SECTION V

TRANSPORTATION

INTRODUCTION

Transportation may take many forms in the community setting. Transportation of people and commodities is facilitated by the local and a regional system of streets and highways, railroads, airports, pipelines, power transmission lines, and in some locations, rivers, lakes and canals. Adequate transportation systems are vital to economic expansion and community growth, and as a result, have always ranked high among the dominant elements in the physical composition of communities. In addition, adequate transportation is essential in an internal sense, as the day-to-day activities of the population are heavily dependent upon direct, efficient and safe access to all portions of the community.

While transportation systems and the various modes of travel have greatly influenced both the location and extent of development of American cities, the cities of the great plains, throughout their history, have been dependent principally on three systems of transportation: surface, air, and technological. The first utilizes the vehicular and rail mode, the second aircraft, and the third electric transmission lines and pipelines. Each system and mode of transport used is essential to one or more segments of the economy and is balanced in a way that effectively transports people and goods. Because these systems influence patterns of community development so significantly, it is the purpose of the transportation study to review the current transportation systems in the community and explore ways and means by which these systems can continue to serve a growing population and expanding economy in the years ahead.

Throughout the Clearwater community, the dominant feature of transportation is the vehicular circulation system, which is comprised of the streets, roads, and highways in the City as well as the surrounding rural area. With this in mind, the purpose of this section of the comprehensive plan is the development of a long-range plan for major streets in the City of Clearwater. Additionally, this section will review other transportation systems that either directly or indirectly influence patterns of urban development, such as the railroad.

RAIL TRANSPORTATION

The City of Clearwater is currently served by the Kansas Southwest Railroad over a former branch line of the Santa Fe which reaches from Wichita southwest to Conway Springs and Anthony. The line intersects the main line trackage of the Burlington Northern/Santa Fe system a few miles east of Harper. The line is freight service only, with grain and petroleum representing the majority of the annual traffic.

The railroad is at once both an economic benefit and an influence in the physical development of the community. Historically, the railroad has significantly limited urban expansion toward the north and northwest although development in recent years has begun to cross this barrier on the north. Due to the present configuration of the rail line and the current usage patterns, it is unlikely that major rail corridor expansions will occur during the planning period.

AIR TRANSPORT SERVICE

Although the City does not have a local airport, the location is within 12 miles of the Mid-Continent Airport at Wichita, one of the major air traffic facilities in the Midwest. Offering immediate access to a number of major certificated air carriers as well as freight and charter services, the airport offers air access to locations worldwide and one-day passenger service to most major metropolitan areas in the United States.

The close proximity of this regional hub airport is a significant economic benefit for the City of Clearwater as well as a major transportation convenience.

SURFACE VEHICULAR TRANSPORTATION

Provision of nearly all of the materials and goods of local commerce, including supply of basic essentials, has become dependent upon surface commercial transportation. In addition to rail access, the community is served by a number of motor freight truck lines which operate over area highways. Through these systems, access to almost any location is possible within a very short time over the network of major regional and national travelways.

In this context, Clearwater is served by two major county roads, 103rd St. South which connects with K-42 highway about 4 miles toward the west and the US 81 Highway corridor about 8 miles toward the east; and 135th St. West, which connects to K-42 about 8 miles toward the north. These major vehicle corridors allow rapid and immediate access to the Wichita metropolitan area and other area communities.

Surface transportation, other than rail, is directly dependent upon availability of these vehicular corridors supplemented by a quality system of local streets and roads. In this sense, efficient surface transportation at the local level is best affected through maintenance of a network of major streets adequate to provide direct access to all portions of the community with immediate and efficient connection with the external highway system. Identification and planning of the network is the primary purpose of the Major Street Plan.

CLASSIFICATION OF TRANSPORTATION CORRIDORS

For the purposes of street system planning, vehicular travelways are classified according to function and traffic carrying capacity. Four classifications are commonly recognized, which include local streets, collector streets, arterial streets and expressways. General characteristics of these street classifications include the following:

Local Streets

The primary purpose of a local street is to provide access to abutting property. Traffic generated from abutting land use is generally light. Through traffic, buses and large trucks are discouraged from using local streets.

The traffic volume on a local street is normally related to the residential dwelling unit. It has been found in many national transportation studies that each dwelling unit will generate from 4 to 10 trips per day. Studies indicate that volumes on local streets usually do not exceed more than 600 vehicles per day.

