

2015

# Dodge City Fixed Route Transit

Demand Analysis and Fixed Route Transit  
Design for Dodge City, Kansas



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**Table of Contents**

Purpose of the Study ..... 6

Existing Conditions..... 6

    Characteristics of Dodge City..... 6

    Transit in the region..... 7

    Transit in Dodge City ..... 8

Fixed Route Concepts ..... 9

    Types of Routes ..... 9

    Design Principles ..... 10

Fixed Route Data Analysis ..... 12

    Census Data..... 12

    Major Employers..... 16

    Current System Data ..... 18

    Peer System Data..... 21

    TCRP Report 161 ..... 22

    Survey Data ..... 23

    Summary of Data Analysis ..... 30

Route Concepts..... 32

Initial Route Alignments..... 35

Public Meetings ..... 44

Route Alignment Options/Adjustments ..... 49

    Blue Route – Route Alignment Options..... 49

    Red Route Alignment Options/Adjustments ..... 54

    Yellow Route Alignment Options/Adjustments ..... 56

Final Route Alignments.....59

    Blue Route Final Alignment.....60

    Red Route Final Alignment.....63

    Yellow Route Final Alignment.....66

Complete System Service Characteristics .....69

ADA Paratransit Requirements .....71

Operating Characteristics .....73

    Service Span/Coverage .....73

    Fares.....73

    Vehicle.....73

    Cost Estimates.....74

Implementation Plan .....74

**Table of Figures**

Figure 1 Kansas Map – Dodge City ..... 6

Figure 2 Southwest Region - Olsson Associates 2013..... 7

Figure 3 Demand Response Ridership ..... 8

Figure 4. Route Diagrams..... 9

Figure 5 Population Density ..... 12

Figure 6. 65 Years + ..... 13

Figure 7 Poverty ..... 13

Figure 8 No Vehicle Available ..... 14

Figure 9 Potential Ridership..... 14

Figure 10 Potential Ridership/Total Pop..... 15

Figure 11 Major Employment Centers ..... 17

Figure 12 Density and Destinations ..... 18

Figure 13 Passengers per Revenue Hour (Dec. - Aug.) ..... 19

Figure 14 August Passengers per Revenue Hours..... 19

Figure 15 Monthly Passengers per Revenue Hour ..... 20

Figure 16 Survey Results..... 23

Figure 17 Survey Results..... 24

Figure 18 Survey Results..... 24

Figure 19 Survey Results..... 25

Figure 20 Survey Results..... 25

Figure 21 Survey Results..... 26

Figure 22 Survey Results..... 26

Figure 23 Survey Results..... 27

Figure 24 Survey Results..... 27

Figure 25 Survey Results..... 28

Figure 26 Survey Results..... 28

Figure 27 Service Span..... 29

Figure 28 Preferred Headways..... 29

Figure 29 Willingness to Pay ..... 29

Figure 30 Identified Stop Locations..... 31

Figure 31 Conceptual Route Zones ..... 34

Figure 32 Initial Blue Route Alignment.....36

Figure 33 Red Route Initial Alignment.....38

Figure 34 Yellow Route Initial Alignment.....40

Figure 35 Initial Fort Dodge Route .....42

Figure 36 Initial Route Alignments.....43

Figure 37 Public Meeting July 21st - Dodge City Commission Chambers.....44

Figure 38 Top 10 Public Meeting Mentions .....44

Figure 39 Multiple Public Meeting Mentions.....45

Figure 40 High School Traffic (Google Earth).....46

Figure 41 Blue Route Scenario 1.....50

Figure 42 Blue Route Scenario 2.....51

Figure 43 Blue Route Scenario 3.....52

Figure 44 Blue Route Impacts.....53

Figure 45 Red Route Adjustments .....55

Figure 46 Yellow Route Scenario 1.....57

Figure 47 Yellow Route Scenario 2.....58

Figure 48 Yellow Route Scenario 3.....58

Figure 49 Final Blue Route .....60

Figure 50 Blue Route Timing.....60

Figure 51 Blue Stops Buffer .....61

Figure 52 Blue Route Buffer .....61

Figure 53 Blue Route Population Density.....62

Figure 54 Final Red Route .....63

Figure 55 Red Route Timing.....63

Figure 56 Red Route Stops Buffer .....64

Figure 57 Red Route Buffer.....64

Figure 58 Red Route Population Density .....65

Figure 59 Final Yellow Route .....66

Figure 60 Yellow Route Timing.....66

Figure 61 Yellow Route Stops Buffer .....67

Figure 62 Yellow Route Buffer.....67

Figure 63 Yellow Route Population Density .....68

Figure 64 Complete System .....69

Figure 65 All Stops - Population Served ..... 70

Figure 66 Service Coverage..... 70

Figure 67 ADA Paratransit Requirement ..... 71

Figure 68 Planned Paratransit Service..... 72

Figure 69 El-Dorado National Bus..... 73

## Purpose of the Study

The purpose of this study is to determine the appropriate level of transit service in Dodge City, Kansas. Dodge City has experienced an increasing number of rides on the currently operating demand response system and the community has expressed interest in fixed route transit. This study will determine whether fixed route transit is a more efficient and effective option for serving the community members. This study will also examine the existing conditions of transit in Dodge City and the surrounding area as well as the potential for expanded transit operations in the service area.

## Existing Conditions

### Characteristics of Dodge City

Dodge City, Kansas is located in Ford County in Southwest Kansas with a population of over 28,000 people. The population has continued to grow in Dodge City and has resulted in an increase from around 21,000 in the early 1990's to over 28,000 currently.

Dodge City serves as a regional trade center in southwest Kansas and is primarily agriculture driven. Two major employers in Dodge City are Cargill and National Beef, both beef processing plants. Dodge City is also known for its tourist attractions, specifically the Boot Hill Museum and other similar historical places.

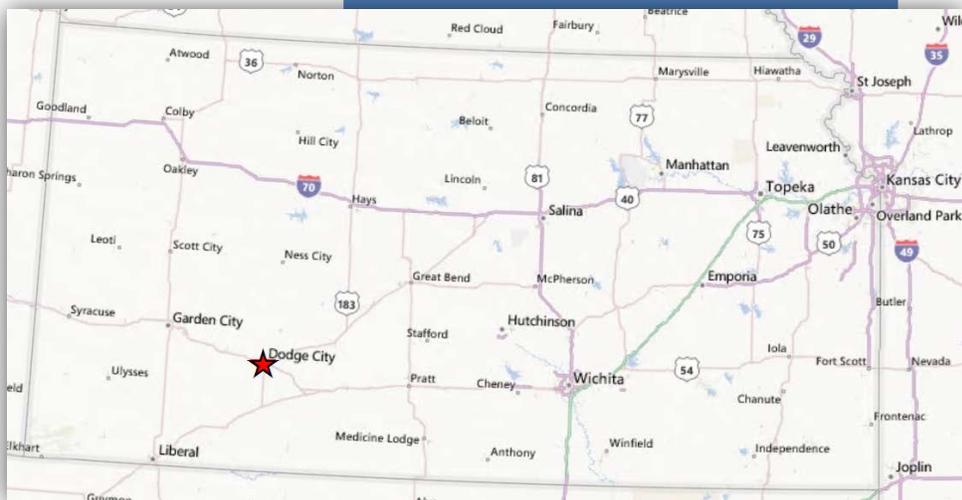


Figure 1 Kansas Map - Dodge City

### Transit in the region

There are multiple types of transit service operating in the region currently. There are general public transportation providers in the region providing demand response, fixed route, and para-transit services. There is also an intercity bus route operating through the region that stops in Dodge City. Other types of transit that aren't as formally established as the previously mentioned services are carpools, vanpools, and taxi services. Another informal mode of transportation is volunteer transportation via different organizations throughout the region such as hospitals and churches.

The Kansas Department of Transportation is in the process of identifying a more efficient business model for regional transit throughout the state. As a part of this effort they have defined the Southwest Region as the area encompassing Dodge City, Garden City, Liberal and the surrounding 23 county area. As a part of this effort it has become evident that the three cities mentioned above are crucial in delivering the necessary services to the region. Having quality transit service in Dodge City to serve the needs of the regional transit riders coming to Dodge City for services is important to the success of the regional project.

In regards to the other general public transit providers, there are currently two fixed route operators in the Southwest Region: City of Liberal and Finney County Transit serving Garden City. These two locations are similar in nature to Dodge City in terms of regional services and the necessity of people to get to these locations for services. Of the remaining counties in the region very few are served by transit and those that are served are primarily served by demand response service.

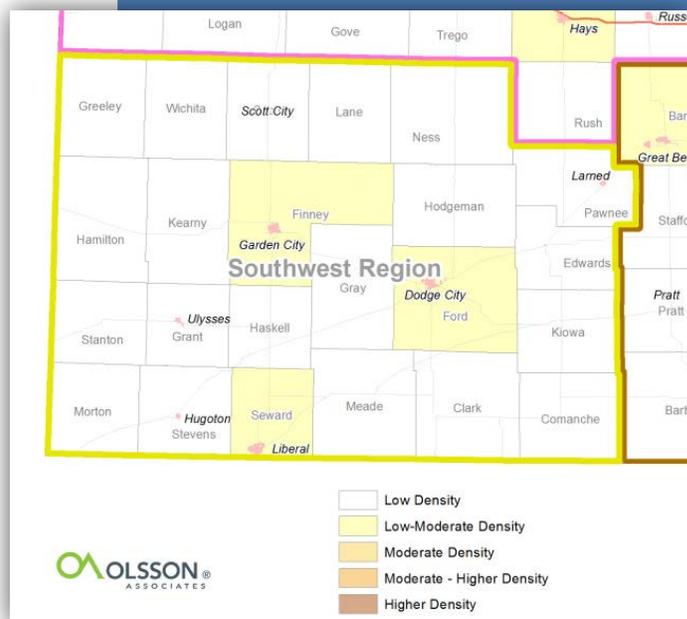


Figure 2 Southwest Region - Olsson Associates 2013

As was previously mentioned, there is an intercity bus that operates in this region. The Bee-Line Express operates from Wichita, KS to Pueblo, CO with stops in the Southwest Region consisting of Dodge City, Garden City, and Syracuse. Providing an opportunity to connect with intercity bus can be beneficial to both the intercity route and the local fixed route service. The possibility of a connection will be identified later in this study.

The several types of transit in the region and the extent to which these services are utilized, illustrate the need for transit in the region. Enhancing local transit services by implementing the appropriate level of quality service will help meet not only the needs of the community, but the entire region as well.

### Transit in Dodge City

Currently Dodge City is served by a demand response service. Ridership has dramatically increased for this service and is up near 2,000 riders per month. The service utilizes 4 vehicles to provide service to the city limits and 2 miles beyond the city limits. The service has also experimented with routes serving some of the smaller communities in Ford County such as Bucklin and Ford.

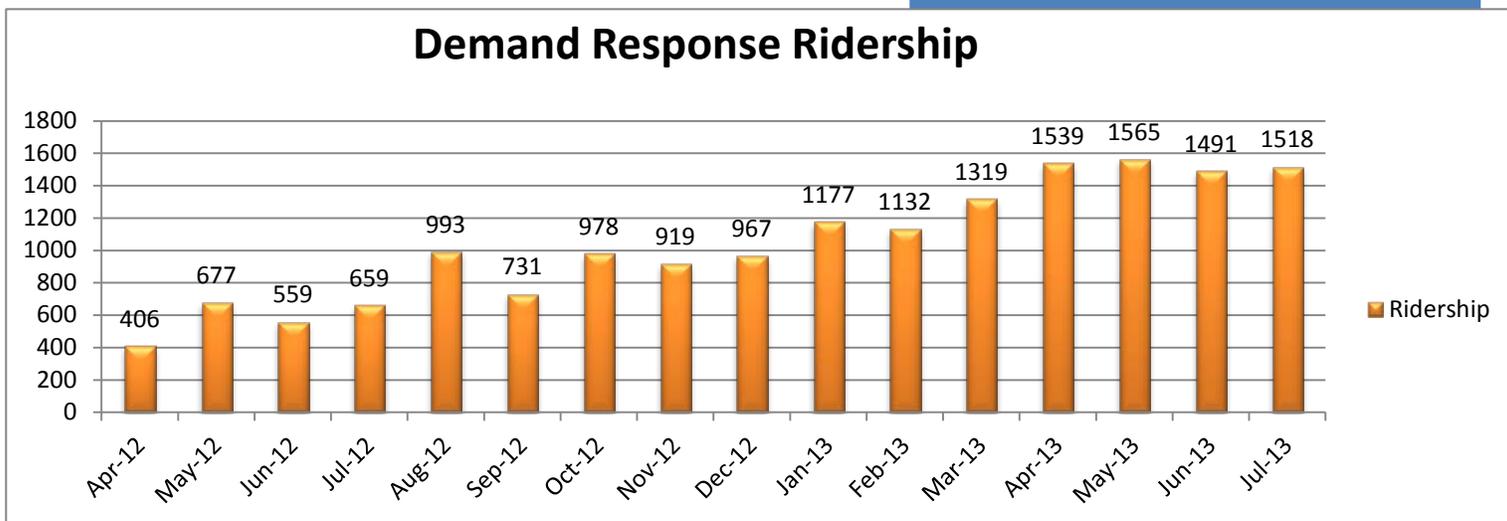


Figure 3 Demand Response Ridership

## Fixed Route Concepts

### Types of Routes

**Deviated fixed route:** A hybrid of fixed-route and demand-response services. With this type of service, a bus or van stops at fixed points and keeps to a timetable but can deviate its course between two stops to go to a specific location for a pre-scheduled request. Deviated fix route service is often used to provide accessibility to people with disabilities. – Community Transportation Association

**Fixed route service:** Transit service where vehicles run on regular, scheduled routes with fixed stops and no deviation. Typically, fixed-route service is characterized by printed schedules or timetables, designated bus stops where passengers board and alight and the use of larger transit vehicles. – Community Transportation Association

**Types of Fixed Routes:** - City of Hays Route Study (RTAP)

- Loop or circular route
- Pulse system
- Radial network
- Trunk route

#### Loop or circular route

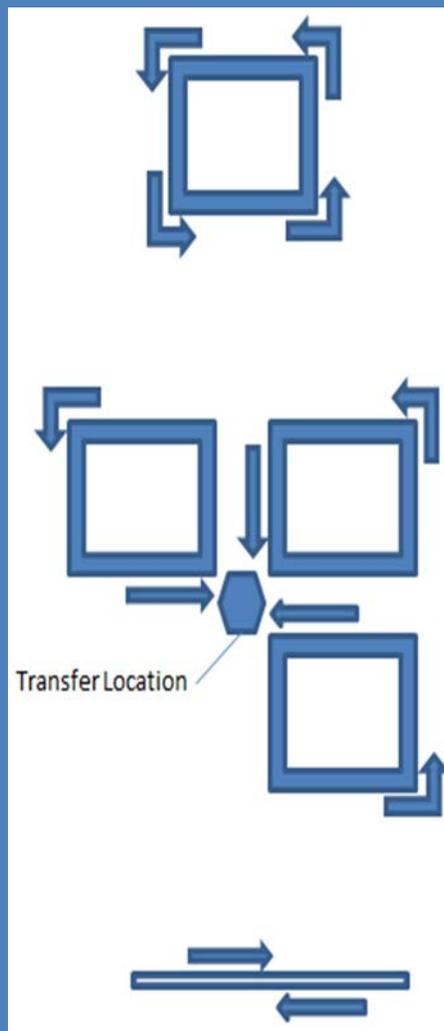
This type of fixed route service is suitable for low density areas and has the capability to serve large areas with fewer routes. With the capability to serve large areas this type of route has the potential to serve more trip generators and attractions than other route types. As a result of these routes serving larger areas, a downfall of this route type is the longer headways which can result in longer trip times for passengers.

#### Pulse System

A pulse system is organized around a central transfer location. All fixed routes converge at a single point at the same time. This type

The figure below represents three of the fixed route types mentioned. The first image represents a loop or circular route. The second image illustrates a radial network and the third represents a trunk route.

**Figure 4. Route Diagrams**



of route system allows for ease of transfers from route to route.

### **Radial Network**

A radial network combines the operational components of the loop system and a pulse system. This service type typically serves large areas of the service area and also includes a central transfer location. The combination allows for the maximum area served with the most efficient number of routes. A benefit of this system is the ability to get from most locations of the service area to most other trip attractions in the service area.

### **Trunk Route**

A trunk route operates along a main arterial, typically in both directions. This type of system is ideal for streets with strong trip generators and trip attractions. This type of route is not efficient in low density areas and is not likely an option in Dodge City.

### **Design Principles**

The following design principles will be utilized when determining the most efficient and effective route alignments for Dodge City.

#### **Straight and direct**

With the intent to serve as much of the service area as possible and make the most possible connections the route alignments need to be straight and direct, minimizing dead-ends and unnecessary deviations from the most direct route.

#### **Scheduling**

A common strategy in fixed route service planning is designing the service with a simple route schedule. Keeping the headways to every 30 or 60 minutes allows for an easier understanding of the schedule for potential riders.

**Layover**

Another strategy commonly utilized in fixed route design is the inclusion of layover time in the route schedule. Layovers are typically a short period of time allotted to the end of the route cycle that allows for leeway in route timing. The layover is important for vehicles that may have experienced a delay in the route and are running behind the scheduled times and can also be valuable for transfers allowing for increased transfer time.

**Deviations**

A possible fixed route system design could be implemented to allow deviations as described on previous pages. If this type of system is implemented it will be necessary to implement a policy that describes the maximum number and distance of the deviations from the route. This policy would be necessary to ensure the route operates in a timely manner.

**Stop locations**

Identifying stop locations is essential in progressing toward a fixed route system. This report will define the best stop locations in a general sense, i.e. Walmart, Dodge City Medical, etc. The transit operator will have final determination of the physical stop locations. In determining the physical stop locations, ADA compliance and amenities need to be considered. Information regarding bus stop design can be found in the appendix.

**Fare Structure**

The fare structure will be implemented based on optimizing farebox revenue and ridership. It will be structured in a manner that is rider friendly and minimizes administrative complexities.

The combination of aforementioned design principles will be utilized in determining the optimal system design.

## Fixed Route Data Analysis

The function of this study is to examine multiple levels of data to determine the appropriate level of transit service in Dodge City, Kansas. The sources of data that will be analyzed are census data, current system data, peer systems data and survey data.

### Census Data

The key statistics in determining the need for transit that are accessible from census data are carless households, elderly population, and the disabled population. These categories of data allow for a better understanding of the transit dependent population in Dodge City. The following charts and maps illustrate the current situation of these populations in Dodge City according to the 2010 Census.

Figure 5 illustrates the population density of Dodge City. In order to serve the transit dependent population via fixed route transit, the fixed routes need to serve the core residential populations as the residential areas typically serve as the majority of trip origins. The population density map allows for a better understanding where the core population resides. The result of this analysis shows pockets of dense population in South Dodge City, the center of the city and north between 14<sup>th</sup> Avenue and Central Avenue. These locations will be a focal point for route design.

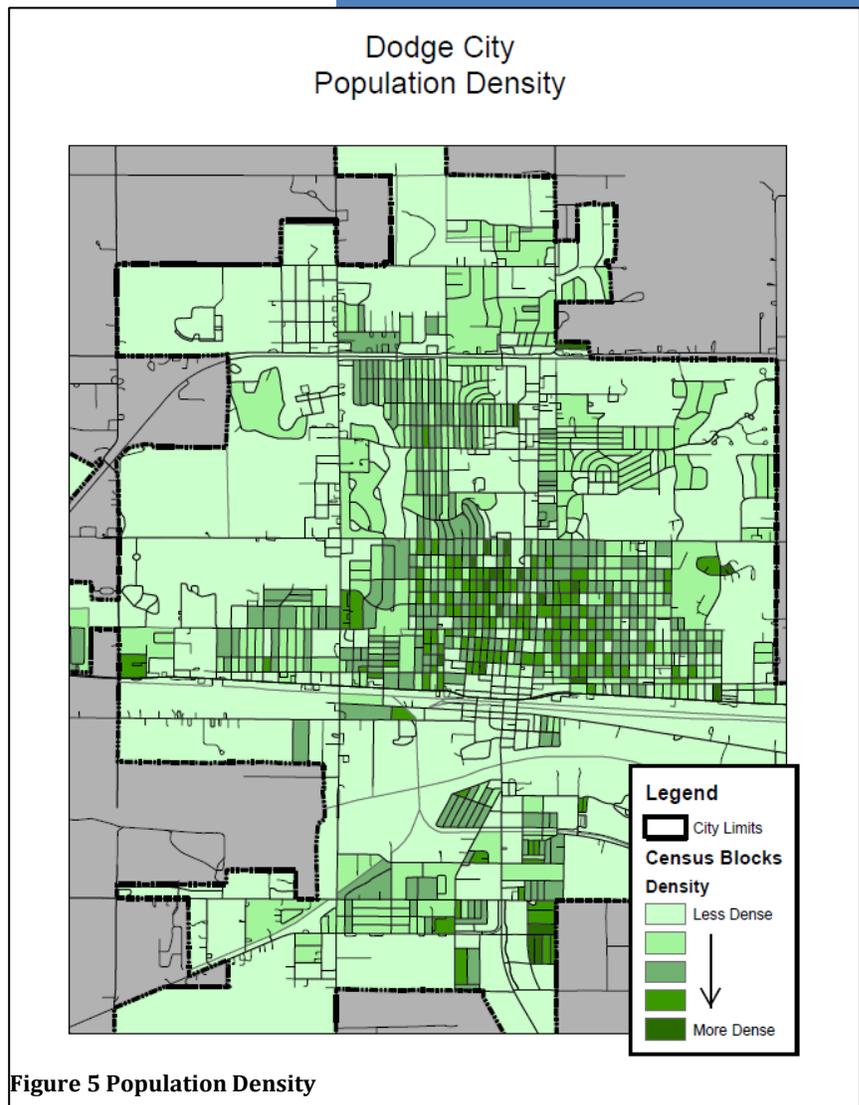


Figure 5 Population Density

Figure 6 illustrates the percentage of population that is 65 years of age or older utilizing block group data. As the elderly population ages many individuals become incapable of driving their own vehicle and rely on other modes of transportation. Fixed route transit could provide the aging population with a mode of transport; therefore this information is useful when designing fixed route transit. As Figure 6 shows, the highest percentage of the elderly populations resides in the northeast section of the city and the majority of high percentage elderly populations are north of Comanche St.

Figure 7 represents the percentage of the population that is in poverty. This data is broken down by census tract, which is the lowest level available from the census. Commonly, impoverished individuals or families don't have transportation readily available and therefore rely on public transit for transportation. Fixed route transit can be very beneficial to low income individuals. The data shows the location where the percentage of poverty is the highest is in southwestern Dodge City. East and North Dodge City also have a relatively high level of poverty. These locations will be utilized in the design of fixed routes operating throughout the city and will ideally provide more opportunities for low income individuals to connect to necessary services.

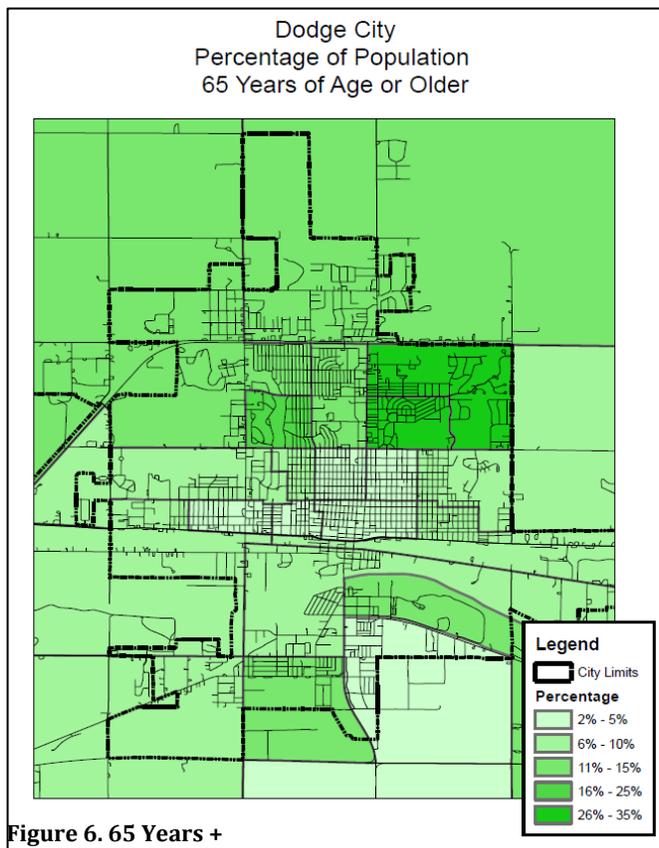


Figure 6. 65 Years +

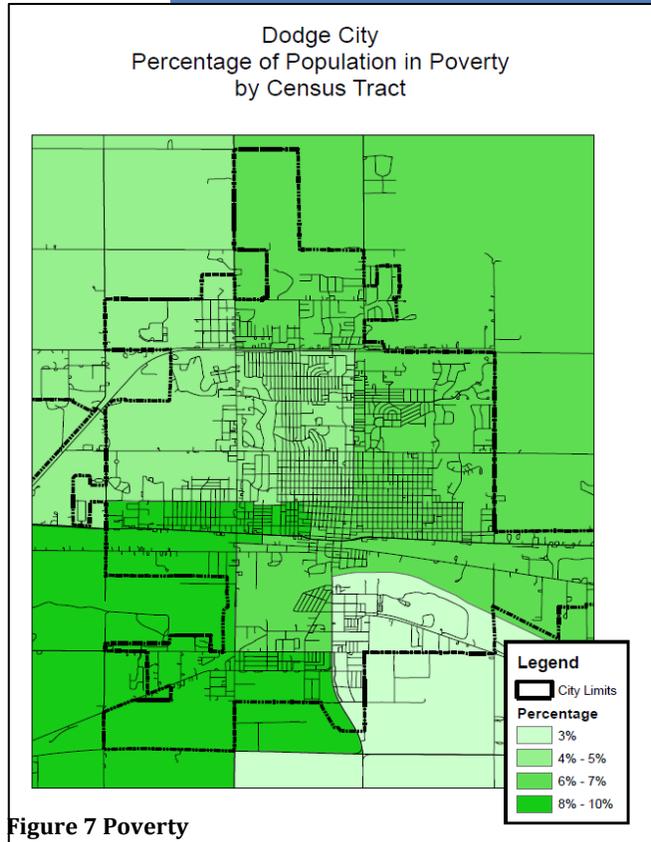


Figure 7 Poverty

Figure 8 illustrates the percentage of the population without a vehicle. Carless households data relates to fixed route transit in a similar manner that poverty data does, in regards to having a reliance on other modes of transportation besides a personal vehicle. The area of Dodge City that has the most carless households is in the census tract that captures parts of south Dodge City and the eastern part of Dodge City directly north and south of Wyatt Earp Boulevard. These areas will be strongly considered when determining the routing of fixed route system because of the nature of this demographic. The lack of a vehicle typically results in a reliance on family and friends, taxi, or public transit for transportation. Fixed route connections to the necessary services for the individuals living in carless households will be very beneficial to this demographic group.

