Herriman City Transportation Master Plan

Founded 1851

Herriman

Prepared by J-U-B Engineers, Inc.

2009

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Executive Summary

This Transportation Master Plan Update was prepared as an update to the recently adopted Transportation Master Plan, March 2008 (referred to as existing TMP). Several substantial land use changes have occurred since the preparation and adoption of the existing TMP that require a reevaluation of the transportation network proposed in the existing TMP. Key concerns include a preferred alignment for the Mountain View Corridor and the incorporation of East Herriman area, which was de-annexed from Bluffdale City and annexed to Herriman City.

Goals, principles, and policies that were developed in the existing TMP are still valid. This Transportation Master Plan Update incorporates those ideas with a focus on implementation, and updates the changes in existing and future land uses.

This Transportation Master Plan Update identifies needed transportation improvements as well as their traffic and land use impacts, which can be used by Herriman City for prioritizing and implementing roadway construction projects over the next 15-20 years. The Herriman City Transportation Master Plan is a comprehensive planning document that assembles required data, assesses existing and future transportation development needs, assesses and identifies motorized and non-motorized transportation improvements, provides policy direction, and recommends prioritization of improvements.

The Transportation Master Plan Update has evaluated the condition of and identified the need for improvements to all facets of transportation, including:

- *Traffic Capacity* – The ability of the existing roadway facilities to accommodate existing and future traffic needs. Aside from the projects identified on the Wasatch Front Regional Council (WFRC) STIP, this also included proposed development in East Herriman, unincorporated areas of Salt Lake County, and Daybreak community in South Jordan.
- *Traffic Signals* – Evaluation of existing signalized intersections to meet current and future standards for traffic conveyance and pedestrian safety. Most of the improvements relate to upgrading the signal and pedestrian heads, pedestrian facilities, and intersection geometry.
- *Mass Transit* – Foster opportunities to promote transit as transportation alternatives.
- *Truck Routes* – A truck route discussion is provided that defines those roadways that should be designated for heavy truck traffic.
- *Pedestrian/Bicycle Trails* – An inventory of existing trail locations and identification of future trails consistent with the Parks and Recreation Plan.
- *Additional Capital Street Projects* – These projects represent staff or consultant recommendations that don't fit into any specific category above. Their justification comes from the experience of the community over initial start-up this year.
- *Traffic Calming* – Minimize traffic impacts on residential street through traffic calming and sensitivity to environmental conditions.

The results of this Transportation Master Plan Update will be a foundational element for the preparation of a subsequent Capital Facility Planning Study and an Impact Fee Study. The compilation of these studies will form the basis for the implementation of an updated impact fee which will assess the cost and impacts of development within Herriman City. Projects that are identified in this Transportation Master Plan Update can then be added to the Capital Facilities Plan and submitted to Herriman City Council for their consideration, programming, Funding and implementation. Additionally, the Transportation Master Plan Update is also used for inclusion in the Wasatch Front Regional Council's Regional Transportation Plan. This Transportation Master Plan can serve as the catalyst for acquiring federal funding for roadway projects.

1. Introduction

This Transportation Master Plan Update was prepared as an update to the recently adopted Transportation Master Plan, March 2008 (referred to as existing TMP). Several substantial land use changes have occurred since the preparation and adoption of the existing TMP that require a reevaluation of the transportation network proposed in the existing TMP. Key concerns include a preferred alignment for the Mountain View Corridor and the incorporation of the East Herriman area, which was de-annexed from Bluffdale City and annexed to Herriman City.

Many of the goals, principles, and policies that were developed in the existing TMP are still valid. This Transportation Master Plan Update incorporates those ideas with a focus on implementation, and updates the changes in existing and future land uses.

This chapter outlines the purpose of the Transportation Master Plan, the process that was used to update the existing TMP, and the structure of the document.

1.1. Purpose of the Transportation Master Plan

The Herriman City Transportation Master Plan serves a variety of purposes. It is a vision document that defines the long-term transportation system that Herriman City needs in the future. The Transportation Master Plan also provides policy direction for how decisions regarding the implementation of the transportation system should occur. It is also a framework document that serves as a comprehensive reference guide regarding transportation issues in Herriman City. Finally, the Transportation Master Plan prioritizes projects for implementation to meet short-term deficiencies and assure safety for motorized and non-motorized travel while working towards the ultimate transportation system Herriman City is trying to achieve.

This update reaffirms Herriman City's commitment to provide a multi-modal transportation system, with an expanded discussion of strategies and goals that will foster opportunities for mass transit. As Herriman City has grown, it has witnessed a steady increase in vehicle trip volumes, and a degradation of function across the existing street network, because it has not kept pace with the development of the past 10 years. Herriman City remains committed to providing a more balanced transportation system that provides citizens with transportation choices and to maintain its high quality of life.

The Transportation Master Plan provides the goals, principles, and policies that will be used to change the transportation system today and shape it for the future. The Transportation Master Plan provides a look at existing conditions, what the future may look like based on current practices, goals, and proposed development for the area and region.

1.2. Plan Development Process

The development of this Transportation Master Plan Update began with a comprehensive review of the existing TMP, a review of the East Herriman Development plan, and land use plans or proposed development from adjacent communities. The next step in the process was a review of goals described in the existing TMP, updating them when necessary. City staff collaborated continuously during the entire Transportation Master Plan Update development process.

Next, the travel demand model was used to evaluate traffic under existing conditions, existing and committed conditions, and the current transportation network. Afterwards, an estimate of future conditions was prepared, with a set of proposed improvements to the

transportation network. Improvements were suggested based on professional judgment and guidance from City staff. Once complete, the recommended roadway improvements were identified and reviewed by Herriman City prior to forwarding those to be included in the Herriman City Capital Facilities Plan.

Each step of the Transportation Master Plan Update development is explained in more detail in the pages that follow.

Existing Plan Review

The Transportation Master Plan Update development process began with a review of all planning documents related to transportation, including vision statements, goals, and objectives from other transportation plans that were developed separately from the existing TMP, such as:

- East Herriman (2008)
- Kennecott West Hills (2007)
- Salt Lake County Transportation Master Plan (2006)
- Riverton City Transportation Master Plan (2000)
- South Jordan City Transportation Master Plan
- Bluffdale Transportation Master Plan

Next, all transportations projects completed since 2007 were inventoried. The inventory included extensive discussions with various members of Herriman City's transportation staff and surveys of the arterials in Herriman City to identify bicycle and pedestrian facilities. A bicycle transportation focus group, comprised of members of the Transportation Board, also provided input to the existing conditions analysis, potential bicycle projects and the project prioritization process.

Land Use and Population Projections

In order to determine what growth could occur in Herriman City over the next 20 years, Herriman City Planning Department conducted an available lands inventory for all land within the City limits and areas identified for future annexation. Based on existing zoning and density requirements, population and employment forecasts were allocated to available land within the City over the next 20 years. This information was essential input in the transportation demand model that was used to analyze a variety of elements of the Herriman City Transportation Master Plan.

Transportation Master Plan Goals

The existing TMP developed goals for how transportation and land use planning should occur in Herriman City. Those goals were revisited in this update, to verify that they still represent the future of Herriman City. This process started by defining what Herriman City should look like now and in the future. The following goals were identified in the existing TMP and updated in this Transportation Master Plan:

- Improve existing transportation facilities to meet current and future travel demand;
- Incorporate full accessibility for both motorized and non-motorized travel in all new street design;

- Provide safe and efficient mobility throughout the community by implementing national standards for pedestrian and vehicular travel;
- Incorporate bicycle routes and trails into new street designs when possible, or create separate bicycle facilities;
- Integrate regional plans for public transportation to meet rider needs;
- Optimize available local, State and Federal funding sources;
- Identify future roadway classifications to preserve right-of-way widths;
- Implement access management strategies for all future roadways;
- Develop transportation facilities that are an asset to the community and are compatible with the natural and built environment;
- Meet the State of Utah requirement which requires City's to prepare and adopt a Transportation Master Plan and Capital Facilities Plan.
- Encourage street design that promotes traffic calming opportunities.

The following goal was added in this update:

- Consider transportation alternatives that minimize or reduce impacts to the environment to the greatest possibility; and

The characteristics identified in that process serve as the basis for refining the vision and goals. Revisions to these items then helped shape the direction for changes in other policy related issues.

Development of Conceptually-Modeled Scenarios

Two transportation system scenarios were modeled, based on data from the Wasatch Front Regional Council (WFRC) travel demand model, and data from various transportation plans and field collection. These two scenarios were used to gain a better understanding of the transportation system's current and future needs. The scenarios included:

1) Existing Conditions - The Existing Conditions scenario reflects current traffic conditions. Inputs to this scenario included the existing street network, and current socioeconomic data like land use and population.
2) Existing and Committed - The Existing and Committed (E+C) scenario demonstrates the effects of socioeconomic and population growth on the current transportation system. In modeling this scenario, 2025 population and employment forecasts were used, and the current transportation and future transportation network additions were considered. The transportation network additions used were street projects that were either currently funded or anticipated to be funded.

The scenarios were then analyzed to identify what roadway improvements were needed to meet existing and future travel demand. The travel demand analysis is explained in detail in Chapter 4.

1.3. Plan Document Structure

This document includes an executive summary, eight chapters, references, and appendices:

- Executive Summary – provides an overview of the document, introducing key policy points and major differences from the 2008 Transportation Master Plan

- Chapter 1 – Introduction – discusses the purpose of the document, the process followed to develop the document, planning goals to meet existing and future travel demand for both motorized and non-motorized travel, and the document structure
- Chapter 2 –Recent Changes– discusses changes since the preparation and adoption of the existing TMP in terms of demographic and transportation growth
- Chapter 3 – Existing Transportation Conditions – discusses the existing conditions inventory that was conducted
- Chapter 4 – Future Traffic Analysis – discusses the use of Herriman City's transportation demand model to support the development of the Transportation Master Plan
- Chapter 5 – Mass Transit – provides an expanded discussion on accommodating transit planning, modes, and land uses supporting transit
- Chapter 6 – Bicycle and Pedestrians
- References – A list of the materials used to develop this Transportation Master Plan
- Appendices –Technical information and support documentation

2. Recent Changes

This chapter looks at changes and trends since the adoption of the existing TMP that are related to or impact the transportation system. Significant changes have taken place in population, land use, and regional transportation planning since the existing TMP was adopted.

2.1. Population Changes

The existing TMP used a population projection prepared by the Wasatch Front Regional Council (WFRC). The WFRC projection was prepared based on the build-out scenario for Herriman City, and the expected population density for that area. The WFRC build-out scenario was based on the 2005 city limits. The WFRC estimate placed the build-out population to be between 37,000 to 42,000 people. The existing TMP used a 20-year population estimate, but included the newly annexed East Herriman resulting in a 2020 population estimate of 37,918.

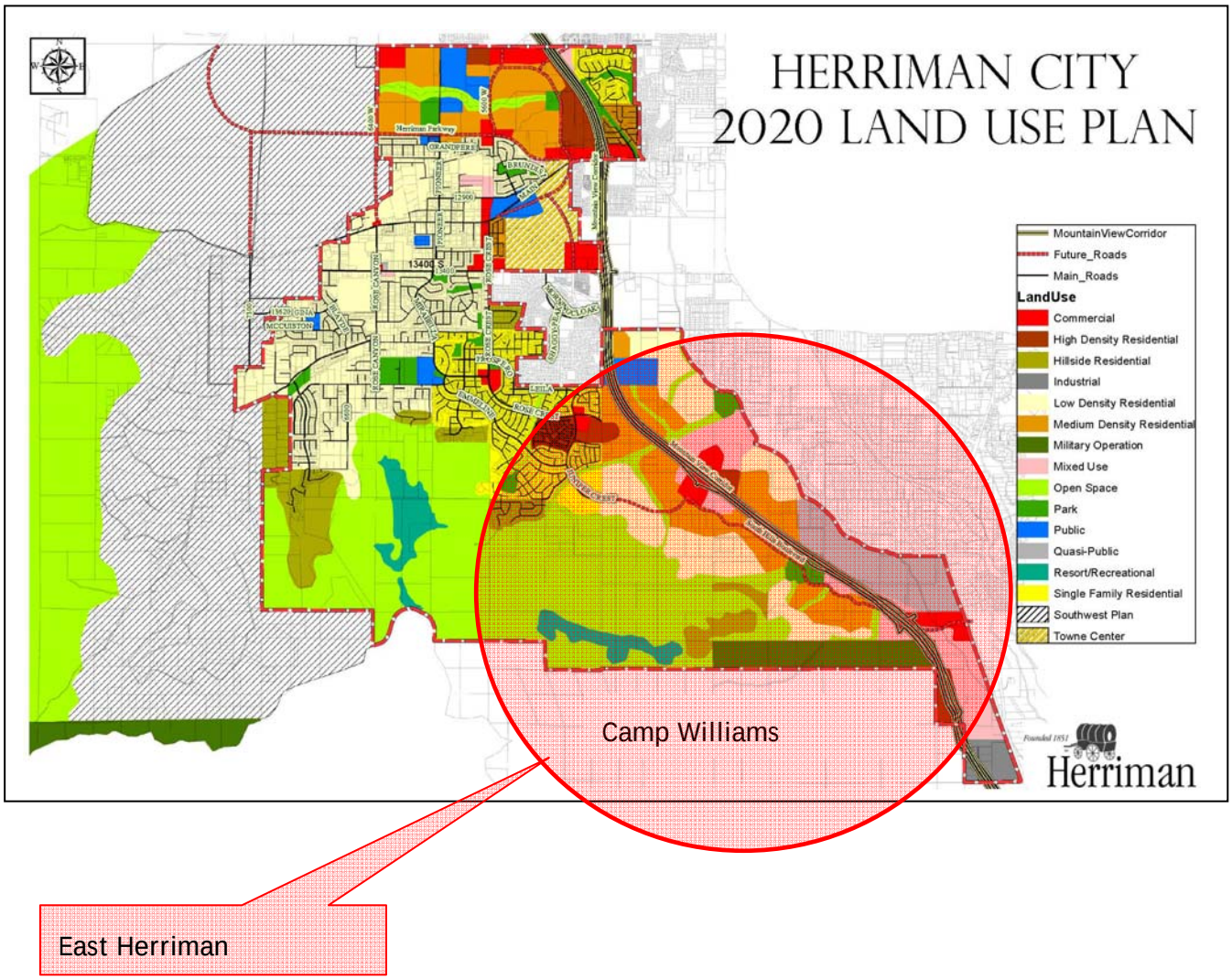
Since the development of the existing TMP, Herriman City has prepared new 20-year land use population projections. The recent projection implies that Herriman City will be nearing build-out conditions by 2040.

Both build-out scenarios and 20-year population projections are appropriate for use in transportation planning. This Transportation Master Plan update will use the Herriman City 2020 projection, as it is the most recently available data.

2.2. Land Use Changes

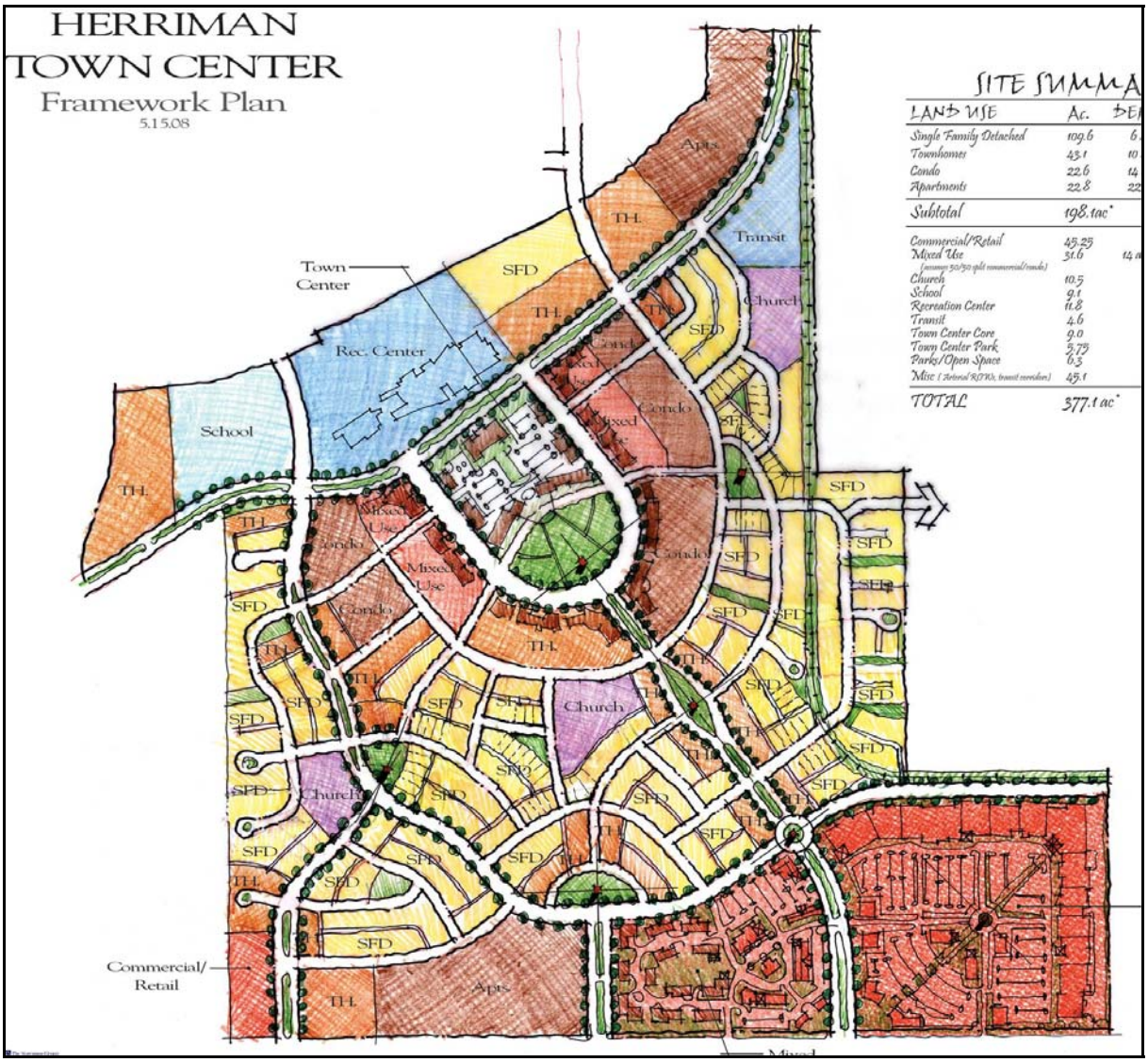
One of the most significant changes since the adoption of the existing TMP is the annexation of East Herriman development. While the annexation was being considered during the development of the existing TMP, data needed for transportation planning was not readily available. The annexation changed the amount of variety in land use in Herriman City, and introduced a new type of land use, mixed-use development. These land use changes were not considered in the existing TMP. This recently annexed property includes 3,850 acres of undeveloped land. It also includes approximately 340 acres of mixed-use development (housing/commercial), and approximately 34 acres of general commercial land use (Figure 1 – East Herriman).

Figure 2-1 East Herriman



The second significant change that has occurred since the existing TMP was the final adoption and approval of the Herriman Towne Center land use plan. The Herriman Towne Center is between 5600 West and the proposed Mountain View Corridor, and 13400 South and Main Street (12600 South). Although transportation concerns at this location were considered in the existing TMP, the type and designation of land uses was not. The Towne Center will accommodate approximately 377 acres of mixed-use development including housing, commercial, and recreational land use (Figure 2 – Herriman Towne Center).

Figure 2-2 Herriman Towne Center



Land use and housing are integrally tied to transportation, in that the type, location, and size of development that occurs both within Herriman City and in the surrounding communities will directly affect the number of trips on the local roadway network. Land use pattern is a dominant factor influencing travel behavior patterns.

If an area develops exclusively as a residential community, with little or no associated services or employment nearby, residents are forced to travel longer distances to commercial

and employment destinations. Additionally, if public transit services are not provided, residents are limited to automobile travel. This kind of lower-density and single-use residential development is often a desirable housing style for home owners, but it typically strains the capacity of the transportation network.

In a well-balanced mixed-use development, one with sidewalks and connecting paths between residential, commercial, and open spaces, residents can travel by foot or by bicycle.

High-density land use developments, including a combination of residential and commercial land uses, provide a larger population base with more origin and destination points, making public transit a more viable transportation mode for the area. In a low-density area, where housing is typically single-family units, there are a greater number of automobile trips per unit. In a high-density area, where housing is typically in multi-family units like apartments, fewer of those trips take place in automobiles because public transit is an efficient mode of transportation and many errands can be completed by walking.

2.3. Transportation Planning Changes

The Wasatch Front Regional Council (WFRC) is the designated Metropolitan Planning Organization for the greater Wasatch Front Region. As such, the WFRC is required by the federal government to develop and approve a Regional Transportation Plan and update it every three years. This Transportation Master Plan usually covers a time span of 30 years and governs regionally significant highway and transit development across the urbanized areas of Salt Lake, Davis and Weber Counties. The most recent Long Range Transportation Plan (LRTP) for the Wasatch Front Regional Council area was adopted in May 2007.

To address future roadway needs, the WFRC has planned improvements for several sections of roads. The roads are administered by state and local governments. The following portion of the WFRC map shows those in or near to Herriman. The current LRTP identifies two projects that will have a substantial change in mobility and travel for Herriman City:

1. the Mountain View Corridor, which is identified as a state highway between Utah County and Davis County and currently planned on the west side of the Salt Lake County,
2. UTA light rail extension planned to service the west-bench communities of South Jordan, West Jordan, Taylorsville, Herriman, Riverton, and Bluffdale.

The Mountain View Corridor has been in the planning stages for several years. A preferred alignment has recently been identified, and this information was not available during the development of the existing TMP. During the development of that plan it was not known where interchanges were planned which greatly limited the ability to make roadway classifications, not project daily traffic, and estimate level of service. The final EIS and Record of Decision was approved in late 2008.

The UTA light rail transit corridor is not completely defined but more is known now than it was during development of the existing TMP. The corridor alignment and station north of Herriman in South Jordan City has been identified. The railway corridor alignment south into Herriman is currently being evaluated, but a general area has been identified. Regardless of the final plan details, future light rail transit and transit stations will have substantial effect on land use and the traffic patterns.

Planning roads in conjunction with the WFRC allows communities to apply for and receive funds from the STIP and other State and Federal funding programs.

