Spanish Valley

Transportation Plan

March 2008

Prepared for
Grand County

Prepared by

HORROCKS
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Spanish Valley Transportation Plan

Prepared for Grand County

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Executive Summary

Spanish Valley, located in Grand County south of Moab, UT, has been and continues to experience significant growth and development as a result of the recent popularity of tourist and recreational opportunities surrounding the Moab area. It is anticipated that this growth will continue into the foreseeable future. The increase in Valley growth over the last several years has local residents and government officials concerned about increased traffic congestion, delay, and safety issues on local streets; not to mention the continuing pressure the main regional roadway system is experiencing.

In efforts to remain ahead in accommodating the increased growth, as well as planning ahead for the future, Grand County officials are seeking to update and improve strategies that will provide for the existing and future transportation demands of Spanish Valley. The purpose of this transportation plan is to update the 1996 study and to provide short and long-range recommendations for roadway improvements that will help in accommodating anticipated future traffic projections.

In order to project future traffic volumes, a traffic analysis was performed for the Spanish Valley area in relation to existing and proposed future land uses within the valley as well as from nearby communities. The first analysis evaluated the existing conditions of the street network within the Spanish Valley. Proposed future development areas were then evaluated and added to the existing and projected traffic volumes to determine future traffic demands for the existing street network. Short and long-range recommendations for the street system were developed based on the results of the existing and future demand analyses. The final result being a transportation improvement program that lists short and long-range projects that would be necessary to accommodate the projected future traffic volumes and still maintain acceptable roadway and intersection levels of service. Table 1 illustrates existing and projected socio-economic data used in the analysis process:

Table 1: Socio-economic Data for Grand County and Spanish Valley Areas

	Population	Dwelling Units	Employment
Grand County 2005	8,826	3,678	5,446
Spanish Valley 2005	3,428	1,428	2,146
Grand County ~2015	9,439	4,290	5,912
Spanish Valley ~2015	3,706	1,685	2,320
Grand County ~2025	9,974	4,750	6,241
Spanish Valley ~2025	3,921	1,867	2,455

Source: Governor=s Office of Planning and Budget and Utah Population Estimates Committee
Method: See Appendix A

Table 2: Population Data for San Jaun County and Grand County

	Population 2005	Population 2015	Population 2025
San Jaun County	14,444	14,792	16,196
Grand County	8,826	9,439	9,974
Moab	4,807(54%)*	5,192 (55%)*	5,498 (55%)*
Spanish Valley	3,428(39%)*	3,706(39%)*	3,921(39)*

Source: Governor=s Office of Planning and Budget and Utah Population Estimates Committee
* (Percent of Grand County Population)

The analysis of the existing conditions indicates that recent minor roadway and intersection improvements have assisted in maintaining acceptable level of service conditions on the roadway system for the most part. There are some locations, primarily on the eastern and southern sides of the valley that experience slightly deteriorated traffic conditions during peak travel periods, but at the present time these conditions do not seem to persist for a long duration or cause severe problems. Presently Mill Creek Drive funding has been approved for roadway and intersection improvements between Murphy Lane and US-191.

Based on the anticipated growth and development, future conditions, both short-range (2015) and long-range (2025), indicate that the major travel corridor, Spanish Valley Drive, on the east side of the Valley may require improvements in order to accommodate projected traffic levels and still operate at acceptable level of service conditions. Existing east/west connections are also experiencing high traffic demand and may require improvement and/or other means will be needed to assist these roadways in keeping future traffic demand on Spanish Valley Drive to a minimum. Recommended safety and capacity improvements for the short and long-range time frames are as follows:

Short-range (2015) Recommended Improvements

- Improve Mill Creek Drive intersections at Murphy Lane and Spanish Valley Drive.
- Geometric improvements and/or signalization at the intersections of US-191/Spanish Valley Drive, Holyoak Lane/Mill Creek Drive, Spanish Valley Drive/Mill Creek Drive, Murphy Lane/Mill Creek Drive, US-191/Sage Avenue, and US-191/Spanish Trail Road.
- Construct a new east-west connector between Murphy Lane and Spanish Valley Drive between Spanish Valley Drive and US-191 near Beeman Road (see East-West Connector Alternatives section below).
- Work with the Utah Department of Transportation (UDOT) to extend the five-lane section of US-191 from Sage Avenue to Spanish Trail Road with additional turning lanes at proposed major intersections.
- Work with the UDOT on Access Management Plan for US-191.

Long-range (2025) Recommended Improvements

- Geometric intersection improvements and/or signalization at the intersections of Mill Creek Drive/Sand Flats Road and Spanish Valley Drive/Spanish Trail Road.
- Widen Spanish Trail Road to a 4-5 lane section. Perhaps, this could be designated as the a gateway into Spanish Valley and be developed in boulevard style with landscaped medians and side treatments, bike paths, and meandering sidewalks in conjunction with strict access control and protected turn bays at major intersections.
- Work with UDOT to extend the five-lane section of US-191 south from Spanish Trail Road to the County line, or beyond if development spills over into San Juan County, with additional turning lanes at proposed major intersections.
- Improve Spanish Valley Drive to a 3-4 lane cross section from Mill Creek Drive to the County line.

East-West Connector Alternatives

In addition to the improvements outlined above, the need for and benefit of additional east-west connection roadways was examined under each scenario. Included in this study was the previously proposed alignment between Murphy Lane and Spanish Valley Drive just north of Marshall Lane and a new proposed alignment from Spanish Valley Drive at Beeman Road extending northwest to US-191 approximately halfway between the Lemon Lane and Stocks Drive intersections (see Figure 5 and 6).

The results of the initial evaluation indicate that with existing and proposed future developments in southern Spanish Valley and San Juan County, the Spanish Valley Drive to US-191 at Beeman Road connection would be beneficial. Other possible east-west connections to be considered would include new northwest alignments from Spanish Valley Drive to US-191 via Starbuck Lane, and Spanish Valley Drive to US-191 via a western extension of Kerby Lane.

The results of the short-range analysis indicate with the short-range improvements implemented, there will still be some pockets of roadway and intersection specific congestion at peak travel periods throughout the area. Additional east-west connections would provide additional travel corridors that would assist in improving circulation, safety, and providing congestion relief for the existing corridors, especially Spanish Valley Drive south of Spanish Trail Road, where much new development is anticipated to occur. Signing Resource Road as a connection to US-191 and implementing at least one new east-west corridor in the short-range period will also help relieve traffic congestion on the northern Spanish Valley Drive and Mill Creek Drive roadways as it will assist in diverting traffic over to US-191 before it travels up the entire length of the corridor, thus delaying the need for widening Spanish Valley Drive. Implementing a new east-west connector near Beeman Road will also assist in reducing traffic volumes and congestion that would be anticipated to occur on Beeman Road as future development continues in southern Spanish Valley and northern San Juan County. Grand County has been working with UDOT in securing a permit for an additional US-191 access for this new corridor alignment, and construction designs for the access are underway.

The long-range analysis results indicates that with short and long-range improvements implemented roadway capacities and operational level of service conditions should be adequate to accommodate projected traffic volumes.

Non-motorized Transportation Recommendations

Rich with popular recreational areas for citizens and tourists alike, Grand County recognizes the need for citizens and tourists to have trails and pathways to provide areas for non-motorized transportation. Grand County and its citizens will continue to benefit from non-motorized transportation as the Grand County Non-Motorized Trail Mix Committee works closely with Federal, State and Local governments in preserving existing trails and developing new trails and pathways throughout the Moab and Spanish Valley areas. Trails and pathways may also assist in helping reduce traffic congestion throughout the County as non-motorized transportation will be more accessible for citizens and tourists daily and recreational activities. Major roadways throughout the County that would benefit greatly from having adjacent trails include Spanish Valley Drive, US-191, Spanish Trail Road, Murphy Lane, and Mill Creek Drive (see Side Treatment cross section in Figure 11). Existing and proposed trails can be found in The Grand County Non-Motorized Trails Master Plan originally adopted May 17, 2005 available online through Grand County Planning and Engineering. Figure 9, Figure 9A and Figure 9B illustrate some of the existing and proposed trails. The Trails Master Plan is continually being updated as proposed trails and pathways change to existing, and additional routes are formulated.

Typical Street Section

Closely associated with roadway functional classification are the typical sections for each classification. The typical street sections show the right-of-way (ROW) for each classification along with the different street elements that are contained within the ROW including: lane configurations, lane widths and side treatments with curb and gutter, parking strips and sidewalks and/or trails. It is always a challenge to develop a typical section that provides enough width to safely accommodate vehicular and non-motorized needs, yet is as narrow as possible to minimize the impacts associated with ROW acquisition, construction, and maintenance. Cross sections are shown in Figure 10 and Figure 11.

It should be noted that the typical sections presented in the transportation plan show the desirable standards for each roadway functional classification that should be followed whenever possible. However, there may be locations or situations where implementing the typical sections could cause undo hardship on County or adjacent property owner. As such, Grand County may need to modify the typical sections at these locations. This decision should be made on a case-by-case basis as recommended by County and Fire Department staffs.

Access Management

Roadways are intended to function effectively and safely in moving people and goods from one place to another. Maintaining functionality and safety can be a direct result of effective access management policies and guidelines that regulate the location, spacing and number of local access points and intersections along main travel corridors. There are several arterial and collector roadways in Spanish Valley that could benefit from some form of access management

including US-191, Spanish Trail Road, Spanish Valley Drive, Murphy Lane and Mill Creek Drive.

In order to help preserve the capacity of existing and future corridors, UDOT and Grand County have prepared specific access control plans for the Spanish Valley principal arterial and collector roadway corridors in efforts to maintain existing and prepare for future capacity demands. An example of access management would be limiting accesses on US-191 between Lemon Lane and Stocks Drive, possibly by a frontage road system that would have limited direct connections onto US-191. This type of access management assists in traffic safety and assists in corridor operational conditions as potential traffic conflicts for traffic entering and exiting access points are reduced.