Figure 9 represents the combination of the aforementioned data that results in a summation of the elderly population, poverty, and carless households. This figure represents the actual number of potential riders based on the three transit dependent categories. The summation of these categories results in the most potential ridership in the northeast area of Dodge City. The entire study area shows some level of potential ridership. Based on the formula, there is potential for more than 338 riders per census tract with a maximum of more than 1500 riders.

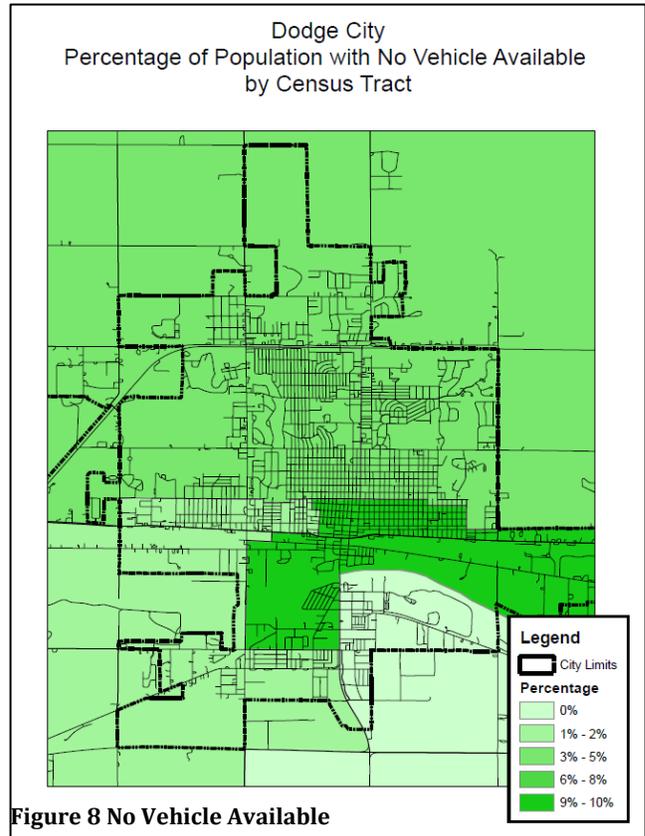


Figure 8 No Vehicle Available

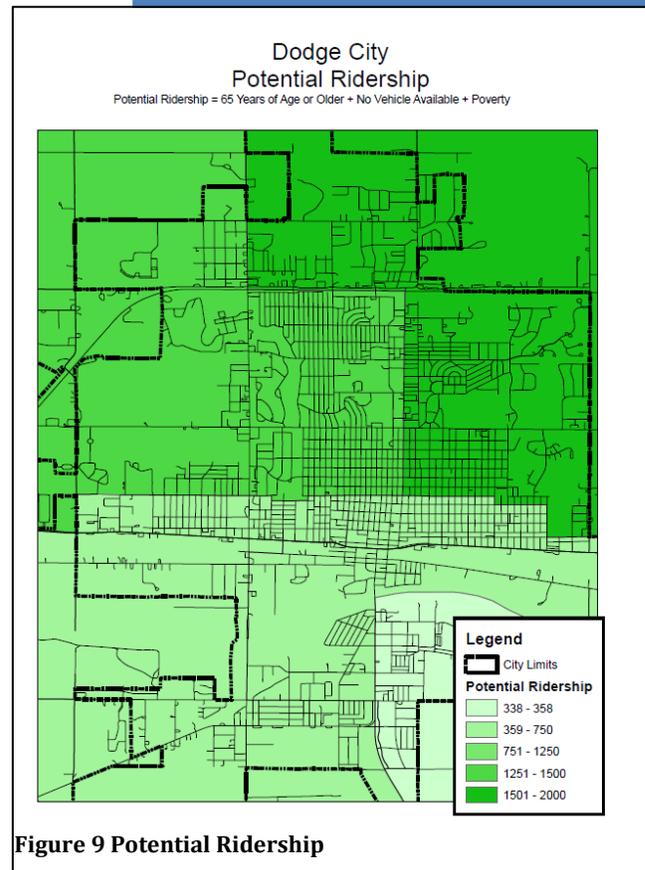


Figure 9 Potential Ridership

Figure 10 to the right represents the combination of data similar to Figure 9 on the previous page. This summation of the elderly population, poverty, and carless households is shown as a percentage of total tract population. This method of displaying this graphic represents a tract by tract comparison of the potential transit ridership. The result of this comparison shows a very similar outcome to Figure 9 with the areas north of Division Street displaying the most potential for transit ridership. These areas have more than 22% of the population considered transit dependent. More than 17% of the population in all census tracts is considered potential transit users.

The combination of all these factors being very relevant in the northeast census tract result in northeast Dodge City having the most potential ridership, but the entire service area has suitable potential ridership for fixed route transit to be feasible. The most important takeaway point from this data analysis is the dispersion of different demographics throughout Dodge City. Different demographic groups are more relevant in different areas of the city. Although these groups are more relevant in certain areas, a majority of these demographic groups also have a significant impact throughout the service area. Knowing that these important demographic groups are dispersed throughout the service area underlines the importance of serving the entire service area effectively and making the most connections as possible. The understanding of the locations of the transit dependent populations along with the data in upcoming pages will be critical in the development of route alignments outlined in later chapters.

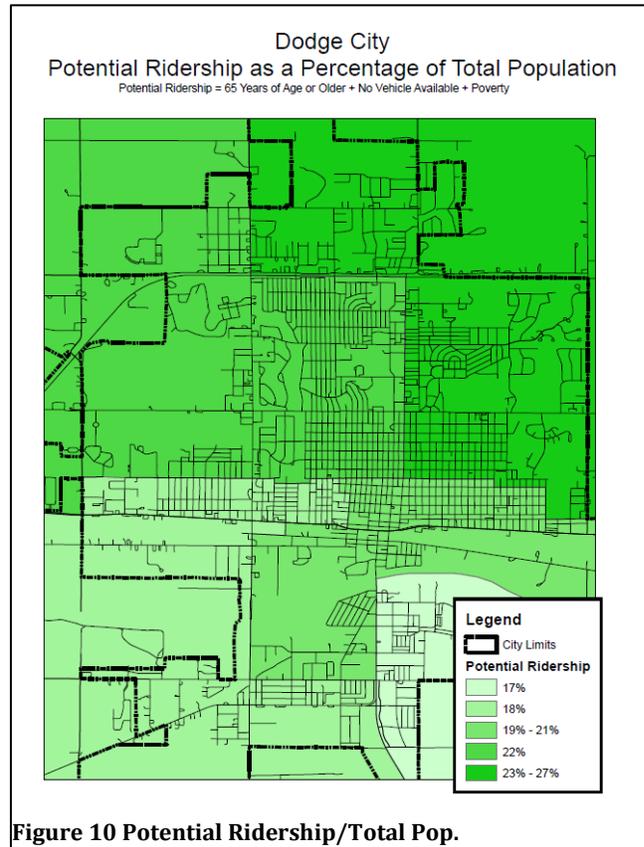


Figure 10 Potential Ridership/Total Pop.

### Major Employers

Employment centers serve as major trip generators because of the daily travel that is required of the employee to get to their place of employment. It is important to make connections between transit dependent populations and the major employers in the area.

Utilizing the previously mentioned census data and major employer data, these connections can be developed.

The table to the right shows the major employers in Dodge City.

The employers listed have at least 100 employees. A focal point of the listed major employers is the beef processing plants south and east of the city center. Combined, the plants employ nearly six thousand people. A major part of designing routes will be determining the best way to serve these plants while maintaining reliable service in the core of the city as well as aligning the route schedule with the shift schedule of both plants. The next highest employer is USD 443 which includes all the schools in Dodge City. These locations are dispersed throughout the city and will need to be treated as separate entities for the purposes of route design. Several of the remaining large employers also double as service agencies, meaning they generate trips in terms of employees and customers. These include Wal-Mart, the casino, the college, and

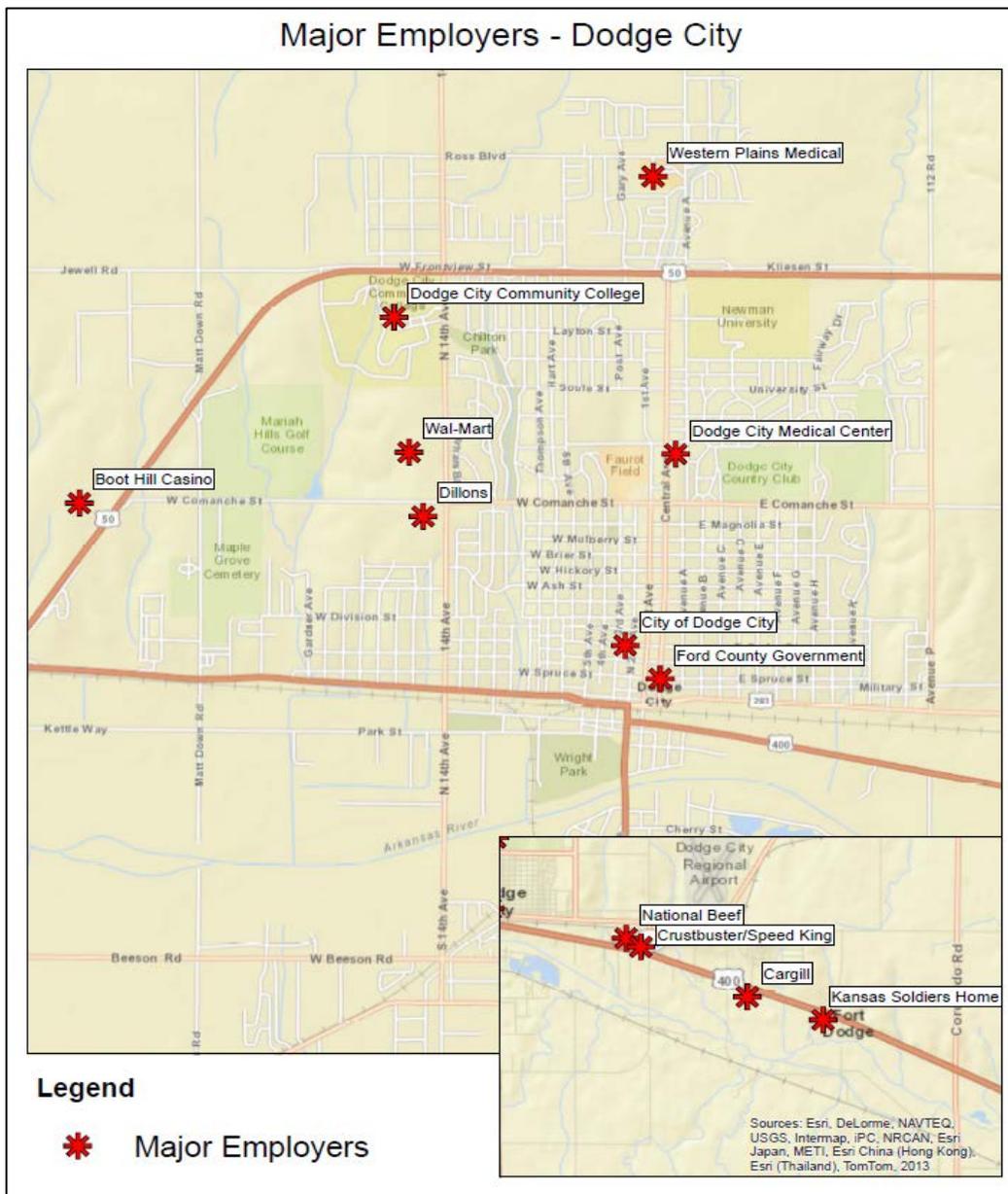
Employer (100+ Employees)	Product/Service	Employees
National Beef	Processed Beef	2,950
Cargill Meat Solutions	Processed Beef	2,800
USD 443	Education	1,102
Wal-Mart	Retail Sales	400
Ford County Government Center	Public Service	322
City of Dodge City	Public Service	302
Boot Hill Casino & Resort	Casino	288
Dodge City Community College	Education	280
Western Plains Medical Complex	Health Care	273
CrustBuster/Speed King, Inc.	Manufacturing	150
Dodge City Medical Center	Health Care	135
Pos-T-Vac	Health Care	131
Arrowhead West, Inc.	Special Education	118
Kansas Soldiers Home	Veterans Home	115
Youthville	Family Services	112
JAG Construction	Contracting	108
Dillons Super Store	Grocery Store	102
Source: www.dodgev.org		

the medical facilities. These locations will be critical in route design as they will likely serve as the largest trip generators in the service area.

Figure 11 represents the location of the major employers in Dodge City. The main map shows the city's core area and the inset illustrates the area south and east of the city center where the beef processing plants are located. One takeaway point from this map is the two corridors (14<sup>th</sup> Ave. and Central Ave) that house both major employment centers and service attractions and will likely serve as main transit corridors. Another takeaway point is the geographical challenge of serving the area south and east of the city center as well as the casino. These locations are determined as

necessary locations to be served and it is critical to design the service to allow for these connections to be made while continuing reliable service in the city's core. Further analysis of the beef processing plants and scheduling service to align with their shift schedules is included later in the study.

This data in addition to the census data gathered and the current system data included in the following section will be fundamental in determining the alignments of a fixed route system in Dodge



**Figure 11 Major Employment Centers**

**Current System Data**

In order to determine the necessary capacity in an expanded transit system, an understanding of the current system and the current ridership trends is necessary. The current operations consist of a demand response system with 3 vehicles operating from 6 AM to 7 PM. As represented by Figure 3 on page 6, ridership has increased substantially over the past year. With the current vehicle resources, this system has been determined to be at capacity.

Figure 12 represents the most common trip destinations for the current demand response system. As the map illustrates the two major corridors are Central Ave and 14<sup>th</sup> Ave. Other common destinations are the North and South Highrise living facilities, the casino, and areas south and east of the city center. These locations serve as the basis for where stops should be located.

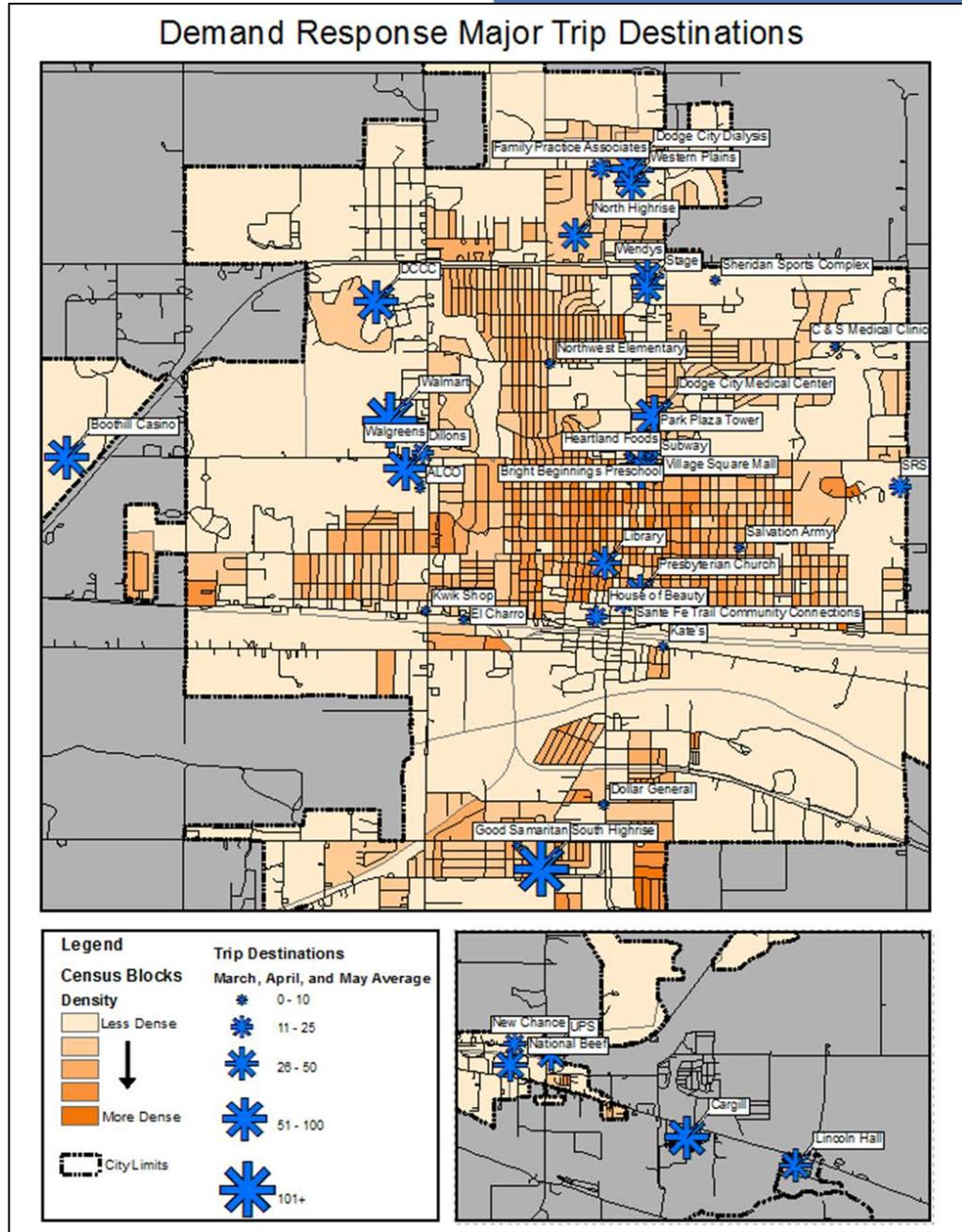


Figure 12 Density and Destinations

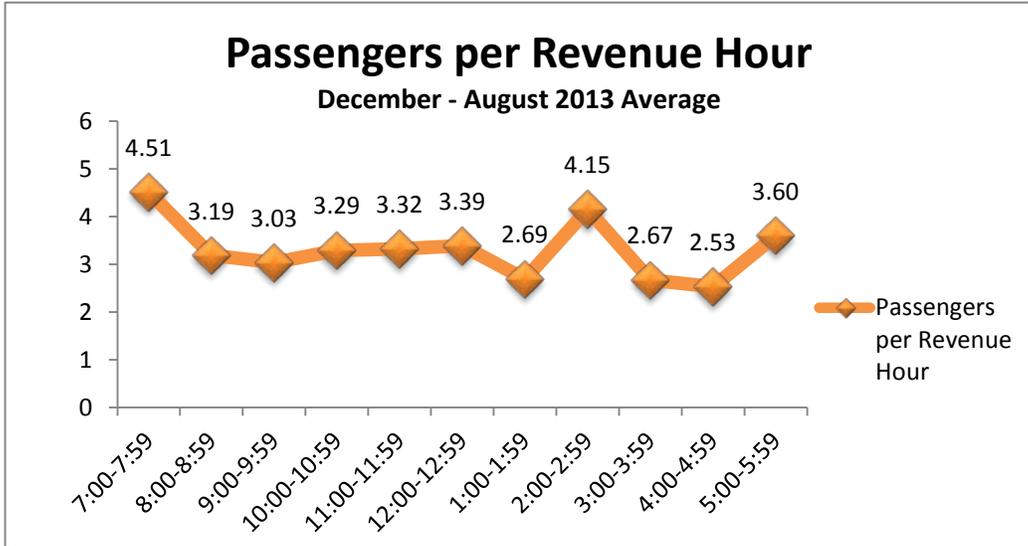


Figure 13 Passengers per Revenue Hour (Dec. - Aug.)

A useful statistic in understanding a transit systems performance is passengers per revenue hour. The following figures represent this statistic as it pertains to Dodge City Public Transportation. Figure 13 above represents average passengers per revenue hour for all hours of operation from December 2012 through August 2013. This chart illustrates the peak hours of the day when ridership is highest. Over this 9 month period the peak times were 7:00 – 7:59,

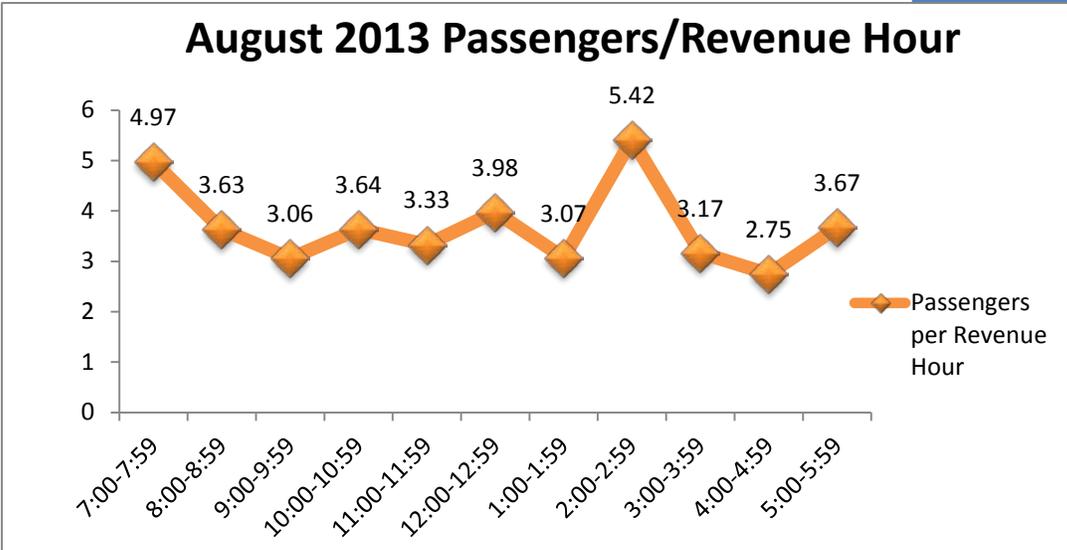


Figure 14 August Passengers per Revenue Hours

2:00 – 2:59, and 5:00 – 5:59 with around four passengers per revenue hour. In order to compare past data to the most recent available data, Figure 14 illustrates August passengers per revenue hour. As illustrated by these charts August is very similar to the 9 month average but with increased numbers due to higher ridership.

Figure 15 represents monthly passengers per revenue hour from December 2012 through August 2013. The chart illustrates an increase in passengers per revenue hour from 3.16 in December to 3.70 in August. This is a result of ridership jumping from more than 900 riders per month to nearly 2,000 in August. When the demand response service reached the higher numbers of riders per month it was determined that the service was at or nearing capacity on a daily basis.

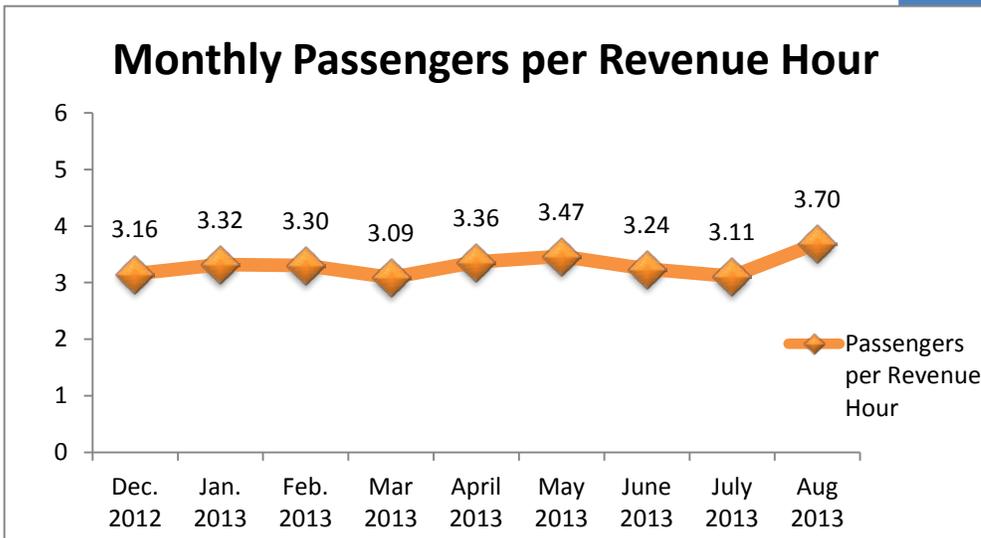


Figure 15 Monthly Passengers per Revenue Hour

The passengers per revenue hour statistics show an overall consistent ridership at three plus riders per hour throughout the day. The data also illustrates the peak times in the morning, mid-afternoon, and evening, which will be accounted for in the development of the proper service hours for the system.

**Peer System Data**

Several other general public transit providers in Kansas are operating fixed route service. Comparing the operations and ridership of these services provides a perspective of other fixed route operations and when compared to the planned operation of fixed route in Dodge City can provide for reasonable projections.

<b>Fixed Route Transit Peer Analysis</b>						
Provider	Location	Population	# of Routes	Annual Ridership	Ridership/Capita	Ridership/Route
City of Liberal	Liberal	20861	2	21967	1.1	10983
Finney County	Garden City	26880	4	67386	2.5	16847
Reno County	Hutchinson	42142	4	110127	2.6	27532
OCCK	Salina	47910	4	196338	4.1	49085
Flint Hills ATA	Manhattan	53678	4	173924	3.2	43481
<b>Average</b>		34448	4	113162	3.3	31434

In regards to comparing Dodge City’s potential ridership to other agencies, Liberal has recently started fixed route service and is a good guideline for newly established services and Finney County’s transit service can be used as a guideline for future projections because of the similar demographics.

