MAG
SPRINGVILLE / SPANISH FORK
STUDY

Mountainland Association of Governments

SPRINGVILLE-SPANISH FORK AREA TRANSPORTATION STUDY

APRIL 2012

HORROCKS
ENGINEERS

1.0 INTRODUCTION

Planners with the Mountainland Association of Governments (MAG) initiated this study to evaluate transportation improvements in the Springville, Spanish Fork, Mapleton areas and parts of unincorporated Utah County.

The population in this area is growing steadily and will continue to increase through the coming years, which requires improvements to the transportation system serving the area. The Governor's Office of Planning and Budget released population projections in 2008 out to 2040. The projections for the communities in south Utah County are shown in Table 1-1. Population projections based on the 2010 census have not been published at the time of this study's printing. It should be noted that the projected 2010 populations for the south Utah County communities ranged from 1.5 percent lower to 29 percent higher than the actual census figures, with the average being 6 percent higher.

As can be seen in Table 1-1, it is anticipated there will be substantial population growth in this area. The increased population will increase travel demand which will strain roadway capacities. The increased population will also increase population densities making transit more feasible.

Table 1-1 – Population Projections for Utah County[1]

	2010	2020	2030	2040	AAGR[2]
Utah County	560,511	727,718	907,210	1,092,450	2.33%
Elk Ridge city	3,133	5,578	6,963	7,100	2.66%
Genola town	1,494	2,886	5,078	7,500	5.72%
Goshen town	937	1,294	1,702	1,800	2.28%
Mapleton city	8,764	11,644	16,358	17,500	2.41%
Payson city	19,221	30,234	43,790	55,300	3.69%
Salem city	9,004	17,022	28,651	38,000	5.09%
Santaquin city	10,882	20,219	29,113	39,300	4.55%
Spanish Fork city	34,173	46,042	56,651	66,300	2.31%
Springville city	30,536	44,438	50,741	58,000	2.24%
Woodland Hills city	1,461	1,558	2,245	2,900	1.09%
Subtotal – South Utah County Cities	119,605	180,914	241,291	293,700	3.15%
Balance of Utah County	440,905	546,803	665,919	798750	2.07%

[1] Governor's Office of Planning & Budget 2008 projections. 2010 projections were approximately 6 percent high based on the 2010 census.

[2] Average Annual Growth Rate

In response to these future needs, MAG adopted the 2040 Metropolitan Transportation Plan (MTP) on May 5, 2011 (see Appendix). The new MTP includes transportation improvements to accommodate increased travel demands in the study area (see Figure 1-1 for map of all MTP projects). Among these improvements are four specific projects that are evaluated by this study:

- A new interchange at I-15 and Center Street in Spanish Fork
- A new commuter rail station in Spanish Fork near a new I-15/Center Street Interchange in Spanish Fork
- A new interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North
- The widening and extension of 1600 South connecting to US-89

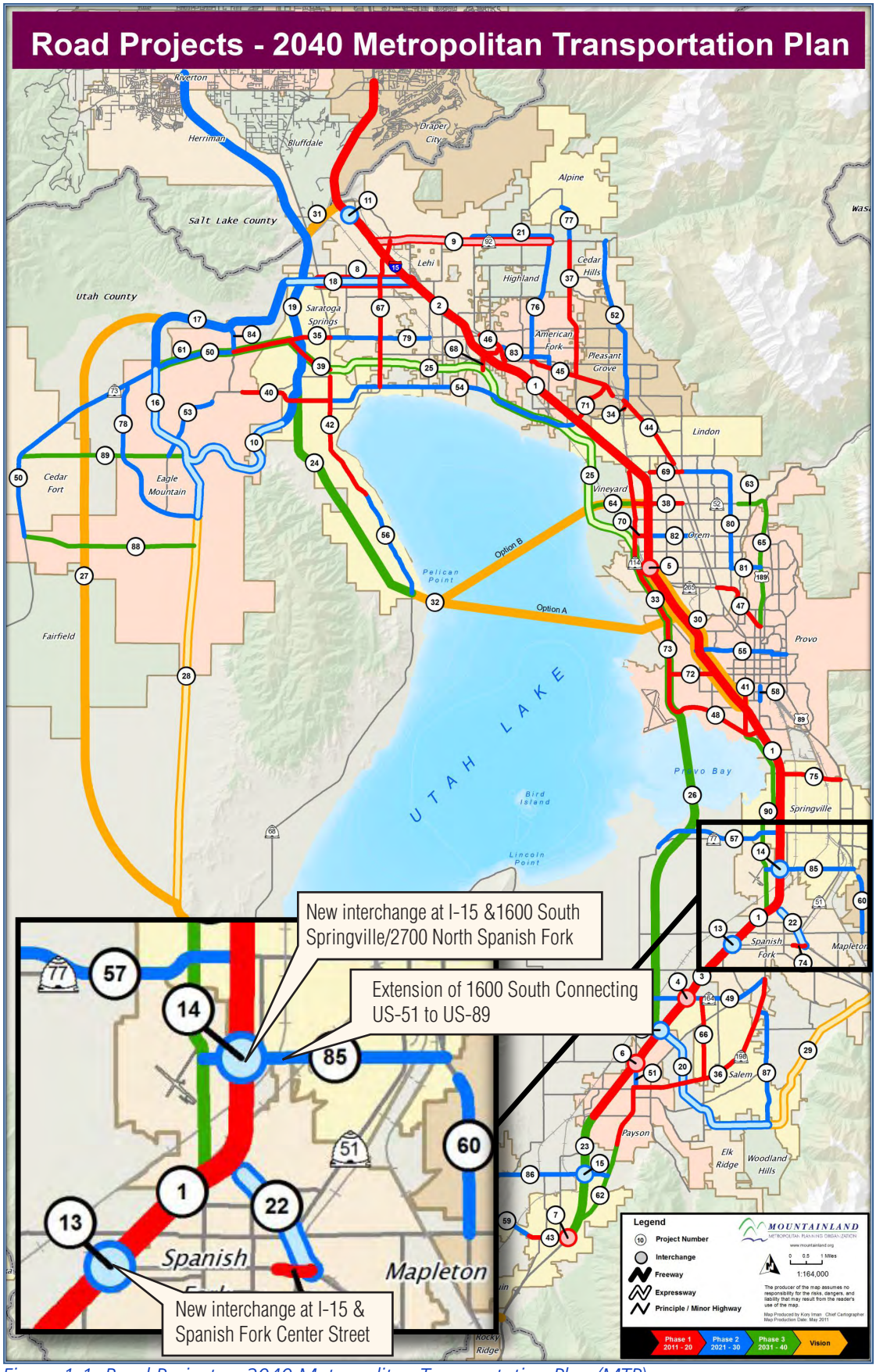


Figure 1-1, Road Projects – 2040 Metropolitan Transportation Plan (MTP)

The purpose of this study was to analyze each of these potential projects and develop feasible design concepts. Each potential project presents its own unique challenges. Shown below are the specific issues addressed by this study for each project, as identified in the scope:

New Interchange at I-15 and Center Street in Spanish Fork

- A railroad spur deletion or relocation.
- Farmland acquisition and possible agriculture protection zones.
- The close proximity of Spanish Fork High School.
- The railroad parallel to I-15 at the proposed interchange site.

New commuter rail station in Spanish Fork near a new I-15/Center Street Interchange in Spanish Fork

- Is spacing between the proposed Spanish Fork and Springville stations acceptable for commuter rail requirements?
- Wetland and environmental issues.
- Identification of the station area parcel(s).
- How would access to this area be addressed, including roadways and rail ROW?

A new interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North

- Limited interchange spacing between Springville 400 South and US 6.
- Ramp design issues of weaving and braiding especially with the long ramps associated with US 6.
- The diversion of traffic, especially truck traffic, from US-6 westbound to the North Main Street Industrial area (The city of Spanish Fork is concerned that the new configuration of the I-15/ US 6/SF Main Street Interchange, with the removal of a direct connection from westbound US 6 to the SF Main Street ramp could induce additional traffic destined for the industrial area to traverse city arterials and collectors).
- Is the interchange needed if the Springville 1600 South connection between US-51 and US-89 is not built?

Widening and extension of 1600 South in Springville connecting to US-89

- Multiple railroad crossings in the west Springville area.
- Wetland issues.
- The new connection between US-51 and US-89 has to cross two railroads, could impact neighborhoods and a cemetery and could be costly.
- Is this highway needed, especially the new connection to Mapleton, if the I-15 Interchange is not constructed?

1.1 STUDY AREA

The study area broadly includes Spanish Fork City, Springville City, Mapleton City, and unincorporated areas of Utah County (see Figure 1-2); however, the area of focus is much narrower and includes the Springville 1600 South corridor between US-89 and I-15, and I-15 near Spanish Fork Center Street.

STUDY AREA

Figure 1-2, Study area and projects being evaluated

1.2 STUDY TEAM

There were seven key stakeholders for the Springville/Spanish Fork Study:

- Spanish Fork City
- Springville City
- Mapleton City
- Utah County
- Utah Transit Authority (UTA)
- Mountainland Association of Governments (MAG)
- Utah Department of Transportation (UDOT)

To appropriately receive input from the stakeholders, two committees were formed: the Technical Advisory Committee and the Steering Committee.

Technical Advisory Committee

The Technical Advisory Committee was comprised of staff members of each key stakeholder who were familiar with the needs and requirements of their respective agency. This team met monthly to discuss all aspects of the project as it progressed and to provide feedback. The project team also met individually with members of the committee as needed to discuss specific concerns as they arose.

Shawn Eliot, MAG Project Manager
Richard Nielson, County Engineer, Utah County
Matt Brady, Planner I, Mapleton City
Brandon Snyder, Planner, Springville City
Jeff Anderson, City Engineer, Springville City
Trapper Burdick, City Engineer, Spanish Fork City
Dave Anderson, Community Development Director, Spanish Fork City
Ken Anson, Senior Service Planner, Utah Transit Authority
Janelle Ericson, Engineering-Construction Planner, Utah Transit Authority
Craig Hancock, Region 3 Preconstruction Engineer, Utah Department of Transportation

Steering Committee

The Steering Committee was made up of elected officials and board members from each stakeholder. One Steering Committee meeting was held on August 9, 2011, to present the study findings to date. Due to the low attendance at this meeting, it was decided that no additional Steering Committee meetings would be held. Members of the Technical Committee agreed to keep their elected officials apprised of the study progress.

Jeff Mendenhall, Utah County Community Development Director, Utah County
Larry Ellertson, Utah County Commissioner and Utah Transit Authority
Mike Nelson, City Council, Mapleton
Phil Bird, City Council, Springville City
Richard Davis, City Council, Spanish Fork
Brian Wall, Mayor, Mapleton City
Wayne Anderson, Mayor, Spanish Fork City
Wilford Clyde, Mayor, Springville City
Shane Marshall, Region 3 Director, Utah Department of Transportation

Consultant – Horrocks Engineers

Jim Horrocks, Consultant Project Manager and Public Involvement Lead
Tracy Conti, Government Liaison
Brian Atkinson, Engineering Lead
Ron Mortimer, Planning Lead
Stan Jorgensen, Environmental Lead

MAG, the consultant, and the TAC met at least once per month throughout the project to discuss the study projects and make decisions regarding development of potential design concepts.

2.0 STUDY METHODOLOGY

Traffic analysis was performed using two separate modeling methods. The first method involved using the regional Travel Demand Model (TDM) to analyze roadways from an area-wide perspective and to predict future travel demand volumes. The second method utilized Synchro and Vissim to analyze traffic operations on a smaller scale and examine specific intersections and roadway corridors. Each method, including the results of the analyses, will be addressed in this study.

2.1 STUDY AREA

The study area broadly includes Spanish Fork City, Springville City, Mapleton City, and unincorporated areas of Utah County; however, the area of focus is much narrower and includes the Springville 1600 South corridor between US-89 and I-15, and I-15 near Spanish Fork Center Street. The Operational Study Area, or the area included for evaluation in the operations model, is shown in Figure 2-1 below.

STUDY AREA

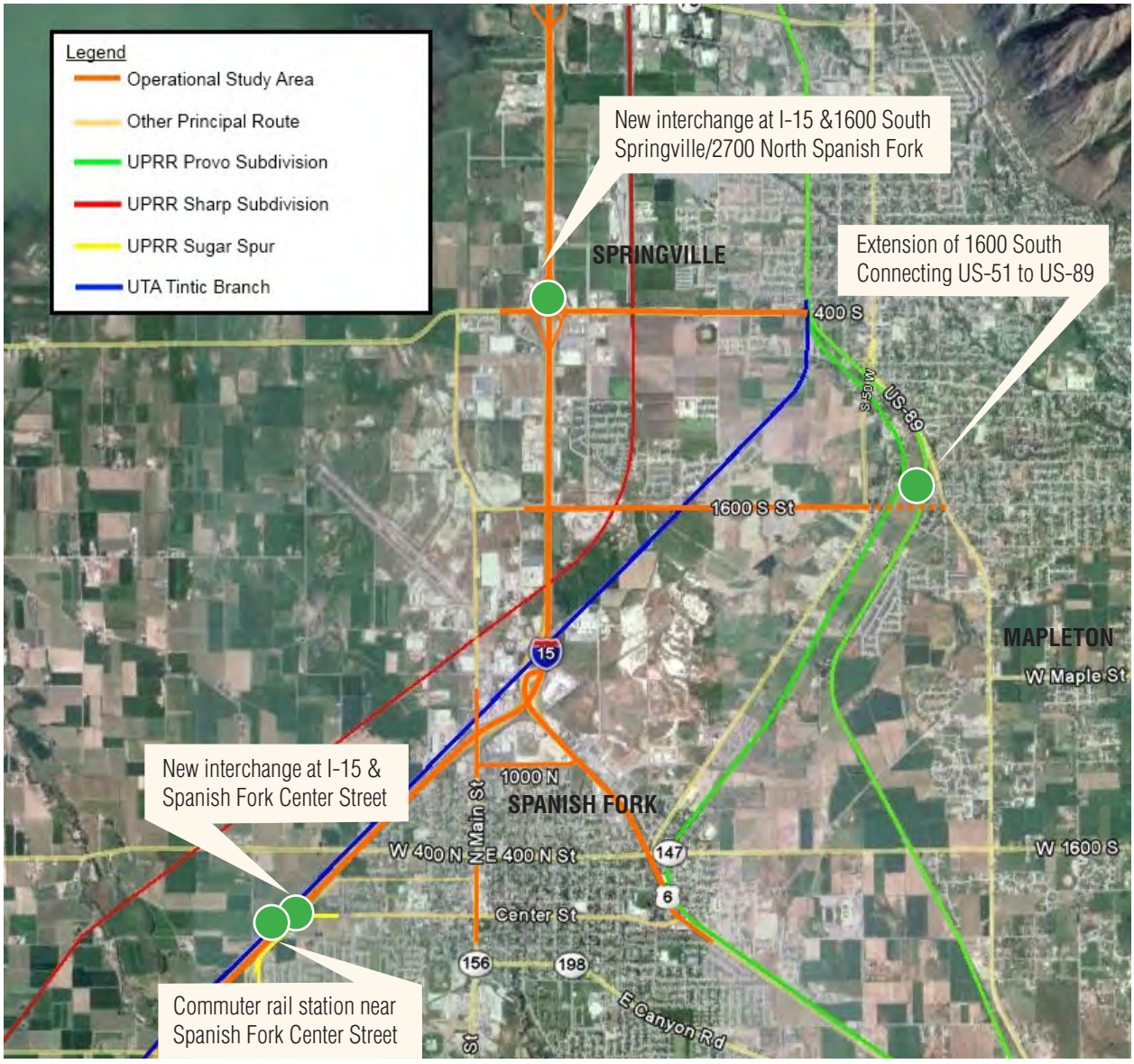


Figure 2-1, Study area and projects being evaluated

The following facilities are included in the operational study model for the baseline condition:

- I-15 Mainline from milepost 254.6 (Payson Main Street (SR-115) overpass) to milepost 261.8 (Springville 1400 North (SR-75) Interchange). The southbound on-ramp and northbound off-ramp of the SR-75 Interchange will be included in the model.
- 400 South (Springville) between 2600 West and 1500 West.
- 1600 South (Springville) between I-15 and US-89.
- US-6 from the I-15 Interchange to approximately 1500 East (Spanish Fork).
- 1000 North (Spanish Fork) between US-6 and Main Street.
- Main Street (Spanish Fork) between 100 South and 1400 North.

Other regional roadways and facilities not included in this list (bus routes, commuter rail, state highways, etc.) will be included in the travel demand modeling. A map of the study area is show in Figure 2-1 on page 5 with the major roadway corridors and railroads highlighted.

2.2 ANALYSIS YEARS

Baseline Year

The study used 2011 as the baseline year for existing conditions analysis; however, because traffic patterns and driver behavior have been affected due to the construction activities related to the Utah Department of Transportation (UDOT) I-15 CORE project, some modifications in the models were made to the "2011" roadway network. The changes to I-15 and to the US-6 and Main Street Interchanges that are planned as part of the CORE project were included in the baseline 2011 model to reflect the conditions that are currently under construction.

Future Conditions

The future conditions analysis was performed using 2040 as the horizon year. Additionally, 2020 and 2030 were analyzed as intermediate years to help determine project phasing. All projects that are part of the MTP were included in these models, except as may be noted in this report for various alternatives analyses.

2.3 TRAVEL DEMAND MODELING

MAG and Wasatch Front Regional Council (WFRC) jointly maintain a travel demand model (TDM) for the four-county metropolitan region including Weber, Davis, Salt Lake, and Utah Counties. The TDM predicts future travel demand based on projections of land use, socioeconomic patterns, and transportation system characteristics. The mode uses the TP+/Cube software (currently using version 5.1.1). References to "the model" in this report refer to the scripts and data maintained by MAG and WFRC, not to the Cube software. At the time of this study, Version 7.0 of the MAG/WFRC TDM had been officially released. It was calibrated to 2007 and uses 2040 as the forecast year.

Traffic Analysis Zones

One of the major updates for the v7.0 model versus the previous version was an increased number of Traffic Analysis Zones (TAZ). The previous model had 1450 TAZ and the v7.0 model has 2250 TAZ. In the past, models have been limited to the number of TAZ, in part, by limitations in computing power and in the ability to collect small area socioeconomic data. Increased computing power and greater availability of aerial photography have eased these limitations. Even with the greater number of TAZ, the study area still contains many large TAZ, which are suitable for regional traffic forecasts but do not provide adequate detail for a smaller-scale study. In particular, some of the larger TAZ found in the study area have covered historically low density areas but are anticipated to grow in the future. Also, smaller TAZ can provide a better loading of traffic onto the roadway network. For these reasons, many of the original v7.0 TAZ within the study area were split into smaller zones, which make the model more sensitive for a corridor-level study. Figure 2-2 shows the TAZ splits compared with the original v7.0 TAZ.

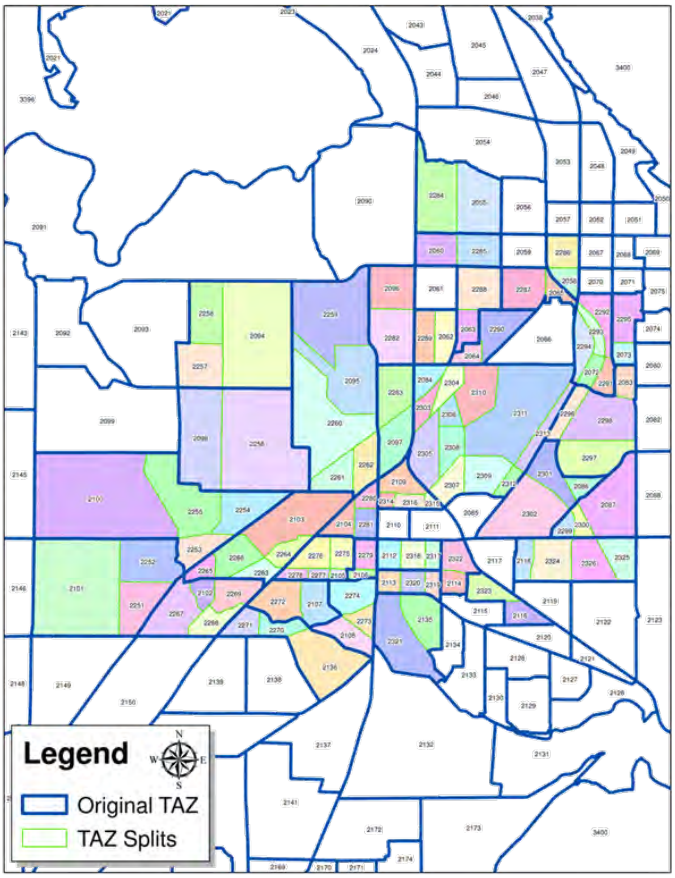


Figure 2-2 TAZ Equivalency Map

Socioeconomic Data

Land use data in the model includes population, dwelling units, household size, retail employees, industrial employees, and other employees. The v7.0 model official inputs include these socioeconomic inputs for the years 2007, 2016, 2020, 2030, and 2040. The 2011 socioeconomic data were obtained from MAG as part of this study. Comparisons within the study area between the original MAG socioeconomic data and the data after it was distributed into the new TAZ are shown in Table 2-1. The small variations in totals can be attributed to rounding during the calculation process.

Table 2-1 Comparison of the Study Area Socioeconomic Data Before and After TAZ Splits

Year	Population			Households			Employment		
	MAG Original	With TAZ Splits	Percent Change	MAG Original	With TAZ Splits	Percent Change	MAG Original	With TAZ Splits	Percent Change
2011	105,412	105,328	-0.1%	30,276	30,251	-0.1%	35,486	35,487	0.0%
2020	141,849	141,748	-0.1%	40,905	40,867	-0.1%	46,523	46,521	0.0%
2030	176,556	176,442	-0.1%	51,936	51,893	-0.1%	58,692	58,686	0.0%
2040	200,207	200,077	-0.1%	60,124	60,072	-0.1%	78,190	78,191	0.0%

Model Roadway Network

The regional TDM generally includes the large collector and arterial-type facilities in its roadway network. The Spanish Fork/Springville Interchange study used this same network as a base but added existing roads as appropriate for the TAZ splits and for existing conditions. The base 2011 network came from the variables LN09 and FT09 in the master network file, but was updated to include the I-15 CORE improvements and additional facilities within the study area. A review of the network within the study area was performed to ensure appropriate representation of the existing roadway conditions. The 2040 network includes all projects in the MTP and projects from the master plans of Springville and Spanish Fork cities.

In some instances, additional modifications to speeds were made to some network links as a means of calibrating to existing traffic count data. The modifications were done using best engineering judgment in cases where the 2011 model results were substantially different from the 2011 count data. The objective is to not perpetuate model errors that are in the existing model to the future model. The adjustments are assumed to apply to the future network where there is no significant change in the expected functional type, number of lanes, or speed of the roadway links. Turn penalties were added at the US-89/US-51/Main Street area to prevent illegal turn movements.

Model Transit Network

The transit networks used in the Spanish Fork/Springville transportation study were essentially unchanged from what were provided in the original model release (see Figure 2-3). The only modifications were those necessary to accommodate link splits and other network modifications described previously.

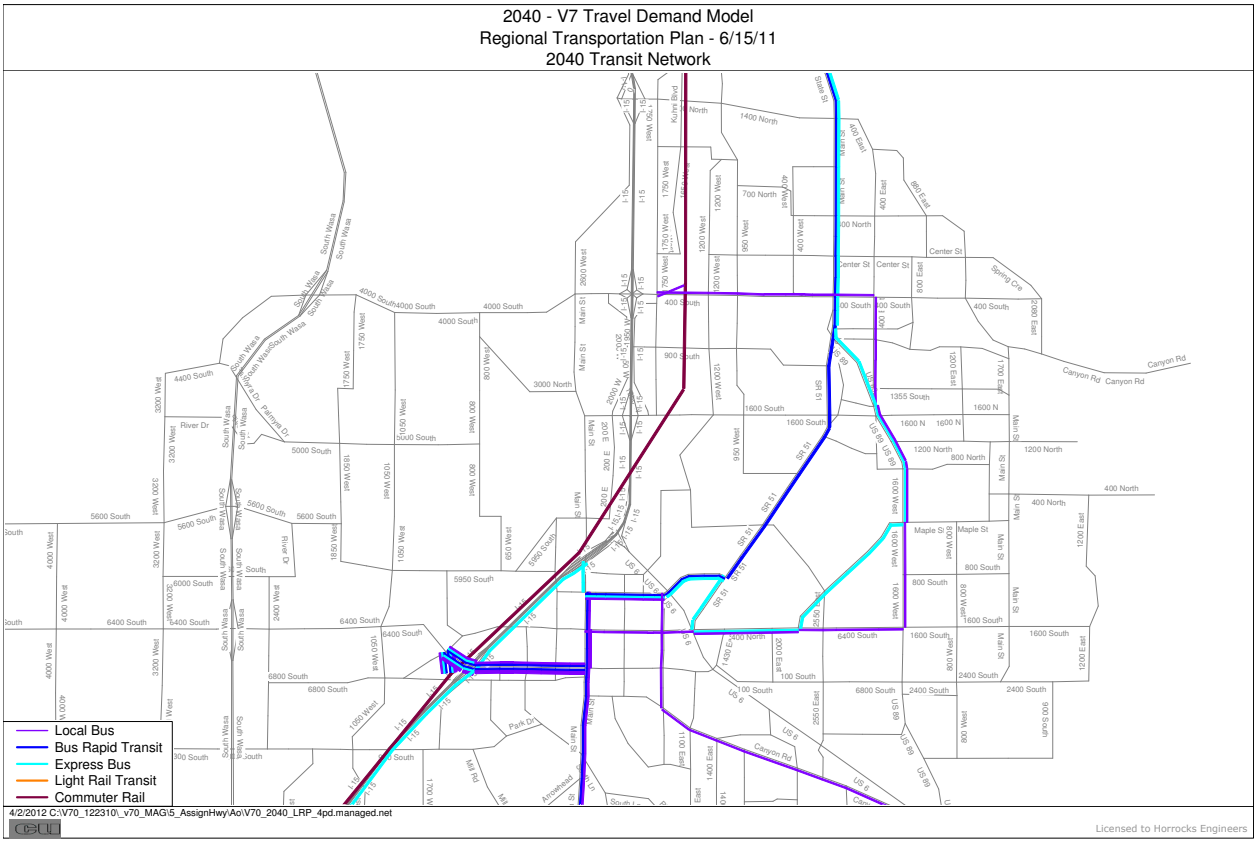


Figure 2-3 2040 Transit Network

Model Verification

The changes that were made to the base MAG model were done in an effort to increase its accuracy within the study area. A Root Mean Squared Error (RMSE) analysis within the surrounding area for the updated 2011 model and 2011 count data was performed to verify that the updated model remains a valid tool. The MAG/WFRC model documentation for v6.0 states, "[t]he RMSE is used to calculate the effectiveness of individual link and node modifications, as well as general changes in trip generation and distribution and assignment parameters." The documentation for v7.0 states, "[t]he percent RMSE should generally be less than 40%, overall, with higher values acceptable for low volume links and lower values expected for high volume links." Table 2-2 contains a comparison of the RMSE values from the base 2011 unmodified model with the modified model in which all the updates described previously have been applied.