Figure 2-3 Wasatch Front Regional Council Planned Improvements Map

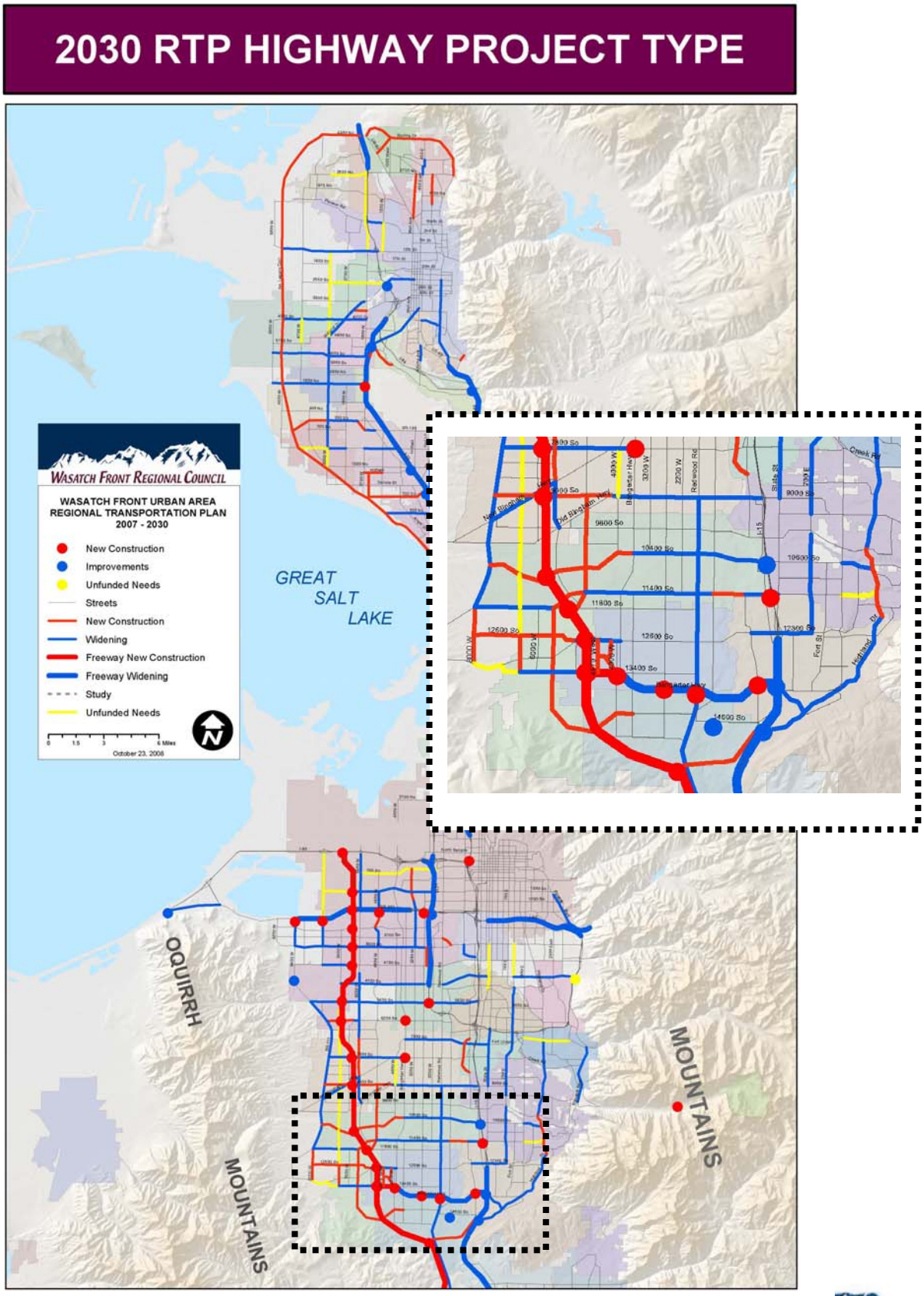
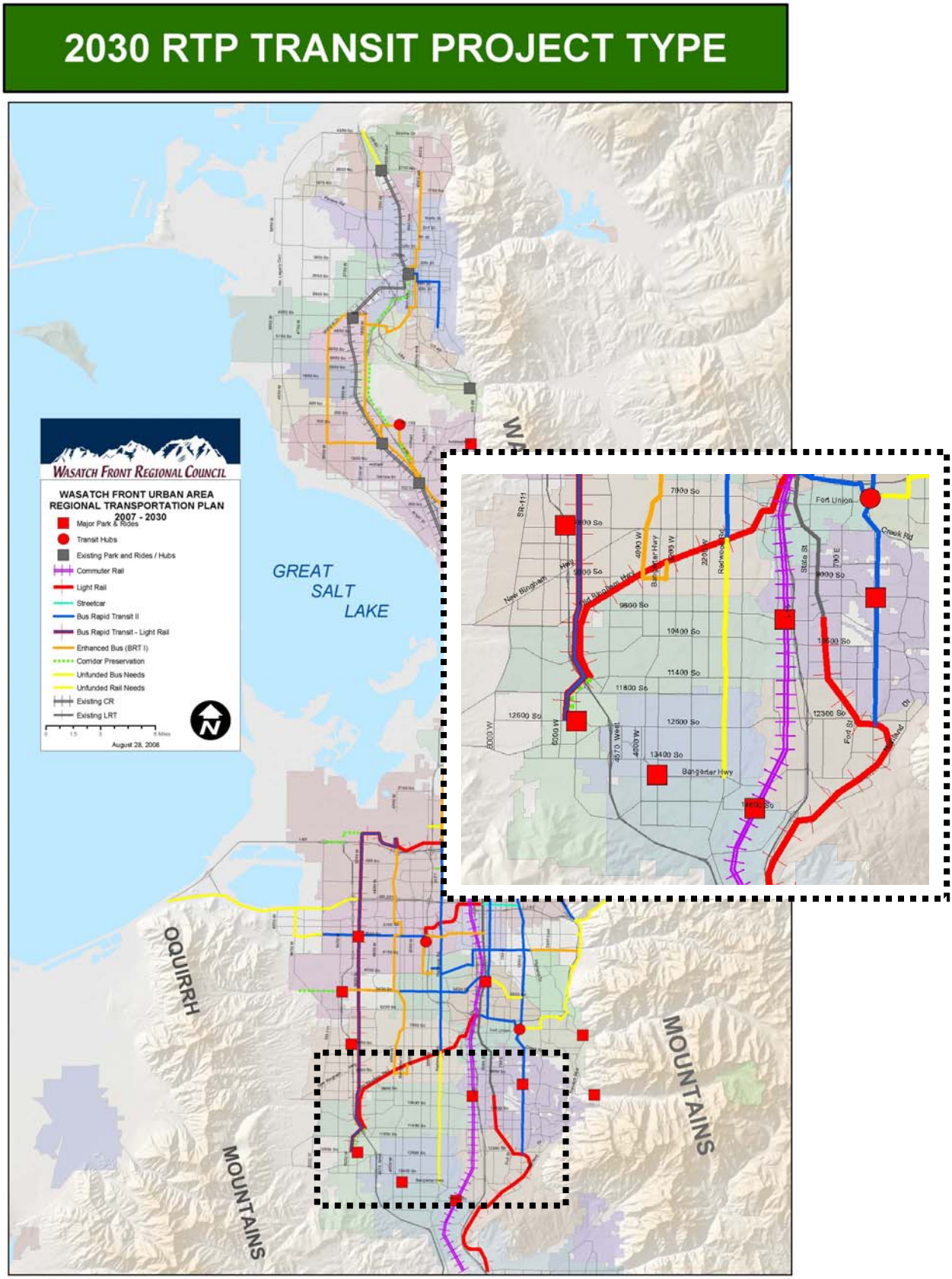


Figure 2-4 Wasatch Front Regional Council Transit Improvements Map



3. Existing Transportation Conditions

Developing an accurate assessment of the existing conditions in the region is an important first step in developing a Transportation Master Plan specific to Herriman City, and in further making recommendations regarding future transportation improvements. The existing street network and traffic patterns will serve as the basis for the future street network and in identifying future transportation conditions and needs.

3.1. Existing Roadway Functional Classification

The functional classification system is a hierarchical organization of streets and highways that facilitates the safe and efficient operation of vehicles along different types of facilities. Freeway and arterial facilities are at one end of the spectrum, primarily providing the function of moving vehicles. Collector and local streets are at the opposite end of the spectrum, providing access to property.

To enable streets and highways to accomplish their intended function, the planning and design of the facilities should consider those elements that support the intended functions. Descriptions of the various roadway functional types and related planning and design considerations are provided in Table 3-1.

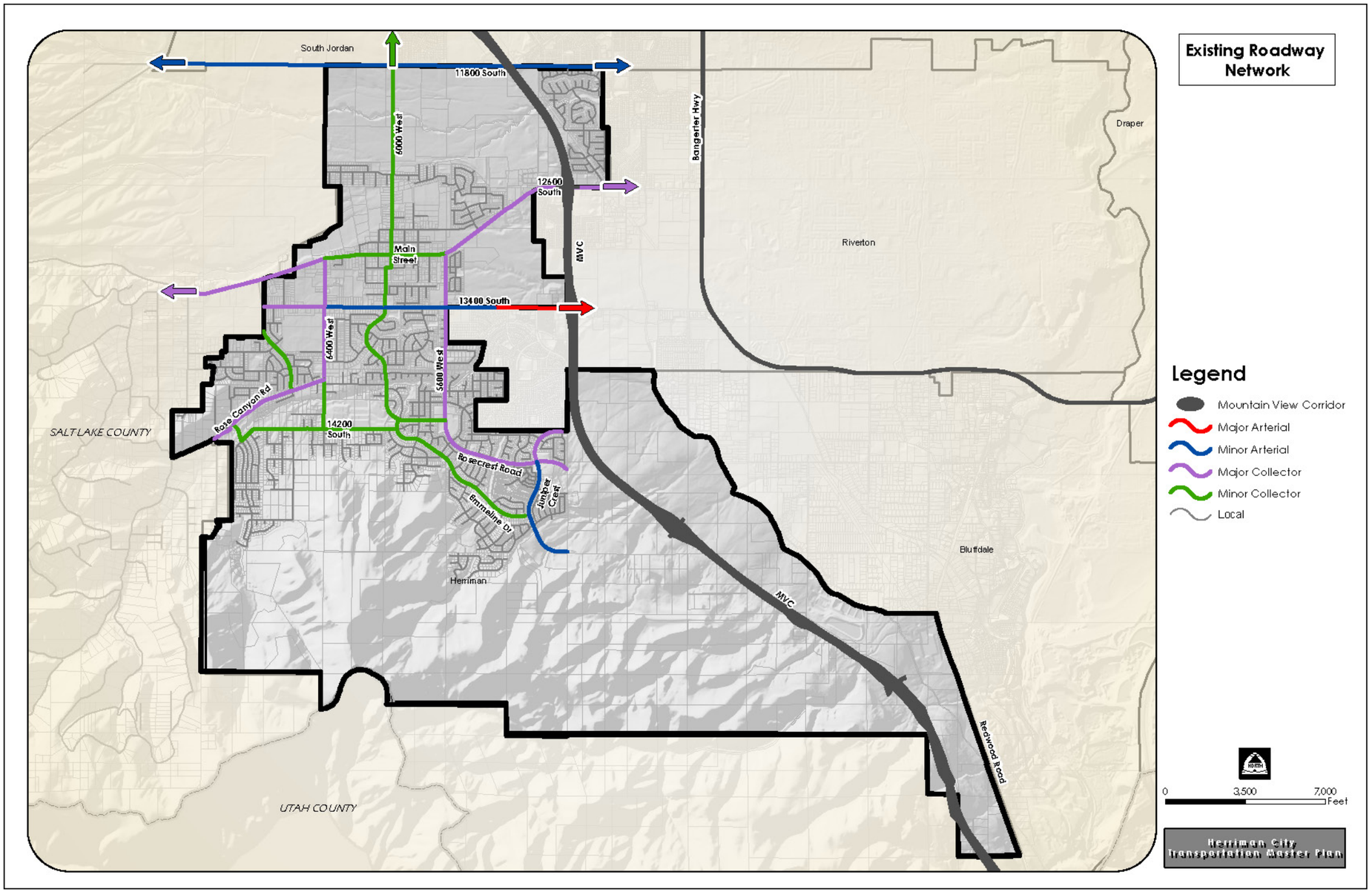
Table 3-1 Roadway Functional Classifications

Roadway Classification	Description	Example
Interstate	Interstates promote movement of traffic with limited access, high speeds, separated directional lanes, adequate geometries, and grade-separated intersections. The interstate freeway is essentially a specialized Principal Arterial.	I-15 I-215 I-80
Major Arterial	Principal Arterials are generally the high traffic volume roads within a study area. These roadways contain the greatest proportion of through or long-distance travel. Roadway access should be limited to promote efficient traffic movement. Speeds are generally in the 35 to 45 mph range in urban situations, and parking is usually prohibited. Arterials are typically about a mile apart, but may be spaced at a the half-mile separation. Many of the intersections will be signalized, and signal placement and coordination are critical to the operation of the arterial.	13400 South Redwood Road Herriman Parkway Juniper Crest
Minor Arterial	Roadways that connect principal arterials and collectors are classified as minor arterials. Minor arterials usually have capacity sufficient to carry 3 or 4 lanes of traffic and have curb, gutter and sidewalk along both sides. The predominant function of a minor arterial is to provide movement of through traffic, but it also provides considerable access for local traffic that originates or is destined to points along the roadway. Often minor arterials become boundaries to neighborhoods, and serve less concentrated developments such as neighborhood shopping centers or schools. Urban speeds are generally in the 35 to 40 mph range. Access may be restricted and parking is often prohibited in an urban situation.	11800 South 13400 South
Collector	A collector is intended to assemble and concentrate residential and rural traffic and direct it to the arterial system. Collectors usually have capacity to carry 2 or 3 lanes of traffic, and have curb, gutter and sidewalk along both sides. To preserve neighborhoods, collectors are generally spaced every half mile. Direct access to adjoining property is common and often essential. Operating speeds are generally in the 25 to 35 mph range. Parking is acceptable, but may be limited. Collectors are sometimes sub-categorized into major and minor collectors. Major collectors tend to connect important regional facilities directly to the arterials, while minor collectors usually connect to the local roads.	12600 South 5600 West Rosecrest Road Emmeline Drive

Roadway Classification	Description	Example
Local Streets	Local streets typically consist of 2 lanes and shoulders, with curb, gutter and sidewalks present in some locations. Local roads are the capillaries of a transportation network, providing direct access to public facilities, businesses, and private property. The typical speed limit on local streets is 20 to 25 mph and parking is usually permitted.	Local streets constitute all the City-owned roads that are not classified under the preceding categories. Some local roads may also be private streets.

Federal funding programs only apply to roadways with functional classifications of collector and above. Figure 3-1 shows the existing roadway classification for Herriman City. Figure 3-2 identifies typical roadway cross-sections for Herriman City.

Figure 3-1 Existing Roadway Classification



Description of Level of Service

Level of Service (LOS) is a measure of the performance of an element of traffic infrastructure and qualitatively describes levels of congestion. An intersection, a rural roadway, or an urban road segment can all be graded, A through F, based on the adequacy of their performance under given traffic conditions.

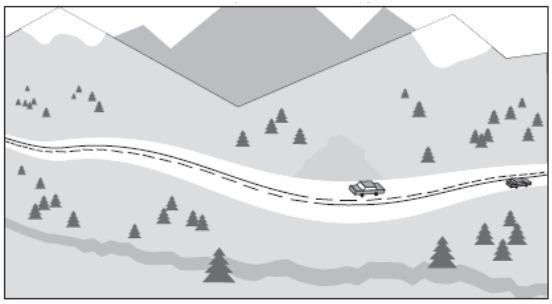
LOS is used to evaluate how well a roadway or intersection operates and is expressed as a letter grade from "A" to "F," similar to letter grades in school. LOS A represents traffic volumes that permit free vehicle movement with little to no congestion, and Level of Service F is traffic where conditions are very congested and vehicles may experience severe delay. Some congestion occurs at a level of Service D, but the transportation system is assumed to be adequate (not failing) at this level.

LOS is a description of different operating conditions that occur when accommodating various traffic volumes. It is a qualitative measure of the effect of traffic flow factors, such as: speed, travel time, interruptions and delays, freedom to maneuver, and driver comfort and convenience. The LOS for roadways and unsignalized intersections ranges from "free flow" to "highly congested flow."

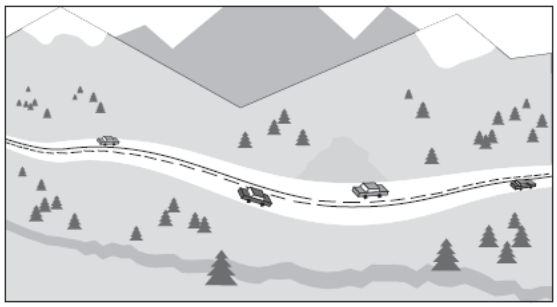
In rural areas, traffic flow is expected to be uninterrupted; but, in an urban situation the roadways are interrupted by traffic controls at intersections, lower speed limits, numerous approaches, and, in some cases, parking. These interruptions in urban situations usually provide the necessary gaps for vehicular access onto other roadways. Rural roadways with no gaps can often compromise vehicular safety because vehicle speed is unpredictable and roadway interruptions are not consistent as compared to urban areas.

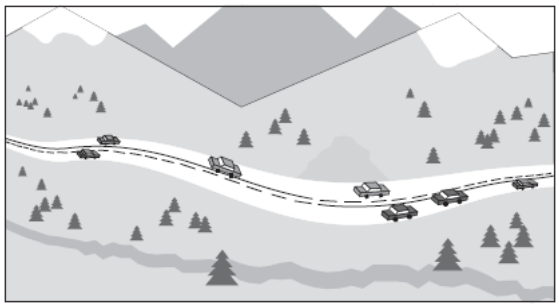
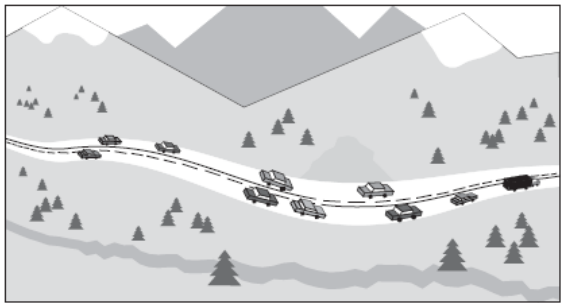
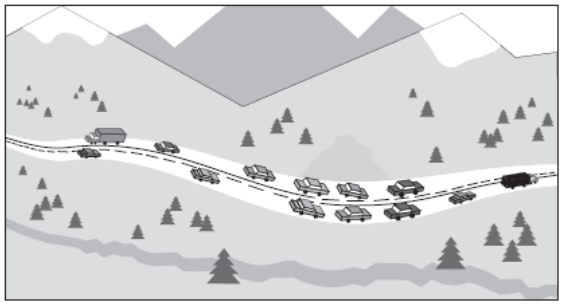
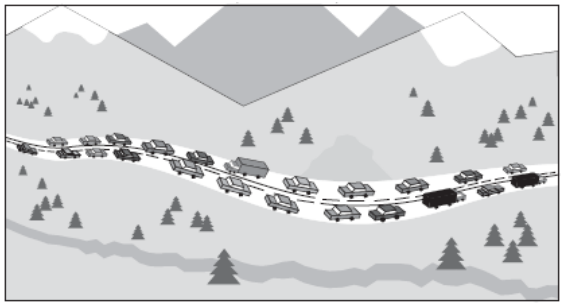
Most of the roadways within Herriman City qualify as urban for their LOS evaluation. The LOS for most of the urban roadways will be restricted by the performance of the intersections on the roadway. Flows are divided into six levels of service, which are defined as follows:

Level A — Free flow, low volumes and densities, high speeds. Drivers can maintain their desired speeds with little or no delay.



Level B — Stable flow, operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed. Suitable for rural design standards.



Level C	Stable flow, but speeds and higher volumes more closely control maneuverability. Suitable for urban design standards.	
Level D	Approaches unstable flow, tolerable operating speeds that are, however, considerably affected by operating conditions. Drivers have little freedom to maneuver.	
Level E	Unstable flow, with yet lower operating speeds and, perhaps, stoppages of momentary duration. Volumes at or near capacity.	
Level F	Forced flow, both speed and volumes can drop to zero. Stoppages may occur for short or long periods. These conditions usually result from queues of vehicles backing up from a restriction downstream.	

To determine the LOS of an urban roadway, numerous factors are considered. For planning purpose the factors to focus on are the number of travel lanes and the road's cross-section. The cross section includes the associated curbs, gutters, sidewalks, parking lanes and medians. These elements influence the efficiency and function of a roadway.

Herriman City has approved roadway design criteria to allow narrower right of way on some local roads. This criterion was introduced to accommodate traffic calming strategies and safety concerns expressed by residents.

Urban roadways are typically constrained by the operation of intersections, so much of the analysis focuses on intersection operation. On roadways where intersections are present, the intersections generally dictate the capacity of an urban roadway section. LOS is determined by the traffic operation performance at major intersections.

3.2. Existing Level of Service

Regional forecasts and plans assist with the development of Herriman's Transportation Plan. A Travel Demand Model was used to identify how many cars will use current and future roads based on the growth forecasts of Herriman City and its neighbors. The Model was also used to model how well the street network performed. The Travel Demand Model is used to predict traffic volumes which are used to estimate the Level of Service. It can also be used to quantify current conditions. The comparison between current and future traffic is used in this study because congestion is not just dependent on the number of vehicles using a road. The number of lanes, the capacity, speed and number of intersections and driveways are factors affecting the LOS experienced by motorists.

Planning in Herriman City has been performed to strive for a Level of Service D in the peak traffic hours for year 2020. Since roads cannot be scaled to exactly fit demand, Level of Service D is a planning goal, but this goal may vary on a street-by-street basis.

Roadways

Existing traffic volumes were provided by Herriman City or collected from recent planning documents. In addition, traffic volumes were collected on 12600 South (at two locations), 13400 South, and 5600 West to determine how much traffic volumes changed from counts obtained in 2006. The traffic volumes were used in determining the level of service for existing roadways, based on capacity as described above and identified in Table 3-2.

While a Level of Service of "A" or "B" is always desirable, achieving this is not always possible due to roadway width limitations. Therefore, often a LOS "C" or even "D" is acceptable for most arterial and/or collector roadways especially in urban areas. The Wasatch Front Regional Council has adopted LOS "D" as an acceptable standard. Additionally, this LOS of "D" is typically experienced during either AM or PM Peak travel for a short duration and would not be worth the capital expense to improve a roadway experiencing a LOS "D" for less than one hour. Figure 3-2 shows the existing Average Daily Traffic (ADT) and Figure 3-3 identifies the LOS for the existing roadway network.

