AECOM

Hurricane to Zion Canyon Transit Study

August 2010

Prepared for

Five County Association of Governments

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1.0 INTRODUCTION

1.1 Project Objective

The Zion Canyon area, including Springdale and the neighboring Zion National Park, represents a major destination for employment, shopping, and recreation in southern Utah. Currently, Zion National Park attracts over 2.7 million visitors per year, and based on historical trends, is expected to continue to grow in coming years. In 2000 Zion National Park began operating the Zion Canyon Shuttle both inside and outside the park. Private vehicle access along Zion Canyon Scenic Drive, the main roadway in Zion National Park, is prohibited during the busy summer months, with the exception of those visitors staying at the Zion Lodge, located inside the park boundaries.

Washington County has experienced and is expected to continue to experience rapid growth over the next several decades (see Chapter 2). The expansion of the St. George urbanized area will account for some of this growth; however the urbanizing and rural areas in Washington County such as Hurricane, La Verkin and Virgin are also expected to continue to grow.

The growth expected in Zion National Park and in the urbanizing areas of Washington County suggests that transit service between Hurricane and Springdale could provide benefit to a variety of potential users from tourists to residents. As growth occurs along the SR-9 corridor between Hurricane and Springdale and as Zion National Park visitation continues to increase, transit service can provide added accessibility and mode choice alternatives for travel.

The Dixie Bus Rapid Transit Feasibility Study, dated June 2, 2010 considered and recommended extending transit service from St. George to Hurricane and to the new St. George airport. The feasibility of providing transit service to Springdale would be greatly enhanced by transit routes that connect Hurricane to the St. George and the airport located in its southeastern quadrant. The proposed route from Hurricane to Springdale combined with the transit routes connecting Hurricane to St. George and the airport would allow potential riders to travel from the St. George area and/or the airport to Springdale without the need of a car. The expansion of transit service outside of St. George and into Hurricane in conjunction with a transit service between Hurricane and Springdale would integrate rural communities along the corridor with the rest of the county.

The *Hurricane to Zion Canyon Transit Study* evaluates the feasibility of providing transit service between Hurricane and Springdale, which would serve Zion National Park and communities along the corridor. The purpose of the *Hurricane to Zion Canyon Transit Study* is 1) to evaluate the potential demand for transit ridership between Hurricane and Springdale, 2) to identify and define the characteristics of a transit service that matches the context of the study corridor and its expected transit ridership demand, and 3) to estimate the cost to implement and then run such a transit service.

1.2 Project Study Area

The proposed transit corridor extends along SR-9 in Washington County, Utah from Hurricane to Springdale. SR-9 provides primary vehicle access between these communities. SR-9 also provides access to the South and River Station Entrances of Zion National Park. The total length of the corridor is approximately 22 miles. As Figure 1-1 shows, the study corridor begins at approximately the intersection of SR-9 and Main Street in Hurricane and travels along SR-9 through La Verkin, Virgin, Rockville, and Springdale. The route would end at the River Station Entrance for Zion National Park located at the northern boundary of Springdale.

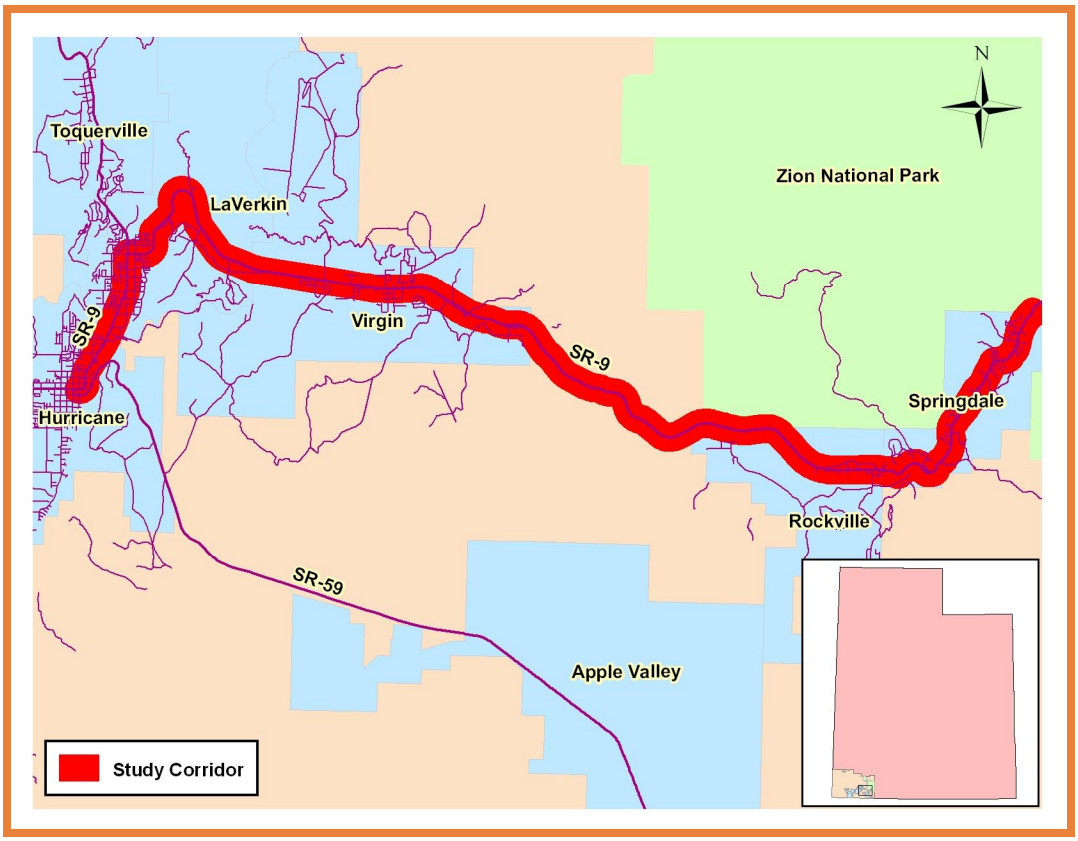

Figure 1-1: Study Area Map

1.3 Report Organization

The *Hurricane to Zion Canyon Transit Study* report is organized into five chapters that introduce the study and describe the process that was undertaken to evaluate the feasibility of transit service between Hurricane and Springdale. The following paragraphs briefly describe the remaining chapters of this report.

Chapter 2 lays out the context in which the proposed transit service would operate. It discusses socioeconomic conditions of the communities along the corridor and visitation for Zion National Park. It also describes the traffic conditions and existing transit conditions along the study corridor.

Chapter 3 presents the analysis of the potential transit ridership demand that could be expected for the proposed transit route. As part of this analysis two comparable transit services are presented to provide insight into the type of transit system that could be implemented and the ridership demand that could potentially be served between Hurricane and Springdale.

The ridership forecasts were used to conceptualize a variety of possible service plans for the proposed transit route. Chapter 4 presents the estimated ridership and capital and operating costs for various service options. A preferred service option is also recommended and presented in detail.

Chapter 5 summarizes the public involvement and stakeholder coordination efforts completed for this study. It highlights public views and support for transit service between Hurricane and Springdale.

2.0 PLANNING CONTEXT

An understanding of the nature of the study area is necessary to evaluate the need for transit service and to conceptualize a service that would meet that need. Existing and future traffic conditions and socioeconomic characteristics along the corridor are discussed here as well as some of the potential transit markets identified by project stakeholders.

2.1 Socioeconomic Conditions

Significant population growth is expected along the proposed transit corridor. Table 2-1 presents the 2000 US Census populations and 2010 projections for communities along the study corridor, as reported by the Utah Governor's Office of Planning and Budget (GOPB). Table 2-1 also presents 2035 interpolated population projections. The Utah GOPB reported 2030 and 2040 population projections; however, to be consistent with other local transportation planning studies and tools, including the Washington County travel demand model, 2035 populations were interpolated from these projections.