Right-of-way widths on local streets will vary from 50 to 60 feet with pavement widths of 26 to 48 feet. In low density residential areas, a pavement width of 28 to 30 feet on a 60-foot right-of-way is possible.

The local street in a residential area serves as open space and provides light and air to adjoining properties. The local street also acts as a fire stop between blocks. In residential areas, overhead utilities should be located underground and within the street right-of-way except in instances where it is not feasible to locate them underground.

Local streets are the major elements in the design composition of a city, providing space for grass and tree planting and arranging properties in various sizes and shapes of blocks with an irregular or rectangular street pattern.

Collector Streets

The function of the collector street is to collect traffic from the local streets and distribute it to the arterial streets. Land access is a secondary function, parking should be controlled and design should emphasize traffic

movement. Curb cuts should be kept to a minimum. Traffic safety is an important design consideration for the collector street.

Since collector streets must move more traffic at an increased speed, they require more width than local streets. It is desirable to provide a 70- to 90-foot right-of-way and pavement width of 40 to 48 feet. The traffic volumes on collector streets will vary greatly depending on location, kind of land use and extent of development. Collector streets should not carry more than 2,000 to 3,000 vehicles per day. Where this volume is exceeded, the collector street is probably carrying through traffic. The spacing of collector streets is influenced by land use, density of development and traffic generating characteristics. A spacing of ¼ to ½ mile is a reasonable standard where conditions are such that it can be achieved.

Arterial Streets

The arterial system is a network of through streets serving the major traffic movements. Arterial streets not only interconnect the various sections of the City, but also interconnect the City with the external highway system. Arterial streets carry the bulk of traffic in the City's major street system. Arterial street traffic volumes may vary from as low as 2,000 to more than 20,000 vehicles per day in an urban setting.

Arterial streets often have right-of-way widths of 80 to 100 feet and pavement widths of 48 to 72 feet. New arterial streets should be designed with rights-of-way from 100 to 150 feet wide. The greater width will provide room to divide opposing traffic lanes and will provide frontage roads on either side to reduce side friction caused by automobiles turning into and from adjacent land uses.

Expressways

Expressways are very large, high-capacity travelways typified by the divided median, controlled access highway common to the federal interstate system. Such roadways feature multiple land development and are designed to carry high volumes of mixed traffic at high speeds. Accordingly, expressways are designed to accommodate current and anticipated future traffic conditions, and may feature 4 to 12 traffic lanes requiring several hundred feet of right-of-way width.

At this time there are no travelways in or near the Clearwater community that would be in this classification, and it is unlikely that any area roadways would be built or upgraded to this classification during the course of the planning period.

EXISTING MUNICIPAL STREET SYSTEM

The Clearwater street system reflects a standard grid pattern platting pattern with typical blocks in the older sections of the community typically ranging from 300 to 320 feet in width and 550 to 380 feet in depth on a north-south orientation. Street rights-of-way typically range from 60 to 100 feet in width, with most featuring an 80 foot right-of-way. Most blocks in the older section also have 20 foot alleys and were platted with 25 foot lots.

In the newest expansion areas, the platting pattern is often based on a curvilinear street pattern with 60 foot rights-of-way and lots ranging from 80 to 110 feet in width and 120 to 150 feet in depth.

While the grid system is perhaps the most efficient method of maximizing use of urban land, there are several inherent problems which are difficult to deal with in the long-range growth patterns of a community. The principal difficulty with the grid system is its rather weak potential for recognition of significant topographical changes, frequently resulting in steep grades, poor building sites and occasionally serious drainage problems. Although widely copied, the grid system has failed to achieve the desired result of uniform, straight arterial and collector streets due to a varied platting practice utilizing differing block and right-of-way sizing.

Most streets inside the municipal boundary are surfaced and most feature concrete curb and gutter, the exception being isolated runs of local streets in fringe areas. Concerning classification of the existing system, the following figure shows a functional designation based on street size and present usage patterns. The figure illustrates arterials and collectors with the remainder classified as local streets. The internal municipal system does not include the controlled access expressway classification.

A summary of the present City street system by functional classification and mileage is outlined in the following table.