Presently UDOT has authorized a complete study for the US-191 corridor that will evaluate potential frontage roads, moving and/or combining existing access locations, and other forms of access control management. This study is anticipated to begin in 2008, with UDOT working closely with Grand County, Moab City, and property owners along the corridor in evaluating solutions that will be beneficial to all Spanish Valley residents and visitors. Grand County should update the transportation plan accordingly when the UDOT study is completed.

Corridor Preservation

Corridor preservation is an important transportation planning tool that agencies should use and apply to all future transportation corridors. There are several new transportation facilities that have been identified in the master plan as being needed over the next several years (see Figure 5). In planning for these future facilities, corridor preservation techniques should be employed. The main purposes of corridor preservation are to:

- preserve the viability of future options
- reduce the cost of these options
- minimize environmental and socio-economic impacts of future implementation

Corridor preservation seeks to preserve the right-of-way needed for future transportation facilities and prevent development which might be incompatible with these facilities. This is primarily accomplished by the community's ability to apply land use controls such as zoning and approval of developments. Adoption of the transportation plan by Grand County is a commitment to citizens and future leaders in the community that the identified future corridors will be the ultimate location for transportation facilities.

Perhaps, the most important elements of corridor preservation are ensuring that the corridors are preserved in the correct location and that they meet the applicable design and right-of-way standards for the type of facility being preserved. As the transportation plan does not define the exact alignment of each future corridor, it becomes the responsibility of the County to make sure that the corridors are correctly preserved. This will have to be accomplished through the engineering and planning reviews done within the County as development and annexation requests are approved that involve properties within or adjacent to the future corridors.

Traffic Studies
It is important, as Grand County continues to develop, that care is taken in evaluating roadway and intersection impacts that may occur with significant growth anticipated throughout the valley. This can be accomplished by requiring developers to submit a Traffic Impact Study for any development that is anticipated to generate in excess of 50 peak hour trips. Traffic Impact Studies will allow the County to determine site specific impacts of a development area so that appropriate measures can be taken to help minimize traffic impacts on the surrounding transportation system.

Planning Level Cost Estimates
In order to assist in the planning process and to act as guidelines for the implementation of the above outlined recommended roadway improvements, planning level cost estimates for the major recommended improvements under both the short and long term scenarios have been prepared. Short-range improvements are estimated to cost approximately $14.3 million and long-range approximately $38.1 million, these estimates do not include inflation. As many of the improvements involve UDOT roads, they may be eligible for state and/or federal funding, thereby reducing the cost to Grand County. Details of the cost estimates and assumptions used in preparing them are explained in the Recommendations section of the report.

Impact Fees
To assist in the costs of roadway improvements required as a result of new development, impact fees can be assessed. These fees are designed so that developers pay a fair share of the cost of necessary improvements due to impacts on the existing transportation system caused by their development. They cannot be used to fund improvements needed for deficient or inadequacies in the existing street system. An example of an impact fee would be requiring the developer to contribute toward the cost of installing a traffic signal at an intersection through which traffic associated with the developers project travels. The development, collection, and use of impact fees are governed by state law and must meet the guidelines set forth under the Impact Fees Act. It is recommended that current impact fees be re-evaluated as necessary through any updates to the Grand County Land Use Code or through traffic impact studies required by the County for new development areas as impact fees are needed to assist in keeping the viability of the transportation system in Grand County.

Potential Funding Sources
Funding sources for transportation are essential if Grand County road improvements and trail projects are to be built. Presently there are three main sources of revenue available to Grand County. These funding sources include: (1) federal funds from Surface Transportation Programs (STP); (2) Class B and C Funds from state highway user revenues; and (3) local general funds.

Miscellaneous Recommendations
A master transportation plan is not intended to be a standalone document, but rather should be a working document that functions as a part of the community's General Plan. As improvements or changes are made in the community and in other areas of the community's General Plan, the

transportation plan should be consulted and incorporated into the decision making process and updated as necessary.

With the unpredictable nature of growth and development, especially in tourist and recreational-based areas like Moab and Spanish Valley, developing accurate land use and traffic projections for twenty years or more into the future is difficult. Even slight changes from initial assumptions and/or land use could dramatically change the results. Therefore, it is important that as time passes and conditions change, the master transportation plan be continually evaluated and updated to reflect the changing conditions in order to be compatible with and successful in addressing the needs of the community.

Introduction

Spanish Valley is located in southeastern Grand County, immediately south of Moab, Utah. With a favorable climate and numerous recreational activities in the area, such as the Colorado River, Arches National Park, Canyonlands National Park, Manti La-Sal National Forest, and Slickrock Bike and Jeep Trail, Moab, and more specifically Spanish Valley, has experienced unprecedented growth over the last several years. Indications are that this growth will continue for the foreseeable future. This continued growth has local residents and government officials concerned about the existing roadway system being capable of meeting existing and future traffic demand, not to mention safety issues on local streets.

In an effort to accommodate the increased growth and to continue future plans, Grand County officials are seeking to update this Master Plan to help identify existing deficiencies and needed infrastructure improvements that will assist in accommodating existing traffic, as well as meeting future transportation demands of Spanish Valley for many years to come. The purpose of this transportation plan is to update the previous 1996 transportation study performed for the Spanish Valley area and provide short and long term recommendations for roadway and/or intersection improvements that will accommodate existing and anticipated future transportation demands at acceptable level of service conditions.

The remainder of this transportation plan update discusses the existing roadway and traffic conditions in Spanish Valley, the development of short and long term analysis models, projected future traffic conditions, and improvement alternatives to meet the future traffic demands throughout the Spanish Valley area. Non-motorized travel alternatives and updated access management guidelines for the principal arterial and collector travel corridors in the study area are also discussed.

Existing Conditions

Spanish Valley is considered a rural community, but continues to experience increased growth and urbanization. The following paragraphs document the street system, land uses, and traffic volumes, patterns and conditions that presently exist within the Spanish Valley study area.

Roadway Network

The existing roadway network consists primarily of local and collector streets. The main arterial roadway through the area, US-191, runs across Spanish Valley from the southeast to the northwest. Figure 1 shows the Spanish Valley street system with the major roadways identified by classification type. Table 6 illustrate the results of the existing AM and PM operational analysis of the intersections counted as part of this study. The principal travel corridors and, consequently, those receiving the most attention in the study are described below.

US-191 As mentioned earlier, this route is the major roadway facility through Spanish Valley and carries the greatest amount of traffic. Not only does it serve local traffic, but is the principal travel route for tourists and other motorists traveling through southeast Utah. From approximately Sage Avenue into Moab on the north end of Spanish Valley, US-191 is a five-lane road with two through travel lanes in each direction and a center median two-way left-turn lane (TWLTL). Between Sage Avenue and Spanish Trail Road, US-191 is a three-lane roadway with one lane northbound and two lanes southbound. At Spanish Trail Road, it transitions to a two-lane road and continues as such throughout the southern end of the valley on into San Juan County.

Generally, the roadway is unimproved without curb and gutter, but shoulders are consistently provided. Currently, there are no traffic signals or other control measures as US-191 is a free-flow facility along its length through Spanish Valley.

Spanish Valley Drive This route is the primary north-south collector roadway that runs along the length of Spanish Valley. It lies east of and generally parallel to US-191. Spanish Valley Drive is a two-lane roadway, no curb/gutter/or sidewalk, with approximately 26 feet of pavement along its entire length. There is a four-way stop sign controlled intersection at Spanish Trail Road. Presently the Spanish Valley Drive alignment terminates by merging into Mill Creek Drive near the north end of the valley.

Recently Mill Creek Drive has been funded for improvements, including: realignment and reconstruction between U.S. 191 and Murphy Lane, intersection improvements, and bridge replacement. These changes will improve pedestrian and bicyclist conditions, and improve overall safety conditions for Mill Creek Drive, Spanish Valley Drive, and other roadways in the northern Spanish Valley area.

Murphy Lane This route is a major north-south collector roadway that runs along the length of Spanish Valley. It lies along the eastern bench areas of the valley and, like Spanish Valley

Drive, is a two-lane roadway, no curb/gutter/ or sidewalk. Recent improvements to correct sharp horizontal and vertical curves deficiencies on the roadway has improved both safety and roadway capacity on Murphy Lane. There is a newly constructed roundabout at the intersection with Spanish Trail Road. Murphy Lane terminates in a stop-controlled intersection at Mill Creek Drive near the north end of the valley, just north of the Spanish Valley Drive/ Mill Creek Drive intersection. With recent funding for Mill Creek Drive improvements approved, Grand County is in the process of evaluating intersection improvements on Mill Creek Drive as well. Presently it is anticipated that the Murphy Lane intersection at Mill Creek Drive may be reconstructed to a roundabout configuration.

Spanish Trail Road This route is a major east-west collector roadway toward the southern end of Spanish Valley. It begins as a stop sign controlled T-intersection at US-191 and terminates at Murphy Lane with a roundabout intersection. There is a four-way stop sign controlled intersection at Spanish Valley Drive. At the present time, Spanish Trail Road is a two-lane roadway, no curb/gutter/ or sidewalk, with approximately 26 feet of pavement.

Holyoak Lane This road functions as a minor collector. However, limited pavement and right of way width, and lack of access control cause traffic problems. Construction of improvements on Mill Creek Drive including intersection realignment with US-191 is anticipated to relieve many of these traffic problems.

Sand Flats Road This road functions as a minor collector. However, limited pavement, steep terrain, and areas of new development occurring and/or planned on the mesa ridge, traffic impacts in this area will continue to manifest. Enforcing requirements for developers to submit traffic impact studies for projects along Sand Flats Road will assist Grand County in monitoring the roadway and Mill Creek Drive intersection for implementing improvements as they become necessary.