<b>Dodge City Fixed Route Transit Ridership Scenarios</b>			
# of Routes	Annual Ridership	Ridership/Capita	Ridership/Route
3	20000	0.7	6667
3	50000	1.8	16667
3	75000	2.7	25000

## TCRP Report 161

The Transit Cooperative Research Program (TCRP) has put together numerous studies and workbooks to assist in the development and enhancement of transit systems through sharing methods and operational strategies of systems nationwide. TCRP Report 161, Methods for Forecasting and Quantifying Need for Rural Passenger Transportation, details multiple tools for estimating the demand and/or need for transit. A useful tool for the purpose of analyzing the potential for this particular fixed route system is the Small City Fixed-Route estimation tool.

Analysis of data from the Rural NTD and data provided by representatives from agencies who attended workshops held as part of TCRP Project B-36 led to the following function for estimating ridership.

The function for small city fixed route service is:

$$\text{Unlinked passenger-trips} = 5.77 \times \text{Revenue-hours} + 1.07 \times \text{population} + 7.12 \times \text{College/University Enrollment}$$

Does not include community college enrollment.<sup>1</sup>

Assuming the potential fixed route transit service in Dodge City would operate from 7 am to 7 pm on three fixed routes, five days per week, resulting in 9,360 annual service hours and a population of 28,075 the estimated demand is as follows:

$$\text{Unlinked passenger-trips} = 5.77 \times 9,360 + 1.07 \times 28,075$$

$$\text{Unlinked passenger-trips} = \mathbf{84,047}$$

Note: This function yields an estimate of demand, not a true ridership projection, as the system will not likely meet all estimated demand.

<sup>1</sup> TCRP Report 161, Methods for Forecasting Demand and Quantifying Need For Rural Passenger Transportation

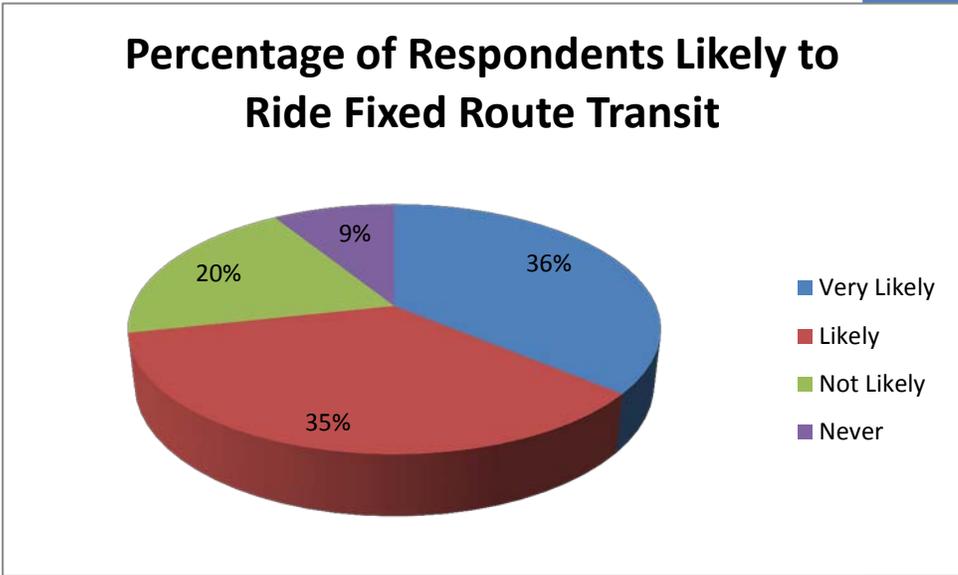
### TRANSIT COOPERATIVE RESEARCH PROGRAM

The Transit Cooperative Research Program (TCRP) is an applied, contract research program that develops near-term, practical solutions to problems facing transit agencies.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.<sup>1</sup>

**Survey Data**

As a part of the planning process, the study team created and distributed surveys to the residents of Dodge City. The intent of the survey was to gather information in regards to the level of interest in fixed route transit and to identify operating characteristics that will best suit the needs of the community. The charts and information on the following pages will detail the results of the surveys. The results will assist in the planning of a fixed route system and will create the possibility to tailor the system to the needs of the community. The following charts are based off of 497 survey responses received from various groups and citizens in Dodge City.



**Figure 16 Survey Results**

Figure 16 above illustrates the percentage of the 497 responses and how likely it would be that they would use a fixed route transit system. 71 % of respondents were either likely or very likely to ride fixed route transit in Dodge City. Only 9% of respondents said they would never ride transit.

A vital section of the survey was designed to gather information on where the stops should be located. The survey was designed in manner that broke down attraction types by medical, shopping, education, employment, and residential. The breakdown allows for analysis on each location type and compares similar attractions. This analysis will allow a ranking of sorts for choosing which locations will be on a fixed route and which locations may not need to be served by fixed route.

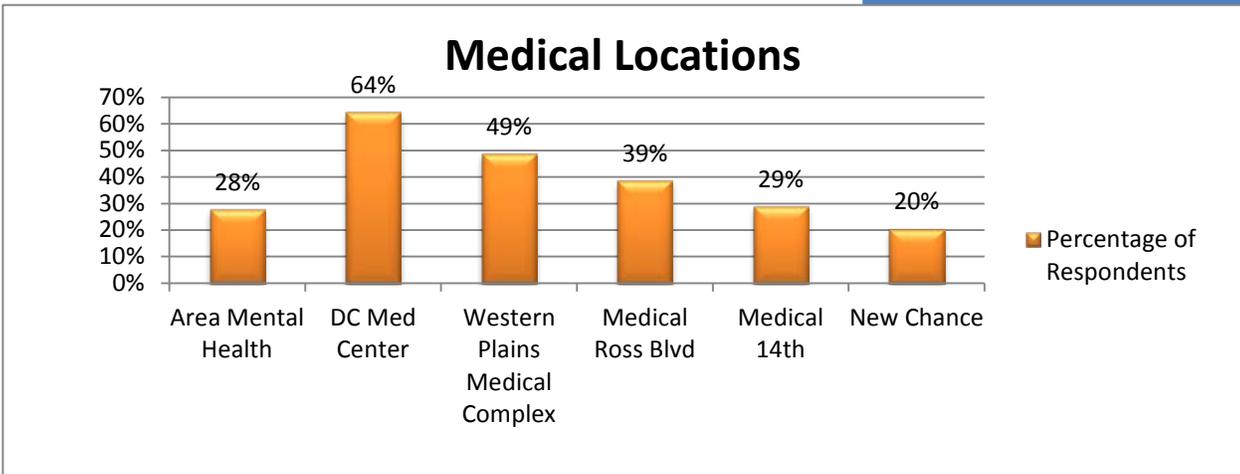


Figure 18 Survey Results

Figure 17 and 18 illustrate the survey responses in regard to medical locations in Dodge City. The responses allow for a better understanding of which medical locations should potentially be located on a fixed route. The Dodge City Medical Center and the

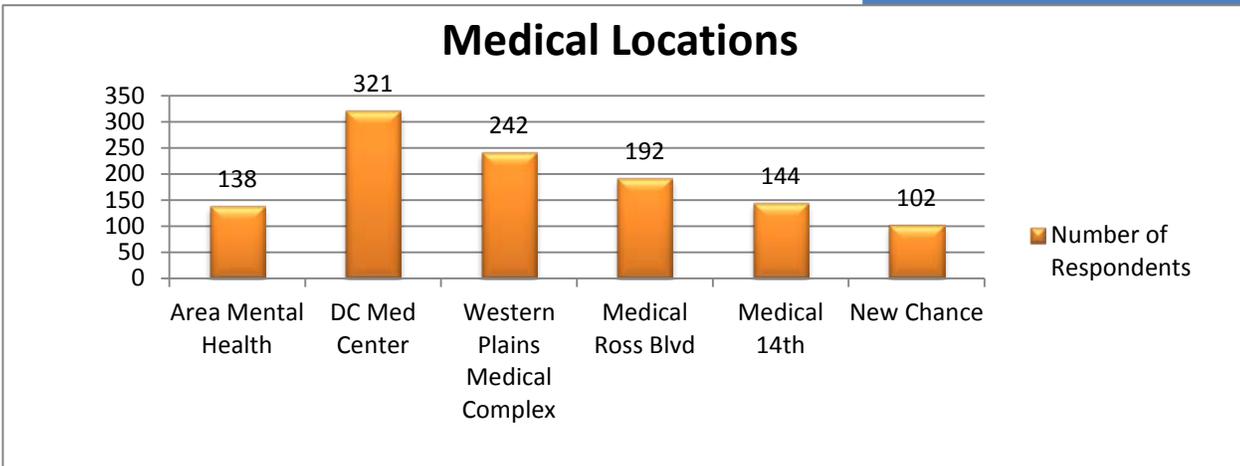


Figure 17 Survey Results

Western Plains Medical Complex had the highest number of responses. Medical facilities are essential to well-being of the citizens and the design of the fixed route will attempt to serve as many locations as possible.

### Shopping Locations



Figure 20 Survey Results

Figures 19 and 20 represent the locations identified in the survey that the respondents would most likely utilize fixed route transit to travel to. Wal-Mart, Village Square Mall, and Dillon’s were the locations that a majority of the respondents identified as important

### Shopping Locations

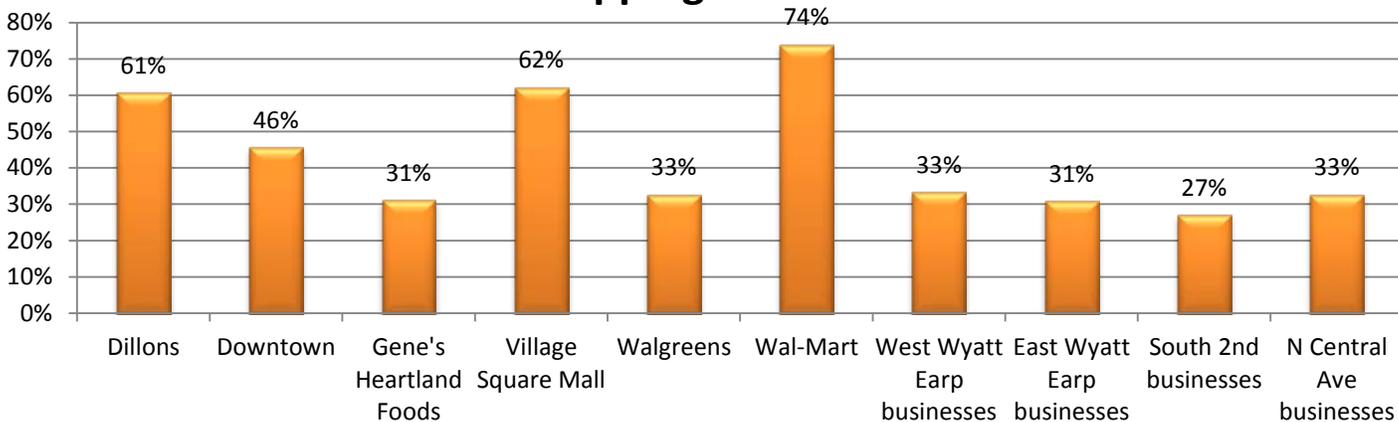


Figure 19 Survey Results

locations. Transit serves as many citizens mode of travel to get their groceries and other necessities. Including these locations on a fixed route system could enhance their access to these necessities.

Figures 21 and 22 represent important employment destinations as identified from survey responses. Major employers are further analyzed in another section of this report, but these figures illustrate the importance of employment transportation as identified by survey respondents. Both beef processing plants are shown as important destinations as well as the downtown area and casino and convention center. Transportation to employment centers is a need that fixed route can meet by providing daily transportation to job centers.

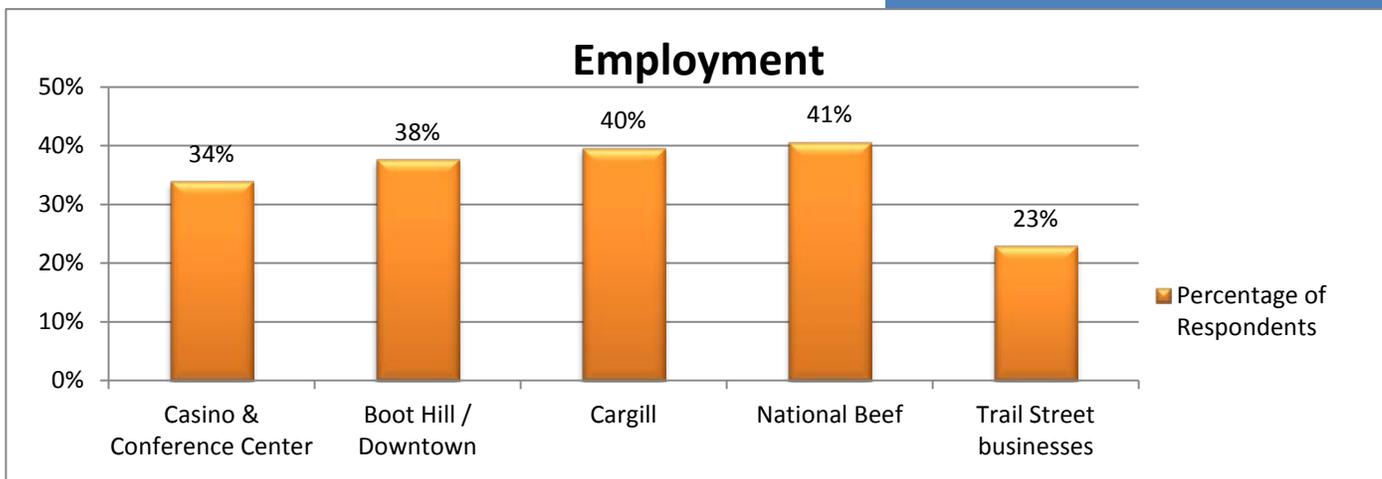


Figure 22 Survey Results

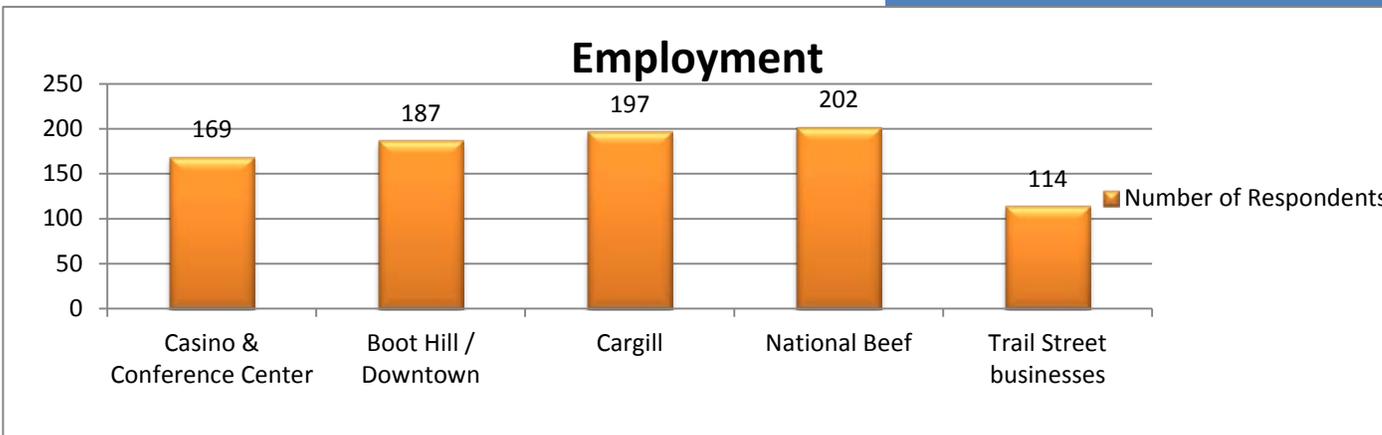


Figure 21 Survey Results

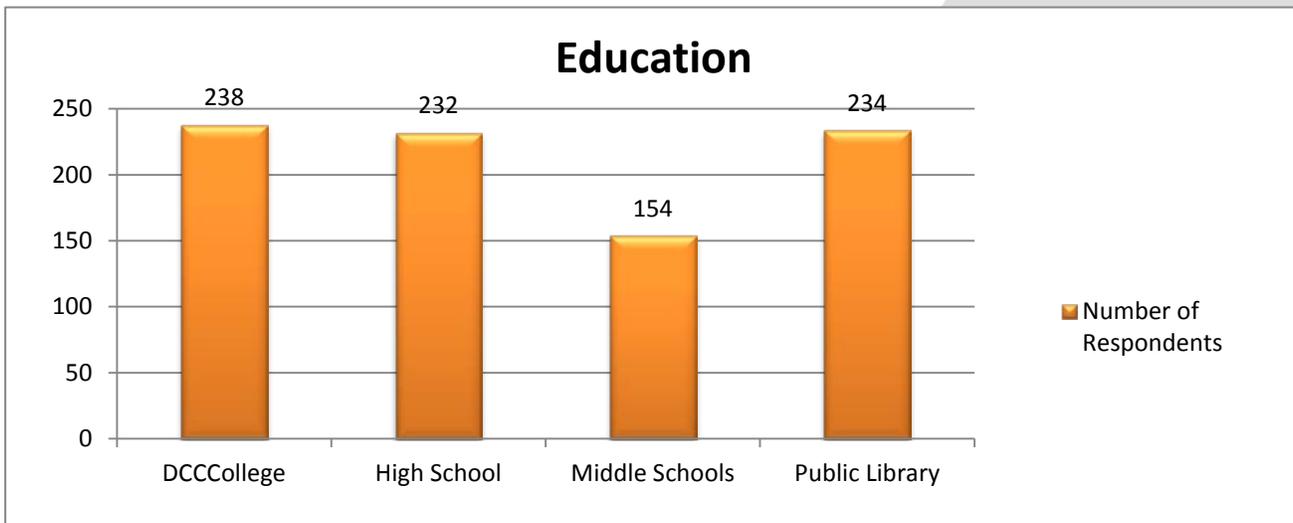


Figure 24 Survey Results

Figures 23 and 24 represent the results from the survey in regards to educational locations. The Middle School was identified as less relevant in terms of transit demand than the other educational locations. Colleges typically produce transit ridership considering the nature of travel to and from campus and student housing as well as the typically large number of students without a vehicle. The outcome of this data will be a focus on serving the college and the educational core in the center of Dodge city.

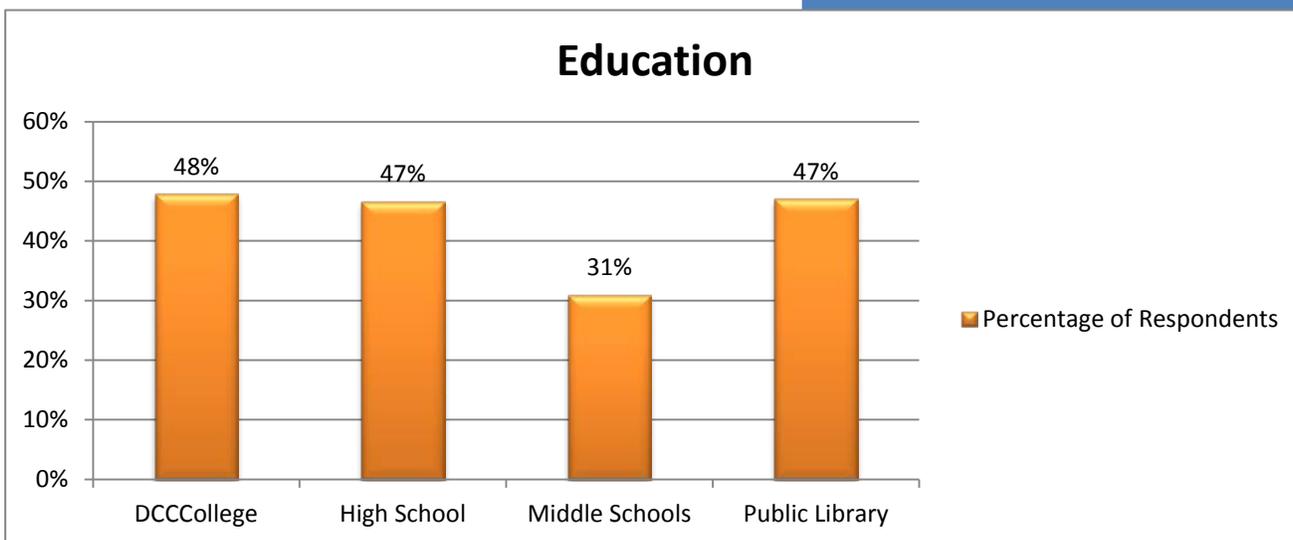


Figure 23 Survey Results

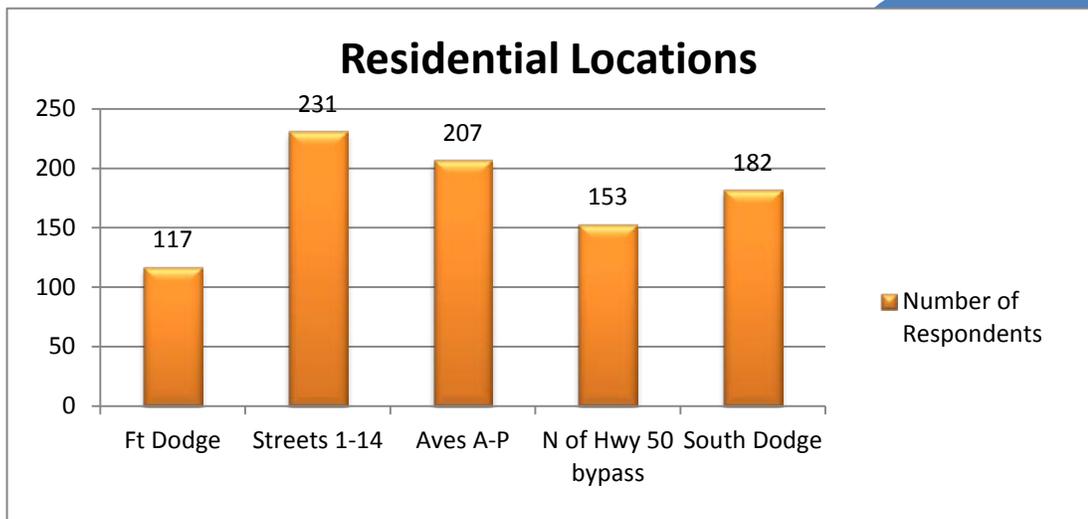


Figure 26 Survey Results



Figure 25 Survey Results

Figures 25 and 26 represent the residential locations that the survey respondents thought were important locations to be served. Residential areas are important to serve with fixed route transit because they typically serve as the trip origin and the attractions discussed on the previous pages serve as the trip destination. This data in conjunction with the Figure 5, Population Density in Dodge City, give a better perspective of where residents that would utilize fixed route transit reside. It provides information on the different divisions of population including South Dodge and Fort Dodge.

Also included in the survey questionnaire were questions pertaining to operational characteristics of the fixed route service. The intention of these questions is to gather input from the potential users of the system and design it to best serve the needs of the community.

Figure 27 illustrates the survey results representing when the respondents would be most likely to use fixed route transit. The number of respondents increases from morning to evening with a fairly even ratio from the three latter categories. With none of the time periods having a minimal number of responses it is likely that all of these time periods will need to be served.

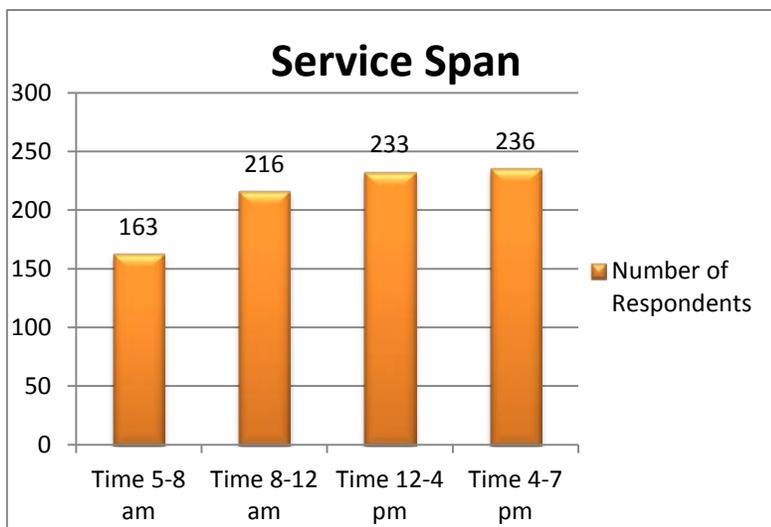


Figure 27 Service Span

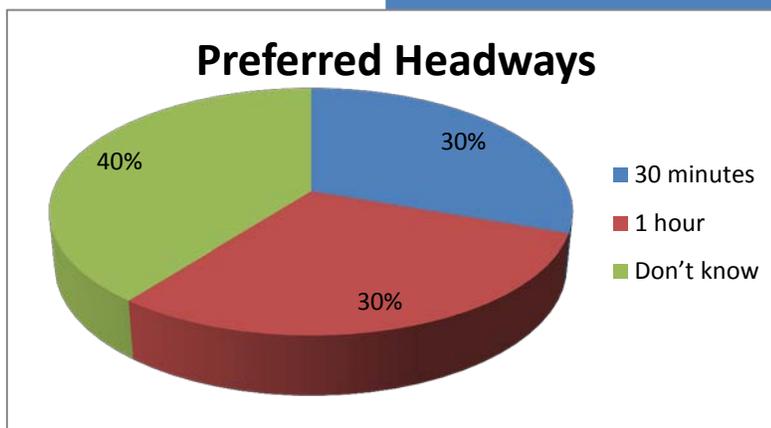


Figure 28 Preferred Headways

Figure 28 and 29 represent the preferred headways of the system and users willingness to pay. The headways will be designed for operational effectiveness and the fare structure will be analyzed further in the operations plan. The purpose of gathering this data was to better understand the potential rider's ideas as to how the system should operate.

