



WHAT'S NEW

WASATCH FRONT TRAVEL DEMAND MODEL

VERSION 9.0.2

WFRC / MAG

July 8, 2024

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1 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 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 roadway volume and transit ridership differences.

2 Changes To Input Files

2.1 Highway Network

2.1.1 Changes to Highway Network 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 2600 S 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

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

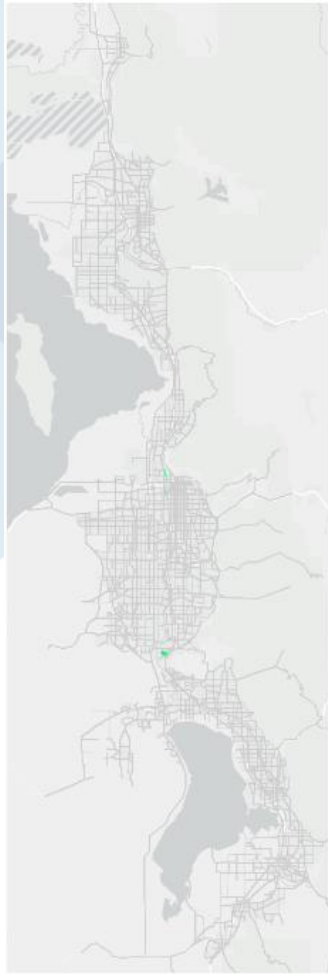
Links

- » 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)

The following figures show the lane and functional type coding differences between version 9.0.2 and version 9.0.1-patch2. Differences are shown at the segment level.



(a) Lanes

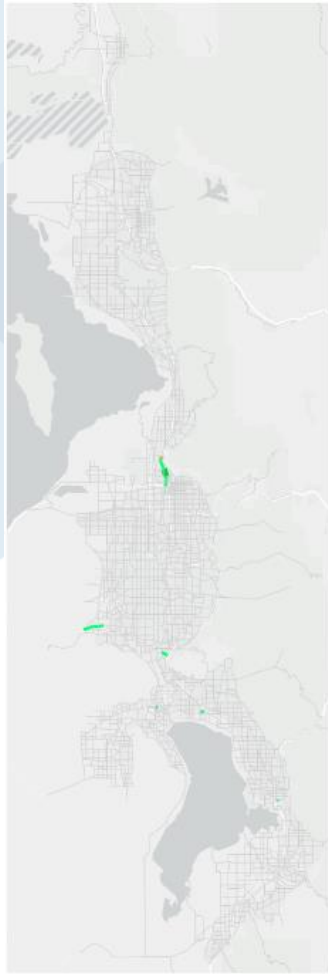
- █ +4 or More Lanes
- █ +3 Lanes
- █ +2 Lanes
- █ +1 Lane
- █ No Change
- █ -1 Lane
- █ -2 Lanes
- █ -3 Lanes
- █ -4 or More Lanes



(b) Functional Type

- █ Change
- █ No Change

Figure 2.1 Lanes and Functional Type Model Differences - 2019



- █ +4 or More Lanes
- █ +3 Lanes
- █ +2 Lanes
- █ +1 Lane
- █ No Change
- █ -1 Lane
- █ -2 Lanes
- █ -3 Lanes
- █ -4 or More Lanes

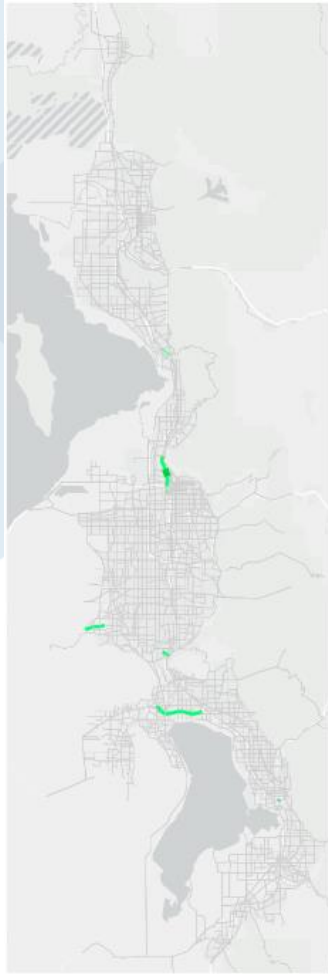
(a) Lanes



- █ Change
- █ No Change

(b) Functional Type

Figure 2.2 Lanes and Functional Type Model Differences - 2032



- █ +4 or More Lanes
- █ +3 Lanes
- █ +2 Lanes
- █ +1 Lane
- █ No Change
- █ -1 Lane
- █ -2 Lanes
- █ -3 Lanes
- █ -4 or More Lanes