Figure 1. Roadway Classification

Mill Creek Drive As both Spanish Valley Drive and Murphy Lane terminate with Mill Creek Drive, this two-lane roadway, no curb/gutter/or sidewalk, functions as a major north-south collector roadway in the north-central part of Spanish Valley carrying traffic from Spanish Valley Drive and Murphy Lane on into Moab. It begins as a stop-controlled T-intersection at US-191 and terminates in a stop-controlled T-intersection at 400 East in Moab. Other than the all-way stop control where Murphy Lane traffic merges with the Mill Creek Drive alignment, it is a free flowing street between US-191 and 400 East.

Presently Mill Creek Drive funding has been approved for roadway and intersection improvements between Murphy Lane and US-191. The present study for these roadway improvements include; a roundabout at Murphy Lane, bridge replacement (including pedestrian walkway), intersection improvements, and road realignment. Improvements on Mill Creek Drive will improve pedestrian and bicyclist conditions, and improve overall safety conditions for Mill Creek Drive, Spanish Valley Drive, and other roadways in the northern Spanish Valley area. The construction of the roadway improvements is anticipated to begin within the next five years.

Land Use

Existing land activity levels reflect the rural suburban character of Spanish Valley. The Valley's residential areas lie primarily along Pack Creek though significant residential development continues to occur in the eastern bench areas as well as to the south. Residents in and to the south of the Valley are heavily dependent upon Moab City for shopping and other services. This results in most travel demand occurring between the residential areas and Moab. Current estimates indicate there are approximately 3,623 residential dwelling units and approximately 300,000 square feet of commercial space, mostly small industrial buildings centered around the US-191 corridor. Office space consists primarily of the Federal office building located between US-191 and Spanish Valley Drive north of San Jose Road.

Traffic Volumes and Conditions

Existing travel patterns in Spanish Valley are primarily along the three north-south routes of US-191, Spanish Valley Drive, and Murphy Lane. Closer to Moab City, both Spanish Valley Drive and Murphy Lane merge into Mill Creek Drive which continues to the downtown area. The primary east/west roadway is Spanish Trail Road. Existing traffic counts were collected during the AM and PM peak traffic periods from various intersections throughout the Valley during March 2005 and were adjusted to reflect UDOT's historical seasonal traffic volumes from approximately May through July. Daily counts were also collected and adjusted for both the Spanish Valley Drive and US-191 roadways at the southern end of the Valley. Typically the PM peak period of trips accounts for approximately 10% of the daily trips and is used for general roadway design capacities. See Appendix B for collected AM, PM, and daily traffic counts performed.

Through the evaluation of the existing traffic counts collected and adjusting them to reflect higher seasonal traffic volumes it was found that a few areas on Mill Creek Drive were experiencing decreases in traffic volumes compared with the 1995 volumes in the previous study.

This decrease in traffic on Mill Creek Drive is a reflection of traffic patterns shifting due to the increased use and decreased operational conditions on Mill Creek Drive and existing intersections on the roadway. The existing Y intersection on Mill Creek Drive at Spanish Valley Drive is becoming more difficult to travel, traffic is shifting to make the easier right-turn onto Mill Creek Drive and then shifting over to Holyoak Lane to gain access to US-191 via Sage Avenue. This change in traffic patterns is not only creating operational and safety issues on Mill Creek Drive, but is also decreasing the capacity and safety of the residential area surrounding Holyoak Lane and Sage Avenue. With Mill Creek Drive being evaluated for improvements, including the possible construction of a roundabout at Murphy Lane, bridge replacement across the Pack Creek river, and the now approved improvements of Mill Creek Drive and all of the intersections on Mill Creek Drive between Murphy Lane and US-191, traffic patterns are anticipated to shift back to using Mill Creek Drive to access US-191, thus improving the poor existing operational conditions on Holyoak Lane and Sage Avenue.

Level of Service and Capacity Definitions

Level of Service (LOS) is a term used by the *Highway Capacity Manual* (HCM) to describe the traffic operations of an intersection and/or roadway, based on congestion and delay. Level of Service is generally defined in ranges from LOS A (almost no congestion or delay, traffic moving freely and unimpeded) to LOS F (traffic demand is above capacity and the roadway experiences long queues and travel delay). LOS C/D is generally considered acceptable for rural/urbanized areas. LOS E is the threshold when the roadway/facility reaches capacity and traffic movement is slow and any disturbance/incident can cause long queues and increased travel delay.

For this study, it is important to understand how Level of Service conditions work for intersections and roadways. At an intersection, Level of Service is based on delay time per vehicle. At signalized intersections the delay per vehicle is based on the control delay of the traffic signal, and at unsignalized (two-way or all-way stop controlled) intersections the delay is based on vehicle time spent waiting at the intersection in order to the make the desired movement. Again, both at signalized and unsignalized intersections, LOS A pertains to little to no congestion and/or delay, and LOS F being that traffic demand has exceeded the capacity of the intersection, with vehicles moving very slowly and/or stopped and where any disturbance or incident can cause long queues in the roadway and/or intersection, increasing travel delay. Tables 3 and 4 illustrate typical LOS conditions for the unsignalized and signalized intersection.

Table 3: Unsignalized Intersection Level of Service Conditions

LOS	Stop Delay per Vehicle (s)
A	# 10
B	> 10 and # 15

C	> 15 and # 25
D	> 25 and # 35
E	> 35 and # 50
F	> 50

Source: *Highway Capacity Manual,* Transportation Research Board, National Research Council, 2000.

Table 4: Signalized Intersection Level of Service Conditions

LOS	Stop Delay per Vehicle (s)
A	# 10
B	> 10 and # 20
C	> 20 and # 35
D	> 35 and # 55
E	> 55 and # 80
F	> 80

Source: *Highway Capacity Manual,* Transportation Research Board, National Research Council, 2000.

For roadways, LOS conditions are typically calculated using capacities/demand values. Depending upon the type of roadway; ie freeway, two-lane or multi-lane highway, or urban arterial, and location; urban or rural, LOS is defined through the capacity of the roadway (vehicles per day or per lane per hour) and/or percentage of time-spent-following of vehicles in queues trying to pass slower moving vehicles. Again, LOS E, as mentioned previously, being the threshold when the roadway reaches full capacity. Table 5 illustrates Atypical@ Daily Traffic Capacity Estimates for LOS C conditions for various types of roadways.

Table 5: Level of Service (LOS) C ATypical@ Daily Traffic Capacity Estimates

Suburban				Rural				Urban / CBD (Central Business District)			
Travel Lanes	Freeway	Arterial	Collector	Travel Lanes	Freeway	Arterial	Collector	Travel Lanes	Freeway	Arterial	Collector
2	NA	10,000	9,000	2	NA	12,000	7,500	2	NA	8,500	7,500
3	NA	11,500	10,000	3	NA	13,000	8,500	3	NA	12,000	10,500
4	60,000	25,000	19,000	4	50,000	20,500	16,000	4	63,000	22,000	16,000
5	NA	26,500	21,500	5	NA	22,000	18,000	5	NA	28,000	22,500
6	95,000	35,000	NA	6	72,000	30,500	NA	6	100,000	35,000	NA
7	NA	40,000	NA	7	NA	33,000	NA	7	NA	42,000	NA
8	126,000	NA	NA	8	NA	NA	NA	8	133,000	NA	NA

Source: Horrocks Engineers.

In general, the roadway network in Spanish Valley currently experiences relatively moderate volumes of traffic with corresponding adequate levels of service as shown in Figure 2. Some problems exist at unsignalized intersections with US-191 during the PM peak hour period but they are short in duration and cause no serious problems. Tables 6 and 7 illustrate the results of the existing AM and PM operational analysis of the intersections counted as part of this study. Roadway geometry at locations on Murphy Lane with sharp horizontal and vertical curves is also a problem with restricted sight distance and its associated safety concerns.

Table 6: Existing AM Peak Hour LOS Operational Analysis Summary

Intersection	Existing AM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	9.2*	A
Mill Creek Drive/Murphy Lane	10.6*	B
Mill Creek Drive/Holyoak Lane	9.8*	A

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.

Table 7: Existing PM Peak Hour LOS Operational Analysis Summary

Intersection	Existing PM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	10.5*	B
Mill Creek Drive/Murphy Lane	11.1*	B
Mill Creek Drive/Holyoak Lane	12.1*	B
Mill Creek Drive/Spanish Valley	9.2*	A
Mill Creek Drive/US-191	15.5*	C
US-191/Sage Avenue	14.1*	B
Sage Avenue/Holyoak Lane	8.3*	A
US-191/Spanish Trail Road	12.3*	B
Spanish Trail Road/Spanish Valley Drive	8.3*	A
Spanish Trail Road/East Bench Road	(roundabout v/c 0.07)	A
Spanish Valley Drive/Beeman Road	9.1*	A
US-191/Stocks Drive	10.7*	B

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.
** Delay and LOS for a roundabout is based on volume to capacity (v/c) ratios.

US-191 Accident Statistics

Accident data was collected on US-191 north of Moab City to the San Juan County line between the years 2003 and 2005 from UDOT. UDOT classifies accident data by the type of accident (i.e. rear end, side swipe, head on collision, turning opposite directions, etc.) and severity of the accident (i.e. no injury, possible injury, bruises and abrasions, broken bones or bleeding wounds, and fatal). Combining this data by the type and severity, along with the functional classification of the roadway and the length, UDOT calculates an average rate and average severity rate for the accidents and compares it to an expected rate. Expected rates are typically based on statewide averages for similar type roadways and the vehicle miles traveled on each type of roadway.

From the 2003 through 2005 accident data compiled into an Operational Safety Report (OSR) by UDOT, there was only one fatal accident on US-191 from 200 South in Moab City to the San Juan County Line. The average accident rate was 1.08 and the average severity rate was 1.62 for the years 2003 through 2005. The expected accident rate for US-191 is 1.73 and the expected severity rate is 1.67. The three most common types of accidents include rear end at 32 percent, vehicle approaching from right turning left in front of vehicle at 11 percent, and single vehicle accidents at 36 percent. An example of a single vehicle accident would include running off the road hitting a post or a guard rail. The 2003 through 2005 accident data from UDOT may be found in the Appendix C.

