

## **Chapter Six: Infrastructure and Transportation**

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### **6.1 INTRODUCTION**

The quality and condition of infrastructure and transportation systems affect all communities and are central to the development or redevelopment of neighborhoods, regardless of the particular land use of a neighborhood. Meeting citizen needs for municipal services such as water, sanitary sewer, and transportation of goods and people within the community is a basic function of any city and is critical to maintaining an adequate quality of life for citizens. It is equally important in efforts to secure economic development.

### **6.2 VISION**

The City will be proactive in developing the best, most cost-effective methods of addressing the current shortcomings in its aging street network, aging utility network, and maintaining the flood protection systems, thereby positioning the city for desired growth.

### **6.3 SURVEY RESPONSES AND COMMENTS**

In early 2013, when asked for their input in a community survey conducted for this comprehensive plan, citizens responded they rated the quality of the City's infrastructure system as average, with the highest satisfaction with the sewer system. When asked how willing they were to pay increased taxes or fees for a variety of items, citizens ranked infrastructure improvements third as something they were very willing (24%) to pay for and first among the items they were somewhat willing to pay increased fees or taxes (50%). Further, when asked what three issues were the most important related to property development, the issue identified as most important was existing public water and sewer service, by a wide margin.

When asked about their level of agreement with the following statements, the results were:

		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>TOTAL RESPONSES</b>
A.	The overall street network in the City meets the needs of citizens	5%	14%	24%	<b>49%</b>	8%	687
B.	I support further construction of pathways and sidewalks to promote walking and bicycling in the City	11%	17%	26%	<b>34%</b>	13%	689
C.	The speed at which drivers travel in residential areas is unsafe	7%	22%	27%	<b>30%</b>	15%	689
D.	Obeying stop signs and signals in residential areas is a concern	6%	18%	29%	<b>31%</b>	16%	681
E.	I support a program for sidewalk replacement in residential areas	6%	14%	35%	<b>36%</b>	9%	672
F.	I support the use of public dollars for rail connections for passenger train service between Fort Worth, Oklahoma City, Wichita and Kansas City	11%	9%	23%	28%	<b>29%</b>	744
G.	I support City removal of snow on main arterials but not residential side streets	11%	23%	21%	<b>35%</b>	10%	685
H.	I support modernizing streetlights to reduce energy costs	5%	10%	30%	<b>41%</b>	15%	686
I.	I support reduced mowing and trimming along city streets to save public funds	13%	36%	<b>29%</b>	17%	6%	696
J.	I support planning for the West Bypass connection to Madison	11%	18%	<b>41%</b>	23%	8%	678
K.	The City needs to increase its planning efforts to encourage quality development	2%	7%	38%	<b>41%</b>	12%	685
L.	The City should encourage development within the City by offering incentives for redevelopment of properties	5%	7%	30%	<b>42%</b>	16%	689
M.	I support future expansion of the city limits if developers share in the cost of infrastructure improvements	8%	10%	28%	<b>40%</b>	13%	685
N.	The City is making acceptable progress on ADA/Handicap Accessible Routes	3%	6%	<b>46%</b>	38%	8%	664
O.	I support preservation of brick streets in the historic downtown area	10%	11%	27%	<b>32%</b>	20%	693
P.	I support preservation of all the brick streets in the City	14%	15%	<b>31%</b>	22%	18%	697

The city has begun designing a water treatment plant for the community and as part of the survey, wanted to gauge community support for some aspects of that plant, as follows:

<b>To make the best use of investment in the Water Treatment Plant Project the City should:</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>TOTAL RESPONSES</b>
A.	Create a wetland for water re-use and educational programs for USD 470, Cowley College and the community	7%	9%	31%	<b>38%</b>	15%	655
B.	Create a wetland for a cleaner environment and to maximize usage of our limited water resources	6%	7%	27%	<b>41%</b>	19%	655
C.	Pursue opportunities to sell water to the casinos and communities south of the City	10%	15%	28%	<b>33%</b>	14%	635
D.	Explore new programs with Cowley College for the training of water treatment plant operators	5%	6%	30%	<b>43%</b>	16%	660
E.	Pursue sustainable building practices when constructing the new plant	2%	2%	26%	<b>47%</b>	22%	673

Given the history of flooding in the City, the management of stormwater is important so survey information was requested on this subject. When asked for their support for regulations that continued to make stormwater management and reduction of flooding a priority, 72% either agreed or strongly agreed. The feeling on other stormwater-related questions was not as strong, though 59% agreed or strongly agreed that working to improve the environment and rivers by having cleaner stormwater should also be action the City should take. Other stormwater survey questions resulted in a majority of neutral answers, so either more education or clarity needs to be had on these issues including requiring reduced runoff, stormwater impact fees, and exempting non-profits from stormwater fees.