Figure 3-2 Existing Average Daily Traffic

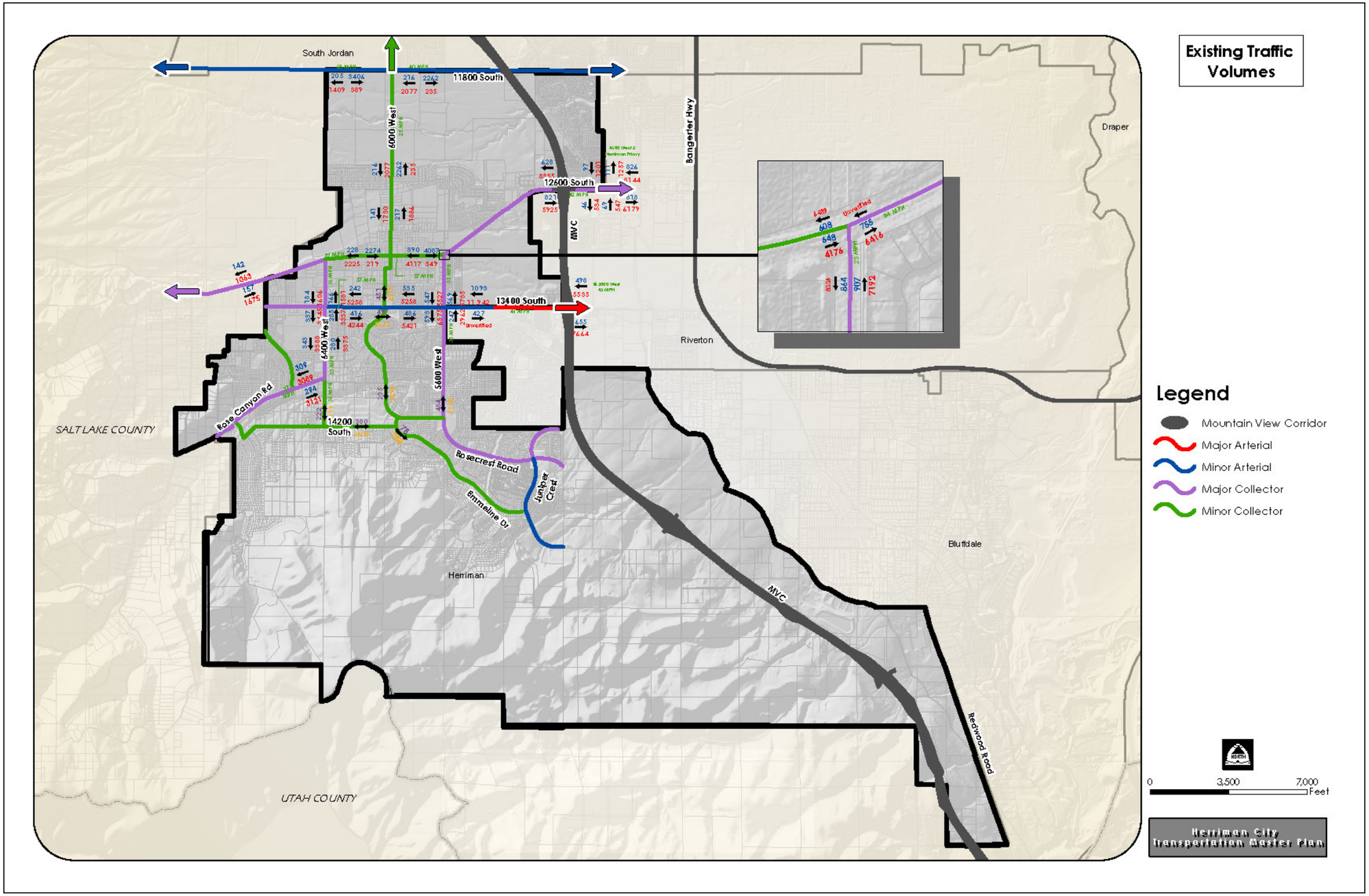
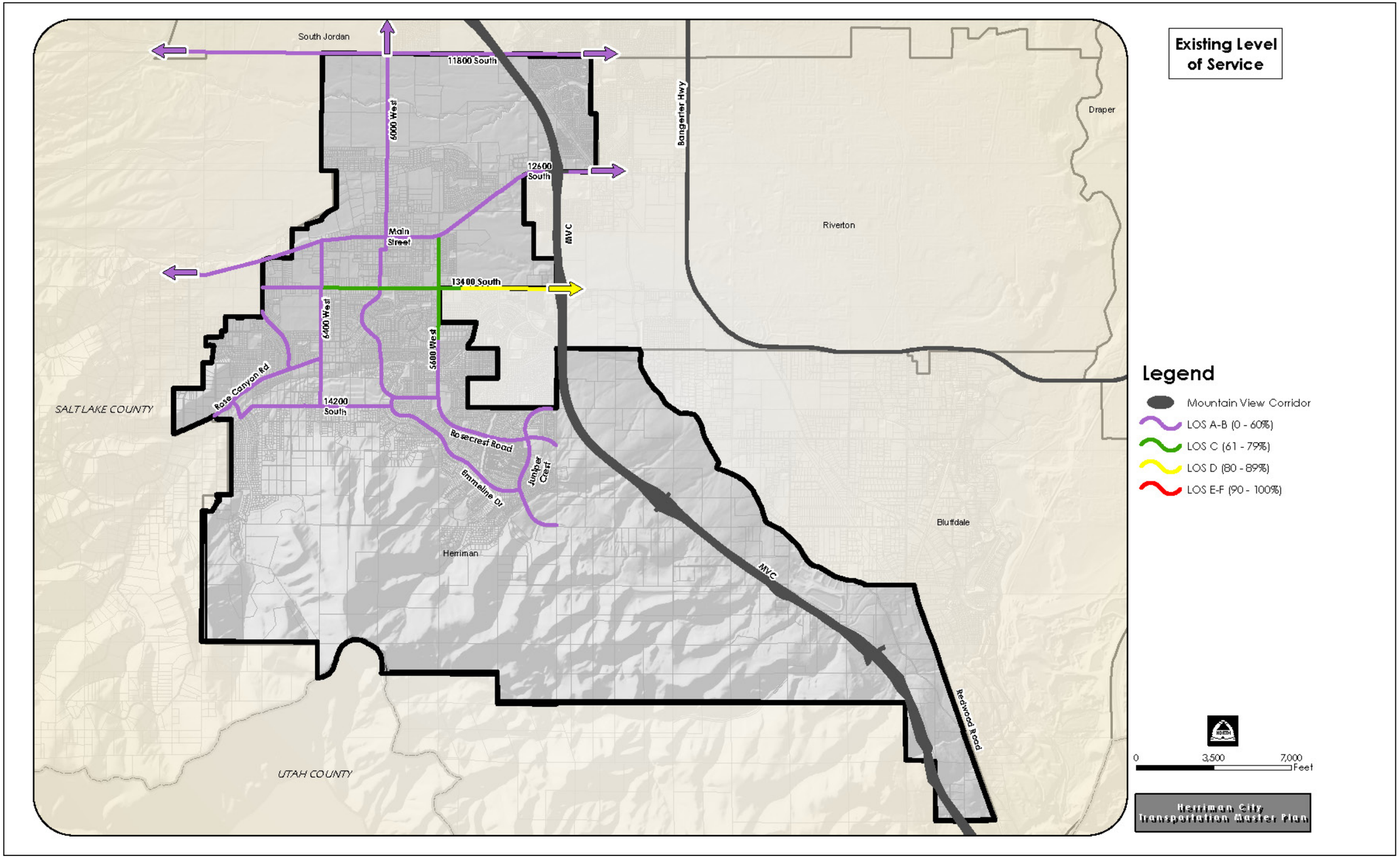


Figure 3-3 Existing Roadway Level of Service



Intersections

Intersections are usually analyzed by collecting turning movement volumes data, and then conducting a highway capacity analysis using the Highway Capacity Manual (HCM) method. This is done for short-range planning purposes when specific turning movement volumes can be obtained. Intersections are evaluated according to the Average Control Delay per vehicle and the corresponding LOS. The HCM LOS criteria for signalized and unsignalized intersections are summarized in Table 3-4.

Table 3-4 Level of Service (LOS) Criteria for Intersections

Level of Service (LOS)	Average Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	<=10	<=10
B	>10 - < 20	>10 - < 15
C	>20 - < 35	>15 - < 25
D	>35 - < 55	>25 - < 35
E	>55 - < 80	>35 - < 50
F	>80	>50

Source: Highway Capacity Manual 2000, Transportation Research Board, National Research Council, Washington, D.C., 2000.

The HCM method calculates delay based on the roadway capacity available to service the various movements at an intersection. For signalized intersections, capacity is based on the amount of green-light time provided for each movement and the impacts of any conflicting movements. For unsignalized intersections, delay is based on the availability of gaps in the major street to allow minor street movements to occur. Delay results in driver frustration and anxiety, loss of time and increased fuel consumption.

Generally accepted standards for unsignalized intersections indicate that intersection approaches must operate at better than LOS “F” for the minor approaches. For unsignalized intersections, approaches can operate at LOS “E” or better unless a secondary access is available.

For a signalized intersection, an intersection LOS of “D” is acceptable. A key component to improve the intersection LOS is to assure that intersection and timing of signals are adequately timed for the amount of traffic volumes for each approach.

Traffic control devices are an essential element to the operation of each intersection. Within Herriman City, two intersections are signalized, while others are controlled by stop or yield signs. The existing signalized intersections were selected for evaluation; turning movement counts were collected; traffic control devices; and posted speeds, adjacent parking, and so on were noted. The signalized intersections are located at 5600 West/Main Street and 5600 West/13400 South. For existing conditions, all signalized intersections are operating at acceptable LOS with the worst vehicle wait time between 35 and 55 seconds or a LOS of D.

3.3. Alternative Travel Modes

Bicycle and Pedestrian Facilities

Bicycling and walking are often the only modes available to the young and elderly. As Herriman City continues to grow, many of its once-quiet streets will carry large volumes of high-speed traffic without the benefit of an environment that is conducive to walking or biking.

A pedestrian and bicycle network allows shorter distance trips, such as children's trips to school, to be taken off of the street network and moved to the pedestrian network. In addition, bicycle and pedestrian facilities offer a wide range of recreational opportunities and often add to the quality of life. Figure 3-3 identifies the existing bicycle and pedestrian facilities in Herriman City.

Transit

Currently, the only form of mass transit available to Herriman City is provided by the Utah Transit Authority (UTA). UTA provides transit service in the form of a daily commuter bus, Route 347, which runs during commuting hours from Herriman City Hall to downtown Salt Lake City

3.4. Truck Routes

Herriman City has designated roadways along commercial corridors designated as truck routes to allow for access to businesses. The purpose is to concentrate all heavy truck traffic on specified roadways to minimize congestion, delay, and improve safety. Roadways designated as truck routes can be designed and constructed to handle the weighted loads, which will prolong the life of other roadways throughout Herriman City. The designation by signage will be handled by Herriman City. The following roadways are currently identified as truck routes for Herriman City (Figure 3-4 Truck Routes):

- 12600 South / 13100 South from Eastern Herriman City boundary to Western Herriman City Boundary
- 13400 South from Eastern Herriman City boundary to 5600 West
- 5600 West from 12600 South to 13400 South
- Redwood Road

Figure 3-3 Bicycle and Pedestrian Facilities

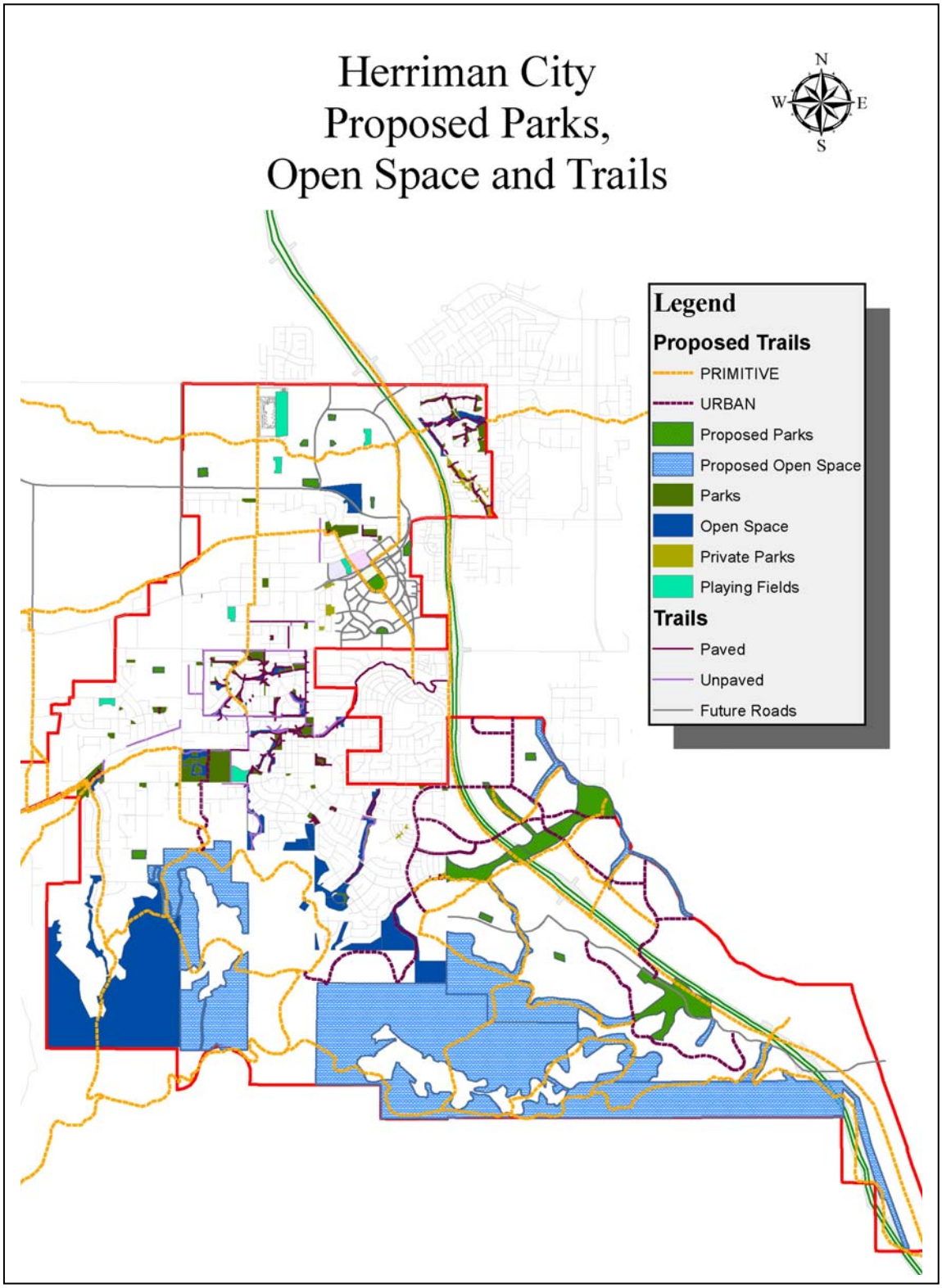
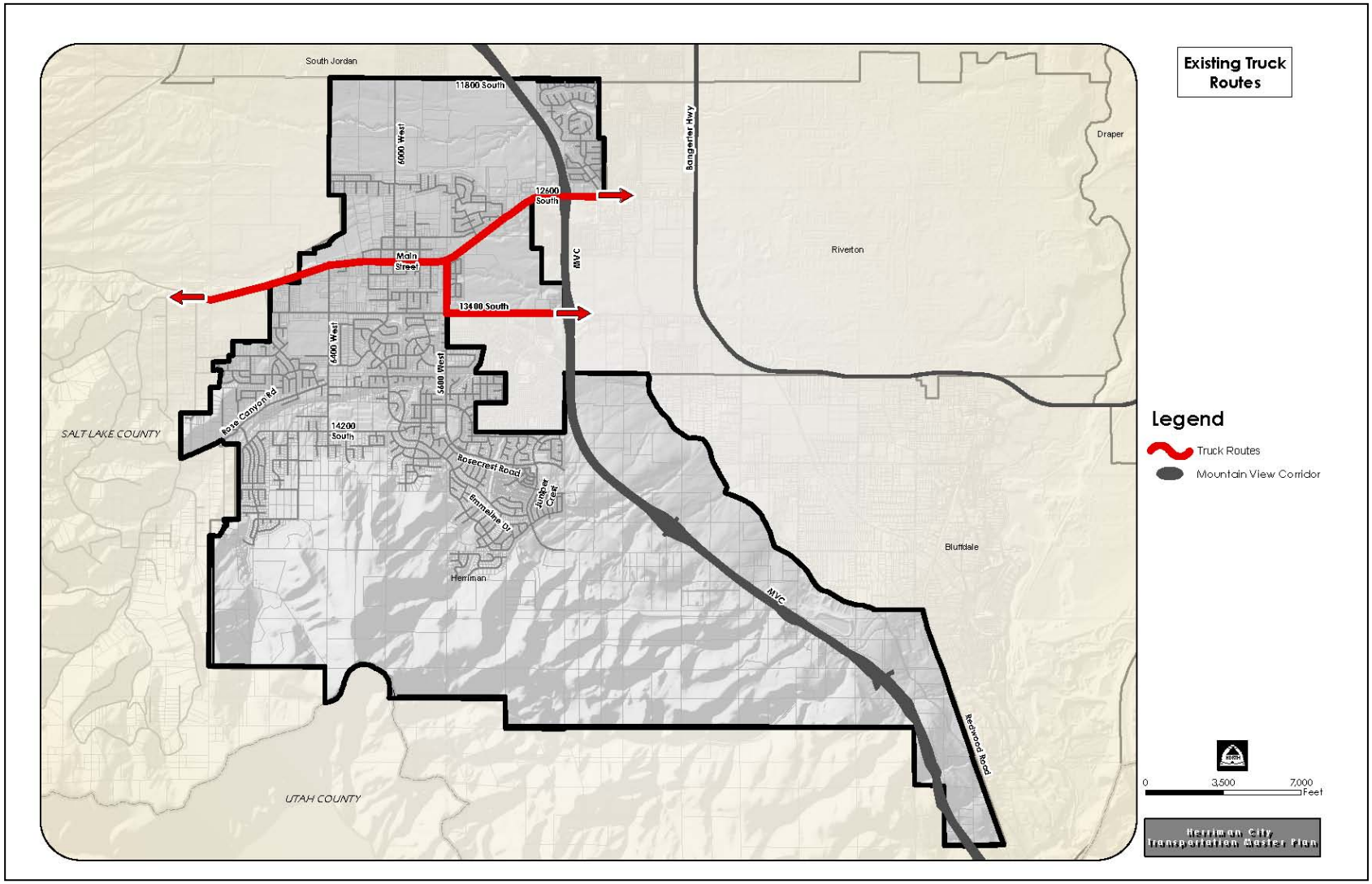


Figure 3-4 Truck Routes



3.5. Jurisdiction of Roadways in Herriman City

At the present time only one existing roadway segment; Redwood Road, within Herriman City is under the jurisdiction of the Utah Department of Transportation (UDOT). Salt Lake County controls and maintains the arterial road U-111, which is downgraded to a Herriman City collector street (Main Street) within Herriman City.

All other roadways within Herriman City are under Herriman City's sole jurisdiction, or are shared with adjacent jurisdictions including South Jordan and Riverton. The specific roadways with shared jurisdiction include:

- 11800 South between U-111 and 4800 West (shared with South Jordan).
- 12600 South between 5100 West and the east Herriman City limit – (shared with Riverton City).
- 13400 South between 5200 West and the east Herriman City limit (shared with Riverton City) – Future widening north of the existing 13400 South ROW is the responsibility of Herriman City.

On shared roadways, Herriman anticipates that each City will pay for half of the maintenance costs including asphalt maintenance, signal and striping, and associated construction costs.

4. Future Traffic Analysis

An understanding of the study area's characteristics and its growth potential is important in the preparation of a Transportation Master Plan. Development of the Herriman City Transportation Master Plan Update involved an evaluation of the existing versus future transportation network to determine their ability to meet future transportation needs. Transportation models were important in determining the future transportation needs of the study area, to develop future travel demand forecasts that were based on projected land use and development patterns in the area.

4.1. Future Land Use

The Herriman City General Plan anticipates that the majority of the land within Herriman City in the future will be a mix of land uses. The General Plan provides for additional residential development throughout Herriman City, with infill development on larger residential/agricultural lots that are currently developed with lower densities.

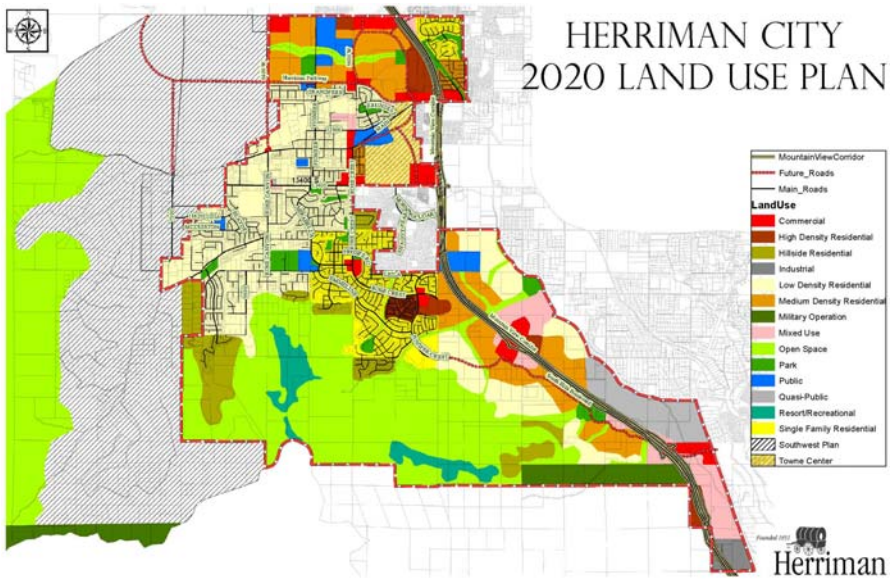


Figure 4-1 2020 Land Use Plan

Herriman actively seeks growth of commercial land uses for its future. Much of the employment growth is projected to occur in the proposed "Towne Center" located between 12600 and 13400 South. Employment pockets are also planned near and along the proposed Mountain View Corridor in the East Herriman.

The Herriman City General Plan was used as the basis for population and employment projections for Herriman City. The future population, household, and employment data were used to estimate future transportation demand within Herriman City, by estimating and distributing trips.

4.2. Trip Generation Analysis

Trip generation forecasts for the 2020 planning horizon year were developed using the QRSII travel demand model. This model is an appropriate planning tool at the micro-level versus a regional level. Regional travel demand models provide a macro-level tool to forecast future travel demand on the roadway network, while a regional travel demand model is an invaluable tool for understanding high-level travel demands throughout the Wasatch Front, it is limited in its sensitivity to detailed traffic operations, such as at individual intersections.

In the QRSII model, the land use and socioeconomic data that dictate travel demand and trip decisions within the model are defined over a discrete area, known as a Traffic Analysis Zone (TAZ). The trips produced within or attracted to the TAZ are then distributed onto the

roadway network via links known as centroid connectors, which generally represent the local roadway system and driveways not explicitly included in the model. In general, the more detailed the TAZ structure and centroid connections are, the more accurate a forecast becomes. The model was then run for the year 2020, based on the future land use and demographic information provided from Herriman City Staff.