- █ Change
- █ No Change

(a) Lanes

(b) Functional Type

Figure 2.3 Lanes and Functional Type Model Differences - 2042



Figure 2.4 Lanes and Functional Type Model Differences - 2050

2.1.2 Changes to the Highway Network Rail Component

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)
- » FrontRunner speeds were adjusted to match UTA's FrontRunner Forward study. 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 Version 9.0.2 Transit Speed Field Correspondence to UTA FrontRunner Study Reference Fields

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

A comparison of the FrontRunner speeds and travel time savings between versions 9.0.2 and 9.0.1-patch2 are found in Table 2.2 through Table 2.5. The difference in speeds results in a savings of 10 to 15 minutes along the entire route in 2032 and 2042. In 2050, the difference in speeds results in a time savings of 26 to 33 minutes.

Table 2.2 FrontRunner Speed Differences - 2032 & 2042

Northbound Travel Speed (mph)					Southbound Travel Speed (mph)				
Segment	v901-patch2	v902	Difference		Segment	v901-patch2	v902	Difference	
Payson North to SF	50.0	47.0	-3.0		Payson North to SF	48.1	56.4	8.3	
SF to Springville	38.8	44.0	5.2		SF to Springville	35.9	52.9	17.0	
Springville to Provo	34.9	60.0	25.1		Springville to Provo	28.9	42.8	13.9	
Provo to Orem	38.9	45.4	6.5		Provo to Orem	38.9	52.8	13.9	
Orem to Vineyard	34.0	30.0	-4.0		Orem to Vineyard	27.0	30.0	3.0	
Vineyard to AF	40.0	51.4	11.4		Vineyard to AF	46.9	45.0	-1.9	
AF to Lehi	39.0	37.2	-1.8		AF to Lehi	40.0	37.2	-2.8	
Lehi to Point of the Mountain	46.1	43.3	-2.8		Lehi to Point of the Mountain	43.5	43.3	-0.2	
Point of the Mountain to Draper	0.0	25.4	25.4		Point of the Mountain to Draper	0.0	25.4	25.4	
Draper to South Jordan	33.9	32.9	-1.0		Draper to South Jordan	35.0	32.9	-2.1	
South Jordan to Murray Central	46.9	45.3	-1.6		South Jordan to Murray Central	43.9	45.3	1.4	
Murray Central to Salt Lake Central	33.0	39.3	6.3		Murray Central to Salt Lake Central	36.0	48.0	12.0	
Salt Lake Central to North Temple Bridge	9.9	10.7	0.8		Salt Lake Central to North Temple Bridge	10.9	8.9	-2.0	
North Temple Bridge to Woods Cross	39.0	42.6	3.6		North Temple Bridge to Woods Cross	33.0	39.0	6.0	
Woods Cross to Farmington	42.0	50.7	8.7		Woods Cross to Farmington	45.9	57.0	11.1	
Farmington to Layton	40.0	44.3	4.3		Farmington to Layton	45.1	44.3	-0.8	
Layton to Clearfield	36.9	36.9	0.0		Layton to Clearfield	32.0	36.9	4.9	
Clearfield to Roy	48.0	45.9	-2.1		Clearfield to Roy	45.0	45.9	0.9	
Roy to Ogden	33.1	37.8	4.7		Roy to Ogden	28.0	33.1	5.1	
Total	40.0	43.4	3.4		Total	39.1	44.0	4.8	