#### **6.4 EXISTING INFRASTRUCTURE AND TRANSPORTATION SYSTEMS**

The City has been somewhat proactive in studying and investing in water and wastewater infrastructure over the years, but less so with regards to roads and stormwater systems. More work is needed to provide good management and growth of the existing transportation, water and wastewater systems for the future.

##### ***Water***

A sound water system is crucial to any community and its ability to grow. Water supply, storage and distribution, including water flow, must be considered not only for meeting the needs of citizens on a daily basis, but also for firefighting. The City's water sources are from ground water rights to ten well areas that are fed by the Arkansas River in the Ark Alluvium aquifer system. Some of the water rights are vested, but two are not. A vested right is fixed, unalterable and irrevocable, giving the city the most certainty. The vested combined water rights held by the City provide for 408 million gallons per year at a rate not to exceed 3,100 gallons per minute. Combined with the non-vested rights, the total rate of diversion from all ten wells is 1.264 billion gallons per year, with a not to exceed total of 6,000 per minute. During the drought, summer 2012, a record five million gallons per day was treated. The treatment consists primarily of chlorine and lime, with fluoride and other chemicals added as well.



The city's new water treatment system is expected to solve a number of problems that exist in the current treatment plant, with redundancy of equipment such as the clarifiers, lime system, and other equipment that has outlived its

functionality. The new plant will have pump valves that open gradually, a much better system for the supply system. The plant will provide six million gallons of water a day at capacity. There will be two one-million gallon clear wells constructed as well as better storage of chlorine. New technology will allow monitoring operations from off-site.

A city's water supply must also provide the water storage needed to adequately fight fires. Average daily demand should be supplemented by at least enough water to fight a four-hour fire. Included in the supply calculations is water stored in water towers. The two elevated storage towers in Arkansas City, one 1,500,000 gallons, one 500,000 gallons, aid in water supply, particularly for fireflow. Other benefits of water storage are meeting peak hourly demand fluctuations and emergency supply due to interruption in source. Bryant Standpipe has a capacity of 1.5 million gallons and is located at 306 W. Bryant Road. Goff Tower has a capacity of 500,000 gallons and is located at 418 Goff Industrial Park Road. A current issue in the water supply system is the need to address flow concerns, through a looped system, east of the Walnut River.



### ***Sanitary Sewer***

Essential to the health of citizens in all cities is appropriate sanitary sewer treatment. Timely extension of sewer service lines is critical to development. Such extensions are affected greatly by topography. The most economical system uses topography within drainage basins, allowing gravity to move waste. The costs are more affordable at both installation time and over time, reducing ongoing maintenance. However lift stations are necessary in some locations. Good planning takes into account which areas can be served with gravity and which areas cannot, and future land use classification is one way to show that this factor is understood. Once waste is collected, mechanical and biological processes break it down. The final treatment separates the mixture into water and bio-solids. In Arkansas City, the treated wastewater is returned to the Arkansas River.

The sanitary sewer treatment plant is located at 1701 S. M Street and went online in 1958. There have been some major modifications such as the grit settling basin converted to aeration tank in 1980, along with pump upgrade, recirculation wetwell and pump station construction. Since 2000, the effluent pump station and UV disinfection were constructed, barscreens replaced and clarifier return sludge valves replaced. Also pumps were replaced and a laboratory upgrade made. More recently, in 2009 the final clarifier drive was replaced and in 2011 the primary clarifiers were rebuilt. The capacity of the plant is 2.1 million gallons a day (MGD), average flow, with a maximum of 4.7 MGD,

and an hourly peak of 6.6 MGD. The City's average flow is 1.2 MGD, with peak flows historically in July of 2007 (flooding) of 7.2 MGD. The treatment process is an extended aeration secondary which means the ammonia is removed by nitrification, with two biological processes trickling filters and activated sludge. The sludge handling is an anaerobic digestion dewatered in drying beds, which produces Class A EQ bio-solids. Within the next five years, the City will have to evaluate the life of the Wastewater Treatment Facility to determine if additional upgrades are best or if a new plant will be required to be constructed to meet the community needs.