Table 2-2 Root Mean Squared Error within the Study Area for 2011

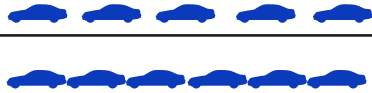
Roadway Volumes	Number of Data Locations	Unmodified Model RMSE	Modified Model RMSE
Less than 15,000	45	62%	42%
15,000 to 30,000	14	33%	29%
Over 30,000	1	18%	22%
Combined	**60**	**46%**	**41%**

As shown in Table 2-2, the overall RMSE improved from 46 percent to 41 percent within the study area. The one anomaly appears to be the I-15 section between SR-6 and Springville 400 South. This section had a lower traffic count than was calculated by either model, which is most likely due to existing construction and the fact that models assumed I-15 CORE improvements were complete.

Level-of-Service (LOS) and Volume-to-Capacity (V/C) Ratios

Level-of-Service (LOS) is a term used by the Highway Capacity Manual (HCM) to describe the traffic operations of an intersection or roadway, based on congestion and average vehicle delay. LOS range from "A" (almost no congestion or delay) to "F" (traffic demand is above capacity and the intersection or roadway experiences long queues and delay). See the chart below for an overview of LOS levels. LOS C or better is generally considered acceptable for rural roadways. LOS D or better is generally acceptable for urbanized roadways. LOS E is the threshold when the roadway approaches maximum capacity.

Level of Service

Rating	Level of Service	Description
A		**Free Flow Traffic –** low volumes, no delays
B		**Stable Flow –** Speeds restricted by travel conditions, minor delays
C		**Stable Flow –** Speeds and maneuverability closely controlled due to higher volumes
D		**Stable Flow –** Speeds considerably affected. High density traffic restricts maneuverability; volume near capacity
E		**Unstable Flow –** Low speeds cause considerable delay; volumes slightly over capacity
F		**Forced Flow –** Very low speeds, volume exceeds capacity, long delays and stop-and-go traffic

LOS for the roadways within the study area was estimated by using the Volume-to-Capacity (V/C) ratios calculated by the TDM. Roadway LOS was estimated to be LOS E or F for V/C greater than or equal to 0.9, LOS D for V/C between 0.8 and 0.9, and LOS C or better for V/C less than 0.8.

2.4 MICROSIMULATION MODELING

A microsimulation analysis was performed to determine the effect of the I-15/Spanish Fork Center Street Interchange and the I-15/Springville 1600 South/Spanish Fork 2700 North Interchange on mainline I-15 operations. The VISSIM microsimulation software was used to conduct this analysis. This software was also used on the I-15 CORE project for the freeway analysis.

The study area for the microsimulation analysis includes the I-15 freeway segments from approximately 900 South Spanish Fork to 1400 North Springville. The US-6 segments from approximately 900 North to the I-15 Interchange were also included. The existing and future conditions models use the I-15 CORE freeway design as a base condition for lane configuration.

Traffic volume data were collected for each network component: mainline, ramps, and intersections. Data sources for this project include manual traffic counts, pneumatic hose counters, and the UDOT Freeway Performance Management System (PeMS). Data was collected for two hours in each peak period (7-9 AM and 4-6 PM) to determine the daily peak hour volume. The maximum one hour volumes observed within these periods are assumed to represent the respective peak hours. Peak hour forecasts for the 2040 future conditions models were developed from the peak periods analyzed with the regional travel demand model. The balanced volumes for existing conditions for both AM and PM are included in the electronic files appendix.

MICROSIMULATION EXAMPLE

Figure 2-2, This side-by-side microsimulation of 400 South was shown to the public to demonstrate traffic conditions on 400 South with and without the interchanges evaluated in this study

3.0 STUDY PROJECTS

3.1 NEW INTERCHANGE AT I-15 AND CENTER STREET IN SPANISH FORK

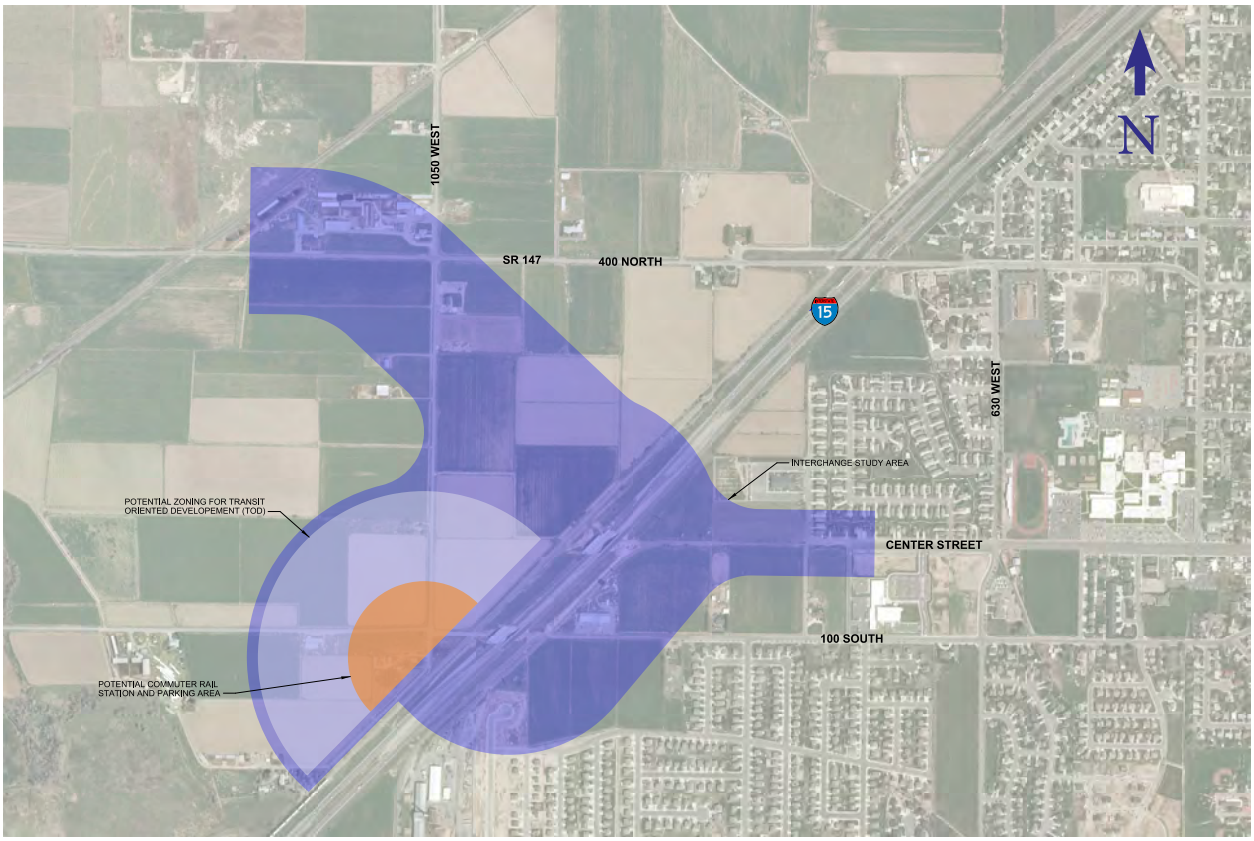


Figure 3.1-1, Study area for interchange at Spanish Fork Center Street and I-15

Background

Spanish Fork's 2030 Transportation Master Plan shows a new I-15 / Center Street Interchange near 850 West. This interchange was not developed earlier because of space constraints with the Union Pacific Railroad (UPRR) track that parallels the I-15 on the west side. The UPRR's Tintic Branch includes a spur track that crosses underneath I-15 and runs along Spanish Fork Center Street. This track services two rail customers on the east side of I-15. The UTA has purchased UPRR's Tintic Branch and plans a Spanish Fork commuter rail station west of I-15 in Spanish Fork.

This study has investigated possible configurations for a new diamond interchange and rail station and their associated impacts to nearby streets, properties, and rail transportation elements. The recommended alternative is accompanied with a variation that will maintain the spur track access. Three feasible alternatives are also presented that provide grade-separated railroad crossings and direct connection to SR-147/400 North. The placements of I-15 and rail station are shown throughout the different alternatives. There are also several other alternatives that have been eliminated due to at-grade railroad crossings and undesirable Center Street connections with SR-147/400 North.

The conditions noted above define the conflicts that a Spanish Fork Center Street Interchange development must anticipate and overcome. Preliminary engineering analysis yielded few interchange and rail development concepts capable of overcoming the space conflicts and meeting transportation

service requirements. Many alternatives were considered, but based on input from the study TAC, any alternative that did not meet three specific criteria, would be screened out and eliminated from further advancement. These criteria required grade-separated railroad crossings and the Center Street alignment to provide a continuous through movement from to SR-147/400 North. Lastly the Center Street alignment must not be too far north to avoid unnecessary property impacts.

The paragraphs below describe the single concept (with a possible variation – see discussion below) considered to be feasible. In this discussion, it is assumed that: 1. UTA development will happen; and 2. Interchange construction and track relocation and improvement, compatible with 79 mph commuter rail operation requirements, will occur simultaneously.

Purpose and Need for the Project

Purpose of the Project

The purpose of the project is to improve traffic operations to Level-of-Service (LOS) D or better on Spanish Fork Main Street from I-15 to Center Street, to provide better connectivity to the areas in and around Spanish Fork, and to provide better access to the proposed Utah Transit Authority commuter rail station adjacent to the interchange.

Need for the Project

The project is needed to improve traffic operations on Spanish Fork Main Street, which is projected to operate at LOS E/F for most of the route from I-15 to Center Street by 2040, and provide direct access to the UTA commuter rail station.

2040 MTP without the Spanish Fork Center Street Interchange

The TDM was run for a scenario that included all projects from the 2040 MTP with the exception of the Spanish Fork Center Street Interchange (see Appendix for full traffic analysis). Figure 3.1-2 shows the 2040 MTP without the Center Street Interchange Scenario. Under this scenario, Spanish Fork Main Street will operate at an unacceptable LOS (LOS E/F) by 2040.

The analysis of the 2040 MTP without the Center Street Interchange Scenario suggests that the primary traffic operations benefit of the Center Street Interchange is to relieve traffic congestion on Spanish Fork Main Street north of Center Street.

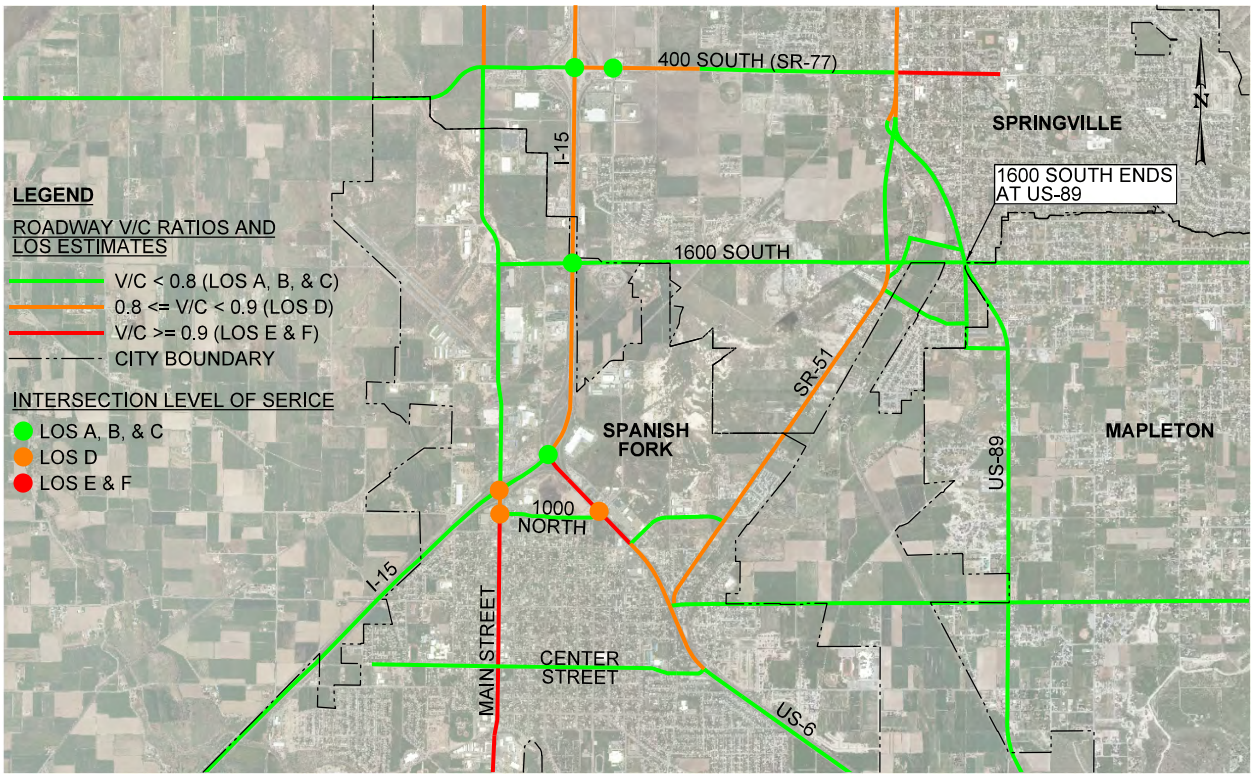


Figure 3.1-2, 2040 Traffic without Implementation of Interchange at I-15 and Center Street in Spanish Fork

Study Recommendation for Interchange at I-15 and Center Street in Spanish Fork

I-15 was constructed on embankment above Center Street and 100 South Street. The recommended alternative leaves the existing I-15 roadway profile unchanged and elevates UTA's line to a profile similar to that of the I-15. The concept shows the Tintic Branch shifted westward 70 feet, and the I-15 right-of-way widened 50 feet, with extensive use of slope-retaining walls, to accommodate a single point urban interchange (SPUI) footprint. Only relatively modest adjustments are required to I-15's existing east right-of-way line. A new Center Street crossroad alignment swings northwestward from about 1000 West, across I-15 and the UTA line, and connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. About 5,500 feet of the UTA line is relocated to achieve the 70-foot westward shift at Center Street. I-15 and the UTA line pass above the new interchange crossroad on new structures. UPRR rail service to properties east of the I-15 is terminated, and 100 South Street is terminated across the I-15 right-of-way and the UTA Commuter Station property. Existing I-15 structures at Center Street and 100 South Street are removed. New right-of-way is acquired for the westward track shift and for new roadways and roadway adjustments both east and west of I-15. It is assumed that UPRR will relocate an existing pallet manufacturing siding track to another location either north or south of this project area.

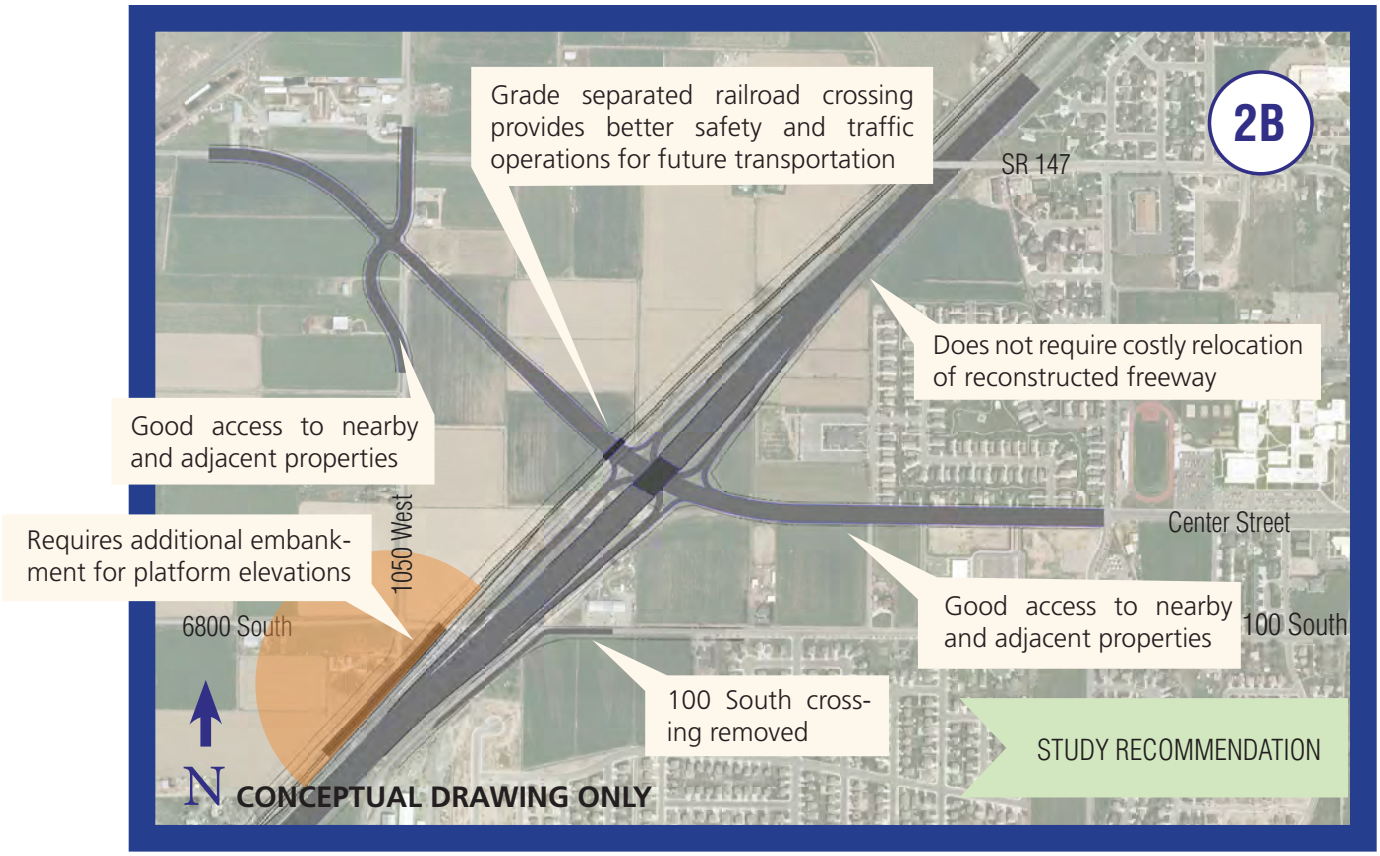


Figure 3.1-3, Study Recommendation for new interchange at I-15 and Center Street in Spanish Fork: Alternative 2b

The recommended alternative shown depicts a Single Point Urban Interchange (SPUI) at the crossing of Center Street and I-15. During the development of the various concepts for the interchange at this location, a tight diamond interchange was shown for all concepts. Once a recommended location and the preferred vertical alignments of the crossing streets and railroad were determined, the design was advanced further to determine better right-of-way and construction costs. It was determined during this conceptual design development that a SPUI interchange type would present the following advantages:

- SPUI configuration provides an overall conservative ROW footprint for the interchange allowing for a conservative ROW footprint that could be preserved from future development
- Due to the close proximity of the UTA tracks with the future interchange a SPUI configuration will provide the maximum distance between the ramp intersection and the railroad grade-separation
- SPUI configuration provides maximum traffic operation capacity for the interchange

The combination of these advantages provide for a conservative ROW preservation and maximum traffic capacity that provides the most flexibility for any future project.

Benefits and Challenges of Study Recommendation

Advantages

- Grade separated railroad crossing provides better safety and traffic operations compared with an at-grade crossing
- Good access to nearby and adjacent properties
- Does not require costly relocation of newly updated I-15

Disadvantages

- Requires relocation of 5,500 feet of horizontal and vertical railroad realignment
- Station platform will be elevated four to eight feet above existing ground

Study Recommendation Cost

A primary study objective was to find a feasible interchange concept and establish an approximate right-of-way footprint for local officials' use in right-of-way preservation actions. A concept-level cost has been estimated for the concept described above as follows:

About $ 55 Million *

Variation of Recommendation for Interchange at I-15 and Center Street in Spanish Fork

In case the railroad rights associated with the railroad spur cannot be relocated or removed, a variation to the study recommendation was developed that could accommodate future spur track service. With only minor changes in the overall right-of-way footprint, this variant preserves UPRR's spur track service to two properties east of I-15. This alternative would require:

1. Development of a UPRR siding on the east-most 30 feet of UTA's right-of-way
2. Moving the spur track crossing of I-15 to 100 South Street.

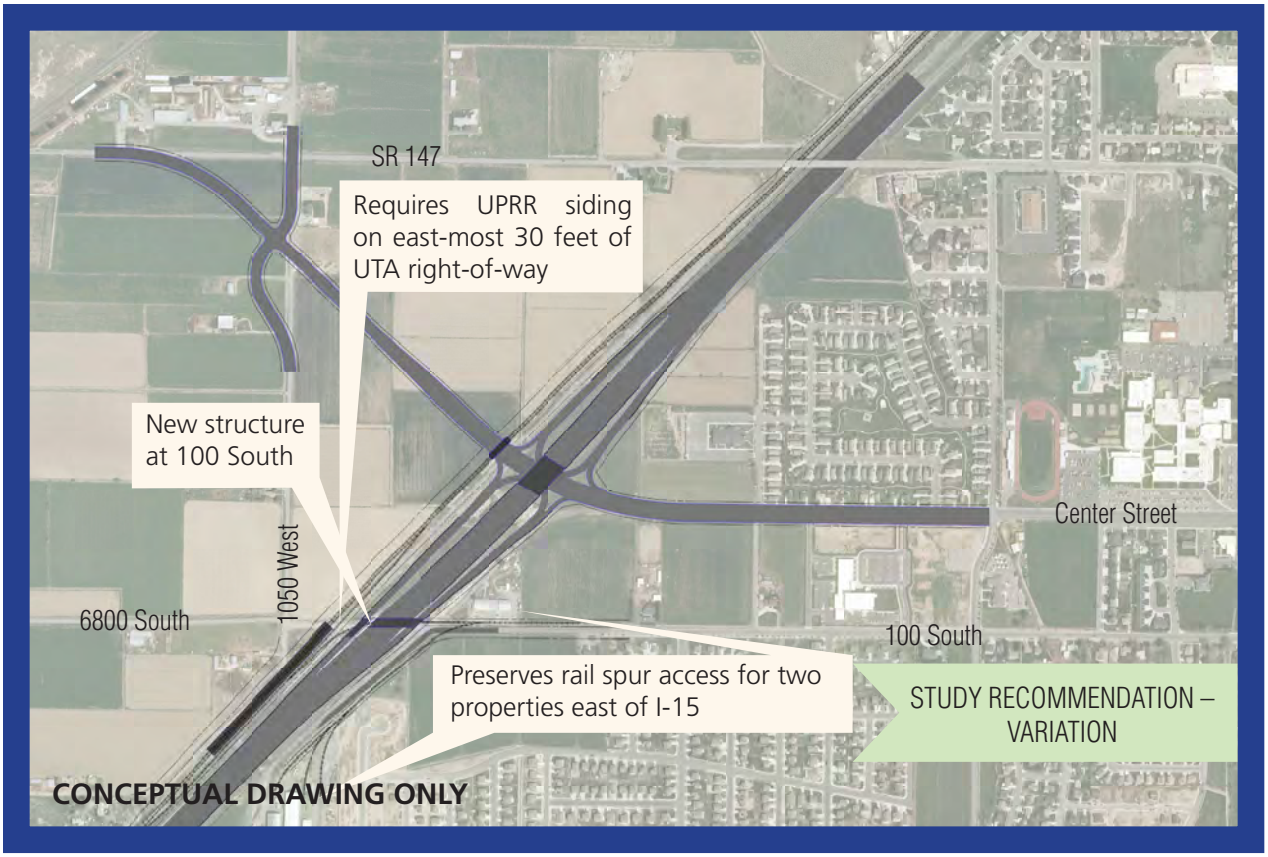


Figure 3.1-4, Study Recommendation – Variation for Interchange at I-15 and Center Street in Spanish Fork

About one-half mile of the I-15 grade would need to be raised, and a new 100 South structure would need to be built, for the required railroad track clearance at 100 South, accounting for much of the increase in cost compared with Alternative 2b. As in the basic concept, 100 South Street would be closed to roadway traffic across the I-15 right-of-way and the UTA Commuter Station property.

The concept-level cost for this improvement was estimated as follows:

About $ 71 Million *

** Note that these estimated costs are useful only as approximate, or "ballpark", figures as placeholders for recommended future improvements. Actual budgeting and programming costs should be determined by detailed future environmental and engineering studies.*

Environmental Considerations for Interchange at I-15 and Center Street in Spanish Fork

For a detailed and complete description of all environmental factors relating to this project, please see the Environmental section of the Appendix.

Summary of Key Environmental Factors Affecting Alternative Selection

Key environmental resources that may affect the alternative selection of a new interchange and commuter rail station at I-15 and Center Street in Spanish Fork include:

- **Farmlands** - The recommended alternative would impact farmland in an Agricultural Protection Area (APA). If the landowner does not agree to remove the land from the APA and make the applicable requests, additional alternatives may need to be examined to determine that "there is no reasonable and prudent alternative to the use of the land within the agricultural protection area for the project."

- **Wetlands and Waters of the U.S.** - The recommended alternative could impact NWI mapped wetlands. Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would result in a discharge of fill material to waters of the U.S. An alternative is practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.

- **Threatened & Endangered Species** - The Endangered Species Act (ESA) provides protection to federally listed threatened and endangered species and their designated critical habitats. It requires that all federal agencies considering a project or action to consult with the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration to ensure that the proposed activity is "not likely to jeopardize the continued existence" of any listed species or will not "result in adverse modification" of its critical habitat. The Endangered Species Act is pertinent to the project because the federally listed, threatened Ute ladies'-tresses (*Spiranthes diluvialis*) could be present within the study area.