ITE collects and publishes data from throughout the United States regarding the number of vehicle trips that a particular land use generates. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 7th Edition (ITE 7th Ed.), is typically used for predicting the future travel demand from various land uses. This is the industry standard when estimating the number of vehicle trip ends to be generated during the AM peak hour, PM peak hour, on normal weekdays. Therefore, it should be recommended that for all local traffic studies associated with future development in Herriman, the ITE Trip generation rates should be used to assure consistency in future projections.

Daily traffic within the transportation network includes three trip categories in this planning process:

- Traffic generated by the residents in the study areas.
- Pass-by traffic generated by the neighboring areas, such as Riverton and Day Break Community.
- Visiting traffic from surrounding regions for commercial purposes.

Residential Land Use Trip Generations

To estimate the travel demand from residential areas, 9.57 daily trips per housing unit[1] (ITE 7th Ed. - Single Family House) is applied for each housing unit in each TAZ. These trips were divided into two trip-purpose categories:

1. Out of the City – trips having at least one trip end outside Herriman City. This was estimated by examining the collected traffic data. It is assumed that one household in Herriman City will generate 4.4 trips daily to or from points outside Herriman City.
2. Internal Trips – all other trips, presumably with destinations to commercial, school, park and recreations. For the specific Towne Center area, It is assumed that 50% of these internal trips will use other modes of travel than vehicles.

Regional Business & Commercial Land Use Trip Generations

These trips are comprised of two trip-purpose categories:

1. Trips generated by residents within the City – Note that 10%-15% of trips are out-of-the-City trips, considering that some of people will stop by the commercial areas on their way back to home.
2. Visiting traffic from surrounding regions for commercial purposes – it is estimated that 37,000 trips per day will be generated from surrounding regions for commercial purposes. This traffic will use the proposed MVC interchanges located at 12600 South and 13400 South.

[1] Herriman City recommends that future traffic studies use the ITE residential trip generation rate of 9.57 used in developing this TMP.

The total projected trip generation for general land uses is identified in Table 4.1. Appendix A, Trip Generation Table, contains detailed trip generation, and the acreage and estimated density for each land use. The trips generated for each land use was then assigned to the 2020 roadway network, to determine roadway volumes and resulting LOS.

Table 4-1 2020 Trip Generation Analysis

Land Use	Total Acres	Total Projected Trips
Low Density Residential	1,727	9,015
Single Family Residential	1,390	17,225
Medium Density Residential	2,015	47,146
Hillside Residential	1,345	5,919
High Density Residential	256	15,444
Commercial	373	102,363
Towne Center	220	2,500
Mixed Use	435	39,793
Public	564	1,057
Park	258	411

5. 2020 Traffic Volumes & Road Network Improvements

Transportation network upgrades were determined by identifying the proposed 2020 road network, upgrading traffic control devices as necessary, and adjusting functional classifications as necessary for certain roads. These improvements were based on the traffic volume data from the 2020 travel demand model. Figures 5-1 identifies the 2020 Roadway Level of Service.

5.1. Roadway and Intersection Recommendations

Traffic volumes on the 2020 road network were evaluated to determine the roadway network operating conditions. The projected improvements for Year 2020 are depicted in Figure 5-2. Table 5-1 shows the projected average daily traffic volumes on road segment in 2020.

Table 5-1 2020 Roadway Average Daily Trips (ADT) and Recommended Class

Road Name	Segment ID	2010 ADT Generated From Herriman City Only	2015 ADT Generated From Herriman City Only	2020 ADT Generated From Herriman City Only	2020 ADT Generated With Surrounding Cities	2020 Road Functional Class	ROW (ft.)	Length (ft.)
						E-W		
11800 S. (Shared with Day Break)	1a	3,196	4,521	7,796	20,500	MJA5	106	3,432
	1b	4,308	8,511	10,508	20,500	MJA7	120	2,798
	1c	5,160	10,195	12,587	20,500	MJA7	120	2,429
	1e	9,277	13,123	22,628	40,000	MJA7	120	2,640
Parkway	3a	10,319	20,387	25,170	27,170	MJA5	106	3,643
	3b	14,190	28,034	34,611	36,611	MJA7	120	2,798
	3c	13,778	31,271	38,607	40,607	MJA7	120	2,376
	3d	18,396	36,344	44,870	46,870	MJA7	120	3,696
Parkway/ 12600 S. (Shared With Riverton City)	3e	22,850	45,142	55,732	57,732	MJA7	120	1,584
12600 S/Main St.	5a	4,054	8,010	9,889	9,889	MC	80	4,752
	5b	2,000	3,951	4,879	4,879	MC	81	2,693
	5c	2,925	5,779	7,135	7,135	MC	82	2,270
	5d	4,597	9,082	11,213	11,213	MJA5	106	4,594
13400 S	7a	6,182	12,214	15,080	15,080	MJA5	106	2,693

Road Name	Segment ID	2010 ADT Generated From Herriman City Only	2015 ADT Generated From Herriman City Only	2020 ADT Generated From Herriman City Only	2020 ADT Generated With Surrounding Cities	2020 Road Functional Class	ROW (ft.)	Length (ft.)
	7b	8,091	15,985	19,735	19,735	MJA5	106	2,640
13400 S. (Shared With Riverton City)	7c	12,327	24,353	30,066	30,066	MJA7	120	4,330
13400 S. (Riverton City)	7d	3,280	6,480	8,000	25,000	MJA7	120	--
Butterfield Parkway	9a	2,606	5,212	6,358	6,358	MINC	66	3,590
	9b	3,025	6,050	7,380	7,380	MC	80	2,640
	9c	2,127	4,254	5,188	5,188	MINC	66	1,901
	9d	1,785	3,590	4,355	4,355	LOCAL	60	5,808
	9e	444	880	1,083	1,083	LOCAL	60	3,907
	9f	1,633	3,266	3,984	3,984	LOCAL	60	5,808
Juniper Crest RD/15000 S	11a	12,300	24,600	30,000	30,000	MJA5	106	7,200
	11b	18,900	37,339	46,098	61,098	MJA7	120	1,800
	11c	--	30,748	37,961	52,961	MJA7	120	1,800
1500S (Riverton City)	11e	7,676	15,352	18,722	28,722	MJA5	106	5,400
15800 S.	13a	--	6,560	8,000	8,000	MINC	60	5,400
4000 W.	13b	--	16,627	20,277	20,277	MJA5	106	6,300
3600 W. Overpass	13c	--	3,280	4,000	4,000	MC	80	2,700
	13d	--	7,079	8,633	8,633	MC	80	3,600
	13e	--	--	500	8,500	MINC	66	1,000
16000 S.	15a	--	9,020	11,000	11,000	MJA5	106	6,300
	15b	--	16,200	20,000	20,000	MJA7	120	1,000
	15c	--	22,832	27,845	47,845	MJA7	120	1,000
	15d	--	11,480	14,000	34,000	MJA7	120	2,340

Road Name	Segment ID	2010 ADT Generated From Herriman City Only	2015 ADT Generated From Herriman City Only	2020 ADT Generated From Herriman City Only	2020 ADT Generated With Surrounding Cities	2020 Road Functional Class	ROW (ft.)	Length (ft.)
							N-S	
6400 W.	2a	2,202	4,352	5,373	7,373	MC	80	4,382
	2b	3,245	6,411	7,915	9,915	MC	80	4,118
	2c	3,351	6,619	8,175	10,175	MC	80	1,109
	2d	5,349	10,699	13,048	13,048	MC	80	3,010
	2e	2,211	4,423	5,394	5,394	MC	80	2,006
	2f	1,127	2,255	2,751	2,751	LOCAL	60	5,016
6000 W.	4a	2,266	4,532	5,528	7,528	MC	80	3,062
	4b	2,099	2,199	2,682	4,682	MC	80	3,432
	4c	410	820	1,000	3,000	MC	80	2,376
	4d	2,553	5,106	6,227	6,227	MINC	66	5,808
	4e	5,666	11,195	13,821	13,821	MINC	66	6,970
5600 W.	6a	6,808	13,616	16,605	21,605	MJA5	106	3,643
	6b	3,683	7,366	8,984	13,984	MC	80	3,643
	6c	6,779	13,599	16,582	16,582	MJA5	106	2,270
	6e	5,479	10,958	13,364	13,364	MJA5	106	792
	6f	5,041	9,959	12,296	12,296	MC	80	4,013
Rosecrest Rd.	6g	4,213	8,325	10,278	10,278	MC	80	5,280
	6h	5,728	11,318	13,973	13,973	MC	80	2,270
South Hill Blvd.	8a	--	22,384	27,635	27,635	MJA5	106	2,340
	8b	--	8,111	10,014	10,014	MJA5	106	8,100
	8c	--	14,599	18,019	18,019	MJA5	106	3,600
2000 W.	8d	--	17,354	21,425	21,425	MJA5	106	8,100
5000 W.	10a	--	2,430	3,000	4,000	LOCAL	60	3,802
	10b	--	2,210	2,729	3,729	LOCAL	60	1,795
	10c	--	20,365	25,141	26,141	MJA5	106	1,056
	10e	--	15,701	19,385	27,385	MJA5	106	2,112

MJA7 = Major Arterial 7 lanes
MJA5 = Major Arterial 5 lanes
MC = Major Collector 3 lanes
MIN = Minor Collector lanes

Figure 5-1 2020 Roadway Level of Service

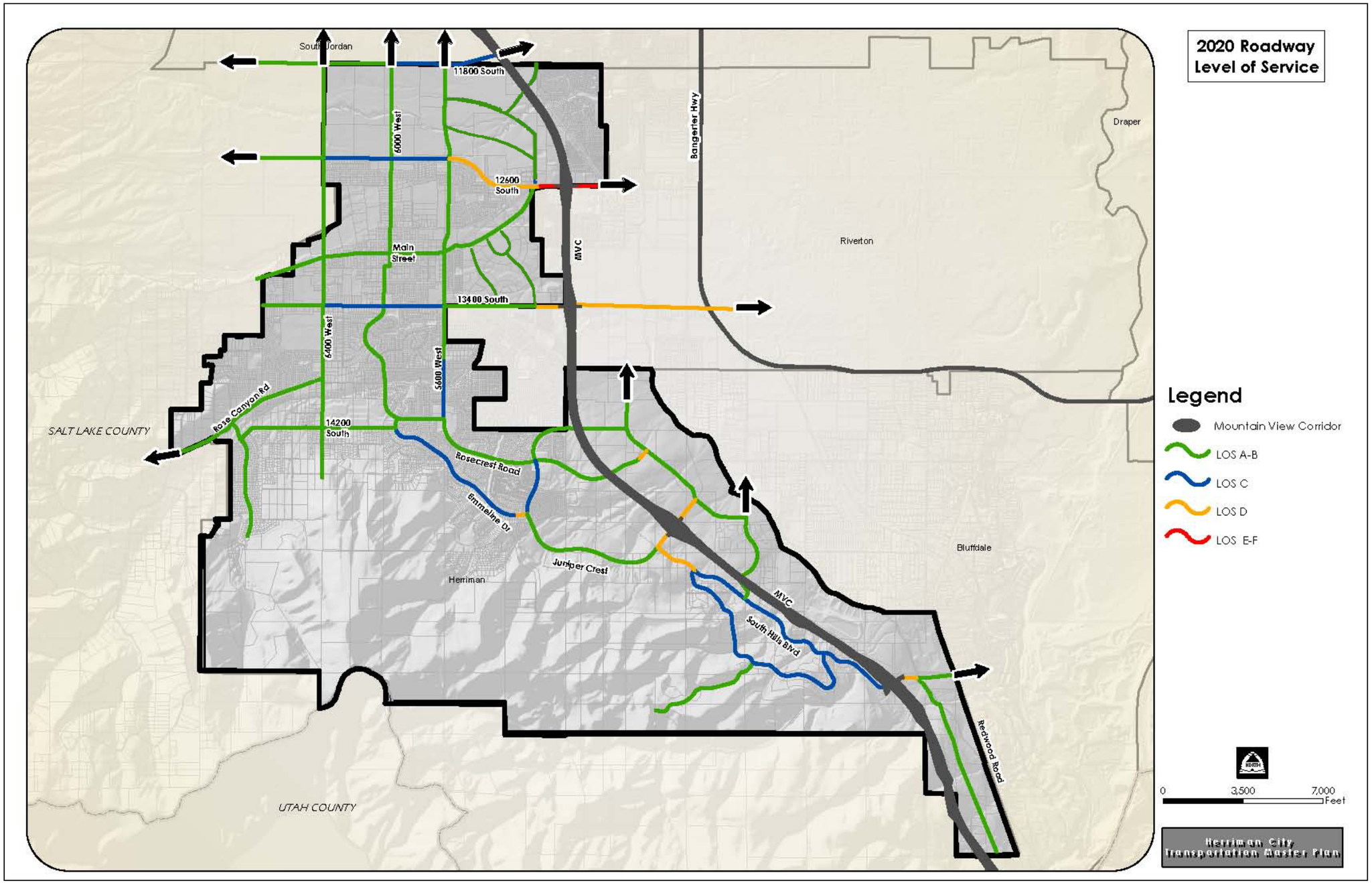
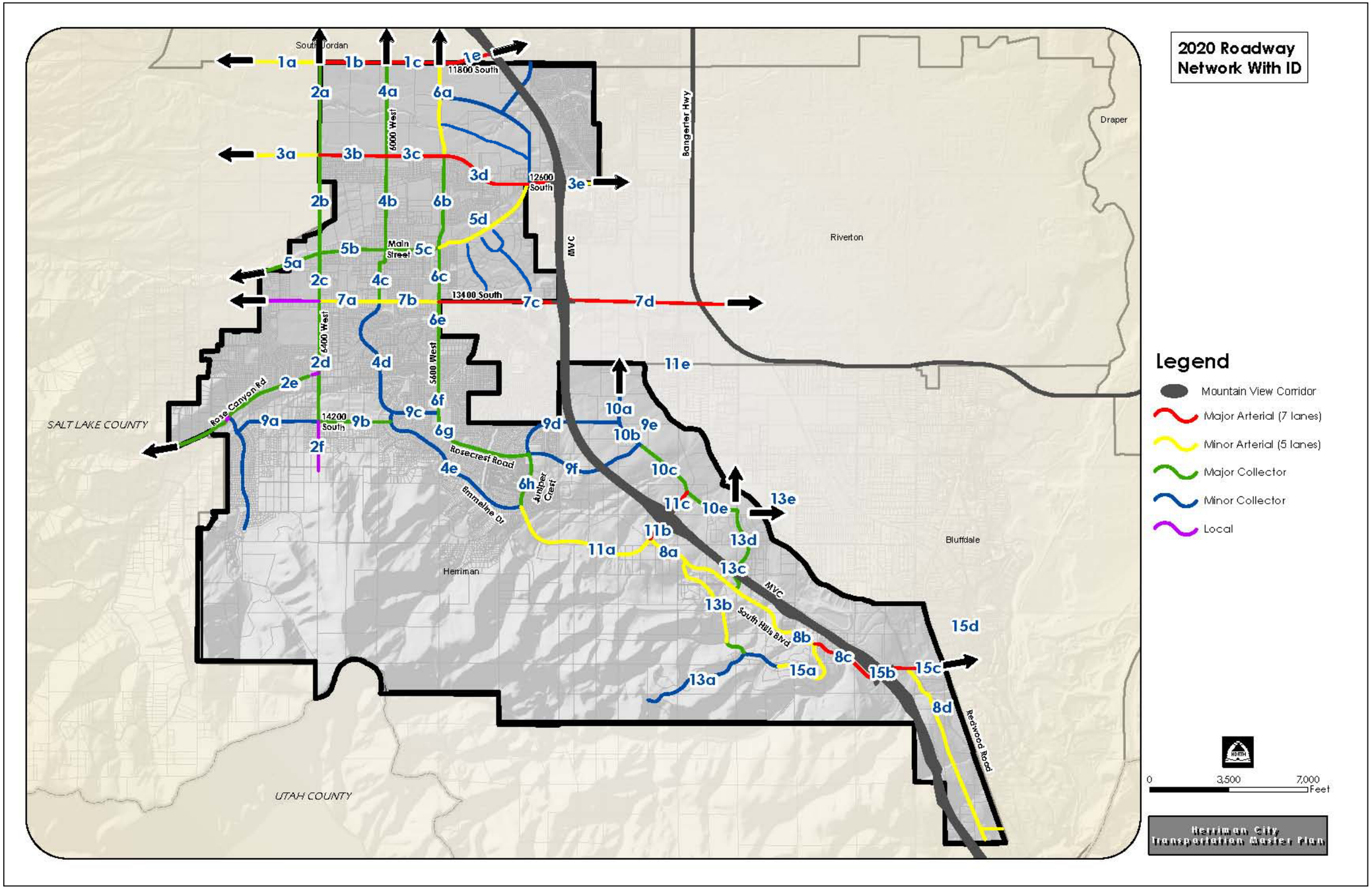


Figure 5-2 2020 Roadway Improvements



Roadway Improvement Descriptions

11800 South

Recommended roadway improvements would include a slight realignment to accommodate the Mountain View Corridor (MVC) alignment. It is also recommended that the roadway be classified as a major arterial, accommodating a seven lane roadway cross section between the MVC and 6000 West. Because this location will be the only crossing of MVC between 11400 South and 12600 South Interchanges, it is projected to carry a great deal of east-west traffic that will be distributed onto north-south roads providing access to the adjacent MVC interchanges. It is suggested that a 120-foot ROW section be acquired to accommodate this demand. Traffic signals are recommended when they become warranted[2], to be installed at the major intersection crossings of 5600, 6000, and 6400 West as shown in Table 5-2 and Figure 5-4.

12600 South/Herriman Parkway

The 12600 roadway currently provides access to and from Herriman with access to Bangerter Highway and easterly destinations. Herriman Parkway is currently being constructed in phases as it is proposed to connect into 12600 South at approximately 5000 West, more or less. The 12600 roadway is designated as a MVC Interchange location. Therefore, it is recommended that a 120-foot wide right-of-way section be provided to accommodate a seven lane roadway cross section. Accessibility onto this arterial corridor should be limited to collector grade roadways or higher that will likely be controlled by future traffic signals. Traffic signals are recommended as warranted, to be installed at the major intersection crossings of 5600, 6000, and 6200 West as shown in Table 5-2 and Figure 5-4.

13400 South

Along with 12600 South, the 13400 South corridor will serve as the primary arterial east-west routes traversing Herriman City. Additionally, 13400 South is designated as a MVC Interchange location. Therefore, it is recommended that a 120-foot wide right-of-way section be provided to accommodate a seven lane cross section between the MVC Interchange and 5600 West. Between 5600 and 6400 West it is recommended that a 106-foot wide right of way section be provided to accommodate a five lane roadway cross section. A connection with 7300 West is ultimately recommended with the alignment to be determined thru ongoing coordination efforts by Herriman City and the property owner. Traffic signals are recommended as warranted, to be installed at the major intersection crossings of 13400 South as shown in Table 5-2 and Figure 5-4.

Butterfield Parkway/14200 South

It is anticipated that Butterfield Parkway will serve as a primary corridor for residents in the west area of Herriman providing access to 13400 South via 6400 West, 6000 West and 5600 West. This roadway is recommended that an 80-foot wide right of way section be provide to accommodate a three lane roadway cross section between Emmeline Drive and 7000 West.

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[2] Traffic Signal Warrant: a study must be prepared to determine if a traffic signal is needed based on several factors identified in MUTCD.

Between 7000 West and 6400 West, only a 66-foot wide right of way section is recommended. This will still accommodate a three lane roadway cross section. Future traffic signal is recommended when warranted at the intersection where these roads split.

Juniper Crest/15000 South

Juniper Crest will serve as a primary corridor for residents in the southwest and east Herriman areas. Juniper Crest is an identified MVC Interchange location. For this reason, it is recommended that a 120-foot wide right of way section be provide to accommodate a seven lane roadway cross section between South Hills Blvd and approximately 4000 West. The roadway between South Hills Blvd. and Emmeline Dr. is recommended that a 106-foot wide right of way section be provided to accommodate a five lane roadway cross section. This same 106-foot cross section is also recommended for the roadway between 4000 West (approximately) and the Riverton City boundary.

15800 South

15800 South is classified as a 66-foot wide minor collector roadway that will provide connectivity to the southeast bench area of Herriman City. This roadway is recommended that sensitivity to hillside and terrain be incorporated into the design as appropriate.

4000 West (unnamed east Herriman Road)

This road is currently not named but is identified in the east Herriman area. It is recommended that a 106-foot wide right of way section be provided to accommodate a five lane roadway cross section. This is recommended due to this roadway carrying a substantial amount of vehicular traffic in the east Herriman area. Additionally, this road will provide access to a proposed MVC Interchange via the Juniper Crest/15000 South Interchange. Traffic signals are recommended as warranted, to be installed at the major intersection crossings as shown in Table 5-2 and Figure 5-4.

16000 South (approximate)

The proposed roadway at approximately 16000 South is designated as a MVC Interchange location. Therefore, it is recommended that a 120-foot wide right-of-way section be provided to accommodate a seven lane cross section between the MVC Interchange and east Herriman/Bluffdale boundary and between the MVC Interchange and South Hills Blvd. This road is also recommended to assure connectivity with Bluffdale's Porter Rockwell Blvd which is identified to provide connectivity to this MVC Interchange. Traffic signals are recommended as warranted, to be installed at the major intersection crossings as shown in Table 5-2 and Figure 5-4.

6400 West

The 6400 West roadway is recommended as an 80-foot wide major collector roadway accommodating a three lane roadway cross section. The road currently exists from 14200 South to Main Street but will require some widening to implement the proposed five (5) lane

roadway width. The section from Main Street to 11800 South will be a new roadway segment at the recommended width of 106 feet to accommodate the five (5) lanes.

6000 West

6000 West is classified as a 66 foot wide minor collector roadway that will provide connectivity through the center portion of Herriman City and from the adjoining major east-west corridors. The roadway is mostly constructed but will require a new connection between Herriman Parkway and 11800 South.

5600 West

5600 West serves a primary function for north-south traffic particularly north of Main Street. This road will be the principal connector for Herriman City to the proposed 11400 South interchange on MVC. As such, this road should be sized to a 106 foot wide five (5) lane facility north of Herriman Parkway in order to accommodate the anticipated traffic volumes. Between Main Street and Herriman Parkway this roadway segment is recommended to consist of five (5) lanes within a narrower 80 foot right-of-way width. South of Main Street the 80 foot width, five (5) lane configuration should continue to 14200 South at which point the road will turn to the east and pass under the MVC into East Herriman.

Intersection Improvements

Figure 5-3 and Table 5-2 show the projected LOS and turning traffic volumes at suggested traffic signalized intersections in 2020. Figure 5-4 identifies the intersections recommended for signals. Most intersections are projected to operate at acceptable LOS. Figure 5-5 identifies proposed roadway improvements. The MVC interchange intersections maybe operate at worse than LOS E in 2020, due to the traffic from Riverton and other cities. The intersection of Herriman Parkway and 5600 West is projected to operate at LOS E. While these may represent conditions worse than residents are accustomed to, it is an acceptable level of service in urban areas.