Figure 2. Existing (2005) Average Traffic Volumes and LOS

Traffic Projections

The intensity of travel activity is a function of the type and location of personal and economic activities, the amount of traffic which they generate, and the spatial distribution of those trips. Each comprises a distinct area of the traffic forecast process and the following discussion presents a broad description of each.

Spanish Valley combines the elements of a rural suburban area with seasonal recreation activity and thus, has varying levels of development types depending upon the location of geographical features and travel corridors. Existing and future estimates of land development were collected from County Staff and from County zoning and parcel maps. The main categories of land use common to Spanish Valley and surrounding communities include:

- Residential dwelling units - comprising single family detached units, multi-family townhouses/condominiums, multi-family apartments, and senior citizen housing.
- Office floor space - which is a reasonable surrogate for employment activity and comprises both general businesses and professional offices.
- Commercial/retail floor space - which is a reasonable surrogate for shopping opportunities and comprises convenience stores, drive-thru facilities, community shopping centers, regional shopping malls, and hotel rooms.
- Industrial floor space - which includes warehouses and industrial manufacturing facilities.
- Schools and Churches - which includes schools by number of students and church property.

Trip generation is the number of trips which are produced by or attracted to a particular facility or area, and is a function of the type of development as well as its intensity. In discussing trip generation, it is crucial to maintain a consistent understanding of trip terminology. In conventional transportation planning terminology, a "trip" is defined as a one-way movement from one place to another, and ought not to be confused with a "round trip" which actually consists of two or more trips to move from the origin to the destination and back. Trip generation, then, is really a discussion of the number of "trip ends" which occur at a given location.

The primary source of trip generation data is the Institute of Transportation Engineers (ITE) Trip Generation Manual (Seventh Edition). This is a compendium of studies from across the nation which indicates trip generation rates for various land uses for daily as well as peak travel periods. It has been generally accepted as the most reliable source of trip generation rates, probably because of the large sample sizes and range of developments studied. However, trip rates were adjusted from the ITE values for the single family residential dwelling units based on local studies and reflective of the larger household family sizes in Utah than across the nation. A trip rate of 12 trips per single family household per day was used in the traffic projections.

"Thru" trips are those vehicle trips which travel across the study area, having neither an origination nor destination within the study area. While Athru@ trips are generally determined

by traffic surveys which were not available for this study, an estimate of these trips has been made based on general traffic patterns and existing traffic counts.

Based on Utah traffic growth trends in Spanish Valley and surrounding areas, overall vehicle mileage is growing at an annual rate of about 2%. Since the short-range growth period approximates 10 years, a compounded growth of Athru@ trips has been estimated at 60%. For build-out conditions, growth of Athru@ trips is estimated at 85%. It is projected that the percentage of Athru@ trips on US-191 will decrease from about 55% to about 40% for the build-out condition. With local growth and increased access through improved alternative routes, US-191 will hold more local trips than regional Athru@ trips.

Upon the establishment of traffic generating land use projections, it is necessary to develop the corresponding relationship to projected vehicle trips along the roadway network. The projected volumes can then be matched to the corresponding capacities of the roadway network to develop levels of traffic congestion, which then indicate the relative comfort of driving, otherwise referred to as levels of service.

As land uses develop, the need to determine the functional classification of the roadway system arises. The following table serves as a guide to help determine the roadway classification which corresponds to cross sections shown in Figures 10 and 11.

Table 8: Functional Classification based on Average Daily Traffic(ADT).

Functional Classification	Average Daily Trips
Arterial	> 17,000 ADT
Major Collector	8,001 - 17,000 ADT
Minor Collector	2,001 - 8,000 ADT
Local Road	0 - 2,000 ADT

Future Conditions

While Spanish Valley has experienced significant growth in the past few years, there remains the potential for further substantial growth. This growth will occur from projects both already committed to or approved and from development of the remaining sizable quantities of vacant land throughout the area. The large growth in land development and trips translates into significant increases of traffic volumes along many of the roadways throughout the Valley.

The following paragraphs document the land uses and traffic volumes, patterns and conditions that are projected to exist within the Spanish Valley study area over the next twenty years. It should be noted that growth projections are dependent upon a time frame, although a precise schedule for projected land development is difficult and is dependent upon a number of non-traffic related factors. Nevertheless, for the purposes of this study, two future scenarios are assumed: a short-range scenario, 2015, which reflects development of vacant land throughout the study area over the next ten years; and a long-range scenario, 2025, which reflects the development of vacant land both in Spanish Valley and south into San Juan County. The ultimate build-out scenario is not expected to be reached for at least thirty years, if not longer.

Land Use

Projection of future land use activity was determined from the Governor Office of Planning and Budget projections. All projected development of vacant land assumes current zoning.

Projected land uses and trip generation for the short-range (2015) and long-range (2025) scenarios is summarized in Tables 8 and 9. Residential dwelling units are expected to grow to a total of approximately 4,290 units in the short-range period and to a total of approximately 4,750 units in the long-range period. Commercial land activity is projected to increase substantially with approximately 500,000 total square feet in the short-range and more than 1,000,000 total square feet under long-range conditions.

As mentioned earlier, it is important to note that build-out is not time dependent and build-out levels may take much longer to reach than estimated and possibly never being reached at all. Much depends on the future growth in recreational popularity and the economic stability of the area.

Table 9: Projected Short-range (2015) New Development Trip Generation Summary

2015 % Build-Out	Land Use	ITE Code	Variable	# Units Built	Total # Units	Daily Trips	AM Peak Hour Trips						PM Peak Hour Trips					
							Total	In		Out			Total	In		Out		
10%	Single Family Detached Housing	210	House	1	8	10	10	25%	3	75%	7		1	63%	1	37%	1	
10%	Single Family Detached Housing	210	House	3	26	31	11	25%	3	75%	8		4	63%	3	37%	1	
20%	Single Family Detached Housing	210	House	6	30	72	14	25%	4	75%	10		9	63%	5	37%	3	
20%	Single Family Detached Housing	210	House	5	23	55	13	25%	4	75%	9		7	63%	4	37%	2	
	Subtotal			**14**	**87**	**168**	**48**						**21**					
10%	Single Family Detached Housing (SITLA)	210	House	26	257	308	27	25%	7	75%	21		32	63%	20	37%	12	
10%	Townhomes/Condominiums (SITLA)	230	Unit	22	220	264	15	17%	3	83%	13		17	67%	12	33%	6	
10%	Single Family Detached Housing (ZINN & CMNRS)	211	House	6	55	66	13	25%	4	75%	10		8	63%	5	37%	3	
10%	Townhomes/Condominiums (ZINN & CMNRS)	230	Unit	21	208	250	15	17%	3	83%	12		17	67%	11	33%	5	
	Subtotal			**74**	**740**	**888**	**71**						**73**					
20%	Single Family Detached Housing	210	House	3	16	38	12	25%	3	75%	9		5	63%	3	37%	2	
40%	Single Family Detached Housing	210	House	6	15	72	14	25%	4	75%	10		9	63%	5	37%	3	
40%	Single Family Detached Housing	210	House	10	25	120	16	25%	5	75%	12		13	63%	9	37%	5	
40%	Single Family Detached Housing	210	House	6	14	67	13	25%	4	75%	10		8	63%	5	37%	3	
40%	Single Family Detached Housing	210	House	8	20	96	15	25%	4	75%	11		11	63%	7	37%	4	
40%	Single Family Detached Housing	210	House	6	15	72	14	25%	4	75%	10		9	63%	5	37%	3	
	Subtotal			**39**	**105**	**466**	**84**						**54**					
From TIS	Johnson's Up on Top (2015 Build-out)	210	House	40	40	480	37	25%	10	75%	28		47	63%	30	37%	17	
	Condominiums	230	Unit	25	25	300	17	17%	3	83%	14		19	67%	13	33%	6	
	Wilderness Lodges	HVS Int'r	Unit	73	73	591	50	67%	34	33%	17		59	41%	24	59%	35	
	Subtotal			**138**	**138**	**1371**	**105**						**125**					
	2015 Build-Out TOTAL			**265**	**1070**	**2893**	**307**						**274**					