The sanitary system is comprised of 80 miles of sanitary sewers mains and five lift stations. The system outlet for all lines is the municipal wastewater treatment plant in southeast Arkansas City, at 1701 South M Street.

### ***Other Utilities***

Electrical supply is provided by Westar Energy and natural gas is supplied by Kansas Gas Service. Local telephone service is provided by AT&T and cable by Cox Communication.

### ***Stormwater Management***

Stormwater volume and flow can limit future development. Areas with a significant propensity to flooding are commonly designated as a 100-year floodplain, hence there is a 1:100 or greater chance that they will flood each year. It is preferable to avoid any urban development in the floodplain; although development regulations recognize a distinction should be made between the floodway and the flood-fringe.

The floodway incorporates the center channel of the waterway and carries a majority of the floodwaters, or in other terms, the center portion of the floodplain which can carry an additional one foot of water after the entire floodplain has been filled.

The flood-fringe is the area between the floodway and the edge of the floodplain. Land within this area can be developed if precautionary measures are taken. These measures include building on enough fill to raise the level of the lowest floor a minimum of one foot above the flood elevation, or sufficiently floodproofing the building itself from hydrostatic and hydrodynamic effects.

A floodplain management program was adopted by the City in the early 1980s, but the most recent regulation was adopted in August of 2010, after a study to determine the flood hazard areas. By having the areas mapped and regulations adopted, owners of property are eligible to purchase flood insurance.

Floodplains include area around both the Arkansas River and the Walnut River. While much of the built area of the community near the rivers is protected by levees, they are still at risk in the event of a levee failure. In Arkansas City, the

length of levee is eleven miles, the longest of any city in the state on a per capita basis.

A map showing the floodplain in and around Arkansas City is included at Appendix I. The map illustrates the potential risk of flood surrounding the community, except to the north and northwest.

The flood of early November 1998 was the most significant flood in recent history with 430 structures damaged by floodwater and 88 destroyed, along with approximately 3000 people evacuated in and around the City. There was eight million dollars in property damage. While the local rainfall was 5.5 inches, the basin received six to ten inches of rain north of the City, worsened by higher than normal precipitation in the month prior. Peak gauge reading was 28.89 feet for the Arkansas River and 32.45 feet for the Walnut. The primary reasons the east side of the community experienced significant flooding were the new levee south of Madison Street was not completed due to some archeological discoveries that delayed levee construction, and a failure of the old levee east of the City's F Street burn pit.

One significant improvement in recent years is the levee/bypass project for U.S. Highway 77, which offers additional protection for the eastern portion of the community from flooding of the Walnut River. This work was completed in 2000. Continuing to enforce stormwater regulations, discouraging development in certain areas, and maintaining the levee system are essential to protecting the City.

The Public Works Department is responsible for stormwater system maintenance and improvements. There are two canal areas that drain water to the Walnut River. These are maintained by the City, "C" Street and the city's "historic" district canal.

## ***Transportation***

### ***Existing Road and Highway Network***

Arkansas City has excellent access to major transportation systems in Kansas through its connections to U.S. Highway 77 (north-south) and U.S. Highway 166 (east-west). These connections allow for both export and import of goods via truck as well as transporting people for work, tourism, or shopping.



Northbound U.S. Highway 77 carries an average of over 11,200 vehicles per day, with the southbound count lower at just over 9,200. The bypass count ranges from 4,430 to 5,170 according to the Kansas Department of Transportation map published for July 2012. The eastbound traffic on U.S. Highway 166 is just over 4,000 vehicles daily just outside the city limit and westbound is nearly 3,500

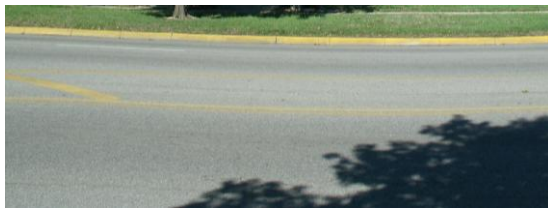
vehicles. Highway connections feed the interior road networks to facilitate transportation needs within the community. Primary growth is expected along U.S. Highway 77, north of the community, in keeping with recent trends and because other areas will be difficult to develop due to floodplains.

