feet. The lowest point along the west border is 1,821 feet, where the Elkhorn River flows into the county. Along the east border it is at 1,645 feet, where the Elkhorn River flows out of the county.

Flood Plain Areas

Antelope County enrolled in the National Flood Insurance Program (NFIP) on November 17, 2008. The county now regulates structures in the counties zoning jurisdiction where flooding may be a problem. New structures must be at least one (1) foot above the 100 year flood level. The zoning administrator handles the duties of Flood Plain Administrator and is keeper of the official flood plain maps.

Water Supply

The two main sources of surface water in Antelope County are the Elkhorn River and the Verdigris Creek. Flow is constant throughout the year. The principle open body of water in the county is Grove Lake, north of the town Royal. Damming the upper end of the east branch of the Verdigris Creek formed it. It has about 60 acres of open water and is spring fed.

The supply of underground water is plentiful for domestic use. Many irrigation wells have and will continue to be drilled in the county. The thick underground deposits of sand and gravel and the Ogallala formation provide a large underground water storage reservoir. The depths of these reservoirs range from 300 to 500 feet thick in the southern part of the county and between 100 and 200 feet thick in the northern part of the county. Thus, the southern part of the county has a higher potential for high-yielding irrigation wells and the most northern part of the county has a lower potential for good wells.

Groundwater recharge in Antelope County is mainly by precipitation. Some recharge also comes from irrigation water, surface water in areas adjacent to streams and underground flows. To date, pumping has not lowered the water level or storage. This is due because of the amount of pumping is small to the wide lateral extent and thickness of the saturated permeable rocks and the very slow rate of groundwater movement provides a vast natural reservoir of groundwater.

Withdrawal of water for irrigation has caused progressive water-level declines in some parts of Antelope County. Available data from the U.S. Geological Survey indicated that water levels in some wells have declined 5.24 feet since 1900. However, recharge during periods of greater than normal precipitation occasionally has resulted in short term water-level rises or lessening of the rate of water-level decline.

During 1981 and 1987, many wells rose as much as 10 feet in many areas of Antelope County when annual precipitation generally was greater than normal. In most of the area, however, groundwater withdrawals for irrigation are large enough to cause net water-level declines in most years when annual precipitation is normal or less than normal. Though, as indicated in Table 14, ground water levels have remained steady in the two-recorded wells in Antelope County.

Table 14
Groundwater Levels
Antelope County (Estimated Predevelopment Water Level)

Antelope County	1980	1990
Elgin Recorder Well	102 Feet	102 Feet
Brunswick Recorder Well	90 Feet	90 Feet

Source: U.S. Geological Survey & Conservation and Survey Division, 1990

MAN MADE FEATURES

The present form of Antelope County and the reasons for it will influence the directions of future growth and expansion as well as the location of the various types of future land uses.

Commercial land uses in Antelope County are generally highway oriented and are located for the most part at the junction of the major highways or in a close proximity to the communities within the County. Commercial land use is not a significant use in the rural County; however,

potential does exist for its future development in and around the existing larger communities within the County.

Industrial land in Antelope County is comprised to a great extent of grain and other agricultural oriented storage, bulk petroleum storage, railroad tracks through the County and sand and gravel pits. These industrial land uses are dispersed throughout the County and along the major highways of the County. For reference, the major State Highways are Highway 14, 20, 70 and 275. The potential for future development of industrial land use is expected around the larger communities and along the major highways in the County, with little expected in the rural County areas. Primary locations for retail, commercial and service businesses along the corridors of the highways located near the existing communities in the County. These uses are quite limited in number and size and conflicts between these uses and adjoining residential uses would be minimal.

FUTURE LAND USE PLAN

➤ *Introduction*

In any planning area, be it a large urban area which is expanding in population or a small rural county which is declining in population, there will be changes in land uses through time. The purpose of a Future Land Use Plan is to provide a general guide for these changes in land use so that as these changes occur conflicts between the uses are avoided or minimized. A Future Land Use Plan for any planning area must reflect the land uses which already exist and must be considered flexible in nature in order to meet the changing needs of its citizens and to encourage expansion of the local economy whenever possible.

A Future Land Use Plan also provides the legal basis for the formulation of land use (zoning) regulations and the application of zoning districts. For this reason it is imperative to formulate a Future Land Use Plan that is tailored to the needs, desires and limitations of each planning area.

In order to accomplish these purposes, the Future Land Use Plan for Antelope County is based upon the land uses already existing in the rural areas of the County and the citizen's desire and need to protect these land uses, local property values, and their life styles and customs while promoting improvements in all components of the local economy with particular emphasis on agricultural growth, as the predominant component of the local economy. The following principles and concepts have thus been selected to guide the development of the Antelope County Future Land Use Plan:

- Private ownership of land is essential to the freedom of individuals, families and communities and to the economic interest of the citizens of the County.
- Existing agricultural uses, methods of agricultural production, property values and the life style and quality of life of the citizens of the County should be protected and preserved while allowing for changes in methods and scale of agricultural production in a manner and in locations which will not be incompatible with such existing uses, which will not damage the environment, and which will not negatively impact property values or the quality of life in the rural areas of the County.

- Land use regulations, which are to be used to implement this Future Land Use Plan, should be minimized to preserve the freedoms and property rights enjoyed by the citizens of the County while effectively addressing the needs to basic protection of the existing land uses, property values, the local environment and the quality of life from development of future land uses which would be inconsistent with these needs.

Land Use Component Concepts

➤ ***Agricultural Uses***

In order to abide by the principles and general land use planning concepts presented above, the future land uses in the unincorporated areas of Antelope County should continue to be dominated by agricultural production, including crop production, pasture land, hay production, livestock production and related and compatible agricultural uses and agribusiness uses.

The loss of "prime" crop production land, through development of other land uses should be avoided as much as possible. Any loss of the best land for crop production in the County will have long-term impacts with regard to maintaining the strength of the local agricultural economy and should not be sacrificed for other uses unless such use will have equal or greater long-term economic impacts on the County.

Residential uses associated with such agricultural production uses should continue to be supported as accessory uses to such agricultural production through continuation in improvements in roadway systems and public and semi-public facilities and services.

Confined livestock feeding operations and commercial agricultural product processing uses, which are not customary and typical agricultural uses, should be encouraged as a method of expanding the economy of the County. However, where such uses have the potential for creating land use incompatibilities due to the production of odor, dust, or other characteristic of the use which can negatively affect the value and marketability of neighboring property, or the potential for degradation of natural resources including ground water, surface water and soil productivity, these uses must be controlled as to location and methods of operation to minimize or eliminate such potential negative impacts.

Wetland protection and maintenance are critical to protecting and preserving the wildlife of the County. Many bird and animal species are dependent upon wetlands for food, habitat and breeding areas. The State Range Judging Board classification system should be utilized in identifying wetlands in the County. Hay harvesting on wetland meadows which occurs after recession of standing water and therefore the suitability of the breeding and nesting habitat should continue to be permitted as an agricultural production activity as should hay harvesting on wetlands which dry up on a semi-annual basis or drought periods.

➤ ***Commercial and Industrial Uses***

Future additional commercial or industrial uses, not needing a location within one of the communities within the County, should be encouraged to locate in the County. Those uses which would generate or attract substantial amounts of vehicular traffic, particularly heavy

truck traffic, should be encouraged to locate along the major highway corridors in the County as opposed to more rural locations which would require extensive use and higher maintenance levels on County roads.

Commercial or industrial uses, which are not directly related to agricultural production or processing of agricultural products, should also, be located along the highways serving the County in or near the urban communities within the County. Such locations will minimize land use conflicts and will also minimize the public costs associated with providing the public facilities, services and utilities necessary to support these types of use while enhancing the development of the communities within the County.

➤ **Non-Agricultural Residential Uses**

Development of residential uses, not associated with farm and ranch operations, should also be permitted as a method of encouraging economic and population growth and to provide expanded choices for existing and future citizens regarding where they may wish to live. Such uses, whether they occur as individual housing sites or as a residential subdivision, should generally be limited to locations on or near the highways and major County road corridors which are in close proximity to the urban communities in the County. Close proximity should generally be interpreted to mean within one or two miles of the urban communities.

This policy will avoid the need for unnecessary demands for expansion of the County road and services infrastructure while enhancing the populations and local economies of the communities within the County.

An exception to this location limitation would be the potential for development of non-agricultural housing around natural or man-made lakes or other scenic areas of the County such as the Grove Lake area north of the Village of Royal. Other areas might include areas along the Elkhorn River and other major streams in the County where major roadway access already exists.

