



Technical Memorandum 23: Glovers Interchange Design Selection

in support of the
Environmental Impact Statement

West Davis Corridor Project

Federal Highway Administration
Utah Department of Transportation



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1.0 Introduction

The purpose of this technical memorandum is to describe the process that the West Davis Corridor (WDC) Environmental Impact Statement (EIS) team used to evaluate interchange options at the intersection of the WDC, Legacy Parkway, and Interstate 15 (I-15) in the vicinity of Glovers Lane. This memorandum contains analysis of a connection that could be built if the WDC were to be routed through the area of western and southern Farmington. A separate memorandum (*Technical Memorandum 24: Shepard Lane Interchange Design Selection*) has been prepared for interchange options if the WDC were to connect to I-15 near Shepard Lane.

The first draft of this technical memorandum was released to the public in May 2013 at the time of the release of the Draft EIS. After the Draft EIS was released, this memorandum was updated based on a more detailed design developed as part of the Federal Highway Administration (FHWA) Interstate Access Change Request process for both the Shepard Lane and Glovers Lane interchanges. The Utah Department of Transportation (UDOT) cannot add points of access to, or exits from, an interstate without approval from FHWA.

FHWA has an interest in ensuring that the National Highway System provides the highest level of service in terms of safety and mobility. FHWA's decision to approve new or revised access points to the National Highway System must be supported by substantiated information justifying and documenting that the proposed designs maintain the safety and performance of the highway system.

The evaluation of the Glovers Lane interchange after the Draft EIS was released also included updated traffic data from the Wasatch Front Regional Council's 2015–2040 Regional Transportation Plan, which was adopted after the Draft EIS was released. Therefore, UDOT decided to update this technical memorandum to reflect the evaluation that was conducted for FHWA's Interstate Access Change Request and the updated travel demand model from the Wasatch Front Regional Council.

2.0 Concept Development

The objective of the proposed interchange is to allow traffic to move to and from the proposed WDC to and from I-15 and Legacy Parkway. This general objective has several possibilities, so different design concepts have been developed for comparison and selection of one or more favorable options.

The Glovers Lane design concepts have been developed by considering design criteria, design variables, and other factors.

2.1 Design Criteria

In preparing the concept-level design for the interchange options in the Glovers Lane area, the WDC team initially considered the following criteria.

- Prepare designs that meet the design standards of UDOT and American Association of State Highway and Transportation Officials (AASHTO)
- Provide designs that allow traffic to move in a reasonably direct manner between destinations with design speeds appropriate for the facility
- Avoid permanent impacts to rail lines that would preclude the future operation of the rail lines
- Avoid reducing the existing number of though lanes on I-15
- Avoid permanently eliminating existing traffic movements (although they might be reconfigured)
- Propose an overall design that is feasible and reasonable (with respect to obvious major impacts, structure layouts, etc.)
- Allow for sufficient lanes on I-15 to provide an acceptable level of service (LOS) of LOS D or better

These initial considerations provided guidance to the WDC team's design effort to determine the feasibility of the concepts before advancing them to more detailed design and analysis. One of the key design criteria shown above is the level of service requirement of LOS D or better. Before advancing concepts for further design, the WDC team evaluated initial designs up front through computer traffic modeling to determine whether the concepts met this level of service criterion. Those concepts that could not meet this criterion were dismissed in a pre-screening process.

In addition to the above design criteria, other factors were considered during the development of each option. Some examples of these factors include avoiding or minimizing impacts to the natural and built environment, exceeding minimum safety and operational standards, and minimizing cost. Note that some of these factors might directly conflict with one another, so some options might favor one factor over another.

2.2 Design Variables

A number of possible interchange concepts could meet the design criteria. Some of the variables for these interchange concepts could include:

- Connection type (system or service)
- Collector-distributor (CD) ramps, auxiliary lanes, or a combination
- Relocate/shift I-15 or conform to existing alignment
- Relocate/shift railroad tracks or conform to existing alignment
- Rebuild existing structures or conform to existing alignment
- Build CD roads that collect all movements, split CD roads, or partial CD roads
- Provide independent WDC/Legacy Parkway/I-15 movements or allow them to combine

This is not meant to be a comprehensive list of all possible variables, but it does reflect some of the factors that the WDC team considered. There are a number of minor variations as well, which can be applied to many of the concepts considered.

2.3 Concept Development

Design concepts for the Glovers Lane Option were developed for both the northbound (NB) and southbound (SB) travel directions. The NB and SB concepts are generally independent of each other (though not always), and thus can be mixed and matched to create several possible combinations. In addition, minor variations of each concept are possible.

Representative design concepts were selected for both the NB and SB movements.