Table 2.3 FrontRunner Speed Differences - 2050

Northbound Travel Speed (mph)					Southbound Travel Speed (mph)				
Segment	v901-patch2	v902	Difference		Segment	v901-patch2	v902	Difference	
Payson North to SF	50.0	47.0	-3.0		Payson North to SF	48.1	70.5	22.4	
SF to Springville	38.8	52.9	14.1		SF to Springville	35.9	44.0	8.1	
Springville to Provo	34.9	60.0	25.1		Springville to Provo	28.9	50.0	21.1	
Provo to Orem	38.9	52.8	13.9		Provo to Orem	38.9	63.5	24.6	
Orem to Vineyard	34.0	37.5	3.5		Orem to Vineyard	27.0	37.5	10.5	
Vineyard to AF	40.0	60.0	20.0		Vineyard to AF	46.9	51.4	4.5	
AF to Lehi	39.0	37.2	-1.8		AF to Lehi	40.0	42.0	2.0	
Lehi to Point of the Mountain	46.1	57.9	11.8		Lehi to Point of the Mountain	43.5	49.6	6.1	
Point of the Mountain to Draper	0.0	25.4	25.4		Point of the Mountain to Draper	0.0	34.0	34.0	
Draper to South Jordan	33.9	39.5	5.6		Draper to South Jordan	35.0	39.5	4.5	
South Jordan to Murray Central	46.9	58.2	11.3		South Jordan to Murray Central	43.9	50.9	7.0	
Murray Central to Salt Lake Central	33.0	43.2	10.2		Murray Central to Salt Lake Central	36.0	54.0	18.0	
Salt Lake Central to North Temple Bridge	9.9	13.4	3.5		Salt Lake Central to North Temple Bridge	10.9	10.7	-0.2	
North Temple Bridge to Woods Cross	39.0	46.9	7.9		North Temple Bridge to Woods Cross	33.0	52.1	19.1	
Woods Cross to Farmington	42.0	65.0	23.0		Woods Cross to Farmington	45.9	57.0	11.1	
Farmington to Layton	40.0	50.7	10.7		Farmington to Layton	45.1	50.7	5.6	
Layton to Clearfield	36.9	27.7	-9.2		Layton to Clearfield	32.0	44.2	12.2	
Clearfield to Roy	48.0	59.0	11.0		Clearfield to Roy	45.0	59.0	14.0	
Roy to Ogden	33.1	44.0	10.9		Roy to Ogden	28.0	33.1	5.1	
Total	40.0	50.2	10.2		Total	39.1	50.4	11.3	

Table 2.4 FrontRunner Travel Time Differences - 2032 & 2042

Northbound Travel Time (minutes)				Southbound Travel Time (minutes)			
Segment	v901-patch2	v902	Difference	Segment	v901-patch2	v902	Difference
Payson North to SF	4.5	4.8	0.3	Payson North to SF	4.7	4.0	-0.7
SF to Springville	6.7	5.9	-0.8	SF to Springville	7.2	4.9	-2.3
Springville to Provo	8.7	5.1	-3.6	Springville to Provo	10.5	7.1	-3.4
Provo to Orem	8.1	6.9	-1.1	Provo to Orem	8.1	6.0	-2.1
Orem to Vineyard	4.5	5.1	0.6	Orem to Vineyard	5.7	5.1	-0.6
Vineyard to AF	8.8	6.9	-1.9	Vineyard to AF	7.5	7.9	0.3
AF to Lehi	8.7	9.2	0.4	AF to Lehi	8.5	9.2	0.6
Lehi to Point of the Mountain	9.7	7.9	-1.8	Lehi to Point of the Mountain	10.3	7.9	-2.4
Point of the Mountain to Draper	0.0	4.1	4.1	Point of the Mountain to Draper	0.0	4.1	4.1
Draper to South Jordan	5.7	5.9	0.2	Draper to South Jordan	5.6	5.9	0.3
South Jordan to Murray Central	8.7	9.0	0.3	South Jordan to Murray Central	9.3	9.0	-0.3
Murray Central to Salt Lake Central	13.0	10.9	-2.1	Murray Central to Salt Lake Central	11.9	8.9	-3.0
Salt Lake Central to North Temple Bridge	4.7	4.4	-0.4	Salt Lake Central to North Temple Bridge	4.3	5.2	0.9
North Temple Bridge to Woods Cross	12.1	11.1	-1.0	North Temple Bridge to Woods Cross	14.3	12.1	-2.2
Woods Cross to Farmington	10.9	9.0	-1.9	Woods Cross to Farmington	9.9	8.0	-1.9
Farmington to Layton	8.8	8.0	-0.8	Farmington to Layton	7.8	8.0	0.1
Layton to Clearfield	6.0	6.0	0.0	Layton to Clearfield	6.9	6.0	-0.9
Clearfield to Roy	8.7	9.0	0.4	Clearfield to Roy	9.2	9.0	-0.2
Roy to Ogden	7.8	6.9	-1.0	Roy to Ogden	9.3	7.8	-1.4
Total	146.2	136.0	-10.2	Total	151.0	136.1	-14.9

