Heber Valley Corridor
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX 1A

Existing and 2050 No-build Traffic Report

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TECHNICAL MEMORANDUM

DATE:	March 25, 2025
TO:	HDR
FROM:	Parametrix
SUBJECT:	Existing and 2050 No Build Traffic and Safety Analysis
CC:	
PROJECT NUMBER:	S-R399(310) PIN 17523
PROJECT NAME:	Heber Valley Corridor EIS

INTRODUCTION

This memorandum documents the traffic and safety conditions for existing and 2050 No Build scenarios to support the Heber Valley Corridor EIS. These efforts update the analysis conducted previously in the study and documented in the previous May 2022 Existing and 2050 No Build Traffic and Safety Analysis memo.

The revised analysis is in response to updated traffic forecasts for the region. The forecasts are a result of an updated regional travel demand model (Summit-Wasatch Travel Demand Model v2.1 2024-03-28). Regional travel demand models typically undergo comprehensive updates every four years coinciding with the four-year long range transportation plan update cycle. This model update accompanied the development and adoption of the 2023 Utah Department of Transportation (UDOT) Long-range Transportation Plan (LRTP) and the 2023 Wasatch Back Rural Planning Organization (Wasatch Back RPO) 2023 Regional Transportation Plan (RTP). Model updates included revisions to growth assumptions for Summit and Wasatch Counties. The growth assumption revisions were an outcome of coordination between regional planning partners: UDOT, Wasatch County, Heber City, Mountainland Association of Governments (MAG), and others. The growth assumptions were revised according to statewide projections, local long-range land use plans, and locally approved developments.

This memorandum documents the data collected to analyze existing conditions, including traffic data and crash data. The traffic data is input into a traffic simulation program to develop measures of effectiveness for existing conditions. Then, the regional travel demand model is utilized to develop traffic volume forecasts for a 2050 horizon year. While preparing the regional travel demand model, the existing traffic data is used to calibrate the model and improve its accuracy for predicting future traffic volumes. Finally, the 2050 traffic forecasts are inserted into traffic simulation programs to compute 2050 measures of effectiveness. In this report, existing conditions generally represents traffic data from 2019.

DATA COLLECTION

Traffic data for the project were collected by UDOT in July and August 2019. Traffic data was collected by video for turning movement counts, by roadway tubes for weekly ADT and vehicle classification counts, and by Bluetooth sensors for origin-destination counts and travel times.

Traffic Counts and Vehicle Classifications

Turning movement counts were conducted for weekday AM and PM peak periods at the following intersections:

1. US-40/SR-32
2. US-40 (Main Street)/500 North
3. US-40 (Main Street)/Center Street
4. US-40 (Main Street)/100 South
5. US-40 (Main Street)/600 South
6. US-40 (Main Street)/US-189
7. US-189/1300 South/Heber Parkway

Turning movement counts were collected during the weekday AM and PM peak periods over the following five days in 2019:

- Friday, July 26, 2019
- Sunday, July 28, 2019
- Wednesday, August 14, 2019
- Friday, August 16, 2019
- Sunday, August 18, 2019

Vehicle tube counts were collected for two, one-week periods in July and August 2019. The tube counts collected both vehicle volumes as well as vehicle classification. Tube counts were conducted at locations along US-40, SR-32, and US-189 near the extents of the Heber Valley. Additional tube count data was also collected on eight north-south streets in Heber City, including Main Street, between 300 South and 400 South. The tube count data for the Main Street location between 300 South and 400 South was accompanied by video recordings which helped to refine the accuracy of the tube count vehicle classification.

Bluetooth Origin/Destination and Travel Time Data

Travel time data along the corridor was analyzed using the UDOT's vehicle probe data to summarize average travel times and speeds along the corridor segments. Probe data represents anonymized Bluetooth information from vehicles passing a sensor. When a network of probe data sensors is temporarily setup in a study area, travel time between two points can be calculated based on the difference in times of when a Bluetooth address is detected by two sensors. The travel time segments from the UDOT vehicle probe data include:

A. US-40 From SR-32 to 500 North (southbound)
B. US-40 From 500 North to SR-32 (northbound)
C. Main St (US-40) From 500 North to US-189 (southbound)
D. Main St (US-40) From US-189 to 500 North (northbound)
E. US-189 From US-40 to SR-113 (southbound)
F. US-189 From SR-113 to US-40 (northbound)

Crash Data

Crash data for the most recently available three years of crash data (2016-2018) was obtained from the UDOT Traffic & Safety Division for the Heber Valley at the time of the original analysis of existing conditions. Using three years of crash data represents a balance between normalizing the year-to-year fluctuations in crash patterns and avoiding data that is too old to accurately reflect current roadway and traffic conditions. Data were compiled and analyzed to better understand the safety trends and investigate potential mitigations. Results are presented in a subsequent section. More recent crash information for the study area is provided in the Safety Section.

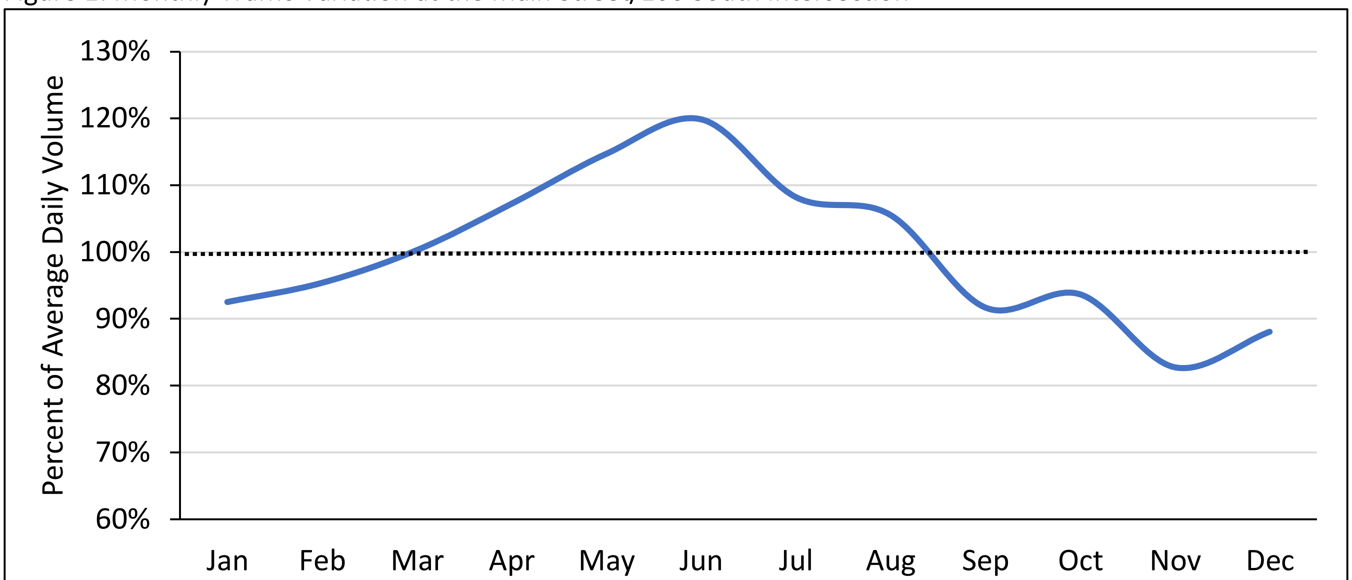
EXISTING CONDITIONS TRAFFIC ANALYSIS

Analysis Time Period

The Heber Valley is subject to seasonal traffic variation with higher traffic volumes in summer months than in winter months. Figure 1 shows the monthly variation of traffic volumes at the Main Street/100 South intersection according to UDOT Automated Traffic Signal Performance Measure (ATSPM) data. As can be seen in Figure 1, traffic volumes are above the annual average for five months of the year in downtown Heber City which is likely related to the high amount of summer recreation-related traffic in the area.

The *Highway Capacity Manual, Version 7* (HCM) states that selection of the appropriate analysis timeframe is a "compromise between providing adequate operations for every hour of the year and providing economic efficiency." (Page 3-11) In the case of the Heber Valley, choosing a timeframe to represent average seasonal conditions could result in a facility that is below capacity for five months of the years. Thus, the summer timeframe was selected for analysis since it would accommodate most traffic conditions experienced all year and is consistent with past studies conducted by UDOT.

Figure 1: Monthly Traffic Variation at the Main Street/100 South Intersection



Traffic Volumes

Analysis of the weekday peak hour is the typical practice for traffic analysis. The midweek count on Wednesday, August 14 was chosen as the starting point to develop the typical summer weekday traffic volume since it was observed to typically have higher traffic volumes than Monday or Tuesday but lower traffic volumes than Thursday or Friday. From the traffic data, a system-wide peak hour of 5:00 to 6:00 PM was identified as the peak hour of traffic volume for a weekday.

Next, to determine if these were representative of typical summer traffic conditions on Main Street, UDOT ATSPM data for the 100 South/Main Street intersection was gathered for several summer days including Wednesday, August 14. The weekday daily and PM peak hour intersection volumes from the ATSPM data were compared to determine the relative magnitude of August 14 volumes in the context of other summer days. Table 1 summarizes the total entering intersection volume for each time frame.

Table 1: UDOT ATSPM Traffic Volume Comparison at 100 South/Main Street

	Weekday Daily			Weekday PM Peak Hour		
Location	Volume	Volume Difference	Percent Difference	Volume	Volume Difference	Percent Difference
Wednesday, August 14, 2019	*32,368*	-	-	*2,481*	-	-
Thursday, June 20, 2019	36,585	4,217	13.0%	2,711	230	9.3%
Thursday, August 1, 2019	36,499	4,131	12.8%	2,496	15	0.6%
Wednesday, June 3, 2020	34,324	1,956	6.0%	2,641	160	6.4%
Thursday, June 18, 2020	36,604	4,236	13.1%	2,800	319	12.9%

As shown in Table 1, the August 2019 weekday had lower daily and weekday PM peak hour traffic volumes than the comparison weekdays in summer 2019 and summer 2020. Daily traffic volumes for the comparison dates were approximately six to 13 percent greater and weekday PM peak hour traffic volumes were approximately 0.5 to 13 percent higher than the August 2019 count date.

Since the August 2019 weekday intersection turning movement counts were lower than the average weekday volumes experienced on other summer weekdays, additional traffic volumes were added to the northbound through and southbound through movements counted along Main Street to better represent the typical summer weekday conditions. These added volumes resulted in an increase in weekday PM peak hour traffic volumes of approximately 15 percent at the Main Street/100 South intersection. The existing weekday PM peak hour traffic volumes are shown in Figure 2.

Turning movement volumes were not collected by UDOT for unsignalized intersections on US-40 between SR-30 and 500 North. Instead, turning movement estimates were developed from turning movement data provided in traffic studies submitted to UDOT by development groups. Figure 3 summarizes these volumes.