Table 10: Projected Long-range (2025) New Development Trip Generation Summary

2025 % Build-Out	Land Use	ITE Code	Variable	# Units Built	Total # Units	Daily Trips	AM Peak Hour Trips					PM Peak Hour Trips				
							Total	In		Out		Total	In		Out	
30%	Single Family Detached Housing	210	House	2	8	29	11	25%	3	75%	8	4	63%	2	37%	1
30%	Single Family Detached Housing	210	House	8	26	94	15	25%	4	75%	11	11	63%	7	37%	4
40%	Single Family Detached Housing	210	House	12	30	144	18	25%	5	75%	13	16	63%	10	37%	6
40%	Single Family Detached Housing	210	House	9	23	110	16	25%	4	75%	12	13	63%	8	37%	5
	Subtotal			**31**	**87**	**377**	**60**					**43**				
20%	Single Family Detached Housing (SITLA)	210	House	51	257	617	45	25%	12	75%	34	59	63%	37	37%	22
20%	Townhomes/Condominiums (SITLA)	230	Unit	44	220	528	27	17%	5	83%	22	31	67%	21	33%	10
20%	Single Family Detached Housing (ZINN & CMNRS)	211	House	11	55	132	17	25%	5	75%	13	15	63%	9	37%	5
20%	Townhomes/Condominiums (ZINN & CMNRS)	230	Unit	42	208	499	26	17%	5	83%	21	29	67%	20	33%	10
	Subtotal			**148**	**740**	**1776**	**115**					**134**				
40%	Single Family Detached Housing	210	House	6	16	77	14	25%	4	75%	10	9	63%	6	37%	3
50%	Single Family Detached Housing	210	House	8	15	90	15	25%	4	75%	11	10	63%	7	37%	4
50%	Single Family Detached Housing	210	House	13	25	150	18	25%	5	75%	14	16	63%	10	37%	6
50%	Single Family Detached Housing	210	House	7	14	84	14	25%	4	75%	11	10	63%	6	37%	4
50%	Single Family Detached Housing	210	House	10	20	120	16	25%	5	75%	12	13	63%	9	37%	5
50%	Single Family Detached Housing	210	House	8	15	90	15	25%	4	75%	11	10	63%	7	37%	4
	Subtotal			**51**	**105**	**611**	**92**					**70**				
From TIS	Johnson's Up on Top (2015 Build-out)	210	House	40	40	480	37	25%	10	75%	28	47	63%	30	37%	17
	Condominiums	230	Unit	25	25	300	17	17%	3	83%	14	19	67%	13	33%	6
	Wilderness Lodges	HVS Int'nl	Unit	73	73	591	50	67%	34	33%	17	59	41%	24	59%	35
	Subtotal			**138**	**138**	**1371**	**105**					**125**				
From TIS	Johnson's Up on Top (2025 Build-out)	210	House	20	88	240	23	25%	6	75%	18	25	63%	16	37%	9
	Condominiums	230	Unit	40	120	480	25	17%	5	83%	21	28	67%	19	33%	9
	Wilderness Lodges	HVS Int'nl	Unit	55	180	446	38	67%	26	33%	12	45	41%	18	59%	26
	Subtotal			**115**	**388**	**1166**	**86**					**98**				
2025	SITLA Redevelopment of the San Juan County Airport															
% Build-Out	~309 Acres total (assume 55% is Roadway/Parking)															
15%	Condominium	230	Unit	22	148	179	15	17%	3	83%	13	17	67%	12	33%	6
15%	Single Family Detached Housing	210	House	15	100	182	20	25%	5	75%	15	19	63%	12	37%	7
100%	Gas Station (Truck Stop)	853	Pumps	12	12	6511	206	50%	104	50%	103	231	50%	115	50%	115
100%	Restaurant	934	1,000 SF GLA	3	3	1488	159	51%	82	49%	78	104	52%	54	48%	50
	Subtotal			**52**	**263**	**8360**	**401**					**371**				
	2025 Residentail Build-Out TOTAL			**483**	**1458**	**5300**	**458**					**140**				
	2025 Build-Out TOTAL with San Juan County			**536**	**1721**	**13660**	**858**					**841**				

Short-range (2015)

This scenario assumes only minor capacity and safety related improvements such as signalized intersections with no significant capacity-related improvements. While the overall street system is expected to accommodate the short-range traffic demand, specific roadway sections along Mill Creek Drive and Murphy Lane as well as major intersections on US-191 are projected to begin experiencing poor and/or failing levels of service, as can be seen in Figure 3. Tables 10 and 11 illustrate the short-range analysis results for the study intersections under both AM and PM peak hour periods.

Table 11: Short-range (2015) AM Peak Hour LOS Operational Analysis Summary

Intersection	2015 AM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	9.7*	A
Mill Creek Drive/Murphy Lane	10.7*	B
Mill Creek Drive/Holyoak Lane	11.5*	B

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.

Table 12: Short-range (2015) PM Peak Hour LOS Operational Analysis Summary

Intersection	2015 PM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	10.4*	B
Mill Creek Drive/Murphy Lane	12.4*	B
Mill Creek Drive/Holyoak Lane	13.8*	B
Mill Creek Drive/Spanish Valley	11.6*	B
Mill Creek Drive/US-191	15.6*	C
US-191/Sage Avenue	24.0*	C
Sage Avenue/Holyoak Lane	9.1*	A
US-191/Spanish Trail Road	38.9*	E
Spanish Trail Road/Spanish Valley Drive	12.3*	B
Spanish Trail Road/East Bench Road	(roundabout v/c 0.15)**	A
Spanish Valley Drive/Beeman Road	10.9*	B
US-191/Stocks Drive	14.3*	B

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.
** Delay and LOS for a roundabout is based on volume to capacity (v/c) ratios.

Figure 3. Short-range (2015) Average Daily Traffic Volumes and LOS - No Build Scenario

Long-range (2025)

Much of the trip growth is projected to come from residential developments along the mountain benches and from the southern areas between the Spanish Valley Drive and US-191 corridors (see Table 8 above). The projected long-range growth impacts on the current roadway system are shown on Figure 4. Without capacity improvements, many of the area roadways are projected to experience poor and/or failing levels of service. Specifically, US-191, Mill Creek Drive, and 400 East all experience failing levels of service along much of their length through the Valley. In addition, Spanish Valley Drive, Kane Creek Boulevard and Spanish Trail Road are projected to experience poor levels of service. Tables 12 and 13 illustrate the long-range analysis results for the study intersections under both AM and PM peak hour periods.

Table 13: Long-range (2025) AM Peak Hour LOS Operational Analysis Summary

Intersection	2025 AM Peak Hour	
	Delay (sec)	LOS
Mill Creek Drive/Sand Flats Road	10.7*	B
Mill Creek Drive/Murphy Lane	12.1*	B
Mill Creek Drive/Holyoak Lane	15.7*	C

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.

Table 14: Long-range (2025) PM Peak Hour LOS Operational Analysis Summary

Intersection	2025 PM Peak Hour	
	Delay (sec)	LOS
Mill Creek Drive/Sand Flats Road	15.0*	C
Mill Creek Drive/Murphy Lane	19.7*	C
Mill Creek Drive/Holyoak Lane	19.5*	C
Mill Creek Drive/Spanish Valley	14.1*	B
Mill Creek Drive/US-191	32.0*	D
US-191/Sage Avenue	30.0*	D
Sage Avenue/Holyoak Lane	10.7*	B
US-191/Spanish Trail Road	37.4*	E
Spanish Trail Road/Spanish Valley Drive	152.9*	F
Spanish Trail Road/East Bench Road	(roundabout v/c 0.27)**	A
Spanish Valley Drive/Beeman Road	16.1*	C
US-191/Stocks Drive	17.7*	C

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.
** Delay and LOS for a roundabout is based on volume to capacity (v/c) ratios.

Figure 4. Long-range (2025) Average Daily Traffic Volumes and LOS - No Build Scenario

Recommendations

Current roadway capacities and levels of service throughout Spanish Valley are good. However, with the projected increases in growth and development and their associated traffic volumes, several roadways will require improvements to maintain acceptable levels of service. Based upon the traffic projections, recommended improvements have been classified as being needed under either the short-range (2015) or long-range (2025) scenarios described earlier. These changes are discussed in detail in the following pages.

Short-range (2015) Improvements

As shown earlier in Figure 3, without any capacity improvements pockets of roadway and specific intersections are anticipated to experience a deterioration in level of service due to the projected traffic volume increases. In order to provide additional capacity and maintain acceptable levels of service on principal roadways, several improvements are anticipated to be required over the next several years. Most of these are related to specific intersections and would include items such as adding additional turning lanes or realigning the intersection to reduce the skew to improve sight distances and safety. There are, however, some other major roadway improvements that are expected. The recommended improvements, listed in order of anticipated need over the short-range time period, are summarized below and shown in Figure 5:

- Improve Mill Creek Drive intersections at Murphy Lane and Spanish Valley Drive.
- Improve Mill Creek Drive with widening from the existing two travel lanes to three travel lanes.
- Geometric improvements and/or signalization at the intersections of US-191/Spanish Valley Drive, Holyoak Lane/Mill Creek Drive, Spanish Valley Drive/Mill Creek Drive, Murphy Lane/Mill Creek Drive, US-191/Sage Avenue, and US-191/Spanish Trail Road.
- Construct new east-west connectors between Murphy Lane and Spanish Valley Drive at Marshall Lane, and between Spanish Valley Drive and US-191 near Beeman Road (see East-West Connector Alternatives section below).
- Work with the Utah Department of Transportation (UDOT) to extend the five-lane section of US-191 from Sage Avenue to Spanish Trail Road with additional turning lanes at proposed major intersections.
- Work with the UDOT on Access Management Plan for US-191.

It should be remembered that the above improvement prioritization is based on the future development projections and traffic patterns derived from existing trends. If development patterns change, either in intensity or location, the time frame for improvements could be significantly affected and improvements not anticipated to be needed for several years may be needed immediately or vice versa.

Figure 5. Short-range (2015) Recommended Improvements

This scenario assumes the recommended improvements for 2015 are put into place. Table 14 illustrates the short-range analysis results for the study intersections under the PM peak hour period.

Table 15: Short-range (2015) with Improvements PM Peak Hour LOS Operational Analysis Summary

Intersection	2015 PM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	10.4*	B
Mill Creek Drive/Murphy Lane	10.5*	B
Mill Creek Drive/Holyoak Lane	10.9*	B
Mill Creek Drive/Spanish Valley	11.5*	B
Mill Creek Drive/US-191	12.7*	B
US-191/Sage Avenue	14.1*	B
Sage Avenue/Holyoak Lane	9.1*	A
US-191/Spanish Trail Road	5.9	A
Spanish Trail Road/Spanish Valley Drive	12.3*	B
Spanish Trail Road/East Bench Road	(roundabout v/c 0.15)**	A
Spanish Valley Drive/Beeman Road	10.1*	B
US-191/Stocks Drive	14.2*	B

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.
** Delay and LOS for a roundabout is based on volume to capacity (v/c) ratios.