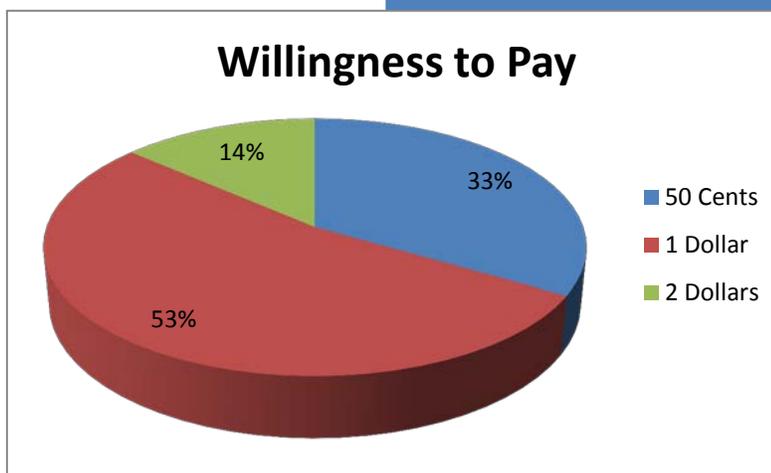


Figure 29 Willingness to Pay

## Summary of Data Analysis

The previous sections detail several different sources of data that is useful in determining the design and structure of a fixed route system in Dodge City, KS. The combination of Census, employment, current system, peer system, and survey data as well as techniques provided through TCRP Report 161 allows for a better understanding of transit demand in the study area. At its rudimentary level, this data allows for comprehension of where potential transit users are and where they want to go. Further analysis of this data assists in the development of the service in understanding the demand of the system, necessary service levels and operational characteristics.

The major finding from analyzing census data was the different transit dependent populations and the different areas in the city that they reside. Census data showed one census tract had more elderly residents, another tract had the most carless households, and another had the most citizens in poverty. The takeaway point is the dispersion of transit dependent populations throughout the city. The system will be designed in a manner that the fixed routes will serve as a connection between these populations and destinations city-wide.

The data included in the previous section regarding peer system data and the TCRP Report 161 calculations are very useful in expectations of the transit system. The comparable fixed route transit systems in Kansas illustrate the potential growth path for Dodge City's system and the TCRP Report 161 illustrates the potential of the system. A valuable comparison for a new start system is the City of Liberal's transit system that provided nearly 22,000 rides in their first full operational year. This system realized a steady increase in ridership as marketing efforts were put in place and knowledge of the system increased. A valuable

Based on the information from the previous sections of data analysis and in conjunction with the summary of data analysis on this page the following are stop locations that will be the basis for designing a fixed route service.

### STOP LOCATIONS:

ALCO  
 Area Mental Health  
 Boothill Casino  
 Cargill Meat Solutions  
 C & S Medical  
 Dodge City Community College  
 Dillons  
 Dodge City Medical  
 Dollar General  
 Downtown  
 Education Institutions  
 Good Samaritan  
 Heartland Food  
 Library  
 National Beef  
 New Chance  
 North Highrise  
 Park Plaza Tower  
 Presbyterian Church  
 Salvation Army  
 Sheridan Sports Complex  
 South Highrise  
 SRS  
 Stage  
 Village Square Mall  
 Walgreens  
 Wal-Mart  
 Western Plains

comparison for future ridership is Finney County Transit considering the similar demographics of the Garden City and Dodge City.

The combination of major employer data, common demand response trip data, and survey data were crucial in determining the list of stop locations on the previous page. As represented in Figure 30 below, these stop locations will serve as the basis for route design. The survey data will serve as a tool in determining a hierarchy in stop importance. Meetings with Dodge City Officials and the public will also play a significant role.

The combination of data from several sources will allow for the optimal design of fixed route services in Dodge City concluding with service available to several demographic groups and connections with the valuable destinations city-wide.

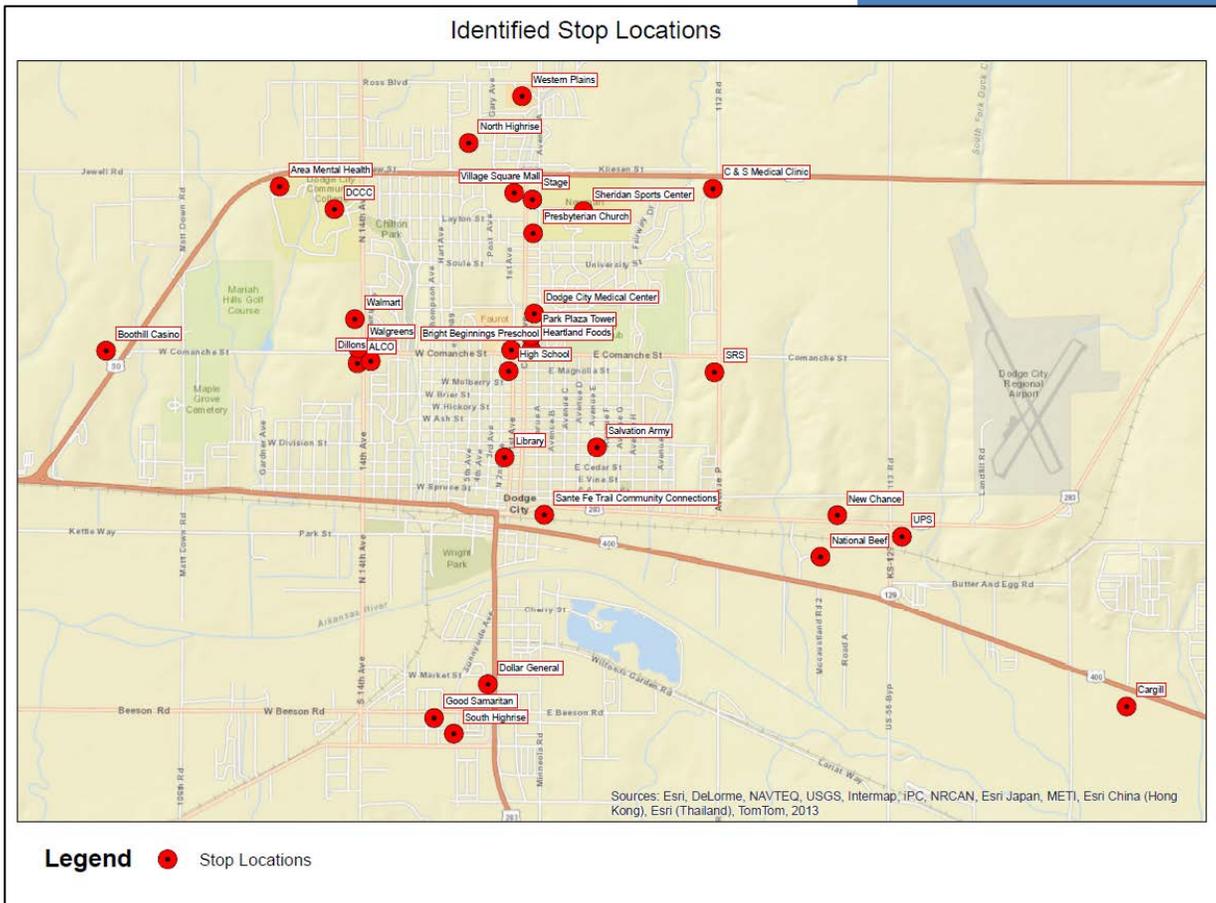


Figure 30 Identified Stop Locations

## Route Concepts

Utilizing the results of the data analysis presented in previous sections it is possible to begin the development of route concepts. The initial step in developing route alignments is determining the most appropriate system type. As discussed in the initial fixed route concept section on page 7, there are several types of routes networks that can be implemented ranging from trunk routes to radial networks.

The geographical layout of Dodge City provides a unique situation where three core service areas can be developed. The divide of South Dodge City from the core of the city generates a need to connect that area to the core of the city. The area north of Wyatt Earp can be divided in a manner that it could be served effectively with two additional routes. In addition to the unique geographical layout of Dodge City, the trip attractions, such as medical and social services, are relatively spread out throughout the service area. Not only are the services spread out, but the trip origins are relatively dispersed as well. The data represented in previous sections illustrates potential transit ridership throughout the service area, resulting in a need to provide service in a majority of the city.

As a result of the wide range of trip origins and destinations throughout the city and the unique geographical layout, a pulse system is recommended. This concept is recommended with the intention to most effectively and efficiently serve the most origins and destinations in Dodge City. The concept is based off the idea of a pulse transit system, which creates the opportunity to transfer between routes allowing access to all parts of the city.

### PULSE TRANSIT SYSTEM CONCEPT

This concept was developed with the intention to most effectively and efficiently serve the most origins and destinations in Dodge City. The concept is based off the idea of a pulse transit system, which creates the opportunity to transfer between routes allowing access to all parts of the city.

The concept described allows for transfer locations at several of the locations that were identified as large ridership generators. Along with the opportunity to transfer at these locations, the concepts allows for most citizens of the city to utilize transit to travel to the greatest trip attractions utilizing a one seat ride.

The concept allows for continuous circulation throughout the eastern and western sections of Dodge City north of Wyatt Earp Boulevard, a connection to major attractions from southern Dodge City.

The map on the following page illustrates a very general representation of the potential routing concept. This concept is based upon two routes operating continually throughout the core of the city north of Wyatt Earp Blvd and another route that will serve southern Dodge City. A key part of this concept will be a common or multiple common locations served by each route to allow potential riders to transfer to other routes to access locations in other route zones.

This concept is based on connecting as much of the areas of Dodge City as possible with shopping at the intersection of Comanche and North 14<sup>th</sup>, medical services near and including Western Plains Medical Complex, Dodge City Community College, and the educational core of the city concentrated between Comanche and Soule Street along 1<sup>st</sup> Ave.

The west zone (blue) will serve the western portion of Dodge City connecting riders to the aforementioned locations as well as the Boothill Casino, locations along Wyatt Earp west of 1<sup>st</sup> Avenue, and several residential locations in the western half of Dodge City.

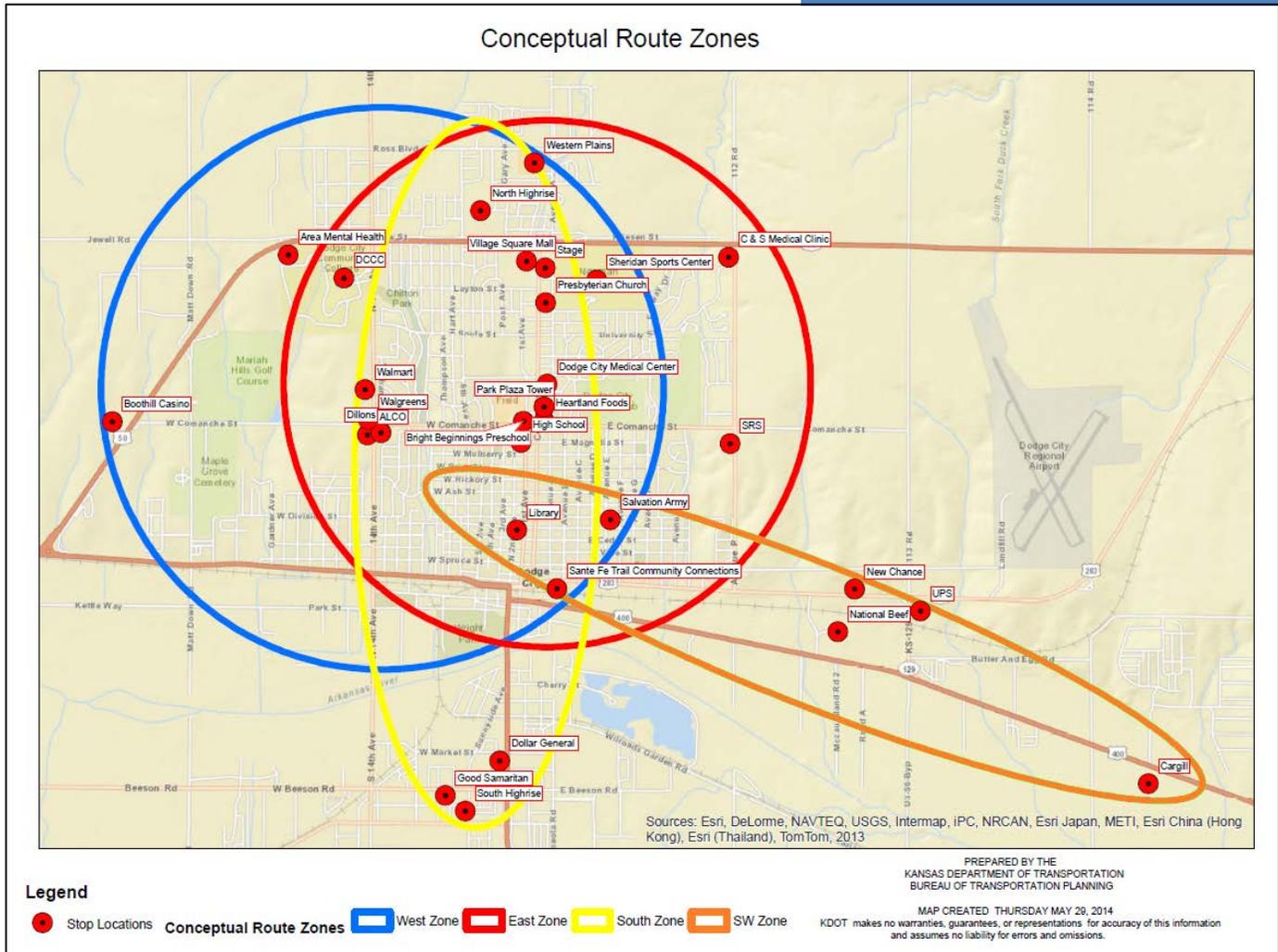
The east zone (red) will serve the eastern portion of Dodge City connecting riders to the aforementioned locations as well as DCFS, the Salvation Army, locations along Wyatt Earp east of 1<sup>st</sup> Avenue, and several residential locations in the eastern half of Dodge City.

The south zone (yellow) will serve as a connection to the locations listed above from the area south of Wyatt Earp Blvd.

The southwest zone (orange) represents an opportunity to serve Fort Dodge and potentially the two beef processing plants with a connection to the core of Dodge City and residential areas within the city. Further analysis of demand and service options will be identified later in the study to better understand the ability to serve this population.

# DODGE CITY FIXED ROUTE TRANSIT

The initial conceptual route zones represented below are intended to provide the most connections to needed services from the entire service area. Overlapping zones will allow for transfers among routes and ultimate connectivity throughout Dodge City.



**Figure 31 Conceptual Route Zones**

Utilizing the described concept and the identified stop locations, initial route alignments will be developed in the following section. The routes will be designed to serve the areas of the city that represent the highest demand for transit ridership based on the data analysis completed in previous sections of the study.

## Initial Route Alignments

Moving forward with the previously recommended pulse system concept and determined route zones, initial route alignments are the next step in the planning process. The following sections will describe the routes, the design process, and the trip attractions and generators associated with each route. The initial approach to establishing these individual routes is to serve as many of the identified locations that are deemed important to serve within the established route zones. This approach includes serving the identified transit dependent populations and maintaining simplified route schedules by designing routes to operate on half hour or hour timespans. The following sections will outline the initial route alignments.

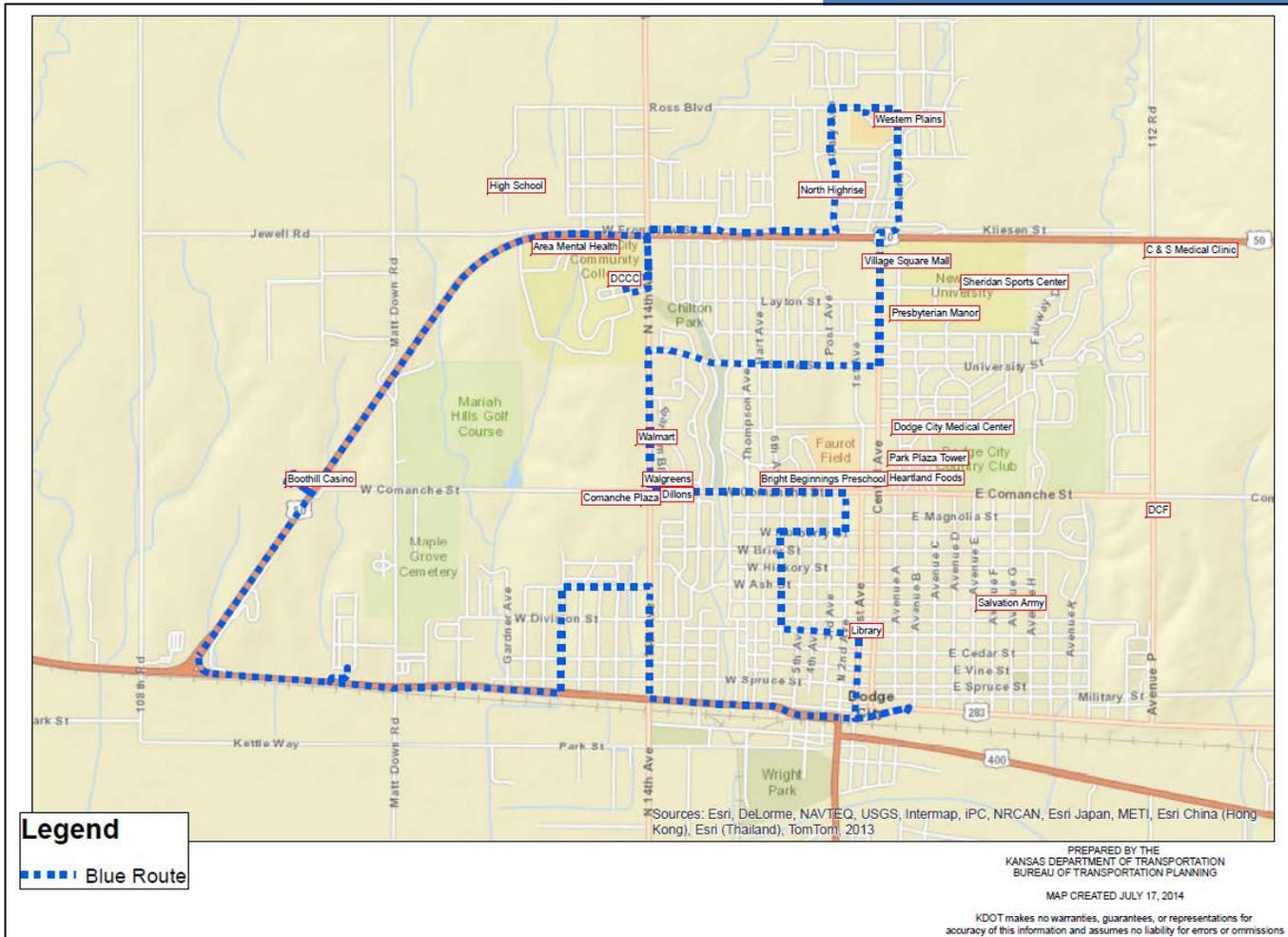
Establishing a central transfer point is essential to developing a pulse system. It was determined as an aside from this process that the Historic Santa Fe Depot at the intersection of Wyatt Earp Blvd and Central Avenue would be the main transfer station for the pulse system. This location is near downtown and will provide a logical connection point for all routes. As a result of the route design process, it is likely that additional transfer points will be incorporated into the system, with the Historical Santa Fe Depot being the true central point of the pulse system.

### BLUE ROUTE:

The initial blue route alignment is intended to serve the western section of Dodge City connecting core residential areas to major trip destinations. The major trip destinations include attractions along Wyatt Earp, the casino, the medical complex north of US-50, the shopping centers at 14<sup>th</sup> and Comanche, the educational core, and downtown.

As all routes in the system are designed to do, the bus will begin the route at the Historical Santa Fe Depot and head west onto Wyatt Earp. The map below illustrates the initial route alignment.

**Figure 32 Initial Blue Route Alignment**



The first deviation off of Wyatt Earp will be at 14<sup>th</sup> Street with the intention of serving the residential along the 14<sup>th</sup> Street corridor and area surrounding Linn Elementary School. The route then returns to Wyatt Earp and approaches Glenridge Estates to provide service to that mobile home community. The route then leads to the casino, which was determined as a major trip generator, with upwards of 72 trips per month being provided by the current demand response system. Following the casino, the route will serve the community college and the nearby Area Mental

Health facility which are expected to be large trip generators. The route then returns to US-50 where it is designed to deviate north to serve the North Highrise and the nearby medical facilities. The route then begins to head back to the Historical Santa Fe Depot serving the Village Square Mall and nearby shopping facilities, the residential areas between 14<sup>th</sup> and Central along Soule Street, and the shopping facilities at 14<sup>th</sup> and Comanche. At this point the route is intended to serve the educational facilities along Comanche as well as the residential area between 1<sup>st</sup> and 14<sup>th</sup>. The two final destinations of the designed route are the Library and downtown before returning to the Historical Santa Fe Depot.

The characteristics of the initial blue route alignment illustrate an ability to serve multiple trip attractions in the western half of Dodge City as well as connecting residential cores to these attractions. The table below illustrates the locations identified as necessary to serve in earlier parts of this study that could be served with the initial alignment of the blue route.

The locations listed are some of the locations identified earlier in the process as some of the major trip generators. The current demand response data aligned with the survey responses illustrate

Blue Route Stop Locations
Comanche Plaza
Area Mental Health
Boothill Casino
Dillons
Dodge City Community College
Downtown
Education Institutions
Library
North Highrise
Village Square Mall
Walgreens
Wal-Mart
Western Plains

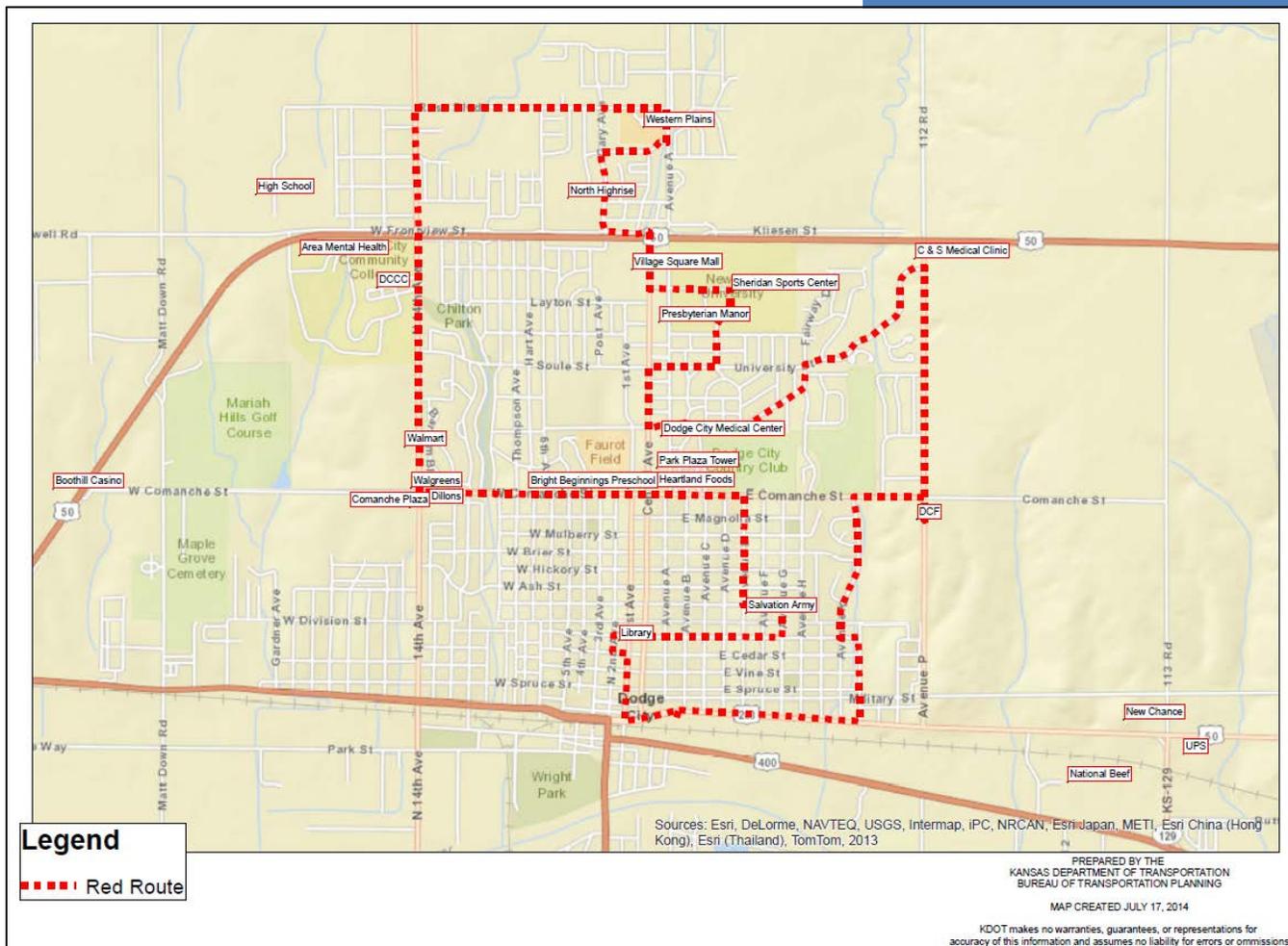
these locations as strong ridership generators.

The next step in developing this route is completing a timing analysis to determine if the route will operate within the one hour headway. Further analysis and decision making will be documented in later stages of this study.

RED ROUTE:

The initial route alignment for the red route is intended to serve the eastern half of Dodge City. The major attractions that aren't served by the initial blue route, that are served by the red route alignment include: Department of Children and Families, C & S Medical, Dodge City Medical Center, and the Sheridan Sports Complex. The route is also intended serve similar locations to the blue route including the Western Plains Medical Complex, the community college, the shopping area at 14th and Comanche, the educational core, and downtown. The common destinations allow for the opportunity to transfer between routes throughout the service area depending on route timing.

Figure 33 Red Route Initial Alignment



Beginning at the central transfer point, the red route is designed to operate in the opposite direction of the blue route. The route heads east on Wyatt Earp providing opportunities for riders to access services along this corridor. The route turns north on Avenue L to allow for service of the planned Area Mental Health facility before returning to Avenue K where it serves the apartment complex near Mulberry Circle. The route then serves the Department of Children and Family Services before it heads northward to the services on Summerlon Circle such as C & S Medical. The route then utilizes University Drive among other streets to arrive at the Dodge City Medical Center before routing to the Sheridan Sports Complex. After the Sheridan Sports Complex the route continues to the Village Square Mall, the North Highrise, and Western Plains Medical Complex. After the route reaches the medical services it continues west on Ross Blvd before heading south on 14<sup>th</sup> to serve the community college and the shopping at 14<sup>th</sup> and Comanche. Similarly to the blue route, the red route serves the educational core and the library, but the red route also serves the United

Methodist Ministries and the Salvation Army in route to the downtown and ultimately the transfer point.