Figure 2: Weekday PM Peak Hour Turning Movement Volumes

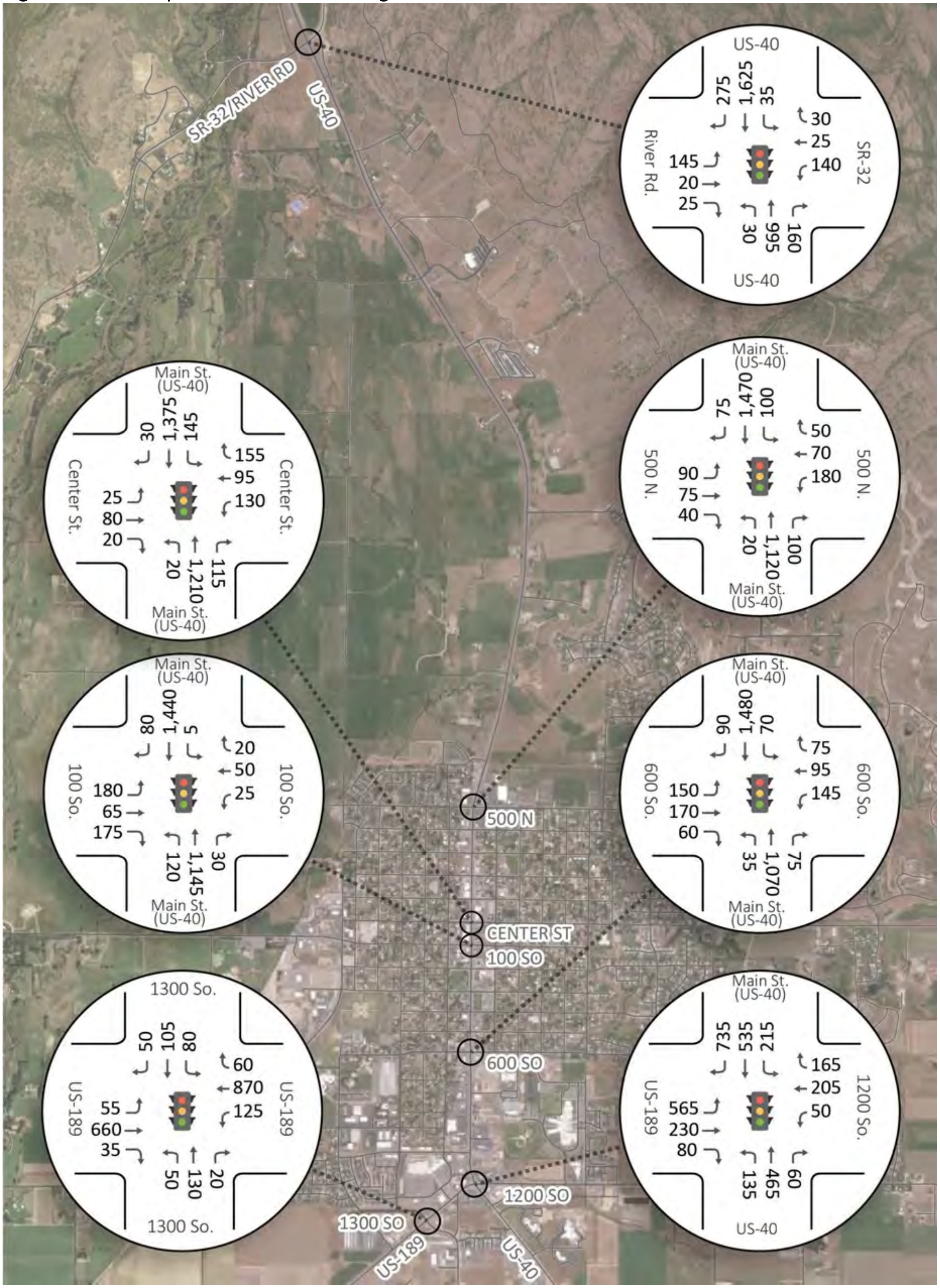
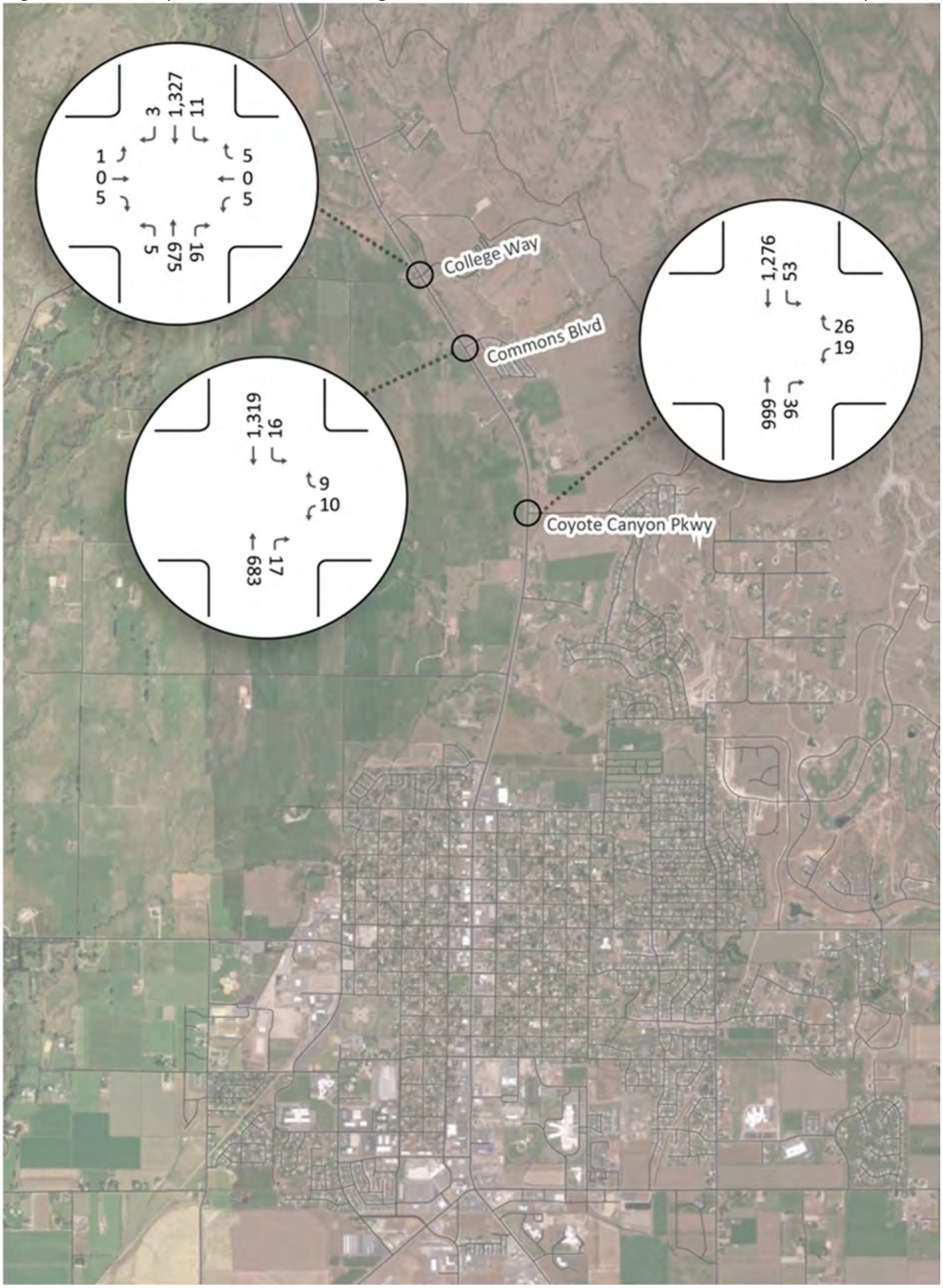


Figure 3: Weekday PM Peak Hour Turning Movement Volumes North of Downtown Heber City

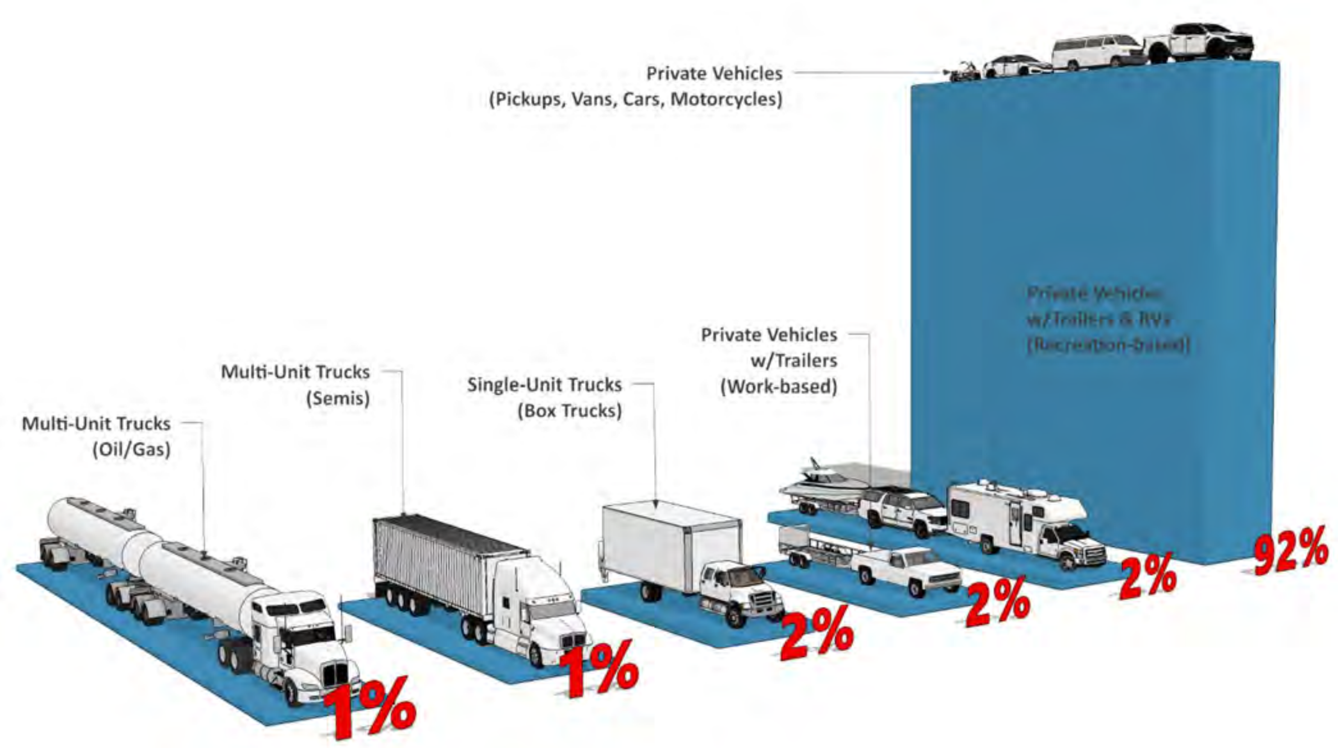


Vehicle Classification

Heber City Main Street experiences a unique traffic flow composition. US-40 is the primary route for oil/gas tanker trucks carrying crude oil from the Uinta Basin to refineries on the Wasatch Front. Likewise, there is a significant amount of recreation traffic on Main Street due to the proximity to several reservoirs, National Forests, and wilderness areas. These vehicles have an impact on traffic flow and the video accompanying the tube count on Main Street between 300 South and 400 South was manually reviewed to further separate vehicle classifications into more detail and better reflect actual conditions.

For example, oil/gas tanker trucks were separated from other multi-unit trucks into their own vehicle classification. Additionally, individual classifications were created for private vehicles towing trailers – whether recreation-based or work-based. These new vehicle classifications help account for how the unique lengths and operational characteristics of these vehicles affect traffic operations. The type and percentage of each vehicle class used in the traffic analysis for weekday PM peak hour conditions is shown in Figure 4.