Table 2.5 FrontRunner Travel Time Differences - 2050

Northbound Travel Time (minutes)				Southbound Travel Time (minutes)			
Segment	v901-patch2	v902	Difference	Segment	v901-patch2	v902	Difference
Payson North to SF	4.5	4.8	0.3	Payson North to SF	4.7	3.2	-1.5
SF to Springville	6.7	4.9	-1.8	SF to Springville	7.2	5.9	-1.3
Springville to Provo	8.7	5.1	-3.6	Springville to Provo	10.5	6.1	-4.4
Provo to Orem	8.1	6.0	-2.1	Provo to Orem	8.1	5.0	-3.1
Orem to Vineyard	4.5	4.1	-0.4	Orem to Vineyard	5.7	4.1	-1.6
Vineyard to AF	8.8	5.9	-2.9	Vineyard to AF	7.5	6.9	-0.7
AF to Lehi	8.7	9.2	0.4	AF to Lehi	8.5	8.1	-0.4
Lehi to Point of the Mountain	9.7	5.9	-3.8	Lehi to Point of the Mountain	10.3	6.9	-3.4
Point of the Mountain to Draper	0.0	4.1	4.1	Point of the Mountain to Draper	0.0	3.1	3.1
Draper to South Jordan	5.7	4.9	-0.8	Draper to South Jordan	5.6	4.9	-0.6
South Jordan to Murray Central	8.7	7.0	-1.7	South Jordan to Murray Central	9.3	8.0	-1.3
Murray Central to Salt Lake Central	13.0	9.9	-3.1	Murray Central to Salt Lake Central	11.9	8.0	-4.0
Salt Lake Central to North Temple Bridge	4.7	3.5	-1.2	Salt Lake Central to North Temple Bridge	4.3	4.4	0.1
North Temple Bridge to Woods Cross	12.1	10.1	-2.0	North Temple Bridge to Woods Cross	14.3	9.1	-5.3
Woods Cross to Farmington	10.9	7.0	-3.9	Woods Cross to Farmington	9.9	8.0	-1.9
Farmington to Layton	8.8	7.0	-1.9	Farmington to Layton	7.8	7.0	-0.9
Layton to Clearfield	6.0	8.0	2.0	Layton to Clearfield	6.9	5.0	-1.9
Clearfield to Roy	8.7	7.0	-1.6	Clearfield to Roy	9.2	7.0	-2.2
Roy to Ogden	7.8	5.9	-1.9	Roy to Ogden	9.3	7.8	-1.4
Total	146.2	120.2	-26.0	Total	151.0	118.4	-32.6

2.1.3 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.

2.2 Transit Networks

2.2.1 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

With the Amendment #1 edits, transit projects crossing the border between Salt Lake and Utah counties are now consistent between WFRC and MAG's unfunded need project lists.