The table on this page illustrates the number of previously identified stops deemed necessary to serve that will be served by the red route. The route has the potential to serve several trip attractions and will also connect to several core residential areas.

Red Route Stop Locations
Comanche Plaza
C & S Medical
Dillons
Dodge City Community College
Dodge City Medical
Downtown
Education Institutions
Heartland Food
Library
North Highrise
Presbyterian Manor
Salvation Army
Sheridan Sports Complex
SRS
Village Square Mall
Walgreens
Wal-Mart
Western Plains

## YELLOW ROUTE:

The initial yellow route alignment is intended to serve the residents of South Dodge City and connect them to the services that are available north of Wyatt Earp. The major trip generators that are not already included on the blue or red route include Dollar General, Good Samaritan, and the South Highrise. This route was also designed with the intention to create multiple transfer opportunities for further access to the entire service area.

The yellow route, beginning at the transfer station, approaches South Dodge City via 2<sup>nd</sup> Avenue and is designed to provide service to the residential areas to both east and west of 2<sup>nd</sup>. The route

**Figure 34 Yellow Route Initial Alignment**



provides service to the South Highrise and Good Samaritan extending west to 14<sup>th</sup> Avenue. The route is aligned to connect

back to 2<sup>nd</sup> Avenue at the intersection of 2<sup>nd</sup> and Sycamore prior to heading north on 2<sup>nd</sup> Avenue. The route is designed to operate in the opposite direction of the blue and red routes serving the educational core, 14<sup>th</sup> and Comanche, the community college, medical complex and the mall, before returning to the transfer station. The yellow route is aligned to operate in the opposite direction due to the enhanced ability to transfer between routes and the ability to provide opposite direction service.

The table below illustrates the number of previously identified stops deemed necessary to serve that will be served by the yellow route. This route, similarly to the blue and red routes, has the potential to serve several trip attractions and will also connect to several core residential areas.

<b>Yellow Route Stop Locations</b>
Comanche Plaza
Dillon's
Dodge City Community College
Dodge City Medical
Dollar General
Downtown
Education Institutions
Good Samaritan
Heartland Food
Library
North Highrise
Park Plaza Tower
Presbyterian Manor
South Highrise
Village Square Mall
Walgreens
Wal-Mart
Western Plains

This route is designed to connect the residents of South Dodge to the stop locations listed above and provides an opportunity for those residents to access essential services.

FORT DODGE:

In addition to the three core routes the Fort Dodge route is designed to serve the residents of Fort Dodge as well as locations along East Wyatt Earp Blvd. The initial alignment would operate on a limited basis in conjunction with the yellow route. The service would be scheduled, in its initial design, to operate two hours per day providing a trip in the morning and one in the afternoon which would provide a connection to the other three routes in the core of the city. During these two hours of service the vehicle operating on the yellow route would operate along the Fort Dodge alignment.

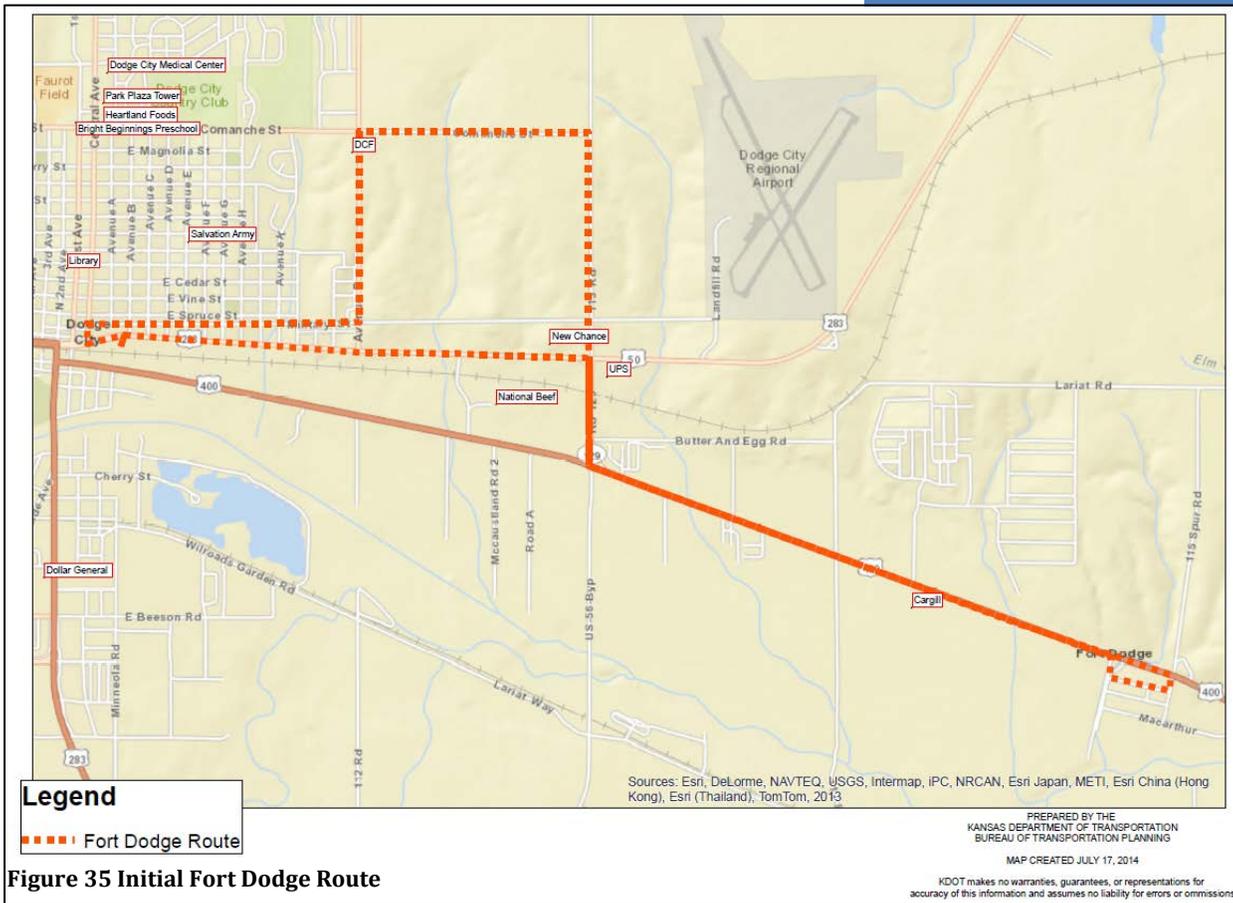


Figure 35 Initial Fort Dodge Route

The route would start at the transfer point and travel east on Wyatt Earp Blvd. serving trip generators along Wyatt Earp including New Chance. The route would then operate along 113 Road until Trail Street where it is aligned to connect to Fort Dodge.

## DODGE CITY FIXED ROUTE TRANSIT

The route would then operate in the reverse manner heading north on 113 Road to serve the prison and returning west to serve the Department of Children and Family Services. The route would then head south on Avenue P until Military Avenue where it would travel west towards downtown until ultimately ending up at the transfer center. Returning to the transfer center allows all riders from Fort Dodge and other locations on this route to connect to the three core routes to be able to travel to all areas of Dodge City.

### ENTIRE SYSTEM:

The pulse concept allows for multiple high demand locations to be served by multiple routes and provide widespread fixed route service throughout the service area. Further timing analysis and public feedback will determine additional route adjustments. This process will be described in the following sections.



**Figure 36 Initial Route Alignments**

## Public Meetings

A critical part of the planning process is the inclusion of the public and getting their feedback on the route alignment design process. Including the public in the process allows for more accurate design of the transit system in regard to the how the actual transit users would be able to best utilize the system. This process also allows for the public to better understand how the fixed route system would operate and how it could positively affect their mobility throughout Dodge City.

Eight public meetings were held in the following locations/groups:

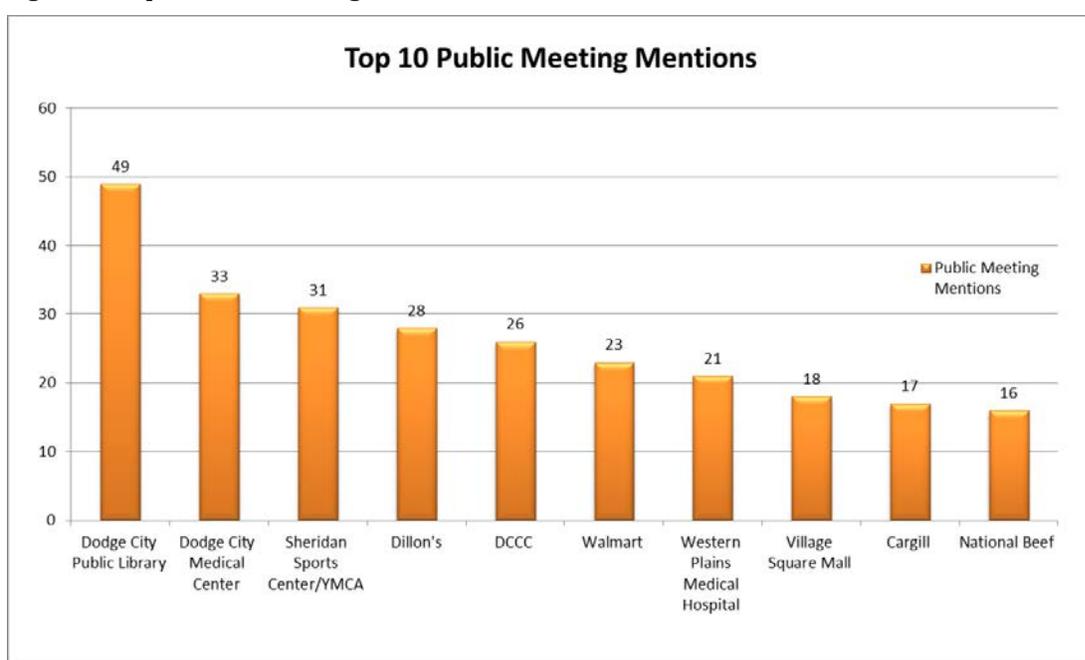
- Commission Chambers
- Public Library
- Somali Community
- Friendship Feast
- Arcoiris Youth Group
- Rotary Club
- Senior Center
- Lion’s Club

During the public meeting process, attendees were asked to review the proposed route alignments and discuss their thoughts with KDOT and Dodge City officials. They were also asked to mark on the maps that were displayed, where they would like to have a transit stop that

Figure 37 Public Meeting July 21st - Dodge City Commission Chambers



Figure 38 Top 10 Public Meeting Mentions



would best suit their needs. The chart on the previous page illustrates the top 10 mentions and/or dot placements. Many of the locations listed on this chart are being served on multiple routes in regard to the initial route alignments and were realized as important locations to serve in the data analysis section.

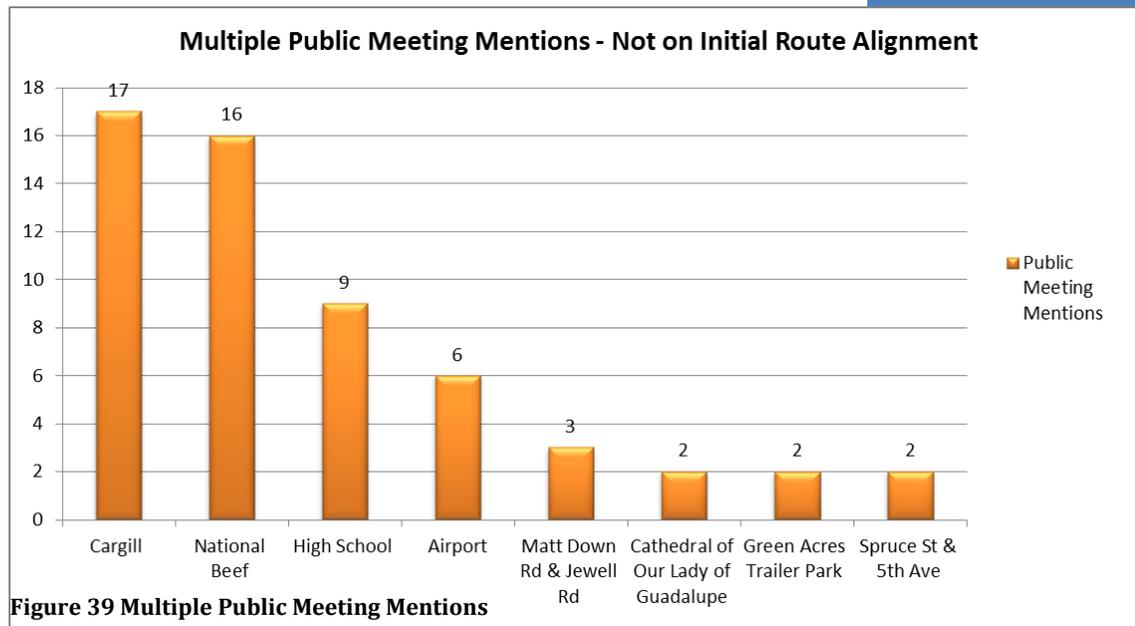


Figure 39 Multiple Public Meeting Mentions

The table above displays the locations with the multiple mentions that were not on the initial route alignment. There were eight locations that were mentioned multiple times throughout the eight public meetings. Each of these locations will be examined in the following paragraphs and it will be determined whether they need to be included on future route alignment adjustments.

Cargill (17 Mentions) National Beef (16): The locations with the most mentions that were not included on the initial route alignments are Cargill Beef and National Beef. Cargill Beef and National Beef are the two largest employers in Dodge City which creates the need for daily transportation to and from the processing plants. The combination of these two plants in close proximity creates a complex situation for serving the plants via public transit. The issues that are raised when attempting to serve

these locations are vehicle capacity, route timing and accuracy due to traffic conditions, shift change timing, and overnight shifts. The combination of the two plants reaches nearly 6,000 employees and during shift change nearly 1,000 employees are entering and exiting each plant. This large number of people wouldn't be able to be served in a quality manner with the size of vehicles currently allowed in the KDOT 5311 program. The vehicles would be over capacity and would limit the service in the core of the city.

Separate from this effort will be an analysis of what would best serve the two processing plants, with a possibility of larger commuter vehicles or a vanpool program. Understanding the challenges that exist in serving these locations, these locations will be excluded from further route alignment analysis.

High School (9): The High School, located in northwest Dodge City, was also mentioned multiple times in the public meeting process. In a typical fixed route system a high school would make the list of probable locations to be on the route alignments. The high school in Dodge City is located in an area with limited access. The only access is from W Ross Blvd and exiting the school property requires W Ross Blvd as well. The image to the right is an image of the high school, which illustrates the potential challenges. The traffic from a combination of school buses and personal vehicles during school arrival and release limit the ability to serve the high school with fixed routes. The traffic would require extended time on the school premises and negatively affect the timing of the rest of the route. A potential option would be to serve the high school using Jewell Rd. This option would require additional



Figure 40 High School Traffic (Google Earth)

infrastructure including pedestrian access to Jewell Rd. and potentially a transit stop. The blue and red routes initial alignments serve areas relatively close to the high school. This being the case, with additional infrastructure or with coordination with the high school, the routes could be restructured to serve the high school with minor adjustments and minimal effects on the route timing. Future discussions between the school and the city will need to occur to move the potential options forward. For this planning process, the alignments will be designed without serving the high school directly.

**Airport (6):** The airport is an additional location that was mentioned during the public meeting process. It was determined during this planning process that the combination of the airport being located more than 3 miles from downtown and the limited demand noticed in the demand response system, that the airport wasn't deemed as a necessary location for providing fixed route service. Although the airport won't be directly served by the fixed route system, a regional network connecting Garden City, Dodge City, and Liberal could potentially include a connection between the regional airports. This could potentially create a connection to the airport for Dodge City residents.

**Matt Down Rd & Jewell Rd (3):** This intersection was mentioned three times during the public meeting process. This location is close to the aforementioned high school location and would be directly impacted by a rerouting scenario to serve the high school. This location was left off of the initial alignments considering the limited population in the surrounding area. This area, according to the initial data analysis, has a limited transit dependent population as well. The service of this area will be dependent upon future process with high school service.

Cathedral of Our Lady Guadalupe (2): The Cathedral of Our Lady Guadalupe is located north of W Ross Blvd on 14<sup>th</sup> Avenue. Although this location is listed as a being mentioned multiple times during the public meeting process, the conversation was typically for Sunday morning service. The initial route operations will likely be limited to weekday service, but future progression of the system could lead to weekend service wherein this location could be a potential stop. In addition to the demand being primarily weekend service, this location is also located relatively far away from the red route alignment on Ross Blvd.

Green Acres Trailer Park (2): Another location mentioned multiple times was the Green Acres Trailer Park south of US-400. The initial alignment dismissed this area due to the distance from the core of the city. The trailer park is located more than a mile from the initial alignments and structuring an alignment to serve this small population would have a negative effect on serving the rest of the city.

Spruce Street & 5<sup>th</sup> Ave (2): This location was mentioned due to the First Christian Church being located at this intersection. This location is not directly served with the initial alignments, but is indirectly served as it is within a quarter mile from the downtown stop locations.

The next step in the planning process is to use the valuable information gathered from the public meetings along with the route timing analysis to design the proper route alignments to best serve the potential transit users. The following section describes different scenarios for serving the locations that weren't initially on the route alignments along with adjustments to better reflect the actual timing of the routes. From this step, final route decisions will be made and will be described in the narrative in the following sections.

## Route Alignment Options/Adjustments

### Blue Route – Route Alignment Options

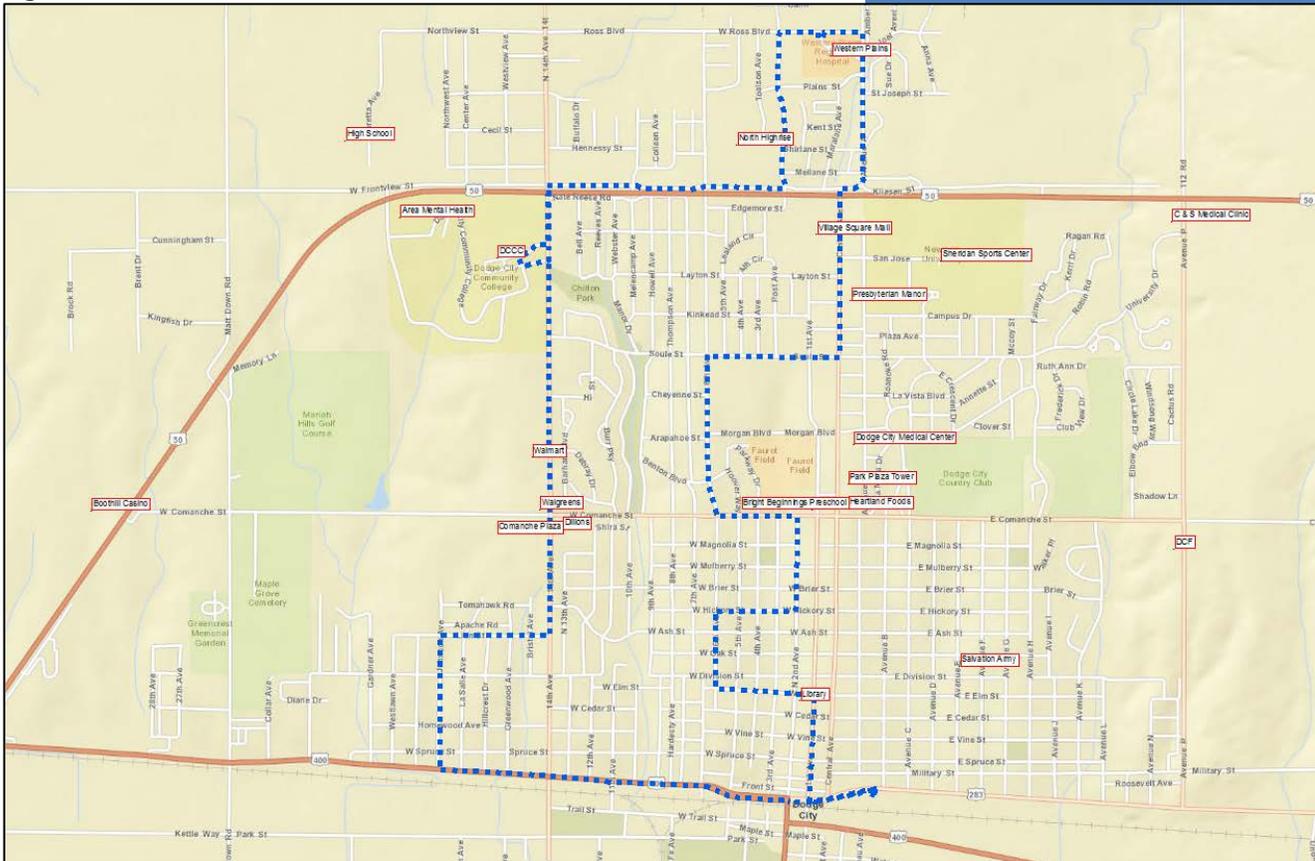
The initial alignment of the blue route was developed to connect the areas west of Central Avenue to the Casino, the college, the Western Plains Medical Complex, the shopping center at 14th and Comanche, and downtown. In an effort to connect these residents to the aforementioned major destinations the timing of the route exceeded the desired 60 minute headway. In order to reduce the time of each run, three alignment options were developed that fit within the desired headway. These options are described below along with the potential positive and/or negative impacts of the alignment change. In all three instances the alignment changes resulted in the loss of a major trip generator along the route. In some instances the major trip generator is served by other designed routes and in others loss of service entirely is the result. The following paragraphs and graphics will explain the scenarios and the resulting impacts.

The first scenario was based upon removing the casino from the blue route opening up the necessary time to fit in the desired headway and resulting in more service in the core of Dodge City. Figure 1 below represents the alignment for this scenario. This scenario presents an array of both negative and positive impacts. The positive impact that results from this alignment alteration is enhanced service to the educational core of Dodge City, specifically along Soule Street north of Soule Intermediate Center and 6th Avenue west of Northwest Elementary. This scenario also enhances the opportunity for riders in the residential areas between Comanche, 14th, US-50, and Central resulting from the route operating along Soule Street and 6th Avenue. The negative impact resulting from this alignment alteration is the loss of a major trip generator, the casino, from not only the blue route, but

## DODGE CITY FIXED ROUTE TRANSIT

the system as a whole. Utilizing data from the spring of 2013, the casino represented the 7th highest demand for stops in Dodge City with an average of 58 trips per month. This is a relatively large quantity of trips per month to not serve with the fixed route system and will negatively affect overall ridership numbers. Another negative impact from this alteration would be the loss of service along Wyatt Earp west of Johnson Avenue. Locations

**Figure 41 Blue Route Scenario 1**



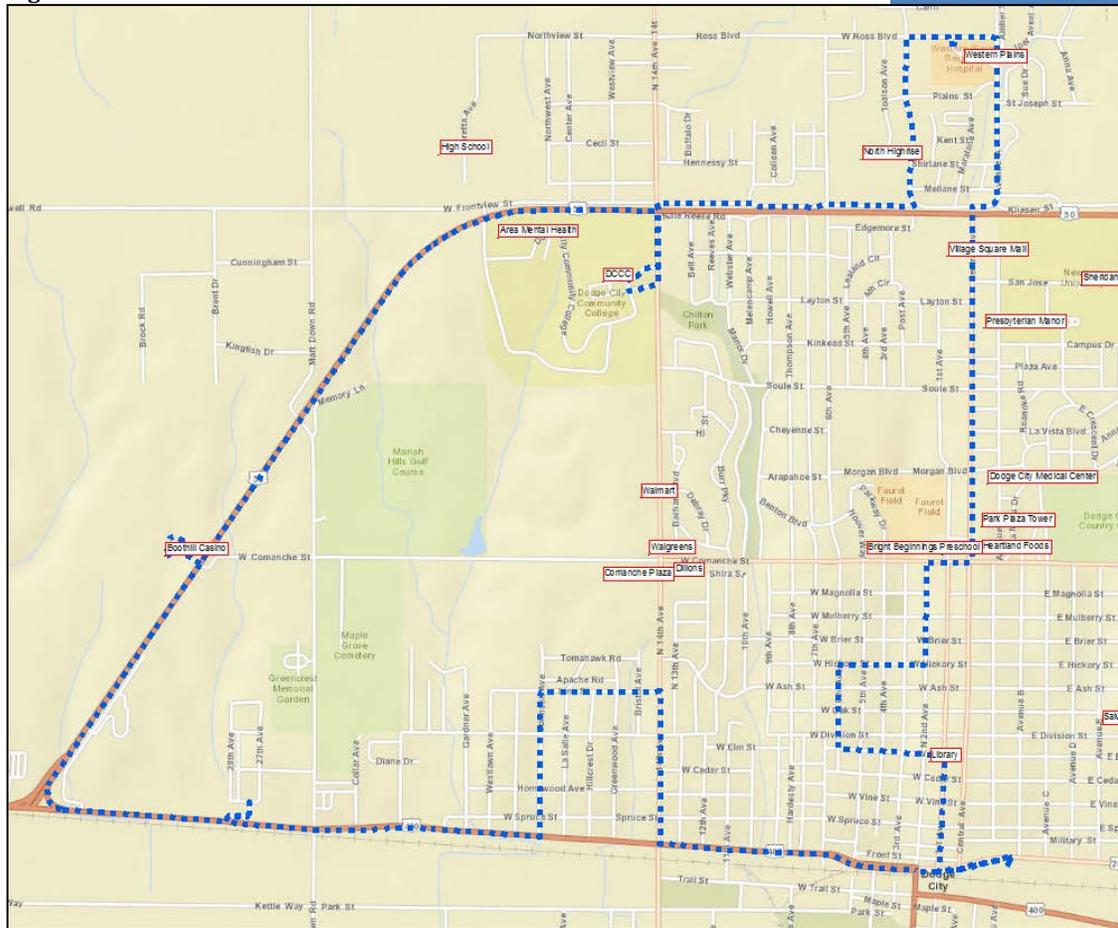
impacted from this loss of service would be hotels along Wyatt Earp and the mobile home parks both to the east and west of Matt Down Road. The impacts, positive and negative, will be compared to the impacts of the following alignment alterations in order to make a final decision on the proper alignment.