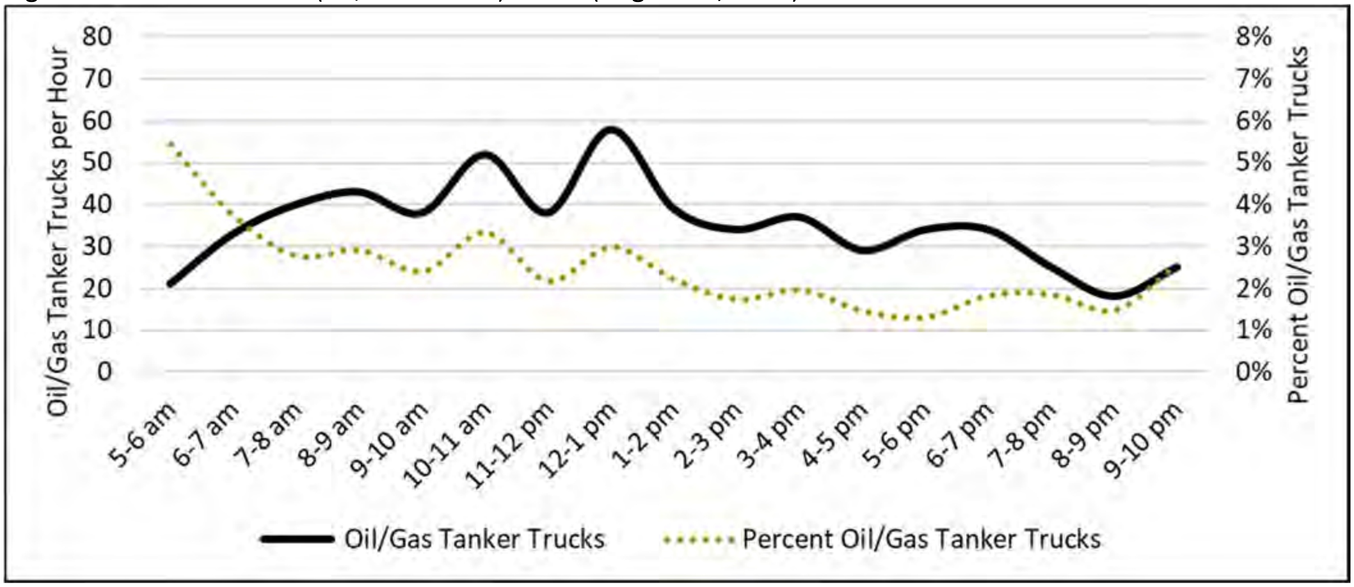
Figure 4: Weekday PM Peak Hour Vehicle Type and Frequency



The volume and percentage of oil/gas tanker trucks varies on Heber Main Street throughout the day. Figure 5 shows the hourly distribution of oil/gas tanker trucks counted from video analysis. Oil/gas tanker truck volumes are highest during the midday hours, approaching nearly 60 trucks per hour. The PM peak hour of 5:00 to 6:00 PM experiences about 30 to 40 oil/gas tanker trucks. Assuming a nominal amount of oil/gas tanker trucks occur outside the hours of the video analysis (before 5:00 AM and after 10:00 PM), the total oil/gas tanker trucks for a 24-hour period is estimated at 600 to 700 trucks.

Figure 5 also shows the percentage of oil/gas tanker trucks as compared to total traffic volumes. The percentage of oil/gas tanker trucks is lower during the PM peak hour of 5:00 to 6:00 PM due to both oil/gas tanker truck volumes being lower than mid-day as well as the influx of private vehicle commuter traffic. During very early morning hours (before 7:00 AM) the percentage of oil/gas tanker trucks can exceed five percent due to the relatively low number of total vehicles on the roadway.

Figure 5: Multi-Unit Truck (Oil/Gas Tanker) Count (August 14, 2019)



Travel Times

Data from the vehicle probe sensors were analyzed for non-holiday, midweek days during July and August 2019 for the weekday PM peak hour. For each of the weekdays analyzed (25 total days), the data provider summarized the travel times into a single average travel time for the peak hour. This allowed the travel times to be summarized on an hourly basis for each day. By summarizing data over the full peak hour, variances in the traffic flow that could be caused by signal cycle failures or faster-than-normal travel conditions prior to or following the heaviest peak congestion periods are averaged out over the entire peak hour. Table 2 shows each of the routes and the average weekday PM peak hour travel time and travel speed.

Table 2: Existing Bluetooth Probe Data Travel Times

Travel Time Route	Length (miles)	Weekday PM Peak Hour		Prevailing Posted Speed Limit (mph)
		Average Travel Time	Average Vehicle Speed (mph)	
A. **US-40** From SR-32 to 500 N	3.2	4:30	43	55
B. **US-40** From 500 N to SR-32	3.2	4:10	46	55
C. **Main St (US-40)** From 500 N to US-189	1.5	3:55	21	35
D. **Main St (US-40)** From US-189 to 500 N	1.5	2:50	30	35
E. **US-189** From US-40 to SR-113	4.1	4:50	51	60
F. **US-189** From SR-113 to US-40	4.1	4:40	54	60

As shown in Table 2, the travel time segments outside of the Heber City downtown area on the longer highway segments (Segments A, B, E, and F) typically have higher speeds than those located within the Heber City downtown area. Within the Heber City downtown area, average vehicle speeds along Main Street were shown to be approximately 21 mph traveling southbound and 30 mph traveling northbound.

However, along Main Street traveling northbound, it was found the north half of the corridor had average travel speeds of 44 mph while the southern portion had average travel speeds of 26 mph. Based on conversations with UDOT staff, the probe data along surface streets, such as on Heber City Main Street, which have a higher amount of vehicles starting and stopping due to traffic signals, turning maneuvers, and yielding to other vehicles or pedestrians, have less accuracy than free flow highway segments. Due to this, the probe data was used only for reference and not used for calibration to the travel times within the traffic analysis models.

Traffic Operations

Traffic operations for US-40 through downtown Heber City (500 North to US-189) were evaluated using a VISSIM microsimulation model of the area and measured using several performance metrics. An existing weekday PM peak hour VISSIM model was built for UDOT for a previous study and provided to the study team. The model was updated with existing signal timing, traffic volumes, and vehicle routing with the resulting calibrated model and outputs reviewed by the UDOT traffic operations group. Performance operations metrics from the existing weekday PM peak hour model used to evaluate traffic conditions include: vehicle travel times, intersection level of service (LOS), arterial LOS, and queuing. Additional detail about the VISSIM model calibration process can be found in the *Heber Valley Parkway EIS Existing Conditions Calibration Report*.

Outside of the downtown Heber City Main Street area, traffic operations are less complex. Existing signals and locations for future signals have greater spacing. Likewise, there is less pedestrian activity. Furthermore, these areas were not part of the VISSIM model built for the previous UDOT study. Traffic analysis for areas beyond Heber City Main Street were primarily conducted with the traffic analysis software Synchro.

Vehicle Travel Times

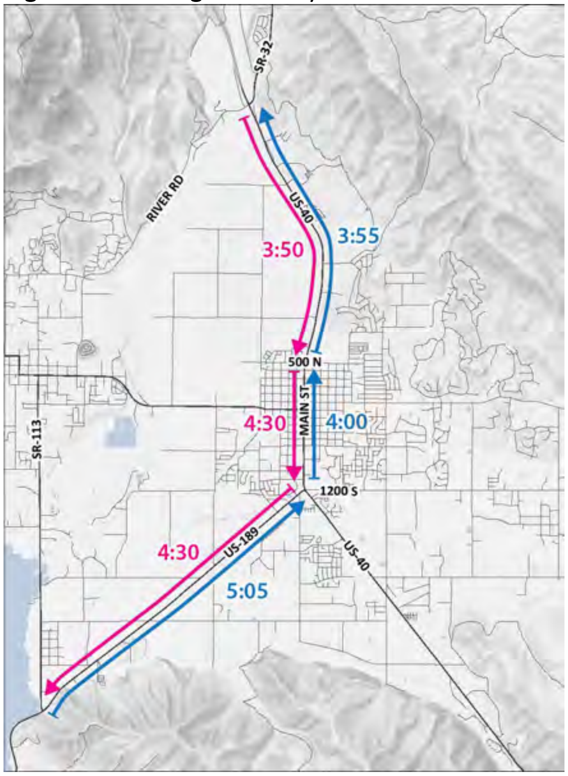
Vehicle travel times were measured throughout the VISSIM network along several northbound and southbound segments. The results of the travel time analysis are shown in Table 3.

Table 3: Existing Weekday PM Peak Hour Travel Time Comparison

Travel Time Segment	Length (miles)	Average Travel Time (mm:ss)	Average Travel Speed (mph)
A. **US-40** From SR-32 to 500 N	3.2	3:50	50
B. **US-40** From 500 N to SR-32	3.2	3:55	49
C. **Main St (US-40)** From 500 N to US-189	1.5	4:30	20
D. **Main St (US-40)** From US-189 to 500 N	1.5	4:00	22
E. **US-189** From US-40 to SR-113	4.1	4:30	56
F. **US-189** From SR-113 to US-40	4.1	5:05	50

As shown in Table 3, north of 500 North (segments A and B) and along US-189 (segments E and F), the average travel speed is close to the posted speed limit on these highway segments. In the downtown Heber City area, the travel speed is lower than the 35 mph posted speed limit. This is due to a combination of slowing caused by traffic signals, closely-spaced intersections, and traffic congestion along the corridor. The travel time results are visualized in Figure 6. It should be noted that these travel times should not be directly compared to the Bluetooth probe travel times presented in Table 2 due to the probe data sampling and data quality issues mentioned previously.

Figure 6: Existing Weekday PM Peak Hour Travel Time



Intersection LOS

Intersection LOS was measured using the node evaluation results from the VISSIM model in the downtown core. Intersection LOS was based on average vehicle delay at each traffic signal with the cutoff thresholds from the HCM used. Intersection LOS outside the downtown core was measured using Synchro delay and LOS results which are comparable to the HCM. Intersection LOS is described on an A through F scale with LOS A indicating freeflow conditions with minimal delay and LOS F indicating intersection failure. Typically, LOS A through LOS D represent acceptable operations during the peak hour. A summary of the average vehicle delay cutoff thresholds from the HCM are shown in Table 4. Existing weekday PM peak hour LOS for the signalized intersections from the VISSIM network and Synchro analysis is summarized in Table 5.

As shown in Table 5, all of the traffic signals in the downtown core currently operate at LOS C or better during the existing weekday PM peak hour. The Main Street/100 South intersection has the highest amount of average vehicle delay with 30 seconds per vehicle of delay during the weekday PM peak hour.

Outside the downtown core, all intersections operate at LOS D or better. The US-40/College Way intersection has the highest amount of average vehicle delay with 32 seconds per vehicle of delay.

Table 4: Intersection LOS Definition

LOS	Unsignalized Intersection Average Delay (sec/veh)[1]	Signalized Intersection Average Delay (sec/veh)
LOS A	0 -10	0 - 10
LOS B	10 - 15	10 – 20
LOS C	15 – 25	20 – 35
LOS D	25 - 35	35 – 55
LOS E	35 - 50	55 – 80
LOS F	> 50	> 80

1. Reported for the worst stop or yield-controlled approach
Source: HCM 7th Edition

Table 5: Existing Weekday PM Peak Hour Intersection LOS

Intersection	Average Vehicle Delay (sec/veh)	LOS
US-40/SR-32	18	LOS B
US-40/College Way[1]	32	LOS D
US-40/Commons Blvd[1]	14	LOS C
US-40/Coyote Canyon Pkwy[1]	14	LOS C
Main St (US-40)/500 N	17	LOS B
Main St (US-40)/Center St	24	LOS C
Main St (US-40)/100 S	30	LOS C
Main St (US-40)/600 S	18	LOS B
Main St (US-40)/US-189	29	LOS C
1300 S/US-189	10	LOS A

1. Unsignalized intersection. Delay and LOS reported for the worst stop or yield-controlled approach

Arterial LOS

The arterial LOS was also evaluated on each of the street segments between the intersections. Using the segment speeds, LOS was calculated using HCM criteria. Similar to intersection LOS, arterial LOS is based on an A through F scale with thresholds based on the average speed of vehicles compared to the segment's free-flow speed or the posted speed limit. A summary of the LOS definitions is included in Table 6.

