WHAT’S NEW

Wasatch Front Travel Demand Model

Version 9.0.2

WFRC / MAG

June 24, 2024

Table of Contents

[1 Overview 1](#_Toc170305921)

[2 Changes To Input Files 2](#_Toc170305922)

[2.1 Highway Network 2](#_Toc170305923)

[2.1.1 Network Changes Due to Amendment #1 2](#_Toc170305924)

[2.1.2 Added Network QA-QC Folder 3](#_Toc170305925)

[2.2 Transit Networks 4](#_Toc170305926)

[2.2.1 Changes to Transit Line Files Due to Amendment #1 4](#_Toc170305927)

[3 Compare Model Results 5](#_Toc170305928)

[3.1 Road Volume Comparisons 5](#_Toc170305929)

[3.2 Transit Comparisons 8](#_Toc170305930)

[3.2.1 Transit Ridership 8](#_Toc170305931)

[3.2.2 Transit Share 11](#_Toc170305932)

List of Figures

**No table of figures entries found.**

List of Tables

[Table 2.1 Transit Speeds based on FrontRunner Study Results 3](#_Toc170227355)

# Overview

Version 9.0.2 reflects the Amendment #1 changes to the WFRC & MAG Regional Transportation Plans (adopted May/June 2024).

The model processes and parameters in version 9.0.2 are the same as version 9.0.0 and version 9.0.1. Version 9.0.2 includes all the highway, transit, and segment maintenance and clean-up work completed up through version 9.0.1-patch2 (06-24-2024).

Changes to the model inputs in version 9.0.2 include updates to the highway network and transit networks, as well as the creation of a few new folders and files that serve as resources.

Model comparisons between version 9.0.2 and version 9.0.1-patch2 were created to demonstrate the location and magnitude of .

# Changes To Input Files

## Highway Network

### Network Changes Due to Amendment #1

The following edits were made to the highway network to account for Amendment #1:

* A HOT Lane on I-15 from Farmington to 2600S was converted to a general-purpose lane (4 GP + 2 HOT 🡪 5 GP + 1 HOT) as a direct result of the EIS (section R-D-45)
* Highway network attributes were also updated in all phases of the plan to accommodate additional passing lanes for the operational project on I-15 in Box Elder from US-91 North to 3000 N
* Updated 12600 S from 6400 W to Bacchus Highway to 5 lanes
* Added Freedom Point Way from 100 W to Pony Express Rd (3 lanes)
* Removed lanes in 2023 and 2028 from Granville Ave from Old Bingham Highway to 10200 S
* Fixed **HOT23\_32** through **HOT23\_50UF** fields to correctly reflect the RTP projects and Amendment from Farmington to the Utah/Salt Lake County Line
* Fixed auxiliary lane **FT** on I-15 from Farmington to 400 S in Salt Lake
* Added new underpass north of 2600 S in North Salt Lake/Bountiful
* Added new configuration at 1000 N to 600 N interchanges on I-15
* Altered Davis-SLC Community Connector from 400 W to 300 W
* Added Maker Way to accommodate for the Farmington Station circulator

Amendment #1 led to the following updates to the highway network’s rail component:

* A new Bluffdale commuter rail station was added at the former point of the mountain prison site (this included updating the rail speeds to/from this station)
* Transit speed fields on commuter rail links in the highway network were updated based on results from the FrontRunner Speed Study conducted by UTA (phases and speed changes are outlined in Table 2.1)
* The following 6 transit speed fields corresponding to the 6 phases of the FrontRunner Speed Study were added to the highway network as a reference; information regarding the process for determining the transit speeds based on the FrontRunner Speed study can be found in the “CRTSpeedSummaryFile.xlsx” located in the ”Inputs/Transit” folder:
  + **TRNSPD\_FF1**
  + **TRNSPD\_FF2**
  + **TRNSPD\_FF3**
  + **TRNSPD\_FF4**
  + **TRNSPD\_FF5**
  + **TRNSPD\_FF6**