Table 2-1: Existing and Projected Populations

City/Town	2000 Population	2010 Projected Population	2035 Interpolated Population
Hurricane	8,250	16,381	47,540
La Verkin	3,392	5,162	14,969
Virgin	394	634	1,838
Rockville	247	319	926
Springdale	457	687	1,281
Corridor Total	**12,740**	**23,183**	**66,554**

Table 2-1 shows that the populations of the urbanizing and rural communities along the SR-9 corridor were projected to increase significantly through 2010. 2010 US Census data were not available at the time of this study so this growth could not be verified. As shown, significant population growth is expected through 2035; in some cases the projected population in 2035 is more than five times the 2000 US Census population.

2.2 Zion National Park

Zion National Park was the first national park in Utah. It is located just outside of Springdale, Utah and covers a total area of 233 square miles. It is known for its scenic views including its high plateaus and colorful sandstone canyons. In 2009, Zion National Park hosted over 2.7 million visitors.

Zion National Park has experienced a significant amount of growth over the last 15 years. A graph of this growth is shown in Figure 2-1. Assuming this past growth will continue and it can be accommodated by the park, yearly visitations to the park could reach 3.3 million by 2035, which is about a 20 percent increase from the current visitations. The future visitation projected based on historical growth is also shown in Figure 2-1.

Two Zion National Park entrances are located adjacent to each other at the northern boundary of Springdale, the South Entrance, which provides vehicle access, and the River Station Entrance, which provides bicycle and pedestrian access. On average approximately 65 percent of visitors currently use the South and River Station Entrances to Zion National Park, which are located at the northern boundary of Springdale. Assuming these past trends continue, by 2035 over 2 million visitors could access the park through the South and River Station Entrances each year. This increase in yearly visitations will increase vehicle traffic as well as the pool of potential transit users for a transit route between Hurricane and Springdale.

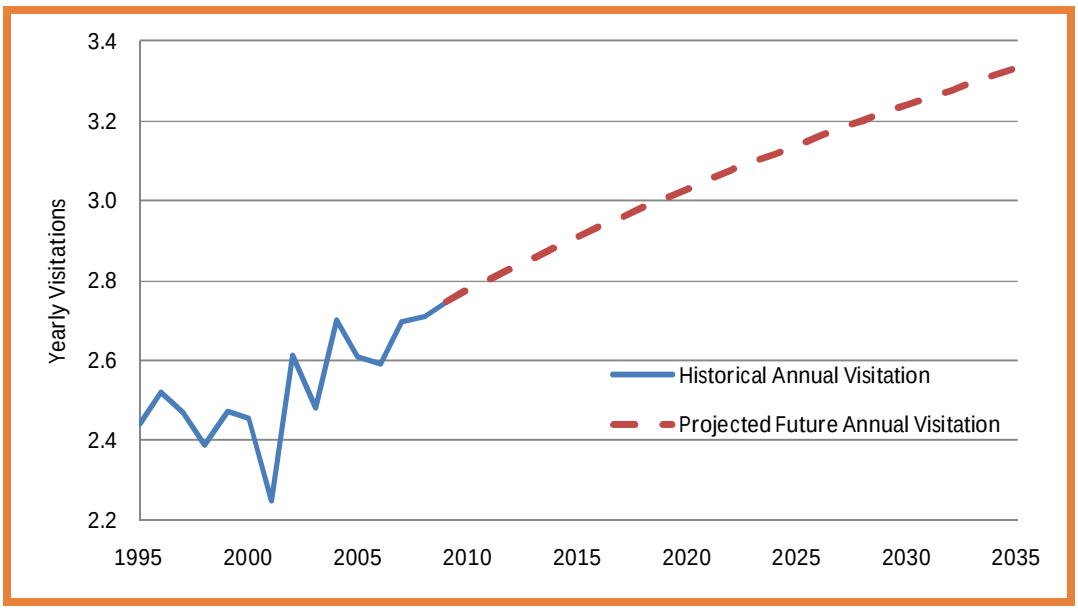

Figure 2-1: Zion National Park Annual Visitation Growth

As Figure 2-2 illustrates, park visitation is very seasonal with June, July and August being the peak months for park visitation. As yearly visitations increase, it is likely that the visitations during the peak season will also increase; however as the park reaches capacity, the peak season will likely expand. Figure 2-2 shows how visitations have changed from 2000 to 2009 and how they could be expected to change and grow by 2035 to reach the projected annual visitation of 3.3 million.

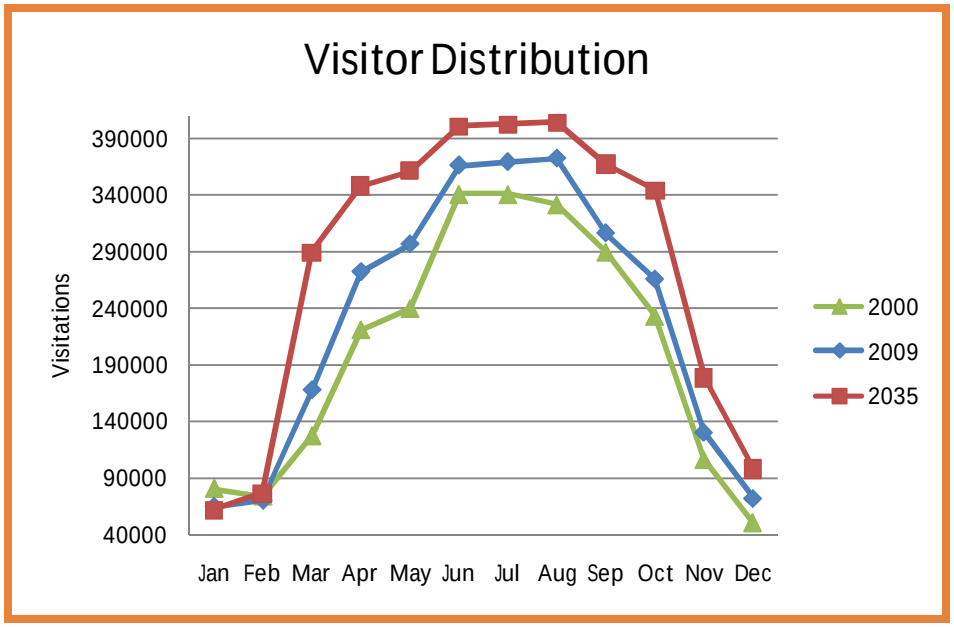

Figure 2-2: Zion National Park Visitations by Month

2.3 Traffic Conditions

The connection to Zion National Park creates large variations in the vehicle use of SR-9. Peak use of SR-9 occurs during the summer months when park visitation is highest. Transit could help reduce traffic volumes along this corridor, especially during the peak usage.

Figure 2-3 shows a portion of SR-9 as it follows the rolling terrain traveling between Hurricane to Springdale with many gradual curves, hills and valleys along the roadway. The posted speed limit along SR-9 ranges from 30 mph to 65 mph. Most of the corridor has a posted speed limit between 55 mph and 65 mph; however, reduced speeds are advised around some of the shaper curves. As SR-9 passes through the communities along the corridor speed limits are also reduced.

In December 2008 the Utah Department of Transportation (UDOT) completed the *Eastern Washington County Transportation Study*, which forecasted and analyzed traffic conditions for SR-9. The study reported that the 2006 average annual daily traffic (AADT) along the SR-9 corridor ranged from approximately 2,200 near Springdale to approximately 5,500 east of Hurricane. UDOT's *Traffic on Utah Highways* reports a similar range for 2009; nevertheless, according to the UDOT study, traffic is expected to nearly double by 2035 in some areas along the corridor with AADT ranging from approximately 5,500 to 6,000. Much of the growth expected along the SR-9 corridor is due to population growth within the communities that it serves. As reported in the UDOT study, traffic along SR-9 is expected to continue to be free-flowing or reasonably free-flowing in 2035 despite the large amount of growth expected.

SR-9 serves as a primary entrance to Zion National Park and is therefore a very tourist- and recreation-oriented corridor. Traffic on SR-9 closely follows peaks and valleys in Zion National Park visitation with seasonal fluctuations of over 30 percent between winter and summer months. As general traffic increases along the corridor seasonal fluctuations are expected to become less noticeable; however the seasonal fluctuations are expected to continue to influence the SR-9 corridor with higher traffic volume conditions during the peak season.