To provide the optimal coordinate between signals Herriman City should use Signal Interconnect for future road projects. Therefore, once the UDOT signal fiber is available through development of the MVC, Herriman City signals can be connected to the regional system.

All signals should also be installed with signal preemption for emergency service vehicles.

Table 5-2 2020 Traffic Signalized Intersections & Projected LOS

2020 Traffic Signalized Intersections	Projected 2020 LOS
11800 S./6400 W.	C~D
11800 S./6000 W.	D
11800 S./5600 W.	D~E
Herriman Parkway/6400 W.	B
Herriman Parkway/6000 W.	B
Herriman Parkway/5600 W.	D
Herriman Parkway/Main St.	C~D
Herriman Parkway/MVC Interchange	E~F

2020 Traffic Signalized Intersections	Projected 2020 LOS
13100 S./6400 W.	B
13100 S./5600 W.	B
13400 S./6400 W.	C
13400 S./6000 W.	B
13400 S./5600 W.	C
13400 S./MVC Interchange	D~E
West Rose Canyon Rd./6400 W.	A
W. Butterfly Parkway/6400 W.	A
W. Butterfly Parkway/W. Emmeline Dr.	A
Mirabella Dr./5600 W.	A
S. Juniper Crest Rd./W. Rosecrest Rd.	B
15000 S./South Hill Blvd.	C~D
15000 S./MVC Interchange	E~F
15000 S./4000 W.	E~F
South Hill Blvd./4000 W.	B
South Hill Blvd. /3600 W. Overpass	A
South Hill Blvd./3000 W.	A
4000 W./3600 W. Overpass	A
16000 S./MVC Interchange	E~F
16000 S./ 2200 W.	C~D
16000 S./ Redwood Rd.	D~E
4000 W./13400 S.	C~D

Mountain View Corridor

As described earlier, the Mountain View Corridor has been in the planning stages for several years. The final EIS and Record of Decision were approved in late 2008. During the preparation of this Transportation Master Plan update, it was determined by UDOT that the MVC would be developed in phases. The first phase of development for the MVC would prepare two-way frontage roads on either side of the proposed highway alignment. The highway would then be built within the right of way at some time in the future. The frontage roads would accommodate future vehicular travel and access for the developing communities adjacent to the MVC.

The modeling for this TMP assumed interchanges at the identified locations as described throughout this document. It was not anticipated that it would have an affect to this TMP update within the next five years. It is anticipated that the development of the MVC frontage roads would be completed in the next 3-5 years or longer. Due to this interim step for the MVC, it is highly recommended that Herriman City reevaluate the access roadways adjacent to the frontage roads as development occurs in those areas.

Figure 5-3 2020 Intersection Level of Service

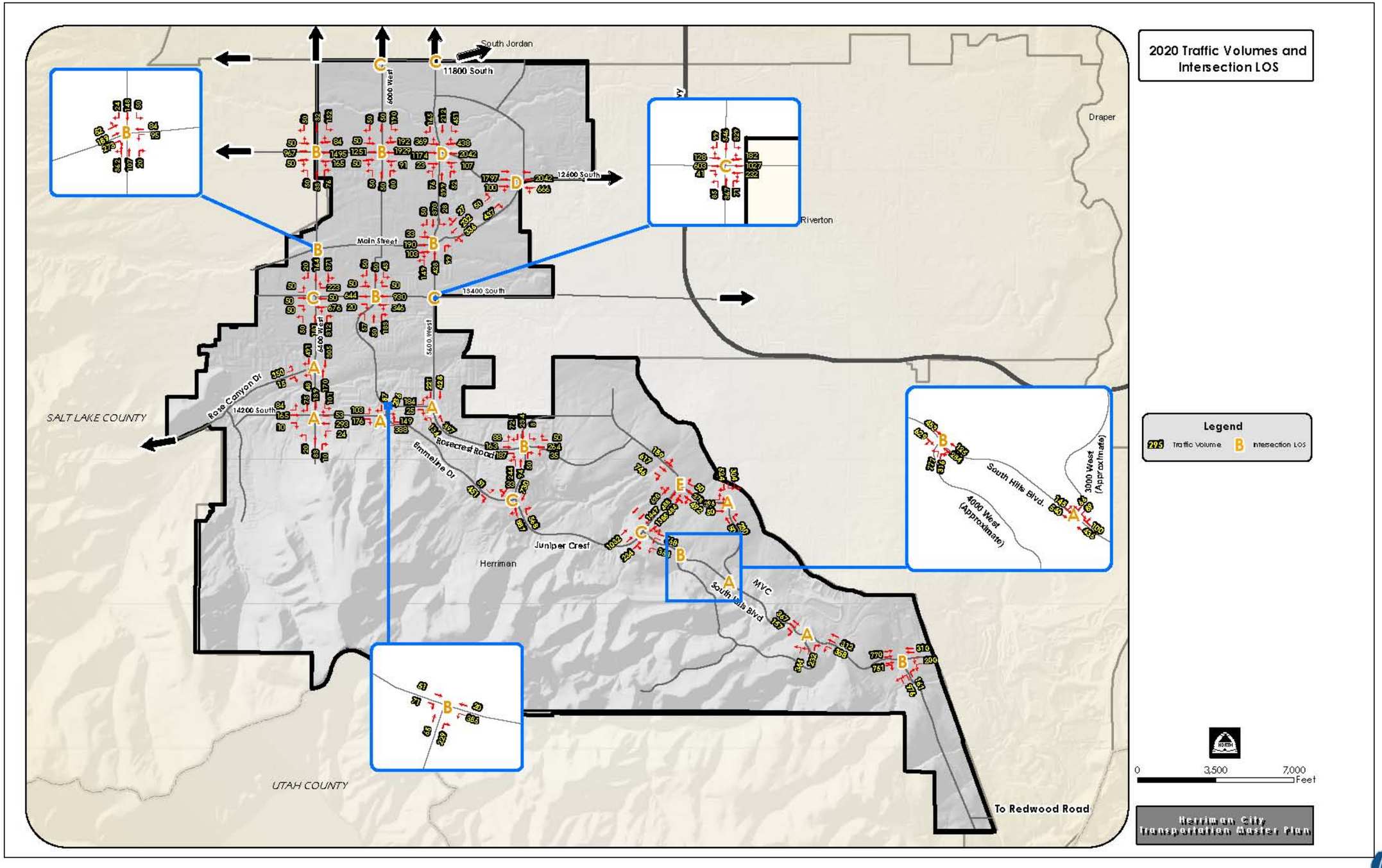


Figure 5-4 2020 Recommended Signalized Intersection

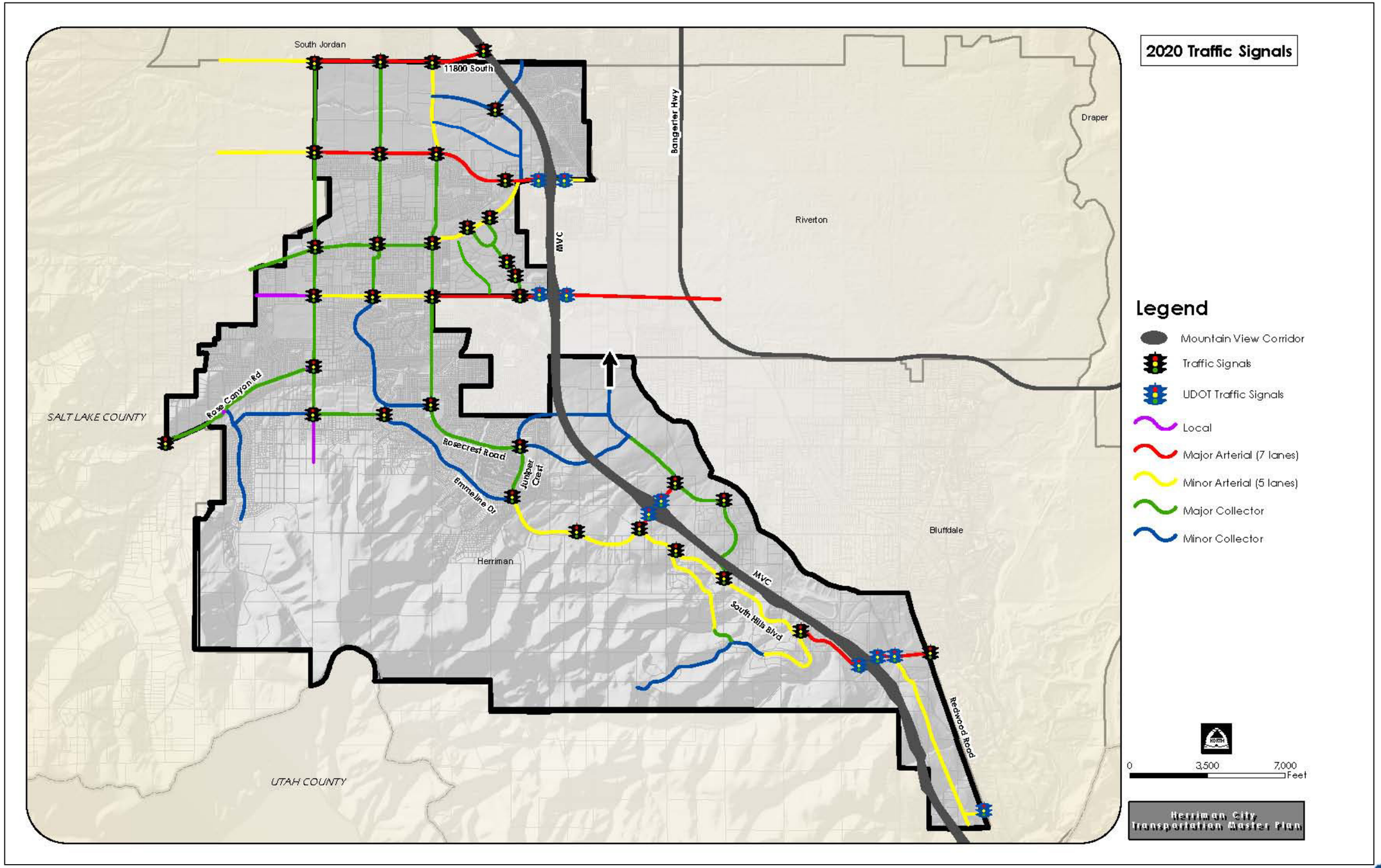
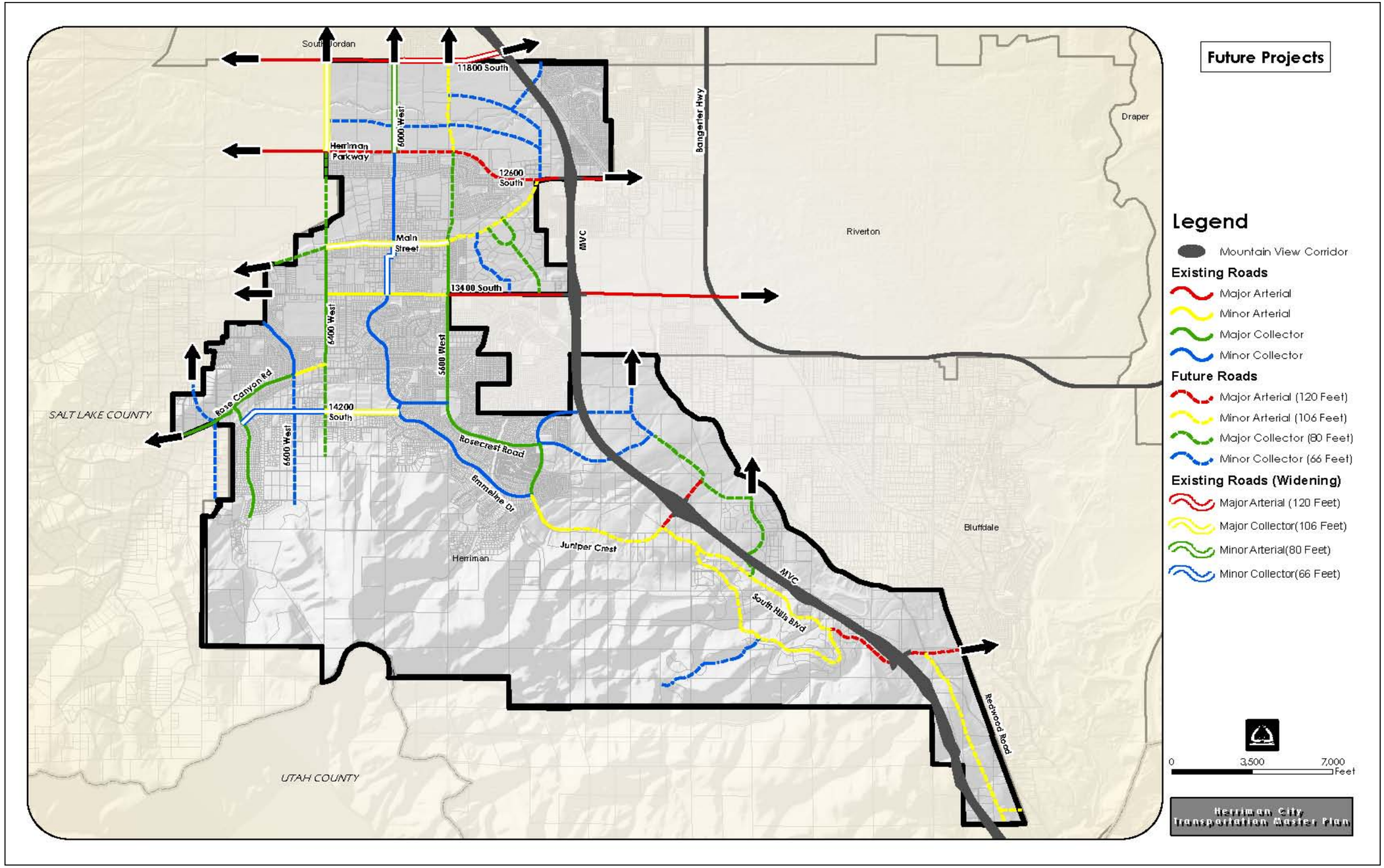


Figure 5-5 2020 Proposed Roadway Improvements

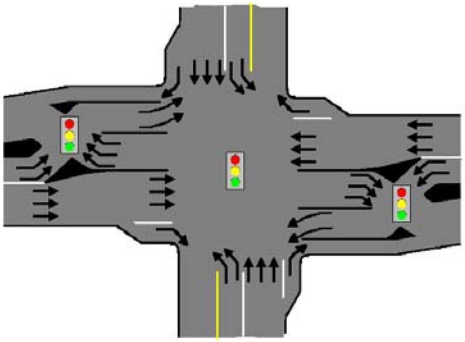
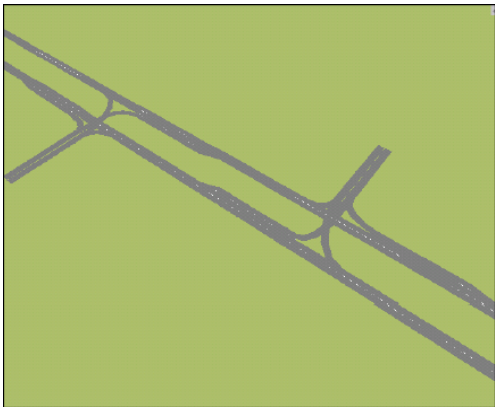
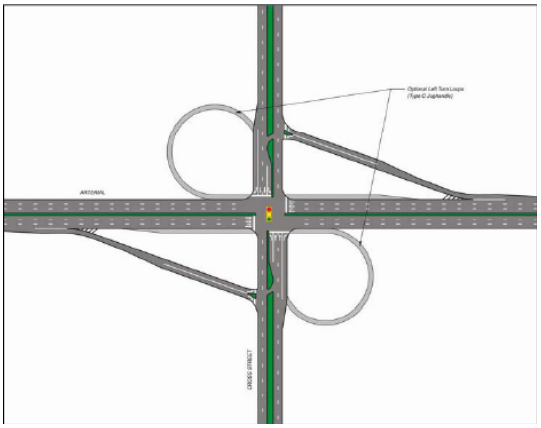


Traffic Signal Options

While traffic signals are the most common method for traffic flow and safety improvements, once traffic volumes exceed a certain threshold, mobility begins to decline and LOS degrades. Many State Transportation Departments as well as County and City transportation departments are looking for creative solutions to increase mobility, improve LOS and maintain vehicular and pedestrian safety.

The following are descriptions of some potential innovative intersection designs that could improve mobility and LOS, while not necessarily requiring a traffic signal. In some cases even if traffic signals are required, the left turn movement is displaced from occurring directly at the intersection to eliminate and/or minimize this conflict. Table 5-4 identifies a few intersection design options.

Table 5-4 Options to Traffic Signal

Traffic Control Alternative	Description	Figure
Continuous Flow Intersection	An innovative intersection design in which left-turning vehicles cross over the travel lanes of the opposing through movement in advance of the intersection, so left-turns and through movements at the main intersection can proceed simultaneously. Also referred to as a "crossover displaced left-turn."	
Continuous Green "T"	A design option at T intersections where oncoming traffic from the right need not be stopped to allow left-turns from the T-approach to enter. Instead, left turns have an extended merge lane.	
Jug handles or mini cloverleaf	To make a left turn, all vehicles would instead make three rights on a "loop ramp" as with a cloverleaf freeway interchange. Unlike a loop ramp on a freeway, this would be very low speed (15-20 mph).	

Logical Development of Roadways

City's always struggle with providing infrastructure improvements to keep pace with development. While several roadway and intersection improvements have been identified throughout Herriman City, it is imperative that new development, particularly in East Herriman, is consistent and methodical with existing and planned roadway infrastructure improvements. Development which is approved and built prior to roadway infrastructure will

require Herriman City to shift project prioritization and funding to these areas to assure safety and access are implemented. With this type of haphazard development, an "island" is often created which forces Herriman City to provide services to these areas even if access is circuitous and discontinuous. Additionally, this change in prioritization results in deficient areas originally programmed for improvements having to wait longer until new funding becomes available.

5.2. Hillside Development Recommendations

Steep slopes are defined as lands in their natural state that have a slope angle of 20% or greater for a minimum horizontal distance of 10 meters. Street networks on the hillside are often designed to fit local topography, to protect environmentally sensitive areas and to minimize cut and fill grading at the site development stage. Unlike neo-traditional neighborhoods with a grid street pattern, hillside networks often resemble a "Christmas tree" pattern with many curvilinear roads, cul-de-sac's, steep grades and limited access routes. Whereas neo-traditional neighborhoods can distribute or disperse traffic onto multiple streets in a grid network, hillside traffic is funneled onto few residential collectors and arterials available to the motorist. Common challenges are summarized below:

- Steep Road Grades -- Many collector and local roads are designed to the maximum allowable grade of 12%. Intersection k factors are usually at minimum values (2 for local and 4 for collector).
- Traffic and Driveway Conflicts -- Many complaints arise from residents who have difficulty exiting from their driveways; especially along busy residential collector routes. This problem is exacerbated if driveways are steep.
- Limited Routes for Emergency Response, Snow/Ice Control, and Waste Collection -- Due to a "Christmas tree" road pattern, emergency vehicles usually have only one or two possible routes to access an incident site. Snow and ice control also require unimpeded access to key routes. Rapid and continuous snow/ice control is crucial for preventing ice build-up on steep roads. If snow or ice accumulates and becomes compacted by traffic, plowing would be extremely difficult and the road may be closed. Road designs must accommodate vehicles for emergency, snow and ice control, solid waste and recycling collection. Excessive or inappropriate traffic calming would impede these operations.
- Inter-municipal Traffic and Driver Unfamiliarity with Streets -- When a residential collector connects to areas outside municipal boundaries, there is low tolerance of traffic from another city. An "us and them" mentality is often created. Visitors and delivery services are more prone to get lost in hillside areas which do not use a neo-traditional street grid. Some residents are frustrated when non-local vehicles drive through their streets.
- Sightline Constraints -- Sightlines for motorists may be restricted due to curvilinear roadways, vertical curves, on-street parking, mid-block pedestrian crossings.
- Surface Traction -- Sharp curves on steep grades can lead to vehicles losing control and running off-road; especially during wet and icy conditions. Conversely, conservative road design speed may encourage speeding.
- Reliance on Automobile and Congestion at School Zones -- There are very few transit opportunities within hillside neighborhoods. Although walking and cycling are popular recreational activities, they are still under-utilized for work and school. Consequently, the majority of residents still rely on their automobile for daily commuting and

shopping. Traffic issues often arise during school drop-off/pick-up periods. Many local schools do not have adequate on-site parking and drop-off/pick-up areas. The topography of hillside areas is not conducive to large parking lots. As a result vehicles overflow onto streets, causing parking, sight-line and other safety issues. Congestion, illegal parking and pedestrian safety are common concerns around schools.

- Noise Issues and Stop Violations -- Large vehicles (e.g. buses and trucks) accelerating or braking on steep roads generates significant noise. A truck climbing uphill would be running in low gear and high RPM to overcome grades. Sometime, they fail to obey stop signs to avoid losing momentum. On the downhill direction, trucks may use engine brakes to decelerate. Some cities do not prohibit truck drivers from using engine brakes completely. Rather, advisory signs are posted to request drivers to refrain from using engine brakes. This has only limited success.
- Enforcement Limitations -- Police can only set up speed enforcement units in areas where it is safe to pull over violators. Some locations are difficult to enforce due to road curves, sightlines obstructions, driveway conflicts, etc.

Hillside Development Opportunities

The objectives of Herriman City is to seek to protect public health and safety by minimizing hazards, including seismic and landslide risks, soil erosion, and fire danger associated with development on steep and/or unstable slopes. While all of these challenges cannot be completely mitigated, development in hillside areas should make every effort possible to minimize potential hazards and conflicts. The preservation of natural hillside features and the development of hillside site design standards should be implemented and followed in a Hillside Overlay Zone. The design of subdivisions on slopes between fifteen and twenty-five percent, should require that lots in hillside subdivisions realistically relate to the natural topography of the land by limiting grading and retaining much of the natural terrain. Tiers should also be considered to minimize cut and fill. This will significantly reduce soil erosion, maintain natural vegetation, and potentially reduce additional conflicts or problems associated with grading and excavation.

5.3. Future Mobility and Access

Mobility and access to efficient transportation systems is important to the quality of life, safety, and stability of a community. Herriman City's location in the extreme southwest corner of the Salt Lake Valley requires residents to drive for access to urban centers and makes vehicular demand on surface streets more certain than in many other urbanized cities.

At the time the proposed Mountain View Corridor is developed, east-west streets in Herriman will likely achieve the highest level of traffic demands. With major employment centers currently outside of Herriman City, residents will travel the east-west corridors to reach these centers in adjacent and distant communities. As commercial areas and employment centers continue to develop in Herriman, trips leaving the community will be reduced; but regional commercial areas will likely continue to attract Herriman residents.