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

3 Compare Model Results

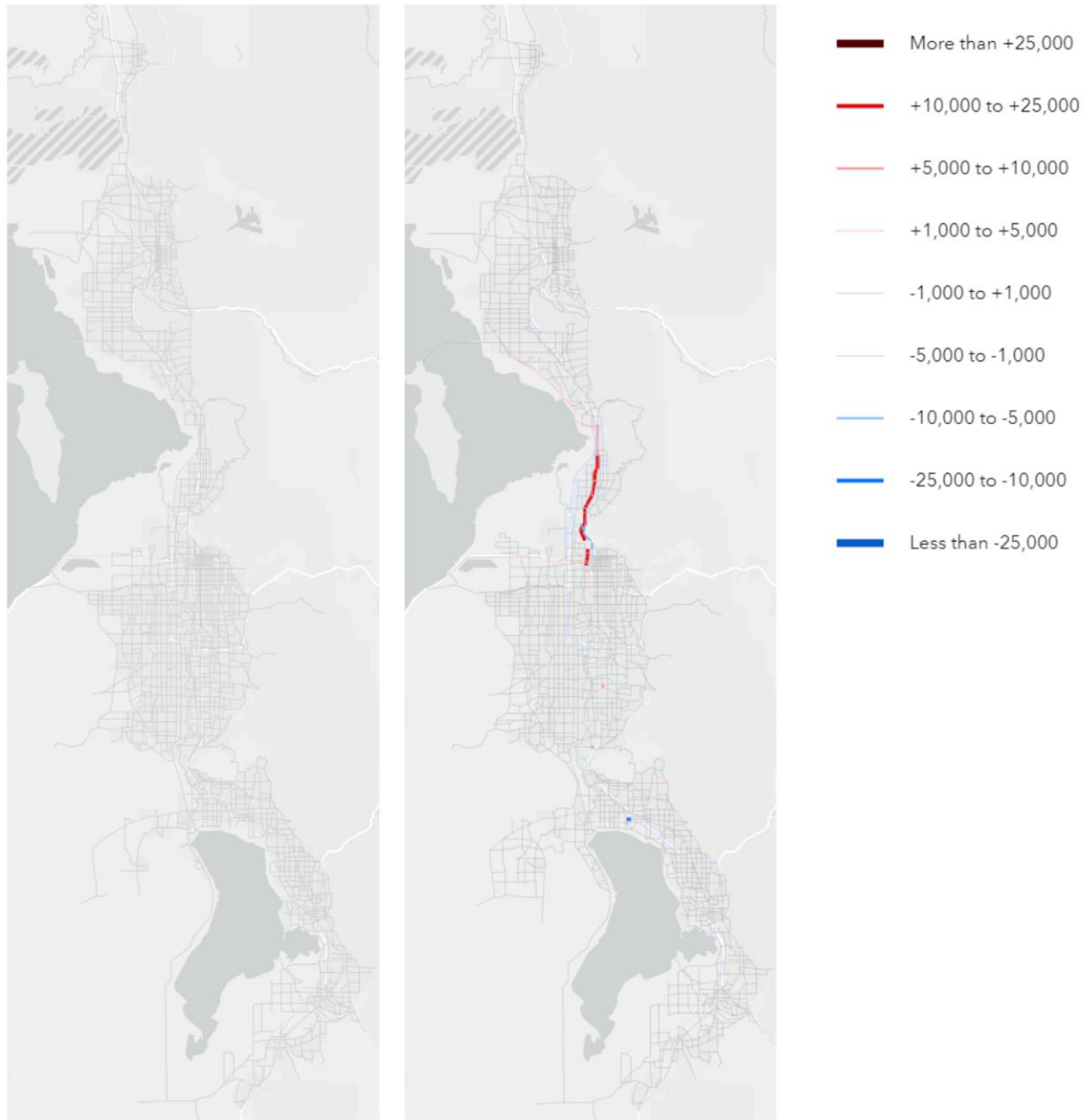
This section compares the model results between version 9.0.2 and version 9.0.1-patch2.

3.1 Road Volume Comparisons

The comparison between daily volumes at the segment level can be found in [Figure 3.1](#) for 2019 and 2050. Decreases in volume in version 9.0.2 compared to version 9.0.1-patch2 are shown in blue, while increases are shown in red. [Figure 3.2](#) shows a similar comparison, displaying medium plus heavy truck volumes.

For 2019, the differences are negligible in all vehicle and truck volumes between the model versions.

For 2050, there are increases in both all vehicle and truck volumes on I-15 in Davis County due to increased general purpose capacity. Other differences are negligible.



(a) 2019

(b) 2050 Fiscally Constrained

Figure 3.1 Daily Volume Comparison - All Vehicles



(a) 2019

(b) 2050 Fiscally Constrained

Figure 3.2 Daily Volume Comparison - Medium+Heavy Truck

3.2 Transit Comparisons

Version 9.0.2 showed a slight increase in transit trips in 2042 and 2050 compared to version 9.0.1-patch2 (see [Figure 3.3](#) through [Figure 3.9](#)). The total transit trips 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.

Commuter Rail saw the greatest increase in trips, some of which were new trips and some that had shifted from Express Bus to Commuter Rail. The shift from Express Bus to Commuter Rail is primarily due to the improvements in commuter rail speeds and to the additional stop in Bluffdale. These improvements make Commuter Rail more attractive and accessible which draws trips away from Express Bus since they compete for trips in similar markets.

BRT saw a slight increase in future trips. Light Rail, Core Route, and Local Bus trips remained relatively unchanged.