Figure 2-3: SR-9 Corridor

2.4 Transit Conditions

The Zion Canyon area offers a positive draw for a transit service. Zion National Park and Springdale are major attractions for employment, recreation, and shopping. From April through October, once a person is in Springdale, the Zion Canyon Shuttle provides the opportunity to travel within Springdale and access Zion National Park without a car. However, currently there are no public transit options along the SR-9 corridor. Tourists, most workers, and others must drive along SR-9 to access Springdale or the Zion Canyon Shuttle service.

The Zion Canyon Shuttle currently operates within Springdale city limits by providing bus service with headways as frequent as seven minutes. Bus pullouts are provided at stops along the shuttle's route and a major shuttle stop is located at the Zion National Park River Station Entrance shown in Figure 2-4. This major stop also provides access to tour buses and could serve as an attractive terminus to the proposed transit service between Hurricane and Springdale because it provides convenient access to both the park and the Zion Canyon Shuttle.

On-street parking for park visitors is provided in Springdale along SR-9. Additional parking is also provided through arrangements with hotels and other Springdale businesses. However this parking is limited and, as park visitation increases, parking availability may become even more limited. In fact, a major driver for providing shuttle service outside the park and within Springdale city limits was to extend visitor parking capacity beyond that available at the park's South Entrance.

Figure 2-4: Zion National Park River Station Entrance Bus Stop

The convenient and frequent local shuttle service within the city as well as the entrance to the park that already accommodates pedestrians and buses are some of the key features that make Springdale transit friendly and, as such, an attractive destination for transit service. For many transit systems, these types of transit-friendly features are not developed until long after the transit service is implemented. The transit-friendly nature of this location increases the probability for a successful transit service to/from Springdale. Additionally, restrictions to personal vehicle traffic within Zion National Park and the limited parking available near the park makes the SR-9 corridor between Hurricane and Springdale a strong candidate for transit service.

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3.0 RIDERSHIP DEMAND

Transit ridership demand between Hurricane and Springdale could originate from a variety of markets. Two markets were identified as major transit ridership contributors and used as a basis to forecast ridership for the study corridor. Because the proposed transit route would service markets that are considerably different than typical rural transit systems, comparable transit systems that currently service rural areas and national parks were reviewed to validate and refine ridership forecasts for the study corridor.

3.1 Potential Transit Markets

The potential transit route could serve multiple markets including persons with limited means of transportation who work or live along the proposed corridor as well as Zion National Park visitors and other tourists vacationing along the study corridor. This section presents the two primary transit ridership markets that would use the proposed transit service between Hurricane and Springdale.

3.1.1 Transit Dependent Populations

For many rural transit services the majority of transit trips are made by a subset of potential transit users that the transit industry refers to as "Transit Dependent Populations." Transit dependent populations are defined to include zero-vehicle households, elderly individuals, disabled individuals, and persons in households below the poverty level. Data for these groups were obtained from the US Census records. Table 3-1 lists 2000 US Census data for each of the communities along the proposed transit corridor. These data represent the market of persons that live along the study corridor and might ride transit to travel to work and/or other trip destinations.

Table 3-1: Transit Dependent Populations along the Corridor

City/Town	Total Households	Zero-Vehicle Households	Total Population	Elderly Population (Age 60+)	Disabled Population	Population Below Poverty Level
Hurricane	2,762	98	8,250	1804	777	996
La Verkin	1,053	41	3,392	568	327	380
Virgin	146	11	394	68	57	37
Rockville	115	5	247	55	19	25
Springdale	192	14	457	101	53	27
Total	**4,268**	**169**	**12,740**	**2,596**	**1,233**	**1,465**

3.1.2 Zion National Park Visitors

With current annual park visitations of 2.7 million and over 3.3 million expected by 2035, and assuming that a transit connection would be provided from Hurricane to St. George, Zion National Park visitors are expected to be a major contributor to transit ridership. During the busy summer months many visitors park in Springdale, ride the shuttle and walk into the park. A transit service between Hurricane and Springdale would provide an alternate mode of transportation allowing these and other visitors to get to and from the

park as well as other major destinations in Springdale without a car. Transit service could also extend tourism beyond Springdale to other communities along the study corridor.

3.1.3 Other Transit Markets

Some businesses and Zion National Park currently provide limited shuttle or van pool arrangements for their employees. These employees could benefit from transit service along the study corridor. A variety of other recreational activities exist along the corridor that could also benefit from transit. For example, feedback obtained through stakeholder coordination efforts for this study indicated that patrons of the Zion River Resort RV Park and Campground often travel to Springdale in the evening for dining. This suggests that there are potential tourist transit markets along the study corridor beyond visits to Zion National Park. Although these and other markets would benefit from – and possibly add riders to – the proposed transit route, they were assumed to be accounted for by the two major markets presented above.

3.2 Comparable Services

Transit systems that serve national parks are very different than typical transit systems. One of the primary differences is their ability to capture additional ridership from the tourist market. Sequoia and Yosemite National Park transit services are two existing systems that provide connections to national parks in much the same way that the proposed system would. These services were reviewed in detail during the course of this study. The review of these services included a site visit to the operating city and discussions with the operators of each system. The information obtained through the review of these systems was used to validate and refine ridership demand for the study corridor as well as to conceptualize the alternatives presented later in this report.

Although these comparable services provided valuable insight regarding potential ridership demand and service alternatives for the proposed transit service, they are not directly comparable from an operational standpoint. These services operate over long distances, up to nearly six times the distance that would be covered by a route between Hurricane and Springdale, requiring more service vehicles and increased service miles. Consequently, these transit services have higher operational costs per rider and charge higher fares.

3.2.1 Sequoia Shuttle

Sequoia Shuttle operates along Highway 198 from the junction of Highway 99 in Visalia, California to the Sequoia National Park Giant Forest Museum stopping at several pickup locations along Highway 198. Sequoia Shuttle operates from Memorial Day to Labor Day. During the operating season, weekday operation consists of four Sequoia-bound shuttles in the morning provided every hour from 7:00 to 10:00 AM and four return shuttles in the evening provided from 3:30 to 6:30 PM. During the weekend a total of ten shuttles are operated, five in the morning and five in the evening. Roadway geometry along the route restricts the size of the buses to 22 feet. The roadway geometry also limits the operating speed of the buses to about 35 mph. Due to this speed restriction a one-way trip to Sequoia along the 56 mile route takes 2.5 hours. To avoid leaving visitors stranded Sequoia Shuttle requires reservations and operates on a demand-response basis.

Figure 3-1: Sequoia Shuttle Bus

Sequoia Shuttle is a new service that has been in operation since 2007. The idea of the shuttle system initiated with the desire of Sequoia National Park to minimize traffic in the park and restore the natural beauty of the area. Sequoia Shuttle now operates a shuttle service inside the park (internal shuttle) and a transit service to and from the park (external shuttle). There was a great deal of public support when the study for the Sequoia Shuttle was initialized, which allowed for quick implementation of the transit service.

The Sequoia Shuttle is operated by Visalia Transit. From Visalia's point of view, the purpose of the system is to have tourism begin in Visalia. Visalia Transit operates both the internal and external shuttles. Since Sequoia National Park itself is outside of Visalia's jurisdiction, Visalia Transit works under contract with Sequoia National Park to provide the internal shuttle service. Sequoia National Park funds the internal shuttles directly and Visalia Transit funds the external shuttle through grants and other subsidies. For the first three years of the system's operation the external shuttle was funded through Congestion Mitigation and Air Quality (CMAQ) funding with no funding coming from Visalia itself. However, as of 2010, the CMAQ funding has expired and the operation of the external shuttle is now fully-funded by Sequoia National Park. Sequoia National Park funds the internal and external shuttles through an increase in the park entrance fee, which was applied when the Sequoia Shuttle was first implemented. Part of the agreement between Visalia Transit and Sequoia National Park allows the park to lease vehicles from Visalia Transit because national parks cannot purchase vehicles.

Cooperating hotels along Highway 198 are used as park-and-ride lots for shuttle patrons. The hotels have entered into an agreement with Sequoia Shuttle to allow non-hotel guests to use their parking lot. Sequoia Shuttle is currently focused on providing service to visitors, but in the future it would like to provide service to the secondary employee market (especially park rangers). Primary demand for the Sequoia Shuttle comes from Visalia residents.