## DODGE CITY FIXED ROUTE TRANSIT

The third scenario represents an alignment that doesn't stop at the shopping area at 14th and Comanche Street which includes Walgreens, Wal-Mart, and Dillons. The figure below represents the alignment. This alteration to the original alignment changes the route to continue south on Central Avenue instead of operating along Soule Street and south on 14th to the shopping area at 14th and Comanche. This negatively impacts the residential areas along Soule Street and throughout the area between 1st and 14th Avenues, specifically along Comanche where no other route is

Figure 43 Blue Route Scenario 3



currently planned to operate. It also negates the major shopping destination in Dodge City which was developed as a major transfer point for the entire system. The reduction of these locations along the route would allow for the blue route to be within the 60 minute planned headway, but the negative impact may be too strong to

support this alignment. The change in service results in additional service along Central Avenue between Soule and Comanche. This area is already served by two other planned routes resulting in possible duplication of service due to similarly scheduled routes. For this particular scenario the negative impacts seem to outweigh the potential benefits, but all options should be considered when selecting the proper alignment.

The three aforementioned alignments were developed in order to reduce the route timing of the original alignment to the planned 60 minute headway. As a result of the realignment both positive and negative impacts are realized. Some impacts have a system wide impact where others have a greater impact on areas directly related to the service of the blue route. In an effort to reduce the negative impacts of changing the route and attempting to garner some benefit from the route change the impacts for all three routes were compared. The second scenario has the least system-wide negative impact and in turn would provide enhanced service to areas otherwise not served by the system. Therefore the second alignment is the recommended alignment of the blue route.

Figure 44 Blue Route Impacts

Summary of Impacts - Blue Route Re-Alignment		
Alignment	Positive Impacts	Negative Impacts
Scenario 1	Enhanced service to the educational core and residential areas west of Comanche	Loss of service to casino, mobile home parks, and hotels along Wyatt Earp west of Johnson Ave.
Scenario 2	Enhanced service along 6th between US-50 and Soule; More service to educational institutions	Loss of service to Western Plains Complex and Village Square Mall; Loss of planned transfer points
Scenario 3	Additional service along Central	Loss of service to major shopping destination; Loss of service to residential area between 14th and 1st; Loss of planned transfer point

## Red Route Alignment Options/Adjustments

The initial alignment of the red route was developed to connect the areas east of Central Avenue to the college, the Western Plains Medical Complex, the shopping center at 14th and Comanche, and downtown. In an effort to connect these residents to the aforementioned major destinations the timing of the route exceeded the desired 60 minute headway. In order to reduce the time of each run minor adjustments were developed that fit within the desired headway. These adjustments are described below along with the potential positive and/or negative impacts of the alignment change. The following paragraphs and graphics will explain the adjustments and the resulting impacts.

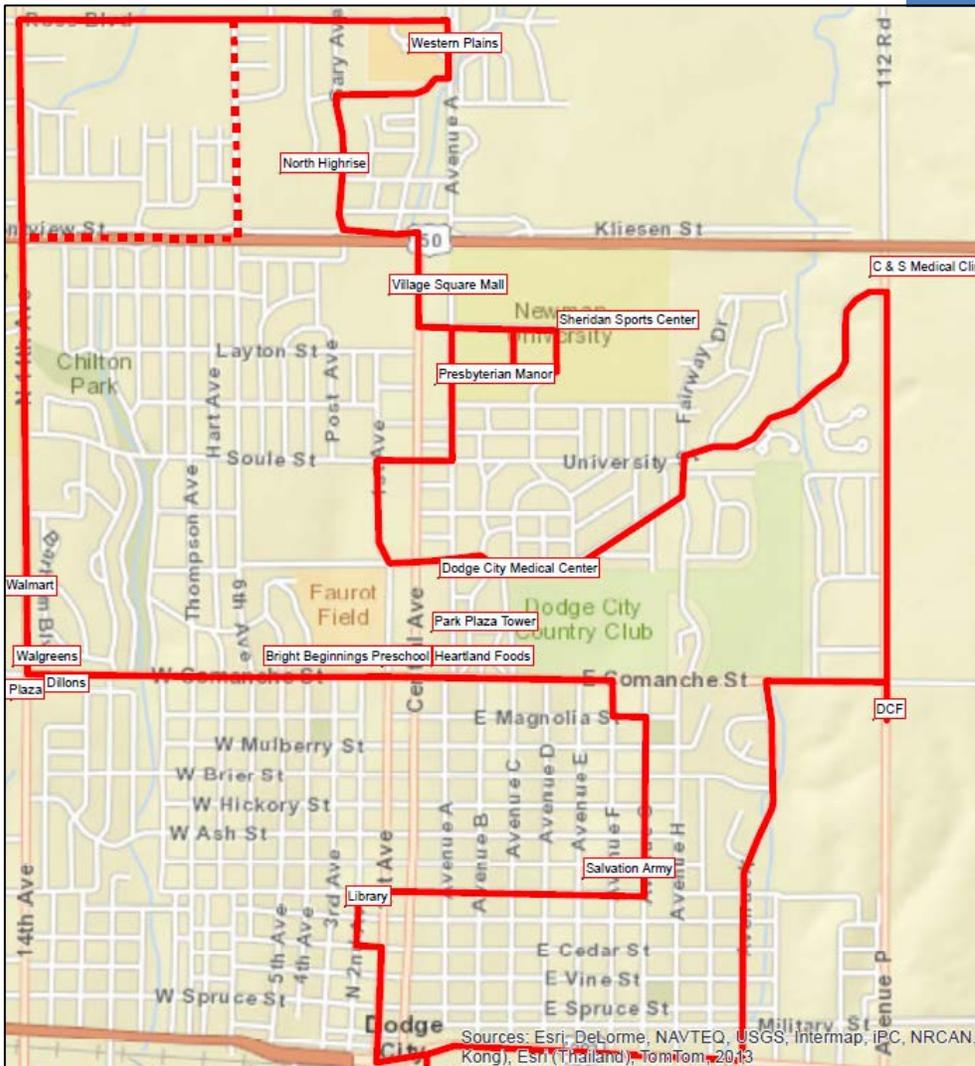
The timing of the initial route design was determined to be over the desired 60 minute headway but only by a relatively small amount of time. The small amount of time that needed to be removed from the route only requires minor adjustments. The minor adjustments that were made on the red route are illustrated in the graphic below and are as follows:

- Removing service from Avenue L and aligning the route to operate on Avenue K
- Adding service to the civic center by extending the route to 1<sup>st</sup> Avenue utilizing Morgan Blvd.
- Utilizing Avenue A and San Jose to access the Sheridan Sports Complex instead of Picayune Dr.
- Adding a rerouting option utilizing 6<sup>th</sup> Avenue instead of 14<sup>th</sup> Avenue during high school arrival/release.
- Minimize deviation on alignment serving the Salvation Army.

Following the timing analysis and the gathering of feedback during the public meeting process, it was determined that the initial red route alignment would only require minimal changes. The aforementioned changes were initiated in order to reduce the overall route time and provide opportunities to serve areas mentioned in the public meetings. Another addition in this version

of the red route is the alternate alignment due to heavy high school traffic. This will allow the red route to continue to serve the intersection at Ross Blvd and 14<sup>th</sup> Ave during a majority of the service hours. With the aforementioned adjustments and timing analysis the red route illustrated below should be relatively close to the final route alignment described in the following section.

Figure 45 Red Route Adjustments



### **Yellow Route Alignment Options/Adjustments**

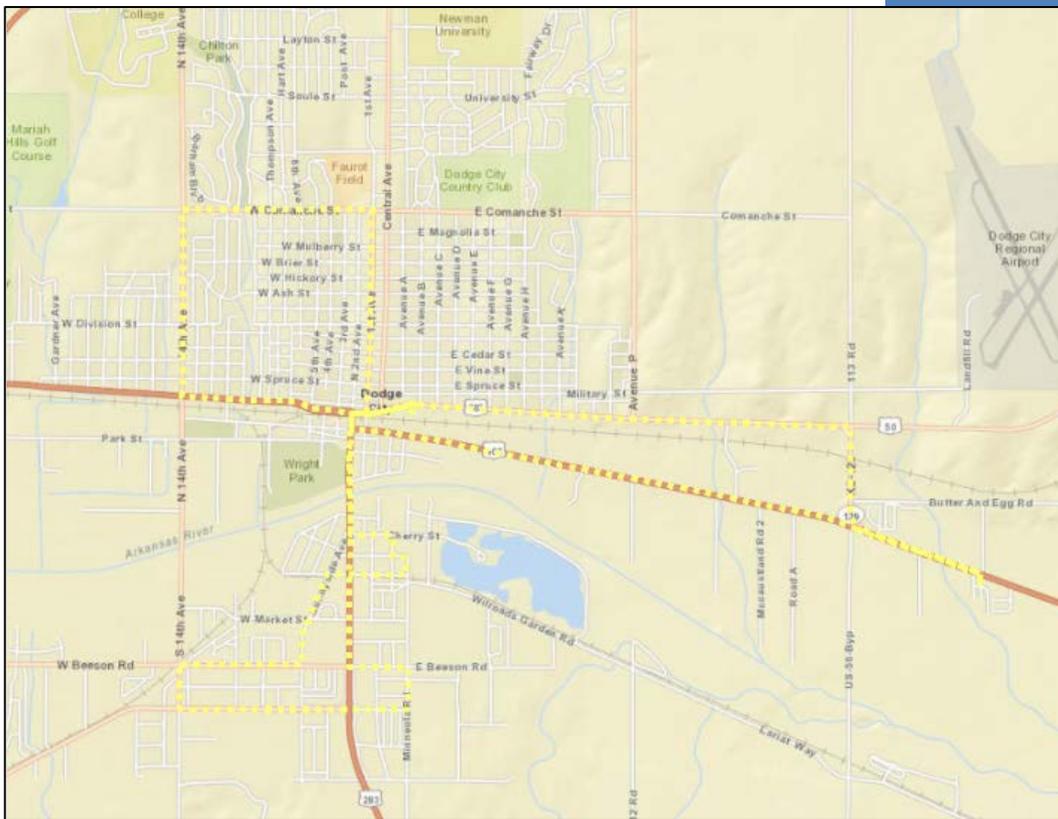
The initial alignment of the yellow route was developed to connect transit users in South Dodge City to the major trip attractions in the core of Dodge City. The alignment was also initially designed to not operate each hour of the day in order to serve Fort Dodge residents.

The initial layout was presented to potential users focusing on service in South Dodge City and in Fort Dodge. As a result of these conversations it was determined that the timing designed for the Fort Dodge service was not ideal for users of the system originating and returning to Fort Dodge. It was determined that a majority of the users in the Fort Dodge are physically disabled and the long wait times for the return trip would be problematic. With these factors now fully understood, other methods of service provision will be analyzed.

Other information that was communicated during the public meeting process was the need to include two mobile home parks along Highway 400: Ranchwood Estates and Happy Home Trailer Park. Along with the locations that were identified as necessary stops and the added route time due to not serving Fort Dodge, several options were developed to determine which would best serve the needs of Dodge City residents. The commonality between all three scenarios is the adjustment to serve the existing South Dodge City as well as the US-400 corridor and the Wyatt Earp corridor east of 2nd Avenue. This was developed to recover the loss of fixed route service due to removing the Fort Dodge route alignment from the system.

The first scenario is designed to continue to connect the yellow route to sections of the core of the city while expanding service along US-400 and East Wyatt Earp. This results in continued connection to the red and blue routes with transfer points at Wal-Mart and at the main transfer point. As a result, riders utilizing the yellow route will continue to have access to a majority of the service area and key destinations. This route is displayed in Figure 1 below.

**Figure 46 Yellow Route Scenario 1**



The second scenario provides service to Green Acres Trailer Park. Green Acres was suggested as a potential stop by multiple individuals during the public meeting process. The route will operate south on 113 Rd to connect to Green Acres Trailer Park and then return to the route along US-400. This route is displayed in Figure 2 below.



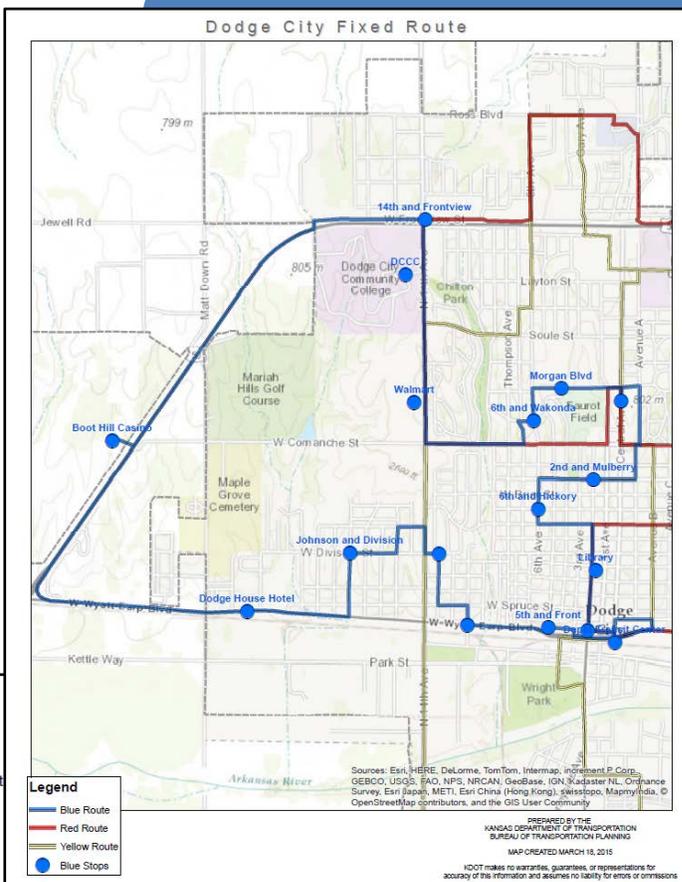
The ultimate decision point in this analysis is determining whether or not better serving residents of South Dodge City in regards to connecting them with more key trip destinations is deemed more important and would generate more ridership than expanding service to the previously mentioned trailer parks. In the instance that the timing of these routes results in the ability to add more stops or reduce stops, adjustments will be necessary to the above scenarios.

The scenarios described in the previous sections will go through a final testing and decision making process to determine the best possible final route alignments. The decisions will be made in a manner that the most locations can be served effectively and efficiently while also remaining within the desired 60 minute headway. The following sections will outline the final routes; the population served by each route, the total population served by the entire system, and will identify the total service coverage area.

### **Final Route Alignments**

As a result of the process that has been document in the preceding sections, final route alignments have been determined. The following sections will identify each route, the population served and the potential stop locations along each route. An overall analysis of geographic coverage will also be included in this section of the report. An essential part in determining the final route alignments was the staff of Dodge City Public Transit driving previously identified route scenarios which resulted in an understanding of potential difficulties in road conditions, route timing, and the ability to transfer between routes. All of the routes fit within the 60 minute headway and will be scheduled to meet at a transfer point at the beginning and end of the route and near the 30 minute mark of the route.

Figure 49 Final Blue Route



### Blue Route Final Alignment

The final blue route alignment closely represents the alignment presented as Scenario 2 in the Blue Route Alignment Options section. This route, as all routes do, begins at the Depot Transit Center and travels in a loop beginning westward on Wyatt Earp and eventually reaching the casino and the community college before reaching the mid-route transfer at Walmart. The route covers 12.2 miles in the western and central parts of Dodge City. The core services along the route include: Boothill Museum, the Dodge House hotel, the casino, the community college, Walmart, the educational core,

Figure 50 Blue Route Timing

#### Dodge City Transit Blue Route 3/6/15 FINAL Version

Times were clocked pausing 30 seconds at each stop, and 2 minute wait at Walmart. Time noted is at end of 30 second (or 2 minute) wait. Route mileage Final Check: 12.2 miles

#### WEST

- 0:00 Depot Transit Center**  
Left on Ave. B to return to Wyatt Earp at Central
- 3:30 Front Street and 5<sup>th</sup> (Boot Hill Area)**  
North on 3<sup>rd</sup>, left on Front, stop at 5<sup>th</sup> in front of Boot Hill Museum; left on 5<sup>th</sup>, right on Wyatt Earp
- 5:30 11<sup>th</sup> & Wyatt Earp**  
Stop in parking lot near Ice Vendor. Turn left (north) on 11<sup>th</sup>, left on Spruce, right on 13<sup>th</sup>
- 7:25 VFW Park (13<sup>th</sup> and Division)**  
Left on to Division; right turn on 14<sup>th</sup>. Left at stop light at Linn and 14<sup>th</sup>.  
Left on Greenwood to Division (to avoid narrow street and Linn School traffic)  
Right on Division to Johnson; left on Johnson and stop at corner of Johnson and Division
- 11:00 Johnson at Division**  
Continue on Johnson then right on Wyatt Earp
- 13:15 Dodge House Hotel (2408 W. Wyatt Earp)**  
Stop at Dodge House will serve residential area from Gardner to 27<sup>th</sup>
- 17:20 Casino/Conference Center (Drop off at Conference Center)**  
Left on Highway 50; left on Frontage Road across from Area Mental Health – NO STOP at this corner. Continue on to stop at Frontage Road and 14<sup>th</sup>
- 22:15 Frontage Road at 14<sup>th</sup>**  
Right on 14<sup>th</sup>
- 24:25 DCCC**  
Stop is on large MEDIAN between the one-way entrance and exit lanes, at first u-turn
- 31:00 Mid-Point Transfer – Walmart**  
Take back exit from Walmart, turning left on Comanche. Continue on Comanche to Hart. Left on Hart, right on Wakonda
- 34:30 Wakonda and 6<sup>th</sup>**  
Left on 6<sup>th</sup>; right on Morgan; stop will be on Morgan
- 36:00 MORGAN (at point where street flattens out)**  
(Dodge City Middle School, and 2 elementary schools)  
Continue on Morgan to Central; right on Central, left into Medical Center
- 38:00 Medical Center (stop at front doors)**  
Exit turning right on Central, right on LaMesa, right on Avenue A; continue on Avenue A to Mulberry; right on Mulberry
- 41:10 Mulberry at Second**  
Continue on Mulberry to 6<sup>th</sup> then left
- 43:10 6<sup>th</sup> and Hickory**  
Left on Ash; Right on 2<sup>nd</sup>
- 45:35 Library**
- 47:30 El Capitan (2<sup>nd</sup> and Front Street)**  
Stay on Front Street to Central (rather than First) in order to avoid problem with stoplight on First which remains red when a train is passing, not permitting the left turn on Wyatt Earp and access to Depot Transit Center.
- 50:00 Depot Transit Center**

# DODGE CITY FIXED ROUTE TRANSIT

Dodge City Medical, the library, and downtown services. Along with the aforementioned services that can be accessed via the blue route, several residential areas are served via the blue route. These areas include: the area surrounding 14<sup>th</sup> Ave. and Linn, 6<sup>th</sup> Ave. and Wakonda, and 6<sup>th</sup> Ave. and Hickory, among others.

The graphics on this page represent the ¼ mile service area around each stop and around the route as a whole. The graphic illustrating the ¼ service area represents the area served around

Figure 51 Blue Stops Buffer

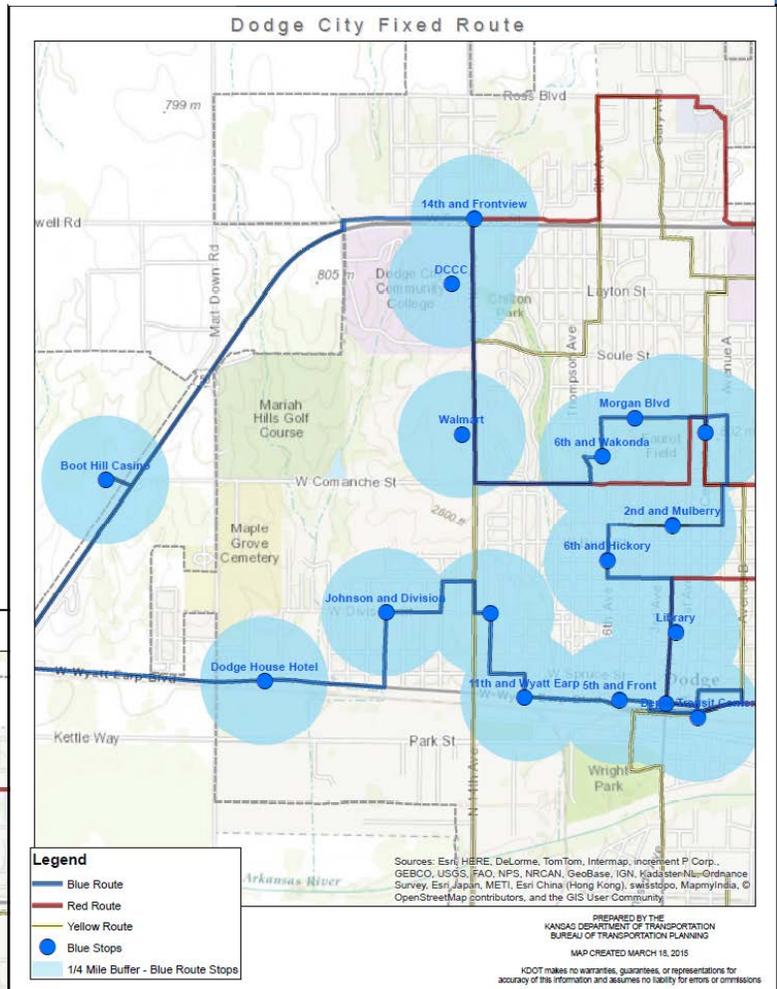
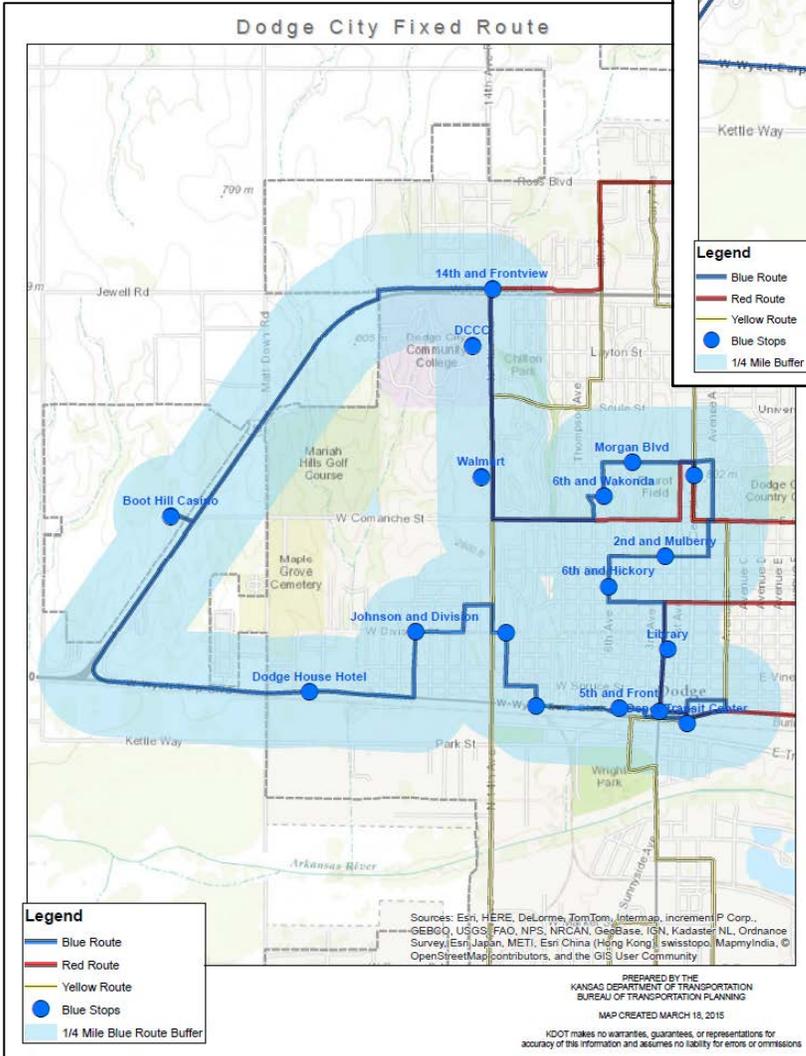


Figure 52 Blue Route Buffer



each of the proposed stops.

The population served by the blue route within ¼ mile of the proposed stops is 9,424; the service area around these stops covers 4.08 square miles.

The graphic representing the ¼ mile service around the route illustrates the area that could be served with a stop on the current route. There are 12,548 people living within a ¼ mile of the blue route which covers 7.59 square miles.

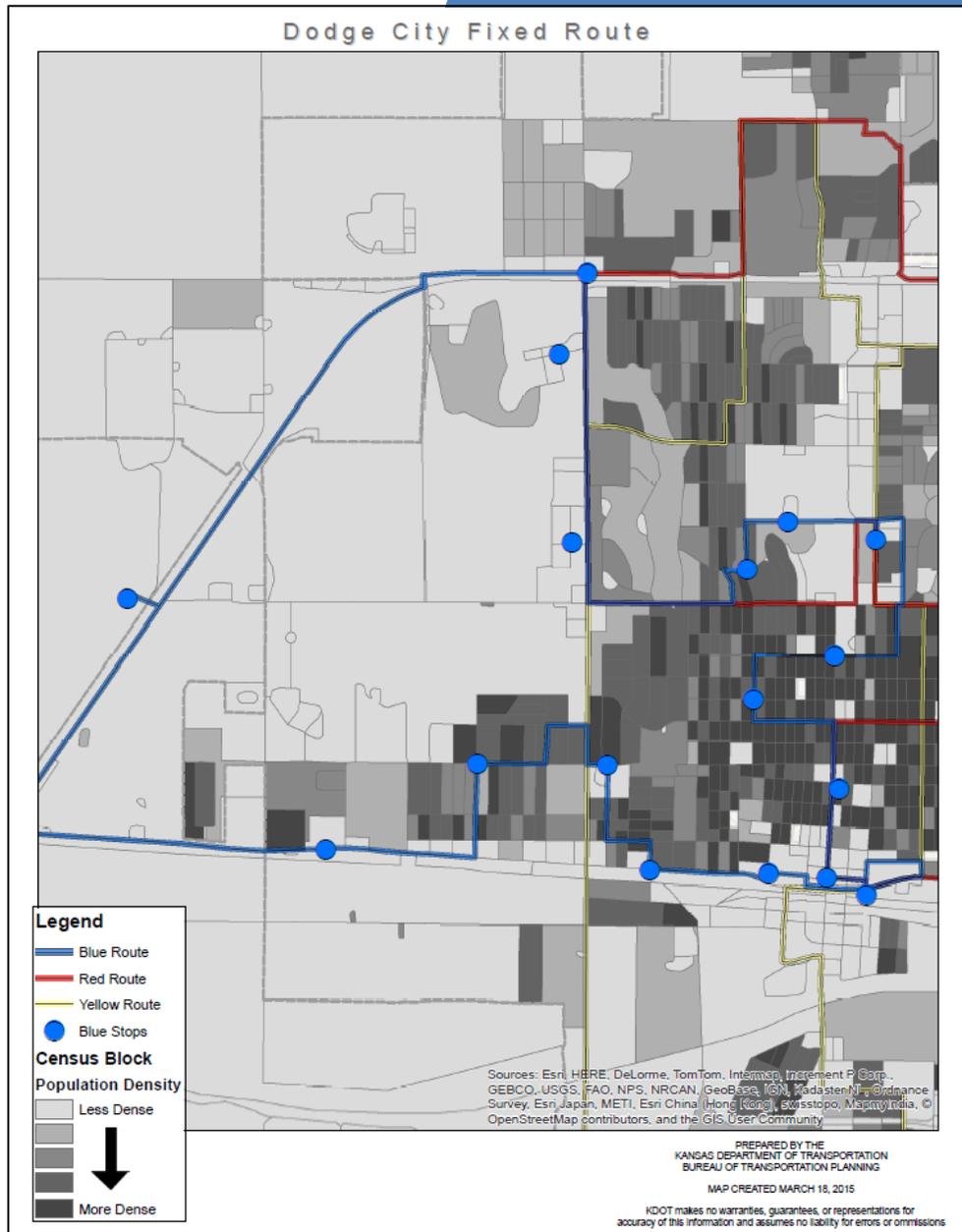
These numbers are relevant in the manner that the stop locations on the route can be adjusted in the future to better serve unrealized demand.