Table 6: Arterial LOS Definition

LOS	Base Free-Flow Speed or Speed Limit						
	25 mph	30 mph	35 mph	40 mph	45 mph	50 mph	55 mph
LOS A	>20	>24	>28	>32	>36	>40	>44
LOS B	>17	>20	>23	>27	>30	>34	>37
LOS C	>13	>15	>18	>20	>23	>25	>28
LOS D	>10	>12	>14	>16	>18	>20	>22
LOS E	>8	>9	>11	>12	>14	>15	>17
LOS F	<8	<9	<11	<12	<14	<15	<17

Source: HCM 7th Edition

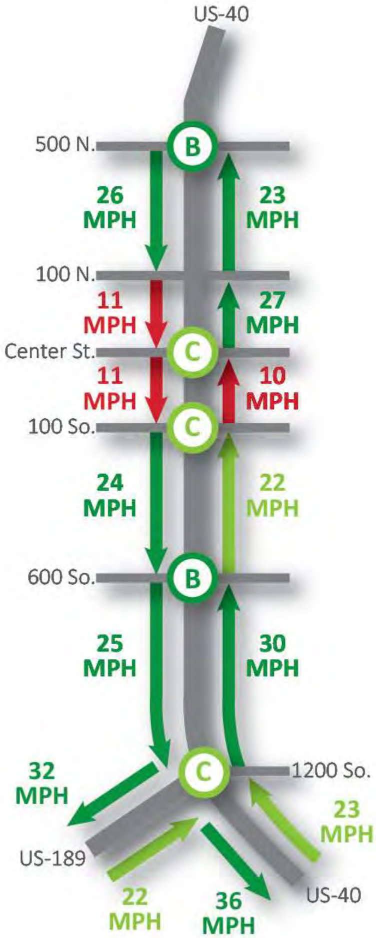
Table 7and Figure 7 summarize arterial LOS results. As shown in Table 7, the southbound road segments from 500 North to Center Street and from Center Street to 100 South and the northbound segment from 100 South to Center Street currently operate at LOS F during the weekday PM peak hour conditions. This is consistent with observed traffic flow, where queueing and vehicle stoppages were highest in the areas surrounding the 100 South and Center Street intersections. Southbound vehicles were observed to queue back beyond the 100 South and Center Street traffic signals. The rolling queue would typically take two to three signal cycles to clear both intersections with queues of approximately 1,000 to 1,200 feet from 100 South observed. Similarly, for northbound vehicles, stopped and slow-moving vehicles cause the average speed on the 100 South to Center Street segment to operate at LOS F conditions. All other roadway segments currently operate at LOS C or better.

It should be noted that the average speeds reported for the arterial LOS differ from the speeds reported on the similar travel time segments due to differing starting and stopping points for the travel times and inclusions of travel time up to and through intersections.

Table 7: Existing Weekday PM Peak Hour Street Arterial LOS

	Street Segment	Average Segment Speed (mph)	LOS
Southbound	US-40: From 500 N to 100 N	26	LOS B
	US-40: From 100 N to Center St	11	LOS F
	US-40: From Center St to 100 S	11	LOS F
	US-40: From 100 S to 600 S	24	LOS B
	US-40: From 600 S to US-189	25	LOS B
	US-40: South of US-189	36	LOS A
	US-189: Southwest of US-40	32	LOS B
Northbound	US-189: Northeast to US-40	22	LOS C
	US-40: North to US-189	23	LOS C
	US-40: From US-189 to 600 S	30	LOS A
	US-40: From 600 S to 100 S	22	LOS C
	US-40: From 100 S to Center St	10	LOS F
	US-40: From Center St to 100 N	27	LOS B
	US-40: From 100 N to 500 N	23	LOS B

Figure 7: Existing PM Peak Hour Intersection and Arterial LOS Summary



Intersection Queuing

In the VISSIM model, vehicle queues were measured at each intersection during the weekday PM peak hour. Consistent with observations from the field and from feedback from project stakeholders, the longest vehicle queues within the model were on southbound approaches. A summary of select significant queues at major intersections at the study intersections from the VISSIM model are shown in Figure 8.

For drivers approaching the 500 North intersection in the southbound direction, the average queue is 275 feet with a 95th percentile queue of 375 feet during the weekday PM peak hour. At the 100 South intersection, average southbound queues were measured at 300 feet within the traffic model with the 95th percentile queuing backing through the Center Street intersection. Similarly, at the Center Street intersection, the average vehicle queue in the VISSIM model for the southbound through movement extended approximately 550 feet north of the intersection while the 95th percentile queue extended 750 feet from the intersection stop bar, approximately 1.5 blocks. All other queues within the microsimulation model were determined to typically fit within the designated storage pocket and would dissipate each signal cycle which was consistent with observed conditions in the field.

Figure 8: Existing PM Peak Hour Intersection Queuing Summary

2050 NO BUILD TRAFFIC ANALYSIS

Traffic Forecasts

The Summit-Wasatch Travel Demand Model v2.1 2024-03-28 was used for the purposes of generating 2050 No Build traffic forecasts for use in the VISSIM traffic simulation model. Version 2.1 is an update to Version 1.0 used for previous iterations in the Heber Valley Corridor EIS. Version 2.1 incorporates the projects proposed in the 2023 UDOT LRTP and some planned local road projects. The UDOT LRTP was adopted since the previous No Build analysis was completed in 2022. Regional travel demand models typically undergo comprehensive updates every four years coinciding with the four-year long range plan update cycle.

Version 2.1 model updates included revisions to growth assumptions for Summit and Wasatch Counties. The growth assumption revisions were an outcome of coordination between regional planning partners: UDOT, Wasatch County, Heber City, MAG, and others. The growth assumptions were revised according to statewide projections, local long-range land use plans, and locally approved developments. The model is a traditional four-step travel demand model consisting of trip generation, trip distribution, model split, and trip assignment. The following sections document the modeling process.

Model Refinements

Refinements are typically applied to travel demand models for project applications to better represent existing travel patterns and improve forecasts at the project level. Several refinements were applied to v1.0 of the Summit-Wasatch model for previous No Build analysis conducted for the Heber Valley Corridor EIS. Revisions were made to traffic analysis zones (TAZ), socioeconomic (SE) inputs, and highway network. Many of these revisions were adopted into v2.1 and therefore automatically carried into this updated 2050 No Build analysis. The revisions are documented in the May 2022 version of the Existing and 2050 No Build Traffic and Safety Analysis memo. No further refinements were applied to v2.1 for this project.

Future Projects

The projects within the UDOT 2023 LRTP and some projects within the Wasatch Back RPO RTP are represented in the v2.1 travel demand model. Future projects affiliated with a planned western Heber Bypass were removed from the model to create the No Build condition Table 8 lists all of the projects assumed in the 2050 No Build scenario.

Table 8: Assumed Projects in the 2050 No Build Model

Name	Extent	Improvement
Heber City East Bypass	Center Street to US-40	New 2 & 3 lane road
North Village Connector	Coyote Canyon Parkway to SR-32	New roadway
500 East	700 South to 600 South	New road
US-40	US-189 to Center Creek Rd	Widen to 5 lanes
US-189	Wallsburg to Charleston	Widen to 4 lanes
SR-113	River Rd to Southfield Rd (MP 4.2 to 6.3)	Widen to 5 lanes

Model Results

The Summit Wasatch model contains various seasonal parameters to represent trip generation rates and travel patterns for different times of year. For 2019 base year and 2050 No Build forecasts, the Summer Season run parameters were used to model typical weekday conditions consistent with the chosen analysis season discussed previously.

Base-Year Correction

A base-year correction was developed for model outputs to produce more accurate travel forecasts. The correction was created by comparing the difference between 2019 traffic counts and base year (2019) travel demand model volume outputs. The correction is then carried forward to the 2050 travel demand model outputs, with the assumption being that similar discrepancies will persist through forecast years of the model. Figure 9 shows the base-year corrections applied to generate the 2050 forecasts.

2050 No Build Forecasts

2050 No Build conditions were modeled using the revised Heber Valley model and forecasts were produced using the correction factor. Figure 10 shows the 2050 Heber Valley No Build forecasts with model v2.1. Compared to v1.0, traffic volumes increase in most areas due to updated growth assumptions for Summit County and Wasatch County. For example, growth assumed in areas along US-40 north of Heber City result in a 30 percent increase in traffic volume on north US-40 compared to v1.0. Meanwhile, traffic volumes on Heber Main Street increased by 10 percent compared to v1.0.

Figure 9: Correction Factor

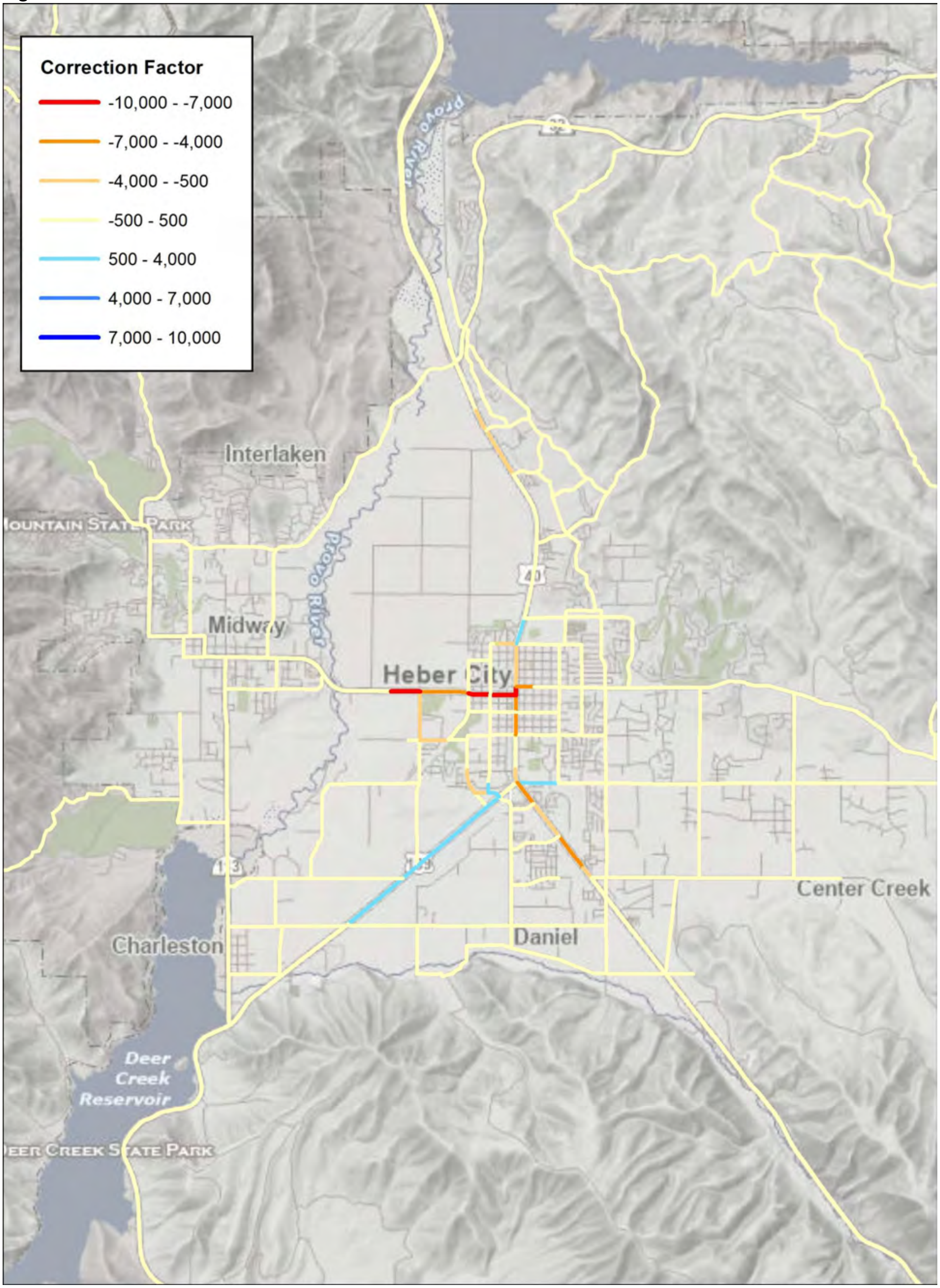
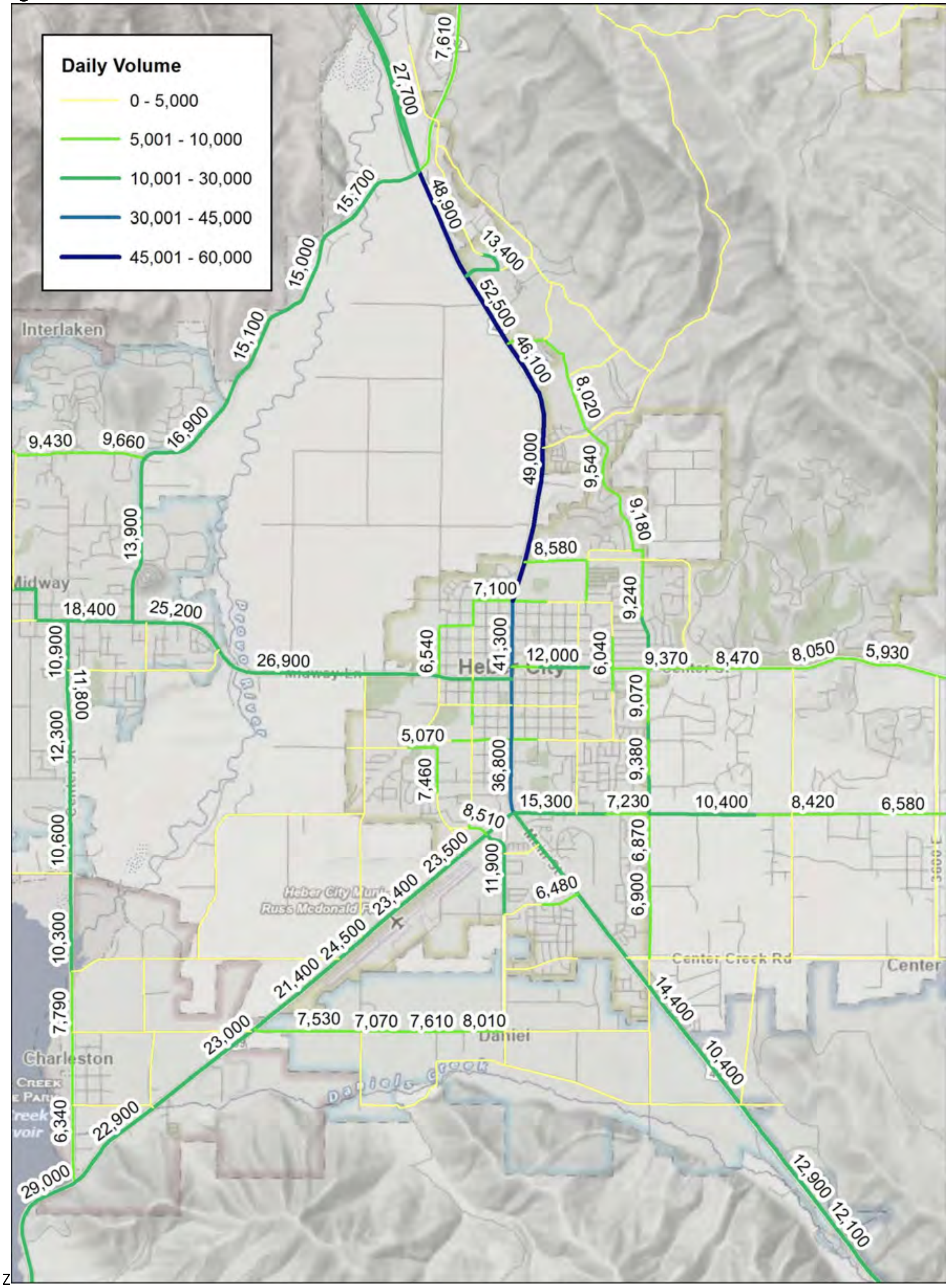