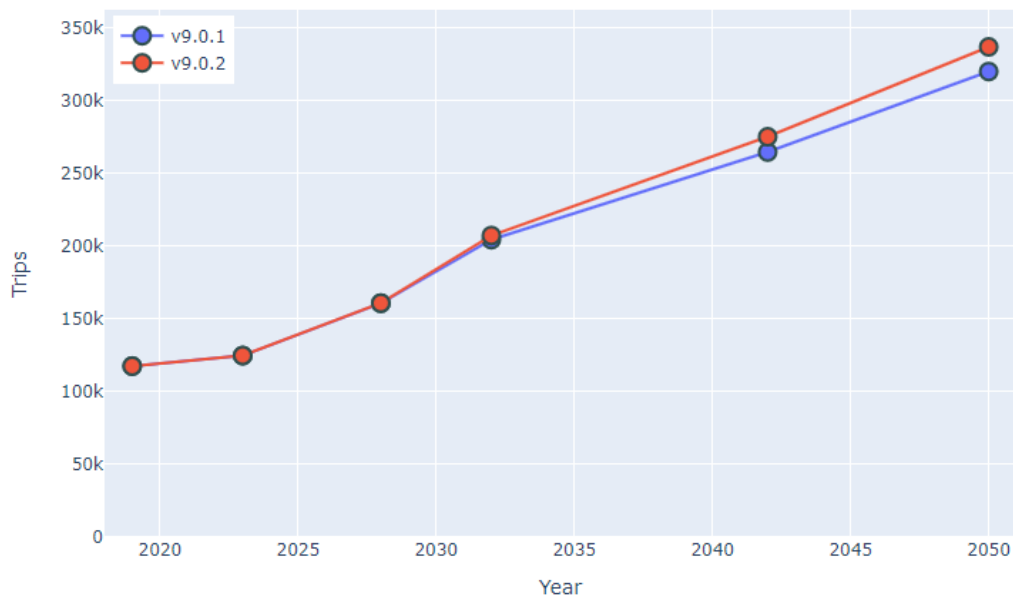


Figure 3.3 Daily Transit Trips - All Modes

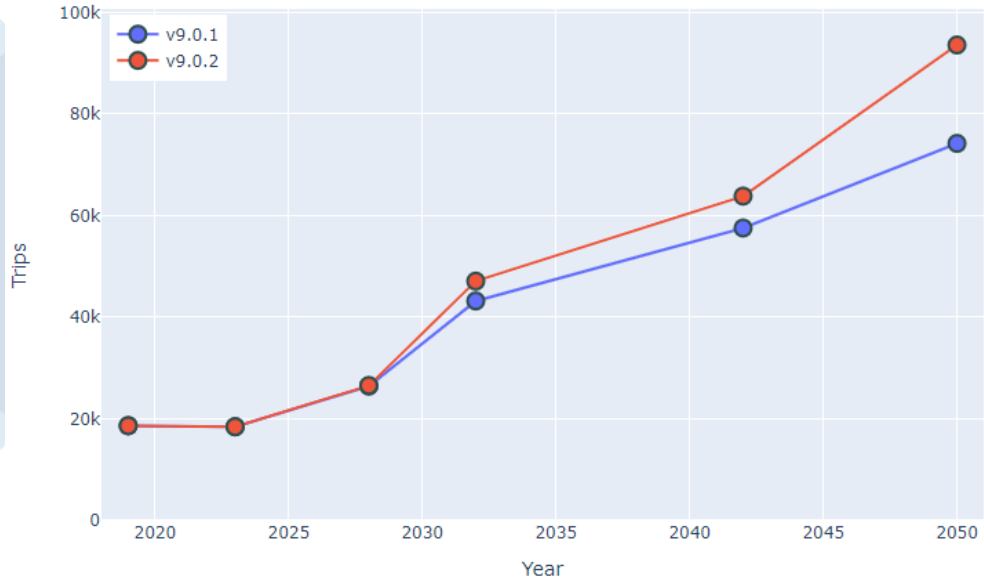


Figure 3.4 Daily Transit Trips - Commuter Rail

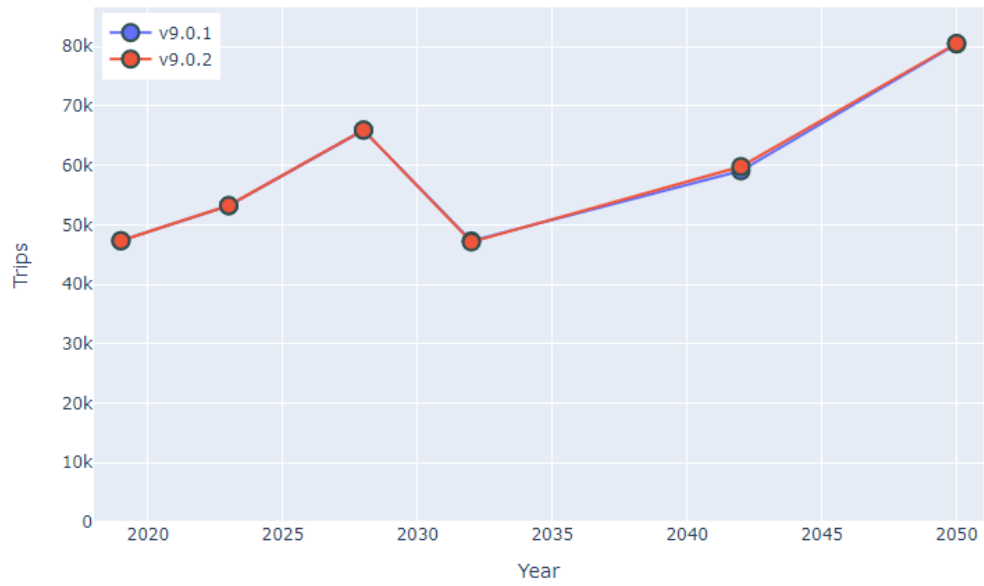