TABLE 22

MUNICIPAL STREET SYSTEM SUMMARY
City of Clearwater, Kansas

Functional Classification	Estimated Mileage	Percent
Arterial Streets	2.4	12.3
Collector Streets	1.9	9.7
Local Streets	10.6	54.4
Subtotal	14.9	76.4
Alleys	4.6	23.6
TOTAL SYSTEM	**19.5**	**100.0**

The data summary indicates that there are nearly 20 miles of vehicular travelways inside the corporate boundary of Clearwater. Of this total, 76.4 percent are streets with the remaining 23.6 percent represented by alleys. Within the overall system, 2.4 miles of streets or 12.3 percent of the total system, are classified as arterials while an additional 9.7 miles are classified as collectors. Local streets account for 10.6 miles and represent well over half of the system total, while alleys total 4.6 miles and represent over 23 percent of the vehicular travelway system total.

In most urban situations, the mileage of the collector system is usually somewhat larger than the arterial street total. However, in Clearwater, due to the extra long east-west reach of Ross Street (103rd St. S.), the arterial mileage is disproportionately larger. This will tend to self correct as the community grows as most new major streets will be classified as collectors. In general, in terms of present location, the existing major street system is well patterned and located to serve present development.

EXISTING STREET SURFACES

Types of street surfacing are illustrated on the following map. The map shows that streets in the City are nearly all asphaltic surface both with and without curb and gutter, plus a few gravel surface streets. A statistical summary of existing street surface types is outlined in the following table.

TABLE 23

STREET SYSTEM SURFACES
City of Clearwater, Kansas

Surface Type	Estimated Mileage	Percent Of Total
Asphalt		
With curb and gutter	9.7	65.1
Without curb and gutter	4.7	31.5
Gravel	0.5	3.4
TOTAL	**14.9**	**100.0**

The statistical summary indicates that the majority, or over 65 percent of the municipal street system travelways feature an asphaltic surface with concrete curb and gutter. Another 31.5 percent of the system has an asphaltic surface, but lacks curb and gutter. The remaining 3.4 percent of the system total has a gravel surface.

A graphic illustration of street surface locations is shown on the following figure.

TRAFFIC VOLUMES

Another of the reliable indicators of street system function and adequacy is the daily volume of vehicular traffic recommended. The following table summarizes traffic counts collected by the Sedgwick County Public Works Department in February 2004 on weekdays.

TABLE 24

VEHICULAR TRAFFIC VOLUMES 2004*
PLANNING AREA MAJOR STREETS
City of Clearwater, Kansas

Location	Number
103rd S., E. of 119h W.	1,849
103rd S. W. of 119 W.	2,510
135th W., N. of Wood Avenue	3,621
135th W., N. of 95th S.	3,929
135th W., N. of 87th S.	3,853
Diagonal Rd., W. of 135th W.	1,189
Tracy St., N. of diagonal Rd.	384
95th S., W. of 135th W.	466
95th S., W. of Tracy St.	705
103rd S., W. of Railroad	1,037
Tracy St., S. of City Limits	720
151st W., S. of River	769

Source: Sedgwick County Public Works Department

The data summary shows that traffic volumes vary somewhat across the community, with the highest numbers found on major streets toward the east and north. Those numbers reinforce the vehicular report of the schools and the downtown district which contribute substantially to the elevated traffic counts in these locations.

The traffic volume data can also be used as one of the primary gauges of street classification. Where 24-hour traffic volumes exceed 800 to 1,000 vehicles, the street will likely qualify as a collector, while volumes exceeding 2,000 to 3,000 per day are generally indicative of an arterial street, particularly in smaller communities isolated from major metropolitan areas. These patterns appear to coincide reasonable well with the existing major street system outlined earlier.

Based on the table above the following figure illustrates traffic volumes for the Clearwater community.

TRAFFIC ACCIDENTS

SHORT- AND LONG-RANGE FUNCTIONAL PATTERNS

Present street system functional characteristics are heavily influenced by the two major county road corridors which intersect in the northeast quadrant of the City near the schools and the public park. Both travelways are heavily utilized by both passenger vehicles and commercial truck traffic between Clearwater and Wichita. Due to the Ninnescah River floodplain on the south and west only two streets have crossings – Ross Street toward the west and Tracy extending south. Both carry significant traffic, but lesser volumes than the travelways toward the north and east.