3.2.2 Yosemite Area Regional Transit System

Yosemite Area Regional Transportation System (YARTS) operates two routes that connect local communities in California to Yosemite National Park. One route operates year round and begins in Merced traveling 87 miles along Highway 140 to Yosemite National Park. The other route operates along Highway 120 from May to September and travels 125 miles from Mammoth Lakes to Yosemite National Park. A total of thirteen runs, six to Yosemite and seven from Yosemite, are operated along Highway 140 each day. Two runs, one to Yosemite and one return trip, are operated on Highway 120. The roadway geometry along the routes does not restrict the size of YARTS vehicles; however vehicle operating

speeds are slower when climbing towards the park. A one-way trip along the Highway 140 route takes approximately 3 hours. A one-way trip along the Highway 120 route takes approximately 4 hours.

The YARTS system began in May 2000 along the Highway 140 route. The main factor driving the implementation of the YARTS service was a provision in the Yosemite Valley Plan to restrict vehicle access to the park; however this provision was never implemented. Prior to the implementation of the YARTs system there were various transit routes in the area, but they were not coordinated with each other. The YARTS system has provided a coordinated transit system.

YARTS operates under a joint powers agreement between Merced, Mariposa, and Mono Counties. One representative is elected from each county to form a board of commissioners, which makes decisions for the YARTS system. An Authority Advisory Committee made up of 13 members selected by the board of commissioners gives recommendations to the board that then makes the final decision.

Most YARTS users, excluding AMTRAK users, originate in Mariposa County. There are no incorporated towns in Mariposa County and for this reason YARTS is operated through the Merced County Association of Governments (MCAG). This is beneficial to YARTS because the MCAG can apply for federal funding without the additional coordination that is required for most multi-agency transit operators. The regional nature of the YARTS system precludes it from receiving formula funding under California policy. YARTS has received FTA 5320 funding which provides capital funds. One of the challenges encountered by YARTS is obtaining funding to subsidize operations; however, the farebox recovery rate is around 25 percent.

YARTS contracts with a private company named VIA Adventures (VIA) for its operation. This allows YARTS to operate without the accounting and management obligations associated with the operation of a transit service. YARTS is in the process of purchasing buses which will cut back on the contracting costs by approximately 15 percent. YARTS plans to purchase nine buses in the next two years. After purchasing its own buses, YARTS plans to continue contracting with VIA for the operation and maintenance of its buses. However, YARTS will not have to pay VIA for the depreciation of the YARTS buses. YARTS hopes that this reduction in contracting costs will free up some monies to cover operations.

Figure 3-2: YARTS Bus (Owned by VIA Adventures)

3.2.3 Service Comparison

Sequoia Shuttle and YARTS both service rural areas and national parks, but do so with significantly different transit service systems. These differences provide contrasting perspectives on how a transit system serving a national park could operate. Table 3-2 presents general system data and 2009 operational statistics collected from the two comparable services. Table 3-3 presents their 2009 ridership statistics.

Table 3-2: Comparable Services – General Characteristics

Transit Characteristic	Sequoia National Park California	Yosemite National Park California
Name of Service	Sequoia Shuttle	Yosemite Area Regional Transit System
Service Area	Visalia, CA to Sequoia National Park	Hwy 140: Merced, CA to Yosemite National Park Hwy 120: Mammoth Lakes, CA to Yosemite National Park
Route Lengths	56 mi. one-way	Hwy 140: 87 mi. one-way Hwy 120: 125 mi. one-way
Institutional Structure	Municipal	Joint Powers Agreement/ Contracted Operation
Annual Budget	$250,000	$7.5 Million
Vehicles/Capacity	6 external - 16-passenger 13 internal - 16-passenger (6) 26-passenger (7)	Contracted with VIA Adventures 26-passenger 50-passenger
Schedule	Weekday - 4 AM runs, 4 PM runs Weekend - 5 AM runs, 5 PM runs	Hwy 140: 7 AM runs, 6 PM runs Hwy 120: 1 AM run, 1 PM run
Fares	$15.00 Round trip	Hwy 140: $1-$25(Distance based) Hwy 120: $3-$30 (Distance based)
Yearly Operation	Memorial Day - Labor Day	Hwy 140 - Year round Hwy 120 - June-September

Table 3-3: Comparable Systems – Ridership Statistics

Transit Characteristic	Sequoia National Park California	Yosemite National Park California
Annual Ridership		
Winter	N/A	13,905
Summer	4,635	25,012
Spring	477	17,957
Fall	273	17,413
Total Annual Ridership	5,385	74,287
Type of Passenger		
Local Trips	<5%	40%
Park Visitor	>95%	60%

3.3 Ridership Forecasts

To estimate ridership demand for the proposed transit corridor, the ridership forecasting methods typically used for rural areas must be supplemented with transit use demand generated by the Zion National Park. The following sections present the ridership demand expected from both of the major transit markets for the study corridor, namely local trips and park visitors. The ridership forecast for park visitors assumes that a transit connection would be provided between St. George and Hurricane.

3.3.1 Local Ridership Forecast

The *Transit Cooperative Research Program (TCRP) Report 3: Workbook for Estimating Demand for Rural Passenger Transportation* defines a process for estimating transit demand in rural areas. The TCRP study was completed in 1995 and its process has been used to forecast transit demand for other rural areas in Utah. This process was applied to the study corridor to forecast ridership demand for local trips from persons that live along the proposed transit route.

The TCRP study presents formulas that relate the number of transit participants to actual transit demand based on 185 transit agencies around the country. The TCRP study considers two categories of transit demand: Program and Non-program demand. Program demand is defined by the TCRP study as “those trips that would not occur but for the existence and operation of a specific social service program.” In other words, Program demand is ridership on a non-public transit service that is provided by a specific social service program. Non-program demand accounts for all trips outside the program-demand definition. Non-program trips may include shopping, employment, recreational and medical trips. Non-program demand procedures of the TCRP study were used to estimate local ridership demand for the proposed transit route.

The TCRP process uses a logit model approach to estimate non-program transit demand. This model relates the quantity of service to the demographics of the service area by calculating a service factor and applying it to the applicable demographic. The non-program demand calculated through the TCRP process can be interpreted as an estimate of the ridership that could be expected on the transit service; however, the TCRP study indicates that actual ridership could vary substantially from the forecasted demand depending on local conditions and actual operating patterns. The TCRP process also does not account for seasonal variations in local transit ridership due to seasonal employment. Despite these limitations, and in the absence of actual transit ridership numbers, this process does provide an acceptable planning level estimate for a local ridership base.

Transit demand was estimated based on a combination of the demographics presented in Sections 2.1 and 3.1.1. The model equations and forms used for this process are presented in Appendix B. To forecast 2010 and 2035 ridership demand, it was assumed that the transit dependent populations would continue to represent the same proportion of the population in the future as they did in the 2000 US Census data. Table 3-4 presents the transit ridership expected for each community along the transit corridor for existing conditions, estimated for 2010, and for future 2035 conditions. This ridership represents the number of one-way trips made by transit riders.

Table 3-4: Annual Local Ridership Forecast

City/Town	2010	2035
Hurricane	13,480	39,120
La Verkin	24,880	72,170
Virgin	2,480	7,180
Rockville	2,010	5,830
Springdale	4,340	8,080
Total	**47,190**	**132,380**

3.3.2 Zion National Park Visitor Ridership Forecast

Zion National Park visitor data were collected from the National Park Service (NPS) website, Zion National Park and the *Zion National Park Visitor Study.* Visitor statistics available on the NPS website included monthly reports dating back to 1994. These monthly reports separate visitor data into recreational and non-recreational visits. The monthly reports also break down overnight stays into lodging and five different camping categories. Additionally, these reports provide information about the amount of visitors using each park entrance each month. The ridership analysis used recreational visitor, camping, and entrance statistics.

Historical visitor data were used to forecast monthly recreational visitors to Zion National Park for existing conditions, 2010, and future conditions, 2035. Zion National Park provided daily visitor data, which was used to separate the forecasted visitors into weekday and weekend visitations for more detailed daily analysis.