➤ **Future Land Use Plan**

Based upon the above noted land use concepts, the Future Land Use Plan for Antelope County, Nebraska envisions four primary land use areas for the expansion or future development of various land uses. As described below, these land use areas include delineation of the majority of the land in the unincorporated areas of the County for farming and ranching which is now typical throughout the County, delineation of "prime" crop production lands, delineation of lands which present environmental obstacles for intensive livestock production (confined feeding) uses, and delineation of land near the urban communities in the County.

The basic premise for this Plan is the preservation and protection of existing land uses and environment in the County, including the protection of the urban communities within the County, while encouraging economic expansion in the agricultural and non-agricultural sectors of the local economy through development of new or expanded land uses which are compatible with existing uses, are environmentally compatible and which respect and support the quality of life of the citizens of Antelope County.

➤ *General Agricultural Use*

As depicted in Illustration 1, the plan for the majority of land in the unincorporated areas of the County is that of continuation of, protection for and enhancement of general production agriculture represented by the farm and ranch activities that now exist in the County.

➤ *Prime Cropland Use*

That portion of the land in the County that contains soils best suited for crop production, those known as "prime" croplands should be preserved as much as possible for future crop production. This does not mean that other agricultural or agribusiness uses should not or could not be developed in the areas where such "prime" soils exist because there are areas within the overall prime cropland area which contain non-prime soils. Delineation of the "prime" cropland areas does, however, mean that protection of these areas should be afforded by evaluating other proposed uses which would serve to take such cropland out of crop production as to whether the proposed use can have the same long term positive impact on the local economy as crop production.

➤ *Commercial Livestock Production (Confined Feeding Uses)*

As in any county, there are areas within Antelope County where the characteristics of the geology, hydrology, topography and soils are more sensitive to high intensity uses such as confined feeding of livestock and where contamination of the local environment could occur even with good quality livestock management practices. The best way of avoiding environmental degradation problems is to avoid the development of uses, which present such potential problems. The areas indicated on Illustration 1 as environmentally sensitive areas are areas where, "generally", there are one or more naturally occurring environmental characteristics or conditions which make such areas unsuitable for the development of confined livestock feeding uses.

➤ *Non-Agricultural Uses*

Through the 10 year planning period there will be additional non-farm residential uses and additional commercial uses which will be added to the land use pattern in the County. These non-agricultural uses can be best situated within 1 or 2 miles of the existing urban communities within the County so that the occupants of these uses can have easy access to the urban services offered in these communities and so that the public services such as fire protection, which are typically headquartered in these communities can be provided at minimum expense.

Encouragement of additional non-farm development in areas in or close to the urban communities will also help support the local economies of each community.

In addition, the areas around the urban communities should be protected from development of uses, which could be incompatible with urban land uses through delineation of the 1 or 2 mile area around each community.

Utilization of these future land use areas as a guide to future land development in the County will result in protection of the existing land uses in the rural areas, as well as protection for the urban communities. Adherence to these land use areas will also assist the County in avoiding development of land uses in areas where it is not environmentally sound to do so and adherence to the concept of protecting the "prime" croplands in the County will assist in

preserving the agricultural production capacity of the County, the key component in the County's economy, for years to come.

PUBLIC FACILITIES AND SERVICES PLAN

➤ ***Introduction***

The various public facilities and services provided to any local population substantially affects the safety, general welfare and the quality of the life for the population and thus affects the desirability of the County as a place to live, work and recreate.

Various levels of government, as well as semi-public and private sector providers provide the public facilities and services, which are provided to the population of the County. Facilities typically include schools, governmental administration, maintenance and service buildings, hospitals and clinics, parks, golf courses, fairgrounds, museums and other buildings while public services typically include education, health care, fire protection, law enforcement, government administrative and senior citizen services.

This component of the Antelope County Comprehensive Plan is designed to identify existing public facilities and services provided for use by the residents of the County, to evaluate these facilities and services relative to their adequacy to serve the existing population and to evaluate the adequacy of the facilities and services to serve the future population of the County.

For purposes of clarity in analysis and presentation, this Public Facilities and Services Plan are divided into the following categories:

1. Educational and Cultural Facilities and Services
2. Public Administrative and Protection Facilities and Services
3. Public Health Facilities and Services
4. Parks and Recreation Facilities and Services



Educational and Cultural Facilities and Services

Educational facilities and services available to the citizens of Antelope County are provided by nine school districts, six of which maintain physical facilities in the County. The school districts in the County are classified as Class 1, 2 and 3. This classification system is a measure of the level of educational services offered and the size of the population included in the district as described below.

Class 1 - Any school district offering educational facilities and services only for the elementary grades. These were closed on June 15, 2006 by LB 126.

Class 2 - Any school district with a territory having a population of one thousand or less inhabitants that provides both elementary and high school educational facilities and services.

Class 3 - Any school district with a territory having a population of more than one thousand and less than one hundred thousand inhabitants that provides both elementary and high school educational facilities and services.

LB 259, a bill passed by the Nebraska legislature in 1990, requires that all taxable property and all elementary and high school age students be included in school districts which offer both elementary and high school educational facilities and services. This law resulted in the affiliation of Class 1 school districts with larger school districts so that the combined services of these education partners would include both elementary and high school facilities and services. This affiliation requirement has resulted in school district affiliations in Antelope County as indicated in Table 15. The Table indicates the school district and the education partners within each district. Also indicated on this Table is the fall, 1997 enrollments for each district.

TABLE 15
ANTELOPE COUNTY SCHOOL DISTRICTS AND AFFILIATIONS
Antelope County, Nebraska
Fall 2005 Enrollment by Grade

School District/Education Partners	K-6	7-8	9-12	Total
Valley view public school district	5	-	-	5
Neligh-Oakdale schools				
Orchard Public schools				
Clearwater public school district	89	16	47	152
Sunny brook public schools				
Sunnybrook Public Schools				
Neligh-Oakdale school district	191	53	201	445
Valley View public school				
Sunny side public school				
Elgin Public School District	94	26	78	198
Pleasant Valley public school				
Sunnyside public school district	5	-	-	5
Neligh-Oakdale Public school				
Orchard public school	86	28	84	112
Valley view				
Page public				
Inman public				
Total enrollments	470	123	410	993

Source: Nebraska Department of Education, 2006

Total school enrollment over the last decade has paralleled the decline in population in the County. As indicated in Table 16, the total school enrollment in all districts in the County has declined by some 398 students since 1980. This decline represents an overall enrollment decline of just under 25% in the last 8 years. Further analysis of the enrollment data indicates that the majority of the decline in enrollment has occurred in the high school age group. High school enrollment, grades 9 through 12, has declined by just over 33% in the last 8 years. Middle school enrollment, grades 7 and 8 have remained relatively stable while elementary enrollment has declined by some 183 students or nearly 25%.

Population projections for the County indicate that the school age population can be expected to continue to decline. As indicated in the Economic and Population Analysis component of this Comprehensive Plan, the school age population is expected to decline to a total of 1,100

students by the year 2010. This would represent a decline of an additional 9% in the total school district enrollment in the County.

TABLE 16
TOTAL SCHOOL DISTRICT ENROLLMENT and ENROLLMENT PROJECTIONS
Antelope County, Nebraska

Total Enrollment by Grade				
Year	K-6	7-8	9-12	Total
1979 - 1980	789	200	623	1,612
1985 - 1986	782	224	430	1,436
1989 - 1990	790	213	452	1,455
1997 - 1998	606	196	412	1,214
2000 - 2001	635	184	401	1,220
2010 - 2011	596	140	364	1,100

Source: Nebraska Department of Education, 1998

Note: Enrollment projections adjusted to reflect out-of-county district enrollment centers.

With the anticipated enrollment declines, the school districts in the County will not be faced with any facility capacity issues, except for limited needs to replace facilities, which have reached the end of their useful life. The more important issue the school districts will face is providing a quality education with more limited revenues and providing equipment and education in a more technologically advanced and computerized manner. The school district needs during the planning period will thus be centered on maximizing efficiency in the educational processes and providing the necessary technology education in this information age.

Cultural Facilities



Antelope County Museum

The Antelope County Museum, located in the City of Neligh east of the Antelope County Courthouse, consists of a two-story brick structure. The museum provides a variety of exhibits on the history of the County, including a reconstructed log cabin furnished in a historically accurate manner. The museum is open two days per week in the afternoons and is staffed and operated by volunteers. The museum is financially supported by the County and through memberships and donations.