- **Section 4(f)** - The recommended alternative would likely impact historic properties protected under Section 4(f) which prohibits U.S. Department of Transportation (USDOT) agencies from approving the use of any Section 4(f) land for a transportation project except as follows:

    - The USDOT agency can approve the use of Section 4(f) land by making a determination that (1) there is no prudent and feasible alternative that would avoid the use of the

Section 4(f) resource, and (2) the project includes all possible planning to minimize harm to that property.

- The USDOT agency can approve the use of Section 4(f) property by making a finding of *de minimis* impact for that property.

The recommended alternative would likely have an impact that would not be considered *de minimis*. An analysis of avoidance alternatives to determine if a feasible and prudent avoidance alternative exists would need to be conducted.

- **Relocations** - The recommended alternative could require two to three residential relocations.

Public Response

The public is in support of this project; no negative feedback was received regarding the interchange or UTA station at this location. Public comment was specifically supportive of the commuter rail station.

For a complete compilation of comments relating to this project, please see the Public Involvement section of the Appendix.

Other Feasible Alternatives for Interchange at I-15 and Center Street in Spanish Fork

The concepts shown in the following section represent other viable alternatives that were considered at Spanish Fork Center Street but are not recommended by this study based on input from the Technical Advisory Committee, Steering Committee, and public comments. These concepts were Alternatives 4A, 5A, and 6A. All three concepts would have substantial impacts to I-15 traffic during construction. Two of the alternatives would require additional ROW over the study recommendation; however, the primary factor in selecting the study recommendation was the significant cost differences between the alternatives (costs for eliminated alternatives range from $77.6 million to $100 million).

Alternative 4a

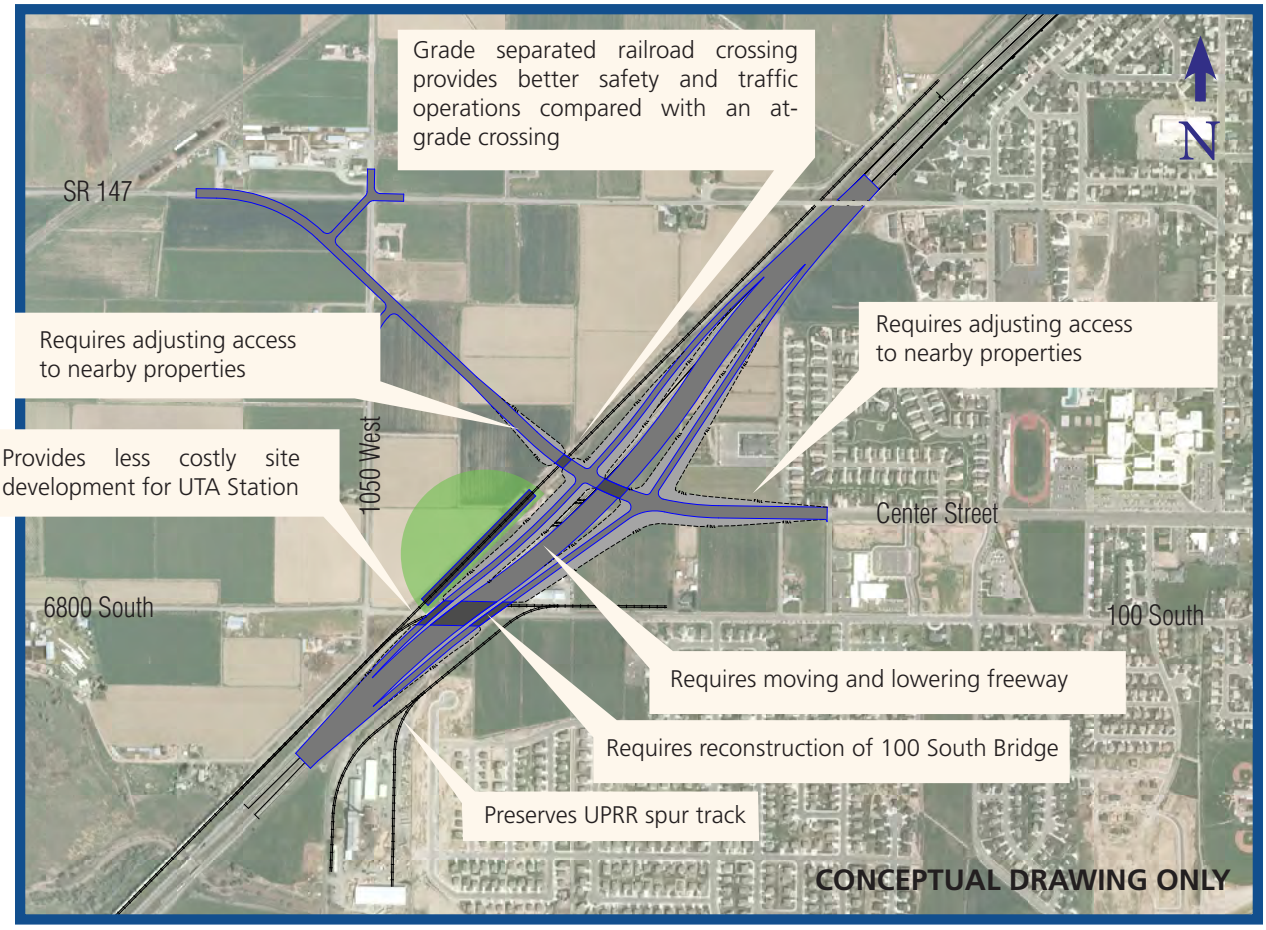


Figure 3.1-5, Alternative 4a: I-15 shifts and lowered, UTA stays in place, Center Street elevated

Alternative 4a shifts and lowers the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, above the lowered I-15 and existing UTA lines, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. The railroad west of I-15 will remain in place. This grade separated crossing requires new structures to carry Center Street over I-15 and UTA. The 100 South structures require replacement due to the realignment of I-15. The UPRR spur track to the east of I-15 is preserved. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative offers the desired grade separated railroad crossing for better safety and traffic operations. It also provides a less costly site development area for the UTA Station. Disadvantages to this alternative include the high cost of moving and lowering I-15 along with the construction of new structures at 100 South. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the cost and property impacts this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 100 Million

Alternative 5a

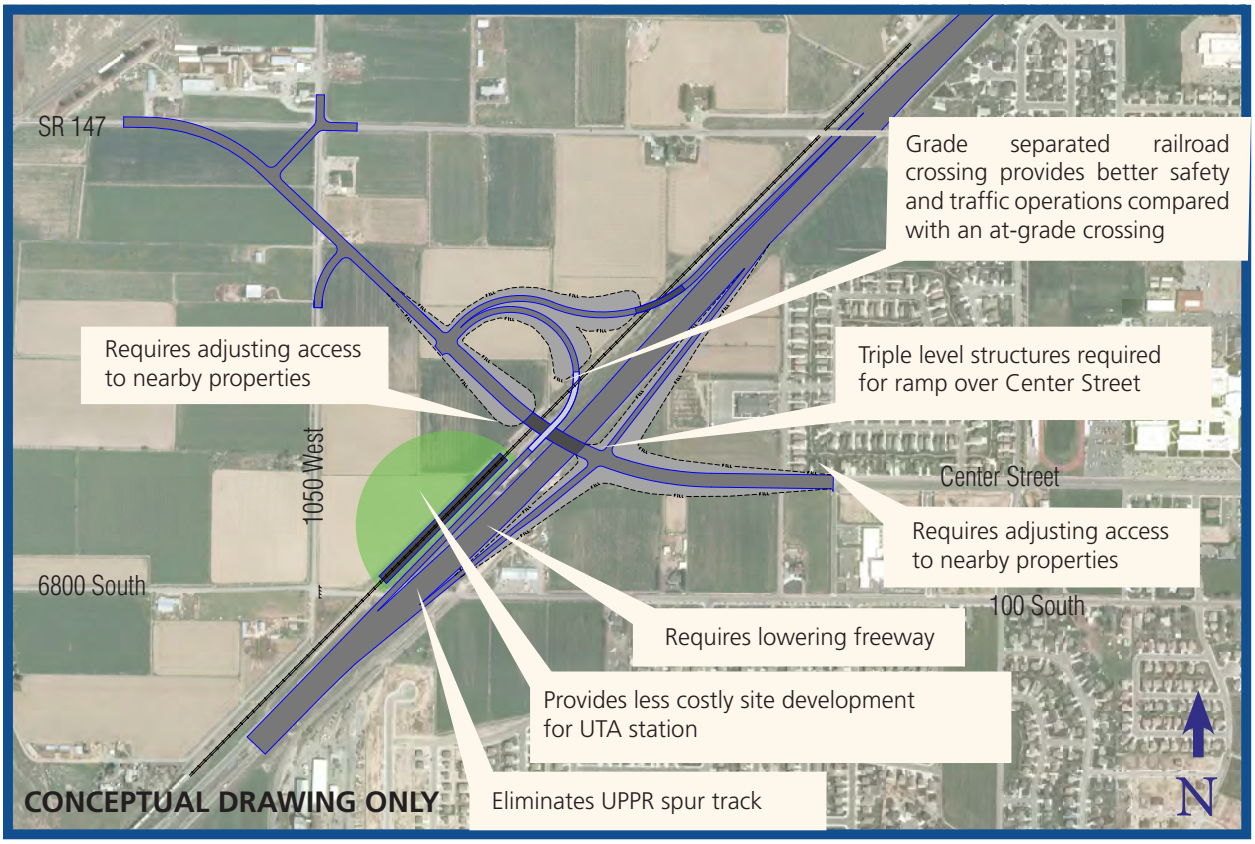


Figure 3.1-6, Alternative 5a: I-15 lowered, UTA stays in place, and Center Street elevated

Alternative 5a lowers the I-15 freeway profile to accommodate a new interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, above the lowered I-15 and existing UTA lines, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. The railroad west of I-15 will remain in place. Grade separated crossings require triple level structures to carry Center Street and new I-15 southbound ramps over the UTA lines. The UPRR spur track to the east of I-15 is eliminated. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative offers the desired grade separated railroad crossings for better safety and traffic operations. It also provides a less costly site development area for the UTA Station. Disadvantages to this alternative include the high cost of lowering I-15 along with construction of the new triple level structures for the ramps and Center Street crossings. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the cost and property impacts this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 85 Million

Alternative 6a

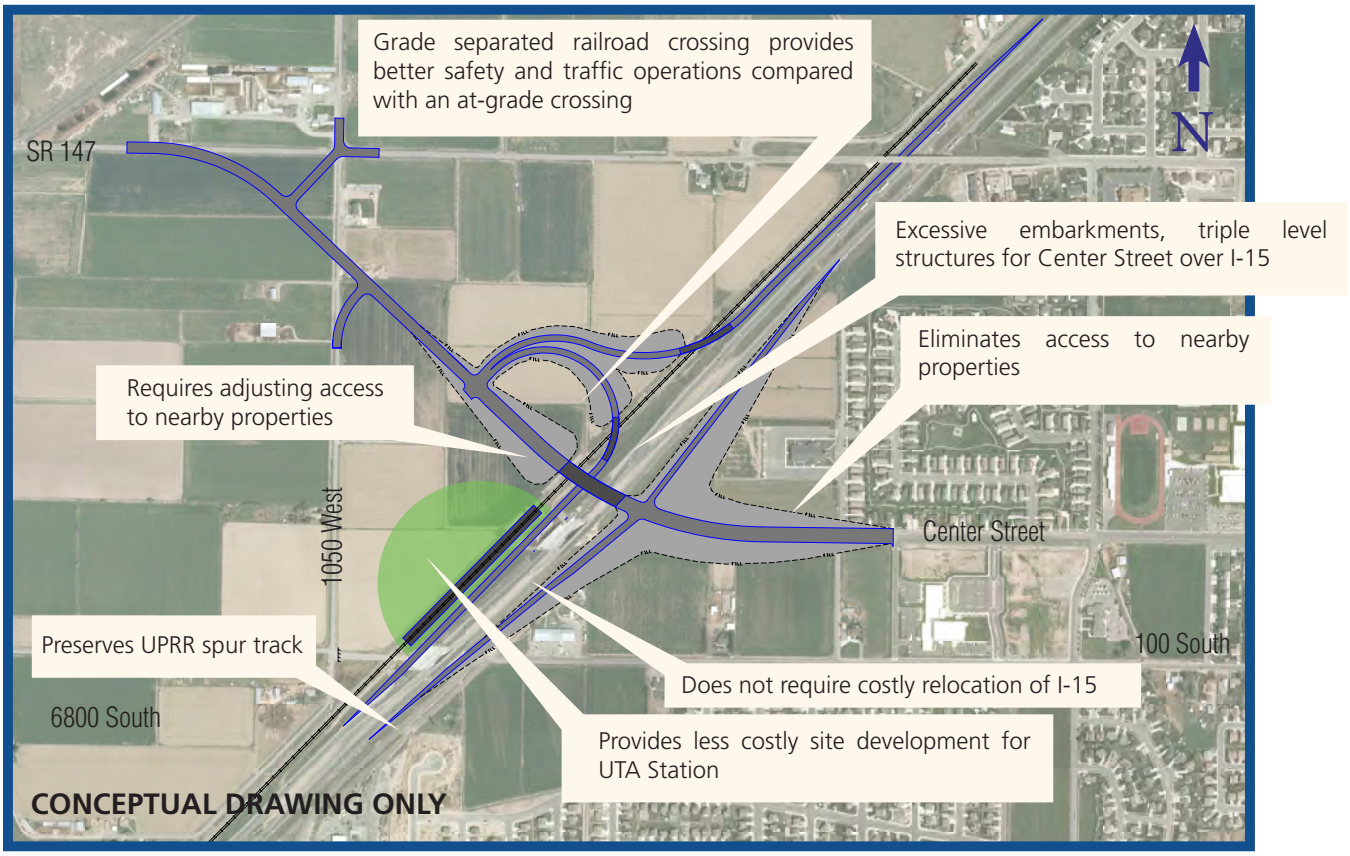


Figure 3.1-7, Alternative 6a: I-15 and UTA stay in place, and Center Street elevated to 3rd level

Alternative 6a preserves the existing I-15 freeway and railroad lines while accommodating a new interchange. A new Center Street crossroad alignment swings northwestward from about 1000 West, above the existing I-15 and UTA lines, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. Grade separated crossings require triple level structures to carry Center Street and new I-15 southbound ramps over the UTA lines. The UPRR spur track to the east of I-15 is preserved. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative does not require costly relocation of I-15 and offers the desired grade separated railroad crossings for better safety and traffic operations. It also provides a less costly site development area for the UTA Station. Disadvantages to this alternative include the high cost of excessive embankment and triple level structures for the ramps and Center Street crossings. Another disadvantage is the properties that are impacted to the west of the interchange that require adjustment for accesses. Accesses for properties to the east are eliminated. Due to the cost and property impacts this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 78 Million

Eliminated Alternatives for Interchange at I-15 and Center Street in Spanish Fork

During evaluation of alternatives, the TAC established criteria that was important for various reasons. The TAC determined that if an alternative did not meet these specific criteria, it would be screened out and eliminated from further consideration. The following are the criteria agreed upon by the TAC that were used in eliminating the alternatives shown on the following pages. Because of their failure to meet one or more of these criteria, the alternatives were deemed unfeasible for further consideration or development in the study:

- Grade separated railroad structures were required, as they provide better safety and traffic operations. Also, new improvement utilizing at-grade crossings would eventually require replacement to grade-separated crossings (affected Alternatives 1A, 1B, 1C, and 2A).
- Center Street alignment must provide continuous through movement to SR-147/400 North (affected Alternatives 1A, 1C, 3A, 3C, and 3D).
- Center Street alignment must not be too far north causing unnecessary impacts to adjacent property owners (affected Alternative 3B)

See figures and details on following pages for details of all alternatives

Alternative 1a

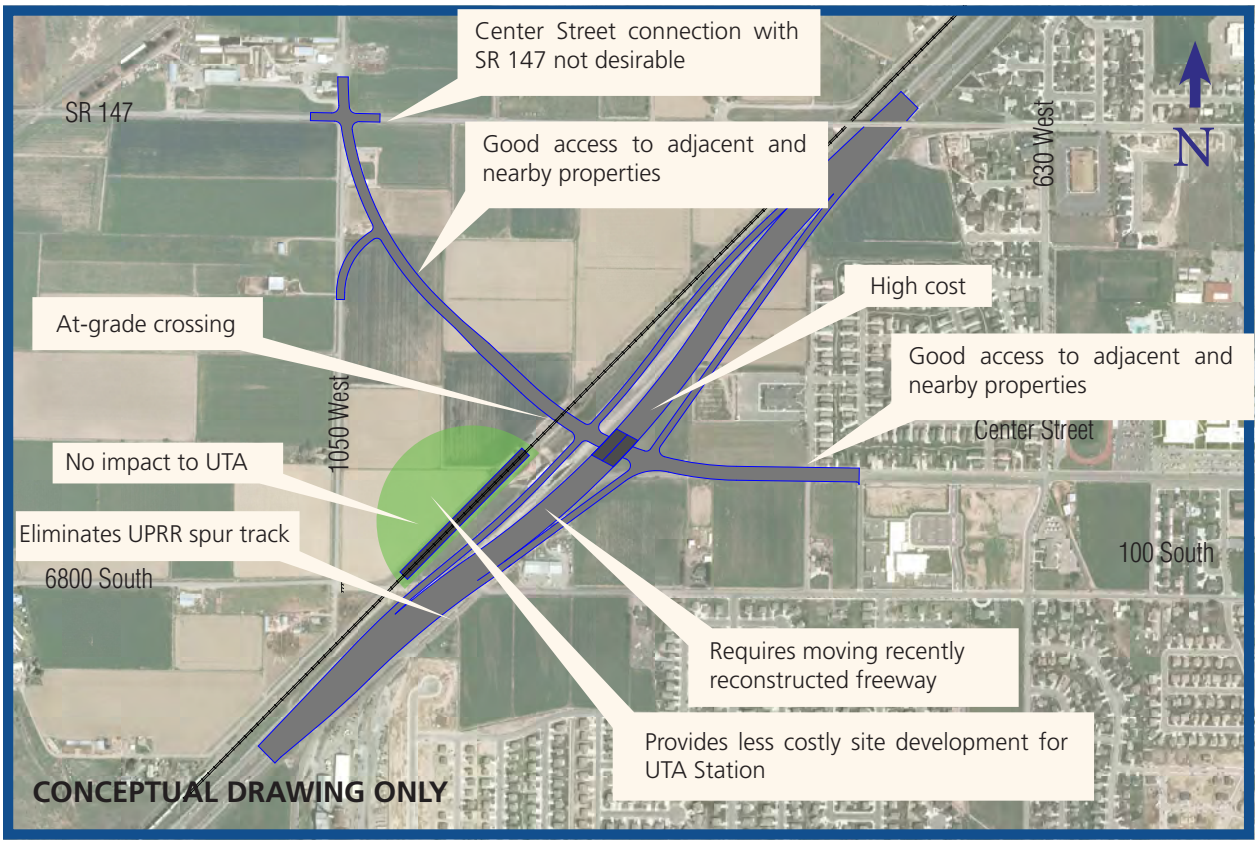


Figure 3.1-8, Alternative 1a : I-15 moves to the East, 100 South closed, UPRR stays in place, Center Street under I-15

Alternative 1a shifts the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, beneath the shifted I-15 line, across the railroad with an at-grade crossing, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at the intersection of 1050 West. The railroad west of I-15 will remain in place. The UPRR spur track to the east of I-15 is eliminated and 100 South is closed due to the realignment of I-15. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative provides a less costly site development area for the UTA Station and good access to adjacent and nearby properties. Disadvantages to this alternative include the cost of moving I-15 along with closure of 100 South. Due to the undesirable Center Street connection with SR-147/400 North and the at-grade railroad crossing at Center Street this alternative was eliminated.

Alternative 1b

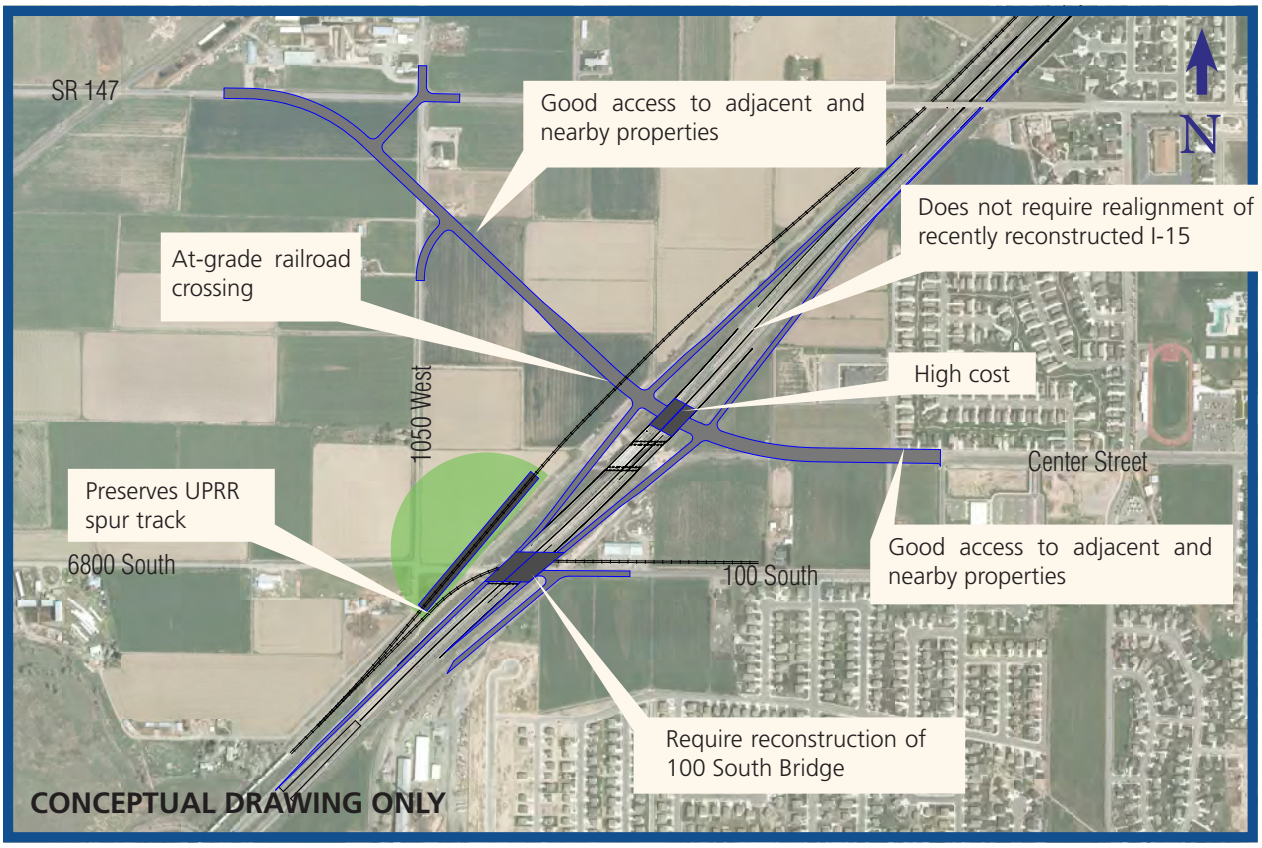


Figure 3.1-9, Alternative 1b: I-15 stays in place, UPRR shifted West (at Grade), Center Street under I-15

Alternative 1b preserves the existing I-15 freeway and shifts the railroad to the west to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, beneath the existing I-15 line, across the railroad with an at-grade crossing, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. The UPRR spur track to the east of I-15 is preserved and the 100 South structures require reconstruction. The new UTA Station is placed along the shifted railroad tracks to the southwest of the interchange.

This alternative does not require costly relocation of I-15 and provides good access to adjacent and nearby properties. Disadvantages to this alternative include the cost of reconstructing the 100 South structures and closure of 100 South Street. Due to the at-grade railroad crossing at Center Street this alternative was eliminated.

Alternative 1c

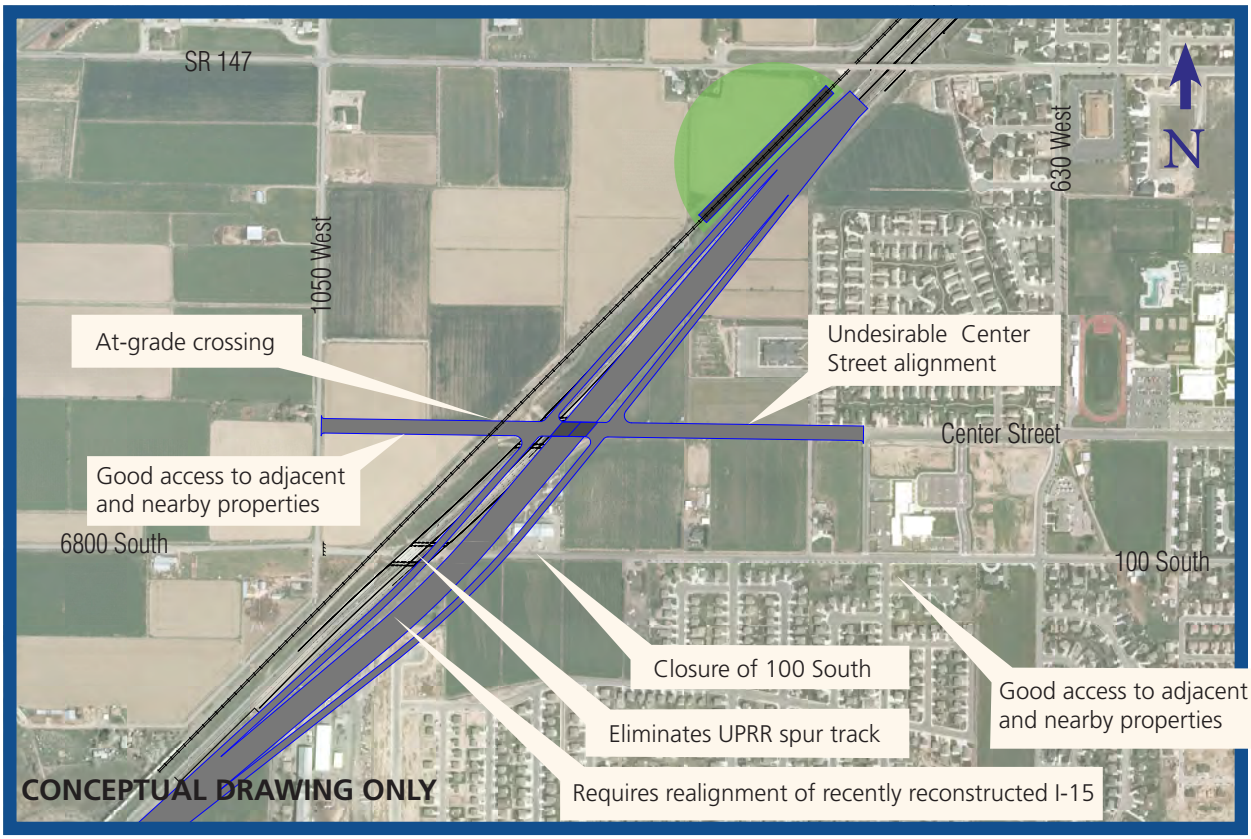


Figure 3.1-10, Alternative 1c: I-15 moves to the East, 100 South closed, UPRR stays in place, Center Street under I-15

Alternative 1c shifts the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment starts westward from about 1000 West, beneath the shifted I-15 line, across the railroad with an at-grade crossing, and then connects to 1050 West as a T-intersection. The railroad west of I-15 will remain in place. The UPRR spur track to the east of I-15 is eliminated and 100 South Street is closed due to the realignment of I-15. The new UTA Station is placed along the existing railroad tracks to the northwest of the interchange.