### ***Standard Street Classification***

Due to the need to transport both people and goods within the community as well as to and from the community, transportation systems are intricately woven with economic development and land development. Streets are classified based on a



hierarchical system considering vehicular movement from one area to another, or from home to work, home to shop, goods from one location to another. This system is generally designed with three basic categories of roads: arterial,



collector and local. The arterial are major roadways, designed to carry greater traffic volumes, fed by collector streets, and ideally with only connections from other streets to allow for fewer intersecting points. Collector streets

connect local streets, the lowest classification, to arterial streets, the highest classification. Residents leaving home typically drive from their driveway onto a local street, which is then connected to a collector street serving other residents from a particular area, and then enter an arterial road for through traffic to their destination area, then back to a collector/local to work, shop, and to access services.

It is desirable to protect arterials by controlling street access. Private driveways are discouraged on major arterials and should be limited where possible, to promote safe and efficient traffic flow. Access control guidelines may need to be developed as a goal of the comprehensive plan, if they are not provided elsewhere, particularly for arterials and possibly for collectors. In addition, street widths for all classifications of roadways should be determined as an aid to developers and decisionmakers. As the community grows, considerations for rural roads should also be made for their transition from roadways with ditches to curb and gutter systems.

It is recommended the City forecast which streets are anticipated to become arterials and collectors. Currently, Arkansas City classifies its streets using Kansas Department of Transportation classifications. Map 6-2 identifies these classifications. Ongoing review should occur each year or two to be sure that additional roads are included as development warrants. All other roadways would be classified as local roads.

### **Air Transportation**

Arkansas City has Strother Field for its local air service, located along U.S. Highway 77, approximately five miles north of the City. The field was built in 1942 for the Army Air Force. Deactivation of the field occurred in 1945 and the field was returned to Winfield and Arkansas City. The airport has two lighted, hard-surfaced, pilot controlled runways, one 5500 feet, the other 3150, enabling the accommodation of various aircraft. The terminal building was constructed in 1970 along with a conventional hangar to accommodate the pilots' needs, the needs of the FBO, weather updates, charters, aircraft rental and repair, fuel and flight instruction. The master plan for the airport was completed in 1996 and within the next few years it is anticipated a new plan will be needed. Goals at the airport include rehabilitation to both runways and taxiway B, with reconstruction of the terminal apron and construction of a taxi lane as longer-term goals.

### **Rail Transportation**

Rail service for freight is provided by Burlington Northern Santa Fe, and there are railroad spurs serving businesses in Strother Field that connect to the main lines.

### **Other Transportation**

The City has only limited public or private operated general public transportation. While the 2013 community survey did not pose questions regarding the need for additional transportation services it is believed there may be demand for more bus or van service to Winfield, Wichita and other nearby communities as well as in-city transportation. It is likely that the demand is greatest among elderly citizens who often have limited transportation options and important travel needs, e.g., specialized medical care.

### **Pedestrian and Bicycle Paths**

The City has several recreational opportunities for walking, hiking, and biking, and continues to receive citizen support for more. As stated in Chapter 5 of this Plan, providing a connected series of sidewalks and paths is seen as a positive for the community, and is an alternative means of transportation that merits discussion in this chapter. Consideration should be given to utilizing the canal area, levee areas or former railroad corridors as the backbone for a pedestrian network. Connections with major public facilities such as parks and schools enhance transportation opportunities for youth in the community as well. Furthermore, careful attention to developing sidewalk programs that serve not only adjacent properties but also the community at-large can enhance the community through better health and well-being and also be a point of community pride.

## **6.5 GOALS AND ACTIONS**

Goals represent overall vision and desired outcomes. They describe the community we hope to develop together in the future. The following goals



implement the overall vision for infrastructure and transportation. Their purpose is to focus resources for the improvement of these central components which are critical to the sustainability and growth of Arkansas City. These goals are derived, in large part, from survey responses and other input from private individuals and public officials.

<b>Goal</b>	<b>Establish a General Public Transportation Service, if Community Needs and Support Exists for that Service.</b>
<b>Goal</b>	<b>Maintain and Improve the City's Streets and Sidewalks According to an Adopted Capital Improvements Schedule and Dedicated Funding.</b>
<b>Goal</b>	<b>Identify the Best, Most Cost-Effective Methods of Addressing the Current Shortcomings in the Street Network.</b>
<b>Goal</b>	<b>Preserve Downtown Brick Streets Where Feasible and Brick Streets Outside the Downtown When Neighborhood Support, and Funding, Exist.</b>
<b>Goal</b>	<b>Make Necessary Improvements to the Water Treatment and Distribution Infrastructure.</b>
<b>Goal</b>	<b>Develop a Stewardship Program Emphasizing Water Conservation and Reuse.</b>
<b>Goal</b>	<b>Make the Necessary Improvements to the Wastewater Plant a Matter of High Priority.</b>
<b>Goal</b>	<b>Complete the Inspection of Sanitary Sewer Lines and Replace Lines as Needed.</b>
<b>Goal</b>	<b>Improve the Stormwater Management Capabilities of the City.</b>