Zion National Park's South Entrance and River Station Entrance are the only entrances directly applicable to the proposed transit service because they are the only entrances in Springdale. The pool of monthly potential transit riders were assumed to be made up of all the recreational visitors using these entrances, except those that drive through the park. As a conservative estimate, visitors camping overnight were also excluded. However, it should be noted that some of those persons camping overnight could use the transit service.

The mode splits for the Sequoia Shuttle and YARTS system were determined by comparing actual ridership numbers for each system to the pool of monthly potential transit riders for each system, which was calculated using park visitor and entrance data for the corresponding parks being served. The average mode split for these two comparable services was approximately 5 percent and was the assumed mode split for Zion National Park visitors. This mode split was applied to the pool of potential

transit riders for Zion National Park. The resulting average annual visitor ridership forecast is approximately 114,520 riders per year for 2010 conditions and 137,450 riders per year for 2035 conditions. It is important to note that this ridership forecast assumes that a transit connection would be provided between St. George and Hurricane. This would provide the urban populations in Washington County and visitors to its urban and urbanizing areas with access to transit service between the St. George area and Springdale.

3.3.3 Ridership Forecast Summary

Transit service could be provided to local transit users along the proposed transit corridor as well as Zion National Park visitors. Table 3-5 summarizes ridership forecasts for both local and visitor transit markets for the study corridor. Zion National Park visitors could account for the majority of transit ridership; however most of the visitor ridership is expected to be focused during the park's peak season from April through October. Local ridership, on the other hand, could provide a stable base ridership that would allow the system to continue operations year-round. Table 3-5 presents the annual combined local and visitor ridership that could be expected on the proposed transit for 2010 and 2035. During the peak season there could also be an increase in local ridership as seasonal jobs become available, but for the most part local ridership is expected to be fairly constant throughout the year. As the local communities grow, Zion National Park visitor ridership could represent a lower percentage of the total ridership on the system. It is important to reemphasize that the ridership forecasts presented here assume that a transit connection would be provided between St. George and Hurricane.

Table 3-5: Annual Combined Ridership Forecast

Transit Market	2010	2035
Local	47,190	132,380
Visitor	114,520	137,450
Total	**161,710**	**269,830**

4.0 SERVICE OPTIONS

The transit ridership estimates presented in Chapter 3 could vary significantly depending on the specific characteristics of the transit service. This chapter identifies some possible types of service that could be provided and presents the estimated ridership and capital and operating costs for these service options. A preferred service option is also recommended and presented in detail.

4.1 Types of Service

When conceptualizing a new transit system there are various options from which to choose. Each option has its advantages and disadvantages. Some offer increased reliability while others offer increased accessibility and flexibility. The type of service also can affect the ability to get federal funding for the transit route. Following is a summary of possible types of transit service that could be provided for the study corridor.

4.1.1 Traditional Fixed Route Service

The traditional fixed route is what is commonly thought of as a typical bus route. A route of this type operates with fixed stops and schedule with no deviation. It may or may not have regular headways. A fixed route could provide service all-day or only during periods of peak demand. It could be catered to meet the needs of the tourist or the local market or both if there is some overlap in the times of peak demand.

A traditional fixed route is the simplest type of route and is easy for potential patrons to understand. It offers high schedule reliability because since the route is fixed. Operational costs for traditional fixed routes are typically lower on a per passenger trip basis than for other route types. However, traditional fixed routes are often less accessible than other route types because they may be difficult for disabled or elderly persons to access. The Americans with Disabilities Act (ADA) requires that communities with traditional fixed route service provide complimentary paratransit service, which must operate within a minimum of a three-quarter mile radius of the fixed route. Providing paratransit service to supplement a traditional fixed route increases costs.

Traditional fixed routes are often unattractive to local persons in rural communities with access to private vehicles; however, they may be attractive to transit captive/dependent persons as well as to the tourist market. YARTS, described as a comparable service in Chapter 3, operates a traditional fixed route between Merced and Yosemite National Park. Complimentary paratransit service is provided by “The Bus,” Merced’s local public transportation service, and “Mari-Go,” Mariposa County’s transit service.

4.1.2 Demand-Response Service

Demand-response service operates in response to requests made to the transit operator. This type of service often operates as a paratransit service; however it could run on a predetermined schedule and be made available to any transit patron that makes a reservation. A demand-response service provides high accessibility for disabled patrons and therefore caters to the local market. Travel times are typically longer than fixed route travel times, especially for longer trips. Since advanced reservations are required for demand-response service, it may be difficult for patrons to adapt to and utilize this type of service. It may be particularly difficult for tourists to utilize this type of service and therefore, may not meet the needs of the tourist market.

The operation of Sequoia Shuttle, described as a comparable service in Chapter 3, employs some aspects of a demand-response service in that reservations are required for the route to run. Sequoia Shuttle has had to educate its patrons through marketing efforts to make them aware of the advanced reservation requirement.

4.1.3 Deviated Fixed Route Service

A deviated fixed route operates in much the same way as a traditional fixed route. However, a deviated fixed route may deviate from its course to serve a specific origin or destination, when requested. A true deviated fixed route can serve a variety of origins and destinations regardless of whether or not they are on the designated fixed route. In a sense this type of route combines a fixed route and a demand-response route into one route. Because the route is flexible it can pick up disabled patrons, thus the complimentary paratransit service is not required. Route deviations may result in longer travel times for passengers and schedule reliability is lower for a deviated fixed route than a traditional fixed route.

Sequoia Shuttle's external route, which provides access to and from Sequoia National Park, has some aspects of a deviated fixed route. It operates on a fixed route along Highway 198 and deviates off the main route when reservations are made; however, it is not a true deviated fixed route because the route deviations are to predefined stop locations.

4.1.4 Seasonal Service

Seasonal service would operate only during the peak tourist season. It could be applied using any of the service types presented above. This type of service keeps annual operating costs low by not operating when demand is low. Seasonal service caters more to the tourist market; however, it can also serve the local market for seasonal jobs. Because this type of service is only offered seasonally, it is typically difficult to develop a strong local ridership base.

4.1.5 Service Type Comparison

The type of transit service that is selected to connect Hurricane and Springdale will affect the ridership as well as capital and operating costs. Table 4-1 compares the different service types presented above. The comparison presented in Table 4-1 is for existing (2010) conditions only. The differences between these service types would be similar for 2035 conditions.

Table 4-1: 2010 Service Type Comparison

	Fixed Route (All-Day Service)	Fixed Route (Peak Demand Period Only)	Demand-ResponseService	Deviated Fixed Route (Deviations in Smaller Communities Only)	Seasonal Service
2010 Annual Ridership	161,710	117,950	96,930	150,960	95,190
2010 Daily Ridership	450	330	270	420	270
Percent Local Riders	29%	22%	38%	29%	5%
Percent Visitors	71%	78%	62%	71%	95%
Annual Operating Costs[a]	$800,000	$500,000	$800,000	$800,000	$300,000
Paratransit Operating Costs[a]	$200,000	$200,000	N/A	$100,000[b]	N/A
Total Annual Operating Costs[a]	$1,000,000	$700,000	$800,000	$900,000[b]	$300,000
Operating Cost per Rider[a]	$6.18	$5.93	$8.25	$5.96[b]	$3.15
Paratransit Capital Costs[a]	$400,000	$400,000	N/A	$200,000[b]	N/A
Total Capital Costs[a]	$2,000,000	$2,000,000	$2,000,000	$1,800,000	$1,600,000

a. All costs are in 2010 dollars. Costs are rounded to nearest $100,000, except cost per rider. Total capital costs include Paratransit Capital Costs.
b. Includes ADA costs for Hurricane, La Verkin and Virgin only

4.2 Recommended Initial Service Plan

The different service types available for the Hurricane to Springdale route were compared and evaluated to determine which transit service type would best meet the objectives of the project as defined by the stakeholders. This section presents the results of this evaluation and the recommended transit service for the study corridor. As with the ridership demand estimates presented above, the service plan recommendations that follow assume that transit service is provided between St. George and Hurricane.

4.2.1 Service Plan

Evaluation of the various service types showed that a fixed route would be the most expensive to implement and operate, however it is also expected to have the highest ridership. Seasonal service would be the least expensive to implement and operate, however its ridership would be much less than that of a fixed route. It is therefore expected that, despite its higher operating cost, a traditional fixed route would best meet the needs of the study corridor.