Neligh Mill State Historical Site

The Neligh Mills, located on the south edge of Neligh, along the Elkhorn River is one of the oldest water powered mills in America. The Mill was constructed in 1873. In 1970 the Mill, its related storage warehouses and milling equipment was acquired by the Nebraska State Historical Society so that the Mill could be preserved and used as a branch museum.



Libraries

Library facilities and services are available to residents of the County from each of the 8 municipal libraries in the County. The City of Neligh and each of the Villages in the County, including the Village of Tilden maintain public libraries. The Elven A. Butterfield Memorial Library in Neligh is the largest library facility in the County. This Library, housed in a building constructed in 1989 and in excellent condition, provides a variety of services, including nearly 20,000 volumes, audio and video tapes and periodicals, Internet access and two computers for research purposes. The Memorial Library is open 34 hours per week while the libraries in the smaller communities in the County are open lesser hours.

Future needs for the libraries in the County during the planning period will consist primarily of updating and expanding the reading and research materials available and expanding computer and research facilities in this age of information.



Antelope County Resource Center

The former Neligh Public Library, a Carnegie building, is now the Antelope County Resource Center. The Center serves the County and the region through provision of economic and industrial development services. These services include:

- Confidential business management consulting
- Information for prospective businesses in the County
- Resources for local businesses seeking information on marketing, exporting, financial or technical assistance,
- Regional tourism development
- Coordination of educational activities and training programs
- Grant identification and preparation assistance.

The facility and the services it provides will prove to be an invaluable resource through the planning period. If the County is to stem the tide of declining population and a declining economy, the need for commercial and industrial expansion and development of the ability to finance or assist in financing business expansions and diversification will be critical. The Center should also investigate and develop the capability to assist local and prospective businesses to expand their trade areas through computer home page and computer catalog marketing on the Internet and World Wide Web.



Antelope County Fair Grounds

The Antelope County Fair Grounds located on a two-acre site adjacent to the Riverside Park in Neligh provides an excellent cultural and recreational facility. The Fair Grounds and the annual County Fair are provided by the Antelope County Agricultural Society.

Facilities at the Fair Grounds include a 4H Pavilion and Club House, a livestock exhibition building which includes a show arena, a horse show and rodeo arena, a youth complex and a concession building.

The Youth Complex is an enclosed building, which houses smaller exhibits and craft exhibits during the fair. The livestock building and horse arena were constructed in 1997 and are in excellent condition.

Anticipated needs for improvements at the Fair Grounds include the development of restroom facilities.

PUBLIC FACILITIES AND SERVICES PLAN

Administrative and Protection Facilities and Services



Government Administration

The offices and officials providing the County government administrative services are located at the Courthouse complex in Neligh. The original courthouse, constructed in 1894 has been maintained in good condition and houses the offices of the County Health and Human Services, the Veterans Service Officer, the County Judges chambers, a Courtroom and the Clerk of the District Court.

A Courthouse Annex, constructed in 1966, houses the offices of the County Clerk, County Assessor, County Treasurer, the County Extension Agent, the Zoning Administrator and the County Board of Supervisors meeting room.

Ample parking for County officials and citizens is provided on the one square block site of the Courthouse complex. During the planning period it is anticipated that the only improvements needed for the administrative offices will be remodeling and updating of the original courthouse. Both courthouse facilities may also need minor modifications to comply with the Americans with Disability Act recently passed by Congress.



Law Enforcement

The Antelope County Sheriff, 5 full-time deputies, 4 full-time dispatchers and 1 part-time dispatcher provide Law enforcement services for the rural areas of the County.

The Sheriffs office is located east of the Antelope County Courthouse. In addition to the sheriffs office, the dispatch office and related administrative space this facility houses the County Jail

which has 3 cells, with 8 beds, an intoxication basin, bathroom facilities and a outdoor recreation area for inmates.

As noted previously, the Sheriffs office provides centralized receiving and dispatching of 911 emergency calls and handles an estimated 90% of the emergency call services in the County.

Inmate probation needs are provided in the county by probation officers headquartered in Norfolk and O'Neill.

The Antelope County Sheriffs office also provides law enforcement services to the Villages of Clearwater, Oakdale, Orchard, as these communities maintain contracts for such services with the County and pay an annual fee for this service. The communities of Neligh, and Elgin maintain municipal police departments with the City of Neligh providing a Police Chief and two full-time officers and the Village of Elgin providing a Police Chief and one part-time officer.

Given the anticipated decline in rural and urban populations in the County through the planning period it is not anticipated that there will be any substantial increase in demand for law enforcement services. Instead the challenge for the Sheriff and the County will be to provide the necessary funds to replace worn out patrol vehicles and update the jail so that it will continue to meet state jail standards through the planning period.



Fire Protection and Emergency Response

Fire protection, emergency rescue and ambulance services are provided by the rural and unified fire districts headquartered in or near Antelope County. The volunteer districts with headquarters in the County include Neligh, Clearwater, Elgin, Oakdale, Brunswick and Orchard (includes Royal). Those with headquarters outside of the County, but with service areas in the County include the volunteer districts headquartered in Creighton, Tilden, Ewing and Plainview, Petersburg, and Bartlett.

All districts provide volunteer fire protection services while ambulance and rescue services are provided by the Orchard, Clearwater, Elgin, Creighton, Petersburg, Bartlett, Ewing, Tilden and Plainview districts as well as the Antelope County Memorial Hospital ambulance and rescue squad.

Each of the fire districts are linked to a centralized 911 call dispatch center maintained in and operated by dispatchers in the Antelope County Sheriffs office and all districts maintain mutual assistance agreements to maximize the level of service throughout the County.

Since the inception of the centralized 911-dispatch center in 1994, there have been a total of 8366 land line calls and 2703 cell phone calls received requesting emergency services or other information. This level of calls averages out to some 697 land line calls and 225 cell phone calls per year. This total represents an estimated 70- 90% of all emergency response requests in the County as calls may also be made directly to the individual fire district headquarters and are not included in the dispatch center's 911 call tallies.

An analysis of the location of the fire district headquarters with regard to fire and emergency response times and distances indicates that all areas of the County, with the exception of the far southwestern corner of the County are within 10 miles of an emergency service headquarters. This is a reasonable response distance for rural areas resulting in reasonable response times.

Given the estimated future declines in total population in the County, there are not expected to be any coverage or response time issues during the planning period. The primary problem the fire districts will face through the planning period will be maintaining and replacing fire fighting and ambulance vehicles and equipment with revenues that are restricted through the tax lid. An additional problem will be maintaining an adequate number of trained fire fighting and emergency service volunteers in the future as the population base from which to recruit these volunteers will continue to shrink. It is recommended that all of the districts continue to maintain an active and coordinated volunteer recruitment and training program to minimize this problem through the planning period.

Public Health Facilities and Services

Medical Care

Medical and related health services are provided through the Antelope County Memorial Hospital, a profit organization that maintains and operates the hospital and medical clinics in Neligh, Elgin, Clearwater and Orchard.

The Acute Care hospital facility, located in the City of Neligh, was constructed in 1952 with a 28 bed addition in 1971 and an ambulance facility in 1981. New construction joined the hospital to the clinic and opened in 2006. It added additional out reach clinic space, more room for the lab and radiology.

The hospital currently maintains a staff of 4 active staff doctors, two Nurse Practitioners, 38 registered nurses, 29 LPN's, 25 EMT's, 28 courtesy and consulting staff, one additional Nurse Practitioner and 6 CRNA's. There is a total of 153 employees (132 women, 21 men) from 21 communities with an annual payroll of over \$3,700,000.

The hospital provides a complete array of patient medical services at the hospital and the five clinics. These services include:

- Swing bed care
- Home Health Care
- Obstetrics and Pediatrics
- Respiratory and Physical Therapy
- Cardiac/Pulmonary rehab
- Diabetic Teaching
- Ultrasound, EEG, Remote Cardiac Monitoring, CT Scan
- Radiology
- Preventive Care and Wellness Classes
- Pathology Services

Out Reach Clinics/Services include:

- Mammography
- Urology
- MRI
- Cardiac
- Nuclear Imaging
- Audiology
- Podiatry
- Cataract
- ENT
 - Speech Therapy
 - Orthopedic
- Occupational Therapy
- Gynecology

The five clinics maintained by the hospital are staffed by 3 doctors or the Nurse Practitioners and one nurse from the hospital who rotate during the week to the various clinic locations in the County.

Outreach doctors from Omaha, Lincoln, Norfolk or Grand Island provide specialized services at the hospital on a weekly basis or monthly basis. The hospital or clinic staff will make patient appointments with the outreach doctors when needed.