This alternative provides good access to adjacent and nearby properties. Disadvantages to this alternative include the high cost of moving I-15 along with closure of 100 South. Due to the undesirable Center Street connection with SR-147/400 North and the at-grade railroad crossing this alternative was eliminated.

Alternative 2a

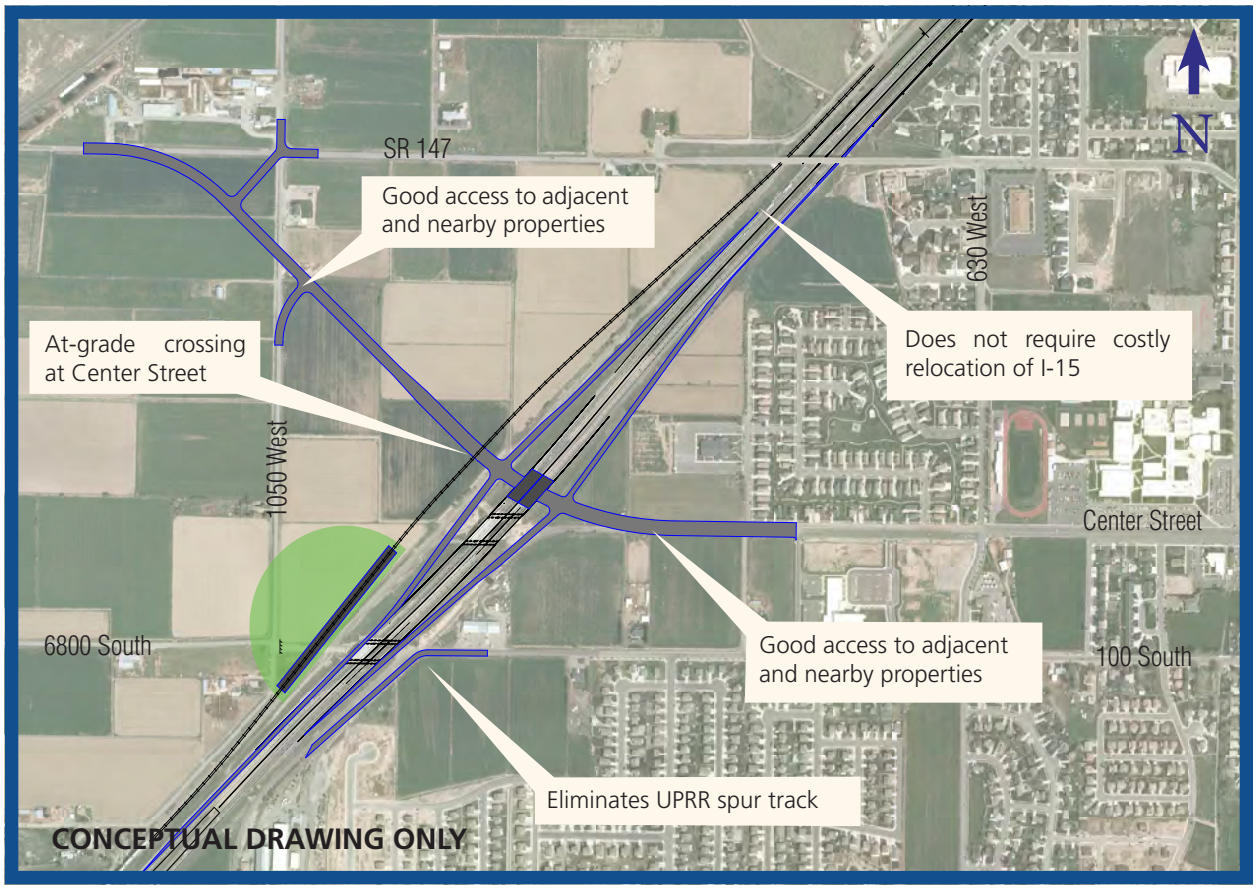


Figure 3.1-11, Alternative 2a: UTA shifts West and elevated

Alternative 2a preserves the existing I-15 freeway and shifts the railroad to the west to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, beneath the existing I-15 line, across the railroad with an at-grade crossing, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. The UPRR spur track to the east of I-15 is eliminated. The new UTA Station is placed along the shifted railroad tracks to the southwest of the interchange.

This alternative does not require costly relocation of I-15 and provides good access to adjacent and nearby properties. Disadvantages to this alternative include the elimination of the spur track and closure of 100 South Street. Due to the at-grade railroad crossing at Center Street this alternative was eliminated.

Alternative 3a

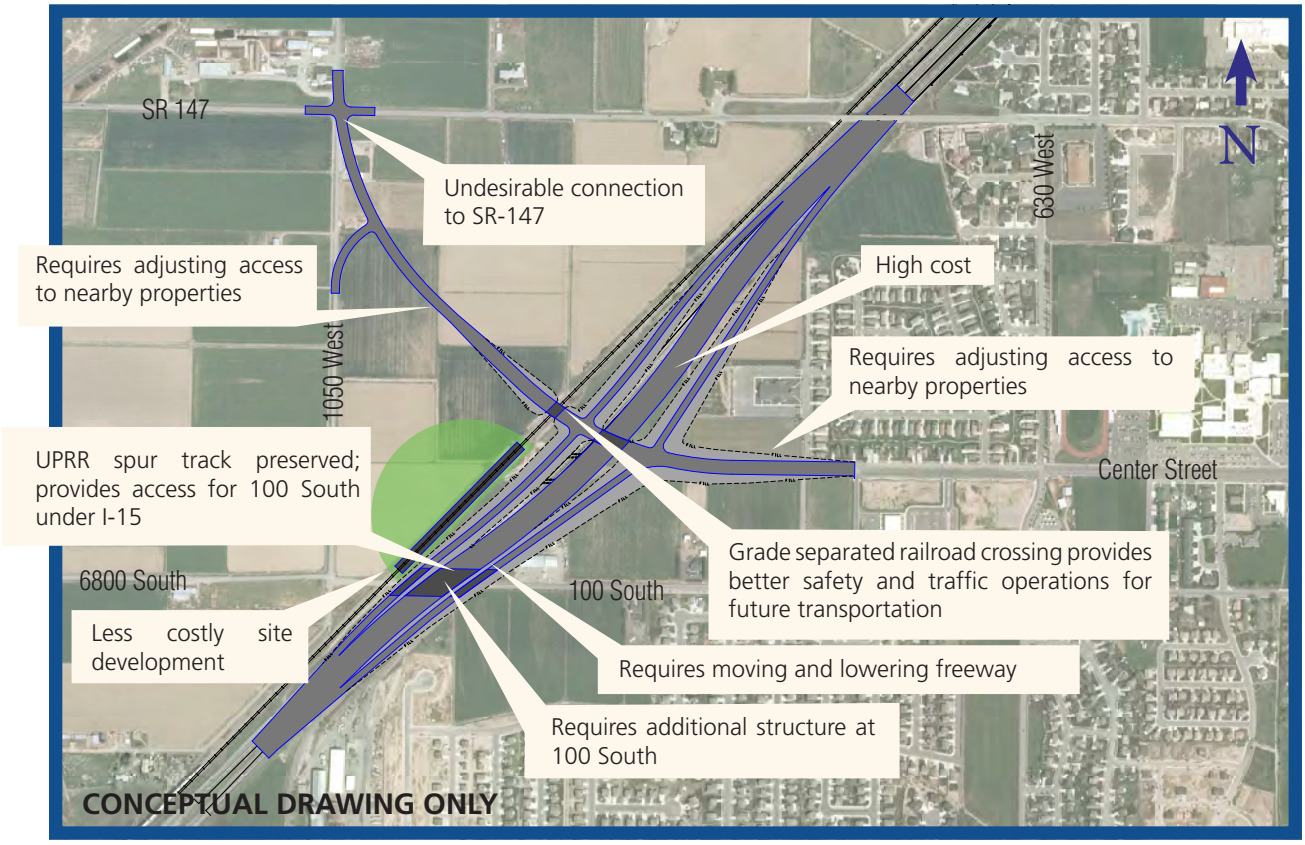


Figure 3.1-12, Alternative 3a: I-15 shifts East and lowered, Center Street elevated

Alternative 3a shifts and lowers the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, above the lowered I-15 and existing UTA lines, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at the intersection of 1050 West. The railroad west of I-15 will remain in place. This grade separated crossing requires new structures to carry Center Street over I-15 and UTA. The 100 South structures require replacement due to the realignment of I-15. The UPRR spur track to the east of I-15 is preserved. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative offers the desired grade separated railroad crossing for better safety and traffic operations. It also provides a less costly site development area for the UTA Station. Disadvantages to this alternative include the cost of moving and lowering I-15 along with the construction of the 100 South structures. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the undesirable Center Street connection with SR-147/400 North this alternative was eliminated.

Alternative 3b

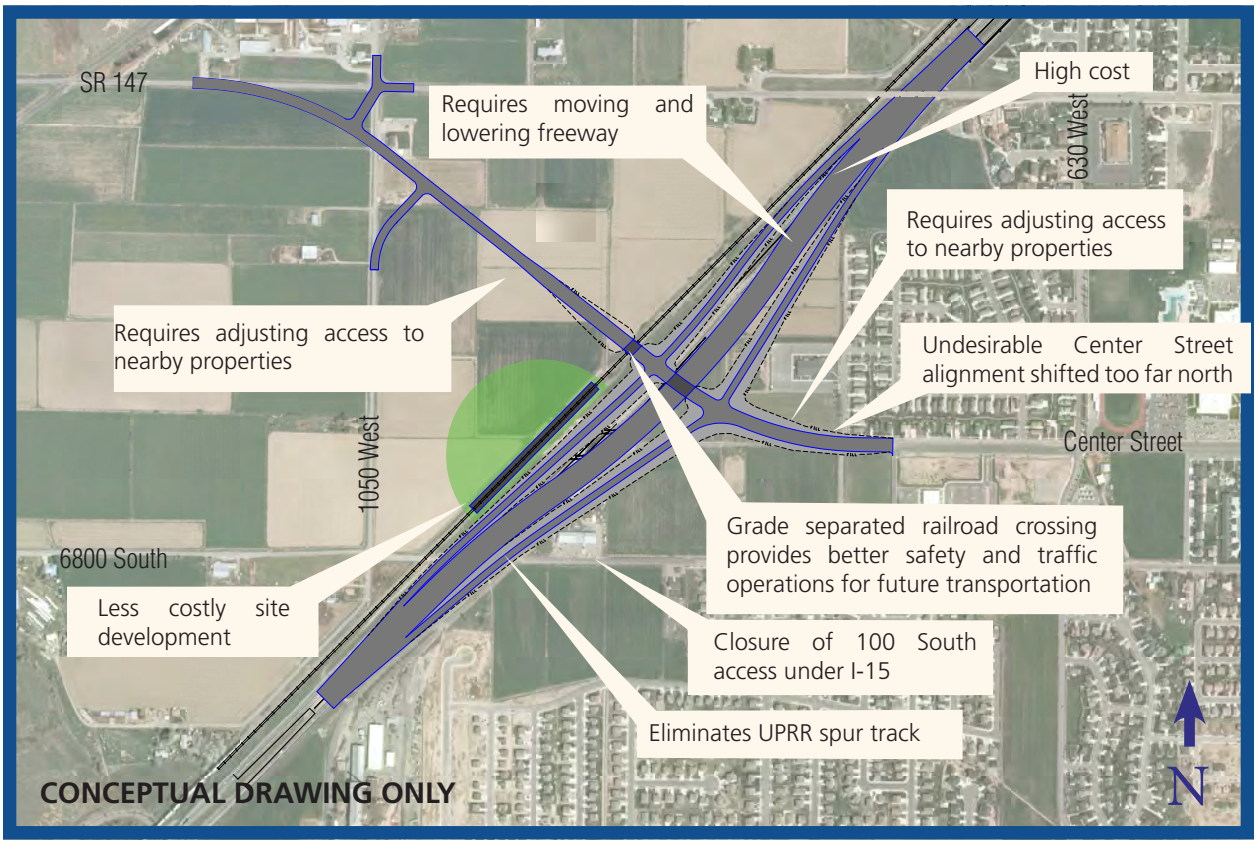


Figure 3.1-13, Alternative 3b: I-15 shifts east and lowered, Center Street elevated

Alternative 3b shifts and lowers the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment swings northwestward from about 1000 West, above the lowered I-15 and existing UTA lines, and then connects to 400 North Street (SR-147- the Benjamin/ Lake Shore Road) at about 1600 West. The railroad west of I-15 will remain in place. This grade separated crossing requires new structures to carry Center Street over I-15 and UTA. The UPRR spur track to the east of I-15 is eliminated and 100 South Street is closed due to the realignment of I-15. The new UTA Station is placed along the existing railroad tracks to the southwest of the interchange.

This alternative offers the desired grade separated railroad crossing for better safety and traffic operations. It also provides a less costly site development area for the UTA Station. Disadvantages to this alternative include the cost of moving and lowering I-15 along with the closure of 100 South Street. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the undesirable Center Street alignment crossing I-15 too far to the north this alternative was eliminated.

Alternative 3c

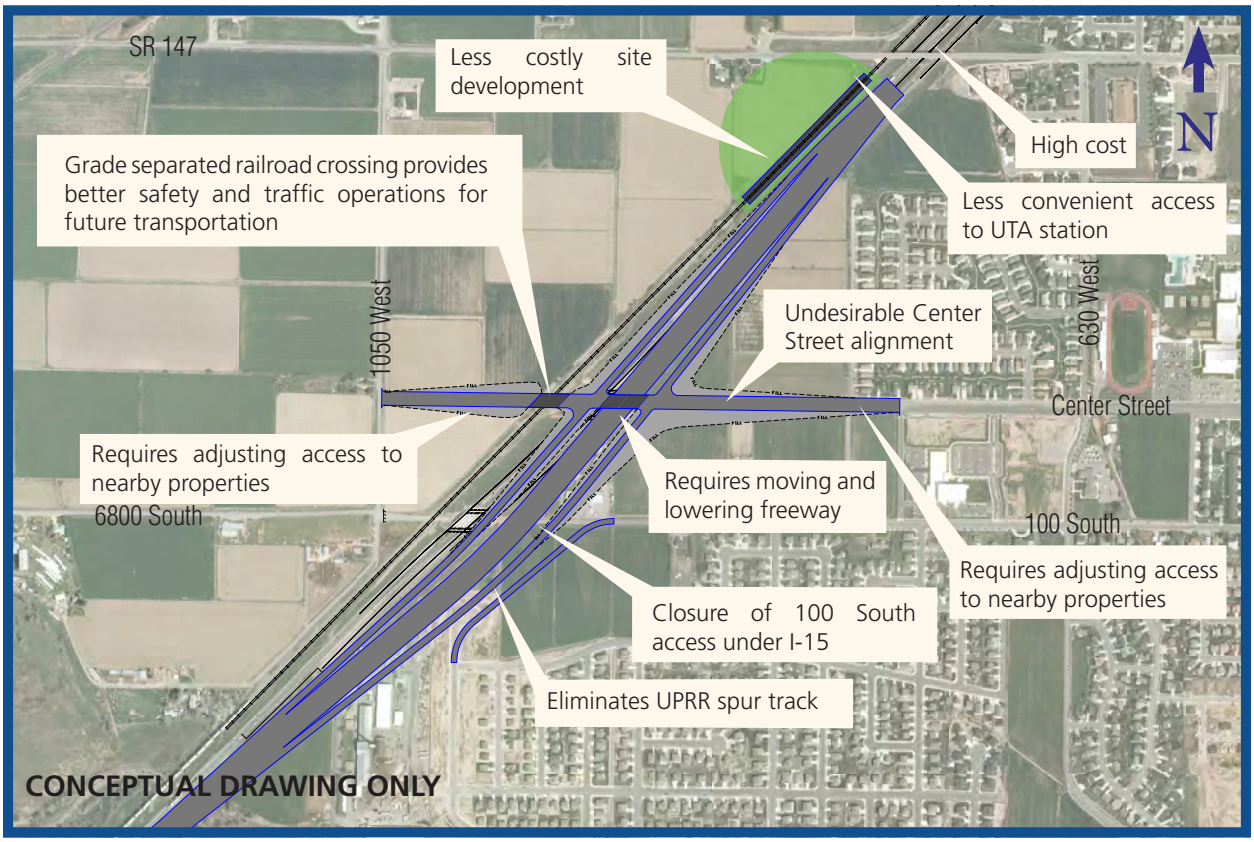


Figure 3.1-14, Alternative 3c: I-15 shifts East and lowered, Center Street elevated

Alternative 3c shifts and lowers the I-15 freeway to the east of the existing freeway to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment starts westward from about 1000 West, above the lowered I-15 and existing UTA lines, and then connects to 1050 West as a T-intersection. The railroad west of I-15 will remain in place. This grade separated crossing requires new structures to carry Center Street over I-15 and UTA. The UPRR spur track to the east of I-15 is eliminated. The new UTA Station is placed along the existing railroad tracks to the northwest of the interchange.

This alternative offers the desired grade separated railroad crossing for better safety and traffic operations. It also provides a less costly site development area for the UTA Station although the placement to the north is in a less convenient location. Disadvantages to this alternative include the cost of moving and lowering I-15 along with the closure of 100 South Street. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the undesirable Center Street alignment not connecting with SR-147/400 North this alternative was eliminated.

Alternative 3d

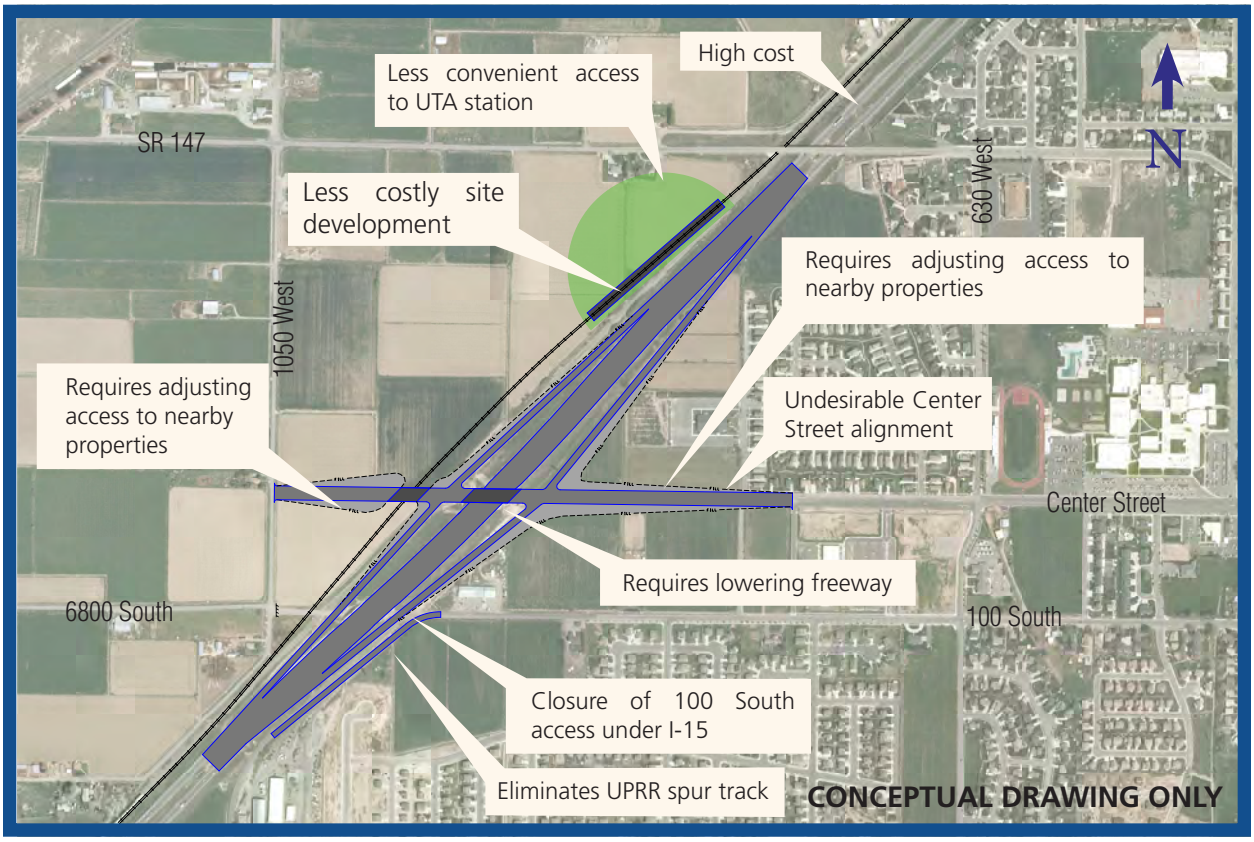


Figure 3.1-15, Alternative 3d: I-15 lowered in place, UTA shifted West, Center Street elevated

Alternative 3d lowers I-15 freeway profile and shifts the railroad to the west to accommodate a new diamond interchange at Center Street. A new Center Street crossroad alignment starts westward from about 1000 West, above the lowered I-15 and shifted UTA lines, and then connects to 1050 West as a T-intersection. This grade separated crossing requires new structures to carry Center Street over I-15 and UTA. The UPRR spur track to the east of I-15 is eliminated and 100 South Street is closed due to the lowering of I-15. The new UTA Station is placed along the shifted railroad tracks to the northwest of the interchange.

This alternative offers the desired grade separated railroad crossing for better safety and traffic operations. It also provides a less costly site development area for the UTA Station although the placement to the north is in a less convenient location. Disadvantages to this alternative include the cost of lowering I-15 along with the closure of 100 South Street. Another disadvantage is the properties that are impacted to the east and west of the interchange that require adjustment for accesses. Due to the undesirable Center Street alignment not connecting with SR-147/400 North this alternative was eliminated.

Summary of Alternatives for Interchange at I-15 and Center Street in Spanish Fork

Table 3-1 Summary of Alternatives for New Interchange at I-15 and Center Street in Spanish Fork

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Farmland Impacts	Wetland Impacts	Advantages	Disadvantages
1a	***Eliminated due to at-grade railroad crossing and undesirable Center Street connection with SR-147/400 North***					UTA: No impact, less costly site development of platform and parking lot City: Access to properties	UDOT: $$$, moving recently reconstructed freeway UTA: At-grade crossing City: Undesirable Center St. connection, closure of 100 South
1b	***Eliminated due to at-grade railroad crossing***					UDOT: Minimal impact to I-15 UTA: Preserves UPRR spur track City: Access to properties	UDOT: Reconstruct 100 South bridge UTA: At-grade crossing City: Closure of 100 South
1c	***Eliminated due to at-grade railroad crossing and undesirable Center Street connection with SR-147/400 North***					City: Access to properties	UDOT: $$$, moving freeway UTA: $$, at-grade crossing, elimination of UPRR spur track City: Undesirable Center St. connection, closure of 100 South
2a	***Eliminated due to at-grade railroad crossing***					UDOT: Minimal impact to I-15 City: Access to properties	UTA: At-grade crossing, elimination of UPRR spur track, closure of 100 South
2b	**$54.6 Million**	**2 to 3**	**Up to 2**	**Substantial (Agricultural Protection Area)**	**Minimal (less than 0.5-acres)**	**UDOT: Minimal impact to I-15 UTA: Grade-separation, City: Access to properties**	**UTA: $$, additional embankment required for platform and parking lot; eliminates spur track (see variation on page 34)**
3a	***Eliminated due to undesirable Center Street connection with SR-147/400 North***					UTA: Grade-separation, preserves UPRR spur track	UDOT: $$$, moving and lowering freeway, additional structures at 100 South City: Hinders access to adjacent properties
3b	***Eliminated due to undesirable Center Street alignment crossing I-15 too far to the north***					UTA: Grade-separation, less costly site development of platform and parking lot, preserves UPRR spur track	UDOT: $$$, moving and lowering freeway UTA: Elimination of UPRR spur track City: 100 S. closure, hinders access to properties
3c	***Eliminated due to undesirable Center Street alignment not connecting with SR-147/400 North***					UTA: Grade-separation, less costly site development of platform and parking lot	UDOT: $$$, moving and lowering freeway UTA: Elimination of UPRR spur track City: 100 S. closure, hinders access to adjacent properties

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Farmland Impacts	Wetland Impacts	Advantages	Disadvantages
3d	***Eliminated due to undesirable Center Street alignment not connecting with SR-147/400 North***					UTA: Grade-separation, less costly site development of platform and parking lot	UDOT: $$$, moving and lowering freeway UTA: Elimination of UPRR spur track, less convenient access to UTA station City: Access to adjacent properties, undesirable Center St. connection , closure of 100 South
4a	$99.97	2 to 3	Up to 2	Substantial (Agricultural Protection Area)	Minimal (less than 0.5-acres)	UTA: Grade-separation, less costly site development of platform and parking lot, preserves UPRR spur track	UDOT: $$$, moving and lowering freeway, additional structures at 100 South City: Requires adjusting access to properties
5a	$85.27	2 to 3	Up to 2	Substantial (Agricultural Protection Area)	Minimal (less than 0.5-acres	UTA: Grade-separation, less costly site development of platform and parking lot	UDOT: $$, lowering freeway, triple level structures for ramps and Center St UTA: requires elimination of UPRR spur track City: Requires adjusting access to properties
6a	$77.60	2 to 3	Up to 2	Substantial (Agricultural Protection Area)	Minimal (less than 0.5-acres)	UDOT: Minimal impact to I-15 UTA: Grade-separation, less costly site development of platform and parking lot, preserves UPRR spur track	$$$, Excessive embankment and triple level structures for I-15 and UTA. Eliminates access to east properties and adjustments to access other properties.