The graphic on this page represents population density and how the blue route and stops along the route serve areas of high density. The stops along the blue route are

organized in a manner that both serves core services but also provides transportation to the residential areas with the highest population density. This allows for a connection between the transit users origin and their destination.

The blue route will provide mobility throughout Dodge City and provide necessary connections between residents and services.

Figure 53 Blue Route Population Density



**Red Route Final Alignment**

The red route, displayed to the right, serves the eastern portion of Dodge City as well as connecting to the mid-point transfer at Walmart and returning to the downtown area. The core locations served by the red route include: the Department of Children and Families, services located near Summerlon Ct, Western Plains Hospital, DCCC, Dillon’s, the library, and the downtown area. A big benefit of the red route is the access to medical services as it serves the Dodge City Medial Center, C&S Medical, and Western Plains Hospital. This will provide clarity to users as they will know that if they are on the red route they

Figure 54 Final Red Route

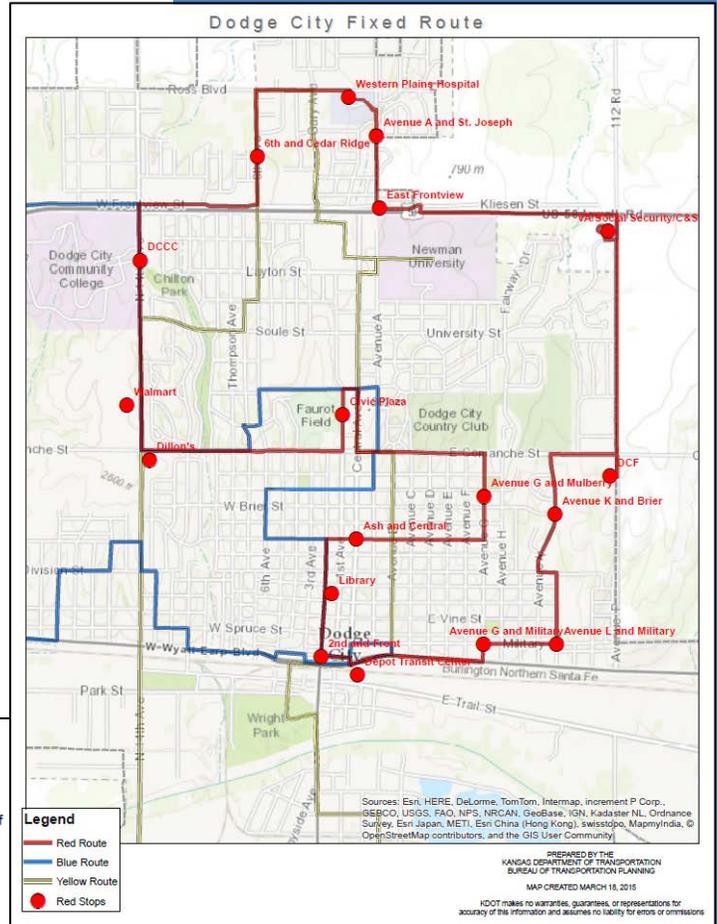


Figure 55 Red Route Timing

**Dodge City Transit  
Red Route  
3/6/15 FINAL Version**

Times were clocked pausing 30 seconds at each stop. 2 minute wait at Walmart. Time noted is at end of 30 second (or 2 minute) wait. Route mileage Final check: 12.2 miles

**EAST**

<p><b>0:00</b> Depot Transit Center East on Wyatt Earp; left on Ave. G</p> <p><b>2:40</b> Ave. G and Military (Adult Learning Center)</p> <p><b>4:10</b> Ave. L and Military (new Ford County Health Campus; Arrowhead West on K; Lotus Garden and Holy Star Market are one block south on Wyatt Earp) Stop is on Ave. L; continue on Ave. L to Division; left on Division then right on Ave. K</p> <p><b>6:45</b> Ave. K and Brier (Sundance Apartments) Turn right on Comanche, then right on Ave. P</p> <p><b>9:30</b> Ave. P at DCF/SRS Exit left on Ave. P</p> <p><b>12:50</b> VA Clinic, Social Security Office, C&amp;S Medical Return to Ave. P, then left on Highway 50; make right off Highway at Cox, then left onto Frontage Road</p> <p><b>16:45</b> 210 East Frontview (Edward Jones, Saigon Bistro) At Avenue A, take right</p> <p><b>17:30</b> Avenue A at St. Joseph (serving Woodland Hills Apts., and many Arrowhead West clients who live in group homes near St. Joseph)</p> <p><b>20:30</b> Western Plains Hospital From Ave. A take left into Western Plains Hospital – stop at front Exit left onto Ross Blvd; left on Sixth</p> <p><b>23:30</b> Sixth Avenue at Cedar Ridge (Cimarron Valley Apartments, and North High Rise with a one block walk)</p> <p><b>26:35</b> DCCC Stop is on large MEDIAN between the one-way entrance and exit lanes, at first u-turn</p> <p><b>31:00</b> Mid-Point Transfer - Walmart Back exit out of Walmart to Comanche, right onto 14<sup>th</sup> then immediate left exit into Dillon's.</p> <p><b>33:30</b> Dillon's Exit Dillon's turning right on Comanche, taking Comanche all the way to First. Left onto First Street (to get out of Comanche traffic)</p> <p><b>38:00</b> First Street (between Aspen and Morgan, serving Mexican American Ministries Dental Clinic; schools with a short walk: Bright Beginnings, Comanche Middle School, Dodge City Middle School) Turn right on Morgan to Central. Turn right on Central and then left on Comanche.</p> <p><b>43:00</b> Avenue G between Mulberry and Brier Turn right on Ash</p> <p><b>45:30</b> Ash and Central (near Central School) Continue on Ash to 2<sup>nd</sup> Street; Left on 2<sup>nd</sup></p> <p><b>47:45</b> Library</p> <p><b>50:20</b> El Capitan (2<sup>nd</sup> and Front Street)</p> <p><b>52:00</b> Depot Transit Center</p>
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# DODGE CITY FIXED ROUTE TRANSIT

can access all medical services. Similarly to the blue route, the red route also travels 12.2 miles throughout Dodge City connecting several residential areas to the services throughout Dodge. The residential locations served by the red route include: the area around Military Ave. surrounding Avenue G and L, Ave. K and Brier, areas north of US-50 along Ave A and 6<sup>th</sup> streets, and areas surrounding Ave G and Mulberry and Ash and Central.

The graphics on this page, similarly to the graphics in the section illustrating the blue route

Figure 56 Red Route Stops Buffer

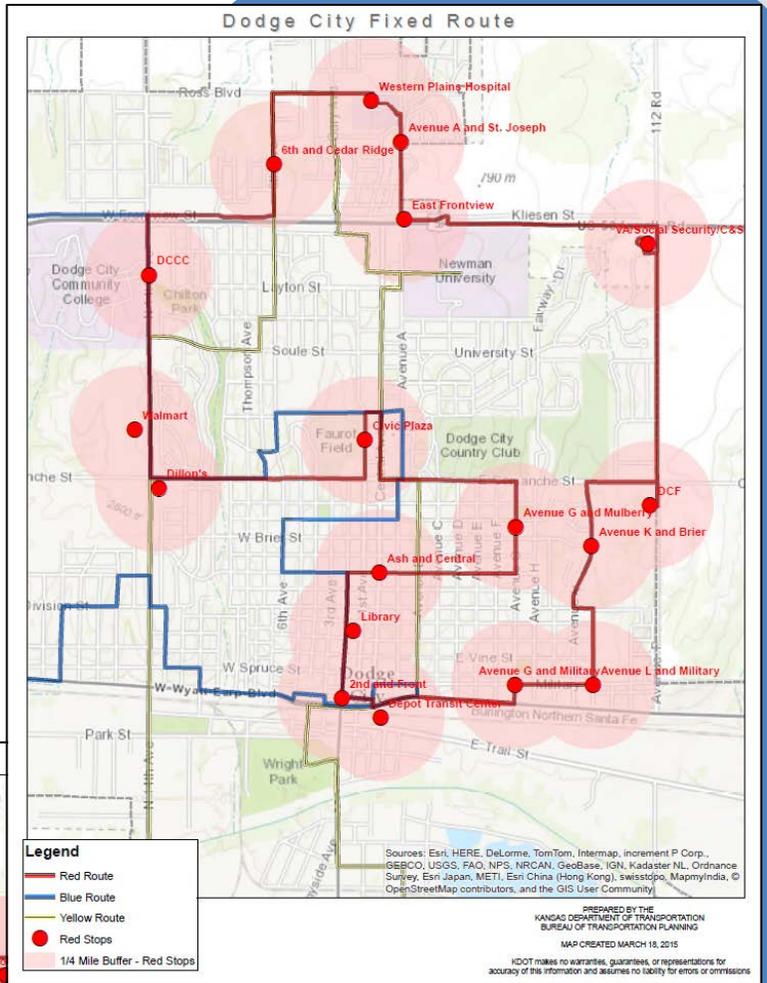
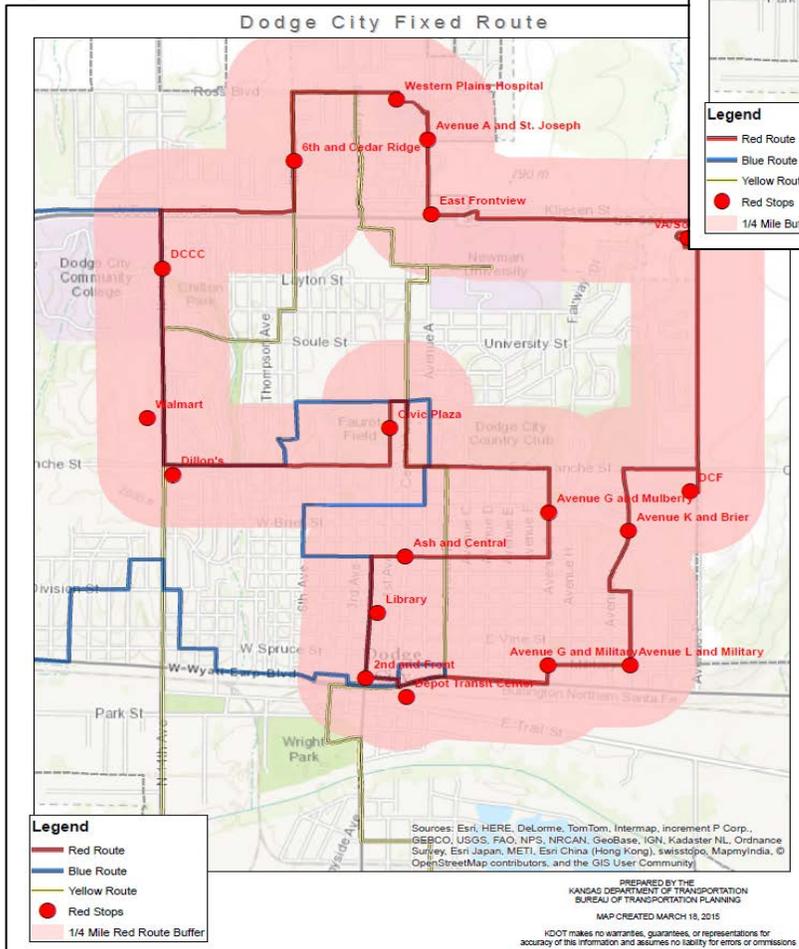


Figure 57 Red Route Buffer



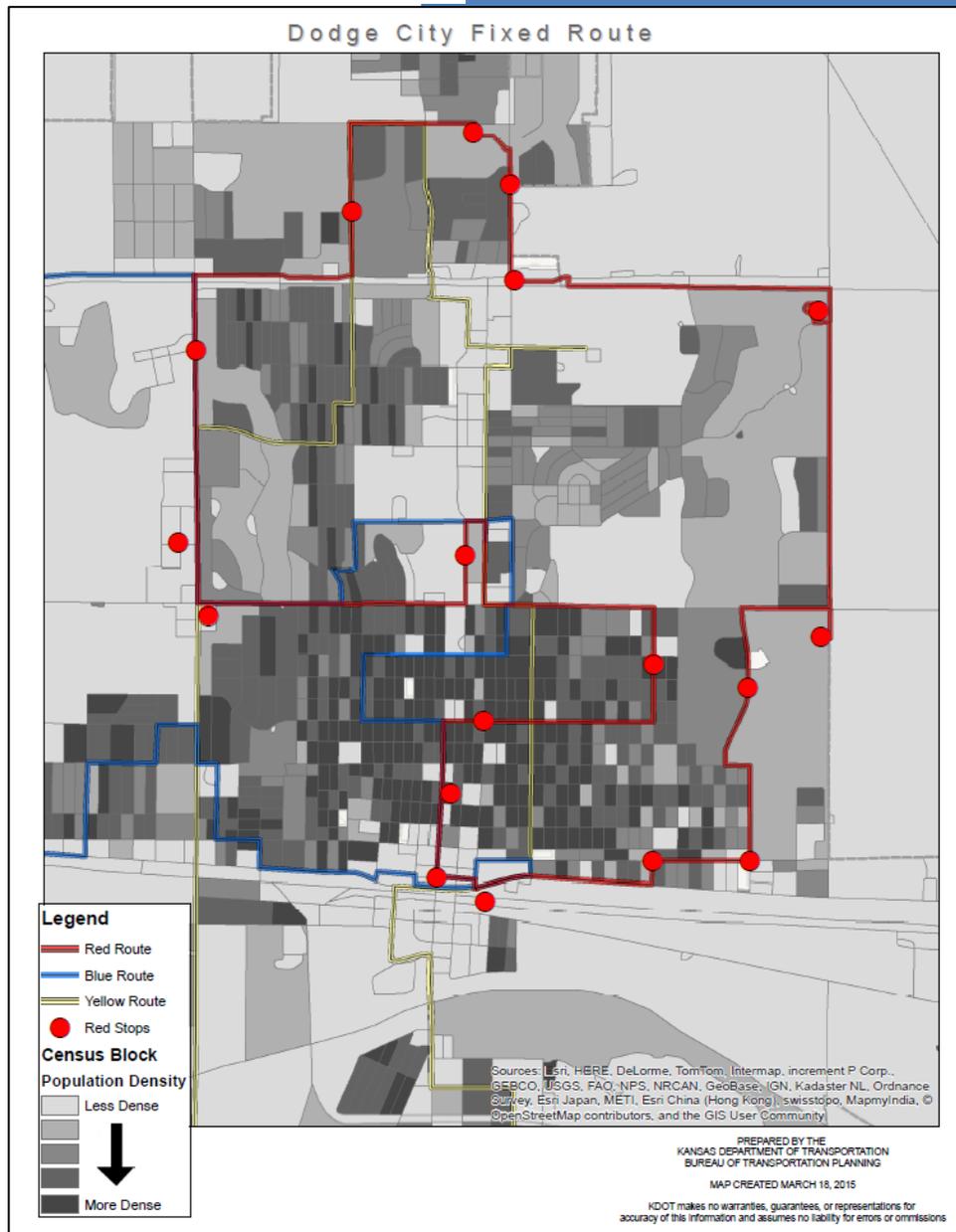
characteristics, illustrate the ¼ mile service areas of both the proposed stops and the route as a whole. The ¼ mile service area around the proposed red stops cover 4.59 square miles and serves 8,868 people. The ¼ mile service area around the route as a whole covers 7.59 square miles and encompasses 14,013 people.

Given that the ¼ mile buffer around the route as a whole, not the individual stops, encompasses 14,013 people, the stops along this route alignment can be versatile and adjusted to serve demand that is identified beyond the initial route operation. This versatility will be important when the route alignments are re-examined to determine adjustments after 6-months to a year of operation.

The graphic to the right illustrates the population density of Dodge City and how the red route and stops serve the key locations of dense populations. These locations allow for access to services from the transit users trip origin or their living location.

The red route will serve as a connection between residential areas in the eastern half of Dodge City to services throughout Dodge City both by remaining on the red route and using the option to transfer.

**Figure 58 Red Route Population Density**



## Yellow Route Final Alignment

The core purpose of the yellow route is to provide a connection between South Dodge City and the core services throughout Dodge City. The graphic to the right represents the yellow route and the stops along the identified alignment. The route operates along an 11.9 mile alignment. The services that are located along the yellow route include: Carters Thriftway, Dodge City Medical, the Senior Center, Village Square Mall, DCCC, and Walmart. The community college will not be served directly, like the blue and red routes, but it will be served by a stop located at 14<sup>th</sup> and Soule. This is approximately a ¼ mile from the intersection of 14<sup>th</sup> and the DCCC entrance. The route is designed to collect passengers from South Dodge

Figure 59 Final Yellow Route

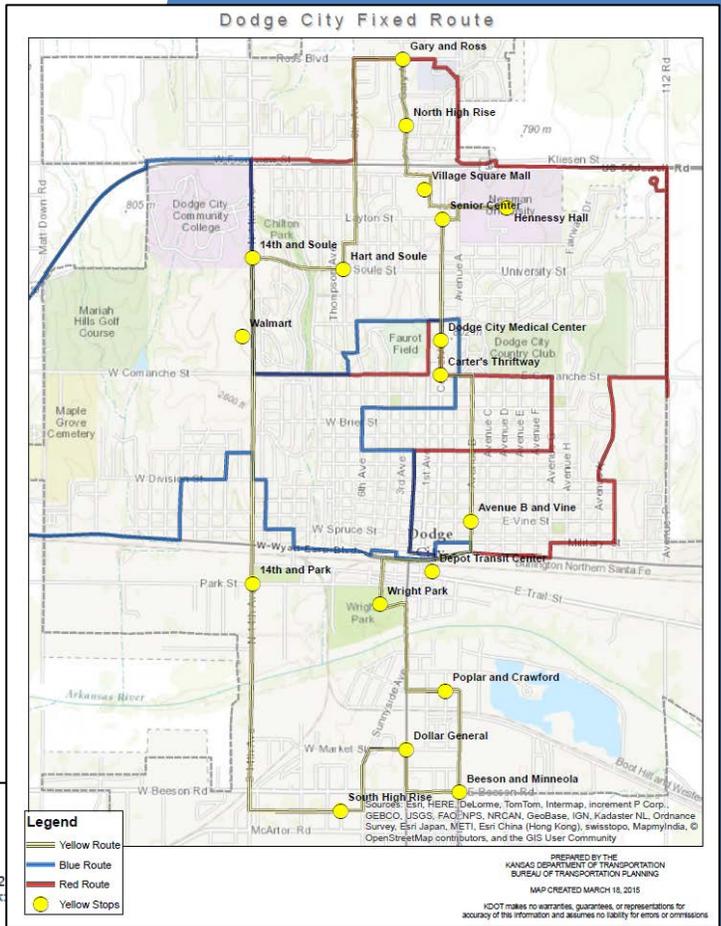


Figure 60 Yellow Route Timing

**Dodge City Transit  
Yellow Route  
3/6/15 FINAL Version**

Times were clocked while driving 5 miles under the speed limit, and pausing 30 seconds at each stop. 2 minute wait at Walmart. Time noted is at end of 30 second (or 2 minute) wait. Route mileage Final check 11.9 miles

**North – South**

**Train Delays** - This route crosses railroad tracks in three places.

- BNSF/Amtrak at 14<sup>th</sup> just south of Wyatt Earp. at about 35 minutes past hour.
- Cimarron Valley RR tracks at 14<sup>th</sup> and Beeson. Train only runs 2 or 3 times a week in the afternoon, but long and slow.
- BNSF/Amtrak at 4<sup>th</sup> just south of Wyatt Earp. Route arrives at this just prior to Depot stop at end of route (52 minutes past hour). This will give us a chance to overcome delay since buses will not leave Depot till top of hour.

**0:00 Depot Transit Center**  
East on Wyatt Earp; left on Ave. B

**2:00 Avenue B and Vine**  
Ave. B to Comanche; left on Comanche to Carter's at Comanche and Central

**5:00 Carter's Thriftway (stop at front door)**  
Exit right onto Central

**6:25 Medical Center**  
Stop at front entrance, exiting right on to Central; stay on Central all the way to Senior Center

**9:30 Senior Center (2408 Central)**  
Drive through Senior Center parking lot to exit left on Avenue A; right on San Jose

**11:35 Hennessy Hall (240 San Jose) (YMCA, Arrowhead West, and Newman University)**  
Exit San Jose returning to Central; cross Central to Mall

**13:50 Mall (Front door; exit on west side of Mall, cross Highway 50 to Gary)**

**18:30 North High Rise**

**20:00 Gary at Ross (200 W. Ross – parking lot)**  
Exit right on Ross, then left on Sixth; cross Highway 50

**25:00 Hart and Soule**  
To avoid traffic snarl at schools on Soule, take right on Kincaid, left on Hart, then stop just prior to Soule.

**26:30 Soule & 14<sup>th</sup> (Centera Bank parking lot)**  
Stop allows passengers to walk to DCCC

**31:00 Mid-Point Transfer – Walmart**  
Exit back of Walmart; left on Comanche; right on 14<sup>th</sup>

**36:10 305 N. 14<sup>th</sup> (parking lot)**

**41:00 South High Rise**  
Northeast on Sunnyside to Market Street; right on Market to Dollar General (on Second)

**42:30 Dollar General**  
Right on Second to Beeson; Left on Beeson to Minneola Road

**45:00 Beeson & Minneola Road**  
Left on Minneola Road; left onto Poplar

**47:30 Poplar & Crawford (Farrow Ford Park)**  
Continue on Poplar to Second; Right on Second; Left into Wright Park

**49:00 Wright Park**  
Exit Wright Park on 4<sup>th</sup>; take 4<sup>th</sup> to Wyatt Earp; right on Wyatt Earp to Depot Transit Center

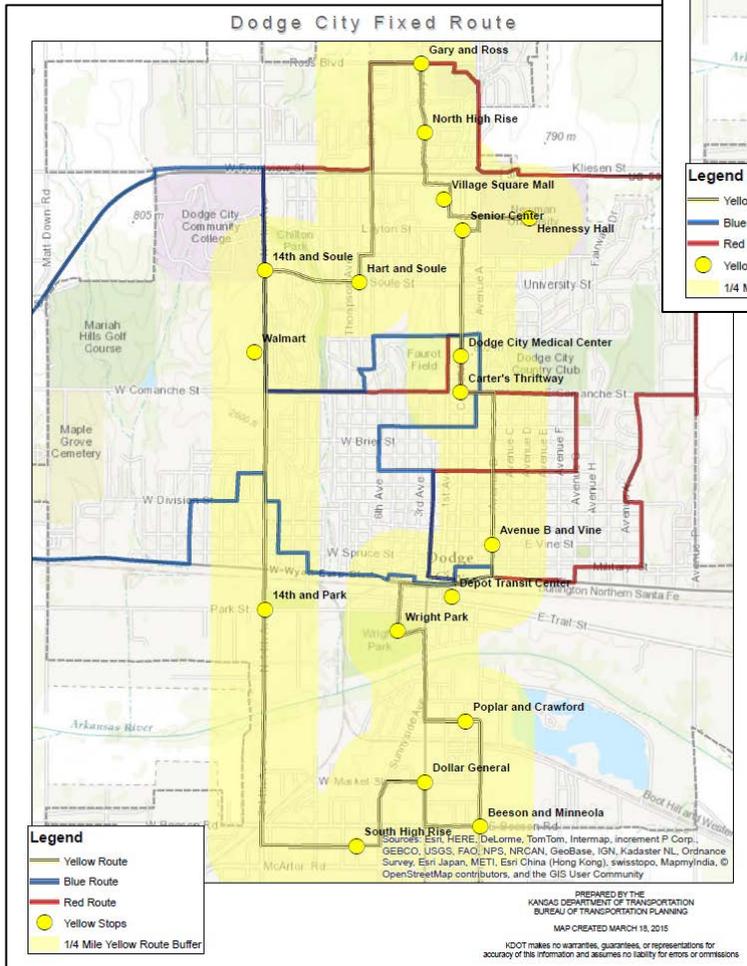
**53:00 Depot Transit Center**

# DODGE CITY FIXED ROUTE TRANSIT

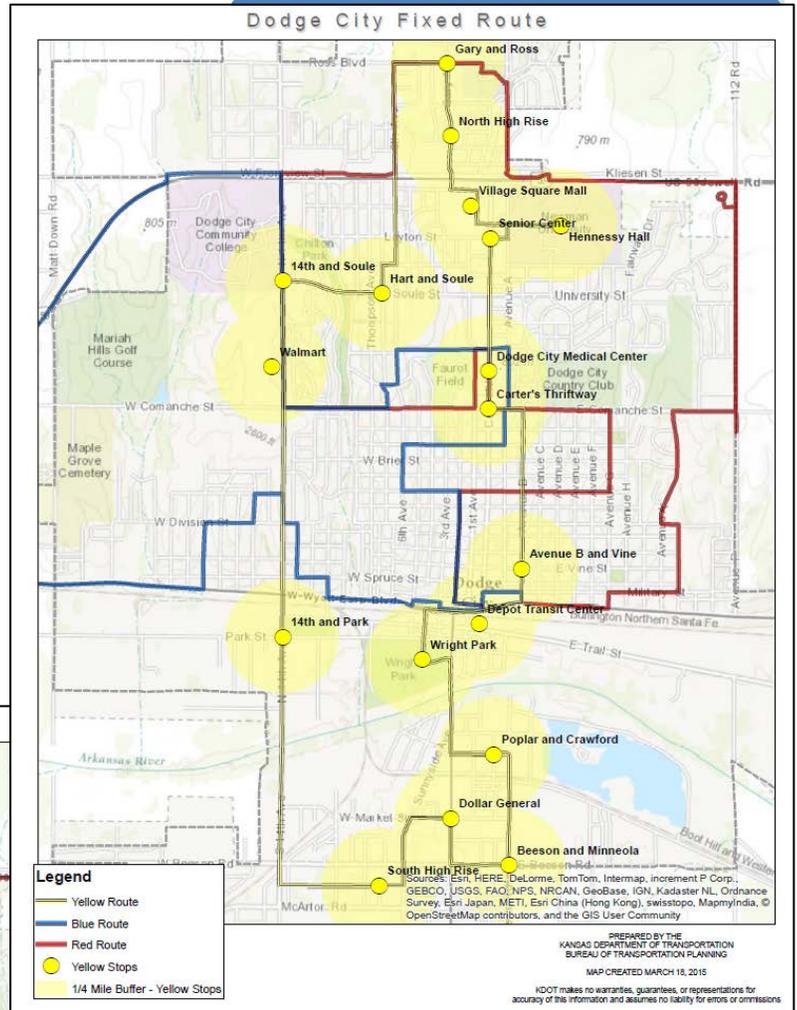
City and bring them, within the first 20 minutes of their trip, to the transfer station to allow access to all of the services on the other two routes. In order to return to South Dodge from the other routes the passengers will transfer back to the Yellow route at Walmart which is the midway transfer point. This will allow passengers to easily transfer from the yellow route to other routes and vice versa, without requiring multiple long trips.