Figure 6. Short-range (2015) Average Daily Traffic Volumes and LOS - Improvement Scenario

Long-range (2025) Improvements

If development continues at its current pace, long-range traffic volumes are projected to significantly increase and if no improvements are made, many area roadways will experience severe congestion as discussed earlier and shown on Figure 4. In addition to the short-range improvements outlined above, several other significant roadway improvements will be required to maintain adequate levels of service and provide safe travel. The recommended improvements, listed in order of anticipated need over the long-rang time period, are summarized below and shown on Figure 7:

- Geometric intersection improvements at the intersections of Mill Creek Drive/Sand Flats Road and Spanish Valley Drive/Spanish Trail Road
- Signalization at the intersections of Mill Creek Drive/Sand Flats Road and Spanish Valley Drive/Spanish Trail Road.
- Widen Spanish Trail Road to a 4-5 lane section. Perhaps, this could be designated as the Agateway@ into Spanish Valley and be developed in a Aboulevard@ style with landscaped medians and side treatments, bike paths, and meandering sidewalks in conjunction with strict access control and protected turn bays at major intersections.
- Work with UDOT in future for a corridor study to extend the five-lane section of US-191 south from Spanish Trail Road to the County line, or beyond if development spills over into San Juan County, with additional turning lanes at proposed major intersections.
- Improve Spanish Valley Drive to a 3-4 lane cross section from Mill Creek Drive to the County line.

Again, it should be noted that if the rate of development or development patterns change from the assumptions used in the traffic projections, the need for and timing of improvements could significantly change.

Figure 7. Long-range (2025) Recommended Improvements

This scenario assumes the recommended improvements for 2025 are put into place. Table 15 illustrates the long-range analysis results for the study intersections under the PM peak hour period.

Table 16: Long-range (2025) with Improvements PM Peak Hour LOS Operational Analysis Summary

Intersection	2025 PM Peak Hour	
	Delay (sec)	**LOS**
Mill Creek Drive/Sand Flats Road	11.9*	B
Mill Creek Drive/Murphy Lane	5.2	A
Mill Creek Drive/Holyoak Lane	12.2*	B
Mill Creek Drive/Spanish Valley	11.6*	B
Mill Creek Drive/US-191	14.0*	B
US-191/Sage Avenue	14.9*	B
Sage Avenue/Holyoak Lane	10.7*	B
US-191/Spanish Trail Road	13.1	B
Spanish Trail Road/Spanish Valley Drive	6.6	A
Spanish Trail Road/East Bench Road	(roundabout v/c 0.27)**	A
Spanish Valley Drive/Beeman Road	11.1*	B
US-191/Stocks Drive	12.8*	B

* Delay and LOS for the stop-controlled approach with highest delay value, source *Synchro vs 6*.
** Delay and LOS for a roundabout is based on volume to capacity (v/c) ratios.

Figure 8. Long-range (2025) Average Daily Traffic Volumes and LOS - Improvement Scenario

East-West Connector Alternatives

As part of both the short- and long-range scenarios, new east-west connector road alternatives were examined in addition to the above improvements to determine their need and added benefit in terms of alleviating traffic congestion and improving circulation throughout the area. The alternative evaluated includes an alignment proposed to begin on Spanish Valley Drive at Beeman Road and extend northeast to US-191 approximately halfway between the Lemon Lane and Stocks Drive intersections. The new alignment would be easier to preserve as future development and site plans are not yet determined. As the northern Valley east-west connections are primarily back-tracking in nature, this new alignment would also help to relieve traffic congestion and decrease delays on both the northern and southern ends of the Valley, especially on Mill Creek Drive, Spanish Valley Drive, and Spanish Trail Road. Other possible east-west connections to be considered would include new northwest alignments from Spanish Valley Drive to US-191 via Starbuck Lane, and Spanish Valley Drive to US-191 via a western extension of Kerby Lane (see Figures 5 and 6). Two East-West connections between Spanish Valley Drive and US-191 are being planned in San Juan County.

As discussed earlier, under the short-range scenario, there will still be some pockets of roadway and intersection specific congestion at peak travel periods throughout the area. Signing Resource Road as a connection to US-191 and implementing recommended east-west connectors in the short-range time period will provide an additional travel corridor that would assist in improving circulation, safety, as well as providing congestion relief for existing corridors, especially Mill Creek Drive, Spanish Valley Drive, and Spanish Trail Road. This relief in congestion will be possible as new east-west corridors will assist in diverting traffic over to US-191 before it travels up the entire length of the corridor, thus delaying the need for widening Spanish Valley Drive. A new east-west connector will also assist in reducing traffic volumes and congestion that would otherwise be anticipated to occur on Beeman Road as future development continues in southern Spanish Valley and northern San Juan County. Grand County has been working with UDOT in securing a permit for an additional US-191 access for this new corridor alignment, and construction designs for the access are underway.

Under the long-range scenario, with the implementation of the short and long-range improvements, it is anticipated that roadway capacities and operational level of service conditions should be adequate to accommodate projected traffic volumes. The following paragraphs further discuss evaluations and recommendations for the transportation plan.

Non-motorized Transportation

The Moab and Spanish Valley areas of Grand County, are rich with popular recreational areas for citizens and tourists alike. Recognizing the need for citizens and tourists to have trails and pathways to provide areas for non-motorized transportation for recreational and daily activities such as; bicycling, hiking, skating, skiing, and horseback riding, Grand County has formed the Trails Mix Committee. The Trails Mix Committee works closely with Federal, State and Local government agencies to help preserve and develop existing and new trails and pathways throughout Moab and Grand County areas. The Grand County Non-Motorized Trails Master Plan, originally adopted May 17, 2005, is available online through Grand County Planning and Engineering. The Trails Master Plan is constantly being revised as proposed trails and pathways change to existing, and additional routes are formulated. Figure 9, Figure 9A, and Figure 9B illustrates some of the existing and proposed trails planned in the Spanish Valley area.

Trails and pathways may also assist in helping reduce traffic throughout the County as non-motorized transportation will be more accessible for citizens and tourists daily and recreational activities year round. Major roadways throughout the County that would benefit greatly from having adjacent trails include Spanish Valley Drive, US-191, Spanish Trail Road, Murphy Lane, and Mill Creek Drive.

Typical Street Section

Closely associated with the roadway functional classifications are the typical sections for each classification. The typical street sections show the ROW for each classification along with the different street elements that are contained within the ROW including: lane configurations, lane widths and side treatments with curb and gutter, parkstrips and sidewalks and/or trails. It is always a challenge to develop a typical section that provides enough width to safely accommodate vehicular and non-motorized needs, yet is as narrow as possible to minimize the impacts associated with ROW acquisition, construction, and maintenance. A graphical depiction of the typical sections and standards for each functional classification are detailed in Figures 10 and 11. A brief explanation regarding each typical section is provided in the following paragraphs.

It should be noted that the typical sections presented in the transportation plan show the desirable standards for each roadway functional classification that should be followed whenever possible. However, there may be locations or situations where implementing the typical sections could cause undo hardship on the County or adjacent property owners. As such, Grand County may need to modify the typical sections at these locations. This decision should be made on a case-by-case basis as recommended by County and Fire Department staffs.

Figure 9. Spanish Valley Trails

Arterial Street Section
US-191 is the only arterial street in Spanish Valley and is a State route. US-191 has a proposed typical section much different than other roadways in Spanish Valley as it desired to have a frontage road system to help with access control along the corridor. UDOT is presently scheduled to start a corridor study for US-191 that will begin summer of 2007 and evaluate the frontage road system and potential access closures that will assist in providing safer and more efficient traffic flow through the Valley.

Arterial street sections have two through travel lanes in each direction with a center median area that can either be used for a continuous two-way left-turn lane (TWLTL), a raised median, or buffer space between the travel lanes. In addition, they typically have shoulder areas to accommodate vehicular difficulties, bus and/or bicycle operations, curb and gutter to control drainage, parkstrips for landscaping and an area for sidewalks or multiuse trails. Figure 7 illustrates the proposed typical section for US-191 with frontage roads and multiuse trails.

Collector Street Section
Collector streets in Spanish Valley serve the majority of local trips within the community. They are designated as either major or minor collectors. While both major and minor collectors have only one through travel lane in each direction, major collectors may also have a center median area for use as a continuous TWLTL. In addition, collectors have shoulder areas to accommodate on-street parking, bus and/or bicycle operations, curb and gutter to control drainage, parking strips for landscaping, and an area for sidewalks or multiuse trails.

Within Spanish Valley, only some of the needed collector streets have been fully constructed. Many of the needed collector streets will require roadway widening improvements to a road that may have existed for many years. Most of the existing roads identified for roadway widening improvements are adjacent to property that is already developed and widening roads could become expensive if additional ROW acquisition is required. Figure 11 illustrates typical sections for collector streets with and without a multiuse trail.

Local Streets
Local streets in Spanish Valley are designated as either local or private streets. Although the transportation plan does not specifically address local streets, it is appropriate to discuss a few design and planning elements related to local streets, in this section. Local streets provide access to most residential properties and form the street connections through and between many neighborhoods. In addition, they accommodate a variety of uses and usually have more pedestrian activity than other types of streets. As such, speeds and volumes on local streets are always a concern to residents. Combined with on-street parking, the narrow pavement section gives the appearance of a smaller roadway prism which helps encourage slower speeds. Other features of the local street sections include curb and gutter for roadway drainage, parking strips for landscaping and sidewalks. Figure 11 illustrates the typical section for Spanish Valley local streets.

The design and layout of local streets can have a big effect on local street volumes and speeds. Encouraging curvilinear alignments and/or avoiding long, straight sections without intersecting

streets helps promote slower vehicle operating speeds. In addition, multiple connections to other streets help reduce traffic volumes. A recent trend in subdivision design is to employ a variety of cul-de-sacs and loop roads within the subdivision and only provide a minimum number of through streets and connections to the collector street system. This approach is not recommended as it tends to concentrate all the traffic on one or two streets instead of dispersing it throughout the local street system. This leads to a disproportionate number of residents having to travel greater distances or out of direction in order to access the collector street system. As a result, speeds and volumes are higher on these one or two main local roads. Ultimately, good design and planning in the beginning can help prevent these problems. The proliferation of cul-de-sacs also has a negative effect on the provision of municipal services such as police, fire, emergency medical services and garbage collection as access locations are limited, out of direction travel routes are usually required and it is more difficult to maneuver large vehicles in the cul-de-sacs. Care should be taken in designing the layout of local roads to ensure that they are consistent with the overall transportation goals of the community.