3.2 COMMUTER RAIL STATION AT I-15 AND CENTER STREET IN SPANISH FORK

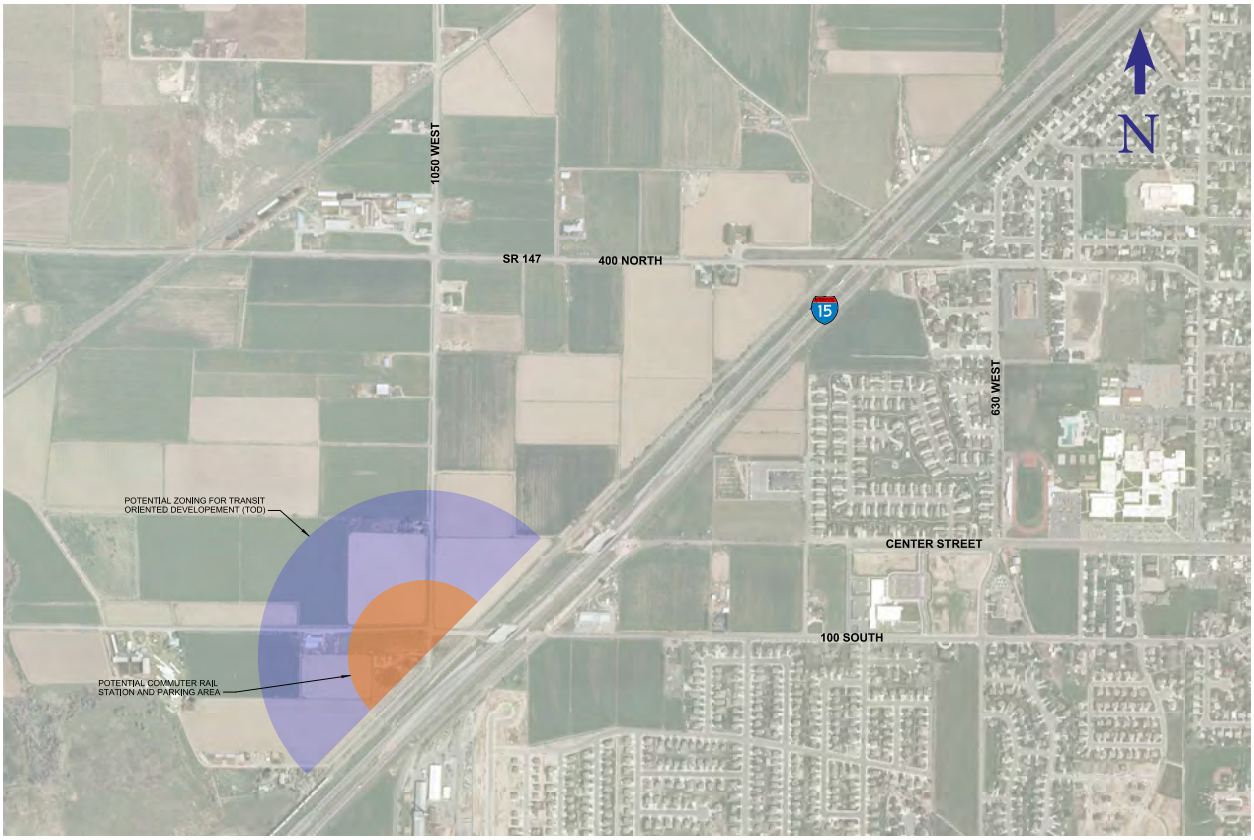


Figure 3.2-1, Study area for commuter rail station at Spanish Fork Center Street and I-15

Background

The UTA has purchased UPRR's Tintic Branch and plans a Spanish Fork commuter rail station west of I-15 in Spanish Fork. This study has investigated possible configurations for an interchange and rail station and their associated impacts to nearby streets, properties, and rail transportation elements.

The UTA track is operated by UTA, but UTA allows UPRR to run freight on their line twice a week. UTA development of a commuter rail station would bring a dramatic increase in rail traffic to the Tintic Branch. UTA verbally provided the information that this increase could go from two nighttime passes per week to 70 passes per day at this station. Traffic safety and roadway capacity concerns would dictate a grade-separated track crossing.

Purpose and Need for the Project

Purpose of the Project

The purpose of the project is to provide a convenient and well located commuter rail station to access the Provo to Payson Commuter Rail Line.

Need for the Project

Transportation Planning

The MAG MTP for 2040 includes transit planning for the project area. Based on these studies, it is expected that as population and employment grow, more areas of the county will have densities to support internal, circulating transit routes. A new bus network has been developed in partnership with UTA. Transit stations in various parts of the county connect localized routes to high frequency core routes along the I-15 corridor (see Figure 3.2-2 on next page).

A commuter rail line is currently under construction from Salt Lake City to Provo. The 2040 MTP includes extending the commuter rail line from Provo to Payson in Phase 2 of the plan, which would be in the 2020 – 2030 time frame (see Figure 3.2-2 on next page). It is anticipated that commuter rail would use the UTA owned rail corridor located immediately west of I-15 through Spanish Fork.

Additional bus routes are also anticipated to serve the south Utah County area as population, and population densities, increase.

Population Growth

It is anticipated there will be substantial population growth in Utah County (see Table 1-1 for population projections in Utah County). The increased population will increase travel demand which will strain roadway capacities. The increased population will also increase population densities making transit more feasible.

Ridership Projections

According to a UTA travel demand model analysis for the planned commuter rail from Provo to Payson, the ridership projections for the rail line in this area would be 13,325 riders per day. The proposed Spanish Fork Center Street commuter rail station would attract approximately 370 riders per day.

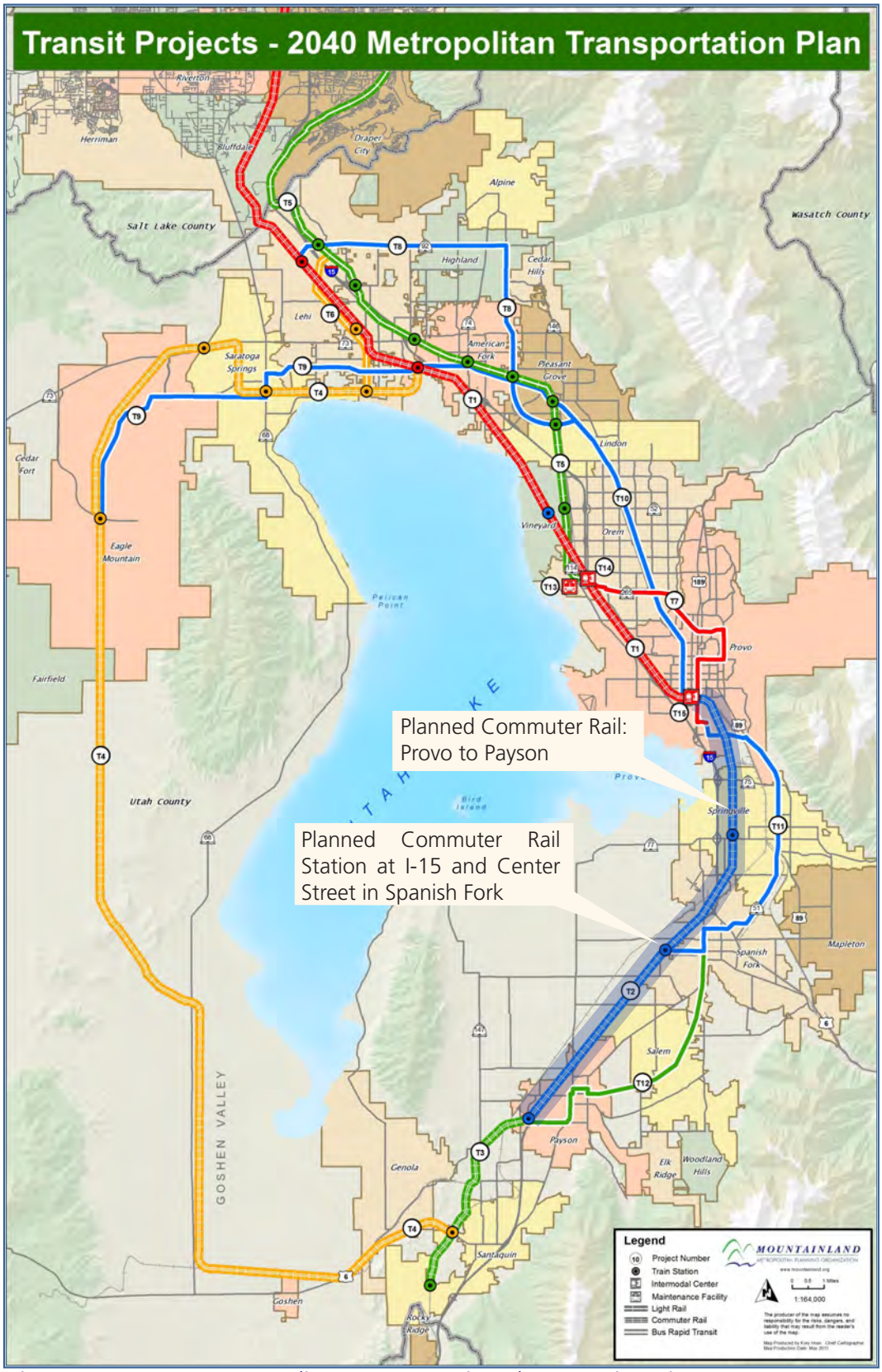


Figure 3.2-2, 2040 Metropolitan Transportation Plan, Transit Projects

Study Recommendation for Commuter Rail Station at I-15 and Center Street in Spanish Fork

The recommended location for a UTA Commuter Rail Station at I-15 and Center Street in Spanish Fork was recommended in accordance with UTA's master plan. This strategic location provides easy access to a major arterial, Center Street. This arterial connects to the heart of Spanish Fork, and it will also adjoin the proposed Spanish Fork Center Street Interchange. The placing of this station was also influenced by the location of another station in Springville to the north. The Springville station will be less than five miles to the north of the proposed Spanish Fork Center Street location; however, UTA has approved of this close spacing. The Center Street location provides better accessibility for a greater number of people than a station further south, for example at the I-15 and US-6 Interchange.

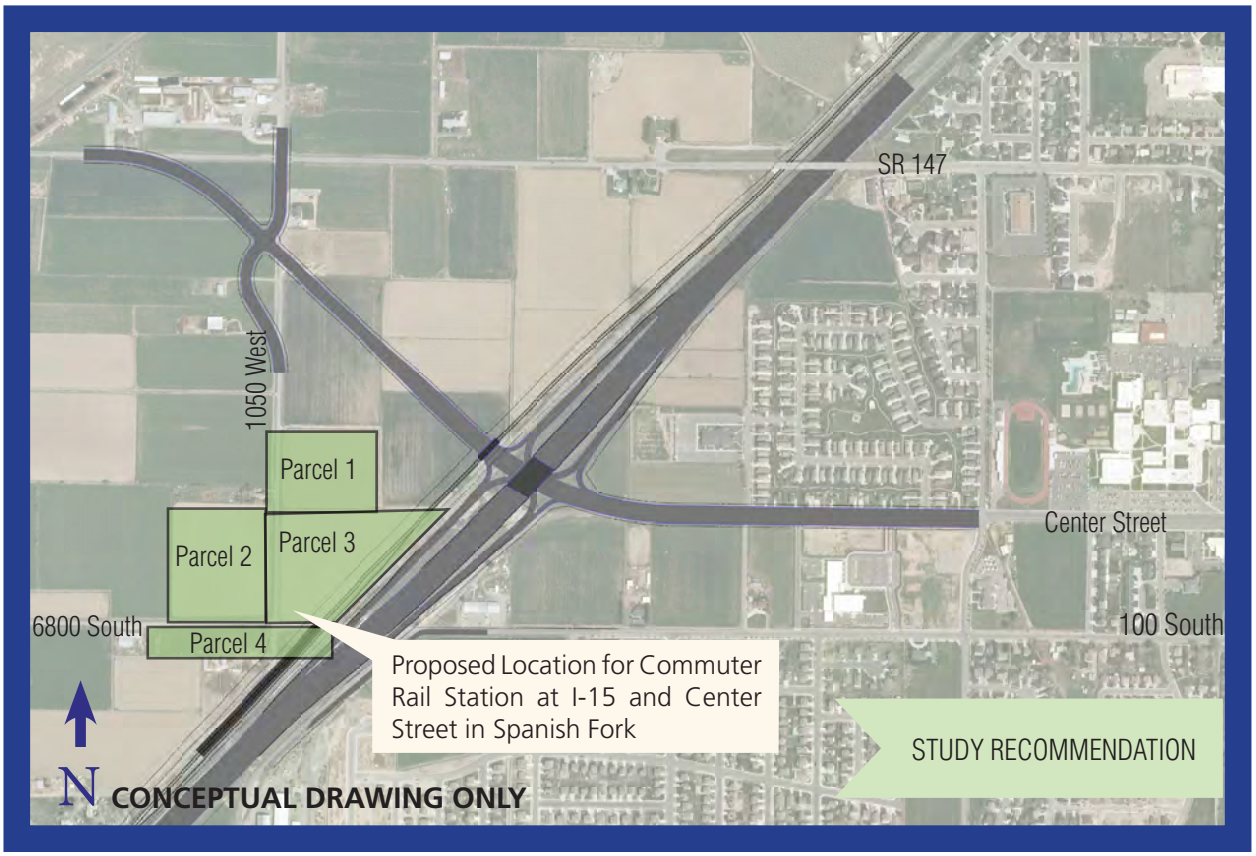


Figure 3.2-3, Study recommendation for commuter rail station at I-15 and Center Street in Spanish Fork

The interchange, Center Street, and rail lines are configured to allow for a 79 mph or 124 mph commuter rail design speed, as well as a grade-separated crossing. However, the 124 mph design speed will have additional impacts outside the limits of the study area.

UTA has been given the information regarding four potential parcels of land that could be used for the placement of the rail station. UTA will coordinate with the individual property owners to select and purchase the specific location.

Environmental Considerations for Commuter Rail Station at I-15 and Center Street in Spanish Fork

For a detailed and complete description of all environmental factors relating to this project, please see the Environmental section of the Appendix.

Summary of Key Environmental Factors Affecting Alternative Selection

Key environmental resources that may affect the alternative selection of a new interchange and commuter rail station at I-15 and Center Street in Spanish Fork include:

- **Farmlands** - The recommended alternative would impact farmland in an Agricultural Protection Area (APA). If the landowner does not agree to remove the land from the APA and make the applicable requests, additional alternatives may need to be examined to determine that "there is no reasonable and prudent alternative to the use of the land within the agricultural protection area for the project."

- **Wetlands and Waters of the U.S.** - The recommended alternative could impact NWI mapped wetlands. Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would result in a discharge of fill material to waters of the U.S. An alternative is practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.

- **Threatened & Endangered Species** - The Endangered Species Act (ESA) provides protection to federally listed threatened and endangered species and their designated critical habitats. It requires that all federal agencies considering a project or action to consult with the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration to ensure that the proposed activity is "not likely to jeopardize the continued existence" of any listed species or will not "result in adverse modification" of its critical habitat. The Endangered Species Act is pertinent to the project because the federally listed, threatened Ute ladies'-tresses (*Spiranthes diluvialis*) could be present within the study area.

- **Section 4(f)** - The recommended alternative would likely impact historic properties protected under Section 4(f which prohibits U.S. Department of Transportation (USDOT) agencies from approving the use of any Section 4(f) land for a transportation project except as follows:

    - The USDOT agency can approve the use of Section 4(f) land by making a determination that (1) there is no prudent and feasible alternative that would avoid the use of the Section 4(f) resource, and (2) the project includes all possible planning to minimize harm to that property.
    - The USDOT agency can approve the use of Section 4(f) property by making a finding of *de minimis* impact for that property.

    The recommended alternative would likely have an impact that would not be considered *de minimis*. An analysis of avoidance alternatives to determine if a feasible and prudent avoidance alternative exists would need to be conducted.

- **Relocations** - The recommended alternative could require two to three residential relocations.

Public Response

The public is in support of this project; no negative feedback was offered regarding the UTA station at this location. Public comment was specifically supportive of the commuter rail station.

For a complete compilation of comments relating to this project, please see the Public Involvement section of the Appendix.

3.3 NEW INTERCHANGE AT I-15 AND SPRINGVILLE 1600 SOUTH/SPANISH FORK 2700 NORTH

Background

This interchange has not been advanced earlier due to more pressing needs of surrounding areas with higher development density. Other factors include low interchange utilization in the absence of a Springville 1600 South direct connection with SR-51 and US-89 in Mapleton and interchange spacing conflicts with the US-6 exit one-half mile south of Springville 1600 South.

I-15 lane-striping for the US-6 split begins about 400 feet south of 1600 South. This conflicts with necessary weave movements for southbound traffic entering I-15 from a Springville 1600 South/ Spanish Fork 2700 North Interchange. North of 1600 South, commercial development and frontage roads border both edges of I-15 making new right-of-way acquisition difficult. 1600 South crosses UPRR's Sharp Subdivision at-grade about 2,000 feet east of I-15. The rail crossing should be grade-separated if 1600 South should become an I-15 interchange access road. The grade-separation would make alternate access development necessary to serve those fronting properties, which would lose their direct access to 1600 South.

Several new interchange alternatives for Springville 1600 South/Spanish Fork 2700 North have been identified and reviewed. A Single point Urban Interchange (SPUI) was evaluated and eliminated due to merging and weaving issues with the US-6 Interchange. A CD road system was also eliminated due to costs, ROW impacts and business relocations. Three alternatives for a loop-ramp interchange system that utilize the new bridge structure and solve the weaving problem with US-6 were evaluated. The first is the recommended Alternative A2 that minimizes business impacts. Alternative A3 is another feasible alternative that provides the same advantages as A2 but increases business impacts along I-15. Alternative A1 uses a braid ramp design and was eliminated due to the cost and business impacts.

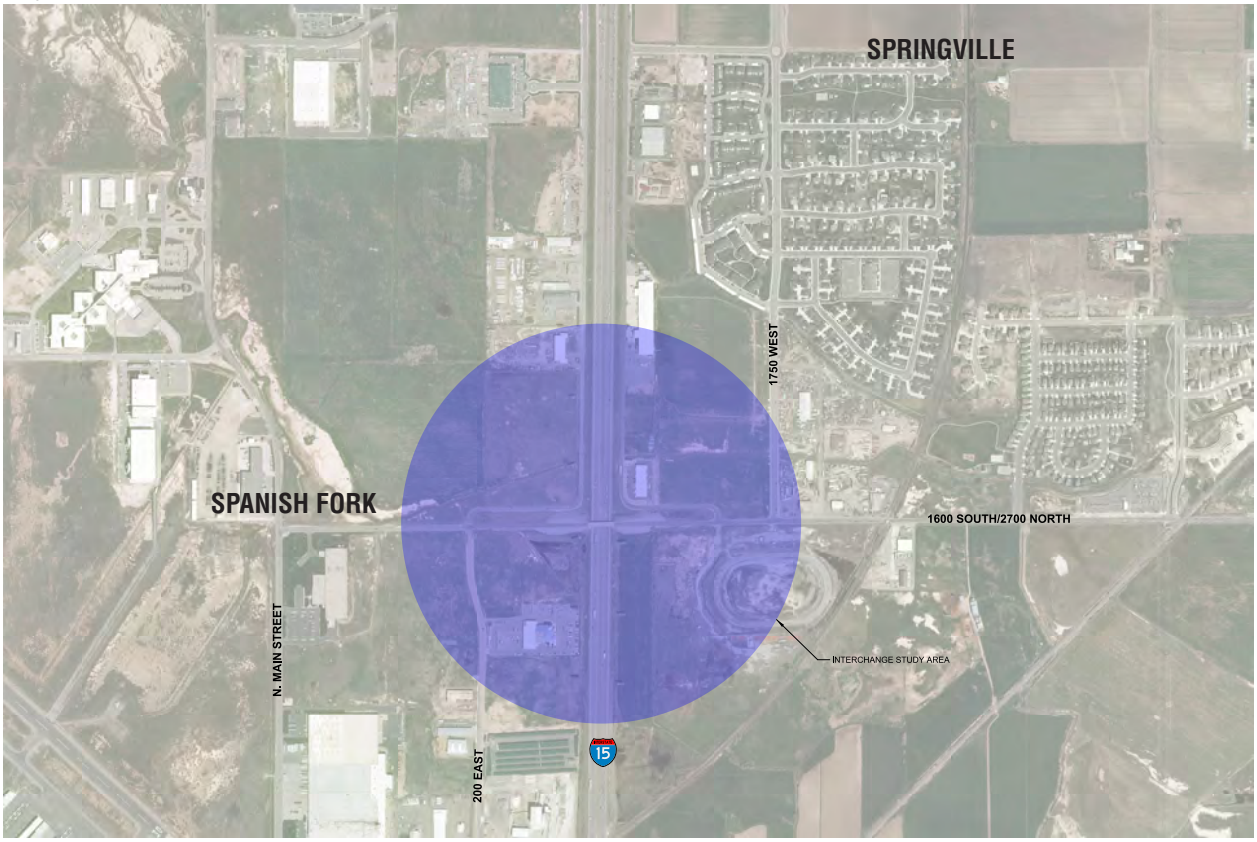


Figure 3.3-1, Study area for interchange at Springville 1600 South/Spanish Fork 2700 North and I-15

Purpose and Need for the Project

Purpose of the Project

The purpose of the project is to provide LOS D on 400 South from I-15 to US-89 in Springville and to provide better access to the Spanish Fork industrial area and proposed commercial and institutional uses in the study area.

Need for the Project

The project is needed to improve traffic operations on 400 South from I-15 to US-89 in Springville. 400 South in Springville will be congested by 2040 and operate at LOS E and F.

2040 MTP without New Interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North

The TDM was run for a scenario that included all projects from the 2040 MTP with the exception of the Springville 1600 South/Spanish Fork 2700 North Interchange (see Appendix for full traffic analysis). Figure 3.2-2 shows the 2040 MTP without the Springville 1600 South/Spanish Fork 2700 North Interchange Scenario. Under this scenario, 400 South in Springville will operate at an unacceptable LOS (LOS E/F) by 2040.

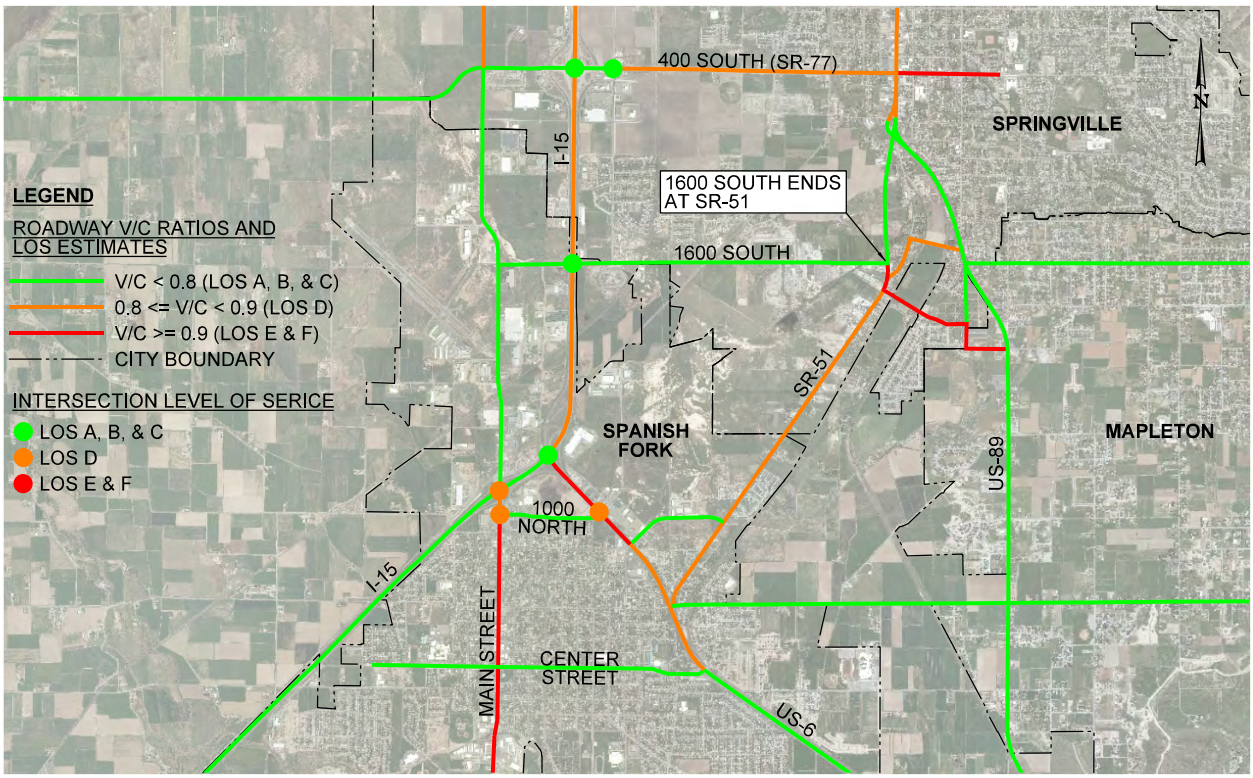


Figure 3.3-2, 2040 Traffic without Implementation of Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

The analysis of the 2040 MTP without the Springville 1600 South/Spanish Fork 2700 North Interchange Scenario suggests that the primary traffic operations benefit of the Springville 1600 South/Spanish Fork 2700 North Interchange is to relieve traffic congestion on 400 South in Springville from I-15 to US-89.

Study Recommendation for New Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

The difficult US-6 conflict to the south, and the potential right-of-way conflicts with commercial development in the northeast quadrant, make both a typical diamond interchange and a CD road system either infeasible or cost prohibitive. The recommended Springville 1600 South/Spanish Fork 2700 North Interchange concept is a loop-ramp system with symmetrical, 35 mph loops constructed on presently-undeveloped ground in the southeast and northwest quadrants.