Local and regional mobility will become more important over time. Coordination with adjacent communities to connect transit systems will improve conditions throughout the transportation system. Coordination of transportation planning between these communities is a minimum requirement; and understanding the future growth and improvement plans of neighboring cities is essential. Ideally, these communities should agree on roadway classifications for facilities they share.

An evaluation of the local and regional network was performed on the Herriman transportation network. Herriman is in the process of developing an efficient internal network. The internal network design should consider the impact of external and regional traffic conditions. The following sections consider contradictions in roadway connections between Herriman and the adjacent communities of Riverton City to the east, South Jordan City to the north, Bluffdale City to the south, and with the overall Salt Lake County roadway plans.

Regional Coordination

Eastbound Mobility

The Riverton transportation network, to the east of Herriman, connects to three Herriman east-west arterials, at 12600 South, 13400 South, and on the Bangerter Highway at 13800 South. The Mountain View Corridor (MVC) will provide a north-south route that crosses city boundaries at several points. Riverton has planned for 12600 South to have a right-of-way of 120 feet as it reaches Herriman City. 13400 South forms a portion of the boundary between the two cities, and jurisdiction is divided at the road's centerline. Riverton has planned 13400 South to have a right-of-way of 150 feet, while Herriman has identified a right-of-way of 120 feet. The 150-foot section proposed by Riverton consists of a pavement section consistent with the 120-foot section proposed in Herriman City, but provides additional allowance for landscaping improvements on the roadway edge.

Additional east-west roadways requiring coordination include the minor collectors 13000 South and 13100 South (Figure 5-5 – Roadway Connectivity).

Three roadways are planned to connect with roads in Bluffdale, requiring coordination with Bluffdale City. Rosecrest Road in Herriman will connect with 14400 South in Bluffdale, and two currently unnamed roads in Herriman will connect with 15000 South and Porter Rockwell Boulevard in Bluffdale (Figure 5-5 – Roadway Connectivity). Coordination is required because each city classifies these roadways differently. 14400 South and 15000 South are both identified as Collectors for Bluffdale and as Minor Collectors for Herriman. Both cities have identified Porter Rockwell Boulevard and the unnamed road connecting to it as a Major Arterial.

Northbound Mobility

The South Jordan Master Transportation Plan completed in July 2004 depicts roadways immediately north of 11800 South that will provide direct connectivity to roadways in Herriman City. These roadways include 6400 West, 6000 West, 5600 and 5200 West.

The 11800 South road forms the boundary between South Jordan and Herriman City. Herriman has identified a 120-foot right-of-way for 11800 South, while South Jordan City has identified a 111-foot right of way. The cities differ on planning for a shoulder and parking strip for this road.

The 6400 West roadway is identified as a Major Collector (80' ROW) for Herriman while South Jordan has identified it as a Minor Collector (71' ROW) – South Jordan's plan does not provide for a road shoulder.

Herriman identifies the 6000 West roadway a Minor Collector (66' ROW), while South Jordan identifies it as a Major Collector (85' ROW)—Herriman's plan does not provide for a road shoulder.

In 2004, the alignment for the Mountain View Corridor was uncertain. As such, the South Jordan Master Transportation plan does not connect 5600 West and 5200 West to congruent roadways in Herriman. Both cities have only conceptual plans for these roads. This Transportation Master Plan Update acknowledges the Mountain View Corridor alignment and provides opportunities for 5600 West and 5200 West roadway connectivity to South Jordan City. South Jordan City may need to reconsider roadway alignments adjacent to the Mountain View Corridor that proceed south to 11800 South and beyond.

Southwest Mobility

Although Herriman is located in the extreme southwest area of Salt Lake County, connectivity further west should be considered. This area is within the jurisdiction of Salt Lake County, and contains primarily agricultural and residential development. Two transportation corridors provide access to the west: U-111 provides north-south access and Herriman Main Street provides east-west access.

Substantial development opportunity exists in this area and will likely occur over time. Apart from the development opportunity, providing residents of Herriman alternatives for east-west and north-south access is imperative for overall traffic conditions.

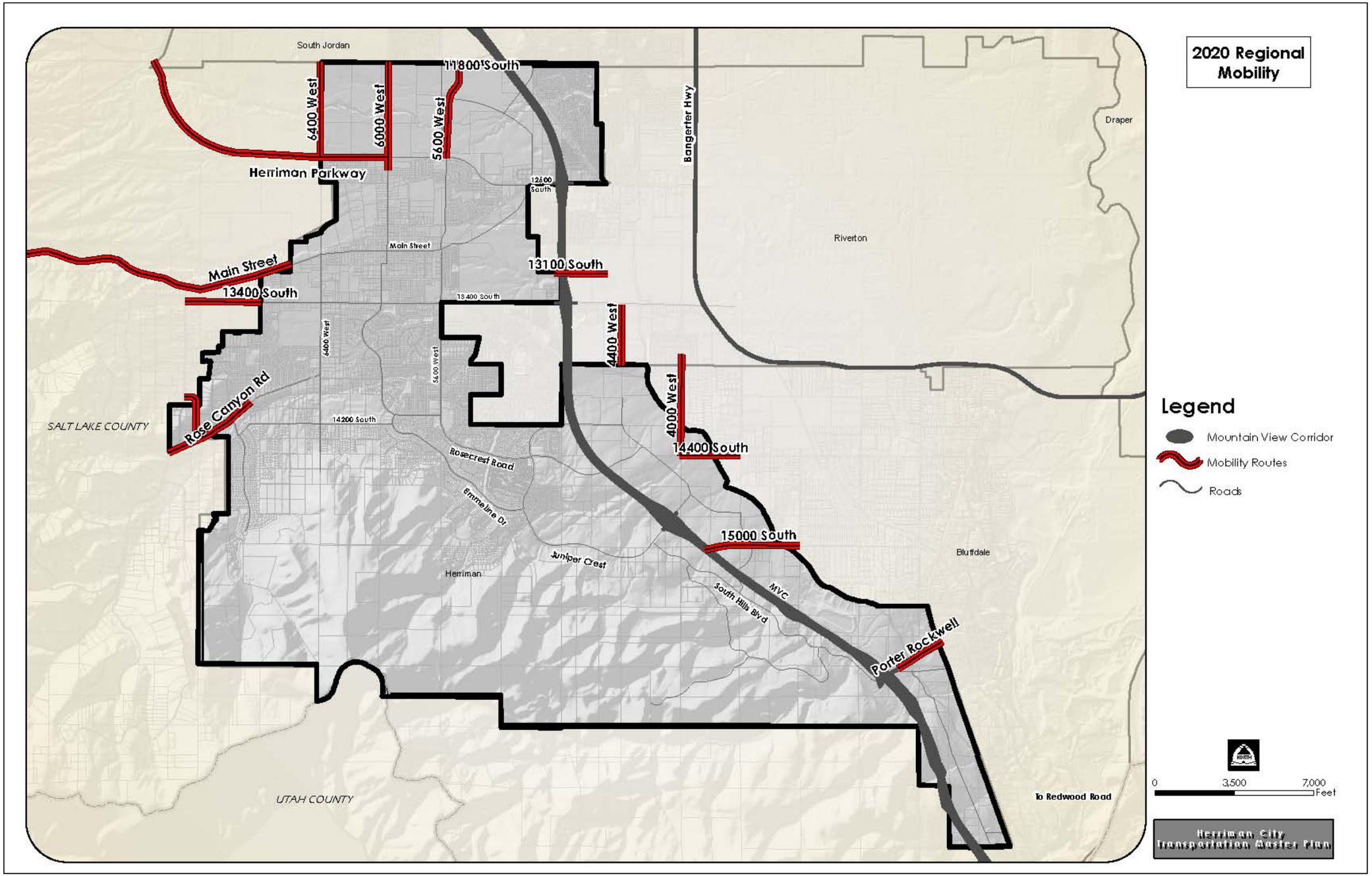
Regional Resource Planning

The WFRC is required by the federal government to develop and approve a Regional Transportation Plan and update it every four years. This Transportation Master Plan usually covers a time span of 30 years, and governs regionally-significant highway and transit development across the urbanized areas of Salt Lake, Davis and Weber Counties. This Regional Transportation Plan is used by UDOT to prioritize state funding for roadway improvements.

The most recent Regional Transportation Plan was adopted in May 2007. To address future state roadway needs, the WFRC has identified planned improvements for several sections of roads, administered by Utah State and local governments. Figure 2-3 shows these planned improvements.

After being identified on the WFRC RTP, a project may be placed on UDOT's Statewide Transportation Improvement Program or STIP. UDOT manages the STIP through its Systems Planning and Programming Division on a five year planning basis. The STIP is maintained annually and includes transportation projects on the state, city and county highway systems as well as projects in the national parks, national forests, and Indian reservations. Highway and transit projects will be identified on the STIP if they are financially constrained, and have specific funding identified for the proposed improvement. These projects use various federal, state, and local funding programs.

Figure 5-5 Regional Connectivity



5.4. Roadway Lighting

According to AASHTO's *Geometric Design of Highways and Streets,* "Good visibility under both day and night conditions is fundamental to enabling motorists, pedestrians, and bicyclists to travel on roadways in a safe and coordinated manner. Properly designed and maintained street lighting should provide comfortable and accurate night visibility, which should facilitate vehicular, bicycle and pedestrian traffic. Decisions concerning appropriate street lighting should be coordinated with safety management, crime prevention, and other community concerns. The AASHTO publication *An Informational Guide for Roadway Lighting* (11) provides discussion on street and roadway lighting."[2]

Of particular interest for Herriman City are the safety improvements that could be realized with proper lighting of facilities. Lighting improvements also enhance and improve roadway Level of Service conditions as vehicles can flow more freely when proper lighting conditions are provided. Street lights should be included on all collector grade streets and above within the transportation capital facilities plan. These elements are planned to be implemented with all roadways being improved and for roadways that currently do not have lighting facilities. Lighting can also provide attractive gateway features or entrances to specific areas or demarcating Herriman City boundary. Additionally, lighting should also be provided on State Roads within Herriman City for consistency and continuity. These would include Redwood Road and Camp Williams Frontage Road.

6. Bicycle and Pedestrian Facilities

A fully developed Transportation Master Plan involves not only roadway improvements but all modes of transportation. Cities that provide well-designed bikeways and pedestrian network facilities encourage greater use and commonly experience higher utilization.

Many factors can influence how and when these alternative modes of transportation are used. With new development, separate trails and bikeways, existing streets that currently serve the community's needs should be retrofit to include safe bikeways and trails. Often other modes of transportation are not supported or implemented by development. Herriman is determined to implement non-motorized modes of transportation in its Transportation Master Plan.

The Importance of Good Planning and Design

Successful bikeway and trails plans are integrated into the overall transportation plan of a city, region or state, where they reflect the mobility and access needs of a community. Bikeways and trails are placed in a wider context than simple movement of people and goods. Issues such as land use, energy, the environment and livability are important factors. Bikeway and trail planning undertaken apart from planning for other modes can lead to a viewpoint that these facilities are not integral to the transportation system. If bikeways and trails are regarded as amenities, bicycling and walking may not receive sufficient consideration in the competition for financial resources and available right-of-way.

People who walk or ride bicycles are the most vulnerable road users, being less protected from the weather and more likely to be injured in a collision with a motor vehicle. They must often use facilities that were designed primarily for automobiles. Effective and usable bikeway and trail networks depend on:

1. Accommodating bicyclists and pedestrians on arterial and collector streets.
2. Providing appropriate facilities such as trail heads, designated paths, and signage.
3. Creating and maintaining a system of closely spaced, interconnected local streets.
4. Overcoming barriers such as freeway crossings, intersections, rivers and canyons.

Well-designed bicycle and pedestrian facilities are safe, attractive, convenient and easy to use. It is wasteful to plan, design and build a facility that is little-used because of poor

design. Bikeways and trails may be under-designed if they are considered add-on features to roadway networks. Good design cannot solve all safety problems: enforcement and education are needed to make all road users aware of the presence of others.

Well-planned facilities are appropriate to demand and integrated into the transportation network. Inadequate facilities discourage users, and unnecessary facilities waste money and resources. Bicycle and pedestrian facilities must be considered at the inception of transportation projects and incorporated into the total design, so that potential conflicts with the safety and level of service for various modes are resolved early on.

6.1. Design Requirements for Bicyclists and Pedestrians: Similarities & Differences

Many early bikeway designs assumed that bicyclists resemble pedestrians in their behavior. This led to undesirable situations: bicyclists are under-served by inadequate facilities, pedestrians resent bicyclists in their space, and motorists are confused by bicyclists entering and leaving the traffic stream in unpredictable ways. Only under special circumstances should designs allow bicyclists and pedestrians to share the same space, e.g. on multi-use paths.

Design requirements are similar in three ways:

1. Location: Bicycle and pedestrian facilities, though separate from each other, are found at the roadway edge and often allocated insufficient space for their needs. This puts them close to the right-of-way line and in conflict with other demands such as parking, utility poles and signs. This creates competition for use of this valuable space.
2. Exposure: Pedestrians and bicyclists are exposed to the elements and are more vulnerable than motorists.
3. Variable Ability: Pedestrians and bicyclists can be of any age and no license is required. Their actions and reactions change with age and are sometimes unpredictable.

Types of Bicyclists

Bicyclists vary in their skill levels and willingness to ride in traffic. These range from the experienced adult cyclist to the casual cyclist. These levels of skill should be considered when planning and designing bikeways that can be used by all those interested.

The following are the types of bicyclists that should be considered when designing a bikeway system within Herriman City, because it is not practical to plan facilities largely or solely for the needs of one area of bicyclists.

Table 6-1 Bicyclist Types and Motivations

Cyclist Type	Motivation	Skill Level
Community/Utility	Travel to and from a specific destination; usually along routes that are efficient and fast such as arterial and connector streets.	Experienced and some novice riders.
Recreation	Pleasure, exercise, and to enjoy scenic beauty. They may or may not have a destination in mind but usually do not tolerate nearby, continuous automobile traffic.	Novice riders.
Touring	Touring, exploring or sightseeing by bicycle (similar to backpacking for pedestrians).	Experienced riders.
Off-road/Mountain	Riding on natural trails or off-road.	Novice riders.

Types of Bikeways and Design Considerations

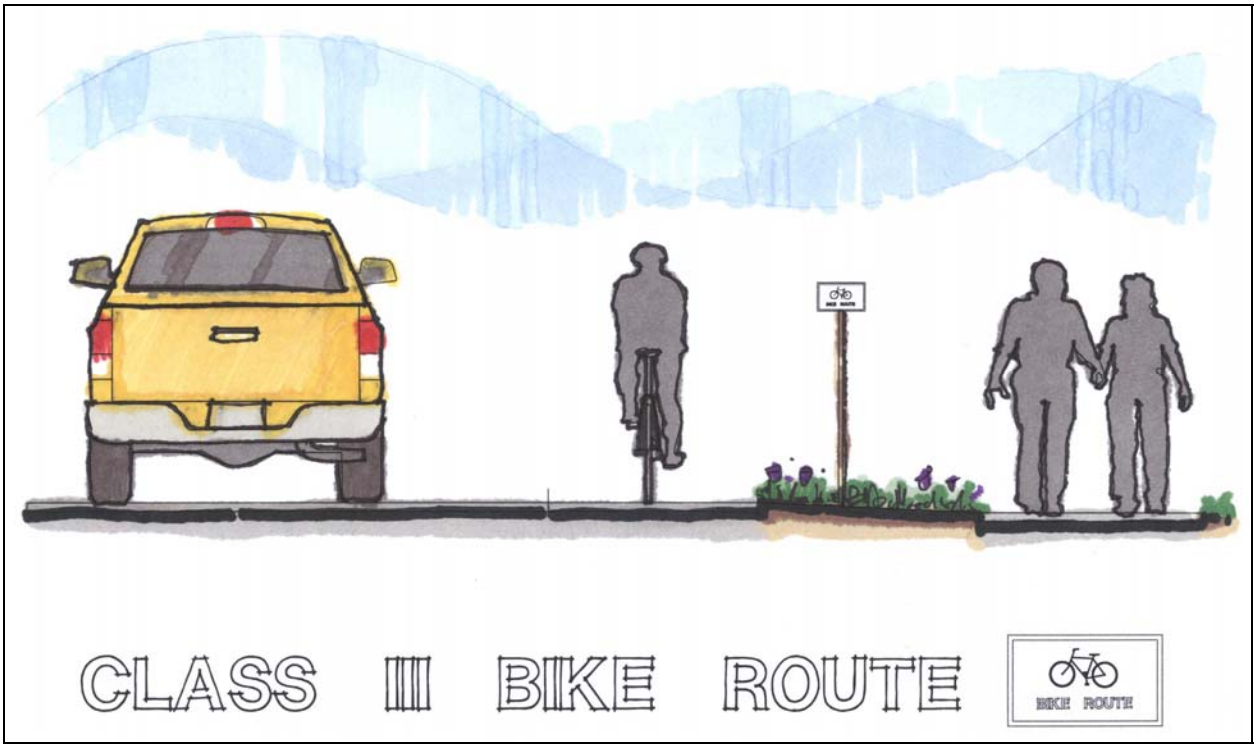
Bicycles are legally classified as vehicles, and most public roads in Utah are open to bicycle traffic, with a few exceptions (mostly the freeways). Roadways must be designed to allow bicyclists to ride in a manner consistent with the AASHTO standards.

A bikeway is created when a road has the appropriate design treatment to accommodate bicyclists, which is determined by motor vehicle traffic volumes and speed. The basic design treatments used to accommodate bicycle travel on the road are: shared roadway, shoulder bikeway, or bike lane. Another type of facility is separated from the roadway: multi-use path.

Shared Roadway

On a shared roadway, bicyclists and motorists share the same travel lanes. A motorist will usually have to cross over into the adjacent travel lane to pass a bicyclist. Shared roadways are common on neighborhood streets and on rural roads and highways.

Figure 5-1 Class III Bike Route



There are two treatments that enhance shared roadways for cyclists:

Wide Outside Lane – Where shoulder bikeways or bike lanes are warranted but cannot be provided due to severe physical constraints, a wide outside lane may be provided to accommodate bicycle travel. A wide lane usually allows an average size motor vehicle to pass a bicyclist without crossing over into the adjacent lane.

Bicycle Boulevards – A modification of the operation of a local street to function as a through-street for bicycles while maintaining local access for automobiles. Traffic calming devices control traffic speeds and discourage through-trips by automobiles. Traffic controls limit conflicts between automobiles and bicycles and give priority to "through" bicycle movement.

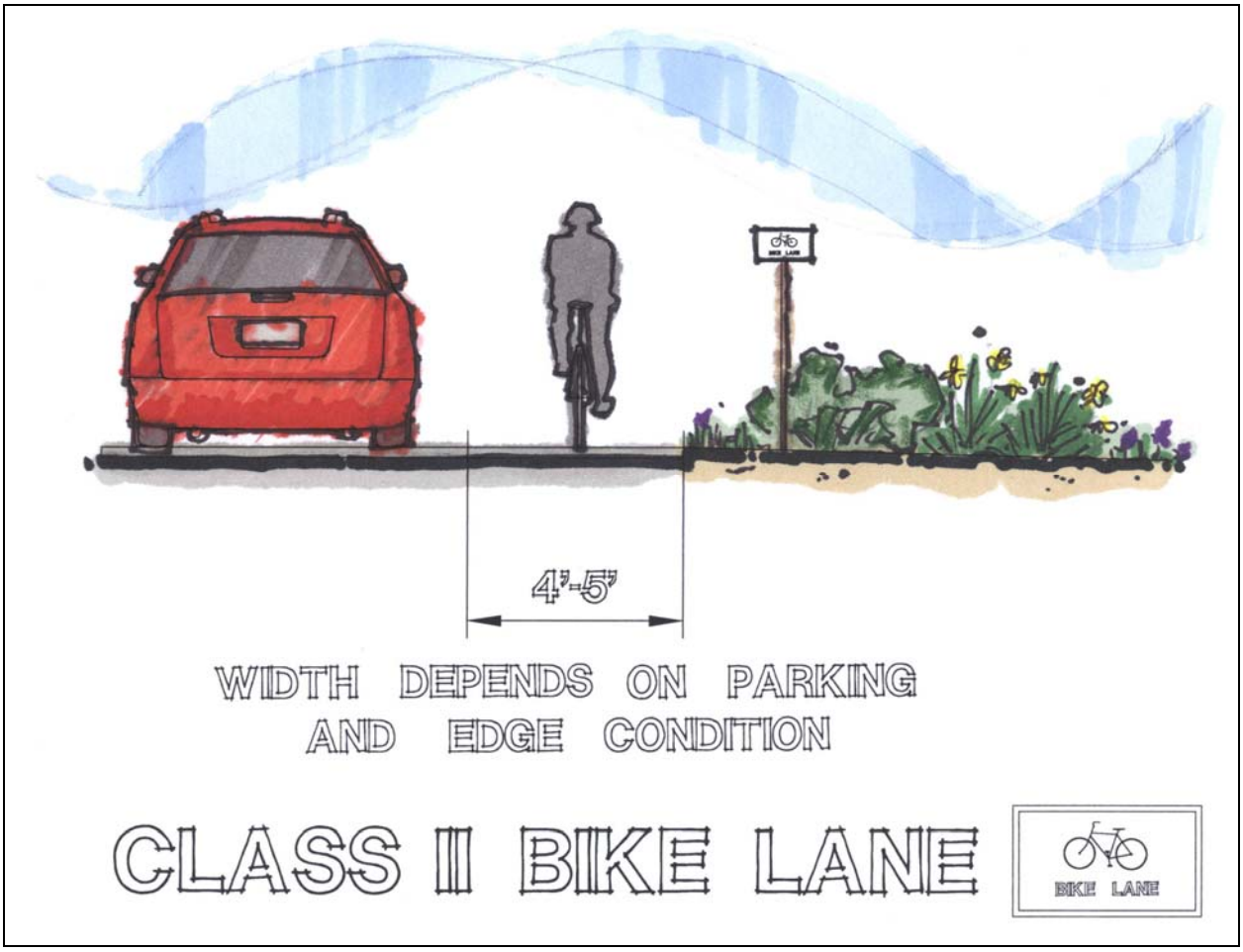
Shoulder Bikeway

(Also referred to as a Class III Bike Route) Paved roadway shoulders on rural roadways provide a suitable area for bicycling, with few conflicts amid faster moving motor vehicle traffic. In this facility, a Class III signed bike route may be a local or residential street, bicycle boulevard, an arterial with wide outside lanes, or a roadway with a paved shoulder.

Bike Lane

(Also referred to as a Class II Bike Lane)

Figure 5-2 Class II Bike Lane



Bike lane is a portion of the roadway designated for preferential use by bicyclists and is appropriate on urban arterials and major collectors. They may also be appropriate in rural areas where bicycle travel and demand is substantial. Bike lanes must always be well marked to call attention to their preferential use by bicyclists. Under ideal conditions, minimum bike lane width is four feet.