Intersection Recommendations

At the intersections of many arterial and collector roadways, traffic volumes may be high enough to warrant additional turning lanes such as exclusive right-turn lanes or dual left-turn lanes. To accommodate extra lanes, some localized intersection widening will be required.

Figure 10 - Spanish Valley Typical Street Section

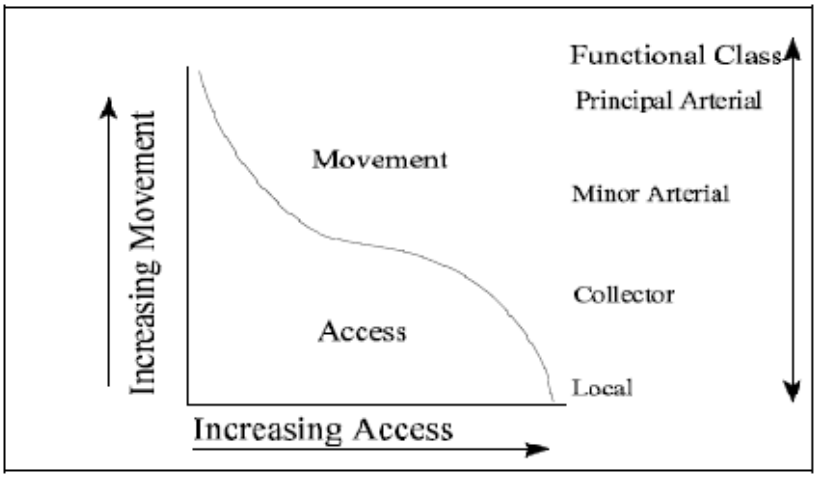
Figure 11 - Spanish Valley Typical Street Section

Access Management

It is important that roadways be able to function effectively in moving people and goods from one place to another. Maintaining functionality can be a direct result of effective use of roadway hierarchy so that intersecting roadways are not more than one level apart as illustrated below. A desirable roadway hierarchy consists of:

- Local Roads - Principal function is to provide access to adjacent land development.
- Collector Roads - Principal function is to distribute trips between local roads and major land developments.
- Arterial Roads - Principal function is to move traffic within the region and between cities.
- Freeways/Expressways - Principal function is to move traffic between regions.

Tradeoff of Mobility and Land Access



The Federal Highway Administration=s official definition of access management is A...the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity and speed.@ In practical terms, it means managing the number of driveways that a vehicle may encounter without hampering reasonable access to a property and removing slower, turning vehicles from the main traffic stream as efficiently as possible.

Access management attempts to:

- Deal with the traffic problems caused by un-managed development before they occur
- Address how land is accessed along arterials and major collectors
- Focus on mitigating traffic problems arising from development and the increased traffic volumes attempting to utilize these developments
- Call upon local planning and zoning to address overall patterns of growth and the aesthetic issues arising from development

The overall goal of local access management plans is to reduce traffic conflicts by:

- Limiting the number of conflict points that a vehicle may experience in its travel. This is especially true at intersections and driveways where vehicle, pedestrian and bicycle paths cross, merge and diverge. Generally, as the number of conflict points increases, so does the potential for crashes. Eleven conflict points are present at the intersection of a four-lane roadway and a two-lane driveway. In comparison, by restricting left-turn ingress and egress movements at the same driveway, the number of conflict points is reduced to two.
- Separating conflict points that cannot be completely eliminated. Where conflict points occur, it is desirable to provide adequate spacing between conflict points to provide motorists, pedestrians and cyclists adequate time to react to one conflict point at a time.
- Removing slower turning vehicles from through travel lanes. Motorists need time to react and begin slowing to avoid vehicles exiting, entering or turning across the roadway. Providing turning lanes and restricting turning movements allows turning and merging traffic to appropriately adjust travel speeds with minimal impact to through travel movements.
- Providing adequate on-site circulation and storage. The proper design of internal site circulation and vehicle storage can improve operations on the major roadway.

These four basic means of eliminating or separating conflicts can be achieved in many ways. Good land use planning, sensible regulation, and reasonable site planning guidelines can all help improve traffic operations. The need for invasive improvement measures can be avoided when access management techniques are appropriately implemented during the initial planning stages of a project. Similarly, the implementation of access management techniques as a Aretro-fit@ activity can significantly improve conditions along a corridor where traffic conditions have deteriorated below acceptable levels. In these situations, costly improvements can often times be avoided without compromising safety.

Access management is an obvious strategy in the fight to preserve capacity and minimize accidents on the arterial and collector roadway system. It is a relatively low cost measure that can provide many substantial benefits. In order to help preserve the capacity of existing and future corridors, Grand County is adopting specific access control plans along their principal arterial and collector roadway corridors. Access management will prove very valuable to increase capacity on streets that cannot be widened. The arterial and collector roadways in the Spanish Valley study area that need access management include:

- US-191
- Spanish Trail Road
- Spanish Valley Drive
- Murphy Lane
- Mill Creek Drive

Access management for US-191 will minimize the number of access points by limiting the number and spacing of intersecting roadways and driveways. An example of this would be

limiting the accesses on US-191 from Lemon Lane to Stocks Drive. Present discussions for access management in this area include constructing a frontage road that would provide inner connectivity for all the streets while allowing only limited access onto US-191. This would assist in traffic safety and in corridor operational conditions as potential traffic conflicts for traffic entering and exiting access points are reduced.

Effective access management includes the use of design criteria and considerations such as:

- Characteristics of the proposed land use
- Property location, size, and orientation
- Existing traffic flow conditions and the anticipated future traffic demand
- Travel speeds of adjacent roadways
- Number and location of driveways servicing adjacent and opposite properties
- Number of driveways needed to accommodate proposed traffic volumes
- Proposed geometric design of driveways
- Location and capacity of adjacent intersections and/or driveways
- Spacing between adjacent and opposing driveways - driveways should be spaced at least 300 feet apart
- Signal spacing - signals should be spaced depending upon desired speed and signal cycle lengths, i.e., approximately 2 mile apart for 35-40 mph and 90 second cycle lengths
- Deceleration and exclusive right-turn lanes should be used for right turning movements where peak hour volumes exceed 100 vehicles per hour.
- Proposed on-site circulation elements

Tradeoffs are often required as desirable access management features for one mode of travel may not be appropriate for other travel modes. For example, by providing larger curb return radii at driveways, vehicular turning movements are more easily accomplished at higher speeds, thus reducing the impact on through movements. However, provisions for larger curb return radii result in increased pedestrian crossing distances and higher vehicular turning speeds increase the risk for pedestrians and cyclists crossing the driveway. When implementing access management standards, engineering judgment shall be applied and all issues shall be considered.

Corridor Preservation

Corridor preservation is an important transportation planning tool that agencies should use and apply to all future transportation corridors. There are several new transportation facilities that have been identified in the master plan as being needed over the next several years (see Figure 5). In planning for these future facilities, corridor preservation techniques should be employed. The main purposes of corridor preservation are to:

- preserve the viability of future options
- reduce the cost of these options
- minimize environmental and socio-economic impacts of future implementation

Corridor preservation seeks to preserve the right-of-way needed for future transportation facilities and prevent development which might be incompatible with these facilities. This is primarily accomplished by the community=s ability to apply land use controls such as zoning andapproval

of developments. Adoption of the transportation plan by Grand County is a commitment to citizens and future leaders in the community that the identified future corridors will be the ultimate location for transportation facilities.

Perhaps, the most important elements of corridor preservation are ensuring that the corridors are preserved in the correct location and that they meet the applicable design and right-of-way standards for the type of facility being preserved. As the transportation plan does not define the exact alignment of each future corridor, it becomes the responsibility of the County to make sure that the corridors are correctly preserved. This will have to be accomplished through the engineering and planning reviews done within the County as development requests are approved that involve properties within or adjacent to the future corridors.

Corridor Preservation Techniques

Several publications are available which discuss corridor preservation. A corridor preservation manual prepared by UDOT and Brigham Young University entitled *Methods and Techniques of Corridor Preservation: A Guide for Utah Practice (June 30, 1999)* is an excellent reference and should be consulted for a detailed discussion on corridor preservation.

Some specific corridor preservation techniques that may be most beneficial and easily implemented are:

- **Developer incentives and agreements**. Public agencies can offer incentives in the form of tax abatements, density credits or timely site plan approvals to developers who maintain property within proposed transportation corridors in an undeveloped state.

- **Exactions**. As development proposals are submitted to the County for review, efforts should be made to exact land identified within the future corridors. Exactions are similar to impact fees, except they are paid with land rather than cash.

- **Fee simple acquisitions**. This will most likely consist of hardship purchases or possible county acquisition of property identified within the corridors. Parcels obtained in fee title can later be sold at market value to the owner of the transportation facility when construction begins.

- **Transfer of development rights and density transfers**. Government entities can provide incentives for developers and landowners to participate in corridor preservation programs using the transfer of development rights and density transfers. This is a powerful tool in that there seldom is any capital cost to local governments.

- **Land use controls**. This method allows government entities to use police power to regulate intensity and types of land use. Zoning ordinances are the primary controls over land use, a community can zone for agriculture, parks, open space, and low density residential so that future conflicts of development with a corridor can be held to a minimum.

- **Purchase of options and easements**. Options and easements allow government agencies to purchase interests in property that lies within highway corridors without obtaining full title to the land. Usually, easements are far less expensive than fee title acquisitions.

These are just some of the techniques which can be implemented by the County. Appendix E contains a more thorough discussion of the above and other techniques.