A description of each selected concept is included in Section 3.0, with figures included in Appendix A.

3.0 Concepts Selected for Comparison

The WDC team looked at interchange concepts both to the north and to the south of Glovers Lane but determined that the preferred interchange location is south of Glovers Lane. Placing the interchange south of Glovers Lane avoids conflicts with the existing southbound ramp and structure from Lagoon Drive, avoids impacts to the existing structures at Glovers Lane, provides more spacing between the existing I-15/U.S. Highway 89 (US 89) interchange, results in far fewer residential relocations, and avoids impacts to the Davis School District's bus facility and high school site. Therefore, all representative concepts place the WDC interchange south of Glovers Lane.

3.1 Northbound Concepts

This category includes concepts that provide the following traffic movements:

- NB I-15 to NB WDC
- NB Legacy Parkway to NB WDC
- SB Legacy Parkway to NB WDC (also accommodates SB I-15 to NB WDC)

The northbound concepts considered are described below.

Concept NB-1, Direct Connection. Northbound traffic from NB I-15 connects directly to NB WDC via a directional ramp. Northbound traffic from NB Legacy Parkway connects to NB WDC via a separate directional ramp. Northbound traffic from SB I-15 connects to SB Legacy Parkway north of Park Lane, and then connects to NB WDC via a directional ramp connecting SB Legacy Parkway to NB WDC. See Figure NB-1.

Concept NB-2, Jump Over. A ramp connects NB traffic from NB I-15 to Legacy Parkway north of Parrish Lane. This traffic travels on Legacy Parkway to the point where a flyover ramp connects NB Legacy Parkway to NB WDC. This ramp takes the combined I-15 and Legacy Parkway traffic to the WDC. As in Concept NB-1, WDC-bound traffic from SB I-15 connects to SB Legacy Parkway north of Park Lane and combines with Legacy Parkway traffic, and then traffic from both Legacy Parkway and I-15 can connect to NB WDC via a directional ramp connecting SB Legacy Parkway to NB WDC. See Figure NB-2.

3.2 Southbound Concepts

This category includes concepts that provide the following traffic movements:

- WDC to SB I-15
- WDC to SB Legacy Parkway
- WDC to NB Legacy Parkway (also accommodates WDC to NB I-15)

Concept SB-1, SB Direct Ramps. Separate directional ramps connect traffic from the WDC to SB I-15 and SB Legacy Parkway. Traffic from the WDC heading northbound connects to Legacy Parkway (and eventually I-15 or US 89) with a flyover ramp that connects to NB Legacy Parkway. See Figure SB-1.

Concept SB-2, SB Jump Over. All southbound traffic travels on a directional ramp connecting the WDC to SB Legacy Parkway. Traffic bound for I-15 travels south combined with Legacy Parkway until reaching another directional ramp connecting SB Legacy Parkway to SB I-15 near Parrish Lane. Traffic from the WDC heading northbound connects to Legacy Parkway (and eventually I-15 or US 89) with a flyover ramp that connects to NB Legacy Parkway. See Figure SB-2.

4.0 Concept Comparison

As explained in Section 1.0, Introduction, after the Draft EIS was released in May 2013, new travel demand model information from the adopted 2015–2040 Regional Transportation Plan was used to re-evaluate the concepts previously considered. As a result of this new information, the WDC team was able to use updated projected traffic volumes in a level of service pre-screening evaluation of these concepts, as explained in Section 2.1, Design Criteria.

Using these new volumes, only one concept in each NB and SB direction met the level of service criterion of LOS D or better. As a result, the remainder of the concept comparisons and rankings that were used in the previous version of this memorandum are no longer applicable.

4.1 Level of Service Pre-screening Evaluation

Tables 1 and 2 show the level of service pre-screening evaluations for the northbound and southbound concepts.

Table 1. Northbound Concepts, Level of Service Pre-screening

	NB-1	NB-2
Level of service D or better?	Yes	No

Each concept was evaluated for level of service using VISSIM traffic modeling software. Only those concepts with a level of service of LOS D or better on all roadway links are considered acceptable for further evaluation. Note that a link can achieve LOS D or better even though individual lanes within that link do not achieve LOS D or better.

Table 2. Southbound Concepts, Level of Service Pre-screening

	SB-1	SB-2
Level of service D or better?	Yes	No

Each concept was evaluated for level of service using VISSIM traffic modeling software. Only those concepts with a level of service of LOS D or better on all roadway links are considered acceptable for further evaluation. Note that a link can achieve LOS D or better even though individual lanes within that link do not achieve LOS D or better.

As shown in Tables 1 and 2, Concepts NB-1 and SB-1 are expected to provide acceptable levels of service. Concepts NB-2 and SB-2 are not expected to provide acceptable levels of service and are therefore not analyzed further.