Multi-Use Path

(Also referred to as a Class I Bike Path)

Figure 5-3 Class I Bike Route

A facility separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within an independent right-of-way. These are typically used by pedestrians, joggers, skaters and bicyclists as two-way facilities. Multi-use paths are appropriate in corridors not well served by the street system (if there are few intersecting roadways), to create short cuts that link origin and destination points, and as elements of a community trail plan. Typically, bike paths are a minimum of 8 to 12 feet wide, with an additional graded area maintained on each side of the path.

Types of Trails

Trail users vary in their skill levels and willingness to utilize trails. Types of users range from joggers, walkers, and commuting. While most users normally adjust to certain types of trails, not all casual walkers or commuters utilize trails with gravel, woodchip, or other materials affecting the trail surface. These type of users should be considered when planning and designing trails that can be used by all those interested.

Bicycle Parking

For a bikeway network to be used to its full potential, secure bicycle parking should be provided at likely destination points. Bicycle thefts are common, and lack of secure parking is often cited as a reason people hesitate to ride a bicycle to certain destinations. The same consideration should be given to bicyclists as to motorists, who expect convenient and secure parking at all destinations.

To provide real security for the bicycle (with its easily removed components) and accessories (lights, pump, tools and bags), either bicycle enclosures, lockers or a check-in service is required. Bicycle parking facilities are generally grouped into 2 classes:

> Long Term – Provides complete security and protection from weather; it is intended for situations where the bicycle is left unattended for long periods of time: apartments and condominium complexes, schools, places of employment and transit stops. These are usually lockers, cages or rooms in buildings.
>
> Short Term – Provides a means of locking bicycle frame and both wheels, but does not provide accessory and component security or weather protection unless covered; it is for decentralized parking where the bicycle is left for a short period of time and is visible and convenient to the building entrance.

Bicycle racks must be designed so that they:

- Do not bend wheels or damage other bicycle parts
- Accommodate the high security U-shaped bike locks
- Accommodate locks securing the frame and both wheels
- Do not conflict with pedestrians (include in site plan during review process)
- Are covered where users will leave their bikes for a long time (e.g. at employment centers)
- Are easily accessed from the bikeway or street and protected from motor vehicles

Pedestrian Design Considerations

Pedestrian design standards are not as fully developed in the field of traffic engineering as are roadway and bicycle facility standards. However, there are isolated examples of cities with adopted pedestrian plans and design guidelines, such as Portland, Oregon, and Cambridge, Massachusetts. Additionally, the Americans with Disability Act (ADA), and AASHTO standards have led to the formation of many guidelines that affect pedestrian facilities.

In designing for pedestrian circulation and access, the following design criteria should be considered. It is also important to note that there are differences between walking and bicycling in the design of facilities. These design considerations are listed here in the following table to ensure that the differences between walking and bicycling are taken into account.

Table 6-2 Design Considerations for Paths

Issue	Pedestrian Design Concerns	Bicycling Design Concerns
Surface Treatment	Surface can vary considerably from concrete or asphalt to cobblestone to crushed granite; ADA rules will apply.	Asphalt or concrete; Decorative pavers if installed appropriately (and not cost-prohibitive)
Design Speed	Typically 2 to 4 mph. Pedestrian phasing timed at between 2.5 feet per second (fps) (1.7 mph) and 4 fps (2.7 mph)	20 mph level; 30 mph on a graded surface.
Location	Sidewalks in urban/suburban areas. Shoulder or edge of roadway in rural areas.	Shoulder or bike lane preferred, regular traffic travel lane acceptable. Sidewalk permitted if riders are age 12 or under
Parking	N/A	Needed
Grades	Stairs permitted, ADA also requires ramps.	Stairs not permitted ADA usually governs an 8.25% maximum grade for ramps

Mixed-use trails need special consideration because by definition they accommodate more than one mode of transportation, all with varying speeds: pedestrians, joggers, bicyclists, roller-bladers, children on tricycles, etc. In general, the more varied the users, the wider the trail should be. Optimum designs will separate trails for slower users and faster users. When trails are adjacent to roadways, automobile traffic calming provides many benefits to pedestrians and to the creation of livable neighborhoods. Traffic calming and slower traffic enhances pedestrian safety by: decreasing the chances of a car-pedestrian collision, reducing the severity of injuries should a collision occur, and making it easier and less intimidating for pedestrians to cross streets.

Traffic calming and slower traffic encourage more walking and bicycling by improving the ambiance of the neighborhood and more livable streets by reducing traffic noise. On street parking creates valuable buffers between traffic and pedestrians. Larger parking lots should be located away from the street and placed behind buildings when appropriate or possible to create a more inviting pedestrian environment thereby encouraging walking.

6.2. Improvement Prioritization

Priority for bicycle and pedestrian improvements and projects should be determined by working within the priority guidelines of the Bicycle Plan. Improvements can be made to segments of a network as a whole or to specific spots. Improvements can be made to the network by adding a new route or path or installing directional and safety signage or systematic installation of bike parking.

"Spot improvements" is a large category that includes many different types of safety and access improvements that significantly improve the safety, convenience, travel time, ambiance and/or overall utility of a bicycle route. A spot improvement is generally limited to a specific location or intersection, as opposed to those that are applied to an entire segment. Examples of spot improvements include:

- Improving site-specific hazards such as railroad tracks or unsafe drainage grates

- Providing a signal or other device to help bicyclists cross an arterial
- Bicycle/pedestrian over-crossings needed above a freeway or other barrier

Five main categories can be used in prioritizing bikeway projects. Each category is scored on a three-part scale of High, Medium and Low. The highest scoring projects can then be considered the High Priority projects.

The five criteria used to prioritize the projects are:

1. Accident history: Safety for all users of the system is paramount. Projects that directly or indirectly improve safety are rated higher than others.
2. Broad bicyclist demand: Projects that serve the highest numbers of bicyclists (existing or future) are rated higher than others.
3. Serves a school: Projects which serve schools are rated higher than other routes.
4. Closure of a gap in the bicycle network: Connectivity is important and projects that enable direct travel are given higher priority.
5. Ease of implementation: Projects which can be implemented quickly and with little controversy should be given higher priority.

It is recommended that as roadway projects are implemented and in response to changing conditions, Herriman City will re-assess these priorities annually and revise them as needed. The projects within the "High" priority category should be rated relative to each other in order to advance the development of these high priority bikeways. Figure 6-1 identifies proposed future Bikeway and trails.

Plans to Improve Bicycling in Herriman City

The goal is to provide safe, accessible and convenient bicycling and walking facilities, and to support and encourage increased levels of bicycling and walking in Herriman City.

ACTION 1

Provide bikeway and trail systems that are integrated with other transportation systems.

- STRATEGY 1A - Integrate bicycle and pedestrian facility needs into all planning, design, construction and maintenance activities of Herriman City.
- STRATEGY 1B - Retrofit existing roadways with paved shoulders or bike lanes to accommodate bicyclists, and with sidewalks and safe crossings to accommodate pedestrians.
- STRATEGY 1C - Seek financial assistance for bikeway and trail projects on local streets through grants.

ACTION 2

Create a safe, convenient and attractive bicycling and walking environment.

- STRATEGY 2A -Adopt design standards that create safe and convenient facilities to encourage bicycling and walking.
- STRATEGY 2B -Provide uniform signing and marking of all bikeways and trails.

- STRATEGY 2C -Adopt maintenance practices to preserve bikeways and trails in a smooth, clean and safe condition.
- STRATEGY 3C -Develop bicycling and walking safety education programs to improve skills and observance of traffic laws, and promote overall safety for bicyclists and pedestrians.
- STRATEGY 3D -Develop a promotional program and materials to encourage increased usage of bicycling and walking.

7. Mass Transit

Transit systems are one of the most widely used methods for reducing vehicular demand. When transit captures peak-hour and other common trips, it can reduce the problems associated with traffic congestion and improve the livability of the area. When the transit options are convenient and reliable, residents will use transit for some, or all of their daily trips.

Much like other communities in the region, Herriman City has experienced rapid population growth. Continued growth will transform parts of the community from a suburban to a more urban environment. One challenge to this transformation is the addition of transit facilities and integration into the existing transportation system. A proactive approach and heavy advanced planning here can result in significant cost savings. Traditionally, public transit has followed development, resulting in high real estate costs for transit enhancements. Advanced planning and corridor preservation will help ensure a more cost-effective phasing of public transit projects. Ideally, the transit network will also balance local and regional mobility needs with community character.

This section develops information in sufficient detail so that citizens, elected officials, City staff, and others can determine the appropriate level of transit investment for Herriman City. Some of the major issues include:

- Utilizing information from previously completed transit and transportation studies
- Targeting transit growth areas by analyzing ridership potential, capacity, infrastructure, demographics, land use, and economic development
- Ensuring local system compatibility and insurability with the regional transit system
- Developing and evaluating enough transit service options for consideration, without delaying implementation planning

7.1. Vision for Herriman City Transit

These over-arching goals are based on the General Plan Community Mobility Element goals. The following goals comprise this vision:

- Protect and improve the physical integrity of regional networks to help reduce the number, length and frequency of private automobile trips
- Automobile trips degrade air quality and increase traffic congestion
- Promote regional connectivity and the diversity and connectivity of mobility choices
- Encourage a diversity of links between neighborhood systems and citywide and regional systems

7.2. Transit Background

The 2007 WFRC Regional Transportation Plan (RTP) programmed a number of transit improvements for the Wasatch Front, including transit operations and facility improvements. The improvements included in the RTP will provide the basis for much of the transit service and capital expansion identified here.

7.3. Transit Technologies

A variety of transit technologies exist. This section reviews several available options, though not all options are necessarily practical for Herriman City.

Fixed Route Bus

Fixed route bus service is the most common form of transit service in the region. It uses standard size buses (usually 40-foot buses) that generally operate along the major arterial grid network. Standard buses have a capacity of approximately 60-80 passengers total. In high population areas articulated or even bi-articulated buses may be used, significantly increasing the passenger capacity to well beyond 100 passengers. Buses make frequent stops and may require passengers to transfer in order to reach their destinations.

Limited Stop/Express Bus

Express buses serve commuters during peak hours and usually connect outlying areas with major activity centers. Routes typically serve park-and-ride lots and may parallel fixed route service with fewer stops. Vehicles may include additional amenities geared toward commuter travel, such as reading lights and reclining seats. Route 347, which travels between Herriman and Downtown Salt Lake City, is an example of express bus service.

Neighborhood Circulators/Shuttles

Neighborhood circulators focus on serving a common area with frequent, all-day service. The vehicles enable passengers to connect to a wider transit network from residential neighborhoods and activity centers. Shuttles provide shorter trips at higher frequencies and are usually free or charge very low fares.

Paratransit

Paratransit provides flexible schedule, on-demand transportation for those unable to access traditional fixed-route service, such as seniors and passengers with disabilities. The American with Disabilities Act (ADA) requires that complementary paratransit service be provided in all areas within three-fourths of a mile of fixed route bus service. Extended service hours are usually provided for individuals who qualify under ADA.

Bus Rapid Transit

Bus Rapid Transit (BRT) is a higher capacity bus service which combines the advantages of rail transit with the flexibility of buses. It uses a dedicated or shared guideway, such as a designated bus lane or high occupancy vehicle lane, to provide limited-stop service in medium to heavy travel demand corridors. Common BRT vehicles provide seating for approximately 50 or more passengers. While BRT service can range from operating in mixed flow traffic lanes to fully separated lanes, BRT vehicles are typically

given at least traffic signal priority. UTA recently introduced MAX, a BRT route along a 10 mile corridor on 3500 South in Salt Lake City and West Valley City. UTA is currently evaluating other corridors for BRT service.

Light Rail Transit

Light Rail Transit (LRT) is an electrically powered, high capacity transit service operating on rails. It typically operates on two sets of tracks (one for each travel direction), has an exclusive or shared right-of-way, and serves stations located approximately one mile apart. LRT emphasizes speed and travel time savings. LRT can operate using multiple vehicles linked together to accommodate large passenger volumes. Individual cars provide seating for approximately 60 passengers and standing room for 170 passengers. Complete trains of four cars have a total capacity of up to 920 passengers.

Modern Streetcar

Modern streetcar transit is also electrically powered, high capacity transit service that operates on a fixed guideway. Modern streetcars are usually a single vehicle and can operate safely in areas with high traffic and/or high pedestrian activity to link neighborhoods with activity centers. Modern streetcar transit is distinguished from LRT by its smaller, lighter vehicles requiring less infrastructure and lower construction costs. Spacing of stations can be as little as .25 miles, and the operating speed is 8-12 mph, making streetcars ideal for high-density, urban settings with heavy vehicular and pedestrian traffic. Depending on model and layout, streetcars have a capacity of approximately 30-50 seated passengers. Total passenger capacity is approximately 180 passengers. The Portland Streetcar is an example of a modern streetcar system.

Heavy Rail

Heavy rail, or commuter rail, operates on a fixed guideway. Trains may be powered by either diesel engines or electric motors. Trains are either diesel multiple units (DMU) or locomotive hauled passenger cars (LHU). Its heavy characteristics allow commuter rail trains to operate in freight rail corridors and travel at higher speeds of up to 80 mph. The distance between stations should be between 5-7 miles. With approximately 140 seats, and standing room vehicle capacity is approximately 200 passengers, totaling 600

passengers for a typical train. Its higher speed and noise generally makes commuter rail a more viable alternative for medium- to long-range distances in less-developed areas.

Other Alternatives

Other transit modes such as bullet trains, subways, monorail, automated people movers, etc. exist and have been utilized with varying degrees of success around the world. However, for the purpose of this study, these modes have been eliminated as viable solutions either due to high cost, limited practicality or poor integration into the existing network.

7.4. Existing Transit Conditions

Existing transit service in Herriman City is operated by UTA and consists of express bus service for commuters. The majority of transit service is focused on the southern and central portions of Herriman City, where the highest population and land use densities are.

Only one commuter route currently serves Herriman, Route 347, which provides east/west service along 13400 South between 5600 West and 2700 West. Route 347 provides continued express service to Downtown Salt Lake City Monday through Friday mornings and from Downtown Salt Lake City to Herriman in the late afternoons.

Ridership data on Route 347 was obtained from UTA. According to this data, in the twelve month period between November 2007 and October 2008, the most recent data available for a one year period, Route 347 has had an annual boarding of 73,000 passengers. The data also provided an indication of weekday performance characteristics. Average weekday boarding's for Route 347 during this time period are 289 persons per day.

7.5. Future Transit Opportunities

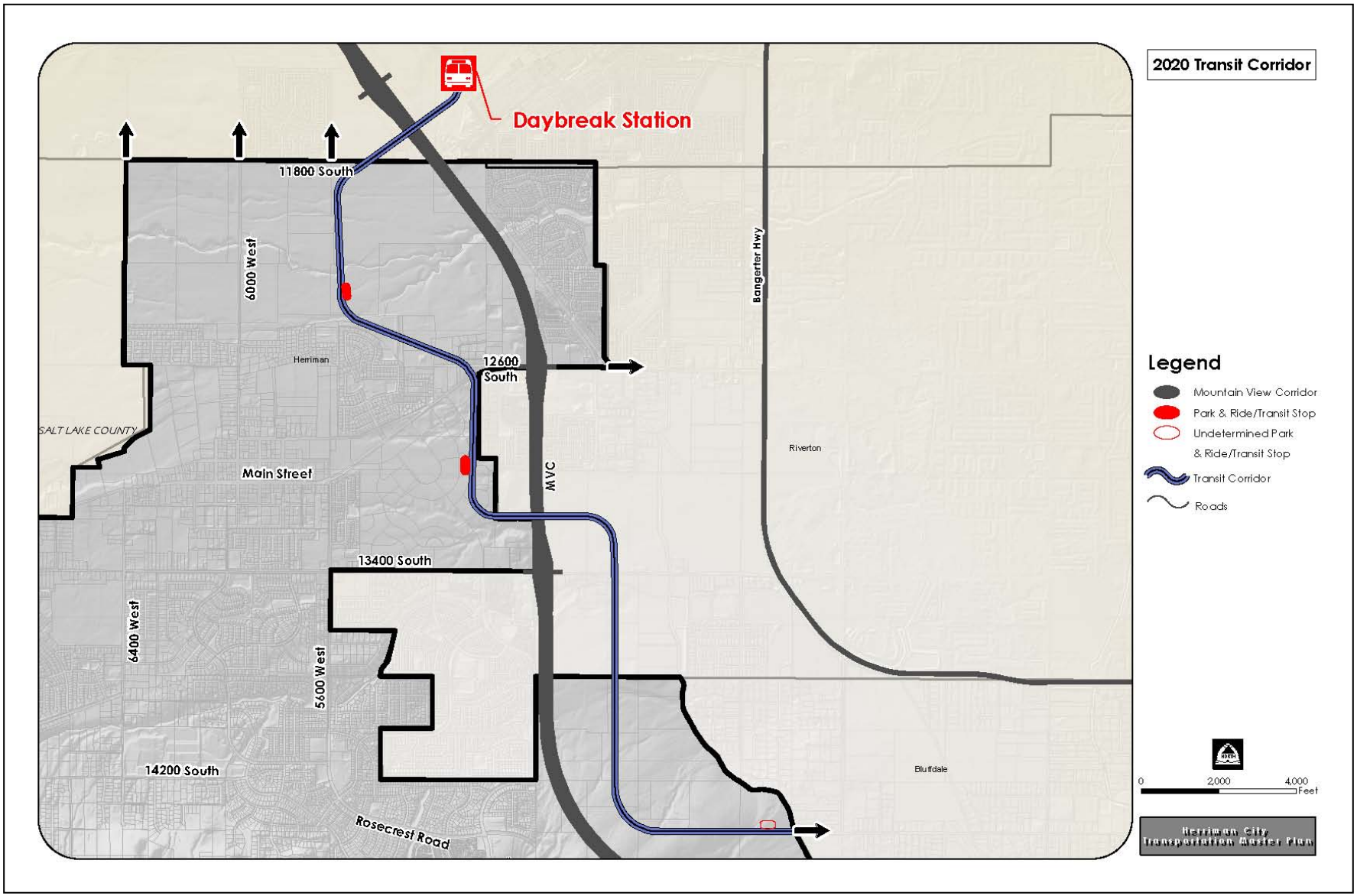
Construction has begun on the Mid-Jordan Light Rail extension, a 10.5 mile project, and is expected to be completed by 2015. This extension will provide service through the communities of Murray, Midvale, West Jordan and South Jordan. The extension will terminate in the Daybreak Community of South Jordan.

UTA is also in the process of evaluating a further southern extension of this corridor to serve the communities of Herriman, Riverton, Bluffdale and eventually Utah County. A conceptual corridor alignment has been identified; it will serve existing and future residential areas of Herriman, and will stop in Herriman City's future city center (Figure 7-1 – Conceptual Transit Corridor).

While this alignment is only conceptual and in the evaluation phase, it is important for Herriman to plan future infrastructure improvements and land uses to accommodate the transit corridor.

Future bus routes for Herriman have not been identified by UTA. Adding additional bus routes depends on demand and ridership. Currently, Route 347 has a high annual ridership. As development continues in Herriman, demand for additional routes and service will also increase.

Figure 7-1 Conceptual Transit Alignment



Transit and Land Use

It is important for Herriman City to coordinate land uses with future transit system alignments and technologies. A land use type which supports certain transit technologies is Transit-Oriented Development (TOD). TODs concentrate jobs, housing, and commercial services around transit stations. TODs encourage commuters to use transit options by connecting housing to major activity centers with transit. Major activity centers are the best transit-supportive land uses, and these areas include:

- Major entertainment complexes
- Large office and commercial complexes
- Universities
- Intermediate and high schools
- Hospitals and medical buildings
- Senior housing projects

Concentrating TOD into urban centers fosters public transit options such as ride sharing and bussing. Urban TODs reduce the need to drive for daily errands.

TOD in suburban areas focuses less on dense residential use and more on creating activity centers where transit and commercial or entertainment coexist. Design focuses on streetscapes and public spaces that appeal to pedestrians.

Most TODs include many elements of mixed-use development and focus design around a transit node. One goal of TOD is to create a quarter-mile walking distance between residences, commercial cores, and transit stops. Common elements in TOD include:

- Mixed Land Use: Mixed land use should include different uses on the same site and in the same building. Employment centers include major activity areas and downtown locations; while suburban locations are primarily residential but also include complimentary commercial uses.
- Compact Development: While density and level of development are market-driven, TOD should be constructed as medium- to high-density areas. This promotes the use of the local transit system by creating more quarter-mile walking destinations.
- Pedestrian Facilities: Striving to maintain a quarter-mile walking radius from all major activity centers, residences, and transit nodes should be a major facet of all TOD. The area should have interconnected blocks, streets, and open space with a landscape, which is inviting to the walking public. Buildings should be oriented towards the street and should include streetscape enhancements.
- Transit-Supportive Uses: All TOD should include convenient connections for pedestrians and transit users from housing, retail and employment centers. Park-and-ride users should also be able to easily access parking lots with their vehicles. Transit stations may be located to benefit retail areas by exposing store fronts to pedestrians traveling to and from transit stations.

Benefits of TOD include:

- Increased Quality of Life: A sustainable transit system improves air quality, reduces energy consumption, increases mobility, and reduces commute time.
- Economic Benefits: There is an economic benefit to those businesses located within a quarter-mile radius of transit stations. Travel expenses are often reduced for those who use the transit system. Also, mixed land uses create economic opportunities for local businesses.
- Future Development Benefits: Benefits include increased land value, higher lease rates and/or increased absorption rates for vacant or developed properties located near transit hubs.