A traditional fixed route could provide reliable service to both park visitors and local transit patrons. From April through October the proposed route could provide transfer points to the Zion Canyon Shuttle in Springdale with the main transfer point located at the River Station Entrance bus stop. During this time the route between Hurricane and Springdale would act as an intercity route and the Zion Canyon Shuttle would act as a local feeder route within Springdale. From November through March the Hurricane to Springdale route could serve as an intercity route with no feeder service in Springdale or the transit service connection between Hurricane and Springdale could be supplemented by extending the operational season of the Zion Canyon Shuttle within the park to provide year-round service. Shuttle service during the winter months could be significantly less frequent than service during the busy summer months.

The difference in capital costs for the fixed route versus the other service types is largely due to the required complimentary ADA service. To make this capital expenditure more manageable it is recommended that a separate county-wide paratransit service be implemented. To meet ADA requirements, the paratransit service would need to be available to all five communities along the corridor. If the transit service between Hurricane and Springdale were implemented before a county-wide transit paratransit service was available, the fixed route service could accommodate minor deviations in Rockville and Springdale to eliminate the need for paratransit service in those communities. In such a scenario, paratransit service in Hurricane, La Verkin, and Virgin could be provided by the operator providing transit service between St. George and Hurricane. The transit route connecting Hurricane to Springdale could in-turn bare a portion of the cost of paratransit service for Hurricane, La Verkin and Virgin.

The recommended transit service would operate at 60 minute headways from 6:00 AM to 10:00 PM. Initially, two 55-passenger buses would be required to provide this level of service along the corridor. In addition, one spare bus would be recommended. More frequent service could be provided as demand requires, however this would require one or more additional buses. It is estimated that a one-way trip from Hurricane to Springdale would take approximately 40 minutes. Due to the length of the trip the transit vehicles should be air-conditioned to improve the comfort of transit patrons.

Nine bus stops could be provided along the corridor, including stops located at each project terminus, one in Hurricane and one in Springdale. Table 4-2 presents approximate locations for stops along the proposed transit corridor.

Table 4-2: Bus Stop Locations

City/Town	Number of Stops	Approximate Locations
Hurricane	2	SR-9/Main Street
		SR-9/860 North
La Verkin	2	SR-9/Center Street
		SR-9/500 North
Virgin	2	SR-9/200 West
		SR-9/200 East
Rockville	1	SR-9/Jennings Lane
Springdale	2	SR-9/Bumbleberry Lane
		Zion National Park River Station Entrance
Total	**9**	

Park-and-ride facilities are not typically offered for traditional bus routes; however, parking facilities may be needed to accommodate some transit patrons. Park-and-ride lots could be provided through arrangements with local businesses or shared with other transit operators. Providing park-and-ride lots could be especially beneficial as parking supply becomes more limited in Springdale.

4.2.2 Costs Analysis

To reduce capital expenses it is recommended that an arrangement be made to share buses, and possibly service, with the operator of the transit service between St. George and Hurricane; provided they meet the service requirements of this system. The buses for the route between Hurricane and Springdale could supplement the buses from St. George to Hurricane by coordinating schedules and operation. This would 1) potentially eliminate the Hurricane to Springdale route's need for a spare vehicle and 2) provide the possibility for a continual transit trip from St. George to Springdale, which could increase transit ridership for both routes.

Maintenance facilities can be a large capital expense. Capital costs for the route could be decreased by sharing maintenance facilities with another transit operator, either Parks Transportation in Springdale or the operator of the transit service between St. George and Hurricane. If it is not feasible to share vehicles and/or maintenance facilities, a private contractor could be employed to provide the transit service, in a way similar to YARTS's arrangement with VIA Adventures. This approach could be particularly attractive during the initial stages of implementation.

Table 4-3 summarizes ridership characteristics and costs for the recommended transit service. The estimated capital and operating costs presented assume that 1) the paratransit service is provided by another entity, 2) buses are shared with another transit service so a spare bus is not needed, and 3) maintenance facilities are shared with another system. Ridership and cost estimates for 2035 conditions are presented (in today's dollars) to show what an initial transit service could look like if implemented in the future.

Table 4-3: Recommended Transit Service

	2010	2035
Annual Ridership	161,710	269,830
Daily Ridership	450	740
Percent Local Riders	29%	49%
Percent Visitors	71%	51%
Number of Buses	2	3
Annual Operating Costs[a]	$800,000	$1,200,000
Shared ParatransitOperating Costs[a]	$100,000	$100,000
Total Annual Operating Costs[a]	$900,000	$1,300,000
Operating Cost per Rider[a]	$5.57	$4.82
Total Capital Costs[a]	$1,300,000[b]	$1,600,000[b]

a. All costs are in 2010 dollars. Costs are rounded to nearest $100,000, except cost per rider.
b. Assumes that paratransit vehicle is provided by another entity, meaning there is no need for paratransit capital investment.

4.3 Funding and Implementation

Before implementing a new transit service it is important to consider possible sources for funding and operational structures for the service. Section 4.3.1 summarizes possible federal funding programs available for this project, Section 4.3.2 summarizes local funding options and Section 4.3.3 presents a recommended strategy for implementing the proposed transit service.

4.3.1 Federal Funding

Federal funding programs are available to subsidize capital and operating expenses, but most require a local match. Federal funding for capital expenditures requires a 20 percent local match. A 50 percent local match, of the net deficit, is required for federal funds used for operating expenses. The net deficit is the total cost of operations minus the operating funds recovered through farebox revenues (i.e., farebox recovery). Federal funding for transit is provided through the Federal Transit Administration (FTA) and, for rural areas in Utah, administered by UDOT.

The following are FTA funding programs are discussed in the *Dixie BRT Feasibility Study dated July 2, 2010* and could also be applied to the route between Hurricane and Springdale:

- FTA Rural Area Funding Program – Section 5311
- FTA Job Access and Reverse Commute Program – Section 5316
- FTA New Freedom Program – Section 5317

These FTA programs can be used to fund capital and operating expenses. However, because the proposed transit system provides access to Zion National Park the proposed transit service could access funds from the Paul S. Sarbanes Transit in Park Program – Section 5320, which provides capital assistance. To apply for this funding, the transit organization operating the transit service between Hurricane and Springdale would need to obtain consent from Zion National Park.

4.3.2 Farebox Recovery and Local Funding

Charging fares for transit service helps recover some of the expenses of operating a transit service; however, higher fares can reduce ridership. The percentage of operating costs recovered through farebox revenues is called the farebox recovery ratio. The typical farebox recovery ratio for a rural transit system is 7-8 percent of the overall operating costs. YARTS and Sequoia Shuttle, presented as comparable services in Chapter 3, operate with 25 percent and 50 percent farebox recovery ratios, respectively.

Two main fare structures can be used when establishing fares for a transit service flat fare and differentiated fare. A flat fare structure charges the same fare for all trips. SunTran operates its St. George system with a flat fare structure and charges a fare of $1.00 for all trips on its fixed routes. A differentiated fare structure allows for variation of fares based on either trip distance or time-of-day. A distance-based fare structure is typically the best option for rural and intercity transit services because their routes are generally longer than routes for urban areas. The proposed transit service could charge fares between $1.00 and $3.00. Higher fare box charges combined with discounted monthly pass charges for commuters could represent a model that successfully caters to both local commuters and visitors. The actual fare charge implemented for the service will need to consider price elasticity (sensitivity) for the local, commuter and tourist markets and the amount of local operating subsidies available.

It can be difficult to gather funds for a local match, especially in rural areas with limited tax revenues. Larger urban areas typically dedicate a portion of local sales tax to transit. Other sources include: redevelopment funds, business licensing fees, parking fees, development fees, lodging fees and local business contributions. Sequoia National Park currently funds the operation of the Sequoia Shuttle system, which provides service to and from the park, through an increased park entrance fee. According to the *Zion National Park Visitor Study* approximately 83 percent of park visitors feel that the current park entrance fee is “about right” and approximately 45 percent feel that the value received for the fee they paid is “very good.” A minor increase in the park entrance fee could be considered to fund part of the operations of the proposed transit service. Parking fees in Springdale or at the park could also increase transit demand and provide additional funding for the local match requirement. Table 4-4 presents a conceptual funding scenario demonstrating how capital and operating costs for the proposed transit service could be divided among local and federal funding sources.