Figure 3.5 Daily Transit Trips - Light Rail

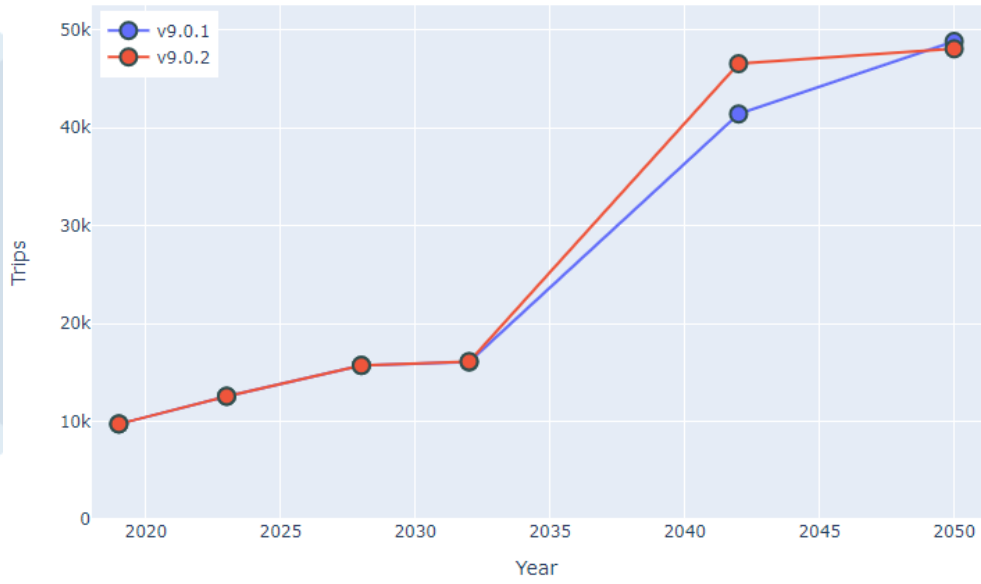


Figure 3.6 Daily Transit Trips - Bus Rapid Transit

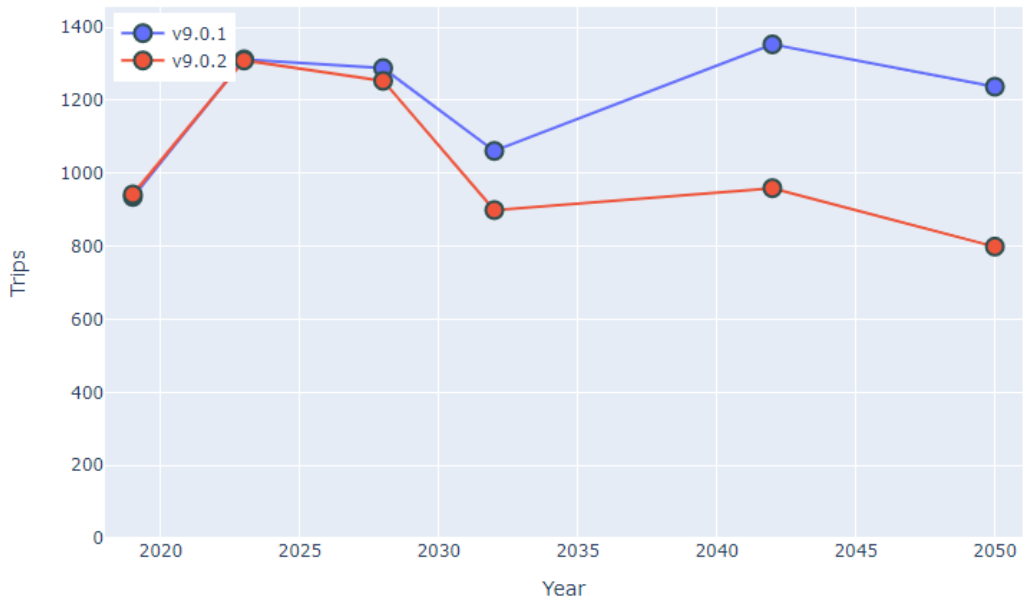