**GOAL ESTABLISH A GENERAL PUBLIC TRANSPORTATION SERVICE, IF COMMUNITY NEEDS AND SUPPORT EXISTS FOR THAT SERVICE**

**Action:** The City should create a study committee, comprised of City Commissioners, Planning Commissioners, members of the business community, health care providers, representatives of Cowley College, and members of the public, to measure the level of community interests in and need for a general public transportation carrier to provide both in-city and out-of-city services. If needs and demands sufficient to support such a carrier are identified, the study committee should present to the City Commission the means by which service can best be provided; whether by private business, as a municipal service, or as a public-private partnership.

**GOAL            MAINTAIN AND IMPROVE THE CITY'S STREETS AND SIDEWALKS ACCORDING TO AN ADOPTED CAPITAL IMPROVEMENTS SCHEDULE AND DEDICATED FUNDING**

**Action:**        The City Commission should annually adopt a rolling 10-year schedule for the maintenance of streets and sidewalks; for the extension of streets and sidewalks into newly developing areas; and for areas of the City lacking the desired level of streets and sidewalks. The adopted schedule should be incorporated into the City's capital improvement plan.

**Action:**        The City Commission should consider a dedicated source of funding for street and sidewalk maintenance, to help ensure reliable, steady revenues with which to better stay on track with the five-year schedule of work.

**GOAL            IDENTIFY THE BEST, MOST COST-EFFECTIVE METHODS OF ADDRESSING THE CURRENT SHORTCOMINGS IN THE STREET NETWORK**

**GOAL            PRESERVE BRICK STREETS WHERE ECONOMICALLY FEASIBLE**

**Action:**

1.        Achieve a proper balance between recognition that brick streets in the downtown help to define the character of the community and the fact that their maintenance creates a significant public cost.

**GOAL            MAKE NECESSARY IMPROVEMENTS TO THE WATER TREATMENT AND DISTRIBUTION INFRASTRUCTURE**

**Action:**

1.        Include within the capital improvement plan the replacement of all water meters as a matter of the highest priority.
2.        Include within the capital improvement plan a schedule for the replacement of water distribution lines so that by the year 2030 no such lines have been in use exceeding 75 years.
3.        Proceed with the construction and financing for a new water treatment plant.

**GOAL            DEVELOP A STEWARDSHIP PROGRAM EMPHASIZING WATER CONSERVATION AND RE-USE**

**Action:** Encourage water conservation and re-use/recycling at schools, businesses and residences by distribution of educational materials, and provision of rain barrels and other devices to the extent funding is available.

**GOAL MAKE THE NECESSARY IMPROVEMENTS TO THE WASTEWATER PLANT A MATTER OF HIGH PRIORITY**

**Action:**

1. Identify as a priority need in the capital improvement plan the deficiencies in the wastewater treatment plan identified in the report prepared in 2013.
2. Request City staff to prepare a report on steps that can be taken to make wastewater treatment as effective and cost-efficient as possible.
3. Address problems with inflow and infiltration as a high priority item in the City's capital improvement program.

**GOAL COMPLETE THE INSPECTION OF SANITARY SEWER LINES AND REPLACE LINES AS NEEDED**

**Action:**

1. Include within the capital improvement plan a schedule for the video inspection of all sanitary sewer lines by January 1, 2015.
2. Prioritize the replacement of defective lines identified in the video inspection.

**GOAL IMPROVE THE STORMWATER MANAGEMENT CAPABILITIES OF THE CITY**

**Action:**

1. Have City staff report to the City Commission whether changes to the requirements for detention/retention structures adequately cover all development impacting stormwater runoff.
2. Study the possibility of using stormwater fees to subsidize the cost of retention/detention structures which exceed the minimum requirements of city codes and regulations.
3. Consider adoption of soil erosion standards to be applied to new development.
4. Increase stormwater fee revenue by applying it to all property, taxable or tax-exempt, and make fees based upon a property's impervious surface area.