A major challenge for the hospital corporation through the planning period will be maintaining medical services to a declining and aging population and continuing to keep the hospital and clinic locations in good condition and properly equipped.



Elderly and Handicapped Services

Respite, rehabilitation and long-term residential care is provided to residents of Antelope County at the Neligh Nursing Center, located in the City of Neligh. This nursing care facility is owned and operated by Beverly Enterprises of Fort Smith Arkansas, a private corporation. The nursing care facility has a capacity of 99 nursing care beds and the facility is currently licensed for 80 beds.

Staff at the Nursing Center provides varying levels of nursing, personal, rehabilitation and residential care based on three options of service at this facility. These options include:

- *Respite Care*: Individual needs care at various times during the year for several days. The patient may come in when needed.
- *Short Stay Care*: Patient stays are usually less than 14 days. Care typically includes some type of rehabilitation care, relearning some type of activity or other rehabilitation service.
- *Long Term Care*: Permanent care and stay at the facility.

The Neligh Nursing Center maintains a handicap accessible van for transportation of patients. The Center also provides physical therapy, speech therapy and occupational therapy on a one day per week, contracted service basis.

Given the anticipated continued aging of the population of the County, there will continue to be substantial demand for Nursing Care services. In addition to the nursing facility and services demand, the demand for assisted living residences will increase through the planning period.

It is suggested and recommended that the needed assisted living facility be developed and maintained by the Neligh Nursing Center or the Antelope County Memorial Hospital corporation to maximize the availability of assisted living services and to minimize the cost of providing these services.

The City of Neligh, in association with the Nebraska Department of Roads, provides a dial-a-ride service for general public in the City of Neligh and surrounding areas of Antelope County. To provide this service they currently have one 14 passenger bus equipped with a lift and one six passenger van operated by municipal personnel. Service is provided on a demand basis by schedule with nominal charges made to the users of this service.

Senior Centers are maintained and operated in the City of Neligh and the Village of Elgin. These centers provide noon meals on a Monday through Friday basis. The Neligh Senior Center also provides meals on wheels to those residents of Neligh who have made a formal request for them to be delivered. Senior citizen meals are also provided in Clearwater during the school year at the Clearwater school facilities. The senior centers also provide facilities and equipment for meetings, card and other games, entertainment, and crafts. Exercise programs are also provided on a one-day per week basis by the staff of the Antelope County Memorial Hospital.

During the planning period, the need for senior transportation, meals and other center services will increase as the population in the County continues to age. The local governments, the senior organizations and the regional support organizations should anticipate this increased demand by evaluating the need for expanded facilities and services in various locations in the County. Joint use of existing school facilities in the outlying areas of the County should be evaluated as a means of providing the expanded services without the cost of acquiring or constructing new facilities.



Parks, Recreation and Points of Interest

The citizens of Antelope County are quite fortunate to have a number of recreational opportunities for a wide variety of interests. In addition to community parks and ball fields for play and picnicking which are available in the Villages within the County, there are a number of outstanding facilities and points of interest in the County. These include:

- Riverside Park, situated along the banks of the Elkhorn River in Neligh provides a wide variety of recreational facilities including a municipal swimming pool, ball fields, and camping facilities.
- Russell Park, also situated along the banks of the Elkhorn River in Neligh provides ball fields and a River Nature Trail.
- The Red Wing Wildlife Management Area southwest of Neligh provides 325 acres of natural wildlife habitat in the County.
- The Antelope County Club, located two miles east of Neligh provides a 9-hole golf course, with a clubhouse and restaurant.
- The Hackberry Creek Wildlife Management Area, located northeast of the Village of Clearwater provides 235 acres of wildlife habitat.
- The Summerland Golf Course, a new 9 hole golf course located northwest of the Village of Clearwater, provides an additional 9 holes of golfing challenges and a new clubhouse.

- The Blue Heron Rookery, located 2 miles west of the Village of Clearwater is a rare northern nesting ground for the Blue Heron and provides a unique opportunity to view the habits of this large bird.
- Flobert Springs, located northeast of the Village of Elgin, is a natural phenomenon formed when a large hill sank and makes a unique point of interest in the County for local citizens and tourists.
- The Diamond E Trout Resort, located north of the Village of Orchard, provides trout fishing, cottages, paddle boats and hiking opportunities for citizens and tourists.
- The Northeast Nebraska Zoo, located at the east edge of the Village of Royal, provides a location where visitors can view and enjoy wild animals such as cougars, monkeys, deer, birds, llamas, pygmy goats and several rare or endangered animals.
- The Grove Lake Wildlife Management Area, located north of the Village of Royal, provides 1,746 acres of trees and grasslands and a 40-acre lake. Recreational opportunities at this site include fishing, camping, boating, hiking and hunting. The area also provides restroom, picnicking facilities and playground equipment. Also located within the Management Area is the Grove Lake Trout Rearing Facility, where some 210,000 trout are raised for stocking the Two Rivers Lake, as well as weekly stockings in creeks and lakes in eastern Nebraska.

In addition to all of the above recreational facilities and points of interest, Antelope County is the location for the Ashfall Fossil Beds State Historic Park. This facility, acquired by the Nebraska Game and Parks Department in 1986, is a 360-acre site containing the fossil remains of 120 different types of pre-historic animals. The Park features a visitor center, picnic areas, nature trails, various displays and a rhino barn, which protects part of the deposits where the fossils were uncovered.

In addition to these excellent recreational facilities, a future attraction for local citizens and tourists will be the development of the Cowboy Trail. This trail, being developed as a rails-to-trails conversion will be a 321-mile trail stretching from Norfolk to Chadron, Nebraska. The Trail will extend through the City of Neligh and the Villages of Tilden, Oakdale, and Clearwater and can be expected to bring additional tourist and trail users into the County.

Given the number and scope of the recreational opportunities now available in the County and the anticipated population decline in the County during the Planning Period, there is no anticipated future demand for additional recreational facilities. However, the County and the municipalities in the County should do everything possible to promote the use of the facilities available in the County as a means of expanding the tourism sector of the local economy.



TRANSPORTATION PLAN

➤ **Introduction**

Transportation facilities and services in any County vary according to a number of factors, including needs of the rural and urban population sectors, topography, population distribution and geographic location. The livelihood of the citizens of rural Antelope County and the citizens residing in the City of Neligh and the six villages in the County is, to a large extent, dependent upon convenient and efficient access to regional and national markets for the products produced in the County, as well as efficient circulation of people and goods within the County. Transportation planning is an important consideration in the future development of the County.

The geographic location of Antelope County, the western edge of Northeast Nebraska, at the edge of the Sandhills, results in population levels and densities that are relatively low. Due to the limited population and tax base, the ability to financially support a wide variety of transportation facilities and services is limited. Despite these limitations, the existing transportation facilities in the County, consisting of Federal and State Highways as well as the County road system that traverse the County.... Provided that the majority of the citizens, businesses and industries in the County depend entirely upon surface transportation, the availability and quality of the highway and County road system becomes critically important to the future of the County.

In addition to the road and highway system the Nebraska Northeastern Railroad serves the Villages in the northern portion of the County, and the Neligh Municipal Airport provide a basic transportation network which has served the County well in past years. This Transportation Plan will thus concentrate on the planning for this mode of transportation.

➤ **Transportation Planning and Land Use**

Land use and transportation create the pattern for future development. An improved or new transportation route generates a greater level of accessibility and determines how adjacent land may be utilized in the future. In the short term, land use shapes the demand for transportation. However, new or improved roads, as well as, county and state highways may change land values, thus altering the intensity of which land is utilized.

In general, the greater the transportation needs of a particular land use, the greater its preference for a site near major transportation facilities. Commercial activities are most sensitive to accessibility since their survival often depends upon the ease potential buyers can travel to this location. Thus, commercial land uses are generally located near the center of their market area along highways or at the intersection of arterial streets.

Industrial uses are also highly dependent on transportation access, but in a different way. For example, visibility is not as critical for an industry as it is for a retail store. Industrial uses often need access to more specialized transportation facilities, which is why industrial sites tend to be located near railroad lines, airports and/or highways to suit individual industrial uses.

➤ **Existing Roadway System**

The highways and roads in Antelope County are the responsibility of three different levels of government. The highways within the County, U.S. Highway 20 and 275 and Nebraska Highways 13, 14, 45 and 70 have been developed and maintained by the State of Nebraska with financial assistance from the Federal Highway Fund. The rural roadways, other than the highways, are the responsibility of the County and Township governments.