Table 4-4: Conceptual Funding Scenario

Capital Costs[a]	
Total Capital Costs	$1,300,000
Federal Funding	($1,000,000)
Local Match	$300,000
Operating Costs[a]	
Annual Operating Costs	$900,000
20-25% Farebox Recovery	($200,000)
Net Deficit	$700,000
50% Federal Funding	($350,000)
Local Match	$350,000

a. All costs are in 2010 dollars.

4.3.3 Institutional Structure

Currently there is no transit organization operating in the communities along the study corridor. The transit service plan for the proposed route will need to consider how it will be governed. Several institutional structures are presented in the *Dixie BRT Feasibility Study.* These governance options could be considered for the proposed transit route. YARTS operates with a joint powers authority and with MCAG operating as a transit oversight agency. Sequoia Shuttle is operated by Visalia Transit which operates as its own service in the Visalia funding area. An operating structure similar to YARTS would most likely provide the best results for early implementation; however, as transit service spreads throughout the county, a regional transit authority may be a better option. As such, institutional structure considerations for expanding transit outside the City of St. George and into Washington City, Hurricane City, and other parts of Washington County, should consider transit service to and from Springdale.

5.0 STAKEHOLDER PARTICIPATION

Stakeholder participation was an important part of this project and a few different strategies were employed to enlist the opinions of project stakeholders. The strategies used to involve project stakeholders included a display at the Dixie Transportation Expo, meetings with key stakeholders, a public open house held in Springdale and a public survey made available at various locations along the study corridor.

5.1 Key Stakeholder Meeting

During the early stages of the project a meeting was held with key project stakeholders including:

- Zion National Park
- Springdale Town
- Zion Canyon Visitor Center
- City of St. George
- Utah Department of Transportation
- Five County Association of Govt.
- Virgin Town
- Zion River Resort
- Parks Transportation
- La Verkin City
- Southern Utah University
- Form Tomorrow
- Hurricane City
- Zion Shuttle

A detailed list of representatives from these groups is presented in Appendix C. The purpose of this meeting was to coordinate with these stakeholders and determine initial sentiment regarding the potential implementation of transit service between Hurricane and Springdale. The feedback received in this meeting gave the project team insight into the potential transit markets and transit applications along the corridor. The project team also gained a deeper understanding of the goals of these stakeholders regarding the implementation of transit. In general, the stakeholders are interested in improving access for employees and tourists through public transit service. A few of the stakeholders already provide limited shuttle service to their employees and the NPS Zion Canyon Shuttle provides transit service within the town of Springdale for visitors to Zion National Park.

5.2 Dixie Transportation Expo

The project team attended the 2010 Dixie Transportation Expo and distributed a survey to those who attended. The information presented at the Expo included information about the *Dixie BRT Feasibility Study*, which considered transit service between St. George and Hurricane, as well as information about the *Hurricane to Zion Canyon Transit Study*. The morning of the Expo an article was published in the *St. George Spectrum* about the *Hurricane to Zion Canyon Transit Study*. Many Expo attendees knew about the study prior to the Expo and came with questions about the potential for transit service between Hurricane and Springdale.

A total of 79 individuals responded to the survey distributed at the Expo. Most of the respondents, approximately 90 percent, did not currently ride transit. About 24 percent of those who did not currently ride transit indicated the reason for not riding transit to be the lack of available transit service. When asked what transit improvements were most important, respondents indicated that transit service to Zion National Park was among the top three improvements. Service to Zion National Park ranked third, behind

service to Washington/Hurricane and the airport. Only 3 percent and 6 percent of respondents worked in and lived in the study area, respectively.

5.3 Public Open House and Survey

A public open house was held in Springdale on April 22, 2010. This open house was held specifically for the communities located along the proposed transit corridor to present the concept of transit service from Hurricane to Springdale.

The survey distributed at the Dixie Transportation Expo provided good information for the *Hurricane to Zion Canyon Transit Study;* however its focus was to gather information for the *Dixie BRT Feasibility Study*. As such, a survey specific to the *Hurricane to Zion Canyon Transit Study* corridor was made available at the public open house. The survey was also made available for additional public and stakeholder input at various locations throughout the study corridor. A total of 144 completed surveys were collected and evaluated. Overall the feedback received was very supportive of transit service between Hurricane and Springdale. Following is a summary of responses.

- 39 percent of survey respondents live in Virgin, 22 percent live in La Verkin and 16 percent live in Springdale. The remaining 23 percent live in other communities along the corridor and other parts of the Washington County area.
- The majority, a total of 58 percent, of survey respondents work in Springdale. The remaining 42 percent are distributed fairly evenly throughout the communities along the corridor and other areas of Washington County.
- 76 percent of survey respondents indicated they are highly supportive of the potential transit service between Hurricane and Springdale. 19 percent indicated they were supportive. This demonstrates a high amount of support for the potential transit service.
- Work, shopping areas and recreational areas such as Zion National Park all ranked high as possible transit destinations with work ranking highest.
- Survey respondents were relatively evenly distributed among daily, 2-3 times per week, weekly, and monthly transit usage with about 25 percent in each category.
- Most transit riders would ride in the morning and the evening with some transit usage during the day. Typically those with non-work destinations indicated they would ride in the morning and during the middle of the day.
- The majority of survey respondents did not have concerns with the proposed transit corridor; however the biggest concerns were traffic congestion and maintaining the rural/scenic nature of the corridor.
- Overall, the most important transit system element was frequent service followed by good accessibility and fast service.

The information obtained through this survey was used in the conceptualization of a potential transit service between Hurricane and Springdale.

5.4 Summary of Stakeholder Participation

The feedback gathered through the stakeholder and public outreach study efforts indicate that there is a significant amount of local support for a transit route between Hurricane and Springdale. Representatives from the variety of organizations involved in the key project stakeholders meeting indicated that they see a variety of benefits for employees and tourists in the proposed transit system. For example, La Verkin City indicated that over one third of its employees would be affected by a transit service along SR-9. A total of over 200 surveys were collected between the Dixie Transportation Expo and the Public Open House. Public responses to both if these surveys indicate high public support for a transit service to and from Springdale.

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APPENDIX A: REFERENCES

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APPENDIX B: RIDERSHIP DEMAND

TCRP Workbook for Estimating Demand for Rural Passenger Transportation Forms

FORM A-1

SERVICE AREA CHARACTERISTICS DATA COLLECTION FORM

Size of Service Area		or	
	Square Miles		Square Kilometers

Population Characteristics	Current or Base Year	Forecast Design Year(*)
Total Population		
Persons Age 60 or Over		
Persons Age 16-64 with a Mobility Limitation		
Persons Age 64 or Less Residing in Households with Incomes Below Poverty Level		

Data below are needed only if the indicated type of social program operates in the service area AND the number of participants is unknown.

	Current	Forecast	Program Type
Persons Age 16 and Over			Developmental Services: Adult
Total Persons with a Mobility Limitation			Dev. Services: Pre-School OR Group Home OR Mental Health Service
Families in Poverty			Headstart OR Headstart: Homebase
Persons Age 3 and 4			Headstart: Other
Persons Age 16 to 59			Job Training OR Sheltered Workshop
Persons Age 16 to 64			Mental Health Services: Case Management
Persons Age 75 and Over			Nursing Home, Senior Nutrition

*: If only a total population estimate is available for the Forecast Design Year, estimate other population characteristics by multiplying the current year figure by the Forecast Design Year total population and dividing the result by the Current Year total population.