Study Recommendation for Interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North

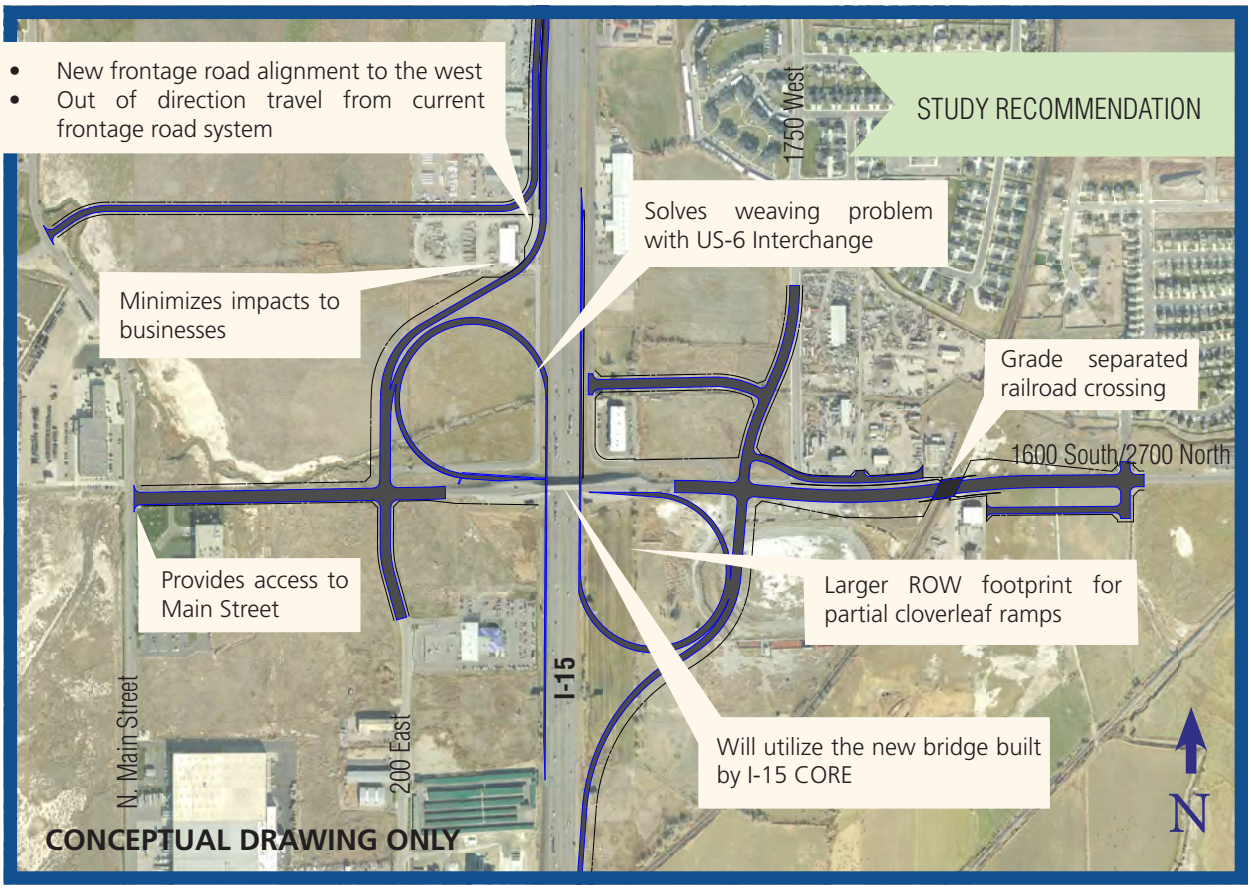


Figure 3.3-3, Study Recommendation for Interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North: Alternative A2

This recommended interchange solves the weaving problem with the US-6 Interchange along with utilizing the new bridge built by the I-15 CORE Project. While this recommended layout will utilize the new bridge, the bridge will require some widening to accommodate a full UDOT five-lane roadway design. This layout also provides a four leg intersection with Main Street and a grade separated railroad crossing to the east of the interchange. Business impacts are minimized along the west frontage road. Disadvantages to this alternative include the out of direction travel from the current frontage road with the realignment to the west and the large ROW footprint for the partial cloverleaf ramps.

Associated modifications to existing streets and frontage roads would be as follows:

- 1600 South developed to a consistent 5-lane cross section within a 100-foot right-of-way
- NW Frontage Road re-routed to Spanish Fork Main Street along Spanish Fork 3000 North
- NW ramp terminal becomes the north leg of the Spanish Fork 200 East intersection

- NE Frontage Road connected to Springville 1750 West along 1500 South
- Springville 1750 West re-routed to intersect with 1600 South at about 1800 West
- SE ramp terminal becomes the south leg of the Springville 1800 West intersection
- Two access roads to serve properties abutting the elevated section of 1600 South

Study Recommendation Cost

An approximate cost was estimated for the recommended concept, as described above, including the 1600 South improvements as far east as Wallace Drive, as follows:

About $ 52 Million

** Note that these estimated costs are useful only as approximate, or "ballpark", figures as placeholders for recommended future improvements. Actual budgeting and programming costs should be determined by detailed future environmental and engineering studies.*

The construction of this recommended interchange layout could be phased, if needed, for budgeting purposes. An interim project could construct the interchange ramps are realign the frontage roads for approximately $31 million. The remaining elements, including the railroad bridge and roadway widening, could then be constructed with a future project.

Environmental Considerations for New Interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North

For a detailed and complete description of all environmental factors relating to this project, please see the Environmental section of the Appendix.

Summary of Key Environmental Factors Affecting Alternative Selection

Key environmental resources that may affect the alternative selection of a new interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North include:

- **Wetlands and Waters of the U.S.** - The recommended alternative could impact NWI mapped wetlands. Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would result in a discharge of fill material to waters of the U.S. An alternative is practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.
- **Threatened & Endangered Species** - The Endangered Species Act (ESA) provides protection to federally-listed threatened and endangered species and their designated critical habitats. It requires that all federal agencies considering a project or action to consult with the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration to ensure that the proposed activity is "not likely to jeopardize the continued existence" of any listed species or will not "result in adverse modification" of its critical habitat. The Endangered Species Act is pertinent to the project because the federally listed, threatened Ute ladies'-tresses (*Spiranthes diluvialis*) could be present within the study area.
- **Relocations** - The recommended alternative would not require the relocations of any residences or businesses.

Public Response

Public response to the interchange was neutral to positive. Few people commented on the interchange itself; most comments were directed at the 1600 South extension connecting to US-89. For a full compilation of public comments relating to this project, please see the Public Involvement section of the Appendix.

Other Feasible Alternative for New Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

The concept shown on the following page represents another viable alternative that was considered at Springville 1600 South/Spanish Fork 2700 North but is not recommended by this study based on input from the Technical Advisory Committee, Steering Committee, and public comments. See discussion below figure for more information.

Alternative A3

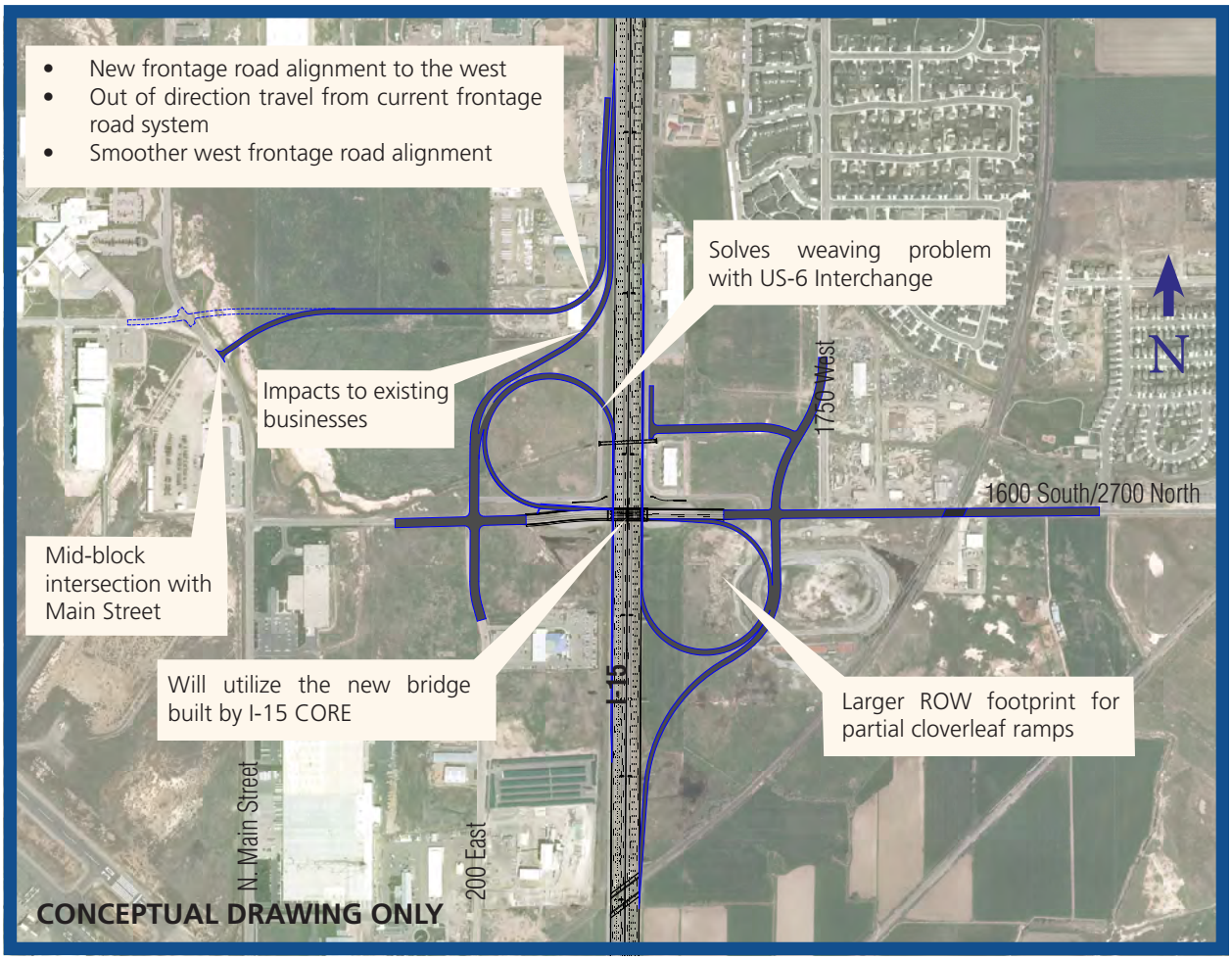


Figure 3.3-4, Alternative A3

Alternative A3 is a new Springville 1600 South/Spanish Fork 2700 North Interchange loop-ramp system with symmetrical, 35 mph loops constructed on presently-undeveloped ground in the southeast and northwest quadrants. The northwest frontage road is re-routed to Spanish Fork Main Street as a mid-block intersection. The northwest ramp terminal becomes the north leg of the Spanish Fork 200 East intersection. The northeast frontage road is re-routed to connect with Springville 1750 West along 1500 South. Springville 1750 West is re-routed to intersect with 1600 South at about the 1800 West intersection. The southeast ramp terminal then becomes the south leg of this intersection. To the east of the interchange a new structure is required to provide a grade separated railroad crossing for 1600 South/2700 North. Two access roads are added to serve properties abutting the elevated section of 1600 South on either side of the railroad crossing.

This alternative solves the weaving problem with the US-6 Interchange along with utilizing the new bridge built by the I-15 CORE Project. It also provides a smoother west frontage road alignment. Disadvantages to this alternative include the out of direction travel from the current frontage road and mid-block intersection with Center Street. Another disadvantage is the large ROW footprints for the partial cloverleaf ramps. Due to business impacts from the re-routed west frontage road this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 48 Million

Eliminated Alternative for New Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

The following alternative was eliminated because of the high costs involved with design and construction. Also, it causes greater impacts to businesses and properties in the study area.

Alternative A1

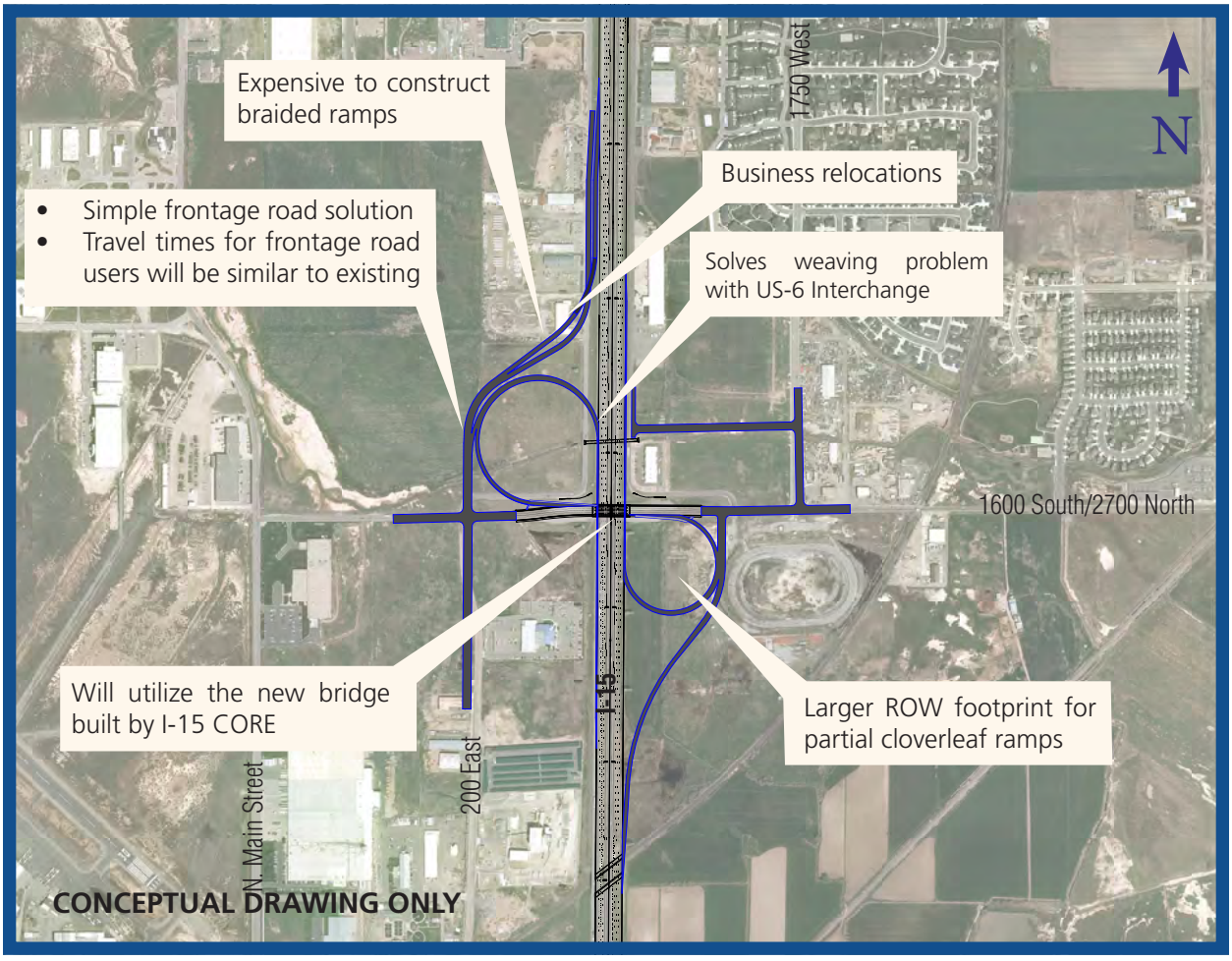


Figure 3.3-5, Alternative A1: Braided ramps and simple frontage road

Alternative A1 is a new Springville 1600 South/Spanish Fork 2700 North Interchange loop-ramp system with symmetrical, 35 mph loops constructed on presently-undeveloped ground in the southeast and northwest quadrants. The northwest frontage road is re-routed to 1600 South with construction of braided ramps. The northwest ramp terminal/frontage road becomes the north leg of the Spanish Fork 200 East intersection. The northeast frontage road is re-routed to connect

with Springville 1750 West along 1500 South. Springville 1750 West is re-routed to intersect with 1600 South at about the 1800 West intersection. The southeast ramp terminal then becomes the south leg of this intersection. To the east of the interchange a new structure is required to provide a grade separated railroad crossing for 1600 South/2700 North. Two access roads are added to serve properties abutting the elevated section of 1600 South on either side of the railroad crossing.

This alternative solves the weaving problem with the US-6 Interchange along with utilizing the new bridge built by the I-15 CORE Project. It also provides a simple frontage road solution that maintains similar travel times for frontage road users. A disadvantage to this alternative is the large ROW footprints for the partial cloverleaf ramps. Due to business impacts and cost to construct braided ramps this alternative was eliminated.

Summary of All Alternatives for New Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

Table 3-2 Summary of Alternatives for New Interchange at I-15 and Springville 1600 South/ Spanish Fork 2700 North

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Farmland Impacts (Acres)	Wetland Impacts (Acres)	Advantages	Disadvantages
A1	***Eliminated due to costs and business impacts***					Solves weaving problems with US-6 Interchange Simple frontage road solution Will utilize the new bridge built by I-15 CORE Travel times for frontage road users will be similar as existing	$$, construct braided ramps Business relocations Larger ROW footprint for partial cloverleaf ramps
A2	**$52.3 Million**	**0**	**0**	**0**	**Substantial (greater than 0.5-acres)**	**Solves weaving problem with US-6 Interchange** **Minimizes impact to businesses** **Will utilize the new bridge built by I-15 CORE** **Four leg intersection with Main Street**	**New frontage road alignment to the west** **Out of directional travel from current frontage road system** **Larger ROW footprint for partial cloverleaf ramps**
A3	$48 Million	1 Commercial			Substantial (greater than 0.5-acres)	Solves weaving problem with US-6 Interchange Will utilize the new bridge built by I-15 CORE Smoother west frontage road alignment	New frontage road alignment to the west Out of direction travel from current frontage road system Impacts to existing businesses Mid-block intersection with Main Street

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Farmland Impacts (Acres)	Wetland Impacts (Acres)	Advantages	Disadvantages
SPUI	***Eliminated due to merge and weave issues not meeting standards***					Smaller ROW footprint	Mainline weaving issues with SB on-ramp and US-6 off-ramp Requires a new bridge over I-15 $$, more expensive construction costs
CD	***Eliminated due to extensive costs and impacts***					Provides for better traffic operations and capacity of mainline and interchanges for 400 South, 1600 South, and US-6	$$$, extensive construction costs for CD system ROW impacts and business relocations from 400 South to US-6

3.4 SPRINGVILLE 1600 SOUTH EXTENSION TO US-89

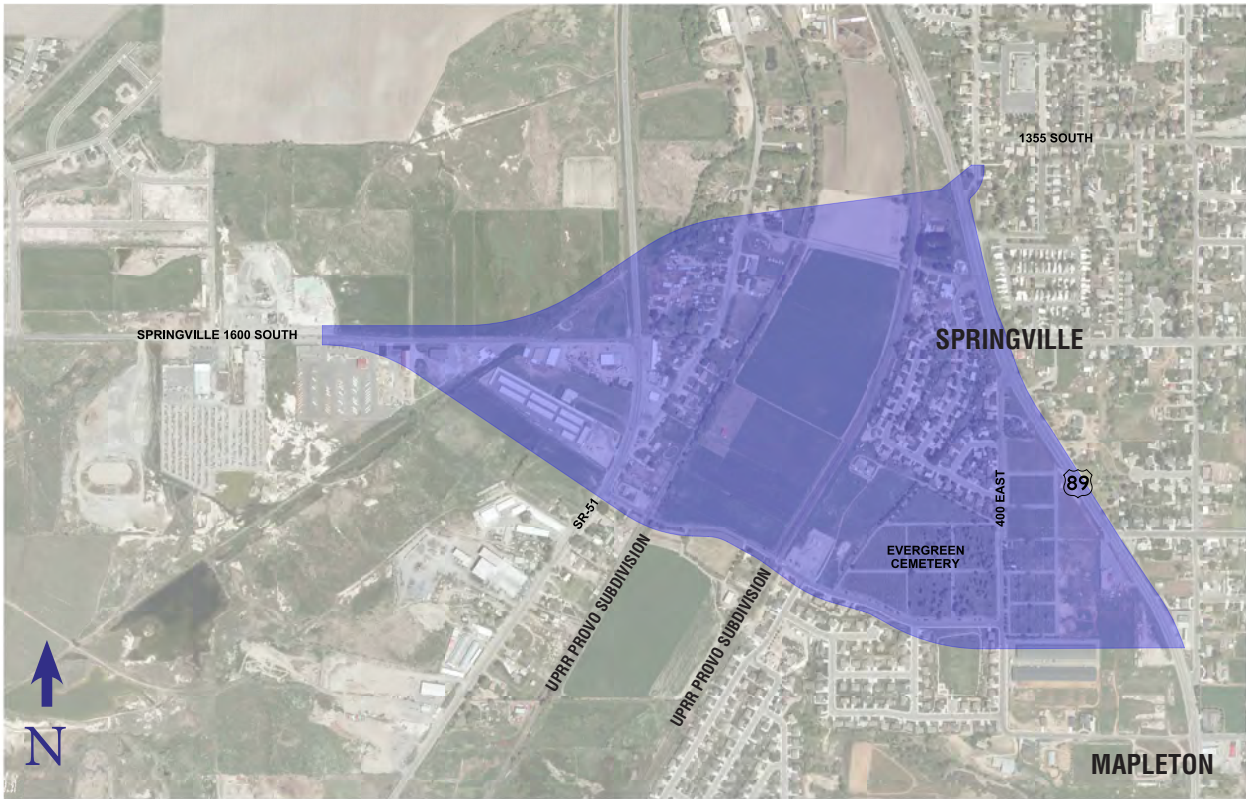


Figure 3.4-1, Springville 1600 South Extension Study Area

Background

The Springville 1600 South Connection, between US-51 and US-89 in Mapleton, is recommended to relieve traffic congestion on Springville's 400 South by providing a direct I-15 access for Mapleton traffic and an alternate I-15 access for residents in south Springville. This connection has been identified as a stand alone project, and it would improve road network connectivity. Nevertheless, the "connection" is the east half of a system for the I-15 Interchange at 1600 South. The function of each "half" is essential to justify the cost and impacts of the other, explaining why a 1600 South connection has not been created earlier.

Operations and public safety considerations suggest that 1600 South should be grade-separated at its two crossings of the UPRR's heavily-used Provo Subdivision. A combined lowering of the roadway and raising of the Provo Subdivision tracks, on new railroad embankments and structures, is recommended. The allowable changes to track gradients are small, so about 5,000 feet on each leg of the Provo Subdivision would be re-constructed to achieve the grade-separation.

Several routing alternatives for a 1600 South Connection have been identified within the 1600 South study area (see Figure 3.3-2 on next page). Each alternative involves major challenges including uneven local terrain, existing residential neighborhoods, and the railroad conflicts. An alignment closely following theoretical 1600 South, and connecting to US-89 at the Mapleton 1600 North Street intersection, would provide the best traffic service. That alternative would also have the greatest impact upon existing neighborhoods. The recommended routing for the US-89 connection was driven primarily by the desire to minimize neighborhood impacts.

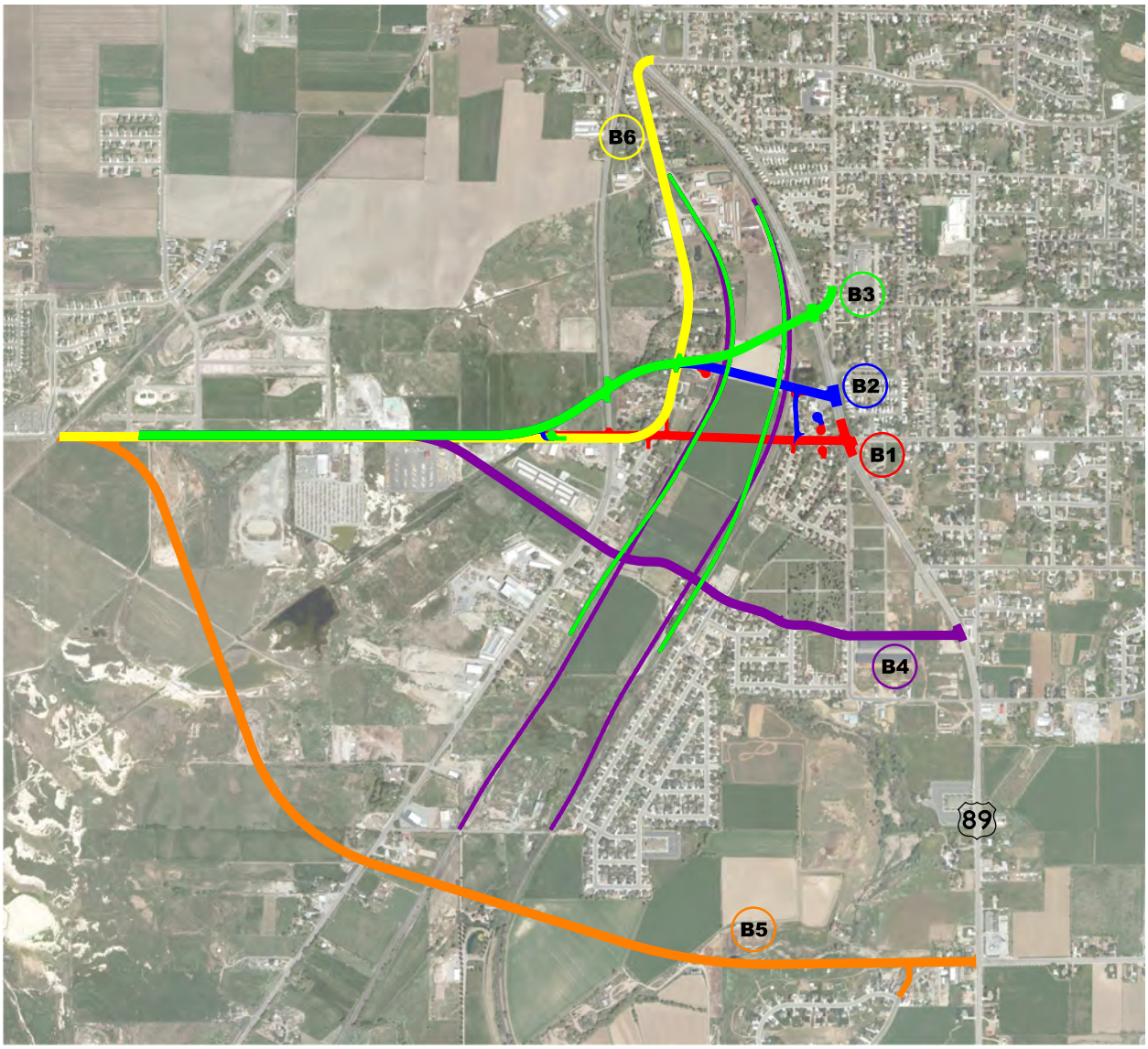


Figure 3.4-2, 1600 South Extension Alignment Alternatives

Purpose and Need for the Project

Purpose of the Project

The purpose of the project is to provide LOS D on 400 South from I-15 to US-89 in Springville, to provide better access to the Spanish Fork industrial area and proposed commercial and institutional uses in the study area, and to provide better connectivity for the Mapleton/South Springville area.