The roadways in the unincorporated areas of Antelope County are classified by function, not only by the County, but also the State and Federal governments. The classification system used by the County differs from that of the State and Federal governments with regard to terminology, but the overall identification of the major roadways are basically the same.

The County roadway classification system consists of four types of roads including:

- State and Federal Highways: Those roadways in the County, maintained by the Nebraska Department of Roads, which provide inter-county travel and link the County to regional and national markets.
- County Primary Roads: Those roadways, maintained by Antelope County, which serve both inter-county and intra-county traffic movement needs, as well as access to individual properties within the County. County Primary roads may be either paved or have a gravel surface
- County Secondary Roads: Those roadways, maintained by Antelope County, which serve to connect local roadways with the County Primary roads or highways serving the County. These roadways also provide access to individual properties, are typically less traveled and have a gravel surface.
- Local Roads: Those roadways, maintained either by Antelope County or individual property owners, which provide access to individual properties and connect to other higher ranked roadways in the County. These roadways receive only limited traffic volumes and are typically surfaced with gravel, but often receive less maintenance.

The Nebraska Department of Roads, utilizing guidelines of the Federal Highway and Transportation Departments, classifies the roadways in the County as they relate to the entire region. This classification system is as follows:

- Major Arterial: A major arterial roadway consists of state and federal highway routes serving major statewide interests for highway transportation. Major arterial roadways are characterized by high speed, relatively long distance travel patterns
- Other Arterial: Other arterial roadways, which can consist of primary or minor arterial roadways, consist of those roadways in the State which do not function as an expressway or major arterial, but which serve as through travel routes. These roadways also provide a secondary function of providing access to smaller urban areas and recreation or special use areas in the State.
- Collector: Collector roadways are those roadways which pick up (collect) traffic from the many local county roads and deliver such traffic to other arterial roadways or to urban population centers. Collector roadways are often referred to as farm-to market roads.
- Local: All other roadways not classified under a higher functional classification are considered local roadways. The primary function of local roadways is to provide access to abutting properties.

➤ *Existing Roadway System Issues*

An evaluation of the existing roadway system in the County identifies several positive and negative issues regarding the road system in the County. On the positive side, the County is well served by major highways. There are 113 miles of Federal and State highways within the County and these highways are distributed throughout the County. A highway serves all seven municipalities in the County and even the most remote location in the rural areas of the County is not more than 10 miles from a highway. Highway 275 serving the central portion of the County is the most highly traveled roadway in the County as it links the County to the urban centers of Norfolk and O'Neill. Highway 20, serving the northern portion of the County, at present the second most traveled roadway serves as a major farm to market roadway. With the construction of the bridge over the Missouri River at Niobrara, Highway 14 may well become a more heavily traveled roadway and have a significant economic impact on those urban areas along its route.

Highways 13, 45 and 70 are lesser traveled roadways, but are none the less important, because they provide high speed linkages to other major highways serving the north-central portion of the State and because they provide primary farm-to-market roadways in the northeast, southeast and southwest portions of the County.

The local roadways, those maintained by the County and the Townships, consist of 1,407 miles of roadways. Of this total 331 miles of road are the responsibility of the County while 1,076 miles are the responsibility of the local Townships.

The local County and Township roads consist of three types including: 1) earthen roads (no surfacing), 2) gravel roads, and 3) paved surfaced roads consisting of those roads with an asphalt or bituminous surface.

The majority of the local roads are gravel surfaced with 936.5 miles of roads, 66.6% of all the local roads in the County, having a gravel surface. This includes 156.6 miles of County roads and 779.9 miles of Township roads. Approximately 184.7 miles or just over 13% of all the local roadways in the County are paved with asphalt or bituminous concrete. The balance of the road miles in the local roadway system, 287 miles of roads, are described as natural earthen roads and have little if any surfacing material. Of these 287 miles of minimally improved roads, all but 0.95 miles are Township roads.

One of the issues related to the local roadway system is the condition of the roadways. During the planning process, a number of local citizens have indicated that they believe the roadways in the County should be maintained in a better condition. In evaluating this issue, it is important for the citizens of the County to understand several facts regarding the local roadway system. First, due to the geographic size of the County and the distribution of the rural population, the County and Townships are now maintaining nearly 1.1 miles of road for each household in the rural unincorporated area of the County. In comparison with other counties in north-central region of Nebraska, this is a relatively high number of miles to maintain.

The second fact that must be understood is that the County and the Townships are now limited in the amount of revenue that can be generated to maintain the roadways due to the tax lids approved by the Nebraska legislature. Thirdly, it must be remembered that road surface maintenance is not the only cost factor which must be considered. Again, due to the large

geographic size of the County, the County and the Townships must maintain a relatively high number of bridges and culverts. The cost of maintaining these transportation system structures can be a major factor in maintaining the local road system, particularly if these structures are not constantly monitored and improved or replaced as they age or are damaged due to major storms.

One rather obvious, but partial solution to this problem would be to consider vacating those roadways in the County, which are no longer needed. This solution sounds simple enough, but an evaluation of the existing lands uses in the County, particularly the locations of the rural dwellings, indicates that there are few, if any roadways which could be vacated. There are, potentially some minimum maintenance or primitive roadways, which could be vacated thus eliminating the need for the County to occasionally grade these roadways, but more importantly eliminating the potential liability, the County or Townships may have in the event of an accident on these unimproved roads.

Another advantage to vacating such roadways is that the land included in the rights-of-way for these roads will be placed back on the tax roles and the property owners adjacent to these roads can use the additional land for crop production or grazing. If the County or the Townships are maintaining bridge or culvert structures on these roadways, the cost of maintenance and eventual replacement would also be eliminated.

A better solution to the road maintenance issue would be to evaluate and identify methods of improving the efficiency and effectiveness of the road, bridge and culvert maintenance efforts by the County and the Townships. To accomplish this, it will be critical for the County and the Townships to develop a consistency in priorities for maintenance and improvements that will result in benefits to all the citizens of the County, particularly the rural citizens. In order to establish such priorities it is necessary to identify and designate the roadways in the local roadway system, which serve different functions and which are more highly traveled. A designation of these major roadways is the intent of the Major Road Plan described below.

➤ *Transportation Financing Issues*

The primary sources of information utilized in the maintenance and development of the transportation and circulation system are (1) County "One and Six Year Road Plan" and (2) the State of Nebraska "One and Five Year Highway Program." These state and local improvement plans should only be viewed as a planning tool, which are subject to change depending on financing capabilities of the governmental unit.

The County's "One and Six Year Road Plan" is reviewed and adopted by the local unit of government to address the issues of proposed road and street system improvements and development. Upon approval of these plans by the Board of Public Road Classifications and Standards, the governmental units are eligible to receive revenue from the Nebraska Department of Roads and the State Treasurers Office, which must be allocated to county road improvement projects.

The "One and Five Year Highway Program", developed by the Nebraska Department of Roads, establishes present and future programs for the development and improvement of state and federal highways. The One-Year Program includes highway projects scheduled for immediate

implementation, while the Five-Year Program identifies highway projects to be implemented within five years or sooner if scheduled bids and work for one-year projects cannot be awarded and constructed.

➤ *Antelope County's One- and Six-Year Plan*

The Antelope County One- and Six-Year Plan adopted during 2006 indicates 31 projects to be completed over the next six years using state, federal and local funding sources.

During the first year there are 13 projects identified in the Plan to be completed. Of the 13 projects there were two bridges identified for replacement; while the remaining projects were typically maintenance. The total anticipated budget in the first year was set at \$207,000.00.

Between years two and six, the county identified 18 projects to be undertaken. Of the 18 projects, eight were noted as bridge replacements. In addition, this portion of the plan noted six paving projects totaling 20.5 miles of Antelope County. The total anticipated budget for year two through six was set at \$4,691,000.00; of which there are state, federal and local funding sources identified. The local funds included in the anticipated projects total \$1,450,250.00 or approximately 31% of the total.

The recommended Major Roadway Plan for Antelope County is indicated on Illustration 4. This is designed to provide adequate surface transportation facilities to all areas of the County so that there can continue to be convenient local farm to market roadways and access into and out of the County for all of the citizens of the County. The Major Roadway Plan is based upon the functional classification system, because it reflects the functions of the roadways based upon actual usage of and traffic volumes on the roads over time.