Figure 3.7 Daily Transit Trips - Express Bus

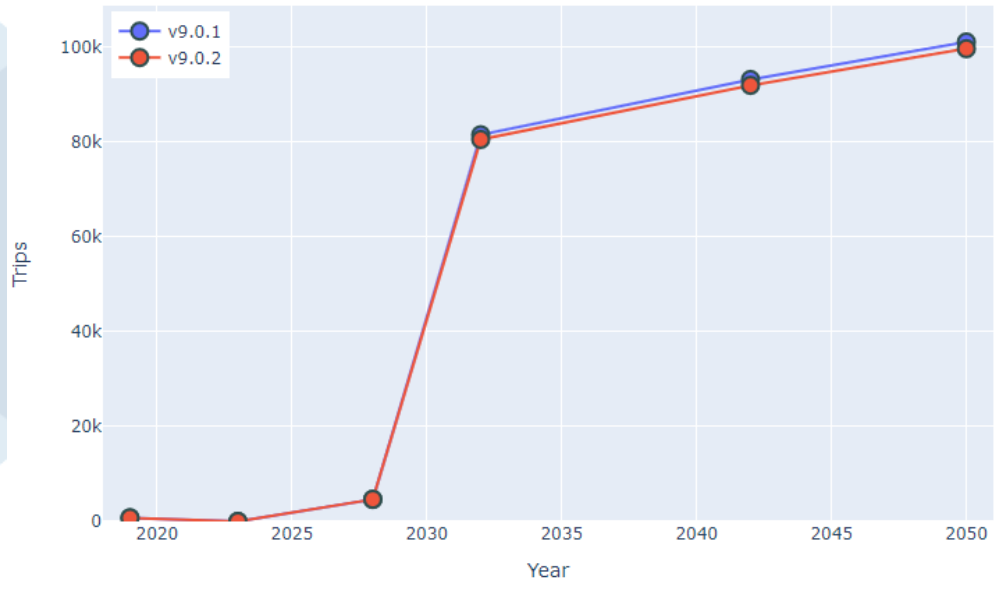


Figure 3.8 Daily Transit Trips - Core Bus

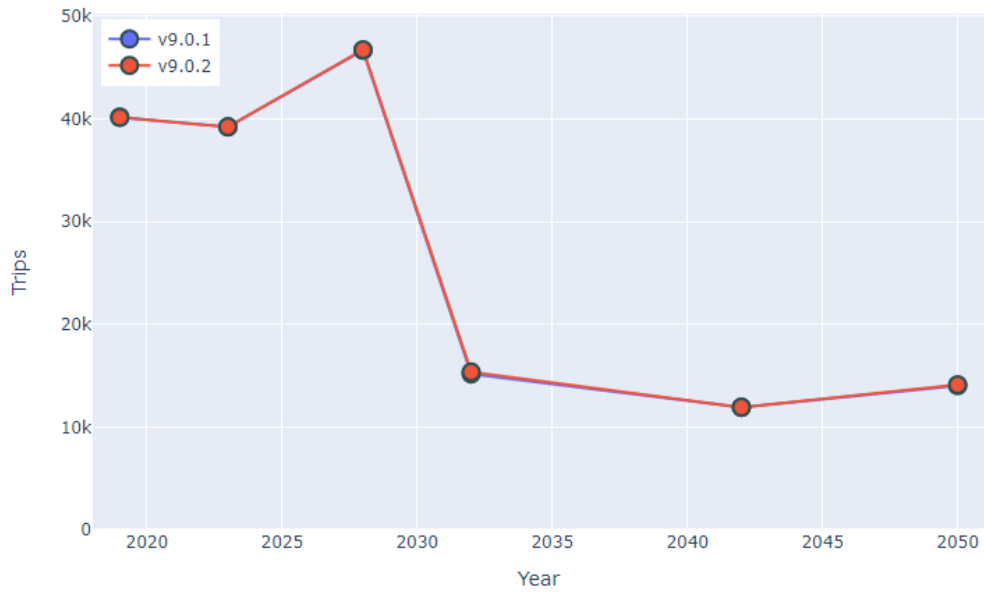


Figure 3.9 Daily Transit Trips - Local Bus