Need for the Project

The project is needed to improve traffic operations on 400 South from I-15 to US-89 in Springville. 400 South in Springville will be congested by 2040 and operate at LOS E and F.

2040 Traffic Conditions without 1600 South Extension to US-89

The 1600 South widening project, from Spanish Fork Main Street to US-89, is listed as a separate project from the Springville 1600 South/Spanish Fork 2700 North Interchange in the MTP. The section between US-51 and US-89 is a new roadway alignment, so a scenario with this section excluded from the network was analyzed using the TDM. The 2040 MTP without the 1600 South Extension Scenario includes all projects from the MTP (including the Springville 1600 South/Spanish Fork 2700 North Interchange) except for the 1600 South extension and the Center Street Interchange (see Figure 3.3-3).

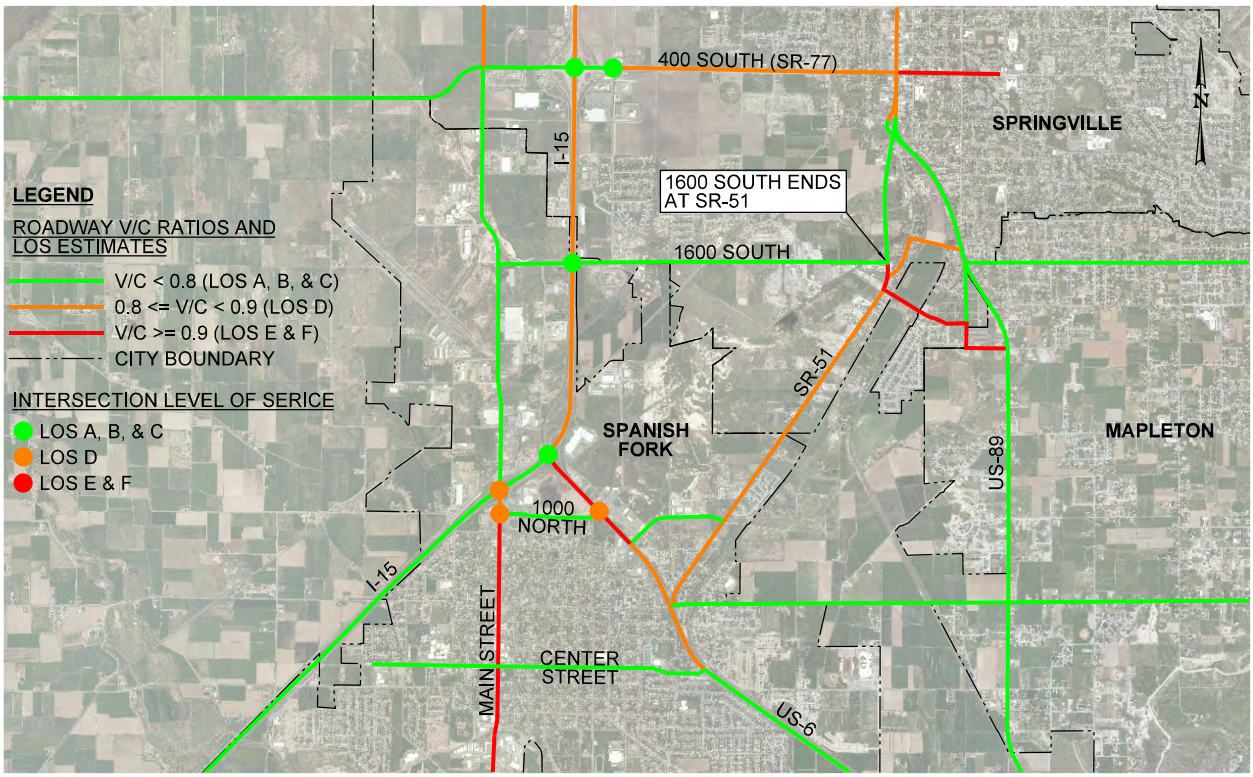


Figure 3.4-3, 2040 Traffic Conditions without 1600 South Extension to US-89

Springville 400 South shows improvement to LOS D, but it is not as much improvement as with the 1600 South extension (see Figure 3.3-3). Also, the existing local roadways near 1600 South between US-51 and US-89 show considerably more congestion. These results suggest that with the Springville 1600 South/Spanish Fork 2700 North Interchange there is a need to extend 1600 South to US-89 to relieve additional congestion from 400 South and keep traffic off the existing residential streets near 1600 South.

Study Recommendation for Springville 1600 South Extension to US-89

The recommended 1600 South connection to US-89 follows the existing 1600 South roadway before swinging northeast to connect with US-89 at the 400 East Street intersection (about 1400 South). The new roadway alignment veers away from the existing roadway at about one quarter mile west of SR-51 and then swings northeast across SR-51, Springville's South Main Street, and the two legs of UPPR's Provo Subdivision to the US-89 connection at 400 East Street. The recommended concept shows 400 East Street hooked sharply into US-89 to create a 4-legged intersection at the terminus of the 1600 South connection.

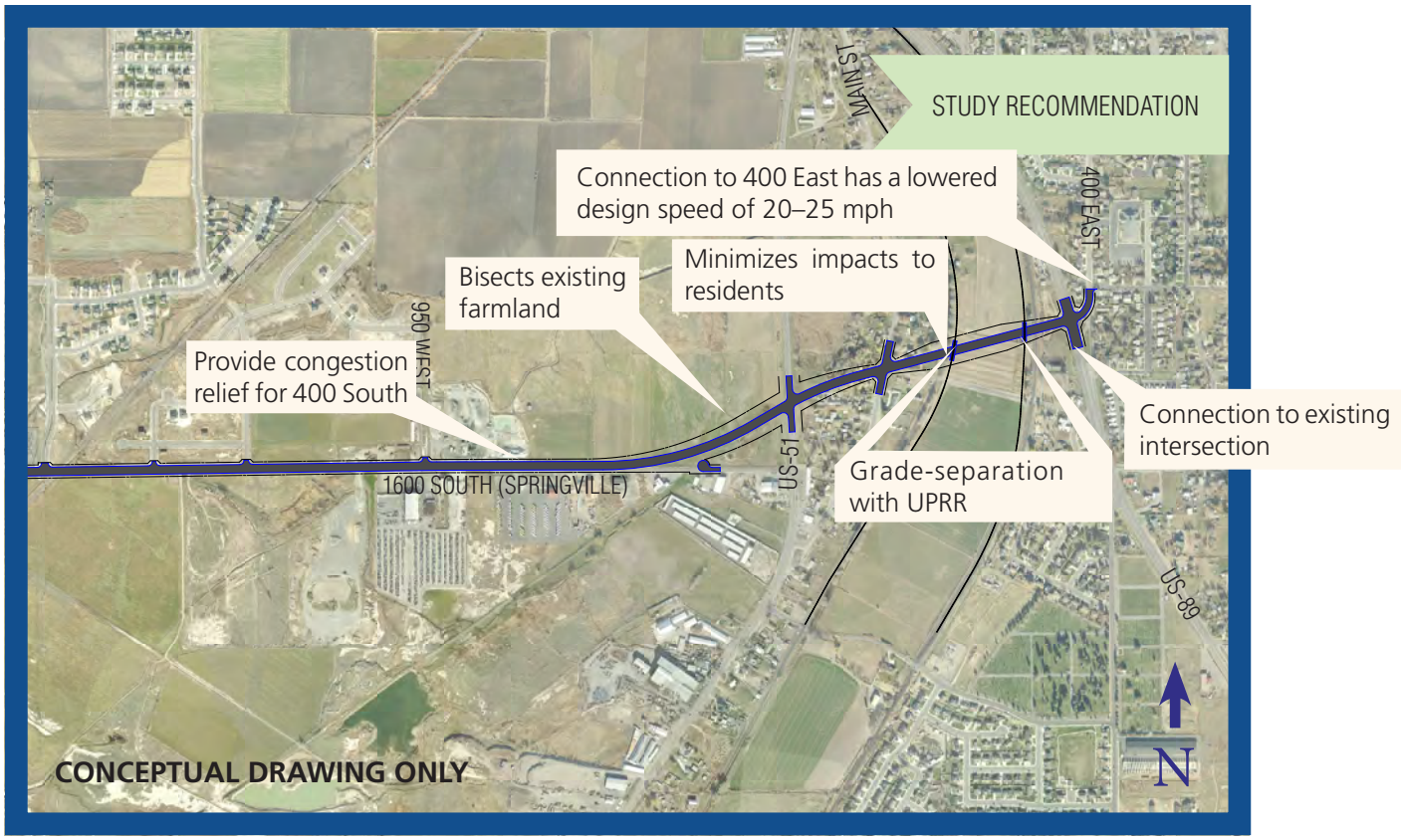


Figure 3.4-4, Study Recommendation for 1600 South Extension to US-89: Alternative B3

The recommended alternative provides congestion relief for 400 South, provides grade-separated crossings with UPRR, and minimizes impacts to residences. Disadvantages to the recommended alternative includes bisecting existing farmland and a lower speed connection to 400 East.

Study Recommendation Cost

An approximate cost was estimated for the recommended concept, as described above, including the 1600 South improvements east of Wallace Drive, as follows:

About $30 Million

** Note that these estimated costs are useful only as approximate, or "ballpark", figures as placeholders for recommended future improvements. Actual budgeting and programming costs should be determined by detailed future environmental and engineering studies.*

Environmental Considerations for Springville 1600 South Extension to US-89

For a detailed and complete description of all environmental factors relating to this project, please see the Environmental section of the Appendix.

Summary of Key Environmental Factors Affecting Alternative Selection

Key environmental resources that may affect the alternative selection of the 1600 South extension include:

- **Farmlands** - The recommended alternative would impact prime, unique, and statewide important farmland. This impact may require examining additional alternatives and measures to minimize harm.

- **Wetlands and Waters of the U.S.** - The recommended alternative could impact NWI mapped wetlands. Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would result in a discharge of fill material to waters of the U.S. An alternative is practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.

- **Threatened & Endangered Species** - The Endangered Species Act (ESA) provides protection to federally-listed threatened and endangered species and their designated critical habitats. It requires that all federal agencies considering a project or action to consult with the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration to ensure that the proposed activity is "not likely to jeopardize the continued existence" of any listed species or will not "result in adverse modification" of its critical habitat. The Endangered Species Act is pertinent to the project because the federally listed, threatened Ute ladies'-tresses (*Spiranthes diluvialis*) could be present within the study area.

- **Section 4(f)** - The recommended alternative would likely impact historic properties protected under Section 4(f) which prohibits U.S. Department of Transportation (USDOT) agencies from approving the use of any Section 4(f) land for a transportation project except as follows:

    - The USDOT agency can approve the use of Section 4(f) land by making a determination that (1) there is no prudent and feasible alternative that would avoid the use of the Section 4(f) resource, and (2) the project includes all possible planning to minimize harm to that property.
    - The USDOT agency can approve the use of Section 4(f) property by making a finding of *de minimis* impact for that property.

  The recommended alternative would likely have an impact that would not be considered *de minimis*. An analysis of avoidance alternatives to determine if a feasible and prudent avoidance alternative exists would need to be conducted.

- **Relocations** - The recommended alternative could require up to five residential relocations.

Public Response

During the first public meeting, this project was represented with a straight path from Springville 1600 South to Mapleton 1600 North. This received strong negative reactions from the public. While the community was very vocally against this alternative and several other alternatives, there was general support of the recommended alternative and better connectivity for Mapleton.

For a full compilation of public comments relating to this project, please see the Public Involvement section of the Appendix.

Other Feasible Alternatives for Springville 1600 South Extension to US-89

The concepts shown in the following section represent other viable alternatives that were considered for the Springville 1600 South Extension to US-89 but are not recommended by this study based on input from the Technical Advisory Committee, Steering Committee, and public comments.

Alternative B1

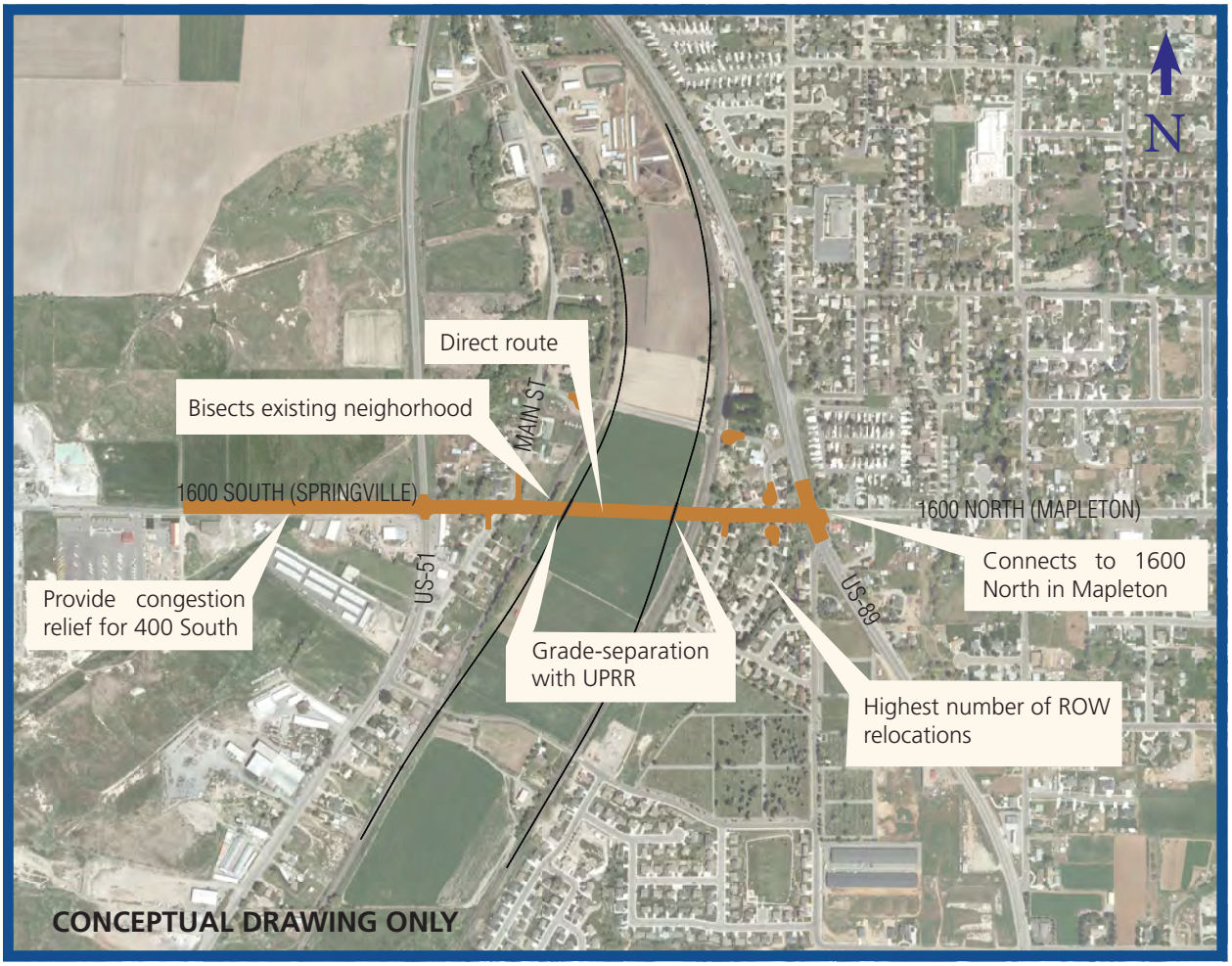


Figure 3.4-5, Alternative B1: Current Master Plan Alternative, straight connection from Springville 1600 South to Mapleton 1600 North

Alternative B1 follows the existing 1600 South roadway from Wallace Drive directly through the existing T-intersection at SR-51, Springville's South Main Street, and across the two legs of UPRR's Provo Subdivision to become the west leg of the existing 1600 North (Mapleton) and US-89 intersection.

This alternative provides a direct route to connect with 1600 North (Mapleton) along with congestion relief for 400 South. It also offers grade separated crossings with UPRR. Due to the roadway bisecting an existing neighborhood and the required property relocations this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 37 Million

Alternative B4

Figure 3.4-6, Alternative B4: Evergreen Road Connection

Alternative B4 follows 1600 South from Wallace Drive to about one quarter mile west of SR-51, where the alignment swings southeast across SR-51 at Evergreen Road, and the two legs of UPPR's Provo Subdivision to its US-89 terminus as a mid-block intersection at about 1250 South.

This alternative provides good access to Mapleton City along with congestion relief for 400 South. It also offers grade separated crossings with UPRR. Disadvantages to this alternative include the excessive curvature in the alignment to minimize property impacts, right-of-way relocations, and cemetery impacts. Due to these drawbacks and the intersection tying in at mid-block this alternative is feasible but not recommended.

The concept-level cost for this improvement was estimated as follows:

About $ 57 Million

Eliminated Alternatives for Springville 1600 South Extension to US-89

The following alternatives have been eliminated, each for their own unique reasons. See below for further detail regarding each alternative:

Alternative B2

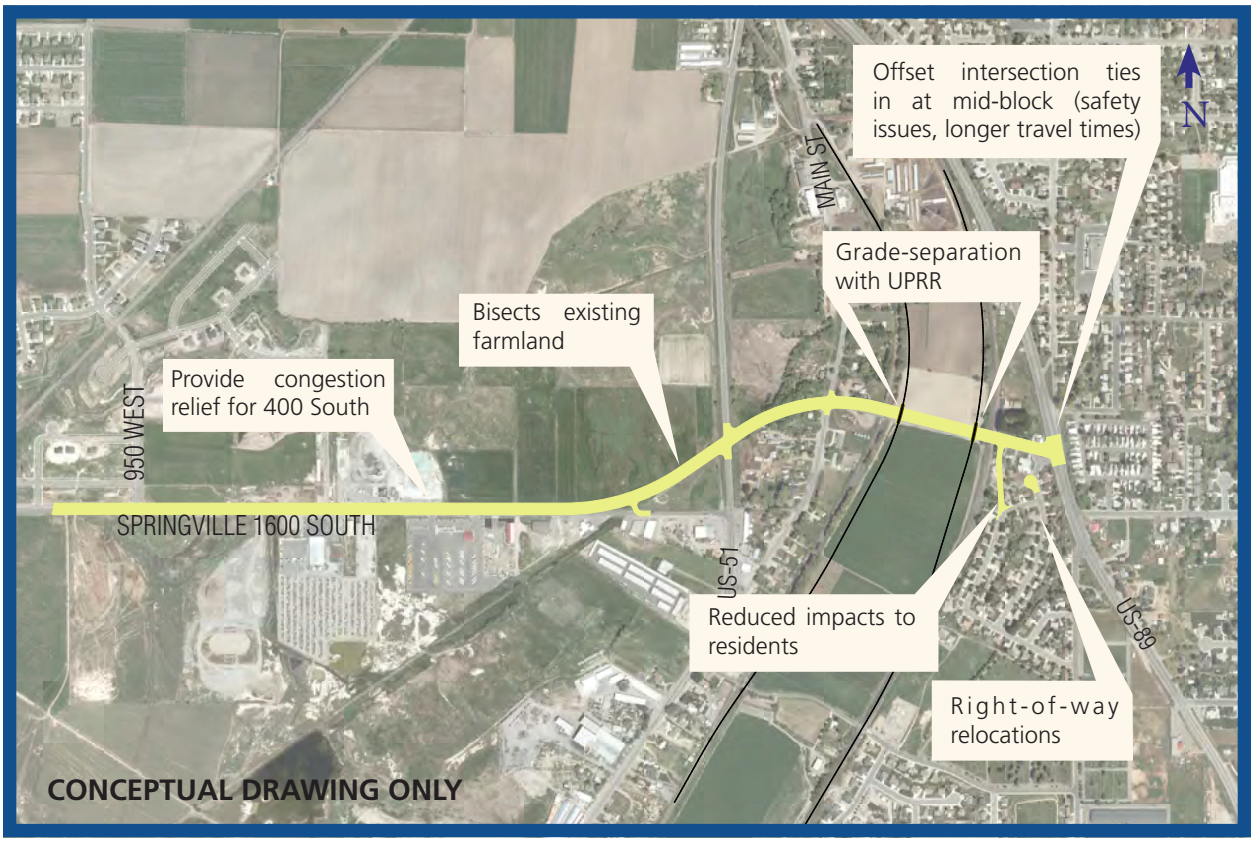


Figure 3.4-7, Alternative B2: Eliminated due to undesirable offset intersections

Alternative B2 follows 1600 South from Wallace Drive to about one quarter mile west of SR-51, where the alignment swings northeast across SR-51, Springville's South Main Street, and the two legs of UPPR's Provo Subdivision to its US-89 terminus as a mid-block intersection at about 1550 South.

This alternative reduces residential impacts and provides congestion relief for 400 South. It also offers grade separated crossings with UPRR. Disadvantages to this alternative include property relocations along with the roadway bisecting existing farmland. Due the undesirable offset intersection this alternative was eliminated.

Alternative B5

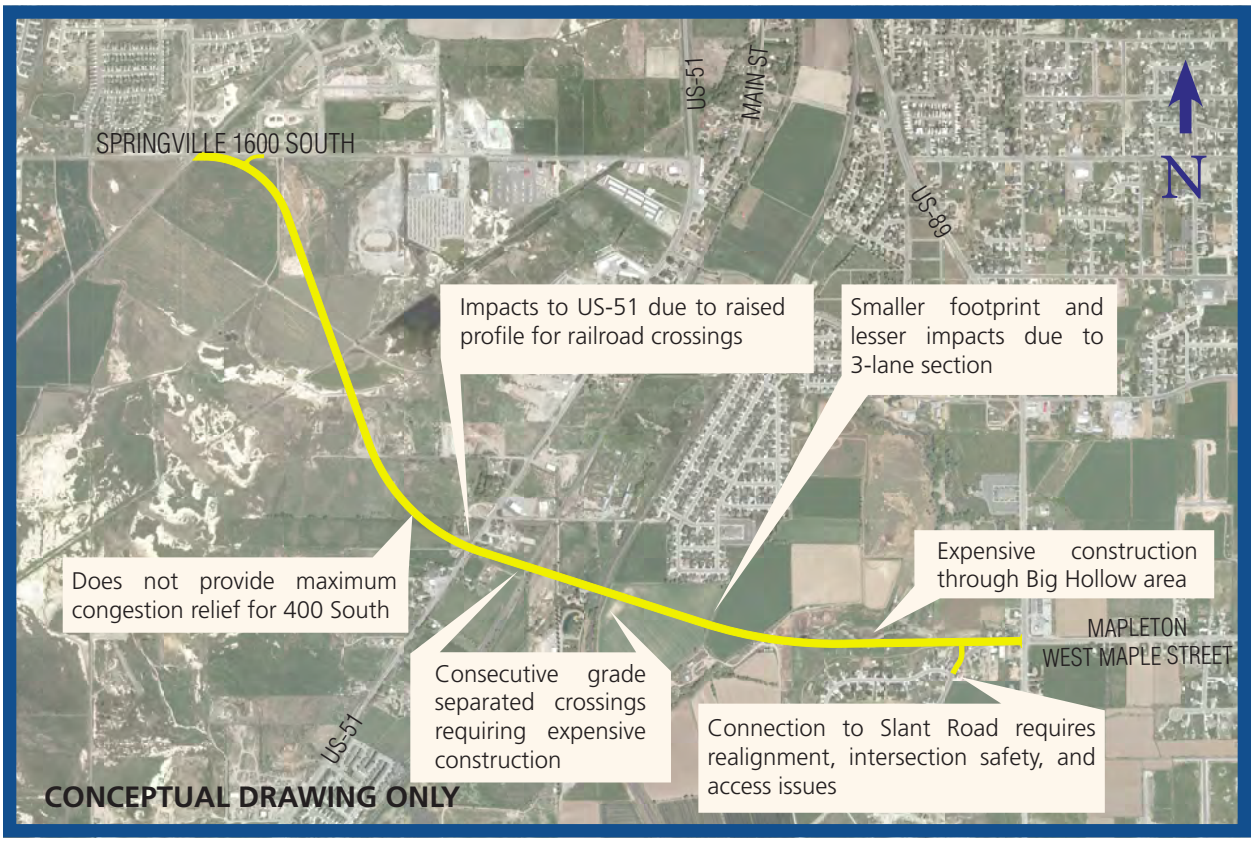


Figure 3.4-8, Alternative B5: Maple Street Connection

During the study Mapleton City officials asked about the possibility of a Maple Street extension to I-15 in Springville. The route represents over two miles of new roadway. Costs and impacts are much greater than any other alternative we have identified, and as a result, the Maple Street route was not competitive in a cost-to-benefit analysis. Current estimates show the construction costs to be two times more than other alternatives considered. Also the Maple Street connections, including intersection improvements at US-51 and Slant Road, would require seven to ten relocations. For full details regarding the benefits and drawbacks of this alternative, see the Appendix for the full memo that was given to the City of Mapleton.

Due to the high cost, relocations, and environmental impacts associated with this alternative, it is not recommended that this alternative be considered as a viable standalone connection to US-51 and US-89 for the MAG study. However, from a regional mobility standpoint, this alternative does show some benefit if it were combined with the 1600 South extension. See following page for the combined alternative.