Table 2.1 Transit Speeds based on FrontRunner Study Results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Plan Phase (2023-2050) | | Assumptions | Field Calculation | Field Calculation (Additional) |
| Phase 1 | Fiscally Constrained | 15/30, POTM Station, Payson Extension | TSPD23\_32 = TRNSPD\_FF1 | Provo to Payson (TSPD23\_32 = TRNSPD\_FF2) |
| Needed | 15/30, POTM Station, Payson Extension | TSPD23\_32U = TRNSPD\_FF1 | Provo to Payson (TSPD23\_32U = TRNSPD\_FF2) |
| Phase 2 | Fiscally Constrained | 15/30, POTM Station, Payson Extension | TSPD23\_42 = TRNSPD\_FF1 | Provo to Payson (TSPD23\_42 = TRNSPD\_FF2) |
| Needed | 15/30, POTM Station, Payson Extension, Electrification | TSPD23\_42U = TRNSPD\_FF3 |  |
| Phase 3 | Fiscally Constrained | 15/30, POTM Station, Payson Extension, Electrification | TSPD23\_50 = TRNSPD\_FF3 |  |
| Needed | 15/30, POTM Station, Payson Extension, Electrification | TSPD23\_50U = TRNSPD\_FF3 |  |

\*speeds received from UTA in March 2024 and coded into the model networks in June 2024

A numeric summary of the specific edits done to the link and nodes (in comparison to v901-patch2) are shown below:

**Links**

* No new links were added to the highway network
* Over 300 links had at least one field variable updated (i.e. lanes, functional type, street name distance, direction)
* 30 links where the **LINK\_ID** attribute was renamed to point to a different node (24 in Salt Lake County, 4 in Utah County, 2 in Weber County)

**Nodes**

* No new nodes were added to the highway network
* 7 nodes were repositioned (5 in Salt Lake County, 1 in Utah County, 1 in Davis County)

### Added Network QA-QC Folder

In the *“1\_Inputs/3\_Highway/\_Network Processing Tools”* folder, the *“Network QA-QC”* folder was added containing new Jupyter Notebook files. The *“0-Network-QA-QC-Process.ipynb”* describes a process for verifying the quality of the highway network, segment shapefile, and transit networks before running/releasing a new version of the model. The *“1-Network-QA-QC-Checks.ipynb”* is a placeholder for the future checks that will be programmatically made. However, for now, this file is empty.

## Transit Networks

### Changes to Transit Line Files Due to Amendment #1

The following edits were made to the transit network to account for Amendment #1:

* Added a shuttle service at the Point of the Mountain in Phase 1 of the RTP
* Replaced BRT with LRT through the Point of the Mountain in Phase 2 of the RTP
* Added a new shuttle service at the Farmington Transit Station
* Added Bluffdale commuter rail station

Minor edits were made to the transit line files to ensure consistency with the changes made to the highway network.

# Compare Model Results

This section compares the model results between version 9.0.2 and version 9.0.1-patch2.

## Road Volume Comparisons

The comparison between daily volumes at the segment level can be found in Figure 7.1 for 2019 and 2050. Decreases in volume in version 9 compared to version 8 are shown in blue, while increases are shown in red.

For 2019, Salt Lake and northern Davis counties display a drop in roadway volumes, most apparent on I-15. Weber, southern Davis, and Utah Counties show increases. Most of the changes are relatively minor, with the largest decreases occurring on the freeways in Salt Lake County. However, given the large daily volume for these roadways, the percent change is relatively low.

For 2050, there are decreases in volumes on I-15 in Salt Lake and northern Davis counties. Weber and northern Davis counties show overall increase in roadway volumes. Utah County shows the most change with the two Utah Lake crossings not part of the 2050 fiscally constrained scenario. The resulting drop in volumes is evident with increases on I-15.

The comparison of daily medium and heavy truck volumes is found in Figure 7.2[**.**](#fig-pdf-volume-truck-comparison) for 2019 and 2050. Truck volumes decreased in the northwest portion of Salt Lake County.

A screenshot of a map

Description automatically generated

Figure 7.1 Daily Total Volume Comparison (version 9.021 vs. version 9.0.1-patch2)

A screenshot of a map

Description automatically generated

Figure 7.2 Daily Truck Volumes Comparison (version 9.0.2 vs. version 9.0.1-patch2)

## Transit Comparisons

Transit comparisons were done with ridership, trips mode share, and boardings mode share. Overall ridership increases slightly in version 9.0.2, with Commuter Rail ridership taking a larger share of trips and boardings and Express Bus ridership taking a lower share of trips and boardings than in version 9.0.1-patch2.