The graphics on this page illustrate the 1/4 mile buffer around the designated stops as well as the 1/4 mile buffer around the route as a whole.

**Figure 62 Yellow Route Buffer**



**Figure 61 Yellow Route Stops Buffer**

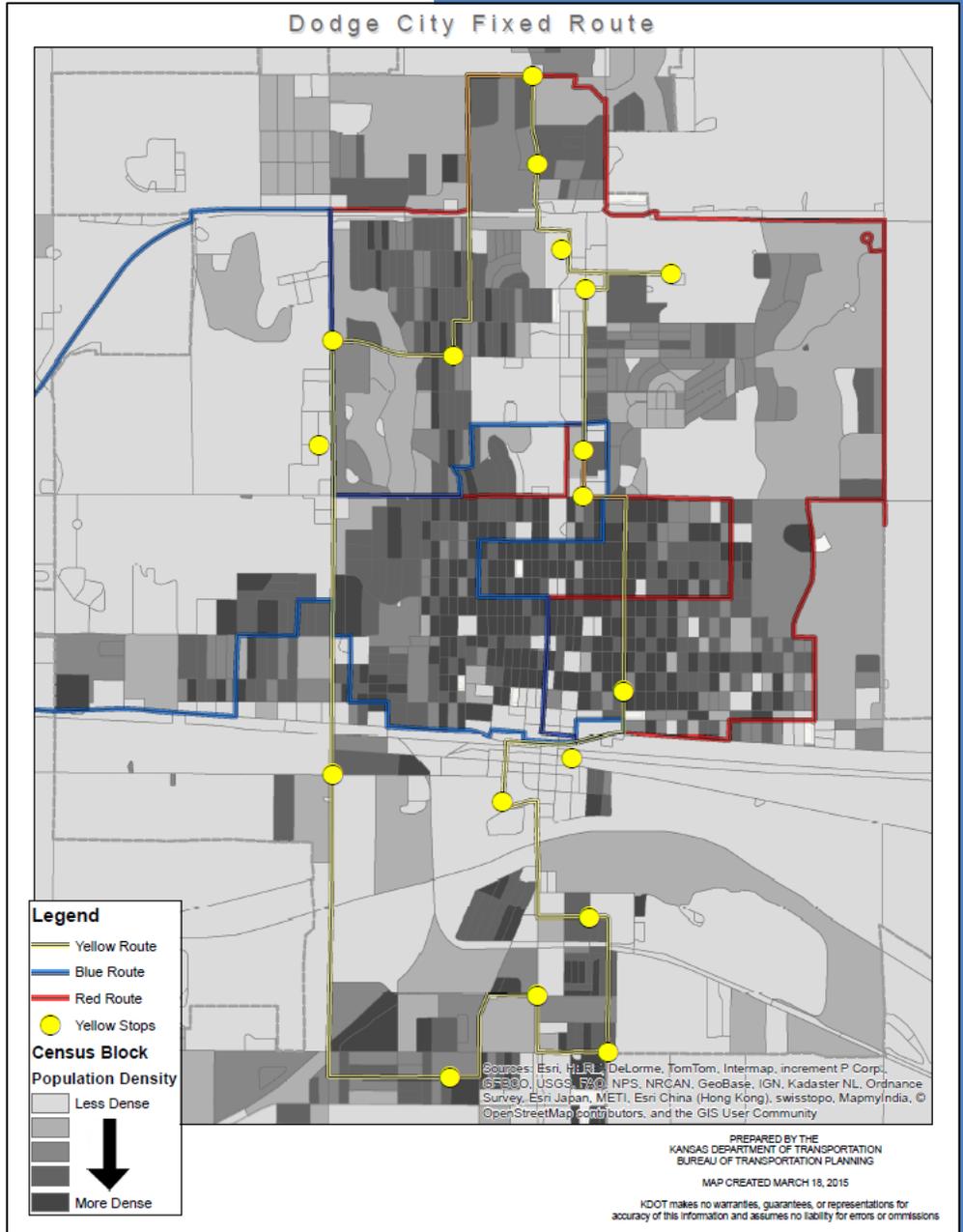


The ¼ mile buffer around the designated stops represents 8,539 people served. The ¼ mile buffer around the entire 11.9 mile route contains 15,009 people. The relevance in these numbers are the current designated stops and the population served by those stops as well as the number of people that live within a ¼ mile of the route. The large number of people living within a ¼ mile of the route illustrates that if demand is realized after the first period of operations; stops can be adjusted or added to serve that demand without completely altering the route.

The graphic to the right illustrates the yellow route and its capacity to serve the more dense populations. This is important to understand because the dense populations serve as your trip origins. The more trip origins or home locations served by the system, the more potential for increased ridership.

Connecting the aforementioned areas with dense population to the needed services as well as connecting with the other two routes provides the needed service for residents of South Dodge City.

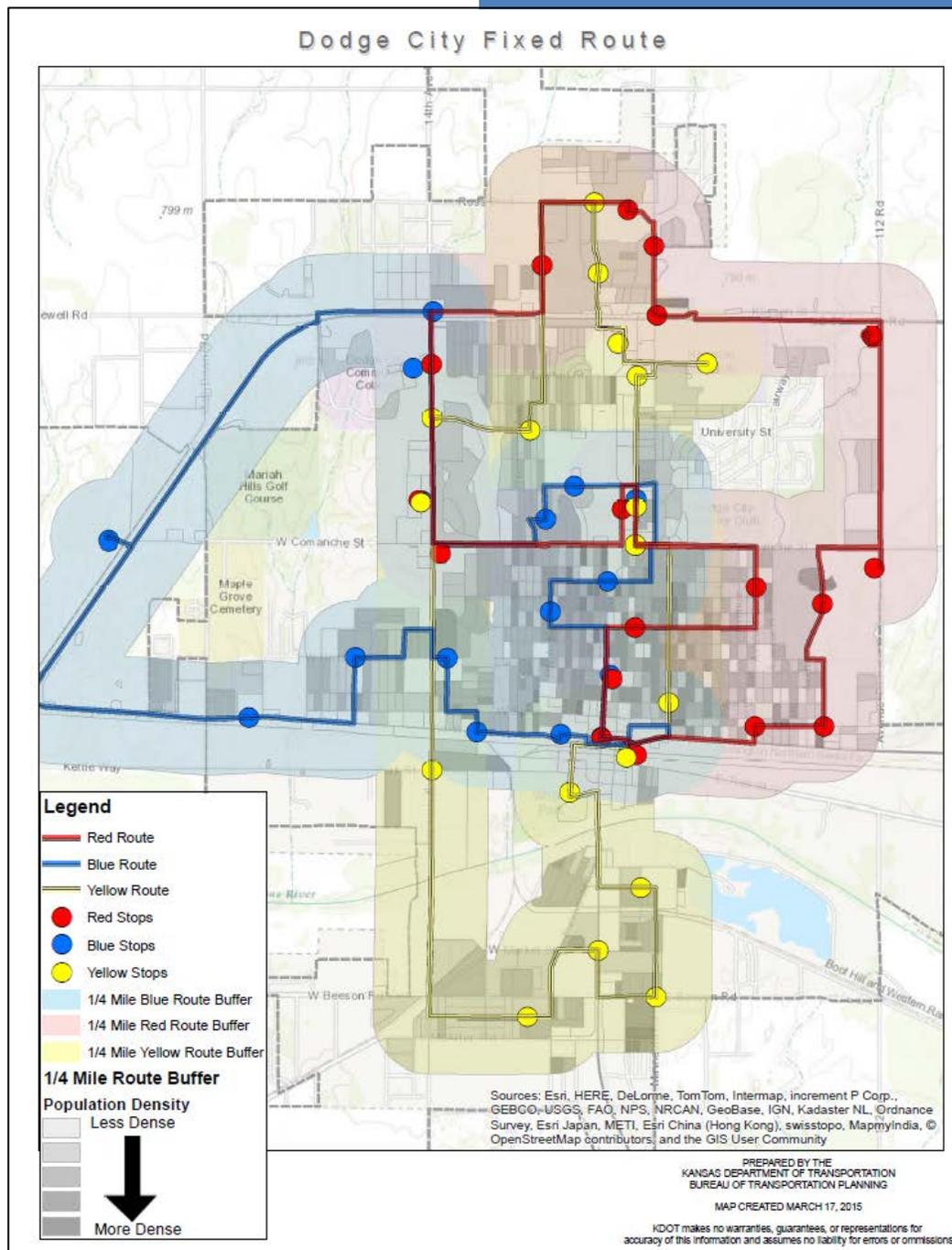
Figure 63 Yellow Route Population Density



### Complete System Service Characteristics

The three routes detailed in the previous section create transportation opportunities for a large portion of Dodge City and provides connections to a multitude of services citywide. The map to the right illustrates the coverage of the three routes and the population density of the areas encompassed by the 1/4 mile buffer. This map serves as an overview of services in Dodge City and how the combination of all three routes has the ability to serve most of the city's population. The takeaway point is the overall service coverage as it pertains to the city and the core populations served. The core residential areas served are illustrated by population density on the map shown. The fixed route service, as designed, has the ability to serve a large portion of the city. These routes should not only increase service options in

Figure 64 Complete System



Dodge City, but it should also continue to serve the needs of the current demand response transit users.

While the map on the previous page illustrated route coverage in terms of a buffer around the route itself, the map on this page represents a 1/4 mile buffer around the actual stops. This represents true service area and identifies the populations that will have direct access to transit via living within a 1/4 mile of a transit stop. 19,867 people live within a 1/4 mile of a designated stop as the service is currently designed. This represents 72% of the population while 89% is encompassed by the 1/4 mile buffer around all three routes.

In terms of service coverage, as represented on the chart below, 1/4 mile around the stops encompasses 66% of the city's square miles and the 1/4 mile buffer around the routes encompasses 105% for the city's square miles due to service outside of city limits. This equates to service to a majority of the city.

Figure 65 All Stops - Population Served Fixed Route

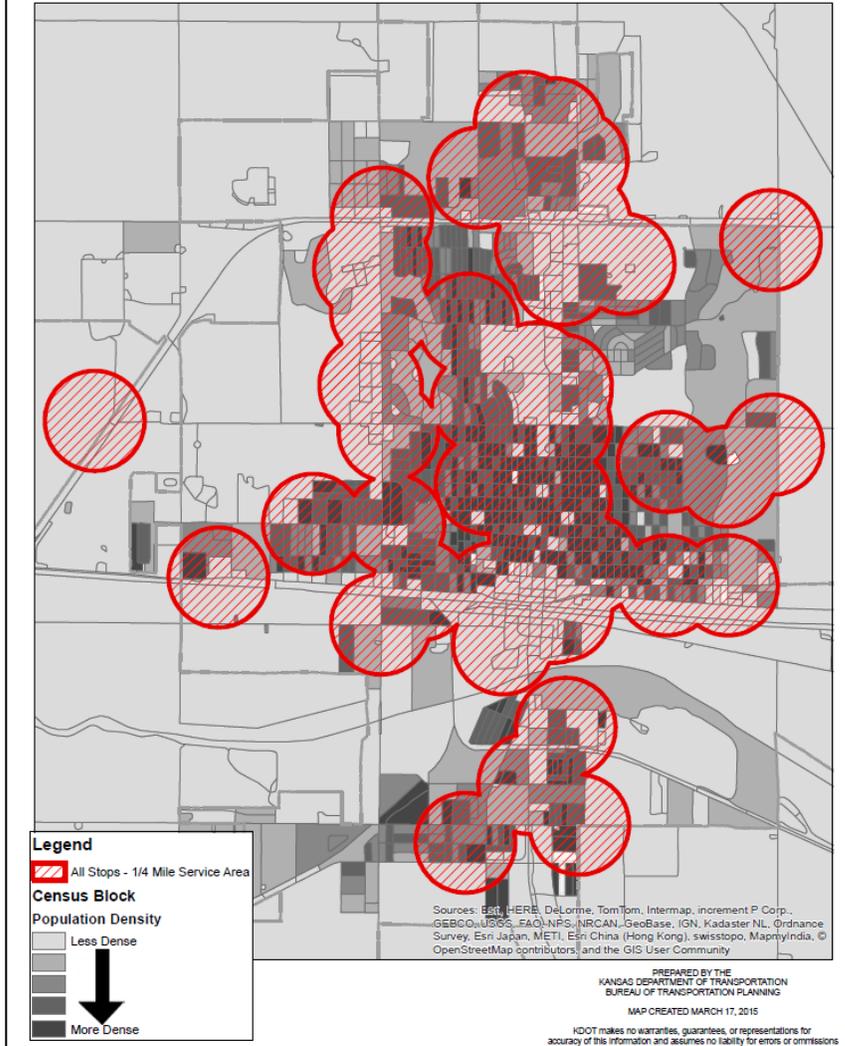


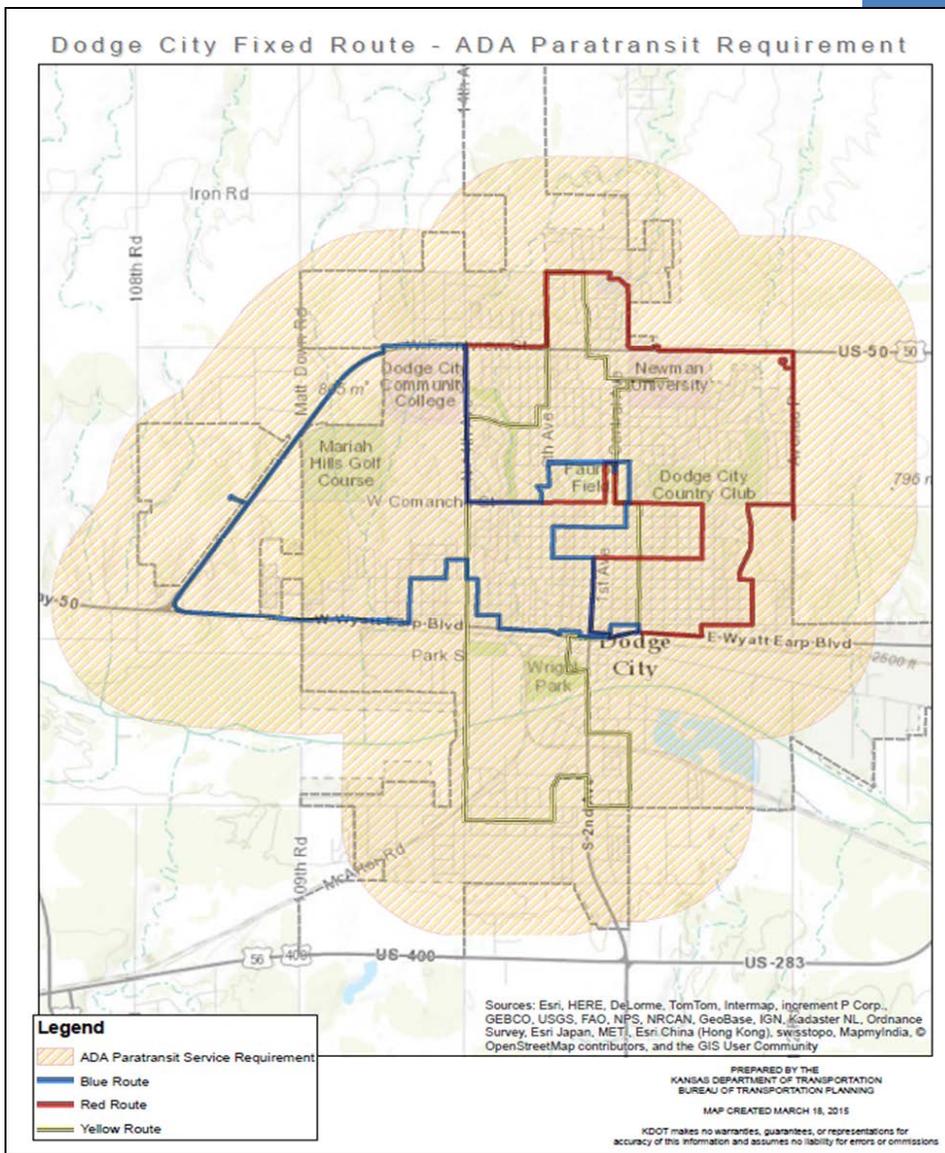
Figure 66 Service Coverage

Dodge City Fixed Route - Population Served					
Route	Blue	Red	Yellow	Total	% of Population
1/4 Stop Buffer	9,424	8,868	8,539	19,867	72%
1/4 Route Buffer	12,548	14,013	15,009	24,372	89%
Dodge City Fixed Route - Square Miles Served					
Route	Blue	Red	Yellow	Total	% City Sq. Miles
1/4 Stop Buffer	4.08	4.59	4.66	9.55	66%
1/4 Route Buffer	7.59	7.59	7.70	15.29	105%

### ADA Paratransit Requirements

As required by the FTA, when a transit service provider operates a fixed route service it must also offer paratransit services for those that cannot utilize fixed route services. This requirement is addressed in ADA guidelines which requires service 3/4 mile away from any route. Along with the operation of this service, a Paratransit Plan must also be created. This will be completed before service operation by Dodge City staff. The image below represents the 3/4 boundary for all three routes combined.

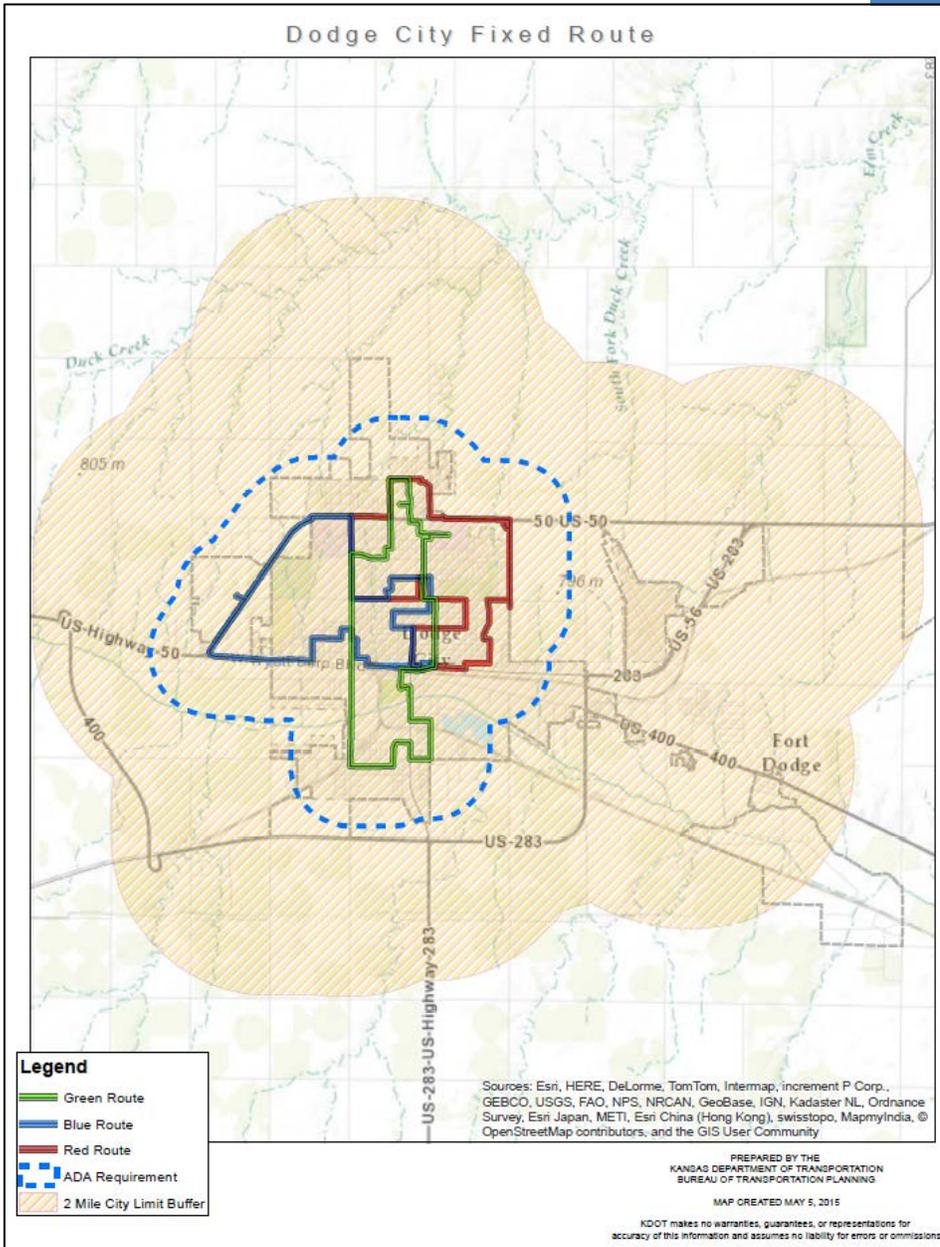
Figure 67 ADA Paratransit Requirement



## DODGE CITY FIXED ROUTE TRANSIT

Dodge City has decided, as a part of their Paratransit Plan to offer demand response services beyond the required  $\frac{3}{4}$  mile. The paratransit services in Dodge City will be offered anywhere within Dodge City and  $\frac{3}{4}$  of a mile from a fixed route. Demand response services will be offered beyond the  $\frac{3}{4}$  mile boundary and up to 2 miles beyond the city limits. This boundary is illustrated below.

**Figure 68 Planned Paratransit Service**



## Operating Characteristics

### Service Span/Coverage

The planned fixed route service will operate from 6:00am to 6:00pm resulting in each route being run 12 times throughout the day.

### Fares

The table below represents the planned fare structure for the fixed route service and the paratransit service. This closely represents fare structures of other transit providers in the region.

Fare Structure		
FIXED ROUTE SERVICES		
	One Way	Monthly
Adult	\$1	\$30
Youth (6-18 with school ID)	\$0.50	\$15
Half-Fare	\$0.50	\$15
Children (5 and under)	Free	-
Personal Care Attendants	Free	-
PARATRANSIT SERVICES		
	One Way	Monthly
All	\$1	\$30
Personal Care Attendants	Free	-

### Vehicle

The vehicles being utilized to run the three designed routes will closely resemble the bus pictured to the right. The example pictured is a 14 passenger Aerotech from El-Dorado National. Three vehicles of this type will be operating constantly, in a fleet rotation, and back-up vehicles will be available in case of breakdowns.



Figure 69 El-Dorado National Bus

### Cost Estimates

The tables below illustrate simple cost estimate scenarios based on the current demand response system. Three scenarios are presented: The first being the planned service, the second with expanded hours, and the third scenario represents the estimated costs if Saturday service was added to the schedule. These are relatively high level estimates based off of previous operating costs, but they should provide a relatively accurate estimate.

Cost Estimates - All Routes 6-6 M-F				
Route	Blue	Red	Yellow	Total
Miles	12.2	12.2	11.9	36.3
Service Hrs	12	12	12	36
Cost/Day	\$457	\$457	\$446	\$1,359
Annual \$	\$118,760	\$118,760	\$115,839	\$353,359
Cost/Mile (Current Demand Response) - \$3.12				

Cost Estimates - All Routes 5-7 M-F				
Route	Blue	Red	Yellow	Total
Miles	12.2	12.2	11.9	36.3
Service Hrs	14	14	14	42
Cost/Day	\$533	\$533	\$520	\$1,586
Annual \$	\$138,553	\$138,553	\$135,146	\$412,252
Cost/Mile (Current Demand Response) - \$3.12				

Cost Estimates - All Routes 6-6 M-Sat				
Route	Blue	Red	Yellow	Total
Miles	12.2	12.2	11.9	36.3
Service Hrs	12	12	12	36
Cost/Day	\$457	\$457	\$446	\$1,359
Annual \$	\$142,512	\$142,512	\$139,007	\$424,030
Cost/Mile (Current Demand Response) - \$3.12				

### Implementation Plan

Branding, marketing, signage, driver training, and other service planning activities have been established by Dodge City. The service is scheduled to start May 11, 2015.