An evaluation of the Major Roadway Plan indicates that maintaining the major arterial highways in the County will provide access to all portions of the County. Maintenance and improvement of the arterial highways in the County is the responsibility of the State of Nebraska and the County and Townships should work closely with the Nebraska Department of Roads in seeing that these major arterial roadways are kept in good condition.

The Plan indicates that there would be 128.5 miles of local roads classified as other arterial roadways. These roadways are distributed throughout the rural areas of the County and are located to provide arterial road links to the major arterial highways and serve as farm-to-market roadways. The distribution of these other arterial roadways indicates that even the remotest location in the County would be within seven miles of an arterial roadway with the average rural resident being only four miles from such an arterial road.

Of the total 128.5 miles of local roads designated as other arterial, 104 miles are now paved with an asphalt or bituminous surface. This is a relatively high proportion compared to other counties in the surrounding area, such as Pierce, Boone, and Knox Counties. This would leave less than 20% of these arterial roads to be improved to better serve this arterial road function.

The Plan indicates that there would be 141 miles of local roads classified as collector roadways. These roadways would function to collect traffic from local, less traveled, roads and link the traffic to the other major and other arterial roadways in the County. Again, the locations of these collector roadways are designed to provide a collector roadway in all areas of the County. Analysis of the Plan indicates that this collector roadway system will result in even the remotest

area of the County being within a maximum of four miles to a collector or arterial roadway. Of the total 141 miles of roads designated as collector roads, 80 miles or nearly 60% are already improved and paved with asphalt or bituminous. This would leave some 61 miles of roadways to be improved to better serve a collector road function, although such improvements does not necessarily include paving of these roadways.

The balance of the rural roads in the county, 1,137.5 miles, is classified as local roadways. 851 miles of these local roads or just fewer than 75% of all the local roads presently are maintained with a gravel surface. The balance of the local roads, some 286.5 miles, has no surfacing. It is these unimproved roadways which should be evaluated with regard to the need for these roads and the potential to remove them from the County and Township road system.

There will be several primary transportation facility and services issues, which the County will face in the future. The first of these will be how to maintain and improve the existing local roadways in the most efficient and effective manner possible. This can be best accomplished by establishing priorities for the maintenance and improvement efforts. Several priorities are recommended as follows:

1. Maintain and preserve the surface condition of the local arterial and collector roadways, which are now paved so that the pavement does not become in such poor condition as to result in the need to replace the pavement. The County and the Townships have made a substantial investment in these paved roadways and it is imperative that this investment be protected rather than lost. Maintenance of these paved roadways may not mean additional overlays of asphalt. It may mean an improved program of patching, sealing and / or armor coating of these roadways to extend their life until sufficient funds are available for overlays which will eventually be needed.
2. Coordinate the maintenance of the paved County and Township roads throughout the County so that all major patching, sealing, armor coating or overlay projects can be done at one time or in planned phases so that the County can receive lower bids for this work due to the larger scale of the projects.
3. Evaluate the present methods of providing maintenance of the County and Township roads, bridges and culverts and determine ways of improving efficiency and effectiveness through better and more coordinated use of manpower and equipment. Such evaluation might include determining the feasibility of utilizing private sector companies to provide services and/or products in the road and bridge maintenance efforts.

A second issue, which the County will face during the planning period, will be the increased demand for transportation services for the elderly. As noted in the Economic and Population Analysis and Projections, a component of this Comprehensive Plan, the number of elderly persons in the County will increase through the planning period as the population continues to age. Although many of these elderly persons will reside in the urban communities within the County, there will be an increased number of elderly persons residing in the rural areas.

To address these transportation services needs issue; the County should continue to support the coordinated efforts of the City of Neligh and the Nebraska Association of Transportation Providers. The City and the Transportation Providers provide a dial-a-ride service to the residents of Neligh. With the anticipated increase in these elderly transportation services, the dial-a-ride service and the equipment and manpower necessary to provide this service will need to be expanded.

The County should continue to manage transportation issues in conjunction with a Land Use Plan and zoning regulation which will direct the locations of large scale confined feeding operations, rural residential subdivisions and commercial or industrial uses which would place undue or unnecessary burdens on the existing roadway system resulting in an unplanned need for otherwise unnecessary road or bridge capacity improvements.

If the local government officials and the citizens of the County effectively address these transportation-related issues, the transportation system within the County should prove reasonably effective and efficient throughout the planning period.

Energy Sustainability Plan

Introduction

During the 2010 session of the Nebraska Unicameral, the State Senators approved and the Governor signed LB 997. This law requires that all counties and municipalities, except villages, in Nebraska when in the process of updating their comprehensive plans incorporate an energy element. This statute specifies that the energy element shall:

“Assess energy infrastructure and energy use by sector, including residential, commercial and industrial sectors, evaluate utilization of renewable energy sources and promote energy conservation measures that benefit the community.”

The later portion of the above statutory wording implies that municipalities and counties should develop plans which will have the effect of reducing energy use and costs as well

as creating “sustainable” communities. A “sustainable” community in this sense is a community or county that works to develop the ability to provide for present energy needs without jeopardizing the ability of future generations to live in the same or improved manner as we do today.

The need for an energy element is prompted by a convergence of factors, including fluctuating but generally rising cost of energy and the negative impacts that such rising costs have on consumers and the local economic development, dependence on imported oil and gas in a setting of global political instability, environmental concerns regarding fossil fuel pollution and mining, vulnerability of our centralized energy systems to terrorist threats, and the relationship of our energy use to alleged climate change.

In addition to the above noted factors, it is important to understand that the production and use of energy in the United States and thus Antelope County is a critical part of our quality of life and our national and local economy. Virtually every aspect of our national and local economies and quality of life is associated with the use of energy.

We all use energy in some form to light and heat our homes, operate our businesses and industries, producing, preparing and preserving our food, transportation, law enforcement, fire protection, health care and even our recreational opportunities.

These factors and the reality of dwindling supplies of non-renewable fossil fuels worldwide has prompted the Federal Government and the State of Nebraska to adopt policies that are more insistent on curbing increased reliance on fossil fuels. For example, Federal policy has set a goal of 20% of electrical power generation in the United States by the year 2010 be from renewable sources such as wind, solar, nuclear, or other renewable sources.

Successful energy strategies may decrease our overall energy use through conservation and efficiency and the development of renewable forms of energy. The benefits of successful strategies include:

- Decreasing costs to taxpayers, energy utility rate payers, individual households, businesses and industries,
- Enhancing spendable incomes of local citizens and enhancing opportunities for future local economic development,
- Increasing comfort in a northern climate,
- Decreasing pollution,
- Diversifying and distributing our energy systems to increase energy security,
- Decreasing carbon and other emissions which some believe is contributing to global climate change.

Local citizens will question what a small county like Antelope County can do to make a better environment and enhance the “sustainability” of the County. The reality is that County leaders and every citizen can make a small, but positive, impact for a better environment now and for the future sustainability of the County for the next generation.

This energy element is structured to not only comply with the requirements of LB 997, as indicated above, but will also identify strategies that the County governing officials and citizens of the County can utilize to reduce energy use and costs now and in the foreseeable future, as well as enhance the present and future environment and local economic development opportunities.

ENERGY INFRASTRUCTURE AND USE

The energy infrastructure in Antelope County consists of publicly and privately owned and operated facilities and services to provide:

- electrical power,
- natural gas,
- petroleum products, and
- other energy sources such as combustion of wood, geothermal and solar energy for heat and/or cooling.

An analysis of energy use within this infrastructure in Antelope County has considerable variables resulting from anything from local annual changes in economic activity to year to year weather conditions. For these reasons and for lack of data for some types of energy, it is more reasonable and most likely more accurate to utilize documented statewide statistics and averages regarding energy consumption to evaluate local energy use.

The following is a statistical analysis of energy use in the County which utilizes statewide data converted to the population and economic activity in Antelope County utilizing per capita statewide energy use data and population estimates for Antelope County in 2009. It is important to understand that this data includes Antelope County's population's share of energy use by energy providers to provide the energy at the local level. The data includes, for example, the energy used to produce electricity which is in turn used by customers in Antelope County.

The data presented is in the form of British Thermal Units (Btu's) which is a standard measure of heat energy. A British Thermal Unit is defined as the energy it takes to raise the temperature of water by one degree Fahrenheit at sea level. For example it takes approximately 2,000 Btu to brew a pot of coffee. A Btu is equivalent to 0.293 wathours.

Estimated energy consumption by sector in Antelope County for 2009, the last year with complete data, is indicated in Table 17. The estimated total energy use in Antelope County in 2009 was 28,300,000,000,000 (28.3 trillion) Btu's.