Appendix A. References

Herriman City Transportation Master Plan, March 2008

East Herriman Traffic Study, 2008

Kennecott West Hills Conceptual Development, 2007

Salt Lake County Transportation Master Plan, 2006

Riverton City Transportation Master Plan, 2000

South Jordan City Transportation Master Plan, 2005

Bluffdale Transportation Master Plan

Institute of Traffic Engineers 7Th Edition

Appendix B. Trip Generation Analysis

Table B-1 2020 Daily Trip Generation Analysis

ID	TYPE	ACRES	DENSITY	OUT OF CITY TRIPS	COM TRIPS	PARK TRIPS	RECREATIN TRIPS	PUBLIC TRI
1	Commercial	41	0	0	11252			
2	Commercial	64	0	0	17563			
3	Commercial	41	0	0	11252			
4	Commercial	47	0	0	12898			
5	Commercial	47	0	0	12898			
6	Commercial	41	0	0	11252			
7	Commercial	41	0	0	11252			
8	Commercial	23	0	0	6312			
9	Commercial	17	0	0	4665			
10	Commercial	11	0	0	3019			
25	Industrail	0	0	0				
100	Mixed Use	40	400	1760	3659			
101	Mixed Use	25	250	1100	2287			
102	Mixed Use	119	1190	5236	10886			
103	Mixed Use	148	1480	6512	13538			
104	Mixed Use	18	180	792	1647			
105	Mixed Use	18	0	0	1647			
106	Mixed Use	40	400	1760	3659			
107	Mixed Use	1	0	0	91			
108	Mixed Use	20	200	880	1830			
109	Mixed Use	6	0	0	549			
200	Public	7	0	0				461
201	Public	24	0	0				1577
202	Public	68	0	0				4470
203	Quasi-Public	320	0	0				100
204	Public	61	0	0				3971
205	Public	15	0	0				950
206	Public	10	0	0				659
207	Quasi-Public	2	0	0				150
208	Public	50	0	0				3247
209	Public	7	0	0				472
300	Resort Recreational	12	0	0			56	
301	Resort Recreational	141	0	0			635	
302	Resort Recreational	113	0	0			507	
400	Park	3	0	0		5		
401	Park	30	0	0		48		
402	Park	12	0	0		19		
403	Park	37	0	0		59		
404	Park	23	0	0		37		

ID	TYPE	ACRES	DENSITY	OUT OF CITY TRIPS	COM TRIPS	PARK TRIPS	RECREATIN TRIPS	PUBLIC TRI
405	Park	13	0	0		21		
406	Park	47	0	0		74		
407	Park	6	0	0		10		
408	Park	3	0	0		4		
409	Park	1	0	0		2		
410	Park	8	0	0		13		
411	Park	14	0	0		23		
412	Park	5	0	0		8		
413	Park	10	0	0		16		
414	Park	3	0	0		5		
415	Park	4	0	0		6		
416	Park	7	0	0		11		
417	Park	12	0	0		19		
418	Park	9	0	0		14		
419	Park	11	0	0		17		
700	Towne Center	220	880	3872	2500		300	
800	Single Family Residential	47	141	620				
801	Low Density Residential	32	48	211				
802	Single Family Residential	25	75	330				
803	Low Density Residential	72	108	475				
804	High Density Residential	80	1200	5280				
805	Medium Density Residential	18	90	396				
806	Medium Density Residential	56	280	1232				
807	Medium Density Residential	45	225	990				
808	High Density Residential	19	285	1254				
809	Medium Density Residential	60	300	1320				
810	Single Family Residential	131	393	1729				
811	Single Family Residential	148	444	1954				
812	Single Family Residential	83	249	1096				
813	Hillside Residential	55	55	242				
814	Hillside	17	17	75				

ID	TYPE	ACRES	DENSITY	OUT OF CITY TRIPS	COM TRIPS	PARK TRIPS	RECREATIN TRIPS	PUBLIC TRI
	Residential							
815	Medium Density Residential	23	115	506				
816	Medium Density Residential	80	400	1760				
817	Medium Density Residential	263	1315	5786				
818	Medium Density Residential	62	310	1364				
819	Single Family Residential	72	216	950				
820	Medium Density Residential	122	610	2684				
821	Medium Density Residential	40	200	880				
822	Single Family Residential	90	270	1188				
823	Single Family Residential	62	186	818				
824	Medium Density Residential	31	155	682				
825	High Density Residential	47	705	3102				
826	Single Family Residential	0	0	0				
827	Hillside Residential	822	822	3617				
828	Hillside Residential	27	27	119				
829	High Density Residential	22	330	1452				
830	Hillside Residential	33	33	145				
831	Hillside Residential	59	59	260				
832	Low Density Residential	83	124	546				
833	Hillside Residential	312	312	1373				
834	Low Density Residential	272	408	1795				
835	Single Family Residential	54	162	713				
836	Low Density	322	483	2125				

ID	TYPE	ACRES	DENSITY	OUT OF CITY TRIPS	COM TRIPS	PARK TRIPS	RECREATIN TRIPS	PUBLIC TRI
	Residential							
837	Single Family Residential	15	45	198				
838	Hillside Residential	0	0	0				
839	Low Density Residential	159	238	1047				
840	Single Family Residential	80	240	1056				
841	Low Density Residential	34	51	224				
842	Single Family Residential	70	210	924				
843	Medium Density Residential	40	200	880				
844	Low Density Residential	0	0	0				
845	Low Density Residential	0	0	0				
846	Hillside Residential	20	20	88				
847	Single Family Residential	3	9	40				
848	Low Density Residential	0	0	0				
849	Low Density Residential	0	0	0				
850	Low Density Residential	80	120	528				
851	Medium Density Residential	0	0	0				
852	Low Density Residential	168	252	1109				
853	Low Density Residential	197	295	1298				
854	Medium Density Residential	151	755	3322				
855	Low Density Residential	176	264	1162				
856	Medium Density Residential	72	360	1584				
857	Single Family Residential	60	180	792				
858	Single Family Residential	127	381	1676				
859	Single Family Residential	287	861	3788				

ID	TYPE	ACRES	DENSITY	OUT OF CITY TRIPS	COM TRIPS	PARK TRIPS	RECREATIN TRIPS	PUBLIC TRI
860	High Density Residential	88	1320	5808				
861	Low Density Residential	204	30	132				
862	Medium Density Residential	933	4665	20526				
863	Single Family Residential	0	0	0				
864	Single Family Residential	36	108	475				
865	Medium Density Residential	19	95	418				
888	Medium Density Residential		1000	4400				
Total		8921	27831	122456	144654	413	1498	16058
Total Internal Trips					143608			
Total R to Commercial Trips within the City					125639			
From Out side Commercial Trips					37383			

Appendix B. Traffic Calming

Introduction

According to the Institute of Transportation Engineers, traffic calming uses mainly physical measures and reduces the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. The overall goal of traffic calming is to increase the quality of life along public streets by creating safe and attractive streets, reducing the negative effects of motor vehicles, and promoting alternative modes of travel (walking, cycling, and transit). Some measurable objectives of traffic calming are achieving slower speeds for motor vehicles, reducing the frequency and severity of collisions, increasing safety for non-motorized users, reducing the need for police enforcement, and reducing cut-through motor vehicle traffic.

Traffic calming is distinguished from traffic control devices (such as signals, speed limits, and stop signs) in that it is designed to be self-enforcing; it does not require law enforcement, but instead relies upon the laws of physics to slow traffic. While streetscape elements such as trees, lighting, and street furniture are often complementary to traffic calming efforts, they do not compel drivers to slow down and are not considered as traffic calming measures.

There are many traffic calming methods. Selection of a particular method should be based on a formally-adopted methodology.

Methods of Traffic Calming

Traffic calming measures may work by limiting traffic volume or slowing traffic down, although most measures have some effect on both volume and speed. While not exhaustive, the following listing is a description of some of the commonly used techniques in each category. Other methods are typically variations on these techniques (or simply known by other names).

Volume Control Measures

Partial and Complete Street Closures

Full street closures are most commonly used as a cure for excessive cut-through traffic in a given area. They typically consist of a barrier placed across a roadway that leaves sidewalks and / or gaps appropriate to allow bicycle through-traffic. A variety of methods exist for creating the barriers including curbing and landscaping, walls, gates, and bollards. Full street closures work best as a component of an area-wide traffic calming policy, rather than a spot treatment, due to the shift of traffic to adjacent streets. Street closures are controversial with the general public and particularly residents of adjoining streets. Additionally, full-closures may impact emergency response routes and time.

Half closures are barriers that block travel in one direction for a distance on an otherwise two-way street. Half closures are commonly used on a gridded street pattern to allow for through movements, albeit in a more circuitous and therefore less desirable manner. Other partial closures include barriers which are placed across an intersection diagonally; median barriers (typically curbs or raised islands) constructed along the street centerline, and continuing through an intersection to block through movements at a cross street; and forced turn islands, which block certain movements at intersection approaches (sometimes called pork chops or right turn islands).

Half Closure or Diverter Volume Control Measure

Speed Control Measures

Speed control measures are typically categorized as vertical measures, horizontal measures, and narrowing. As implied by their names, vertical measures introduce a vertical deflection such as a hump, textured pavement, or a raised intersection, while horizontal measures introduce horizontal curves such as traffic circles, roundabouts, or chicanes. Narrowing reduces the width of streets or intersections using methods such as curb extensions, median islands, or chokers.

Vertical Measures

Speed Humps are by far the most common and ubiquitous form of traffic calming in most jurisdictions. There are a number of speed hump profiles in use, but the most typical is 12 – 14 feet long (in the direction of travel) and 3 to 4 inches high with a taper left at both ends to accommodate drainage between the hump and the gutter. The design speed is typically 15 to 20 mph. There is a wealth of information on various hump profiles and designs to assist in the creation of specifications for the construction of humps.

Speed Tables are similar to speed humps in design and include a flat top, often as a method of delineating pedestrian crossings (when placed curb to curb at intersections). The flat section can be constructed with brick or other textured materials to further distinguish a pedestrian crossing function. Typically the flat top is 10 feet long in the direction of travel with six foot ramps and an overall height of 3 to 4 inches. The geometries can be modified to according to the desired design speed. Speed tables are typically more expensive to construct than speed humps given their larger size and use of textured materials.

Speed Table Vertical Control Measure

Raised Intersections bring the entire intersection up to sidewalk level with paved ramps at each approach. Textured materials are often used on the flat area to delineate the intersection as pedestrian territory.

Raised Intersection

Textured Pavements use brick, concrete pavers, stamped concrete or others to create an uneven surface that makes high speeds uncomfortable. They can be uncomfortable for bikes and pedestrians and are best used on relatively short stretches of roadway.

Texture Pavement Treatments

Horizontal Measures

Traffic Circles / Roundabouts are raised, circular islands placed in the center of intersections to impede straight through movements and to divert traffic around the barrier. They are often landscaped, and typically require a yield sign at each approach. Roundabouts are essentially traffic circles for higher volume roads (collectors and arterials) and can also be used in lieu of traffic control features such as all-way stops and signals.

Chicanes are mid-block curb extensions placed on alternating sides of the street, creating a serpentine effect in an otherwise straight street. They can be landscaped to introduce a vertical element and are particularly effective on long, straight roads. Some cities have alternated on-street parking from one side of the street to the other to create the same effect with striping, without the cost of curbing and landscaping.

Narrowing

Curb extensions, bulb-outs, and chokers are all forms of street narrowing, used most typically at intersections. By increasing the turning radius at the intersection, crossing distances can be reduced for pedestrians, and speeds will be reduced for vehicles traveling through the intersection. In addition, they can be used to delineate on-street parking from the intersection and increase site distances, further enhancing pedestrian safety.

Bulb Out

Median Islands are raised islands installed along the street centerline which have the affect of narrowing the street section. They can be built on larger roads to provide pedestrian refuges at crosswalks and are often fitted with landscaping, textured paving, lighting, and/or decorative signing. When so treated, these medians can often be called gateway treatment or features.

Median Island

Policy Plan

There are a number of considerations when creating a traffic calming program. Specifically, a traffic calming plan must have a focus (proactive or reactive, site specific or area-wide), it must establish criteria for making implementation decisions, it must establish a methodology for evaluating, implementing, and monitoring solutions, and it should include a public involvement component. All of these components are important to the success of the program and should be carefully considered and shared with the public prior to implementation. What follows is a discussion of each of the above considerations.

Plan Focus

Traffic calming programs may be reactive, responding to citizen requests; or it may be proactive which are treatments initiated by staff. In addition, a program may make spot improvements, essentially making decisions on a site specific basis, or it may have an area-wide focus, making concurrent improvements to multiple streets as part of a larger area strategy. Reid Ewing effectively characterizes the range of options in Table 8-1 below.

Plan Focus Options

	Reactive	Proactive
Spot treatment	Somewhat successful	More successful
Area-wide treatment	Less successful	Most successful

Source: Reid Ewing, Traffic Calming State of the Practice, Institute of Transportation Engineers, 1999

Reactive treatments can be reasonably effective on single streets where there is a well-defined traffic problem and a tightly focused calming solution, such as implementing a series of speed humps on a long, straight road experiencing excessive speeding. Reactive area-wide

treatments are typically the least effective strategy as they can often have unintended consequences such as shifting trips from a higher order street to lower order street or simply shifting the traffic burden to another street of the same order.

Proactive treatments, whether spot or area-wide, tend to be more effective than reactive treatments. They also tend to be more expensive as more staff time is involved in identifying problems and designing solutions.

Decision Making Criteria

A traffic calming program must establish criteria for evaluating the need for a proposed traffic calming solution, whether the program is reactive or proactive, site specific or area-wide. There are a number of methods for determining when (or when not) to implement a particular traffic calming technique to a given site or area. These include establishing warrants, adopting guidelines, or creating a priority rating system.

Guidelines

Guidelines are similar to warrants in that they consider the same factors as warrants (traffic volume, accidents, pedestrians, etc.), but they do not prescribe a particular traffic calming method when a given threshold is reached. This allows for more discretion and creativity in dealing with particular sites in need of traffic calming.

Priority Rating Systems

Priority rating systems use the same factors as warrants and guidelines, but they go on to rank projects in order of funding priority. They are able to do this by assigning point values to the various factors, resulting in a composite score that allows projects to be compared in an "apples to apples" fashion, with more critical project rising to the top of the project funding matrix. This approach has the advantage of allowing factors of higher importance to a community being weighted to reflect these values.

Implementation Methodology

It is important to establish a methodology for identifying, evaluating, and implementing potential traffic calming projects. The implementation methodology should try to strike a balance between analysis and implementation such that the traffic calming measure is well reasoned and legally defensible, but streamlined enough that it doesn't take years to be implemented. At a minimum, implementation of traffic calming, whether a spot treatment or area-wide treatment, should be subject to the following steps:
Project request

- Preliminary review & ranking
- Study & recommendation
- Public involvement
- Design
- Construction
- Monitoring & follow-up evaluation

Public Involvement

Public involvement is critical to a successful traffic calming program. Residents of a street typically have strong feelings and opinions about their street and any new street features are

sure to attract attention. It is important for the jurisdiction to establish procedures whereby residents can:

- Request traffic calming measures
- Comment (or vote) on proposed measures
- Petition for removal of implemented measures

Some jurisdictions require a show of neighborhood support such as a petition signed by an established percentage of residents before traffic calming can be considered. Others actually require a ballot to show support. Some require a simple majority, others a super majority. The details are less important than the fact that it is imperative to involve the residents in a meaningful way in the decision making process.

Appendix C. Traffic Management Program

Introduction

This program is an adaptation of a successful Salt Lake City program. Its goal is to encourage cooperation between Herriman City staff and local neighborhoods so as to provide a safe, livable street environment.

Traffic Management

Traffic management is the combination of physical, education and enforcement measures to reduce the negative impacts of motor vehicle use, alter driver behavior and improve the safety conditions for non-motorized traffic in residential neighborhoods. Effective use of traffic management measures will improve the quality of life in Herriman City.

Research has shown that no one measure will solve all of a neighborhood's traffic problems. Each residential neighborhood has its own unique set of problems that must be analyzed for possible traffic management measures. The traffic management "tool box" provided at the end of this appendix suggests possible management measures and their applicable uses.

What is Considered a Traffic Problem?

The most common problems reported on residential streets relate to excessive speed or increased volume.

Vehicles traveling faster than the street's design speed may not be able to stop for a crossing pedestrian or cyclist. They may lose control around a curve or they may just annoy neighbors with increased noise emissions. The distance from the edge of the travel lane to a sidewalk or residence increases the neighborhood discomfort for speeders.

Vehicles seeking to find the quickest route to their destinations may use a residential street to bypass an expected delay. Excessive volume on a street wears out the road, increases noise levels and increases the chances of accidents. Through traffic should be concentrated on collector roads that are designed to more comfortably handle the impact.

What are the Solutions?

The easiest response is to encourage citizens to use Herriman City streets for the purpose they were intended. Herriman City has three classifications of streets, residential, collector and arterial.

Residential Streets – Residential streets provide direct access for residences and businesses which they serve. Traffic flow is not as important as property access. Most residential streets have a speed limit of 25 mph.

Collector Streets – Collector streets provide traffic a link between arterial and residential streets. Access is restricted at locations. Traffic flow is as important as property access. Most collector streets have a speed limit of 35 mph.

Arterial Streets – Arterial streets provide through traffic movement across long distances. These streets are typically the widest in the city. Traffic flow is more important than property access. Most arterial streets have a speed limit of 40 + mph.

If possible, Herriman City wishes to use traffic management measures to encourage motorists to use residential streets to access their residence, collector streets to access arterial streets

and arterial streets to travel long distances. It is not the intent of Herriman City to move a traffic problem from one residential street to another.

How do I Participate?

1. Application

An application is attached to this appendix. To demonstrate neighborhood support and agreement for a traffic management request, a complete application must contain signatures from ten households living in the area where the perceived traffic problem exists.

2. Eligibility and Priority

Traffic management requests will be reviewed upon receipt to determine eligibility and priority. Traffic management plans will be developed on a priority basis.

Upon receipt of the application, a Herriman City staff member will contact the applicant to discuss the problem, determine project boundaries and to review the Transportation Management Plan process. The Herriman City staff member will then collect the neighborhood traffic data for input into an eligibility and priority formula. The formula is based on traffic volumes, vehicular speeds, presence or lack of sidewalks, pedestrian generators, bike routes and transit service. The formula produces a numerical score to determine the requests' eligibility and priority. Applications must achieve a score of at least 80 points to be considered eligible for the Transportation Management Plan. Plans will be developed for eligible applications in a priority manner based on the numerical score. The request with the highest score will be given top priority.

Each application will be placed into one of the following three categories based on its Transportation Master Plan score.

Active Projects – Herriman City staff will work with the neighborhood to create a Traffic Management Plan. This plan will include traffic management measures to address the neighborhood's traffic problems. Staff will work with as many of the highest priority projects as resources allow. As work on one project is completed, work will begin on the next highest priority project.

Eligible Projects – Request in this category meet program eligibility but are not the highest priority project. While waiting to become an active project, neighborhoods will be provided with information on the Pace Car program as well as other self-help solutions that may ease neighborhood traffic problems.

Not Program eligible – Requests in this category do not meet eligibility requirements. However, these neighborhoods will be provided information on the Pace Car program as well as other self-help solutions that may ease neighborhood traffic problems. Petitioners may resubmit in the future if they sense the problem has grown or when new issues arise.

Each applicant will be notified of their requests score, category and priority.

3. Traffic Management Plan Development

An initial meeting will be held with residents, business owners and property owners identified in the study boundaries. Herriman City staff will also invite the Herriman City Council. The purpose of the meeting is to seek input on the neighborhood's traffic issue(s) and to create a Neighborhood Traffic Committee (NTC). The NTC will serve as a critical link between Herriman City staff and the neighborhood during the traffic management plan development.

Using input received from the public meeting and the NTC, Herriman City staff will create a draft plan to address the neighborhood's traffic issue(s). The plan may include alternatives for addressing the issue.

A second meeting will be held with the neighborhood to discuss the proposed plan. The plan, along with a meeting invitation will be mailed to the residents, business owners, and property owners identified in the study boundaries. Comments on the plan will be taken at the meeting or can be submitted to the Engineering Division. Comments must be received on or before the meeting date so they can be discussed at the meeting.

4. Testing the Plan

Herriman City staff will mail a letter, ballot and the plan to all property/business owners within the project boundaries. The letter will describe the Transportation Master Plan process to date and outline the proposed plan. The ballot will request support or opposition to the proposed plan. One vote per residence, business or property owner will be counted.

The plan will proceed to testing if a majority of the ballots returned are in favor of the plan. If at least 80 percent of the ballots returned and a simple majority of all distributed ballots in the project area are in favor of the plan it may skip testing and proceed to funding, design and construction.

Testing allows the neighborhood to experience first hand the effectiveness of the plan. If the measures are not functioning satisfactory to staff or the NTC, the test may be revised or discontinued. During testing, staff will collect and analyze new traffic data. If the results of the testing show the measures to be ineffective or cause negative impacts to surrounding residential neighborhoods staff may modify the plan following consultation with the NTC or the entire neighborhood as deemed appropriate. At the conclusion of the testing period all test measures will be removed.

Following testing, staff will prepare and mail a newsletter to all residencies, businesses, or property owners within the project boundaries. The newsletters will summarize the results of testing, describe funding options and include a ballot requesting support or opposition to construction of the tested plan. One vote per residence, business or property owner will be counted. If at least 67 percent of the returned ballots are in favor of the plan, it will proceed to funding, design and construction. If not, staff will meet with the NTC to decide whether to revise the plan or discontinue the traffic management request.

5. Funding, Design and Construction

Once the plan has received final endorsement of the neighborhood and staff, Herriman City will prepare a cost estimate and proposed schedule for the project design and construction. Design and construction will proceed as determined by availability of funds.

Modifications to Constructed Measures

Herriman City staff will consider a request for removal or modification of existing traffic management measures if a petition is submitted with the signatures of a majority of the residents, business or property owners within the original project area. Staff will organize a neighborhood meeting to discuss the request. A mailing providing the results of the meeting and ballot, if appropriate, will follow. To be approved for removal or modification at least 67 percent of the returned ballots must be in favor of the request. All costs incurred for removal or modification will be borne by the neighborhood. However, if Herriman City finds a traffic management measure must be removed or modified for technical or safety reasons, Herriman City will pay all costs incurred.

Funding Options

An approved Transportation Master Plan project will likely have funding implications. Funding for all Transportation Master Plan projects must be obtained before engineering design and construction begins. The following is a list of funding options available for Transportation Master Plan projects:

1. Traffic Management Plan Funds: Each year the Herriman City Council will consider creating a "pool" of funds, as recommended by the Herriman City Administration, in Herriman City's Capital Improvement Program for implementing approved Transportation Master Plan projects. When available, these funds will be utilized to fund Transportation Master Plan projects.
2. Neighborhood Matching Grant Funds: Neighborhoods may apply for partial funding of approved Transportation Master Plan projects through the Neighborhood Matching Grant program. Under this program up to $5,000 of matching funds are available per project and require a match of 50 percent match in cash or labor. Each funding application will compete with other projects throughout Herriman City for available funding. The Herriman City Council considers and approves funding for projects as part of the annual budget process.
3. 100 Percent Neighborhood Funding: Any approved Transportation Master Plan project can be funded 100 percent through neighborhood funding sources. Neighborhoods may collect monies in any manner they deem equitable to pay for the cost of the project.

TRAFFIC MANAGEMENT REQUEST FORM

We, the undersigned, request a traffic study at the location listed below. These signatures indicate our commitment to work with Herriman City staff in creating safer neighborhood streets.

	Signature	Address	Phone (daytime)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Neighborhood Contact: _____ Day Phone: _____
Location of Concern: _____
What particular concerns do you have at this location?

Application Date: _____ Posted Speed Limit: _____ mph

Is this a designated bus route? Yes ____ No ____ Is this a designated safe school walking route? Yes ____ No ____ Is this a designated bike route? Yes ____ No ____ Is there a park, school, or other pedestrian destination on this street? Yes ____ No ____ Are sidewalks constructed on this street? Yes ____ No ____ Thank you for taking time to complete this form. Please mail it to Herriman City Engineer, 13011 S. Pioneer Drive Herriman, Utah 84065. When it is received by Herriman City you will notified of the study schedule.