### Transit Ridership

Transit ridership in version 9.0.2 compared to version 9.0.1-patch2 shows slight increase in 2042 and 2050 (see [Figure 7.3](#fig-pdf-hy-tr-all)). The total ridership in 2050 for version 9.0.2 is 337,000 daily trips compared to the version 9.0.1-patch2 model that showed 320,000 daily trips, which equates to 5% more trips. The additional trips are largely due to the improvements in commuter rail with an additional stop in Bluffdale as well as adjusted speeds taken from the UTA FrontRunner Speed Study.

Transit ridership by modes is shown in Figure 7.3 through Figure 7.9. Express Bus sees a decrease in 2028 through 2050 compared to v9.0.1-patch2. The decreases can be explained by the shift of riders from Express Bus to Commuter Rail as well as an increase in personal vehicle travel along I-15, which was improved due to the I-15 EIS study. BRT sees a slight increase in 2042, perhaps due to increased ridership in the southern end between Lehi and Provo.

A graph with red and blue lines

Description automatically generated

Figure 7.3 Daily Transit Ridership - All Modes

A graph with red and blue lines

Description automatically generated

Figure 7.4 Daily Transit Ridership - Commuter-Rail Transit

A graph with red and blue lines

Description automatically generated

Figure 7.5 Daily Transit Ridership - Light-Rail Transit

A graph with red and blue lines

Description automatically generated

Figure 7.6 Daily Transit Ridership - Bus Rapid Transit

A graph with red and blue lines and numbers

Description automatically generated

Figure 7.7 Daily Transit Ridership - Express Bus

A graph with red and blue lines

Description automatically generated

Figure 7.8 Daily Transit Ridership - Core Bus

A graph with red dots and numbers

Description automatically generated

Figure 7.9 Daily Transit Ridership - Local Bus

### Transit Share

A comparison of the share of trips amongst the various modes of transit was made for both Trips and Boardings.

The transit ridership trip shares by mode can be found in Figure 7.10 for version 9.0.2 and

[Figure 7.11](#fig-pdf-shr-tr-all-832) for version 9.0.1-patch2. The total percentage of trips by mode remains relatively similar between the two model versions. A difference is detected in 2050, where the Commuter Rail trips increase slightly. This increase is consistent with the increase in Commuter Rail transit ridership. A slight decrease in Express Bus also occurs, although the percentage is negligible.

Transit boardings for version 9.0.2 are found in [Figure 7.12](#fig-pdf-brd-9) and for version 9.0.1-patch2 are found in [Figure 7.13](#fig-pdf-brd-832). Boardings follow the same pattern as trips, but boardings can differentiate between modes better than trips that are categorized hierarchically.

A graph showing different colored lines

Description automatically generated

Figure 7.10 Transit Trips Share by Mode – Version 9.0.2

A graph showing different colored lines

Description automatically generated

Figure.7.11 Transit Trips Share by Mode – Version 9.0.1 – Patch 2

A graph showing different colored lines

Description automatically generated

Figure 7.12 Transit Boardings Share by Mode – Version 9.0.2

A graph showing different colored lines

Description automatically generated

Figure 7.13 Transit Boardings Share by Mode – Version 9.0.1 – Patch 2

#### Commuter Rail Station Boardings

The comparison of base year (2019) station-level boardings for commuter-rail transit (CRT) is found in [Figure 7.14](#fig-pdf-fr-brd). CRT boardings were found to be higher than observed for Davis County and lower than observed for Utah County. An adjustment of 5 additional minutes to in-vehicle-time for trips to/from Davis County and 5 fewer minutes to in-vehicle-time for Utah County was made to attempt to bring the model more in-line with observations.

Additional investigation was conducted into why Provo and Lehi were particularly low in the model. The findings did not turn up any obvious errors in the transit or model network. So, the conclusion is that further adjustments to CRT will be possible in the Mode Choice Update project that is currently being undertaken for the next release of the model.

A graph of different colored bars

Description automatically generated

Figure 7.14 Daily CRT Boardings by Station - Model vs Observed

**\*\*\* please add comparison of master net projects and rail transit speeds** **A graph showing a long line

Description automatically generated with medium confidence**