TABLE 17

TOTAL ESTIMATED ENERGY CONSUMPTION BY SECTOR - 2009
Antelope County, Nebraska

Use Sector	Estimated Energy Consumption (trillion Btu's)	% of Total Consumption
Commercial	5.0	17.7%
Industrial ¹	11.2	39.6%

Residential	5.7	20.1%
Transportation	6.4	22.6%
TOTAL	28.3	100.0%

Source: Nebraska Department of Energy with conversion of statewide data by Stahr & Associates, Inc.

1. Industrial consumption includes agricultural production consumption

The industrial sector in Antelope County, which includes the agricultural sector, is the largest energy consumer of energy utilizing nearly 40% of total energy consumption in the County.

The transportation sector is the second largest consumer of energy. This sector consists primarily of automobile and truck usage of energy. This sector used slightly nearly 23% of the total energy consumed in Antelope County in 2009.

The residential sector utilized 5,700,000,000,000 Btu's of energy in 2009, comprising the third largest energy use in the County. Residential energy use consists of energy used for heating, cooling, heating of water, food preparation and preservation, lighting, ventilation and communications including television and computer use.

The smallest energy use sector in the County is the commercial sector. The sector utilized only 17.3% of total energy consumption in the County in 2009.

In order to have a better understanding of energy consumption in the County and to provide information regarding which end use sectors have the most potential for energy conservation an analysis of the types of energy used by each sector is needed.

The data presented in Table 18 provides details regarding which sectors use which forms of energy together with which sector utilized what portions of each type of energy.

TABLE 18

¹ Nebraska Department of Energy, 2012

ESTIMATED ENERGY CONSUMPTION BY SECTOR & TYPE OF ENERGY - 2009

Antelope County, Nebraska

Use Sector	Type of Energy Consumption (trillion Btu's)									
	Coal	% of Total	Natural Gas	% of Total	Petroleum	% of Total	Electricity ¹	% of Total	Other ²	% of Total
Commercial	-	-	1.20	24.0%	0.08	1.6%	3.68	73.6%	0.04	0.8%
Industrial ³	0.27	2.4%	3.07	27.3%	1.50	13.4%	3.76	33.5%	2.63	23.4%
Residential	-	-	1.51	26.4%	0.30	5.3%	3.80	66.5%	0.10	1.8%
Transportation	-	-	0.25	3.9%	5.95	93.4%	-	0.0%	0.17	2.7%
TOTAL	0.27	-	6.03	-	7.83	-	11.24	-	2.94	-

Source: Nebraska Department of Energy with conversion of statewide data by Stahr & Associates, Inc.

1. Electricity consumption includes transmission energy losses
1. Other energy consumption includes geothermal, wood, solar energy and losses and co-products associated with renewable energy production
2. Industrial consumption includes agricultural production consumption

ESTIMATED NATURAL GAS CONSUMPTION

As indicated in Table 18, in 2009 an estimated 6,030,000,000,000 Btu's of natural gas was consumed in the County. Of this total, the industrial sector, which includes agricultural production, utilized over 3,070,000,000,000 Btu's or nearly 51% of all natural gas consumed in the County.

The residential sector in the County consumes the second largest amount of natural gas. In 2009, residential uses consumed 1,510,000,000,000 Btu's or just over 25% of total natural gas consumption. In this sector natural gas is used primarily for heating of residential dwellings, heating of water and cooking and baking of food. This sector has considerable potential for energy conservation through enhancement of the energy efficiency of each residence. Even only a 10% reduction in consumption would result in a savings of some 151,000,000,000 Btu's of natural gas per year. At current prices for natural gas, this would result in a savings of over \$1,527,000 per year for local residents.

The commercial sector consumed just under 20% of the natural gas consumed in Antelope County in 2009. The estimated 1,200,000,000,000 Btu's consumed by the commercial sector was used for a variety of purposes including heating and food preparation. Like the residential sector, there is considerable potential for energy

conservation through enhancement of the energy efficiency of commercial buildings and processes.

The transportation sector consumed a quite limited quantity of natural gas in 2009.

ESTIMATED PETROLEUM CONSUMPTION

In 2009 an estimated 7,830,000,000,000 Btu's of petroleum products were consumed in Antelope County. As would be expected the vast majority of petroleum product consumption was used for transportation of people and goods. Of the total petroleum products consumed 47.3% was motor gasoline and 40.7% was diesel fuel. Diesel fuel is used primarily in the production of crops and transportation of crops, livestock and goods while motor gasoline is used for transportation of people - our automobiles and pickup trucks.

There is considerable potential for reductions in both diesel fuel and motor gasoline consumption through either conversion to renewable sources or through reductions in usage. The use of bio-diesel can substantially reduce the use of petroleum based diesel fuel while the use of higher levels of ethanol enriched motor gasoline can substantially reduce the use of petroleum based gasoline. A change of only 5% in the type of diesel and motor gasoline could have considerable impact on the demand for oil based fuels. A 5% conversion of the type of diesel and motor gasoline would result in a reduction of 391,500,000,000 Btu's of consumption of oil based fuels and help to reduce our Country's dependence on foreign oil.

ESTIMATED ELECTRICAL ENERGY CONSUMPTION

Consumption of electrical energy in Antelope County in 2009 is estimated to have been 11,240,000,000,000 Btu's. This consumption is comprised of two parts. The first part is the net consumption of electrical energy by all use sectors in the County. The second part is the energy loss in the electrical energy transmission system that represents the County's portion of the total energy delivery system loss on a per capita basis.

Approximately 32% of the electrical energy consumption, some 3,620,000,000,000

Btu's, consists of actual use by all sectors in the County. The balance of the total consumption (68%) or some 7,620,000,000,000 Btu's represents the electrical energy loss in the transmission system to get the electrical energy to the County.

Electrical energy consumption in Antelope County in 2009 was very evenly split between the residential, commercial and industrial sectors. There was no usage of electrical energy in the transportation sector.

Although the industrial sector consumption of electrical energy is primarily in the irrigation of crops and manufacturing processes, there is considerable potential for conservation of energy in this sector as well as the commercial and residential sectors. A large portion of electrical energy consumption is used for heating, cooling, food preparation, lighting, water heating and appliance use. The enhancement of these components in terms of energy efficiency would result in substantial electrical energy conservation in all use sectors.

ESTIMATED ENERGY CONSUMPTION FROM RENEWABLE SOURCES

It is estimated in 2009 all economic sectors consumed approximately 3,023,000,000,000 Btu's in energy derived from renewable sources. However, as indicated in Table 19, 81.7% of renewable energy consumption occurred as losses and co-products generated in the production of ethanol, thus the net consumption of energy from renewable sources in Antelope County is estimated to have been only 553,000,000,000 Btu's. This amounted to only 1.95% of total energy consumption in 2009.

TABLE 19
ESTIMATED ENERGY CONSUMPTION BY SECTOR FROM
RENEWABLE ENERGY SOURCES - 2009
Antelope County, Nebraska

Type of Energy Consumption (trillion Btu's)

Use Sector	Ethanol	% of Total	Losses & Co-Products	% of Total	Wood & Waste	% of Total	Geo-Thermal	% of Total	Solar	% of Total
Commercial	.001	2.3%	-	-	.014	32.6%	.028	65.1%	-	-
Industrial	.004	0.2%	2.47	94.0%	.153	5.8%	-	-	-	-
Residential	-	-	-	-	.085	46.2%	.099	53.8%	-	-
Transportation	.169	100.0%	-	-	-	-	-	-	-	-
TOTAL	.174	-	2.47	-	.252	-	.127	-	-	-

Source: Nebraska Department of Energy with conversion of statewide data by Stahr & Associates, Inc.

Note: Losses and co-products are from the production of ethanol.

Of the renewable energy resources consumed in Antelope County in 2009, 46% was use of wood and waste products. The second largest consumption of renewable energy was the estimated 174,000,000,000 Btu's of ethanol consumed primarily by the transportation sector. The smallest consumption category renewable energy was in the form of geo-thermal energy used primarily in water to air heat pump systems for heating and cooling of buildings.

It should also be understood that a portion of the electrical energy consumption in the County is derived from renewable resources. In 2009 approximately 2.1% of total electrical energy consumption in the State was generated through the use of renewable resources including hydroelectric power, wind power and combustion of wood and wood waste, landfill gas, biomass and solar. Thus total consumption of energy from renewable energy sources in the County in 2009 is estimated to have been 4% of total energy consumption by all sectors.