Figure 10: 2050 No Build Forecast Volumes



Version 2.2 Sensitivity Test

During the project analysis update with v2.1, another travel demand model update was released. This update (version 2.2 2024-10-16) contains the same project list as v2.1 and the same socioeconomic population and employment growth assumptions. The primary differences in the two models relate to calibrating transit representation in the Park City area and calibrating seasonal traffic volume and external trip factor calibration.

A sensitivity analysis was conducted to explore the differences in forecasted traffic volumes between model v2.1 and v2.2. Analysis shows the 2050 No Build volumes on the portions of US-40 critical to the study (SR-32 to US-189) change less than 5 percent between v2.1 and v2.2. Consequently, it was determined v2.1 was still a viable tool to analyze No Build conditions and compare alternative performance. Table 9 compares the 2050 No Build daily volumes for US-40 for v2.1 and v 2.2.

Table 9: Version 2.1 and 2.2 Comparison on US-40

Location	v2.1 Daily Volume[1]	v2.2 Daily Volume[1]	Difference	Percent Change
South of SR-32	49,500	47,800	-1,700	-3.4%
North of Coyote Canyon Parkway	46,900	45,600	-1,300	-2.8%
North of 500 North	46,500	46,000	-500	-1.1%
South of 100 S (SR-113)	48,800	49,800	1,000	2.0%
North of US-189	42,500	44,300	1,800	4.2%

Note: Volumes are raw travel demand model outputs without a base year correction

Traffic Volumes

The 2050 No Build weekday PM peak hour traffic volumes for downtown Heber City were developed using the existing 2019 weekday PM peak hour traffic volumes and the volume changes between the 2019 and 2050 travel demand model. The 2050 No Build traffic volumes are shown in Figure 11.

North of downtown Heber City, the 2008 UDOT/Wasatch County US-40 corridor agreement specifies that three additional traffic signals may be installed on US-40 in the future. The locations of these signals are at University Avenue, Wasatch Commons Boulevard and Coyote Canyon Parkway. Additionally, a new signal was installed at 900 North in 2024. Weekday PM peak hour traffic volumes for these intersections were developed using previous traffic counts and growth in the travel demand model. The previous traffic counts were derived from PM peak hour traffic volumes documented in development traffic impact studies and a UDOT signal warrant analysis. Figure 12 shows the 2050 No Build traffic volumes for the intersections north of downtown Heber City.

Figure 11: 2050 No Build Weekday PM Peak Hour Traffic Volumes

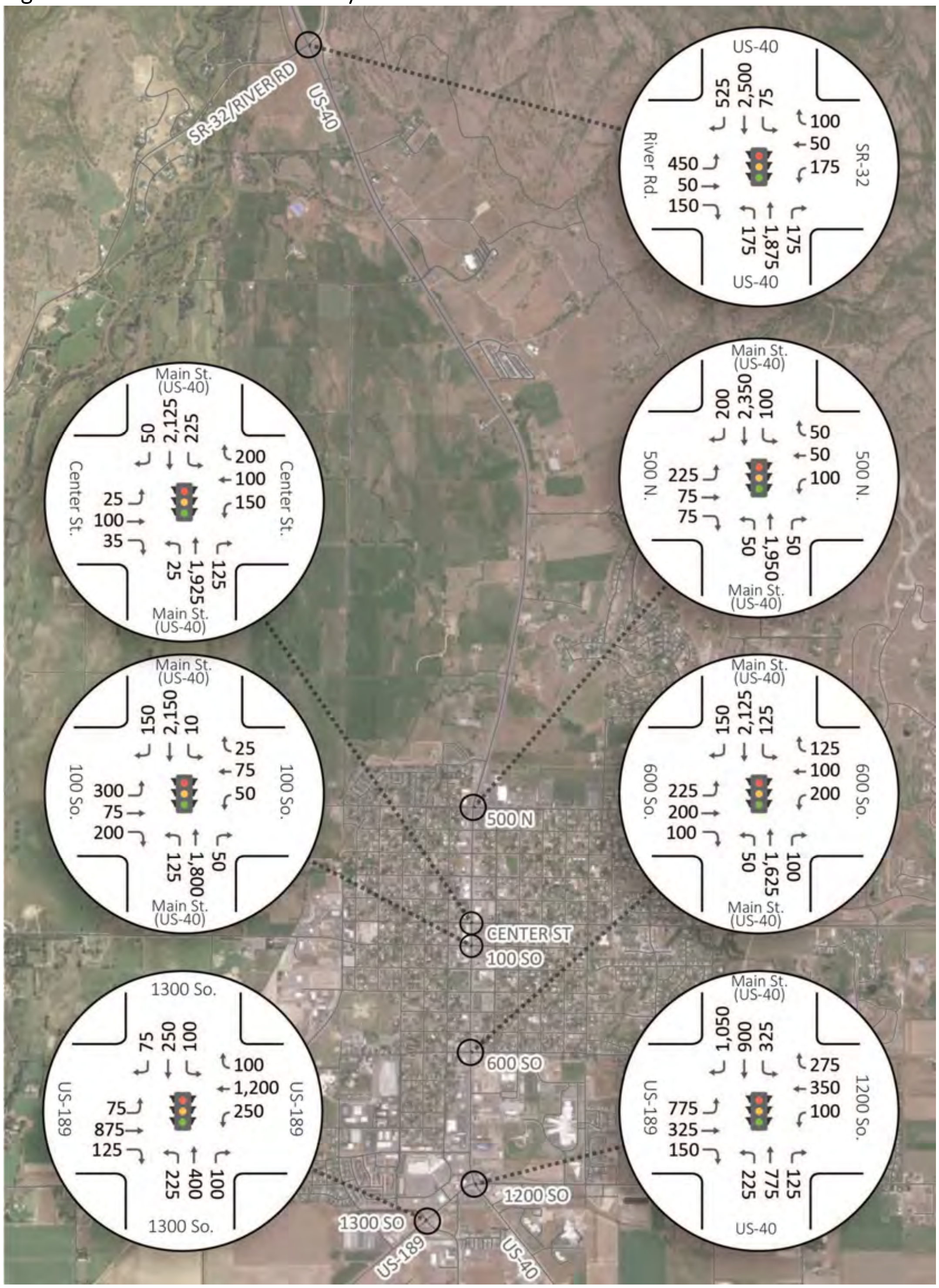


Figure 12: 2050 No Build Weekday PM Peak Hour Traffic Volumes North of Downtown Heber City

Traffic Operations

Traffic operations for US-40 through downtown Heber City (500 North to US-189) were evaluated using the same VISSIM microsimulation model which was used for the existing conditions analysis with updates to reflect the 2050 forecast weekday PM peak hour traffic volumes. Traffic signal timing along the corridor was also optimized. The same performance operations metrics used for the existing weekday PM peak hour model were used to evaluate 2050 No Build traffic conditions, including vehicle travel times, intersection LOS, and arterial LOS. Outside of the downtown Heber City Main Street area, traffic operations are less complex and analysis was primarily conducted with the traffic analysis software Synchro.

Vehicle Travel Times

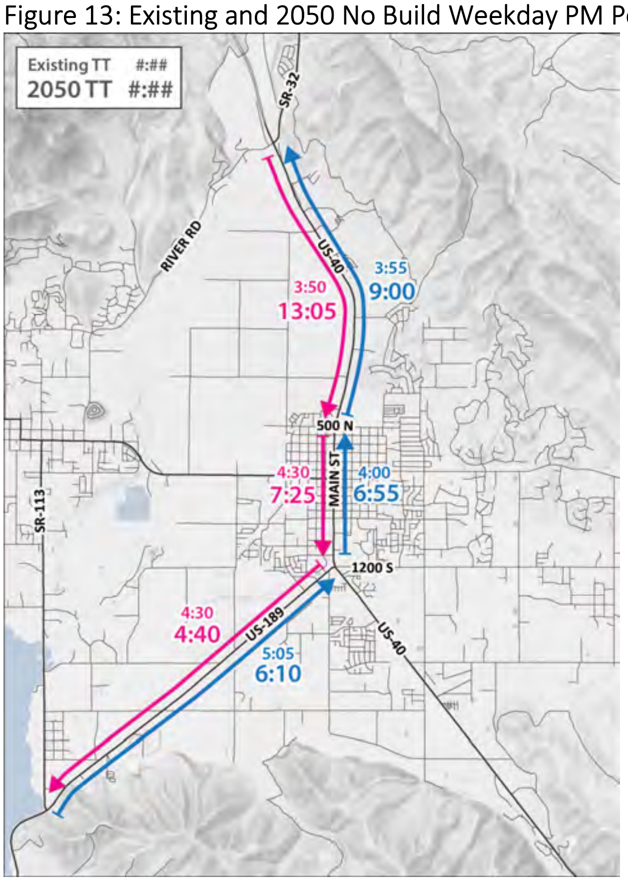
Vehicle travel times were measured throughout the VISSIM network along several northbound and southbound segments. The effect of the new 900 North signal and the three potential signalized intersections north of downtown Heber City were included in the travel times for the segment between SR-32 and 500 North for 2050 No Build. This was estimated by modeling the intersections in the traffic analysis program Synchro and adding the delay outputs from Synchro for the southbound and northbound movements to the respective southbound and northbound segment travel times. Synchro was used in favor of VISSM for these intersections because traffic operations outside of downtown Heber City are less complex due to greater signal spacing and less pedestrian activity. The results of the travel time analysis are shown in Table 10.