Corridor preservation planning includes conducting of corridor studies and preparation of a Corridor Preservation Plan. It is fundamental to the corridor preservation process to identify a range of corridors and to evaluate them as to their impact. It is difficult to do corridor preservation planning if a community does not know where a corridor should be located and how wide it should be, that is what the corridor study accomplishes. A corridor Preservation Plan details what actions are required to preserve a corridor and determines who will be responsible to carry out these actions. Both a corridor study and a Corridor Preservation Plan are valuable and practical tools in the corridor preservation process.

Recent Legislation

The Utah Legislature has long recognized the importance of preserving rights-of-way for future highway and transit facilities. During the 2001 session, the Legislature strengthened key sections of the Utah Code to emphasize transportation corridor preservation, see Appendix E. The considerations used to prioritize disbursements from the Corridor Preservation Revolving Loan Fund were amended to require that *the cost-effectiveness of the preservation project be considered.* The Legislature also established a new *Corridor Preservation Advisory Council* with the following responsibilities:

- assist with and help coordinate corridor preservation efforts of the state transportation department and local governments

- provide recommendations and priorities concerning corridor preservation and use of fund monies to the state transportation department and the transportation commission

- include members designated by each metropolitan planning organization in the state to represent local governments that are involved with corridor preservation through official maps and planning

Traffic Studies

With the amount of development that will occur throughout Spanish Valley, it is recommended that the development process be evaluated on a continual basis for traffic impacts. This can be accomplished by requiring developers to submit a Traffic Impact Study for any development that will generate in excess of 50 peak hour trips. A traffic impact study will allow the County to determine the site specific impacts of a development including internal site circulation, access issues, and adjacent roadway and intersection impacts as well as possible impacts to the impacts to the overall transportation system in the vicinity of the development. General Traffic Impact Study guidelines are included as Appendix F.

Planning Level Cost Estimates

In order to assist in the planning process, in impact fees, and to act as another tool in forming guidelines for the implementation of the above outlined recommended improvements, planning level cost estimates for the major recommended improvements under both the short- and long-range scenarios have been prepared. These costs are summarized in Tables 14 and 15.

Table 17: Short-range (2015) Planning Level Cost Estimates

Recommended Improvement	**Approx. Length**	**Estimated Cost**
Mill Creek Drive - Widen from 2 lanes to 3-4 lanes Murphy Lane to Spanish Valley Drive	1.04 Miles	$2,869,000
US-191 - Widen from 2-3 lanes to 5 lanes* ~Sage Avenue to Spanish Trail Road	2.2 Miles	$10,967,000
Mill Creek Dr/US-191 - Signalization*		$180,000
Spanish Trail Rd/US-191 - Signalization*		$180,000
Sage Ave/US-191 - Geometric improvements*		$75,000
TOTAL		**$14,271,000**
Grand County Minimum Total		**$2,869,000**

* As these improvements involve UDOT roads, they may be eligible for state and/or federal funding, thereby reducing the cost to Grand County.

Table 18: Long-range (2025) Planning Level Cost Estimates

Recommended Improvement	**Approx. Length**	**Estimated Cost**
Mill Creek Dr - Widen from 2 lanes to 3-4 lanes Moab City Boundry to Murphy Lane	0.81 Miles	$2,287,000
US-191 - Widen from 2 lanes to 5 lanes*	3 Miles	$14,364,000
Spanish Valley Dr - Widen from 2 lanes to 3-4 lanes	5 Miles	$17,710,000
Spanish Trail Rd - Widen from 2 lanes to 4-5 lanes	0.95 Miles	$3,287,000
Mill Creek Dr/Murphy Ln - Signalization		$180,000
Mill Creek Dr/Sand Flats Rd - Geometric improvements		$65,000
Spanish Trail Rd/Spanish Valley Dr - Signalization		$180,000
TOTAL		**$38,073,000**
Grand County Minimum Total		**$23,709,000**

* As these improvements involve UDOT roads, they may be eligible for state and/or federal funding, thereby reducing the cost to Grand County.

The above improvement estimates are based on 2006 construction costs and assume fully improved roadways with sidewalk, curb and gutter including any box culvert or bridge reconstruction that would be required. They include right-of-way and utility relocation costs, but it should be pointed out that as these are highly variable and unpredictable, the final cost at the time of actual construction could significantly differ from the costs assumed in the estimate. The actual cost to Grand County is expected to fall between the total and the Grand County minimum total with the final amount depending on the level of participation at the state and federal level. The details of the cost estimates, including assumptions used in their development are included in Appendix G.

Impact Fees

To assist in the costs of roadway improvements required as a result of new development, impact fees can be assessed. These fees are designed so that developers pay their fair share of the cost of necessary improvements due to impacts on the existing transportation system caused by their development. They cannot be used to fund improvements to a currently inadequate system. An example of an impact fee would be requiring the developer to contribute toward the cost of installing a traffic signal at an intersection through which traffic associated with the developer=s project travels.

The development, collection, and use of impact fees are governed by state law and must meet the guidelines set forth under the Impact Fees Act. Appropriately implemented, the use of an impact fee program can significantly assist in funding future transportation improvements allowing more of the existing funds to be used for improving the existing transportation system. It is recommended that current impact fees be re-evaluated as necessary through any updates to the Grand County Land Use Code or through traffic impact studies required by the County for new development areas as impact fees are needed to assist in keeping the viability of the transportation system in Spanish Valley.

Potential Funding Sources

Funding sources for transportation are essential if Spanish Valley recommended projects are to be built. Presently there are three main sources of revenue available to Grand County. These funding sources include: (1) federal funds from Surface Transportation Programs (STP); (2) Class B and C Funds from state highway user revenues; and (3) local general funds. The following paragraphs further describe these various transportation funding sources available to the County.

Federal Funding

Two sources of federal funding were created in 1991 as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) and Transportation Efficiency Act for the 21st Century (TEA-21) legislation. These funding sources are administered through the Transportation Enhancements program by the Utah Department of Transportation. The ISTEA and TEA-21 programs were designated to promote either less polluting transportation and/or less overall single occupancy vehicle travel demand. The Transportation Efficiency Act for the 21st Century expired September 30, 2003, and was reauthorized in 2005, along with the Safe, Accountable,

Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU), which significantly increases the amount dedicated to the program through 2009.

The types of projects available for these funds may range from rehabilitation to new construction for any roadway that is functionally classified as a collector or higher for urban streets, or as a major collector or higher for rural areas. These funds area presently allocated based on population and presently ten percent of the total funding available must be spent on Transportation Enhancements.

(TE) projects. There are ten types of Enhancements, ranging from historic preservation, bicycle and
pedestrian facilities, to water runoff mitigation. Federal aided TE projects are considered reimbursable activities, meaning that project sponsors receive funding after expenditures have been made. In most cases, the Federal government pays 80 percent of the project cost and the sponsor pays the remaining 20 percent. States may have additional eligibility requirements. More information can be obtained at www.enhancements.org.

Other sources of federal funding such as federal demonstration funding, have been ignored for this analysis and probably do not play a role in long term transportation financial planning. However, all federal funding sources should be examined and applied during budget cycles in order to maximize the County=s return on federal contributions. It is not the point of this analysis to present an exhaustive list of federal transportation funding programs other than to identify the largest ones for planning purposes.

State Funding

The State of Utah makes funds available for highway construction from several sources. These sources include a Salt Lake County 1/16 cent sales tax, motor fuel and special fuel taxes, vehicle control fees, motor vehicle registration fees, proportional registration, temporary permits, special transportation permits, highway use tax, safety inspections and miscellaneous fees. In the 1998 fiscal year, the gas tax was raised to 24.5 cents per gallon. The special fuel tax and motor registration fees were also raised in 1998. In addition, the State Legislature has programmed state general funds to support UDOT projects. Presently UDOT keep about 75 percent of these funds and makes the remaining 25 percent available to counties and cities in the State Class B and C program. Current allocations indicate the Class B and C funds are apportioned in the following manner; 50 percent in the ratio of Aweighted mileage@ within each county to the total roads weighted within the state, and 50 percent in the ratio that the population of the county bears to the total population of the state as of the last official federal census or the United States Bureau of Census estimate, whichever is most recent. More information can be obtained at www.le.state.ut.us/~1997/htmdoc/hbillhtm/HB0247.htm.

Local Funding

Local funding includes the State funded Class B and C Program where B funds are distributed to counties and C funds to cities. These funds are primarily for new construction, maintenance, or preservation at the discretion of the counties and cities. Local funding also includes monies that many counties contribute from their own general fund revenue. Road impact fees, funding from

developers for major projects, and other innovative funding programs must be considered for future funding as well.

Non-motorized Funding

Additional funds for non-motorized travel are also available through State Conservation Programs that are administered by the Utah Division of Parks and Recreation. These funds include the Riverway Enhancement Program and the Non-motorized Recreation Trails Program. The Riverway Enhancement Program aims to preserve and enhance river corridors for both wildlife habitat and recreation. The Non-motorized Recreation Trails Program encourages the development of statewide trails system through matching funds for trail development, including; renovation, new construction, acquiring trailheads, property and trail corridors. More information can be obtained at www.governor.state.ut.us/planning/CriticalLands/white.htm#Establishing%20a%20Plan.

Miscellaneous Recommendations

A master transportation plan is not intended to be a standalone document, but rather should be a working document that functions as a part of the community=s overall master plan. As improvements or changes are made in the community and in other areas of the community=s master plan, the transportation plan should be consulted and incorporated into the decision making process and updated, if necessary. For example, if the drainage plan calls for improving a culvert crossing, the transportation plan should be consulted to assure that the new culvert improvement will be designed in harmony with any future roadway improvements that are anticipated to occur at the culvert crossing location.

Finally, due to the volatile and unpredictable nature of growth and development, especially in tourist and recreational-based areas like Moab and Spanish Valley, developing accurate land use and traffic projections twenty years or more into the future is extremely difficult to say the least. Even slight changes from the initial assumptions could dramatically change the results. Therefore, it is vitally important that as time passes and conditions change, the master transportation plan be continually evaluated and updated to reflect the changing conditions in order to be compatible with and successfully address the needs of the community.

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G