5.0 Conclusion

Based on the results of the evaluation, the WDC team selected a **Glovers Lane interchange that combines the northbound Concept NB-1 and the southbound Concept SB-1**. These two concepts are the only concepts that meet the level of service requirements.



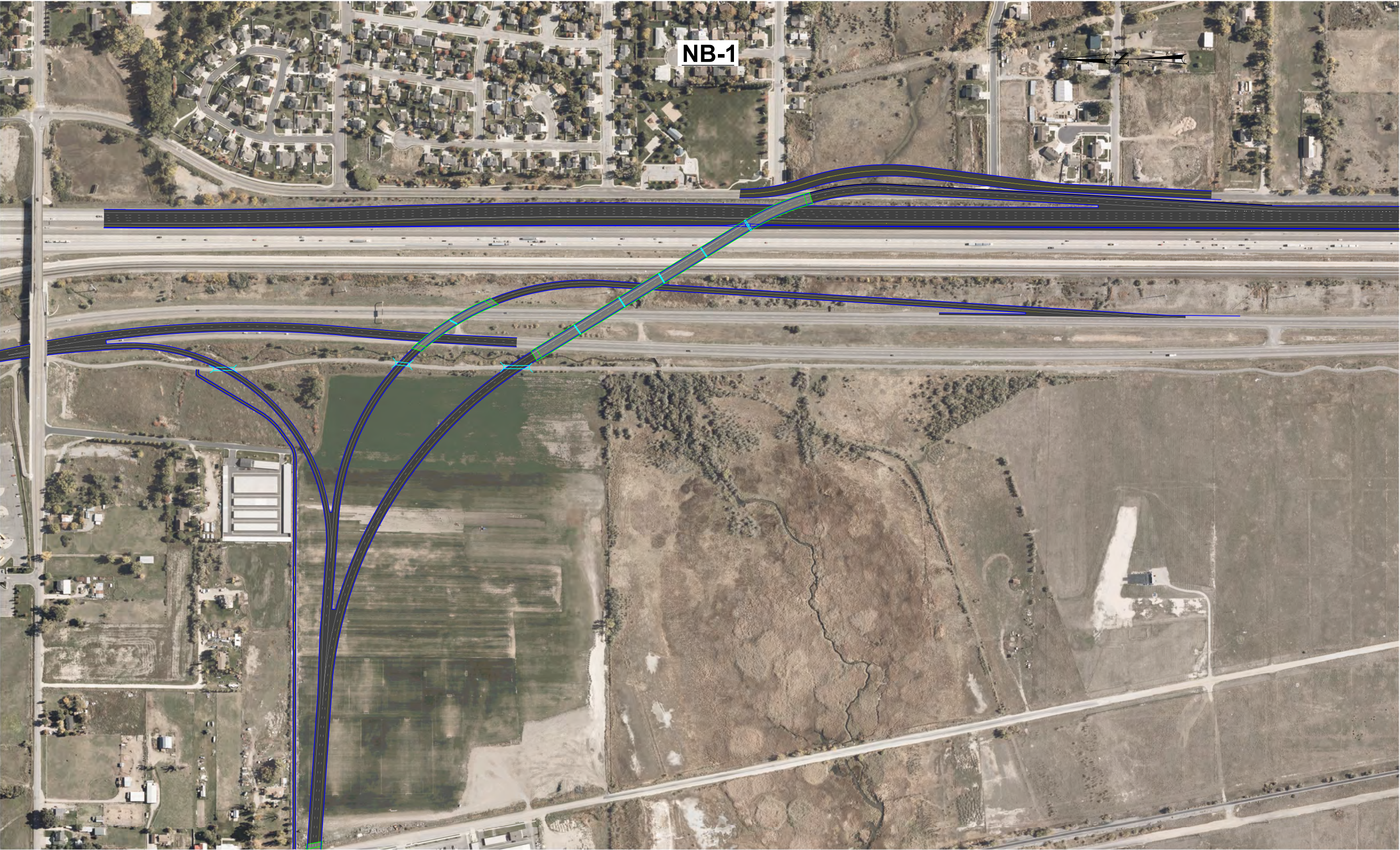
Appendix A: Figures

Figure NB-1 – Direct Connection

Figure NB-2 – Jump Over (Two Figures)

Figure SB-1 – Direct Connection

Figure SB-2 – Jump Over (Two Figures)



NB-1



Matchline - See 2 of 2



NB-2 (2 of 2)

Matchline (See 1 of 2)



SB-1



SB-2 (1 of 2)

Matchline (See 2 of 2)



SB-2 (2 of 2)

Matchline (See 1 of 2)