As shown in Table 10, the average travel time for vehicles traveling southbound between SR-32 and 500 North (Segment A) is anticipated to increase to more than 13 minutes over the 3.2-mile segment. This is primarily caused by delay of vehicles at the 500 North intersection which is anticipated to be unable to handle the forecasted southbound demand volume. Additionally, drivers traveling southbound along Heber Main Street are anticipated to experience nearly three minutes of additional travel time, an increase of approximately 65 percent over existing conditions. Along the remaining travel time segments, lesser increases in travel time are expected; however, it should be noted that many of these segments are not serving the full forecasted volume demand due to the overcapacity conditions at the 500 North intersection. In other words, the 500 North intersection is a bottleneck in the traffic simulation model limiting the number of southbound vehicles that can proceed through to other downtown intersections.

Table 10: Existing and 2050 No Build Weekday PM Peak Hour Travel Time Comparison

Travel Time Segment	Length (miles)	Existing		2050 No Build	
		Average Travel Time (mm:ss)	Average Travel Speed (mph)	Average Travel Time (mm:ss)	Average Travel Speed (mph)
A. US-40 From SR-32 to 500 N	3.2	3:50	50	13:05	15
B. US-40 From 500 N to SR-32	3.2	3:55	49	9:00	21
C. Main St (US-40) From 500 N to US-189	1.5	4:30	20	7:25	12
D. Main St (US-40) From US-189 to 500 N	1.5	4:00	22	6:55	13
E. US-189 From US-40 to SR-113	4.1	4:30	56	4:40	53
F. US-189 From SR-113 to US-40	4.1	5:05	50	6:10	40

Figure 13: Existing and 2050 No Build Weekday PM Peak Hour Travel Time



Intersection LOS

Intersection LOS was analyzed for each of the intersections using the same methodology as used for the existing conditions. The 2050 No Build weekday PM peak hour intersection LOS results are compared to existing LOS results in Table 11.

As shown in Table 11, during 2050 weekday PM peak hour No Build conditions, the 500 North, Center Street, 100 South, 600 South, and US-189 intersections on US-40 are anticipated to operate at either LOS E or LOS F. At these intersections, it is likely that it would take drivers multiple signal cycles to make it through the intersection. Intersections on US-40 north of Heber City also experience higher delays. The SR-32 intersection operates at LOS F and the University Avenue and Coyote Canyon Parkway intersections operate at LOS E.

Table 11: Existing and 2050 No Build Weekday PM Peak Hour Intersection LOS

	Existing		2050 No Build	
Intersection	Average Vehicle Delay (sec/veh)	LOS	Average Vehicle Delay (sec/veh)	LOS
US-40/SR-32	18	LOS B	>100	LOS F
US-40/University Ave	n/a	n/a	63	LOS E
US-40/College Way	32[1]	LOS D[1]	n/a	n/a
US-40/Commons Blvd	14[1]	LOS C[1]	50	LOS D
US-40/Coyote Canyon Pkwy	14[1]	LOS C[1]	57	LOS E
US-40/900 N	n/a	n/a	51	LOS D
Main St (US-40)/500 N	17	LOS B	>100	LOS F
Main St (US-40)/Center St	24	LOS C	39	LOS D
Main St (US-40)/100 S	30	LOS C	>100	LOS F
Main St (US-40)/600 S	18	LOS B	>100	LOS F
Main St (US-40)/US-189	29	LOS C	100	LOS F
1300 S/US-189	10	LOS A	15	LOS B

1. Unsignalized intersection. Delay and LOS reported for the worst stop or yield-controlled approach

Arterial LOS

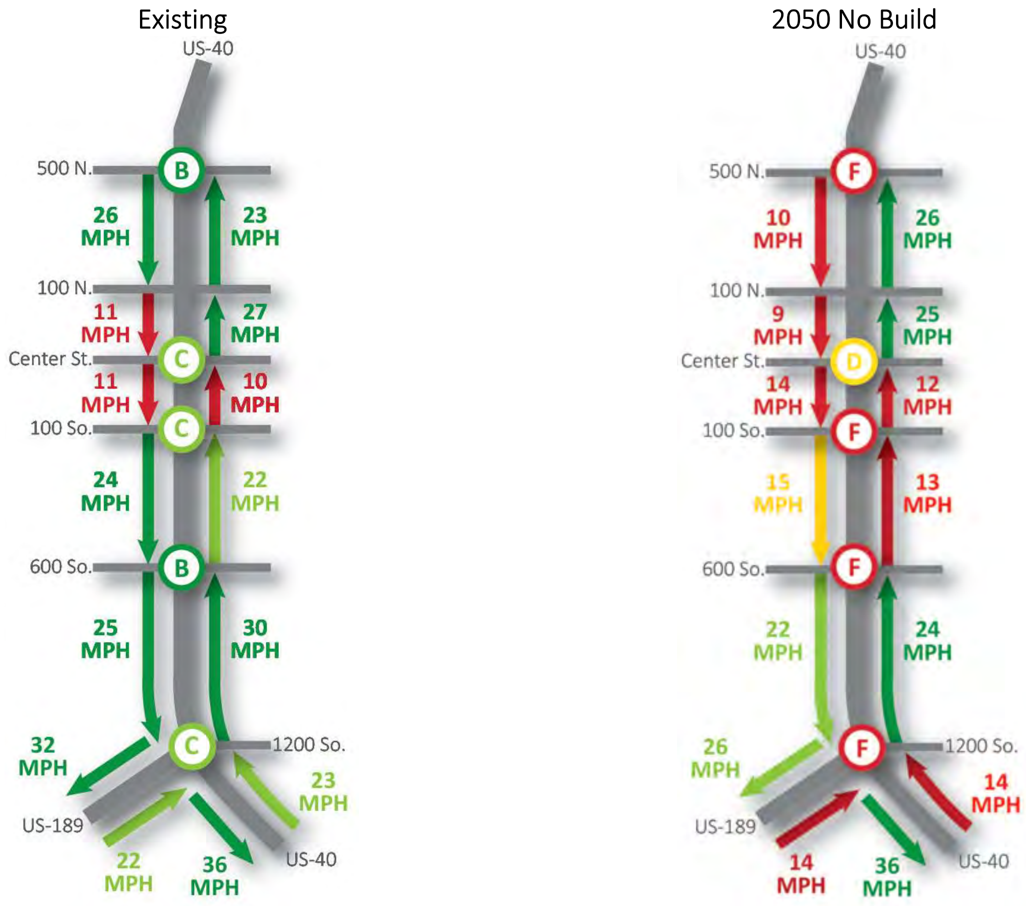
The arterial LOS for the 2050 weekday PM peak hour No Build conditions was analyzed using the same methods used for the existing conditions. The results of the 2050 No Build, along with the existing conditions for comparison, are shown in Table 12.

As shown in Table 12, during the 2050 No Build, the southbound segments from 500 North to 100 South are all anticipated to operate at LOS E or LOS F. Between 500 North and Center Street, the average speed for southbound drivers is anticipated to be 10 mph or less due to the extreme amount of congestion due to the overcapacity conditions observed at 500 North intersection as well as the Center Street and 100 South intersection. Figure 14 summarizes the existing and 2050 No Build intersection and arterial LOS.

Table 12: Existing and 2050 No Build Weekday PM Peak Hour Arterial LOS

		Existing		2050 No Build	
	Street Segment	Average Segment Speed (mph)	LOS	Average Segment Speed (mph)	LOS
Southbound	US-40: From 500 N to 100 N	26	LOS B	10	LOS F
	US-40: From 100 N to Center St	11	LOS F	9	LOS F
	US-40: From Center St to 100 S	11	LOS F	14	LOS E
	US-40: From 100 S to 600 S	24	LOS B	15	LOS D
	US-40: From 600 S to US-189	25	LOS B	22	LOS C
	US-40: South of US-189	36	LOS A	36	LOS A
	US-189: Southwest of US-40	32	LOS B	26	LOS C
Northbound	US-189: Northeast to US-40	22	LOS C	14	LOS E
	US-40: North to US-189	23	LOS C	14	LOS E
	US-40: From US-189 to 600 S	30	LOS A	24	LOS B
	US-40: From 600 S to 100 S	22	LOS C	13	LOS E
	US-40: From 100 S to Center St	10	LOS F	12	LOS E
	US-40: From Center St to 100 N	27	LOS B	25	LOS B
	US-40: From 100 N to 500 N	23	LOS B	26	LOS B

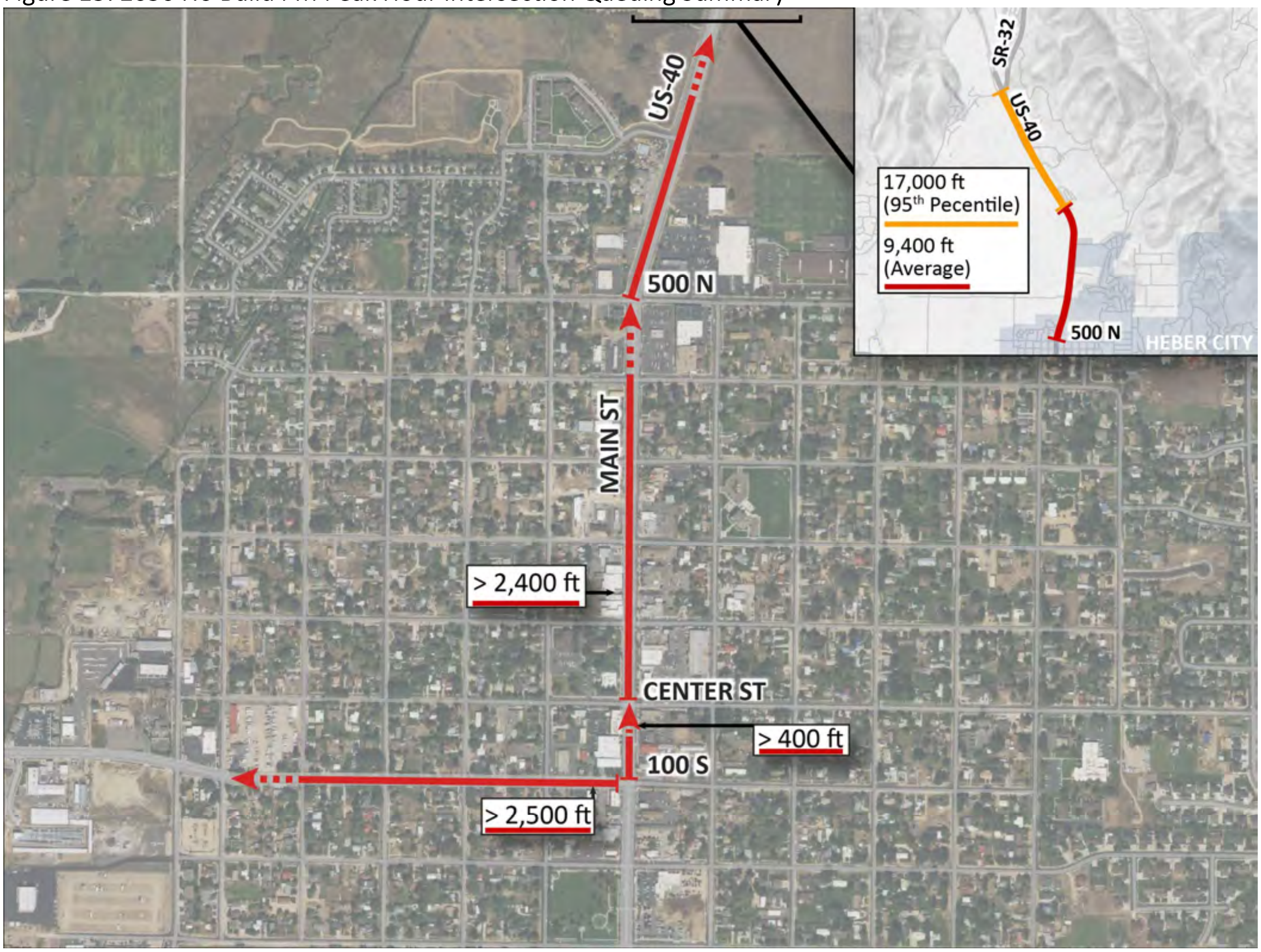
Figure 14: Existing and 2050 No Build Weekday PM Peak Hour Intersection and Arterial LOS Summary



Intersection Queuing

Vehicle queues were measured at intersections during the weekday PM peak hour during the 2050 No Build conditions. A large backup of southbound vehicles US-40 occurs because Main Street intersections are unable to meet the forecasted vehicle demand. Average and 95th percentile vehicle queues as measured in the VISSIM model for movements at key study intersections are shown in Figure 15.