Additionally, the arterial and collector streets in the downtown area also carry substantial daily vehicle volumes particularly Ross, Kansas, Tracy, Lee and Gorin streets in, and within one block of the central shopping district. These and other nearby intersections in the Central Business District and along the highways are often locations for traffic congestion in the community. Also, there are heavy concentrations of vehicles near public facilities at specific periods of time during the day such as the beginning and ending of school. This is particularly true near the elementary and high schools as a result of loading and unloading students.

Throughout the planning period and beyond, it will become important for the City to develop and implement methods to maximize the efficiency of these travelways in a manner that is harmonious with the entire surface transportation system and community as a whole. Included among the methods that should be studies are appropriate traffic controls, turning lanes, and frontage roads along heavily traveled routes, both in terms of placement and functional design of these and all other components of the surface transportation system.

In light of the traffic volume information, accident experience and long-range community growth patterns, it will become increasingly desirable in the years ahead to plan and implement new and extended major street corridors to provide improved service in and around existing development, while providing for the additional demands of continuous urban expansion. Important to this process will be designation of major street corridors which can be extended to develop a fully functional network through and around the community.

Street connectivity will be particularly important toward the north and northeast where substantial new urban development is anticipated in the years ahead. These areas have been somewhat isolated by the railroad corridor and do not have identified vehicular routes. It will be particularly important that future street access in such locations be identified early before development occurs in order to avoid landlocked tracts and to assure continuation of the current circulation system.

MAJOR STREET PLAN

Based on existing and future land use patterns, traffic flow volume and existing street system characteristics, a long-range plan for development of the community major street system can be completed. The major street plan for the Clearwater community is illustrated on the following figure. The plan proposes new major street corridors on the north and northeast as well as upgrading of several existing municipal street corridors. It is the primary goal of the Major Street Plan to outline a primary vehicular

network to help assure future street connectivity and continued functional adequacy of the municipal street system in all areas of the present and future community.

In general, the proposed major street system utilizes the existing street system with sectional upgrading and extensions of new streets as appear warranted to serve potential future community growth patterns. Statistical differences between the current and proposed major street systems are summarized in the following table.

TABLE 25

CURRENT AND FUTURE MAJOR STREET SYSTEM
City of Clearwater, Kansas

Classification	Estimated Current Mileage	Percent	Estimated Future Mileage	Percent	Mileage Change
Arterial Streets	2.4	55.8	2.8	30.8	+0.4
Collector Streets	1.9	44.2	6.3	69.2	+4.4
TOTAL	**4.3**	**100.0**	**9.1**	**100.0**	**+4.8**

The table indicates the potential for up to nearly 5 miles of new major streets over the coming decades. Of the forecasted increase, arterial streets are anticipated to expand by slightly less than one-half mile, while the collector system has the potential for an increase of over four miles. Much of the increase in the collector mileage is due to future upgrading and reclassification of existing street corridors, while a smaller percentage of the increase is due to the need to establish new street corridors in areas toward the northeast which are presently without established travelways.

Designation and construction of new streets should occur as needed to meet development demand. As such areas are converted to urban uses, the emerging patterns of municipal expansion should include the identified major street corridors as an aspect of the formal land planning process.

STREET STANDARDS

In order to balance the need to move traffic with the goal of achieving reasonable economy in construction, it is desirable to establish standards for the various types of roads and streets which reflect the type and intensity of traffic to be accommodated. In this respect, the standards, coupled with plans for extension of the future major street system, provide a general outline of subdivision practices, and a guide for construction and/or reconstruction of existing and future vehicular travelways. Typical standards for the various types of streets and roads are shown graphically on the following figure.

The figure illustrates four types of arterial streets including dimensions for streets with and without parking; with a center median; with frontage roads; and a rural section for use in developing fringe areas which will eventually become part of the community through the annexation process.

Arterials

The arterial sections are an arterial with frontage roads, arterial with median, and arterial with and without parking and a rural arterial. The arterial cross sections are designed for right-of-way widths of 80 to 100 feet in outlying areas, a right-of-way of 150 feet may be more useful.

The rural arterial standard is one designed for county rural roads which can be up-graded later to the urban arterial standard. This type of section can be used for roads at the periphery of the City which will later become

urbanized. This type of road should have a minimum right-of-way of 80 feet. Greater widths are usually necessary to provide for drainage ditches at each side.

Collectors
Two basic types of collector streets are illustrated, one for residential areas and another for local business districts or industrial access. Both types are designed to permit parking. Right-of-way widths typically range from 70 to 90 feet.