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FORM C-2
ESTIMATION OF NON-PROGRAM DEMAND
COUNTY AND SERVICE SUMMARY DATA

BASIC DATA FOR THE COUNTY (or Service Area):

Size of County in square miles (from Form A-1): (H) _____

PERSONS AGE 60 AND OVER

Number of Persons Age 60 or Over:	Vehicle-Miles Available *	Vehicle-Miles Available Per Square Mile
(I) _____	(J) _____	(K) = (J)/(H) _____

PERSONS WITH MOBILITY LIMITATIONS

Number of Persons with Mobility Limitations Age 16-64	Vehicle-Miles Available *	Vehicle-Miles Available Per Square Mile
(L) _____	(M) _____	(N) = (M)/(H) _____

PERSONS RESIDING IN FAMILIES WITH INCOMES BELOW THE POVERTY LEVEL

Number of Persons, age 64 or less, residing in households with income below the poverty level	ADJUSTED Vehicle-Miles Available *	ADJUSTED Vehicle-Miles Available Per Square Mile
(O) _____	(P) _____	(Q) = (P)/(H) _____

* From Form A-5, columns (D), (E) and (F) totals or estimates of services to be provided.

FORM C-3a
ESTIMATION OF NON-PROGRAM DEMAND SERVICE FACTOR

PERSONS AGE 60 OR OVER

Service Factor:

Vehicle-Miles Available
Per Square Mile
Item (K) on Form C-2

	(K)						(R)
If less than 4,000		X	2.682	+	376	=	
If 4,000 to 7,000		X	13.693	-	43,668	=	(R)
If 7,000 to 10,000		X	50.727	-	302,908	=	(R)
If 10,000 to 12,000		X	113.010	-	925,740	=	(R)
If over 12,000	Use Exponential Method (See Appendix)						

SERVICE FACTOR (R)/1,000,000

FORM C-3b
ESTIMATION OF NON-PROGRAM DEMAND SERVICE FACTOR

PERSONS WITH MOBILITY LIMITATIONS

Service Factor:

Vehicle-Miles Available
Per Square Mile
Item (N) on Form C-2

	(N)						(T)
If less than 4,000		X	1.570	+	1,010	=	
If 4,000 to 7,000		X	5.823	-	16,003	=	(T)
If 7,000 to 10,000		X	17.700	-	99,140	=	(T)
If 10,000 to 12,000		X	42.590	-	348,040	=	(T)
If over 12,000	Use Exponential Method (See Appendix)						

SERVICE FACTOR	(T)/1,000,000	

FORM C-3c
ESTIMATION OF NON-PROGRAM DEMAND SERVICE FACTOR

PERSONS RESIDING IN FAMILIES BELOW POVERTY LEVEL

Service Factor:

Vehicle-Miles Available
Per Square Mile
Item (Q) on Form C-2

	(Q)						(V)
If less than 4,000		X	2.450	+	525	=	
If 4,000 to 7,000		X	8.828	-	24,988	=	(V)
If 7,000 to 10,000		X	45.647	-	282,717	=	(V)
If 10,000 to 12,000		X	99.520	-	821,450	=	(V)
If over 12,000	Use Exponential Method (See Appendix)						

SERVICE FACTOR (V)/1,000,000

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FORM C-4
COMPUTATION OF FUTURE PASSENGER DEMAND
NON-PROGRAM RELATED

POPULATION AGE 60 OR OVER

		From Form C-2 Population		From Form C-3a Service Factor		Forecast Ridership
1,200	X		X		=	

POPULATION WITH MOBILITY LIMITATIONS

		From Form C-2 Population		From Form C-3b Service Factor		Forecast Ridership
1,200	X		X		=	

POPULATION RESIDING IN FAMILIES WITH INCOME BELOW THE POVERTY LEVEL

		From Form C-2 Population		From Form C-3c Service Factor		Forecast Ridership
1,200	X		X		=	

TOTAL FORECAST NON-PROGRAM RIDERSHIP

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APPENDIX C: STAKEHOLDER PARTICIPATION

Results of Public Survey

Transit System Elements	Fast Service	Frequent Service	Good Facilities	Good Accessibility	Bicycle Accomodations	Nice Buses
Respondents	141	141	140	140	138	133
Non-Respondents	3	3	4	4	6	11
Total 1's	4	3	10	6	21	13
% of Respondents	3%	2%	7%	4%	15%	10%
Total 2's	5	2	7	4	15	6
% of Respondents	4%	1%	5%	3%	11%	5%
Total 3's	30	15	33	26	42	35
% of Respondents	21%	11%	24%	19%	30%	26%
Total 4's	44	38	39	42	27	50
% of Respondents	31%	27%	28%	30%	20%	38%
Total 5's	58	83	51	62	33	29
% of Respondents	41%	59%	36%	44%	24%	22%
Avg. of Respondents	4.0	4.4	3.8	4.1	3.3	3.6
Ratings: 1 (Not Important) - 5 (Very Important)						

Survey Source	Total	Springdale	Virgin	LaVerkin	Zion National Park	Unknown
Survey Respondents	144	11	46	24	32	31
Percent	100%	8%	32%	17%	22%	22%

Where Do You Live?	Total	Springdale	Virgin	LaVerkin	Toquerville	Rockville	Hurricane	Other
Survey Respondents	144	23	56	31	5	5	15	9
Percent	100%	16%	39%	22%	3%	3%	10%	6%

Where Do You Work?	Total	Springdale	Virgin	LaVerkin	Rockville	Hurricane	Zion National Park	Various	Not Given	Retired	Other
Survey Respondents	144	59	9	4	2	7	25	10	14	5	9
Percent	100%	41%	6%	3%	1%	5%	17%	7%	10%	3%	6%

Support of Transit Service	Total	No Response	Highly Opposed	Opposed	No Opinion	Supportive	Highly Supportive
Survey Respondents	144	2	2	1	2	28	109
Percent	100%	1%	1%	1%	1%	19%	76%

How Often Would You Ride Transit?	Total	No Response	Daily	2-3 Times/Wk	Weekly	Monthly
Survey Respondents	144	10	33	39	30	32
Percent	100%	7%	23%	27%	21%	22%

Where Would You Ride Transit?	Total	Work	School	Shopping Area	Recreation Area	Wouldn't Ride
Survey Respondents	144	75	7	66	68	7
Percent	100%	52%	5%	46%	47%	5%

When Would You Ride Transit?	Total	Morning	Evening	Mid-Day	Afternoon
Survey Respondents	144	101	87	67	3
Percent	100%	70%	60%	47%	2%

Transit Corridor Concerns	Total	No Response	"Yes" Respondents	"No" Repondents	Financial Concern	Maintain Scenic Nature	Parking Access	Traffic	Environmental	Safety	Need More Information	Schedule	Not Specified
Survey Respondents	144	8	39	97	6	8	1	12	2	0	2	2	6
Percentage	100%	6%	27%	67%	4%	6%	1%	8%	1%	0%	1%	1%	4%

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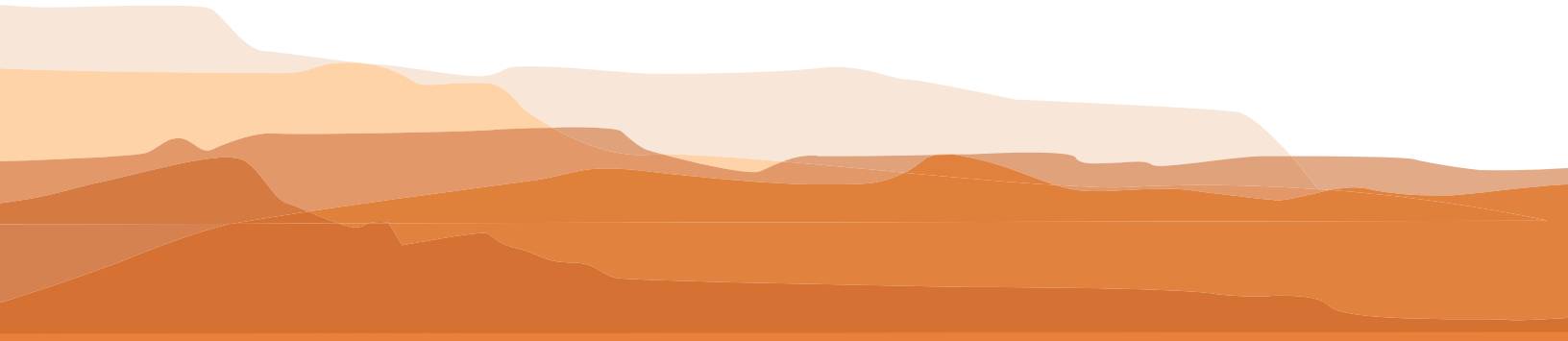

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