Figure 15: 2050 No Build PM Peak Hour Intersection Queuing Summary



At 500 North, a 95th percentile vehicle queue of over three miles long is expected during the weekday PM peak hour with an average vehicle queue greater than 9,400 feet. The speed limit transitions from 55 mph to 35 mph approximately 1,110 feet north of the 500 North intersection which could result in drivers traveling on the 55 mph segment of the roadway to approach a stopped queue during peak conditions. At Center Street, the average southbound vehicle queue is anticipated to be 2,400 feet which would spill back to the 500 North intersection. At the 100 South intersection, average vehicle queues are anticipated to spill into the Center Street intersection. Additionally, the eastbound queue is expected to be greater than 2,500 feet. Consistent with the intersection LOS results, these intersections are expected to have inadequate capacity to handle project volumes and queues would result in drivers waiting multiple cycles to clear intersections.

SAFETY

In the previous May 2022 Existing and 2050 No Build Traffic and Safety Analysis memo, crash analysis was conducted with the most recently available three years of crash data at the time (2016-2018). Since then, MAG adopted a Safety Action Plan (SAP) in 2024 covering Utah, Wasatch, and Summit Counties. The study included a detailed analysis of more recent crash data (2018-2022) and roadway conditions. The study coordinated with UDOT and local governments regarding safety concerns and desired projects in the area. One outcome of the study is a series of prioritized potential safety countermeasures based on crash analysis and agency coordination. The highest priority locations (Tier 1) represent the combination of locations with the highest risk for fatal and serious injury crashes and the most effective and practical potential countermeasures.

The MAG SAP identified seven Tier 1 locations on US-40 between US-189 and SR-32 and provided potential countermeasure recommendations for each location. Table 13 summarizes the Tier 1 safety locations on US-40 and the potential countermeasures. The potential countermeasures include treatments, such as intersection signal timing and phasing changes, treatments for pedestrians and bicyclists, roadway curve improvements, and median barrier. Many countermeasures relate to the need for pedestrian and bicycle safety improvements in downtown Heber City and the high-speed conditions on US-40 north of downtown. Table 13 also notes a median barrier project is already planned by UDOT for US-40 north of downtown Heber City.

Table 13: MAG SAP Tier 1 Locations on US-40 Between US-189 and SR-32

Facility	Extents	Potential Safety Countermeasures	Background Project Notes
US-40 Heber Main Street	US-189 to 500 South and 200 South to Center Street	• Red light turning education/enforcement campaigns • Upgrade pedestrian facilities • Add leading pedestrian interval • Upgrade bicycle facilities • Median improvements, new signal timing, curb bulb outs, gateway entrance	
US-40/US-189 Intersection		• Consider removing southbound permissive left phase • Add leading pedestrian interval • Tighten turning radii • Upgrade pedestrian facilities • Improve access spacing on the north side of the east leg • Add a westbound right-turn lane	
US-40/100 South Intersection		• Consider removing northbound permissive left phase • Red light running education/enforcement • Add a leading pedestrian interval	
US-40/Center Street Intersection		• Red light running education/enforcement campaign • Upgrade pedestrian facilities • Supplement markings with improved signing	
US-40	500 North to SR-32	• Center barrier • Add rumple strips • Add wild animal crossing signage and fencing • Drowsy driver warning signs • Improve lighting • Speed management on corridor • Add signal at Coyote Canyon Parkway if meets warrants	UDOT has a planned center barrier project
US-40	Curve near milepost 15	• Improve lighting • Add Safet Edge • Curve improvements • Add wider edge lines	UDOT has a planned center barrier project
US-40/SR-32 Intersection		• Speeding education/enforcement campaigns • Distracted driving education/enforcement campaigns • Variable speed limit signs • Signal indicator lights to aid enforcement	

Source: MAG Safety Action Plan (2024), mountainlandsafestreets.org

FREIGHT

Highway Freight

There are two freight routes in or near the Heber Valley including I-80 and US-40. Both roadways are listed on Utah's Highway Freight Network as defined in the Utah Freight Plan 2023 (see Figure 16). I-80 is an Interstate and US-40 is a critical rural freight corridor.

Aside from some light industry on the east side of Park City, on Heber City's southwest side, and in the Kamas area, there is little freight generated in this area. Most freight traveling in the Heber Valley is passing through, or providing deliveries to local supermarkets, home improvement centers, and local businesses.

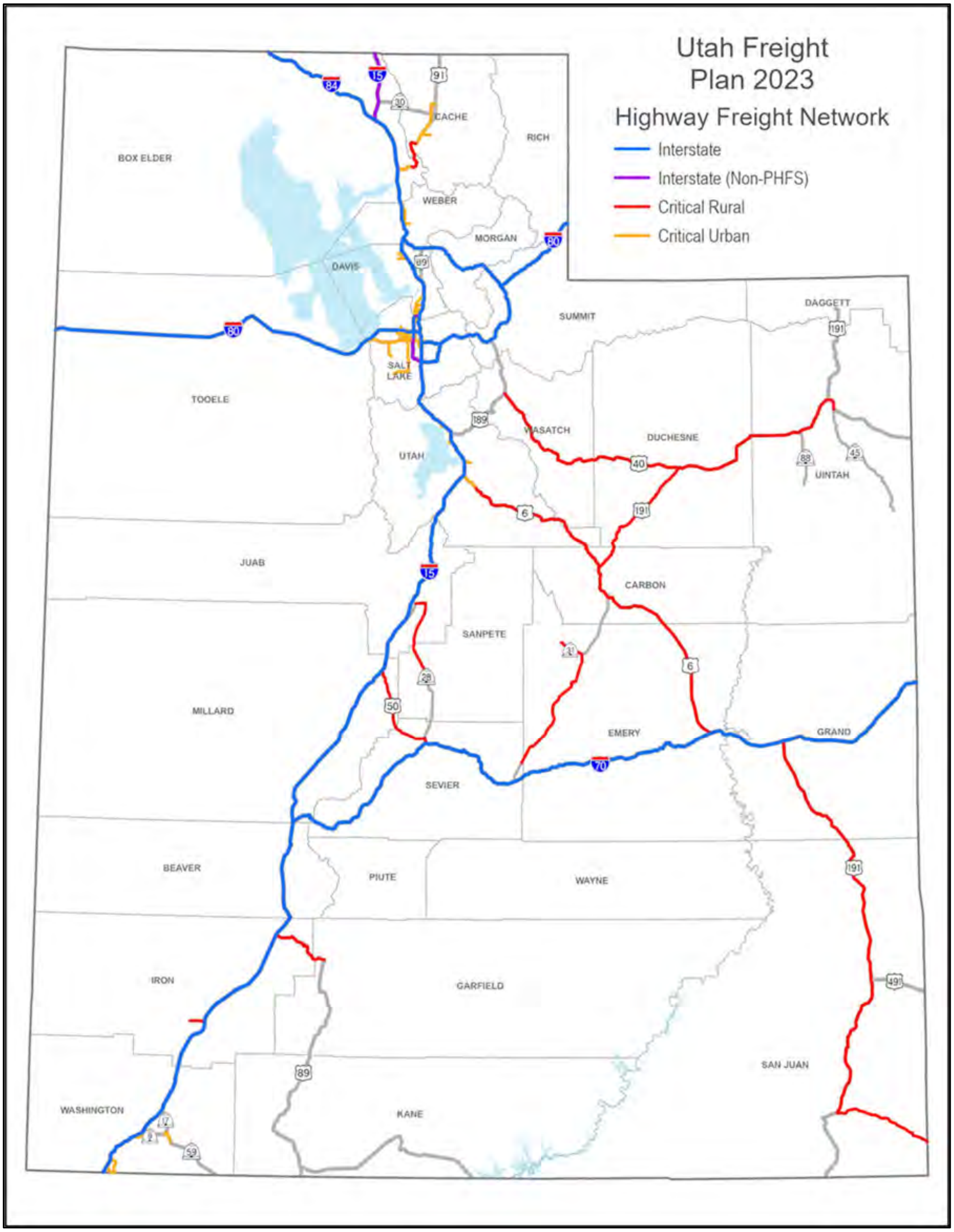
I-80 is the primary transcontinental freight route across western America. With high truck volume percentages east of Salt Lake City, much of I-80's freight is perishable foodstuff being transported in temperature-controlled trucks that originated in California. I-80 also has nonperishable foodstuff and other goods in "dry van" trucks. Most of this traffic does not pass through Heber Valley as it usually stays on I-80 to Salt Lake City before continuing on I-80 west or south on I-15.

US-40 is classified as a principal arterial. It serves as an important facility for transporting people, goods, and services to and from the Wasatch Front via I-80 and US-189 to I-15. US-40 is a major regional freight corridor providing local access and energy-related shipments passing through Heber City and up the steep grade around the Jordanelle Reservoir en route to and from I-80. Large combination vehicles (LCV's) known as "Supertankers" carry crude oil from Uinta Basin oil fields to Wasatch Front refineries via US-40 through Heber City. Oil field support equipment and supplies also travel on this highway. Further, US-40 provides connection to northwest Colorado, which provides some regional truck traffic. There is one truck chain-up location on US-40 near the Heber Valley located northbound at milepost 13 just north of SR-32.

Truck traffic on US-40 is very consistent as 600 to 700 supertankers frequent the route daily, as determined from the video analysis discussed in the Data Collection section of this report. This consists of approximately only one percent of the PM peak hour traffic and only two to three percent of daily traffic. However, because of their weight, slow starts at traffic signals, and loudness of the engines, they are very noticeable. Other semi-trucks account for about the same percentages during PM peak hour and daily traffic. Smaller trucks called single-unit or box trucks account for about two percent of the PM peak hour traffic.

US-189 is not on the highway freight network but does connect US-40 with I-15 via Provo Canyon. US-189 has restrictions and prohibits vehicles and loads over 10 feet wide. However, some trucks use the Provo Canyon route as an alternative to the steep grades on I-80 and US-40 going to and from Salt Lake City. Aside from local delivery runs, most of the freight traffic on US-189 is passing through the area.

Figure 16: Utah Freight Network



Source: Utah Freight Plan 2023

Air Freight

The Heber City Municipal Airport, also known as Russ McDonald Field, is a city-owned, public-use airport located one mile south of Heber City. However, this airport does not have air cargo service.