Local Residential
The local residential standard is for a 60-foot right-of-way. The minimum pavement width is 30 feet. Intermittent parking is permitted; however, long-term or overnight parking should be discouraged.

Overall, the network of arterials, collectors and local streets frame the development pattern of the existing and future community, and, as such, represent a major design element in the evolution of the future community. It will be particularly important for the City to plan the future street system as a continuation of the existing system to improve circulation and safety in existing neighborhoods while providing for extensions and expansions of vehicular trafficways as necessary to provide an adequate service level to newly developing areas of the community. As part of this process, the future street system should provide for continuation of the existing as appropriate to avoid offsets and dead ends in the circulation pattern. This will be particularly important in the northern and northeastern portions of the community where major new neighborhood expansions are likely over the course of the 20-year planning period.

IMPLEMENTING THE STREET SYSTEM PLAN

For the future major street system to function as intended, it must be implemented on a phased and continuous basis. In this regard, the street standards presented earlier will provide a general guideline with respect to sizing requirements to help assure that the transportation corridor will have the necessary physical capacity. In general, the standards will provide adequate service characteristics for the intended type of street.

In addition to physical design details, other means toward implementation of the major street plan include appropriate use of signage and other traffic control measures. Traffic patterns are directly influenced by the presence of required stops and yields on route segments. Developing through streets, while requiring stops on others, produces immediate alterations in traffic flow and is one of the primary means for reducing traffic volume on some route segments and transferring this volume to designated major street corridors.

Concerning administrative guidance as an implementation measure, one of the primary tools is the adopted comprehensive plan and the subdivision regulation. State law provides that when the City has adopted a major street plan, the Planning Commission may review land subdivision proposals for compliance, and may require conformance therewith.

Additionally, state law also provides that when the City has adopted a major street plan, the required rights-of-way may be protected through land reservations. This process is outlined and described in K.S.A. 12-765, which states in part:

> *"(a) Whenever any city or county has a s a part of a comprehensive plan adopted a plan for its major street or highway system, after consultation with the secretary of transportation and the county engineer and any planning commission of the county or counties within which such system lies, the governing body is hereby authorized and empowered, to establish by the appropriate ordinance or resolution building or setback lines on such existing and proposed major streets or highways and to prohibit any new building being located within such building or setback lines on property*

within the plat approval jurisdiction of the City. Such ordinance or resolution may incorporate by reference an official map, which may include supplementary documents, setting forth such plan which shall show with reasonable survey accuracy the location and width of existing or proposed major streets or highways and any building or setback lines."

Subject to a range of procedural requirements as further outlined in detail in the body of the enabling legislation, this authority provides a means whereby Kansas communities can preserve the rights-of-way of future streets from conflicting development, thus assuring that the major street plan can be implemented on a phased and continuing basis.

It should be noted that this authority does not provide a direct taking of land. Actual acquisition of the required right-of-way must proceed according to the usual negotiated purchase procedure.

SUMMARY

The background reviews of local and regional transportation systems show that the Clearwater community is well served by the local rail and street systems, and by the air transport services available at nearby Wichita. The studies also show that the system of most immediate impact to the citizens of the community is the City street system. In this regard, the transportation study proposes a major street plan which provides for extensions of major street corridors into and through areas of future urban expansion.

In addition to development of new streets, there will be continuing need for maintenance and upgrading of the existing system. As part of the street maintenance program, emerging use and demand patterns should be continuously monitored to assure that upgrading and improvements can be provided as required to keep pace with community growth.

In this regard, the City should continue to pursue an aggressive program of street maintenance and development of new streets in transition areas. Such programs should include the available means for review of streets as a function of platting practice, and for reservation of rights-of-way for future major streets where appropriate. These measures, together with continued review of changing needs for marking, signage and signalization on the existing system, will result in continued functional adequacy with reduced congestion and hazard in all areas of the community throughout the 20-year planning period.

The street system is continually evolving to fit the ever-changing urban pattern. Change most often has occurred without the guidance of a plan. The continuing transportation planning program should provide up-to-date information which can be used as a firm basis for planning future street and highway extensions. Analysis of these data should be used to measure the accuracy of the proposed plan. Continuing study may indicate areas where the plan is weak, or where government policies should be strengthened to achieve the desired goal. Maintenance of the major street plan in the context of continued community expansion is one of the primary responsibilities of the Planning Commission within the scope of the continuing planning program.