Combined Alternative (Maple Street Connection and 1600 South Extension)

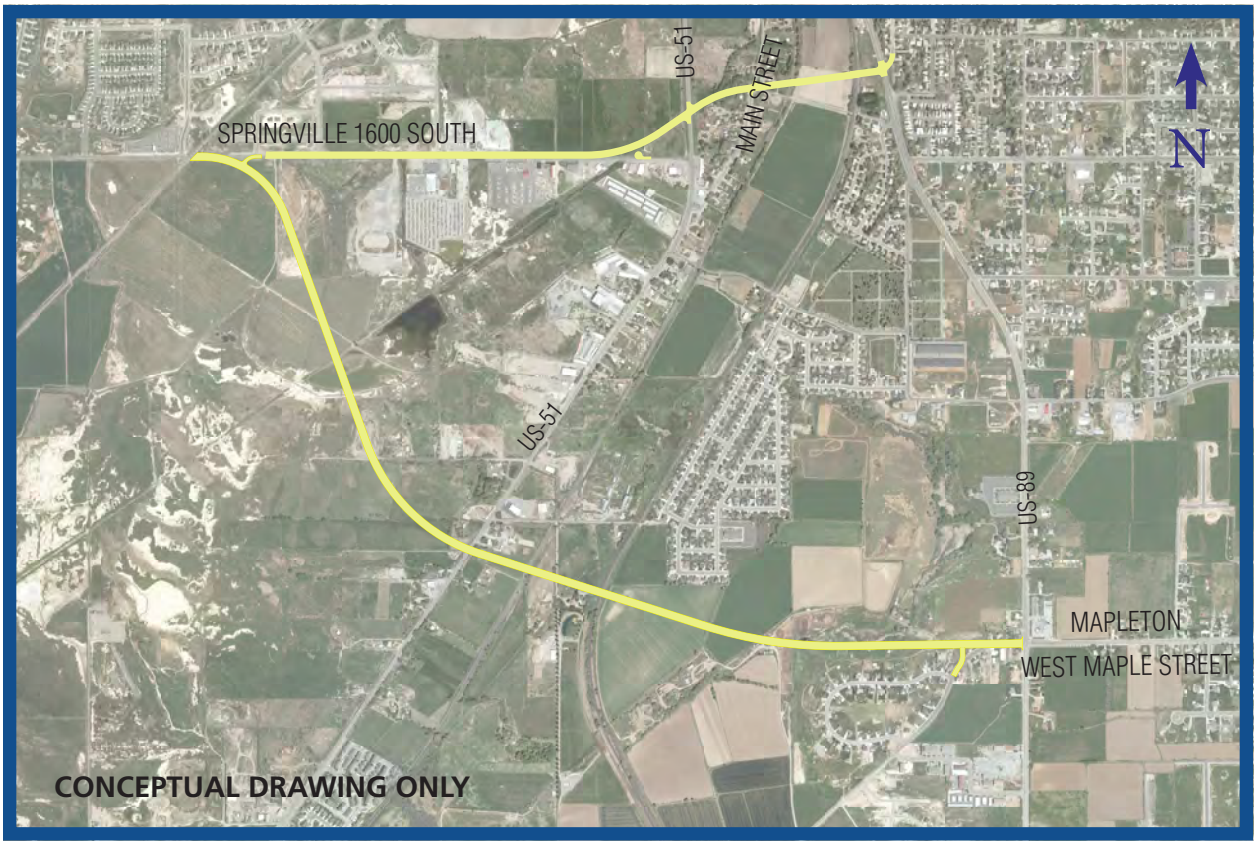


Figure 3.4-9, Combined Alternative (Maple Street Connection and 1600 South Extension)

Alternative B6

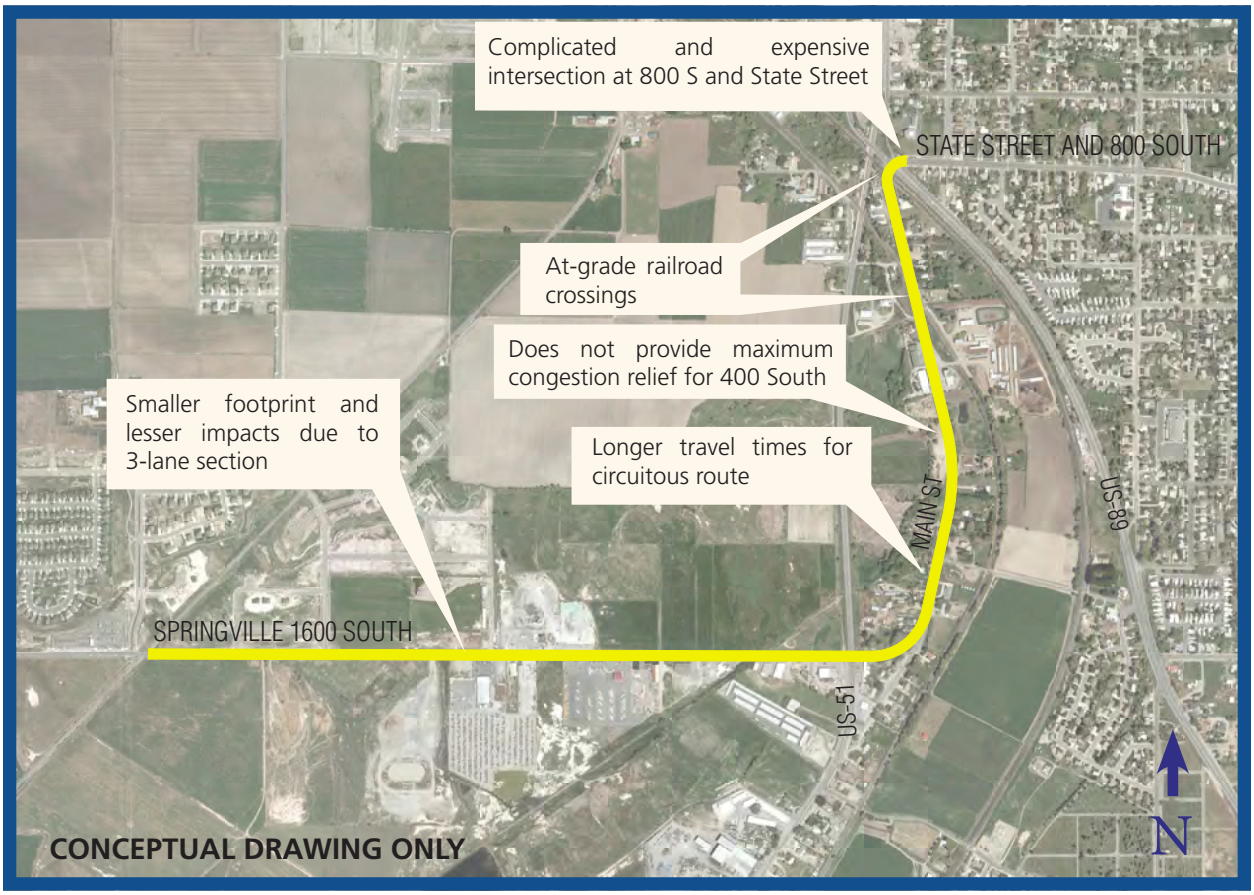


Figure 3.4-10, Alternative B6: Connection with Intersection at 800 South and State Street

Alternative B6 follows 1600 South from Wallace Drive directly through the existing T-intersection at SR-51, where the alignment swings north to follow the existing Springville South Main Street, across the two legs of UPRR's Provo Subdivision with at-grade crossings to the 800 South and US-89 intersection.

This alternative's three-lane roadway provides a smaller footprint and reduces property impacts but does not provide maximum congestion relief for 400 South. Disadvantages to this alternative include the complicated costly intersection at 800 South and US-89 along with the longer travel times for the circuitous route to US-89. Due to the intersection impacts and the at-grade railroad crossings this alternative was eliminated.

Summary of Alternatives for 1600 South Extension to US-89

Table 3-3 Summary of Alternatives for 1600 South Extension to US-89

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Social Impacts	Farmland Impacts (Acres)	Wetland Impacts (Acres)	Advantages	Disadvantages
B1	$37.35	14	Up to 2	High	Moderate (Prime & Unique)	Minimal (less than 0.5-acres)	Connection to 1600 North Mapleton Direct route Provide congestion relief for 400 South Grade-separation with UPRR	Most relocations Bi-sects existing neighborhood
B2	***Eliminated due to undesirable offset intersection***						Reduced impacts to residences Grade-separation with UPRR Provide congestion relief for 400 South	Relocations Offset intersections, ties in at mid-block Bi-sects existing farmland
B3	**$30.5 Million**	**5**	**Up to 2**	**Minimal**	**Moderate (Prime & Unique)**	**Minimal (less than 0.5-acres)**	**Minimizes impacts to residences** **Connection at existing intersection** **Provide congestion relief for 400 South** **Grade-separation with UPRR**	**Bi-sects existing farmland** **Connection to 400 East has lowered design speed**
B4	$56.90	8	Up to 2	Minimal	Moderate (Prime & Unique)	Substantial (greater than 0.5-acres)	Good access to Mapleton City Grade-separation with UPRR Provide congestion relief for 400 South	Relocations Offset intersections, ties in at mid-block Excessive curvature in alignment to minimize impacts Impacts to cemetery
B5	***Eliminated due to a combination of several impacts***						Smaller footprint and impacts due to 3 lane roads Grade-separation with UPRR	Connection to Slant Road Expensive construction through Big Hollow area Expensive construction for railroad crossings Impacts to US-51 due to raised profile for RR crossing Does not provide maximum congestion relief for 400 S Springville

	Construction Costs ($ MIL)	Relocations	Cultural Impacts	Social Impacts	Farmland Impacts (Acres)	Wetland Impacts (Acres)	Advantages	Disadvantages
B6	***Eliminated due to intersection impacts and at-grade railroad crossings***						Smaller footprint and impacts due to 3 lane roads	Complicated and expensive intersection at 800 South and State Street Travel times for circuitous route Does not provide maximum congestion relief for 400 S Springville Does not provide grade separated RR crossings

4.0 IMPLEMENTATION INTO MASTER PLANS/LONG RANGE PLANS

Each of the affected cities—Springville, Spanish Fork, and Mapleton—will have the opportunity to adopt the recommended projects into their respective city master plans. UDOT, UTA, and Utah County will similarly adopt projects and include them in long range plans. The appropriate parties will then be able to start securing right-of-way in anticipation of the coming projects.

5.0 CONCLUSION

Planners with MAG initiated this study to evaluate transportation improvements in the Springville, Spanish Fork, Mapleton areas and parts of unincorporated Utah County. Four specific projects were evaluated:

- A new interchange at I-15 and Center Street in Spanish Fork
- A new commuter rail station in Spanish Fork near a new I-15/Center Street Interchange in Spanish Fork
- A new interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North
- The widening and extension of 1600 South connecting to US-89

Based on the study, the following recommendations were made for each project:

5.1 NEW INTERCHANGE AT I-15 AND CENTER STREET IN SPANISH FORK

The recommended alternative would construct a Single Point Urban Interchange (SPUI) at the crossing of Center Street and I-15.

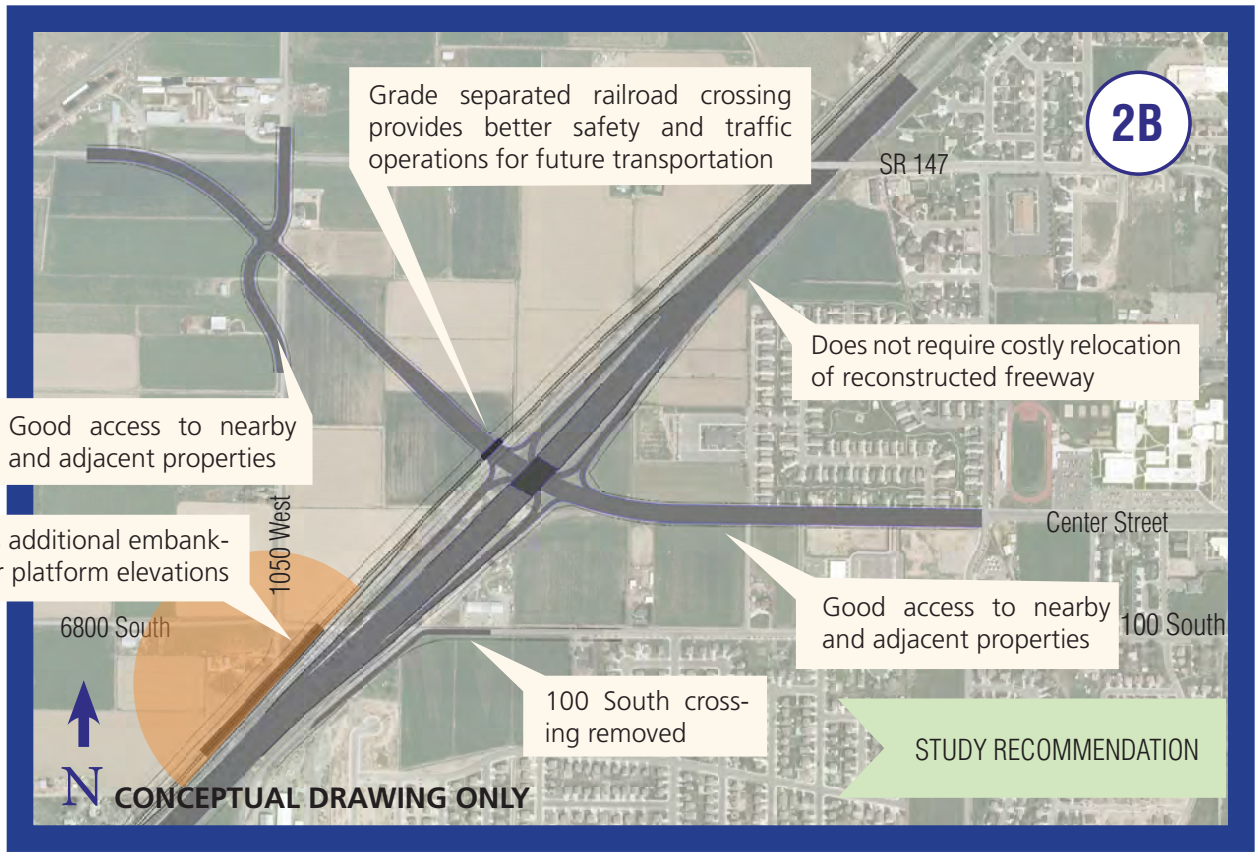


Figure 5-1, Study Recommendation for new interchange at I-15 and Center Street in Spanish Fork: Alternative 2b

5.2 COMMUTER RAIL STATION AT I-15 AND CENTER STREET IN SPANISH FORK

The recommended location for a UTA Commuter Rail Station at I-15 and Center Street in Spanish Fork was recommended in accordance with UTA's master plan. This strategic location provides easy access to a major arterial, Center Street. This arterial connects to the heart of Spanish Fork, and it will also adjoin the proposed Spanish Fork Center Street Interchange. The placing of this station was also influenced by the location of another station in Springville to the north; this location also provides better accessibility for a greater number of people than a station further south, for example at the I-15 and US-6 Interchange.

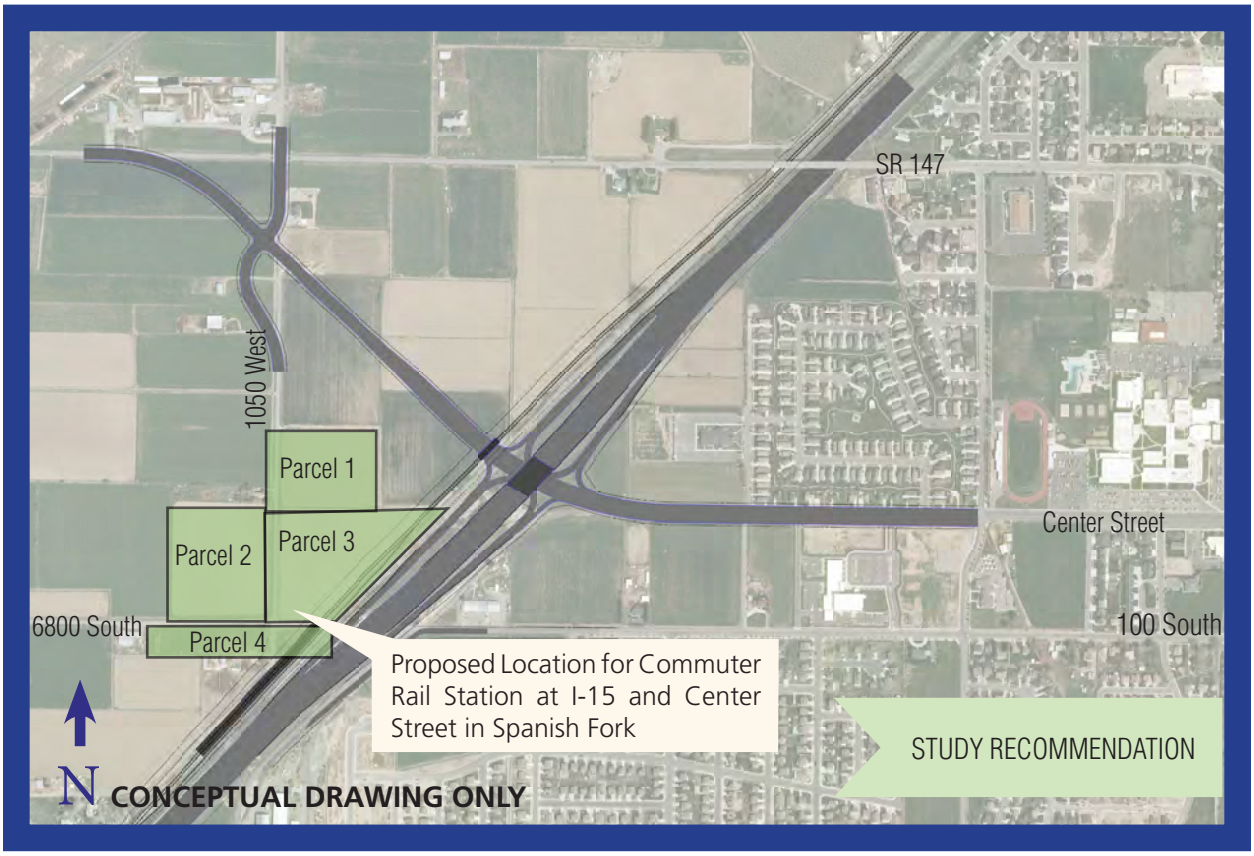


Figure 5-2, Study recommendation for commuter rail station at I-15 and Center Street in Spanish Fork

5.3 NEW INTERCHANGE AT I-15 AND SPRINGVILLE 1600 SOUTH/SPANISH FORK 2700 NORTH

The recommended Springville 1600 South/Spanish Fork 2700 North Interchange concept is a loop-ramp system with symmetrical, 35 mph loops constructed on presently-undeveloped ground in the southeast and northwest quadrants.

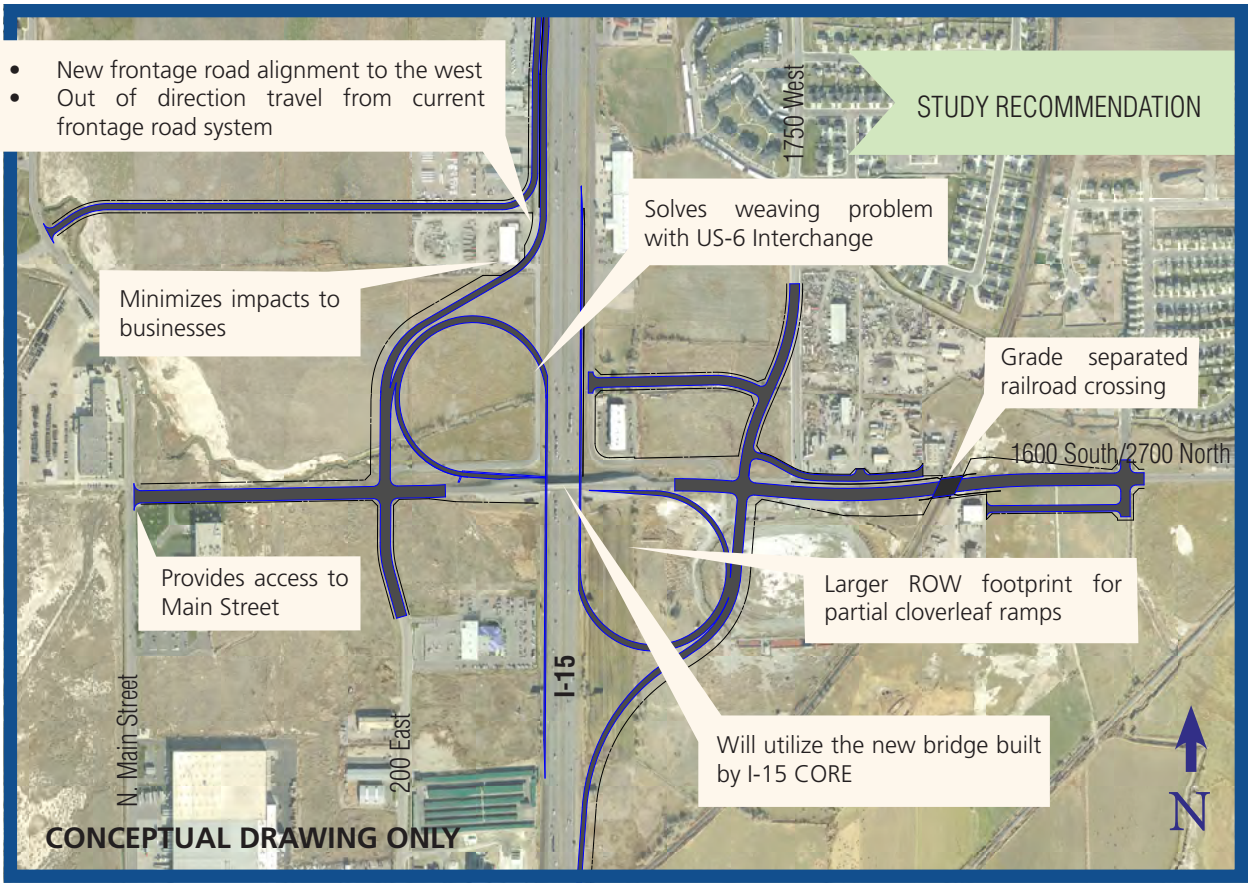


Figure 5-3, Study Recommendation for Interchange at I-15 and Springville 1600 South/Spanish Fork 2700 North: Alternative A2

5.4 SPRINGVILLE 1600 SOUTH EXTENSION TO US-89

The recommended 1600 South connection to US-89 follows the existing 1600 South roadway before swinging northeast to connect with US-89 at the 400 East Street intersection (about 1400 South). The new roadway alignment veers away from the existing roadway at about one quarter mile west of SR-51 and then swings northeast across SR-51, Springville's South Main Street, and the two legs of UPPR's Provo Subdivision to the US-89 connection at 400 East Street. The recommended concept shows 400 East Street hooked sharply into US-89 to create a 4-legged intersection at the terminus of the 1600 South connection.

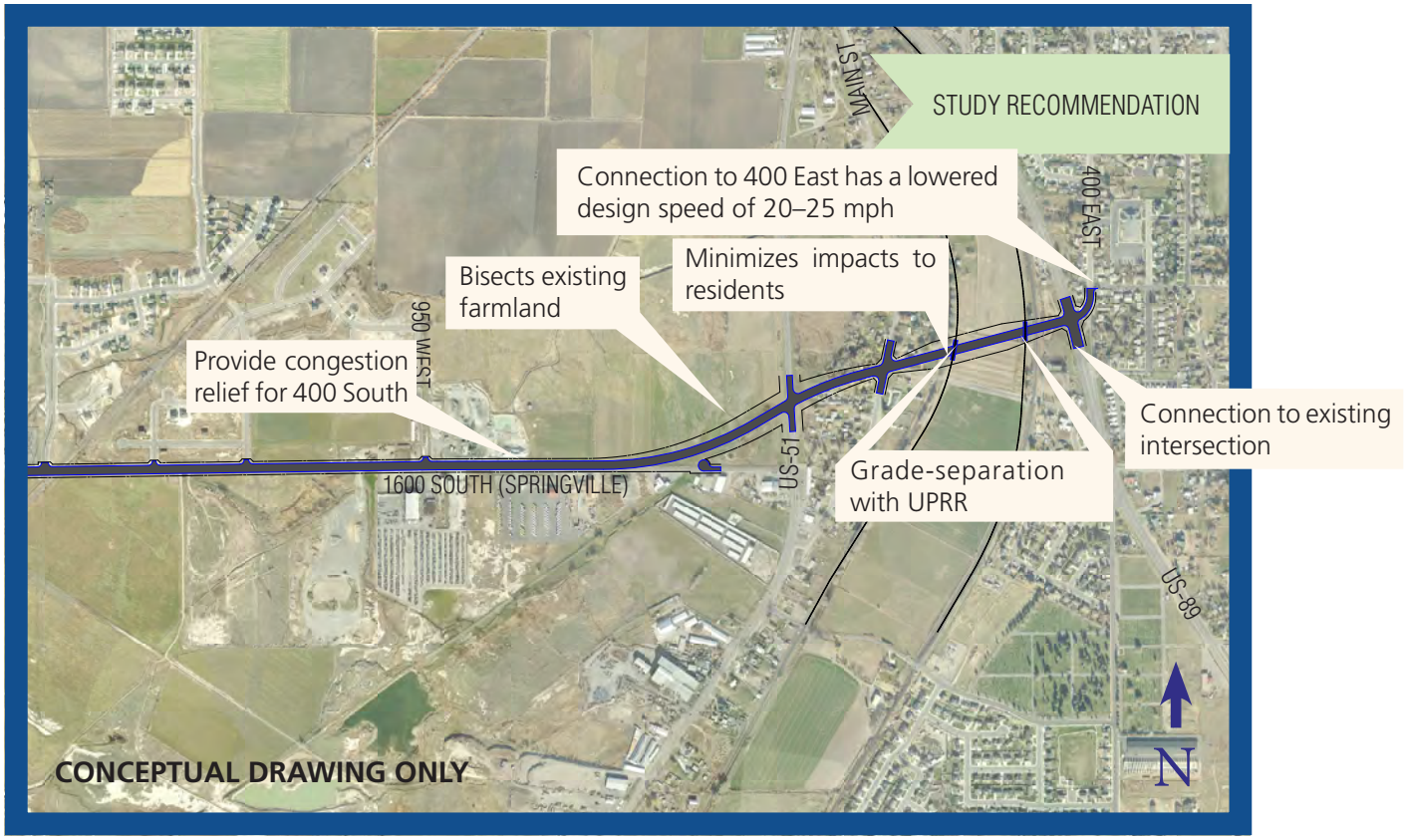


Figure 5-4, Study Recommendation for 1600 South Extension to US-89: Alternative B3