ENERGY EFFICIENCY AND CONSERVATION STRATEGIES

Energy conservation is the wise use of energy and the avoidance of waste. Energy efficiency refers to achieving the same desired goal, such as powering a building while reducing the energy inputs or “doing more with less”. Energy savings are often

achieved by substituting technology more advanced equipment to produce the same level of end-use.

Conservation can be achieved on several levels, from walking or biking instead of use a car to adding more insulation to a building. Efficiency examples include using high efficiency Energy Star appliances and systems, substituting compact florescent (CFL) or light emitting diode (LED) light bulbs for less efficient incandescent lighting.

Energy conservation is the first priority in achieving energy efficiency in existing buildings. A stepwise approach using energy assessment, audit and weatherization is recommended. An assessment of energy intensity or general energy use of a residential, commercial, industrial or governmental building can be done using an online energy assessment calculator such as the EPA Home Energy Yardstick.

Where an energy use assessment indicates notable energy use inefficiencies, the assessment can be followed up by an energy audit which is usually performed by a building science professional and may employ technology such as infrared cameras and pressurizing equipment. Weatherization or energy retrofit is based on the results of the assessment and audit. Significant decreases in electric and thermal energy needs can be achieved by this approach and the cost of the energy audit and the work is offset by the energy cost savings and possible rebates from state or federal sources.

Using efficient building methods and efficient systems for new construction will reduce energy use and operating costs over time. Creating local requirements that new construction meet or exceed the State Energy Code is one approach worth considering in Antelope County.

ENERGY EFFICIENCY AND CONSERVATION GOALS AND STRATEGIES

The best way to achieve higher energy efficiencies in the short and near term in Antelope County is to encourage the implementation of energy conservation measures

in all energy use sectors and implement programs and projects to improve energy efficiency in County buildings and operations.

The following goals and strategies are recommended to maximize the potential for energy conservation:

GOAL: Improve the energy efficiency of County Buildings and Operations

Antelope County should lead by example to show residents and businesses in the County how they can conserve energy, reduce their impact on climate change and reduce their dependence on fossil fuel energy. In order to accomplish this goal the following strategies are recommended:

- Assess and benchmark the energy efficiency of all County buildings,
- Audit and retrofit those County buildings where the assessment and audit indicates additional energy efficiency can be achieved.
- Evaluate the County's vehicle fleet, including automobiles, trucks and road maintenance equipment with regard to use of higher levels of ethanol fuel and biodiesel fuel. In the case of gasoline with higher levels of ethanol such as E-85 and biodiesel, the costs are slightly higher than standard oil based fuels. However, the benefits of generating higher demand for these renewable fuels will help reduce costs in the long term.
- Implement a purchasing strategy for future acquisitions of Energy Star equipment in all County facilities.
- Encourage the municipalities in the County to analyze street lighting efficiencies and replacement of street lighting if energy efficiencies are sufficient to warrant a conversion.

GOAL: Promote conservation and energy efficiency in the private sectors of the local economy.

For the benefit of all of its citizens, Antelope County should take the lead in promoting energy efficiency and conservation in the private sectors of the local economy by implementing the following programs:

- Showcase County actions to educate the public on successes of energy conservation measures. Communicating the energy conservation actions and results can be accomplished through newspaper coverage and having such information available in a County web site.

- Work with the local newspapers and the Nebraska Energy Office to create an on-going communication program which promotes energy conservation by informing readers what they can do to conserve energy. Through an on-going series of articles, this program should address a number of energy conservation elements including:
 - How readers can access and utilize the EPA Home Energy Yardstick to provide a no-cost initial energy consumption assessment.

 - How to access energy audit expertise if a detailed energy audit is desired by any reader.

 - What specific energy conservation actions can be taken together with typical costs and payout periods. This component should address all aspects of energy conservation ranging from replacement of incandescent light bulbs with compact florescent bulbs, addition of installation, installation of programmable thermostats, installation of low-e windows and doors and installing Energy Star appliances, furnaces and air conditioning equipment.

- What programs and incentives are available to help pay for the cost of energy conservation efforts and how to access these programs.
- Consumer guides to the utilization of small wind energy systems, solar panels and geo-thermal equipment and the pay-back periods associated with each.

RENEWABLE ENERGY

General Characteristics

The U.S. Department of Energy defines renewable energy as “energy which comes from sources whose supplies are regenerative or virtually inexhaustible”. Proponents recommend expansion of these sources to meet future energy demands, diversify energy sources and minimize environment impacts.

While there are a host of benefits to renewable energy projects including reduced emissions and decreased transmission losses in a decentralized energy grid, there are negative impacts. These include environmental impacts to wildlife habitat, visual changes to the landscape and economic constraints. Renewable energy sources are inexhaustible, although sometimes limited in the amount of energy available per unit of time. A wind power generator may generate a lot of energy when the wind is blowing, but no energy when there is no wind. Both the positive and negative impacts need to be weighed against each other so an informed and educated decision can be made about their expanded role in Nebraska and Antelope County.

Renewable energy contributes to energy assurance by adding diversity and additional energy resources to meet the County’s needs. It also provides energy security by using indigenous energy resources which are less subject to geopolitical influences. These sources provide environmental protection by reducing pollution and other negative impacts on air, water and land while meeting the energy demand in ways that can be maintained indefinitely. There are also opportunities to create economic stability and

growth by using renewable energy technology to retain dollars in-state and in-county, create new jobs and stimulate the local economy.

Development of additional renewable energy sources is also important due to our increased use of energy. Since 1999 total energy consumption in Nebraska increased by over 107,000,000,000,000 Btu's representing an increase of over 16%. As non-renewable energy sources become more scarce and as prices for more scarce resources increase, the need for the development of renewable energy sources also increases.

Renewable Energy in Nebraska

In Nebraska there are an abundant renewable energy possibilities, especially wind, solar, wood, geothermal, biomass (ethanol), biodiesel, hydroelectric and methane gas. Currently some of these renewable energy resources (especially wind, geothermal and methane gas) are greatly underutilized. In Nebraska in 2009, only 4% of the gross energy use was from renewable sources.

The greatest progress in renewable energy technology has occurred within the wind power industry. In the early years of wind energy technology, electricity production cost was approximately 30 cents / kwh. By 2002, cost of electricity production from wind energy systems dropped dramatically to 3 to 5 cents / kwh. Although improvements in technology for small wind energy generators has improved, but energy production cost vary widely depending on the application. Energy production costs for these small systems range from 11 to 90 cents / kwh.

Geothermal technologies have not had such a dramatic advancement, however, these systems are among the cheapest renewable energy sources to produce electricity at 2 to 4 cents /kwh. This cost is the average for geothermal power plants. Another form of geothermal energy use in the use of geothermal heat pumps. These systems are becoming very popular for commercial and residential applications because they are 3 to 4 times more efficient than a typical high efficiency fossil fuel furnace for space heating.

The highest price for electricity from a renewable energy source is from photovoltaic panels which average about 38 cents / kwh.

For comparison, electricity produced from traditional fuel sources cost approximately:

- 3 - 5 cents / kwh for coal
- 10-12 cents / kwh for oil
- 6-8 cents /kwh for natural gas, and
- 10-14 cents / kwh for nuclear.

Therefore it can be said that properly sited renewable energy projects are price competitive with traditional fuel sources.

Renewable Energy in Antelope County

As a single governmental entity, Antelope County is somewhat limited in what it can do to encourage the development of renewable energy generation projects, but the County can and should implement several strategies and projects to encourage the use of renewable energy sources in the County. These can include:

- The County Board of Supervisors should evaluate the potential cost savings of retrofitting the courthouse and/or other County buildings with closed-loop geothermal heat pumps and, where there would be a notable savings, budget for and implement such projects.
- Adopt codes that require compliance with the Nebraska State Energy Code for all new and retrofitted buildings utilizing compliance certification by the Nebraska Energy Office and encourage green building design, geothermal and solar energy production systems.
- Evaluate the benefits of utilization of gasoline with a higher percentage of ethanol and bio-diesel in the County's automobile and road maintenance fleets.

- Similarly, as increased availability of electric and hybrid vehicles occurs, the County should evaluate such vehicles to determine if replacement of existing vehicles would be warranted.

It should also be noted that the local energy consumption sectors in Antelope County will now and in the future be utilizing electrical power generated by more renewable energy sources. The Nebraska Public Power District, which supplies electrical power to the County, has agreed that it will utilize renewable energy sources to produce 10% of its total electric energy by the year 2020. This will be a notable increase in electric power produced by the use of renewable sources in 2009 which amounted to only 2.1% of total electric power generated.