Rail Freight

There are no freight railroads that serve the Heber Valley. However, the Heber Valley Historic Railroad operates a tourist railroad based in Heber City. It operates passenger excursion trains along a 16-mile line between Heber City and Vivian Park, which is located in Provo Canyon. The tourist railroad is not connected to the national rail network.

ACTIVE TRANSPORTATION

The Heber Valley is a scenic area rich with recreational opportunities. The surrounding mountains feature many hiking and mountain biking opportunities. However, the existing active transportation (AT) infrastructure is inconsistent and lacks connectivity. As growth occurs in this area, so too will demand for access to these recreational opportunities.

Existing Facilities

Heber City, the population center of the valley, is in the process of growing beyond its rural origins. This transition is particularly visible through the presence or absence of sidewalks. Heber Main Street and adjacent parallel roadways feature contiguous sidewalks. However, the sidewalk consistency and continuity rapidly declines further to the east and west of Main Street. Within the belt of newer residential developments ringing the traditional town center, however, sidewalks once again become frequent, contiguous sidewalks. Pedestrian and bicycle infrastructure is also somewhat more common outside in these areas. Figure 17 displays the existing trail infrastructure in the Heber Valley. Two paved multi-use trails extend to the east and west from the center of Heber. The western pathway follows SR-113 and connects into the Midway Main Street pathway using sidewalks. The eastern pathway follows Center Street to the Red Ledges trailhead.

Heber Main Street

Heber Main Street features contiguous sidewalks on both sides of the roadway from 750 North to 1000 South. Traffic signals at 500 North, Center Street, 100 South, and 600 South offer opportunities to cross Main Street at a signalized location. Additionally, a pedestrian-activated overhead flashing beacon is located at 100 North and a High-Intensity Activated Crosswalk (HAWK) beacon is located at 250 South. Beyond the vicinity of Center Street, east-west AT mobility is limited, requiring multi-block detours to access designated crossing opportunities.

There is no designated bicycle infrastructure on Main Street creating a low-comfort experience for all but the most confident riders due to the large traffic volumes, numerous trucks, and parallel parking on the shoulders.

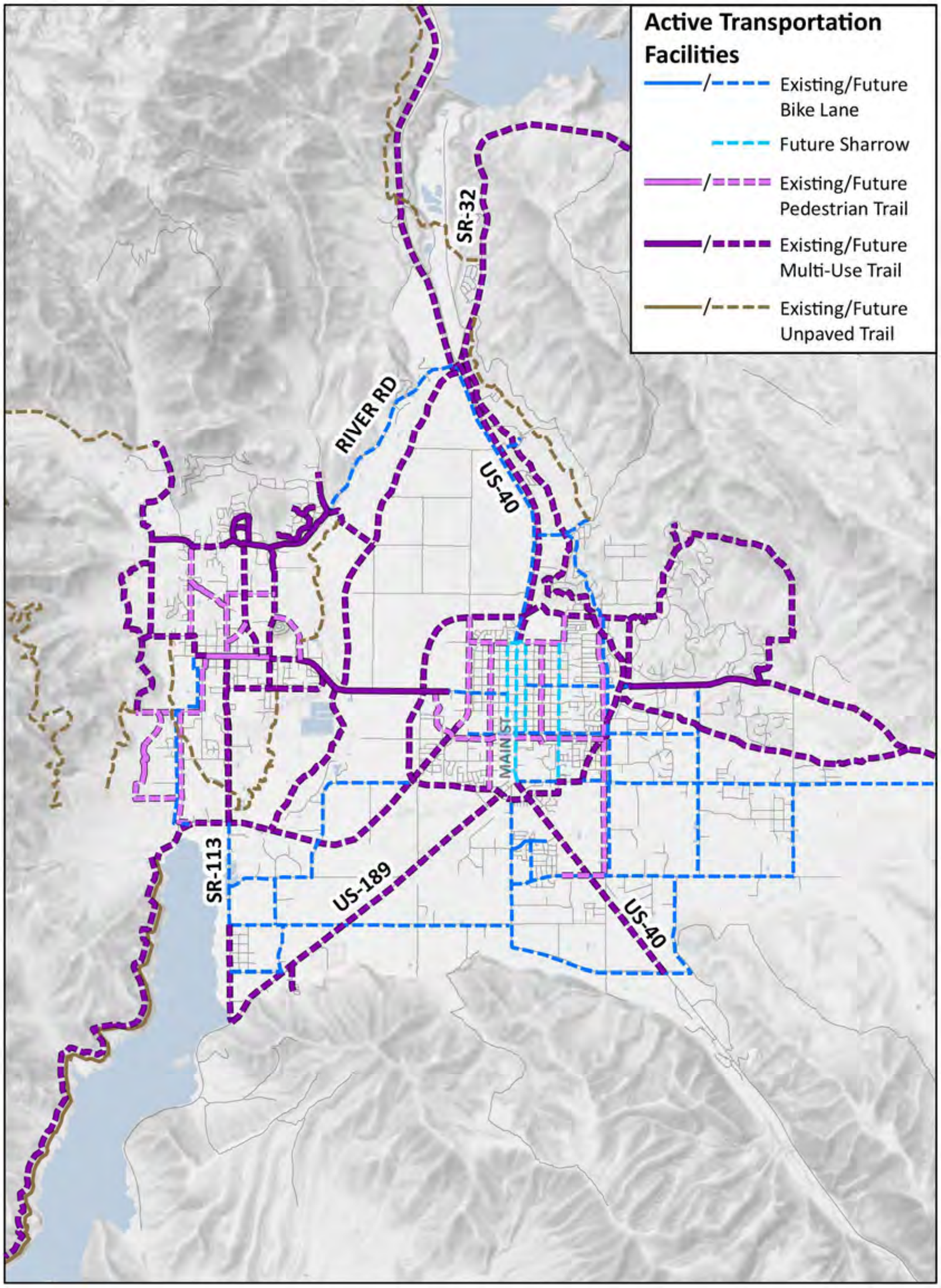
Midway

The greatest concentration of existing pathways in the Heber Valley is located in Midway, particularly in the vicinity of SR-32. The Midway Main Street trail is categorized as a paved pedestrian trail in the Wasatch County Regional Trails Master Plan (WCRTMP). This typology encompasses several configurations including: wide sidewalks, trails through parks or developments, and narrow paths separate from roadways.

Deer Creek Trail

To the west of Deer Creek Reservoir is an unpaved trail that connects Soldier Hollow to the trailhead of the Deer Creek Reservoir trail.

Figure 17: Heber Valley Existing and Planned AT Facilities



Source: WCRTMP, UDOT Region 3 Bicycle Pedestrian Plan, MAG 2050 RTP, Railroad Trail Feasibility Study

Existing Bicycle Activity

Popular routes with bicyclists can be identified using data from GPS-based, ride-tracking smartphone applications. UDOT purchases such a dataset from an application developer and then made available for analysis. Figure 18 illustrates the data for the Heber Valley in 2019. It is worth noting that these applications are particularly popular among competitive cyclists and mountain bike trail riders, hence the activity displayed in Figure 18 does not include the full range of ongoing bicycle activity.

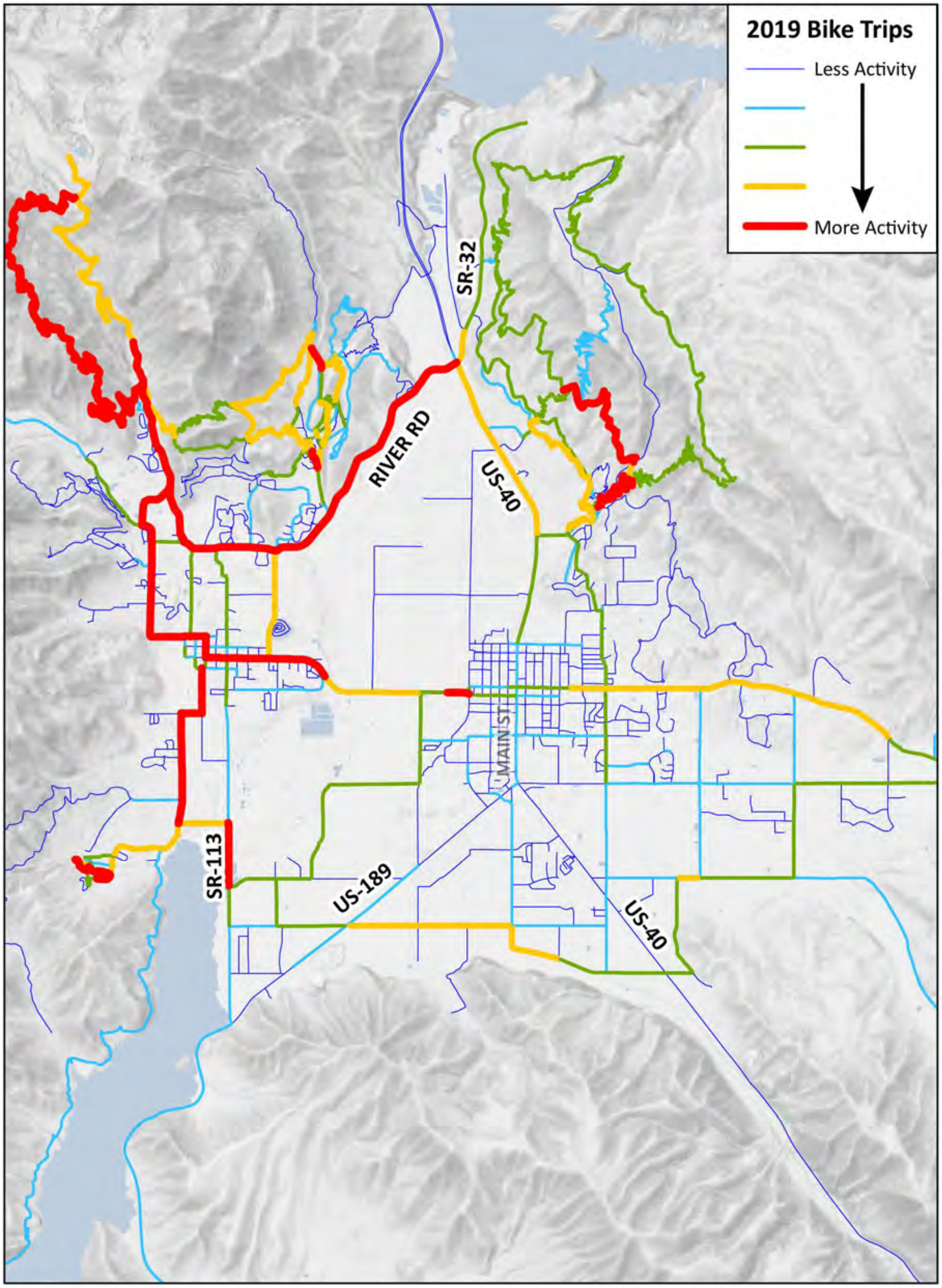
As seen in Figure 18, the most significant ridership in the Heber Valley is in the vicinity of Midway and to the northeast of US-40. Recreational areas such as Soldier Hollow to the southwest, Coyote Canyon to the northeast, or Wasatch Mountain State Park and Dutch Hollow to the northwest are the most popular. Routes connecting to these areas feature significant ridership which indicates much of the bicycle activity in this data set is more recreational than commuter based.

As previously mentioned, these datasets are produced by smartphone applications that many competitive cyclists use to track their times and training routes. The 2019 Tour of Utah bicycle race crossed through the Heber Valley using Center Street, the road to Midway, SR-222 around the west side of Midway, and Pine Canyon. This race and related training or recreational rides may partially explain the higher ridership on these routes.

US-40 to the north is another route to Summit County and the Park City area, however it has a fraction of the ridership compared to Pine Canyon or SR-32, indicating less favorable conditions. The highest ridership on US-40 is between the SR-32 intersection and 500 North. This area features wide paved shoulders and limited parallel alternatives. Closer to Heber on US-40 the ridership appears to disperse onto parallel routes. The low ridership between the 500 North and the US-40/US-189 South intersections reflects the uncomfortable riding conditions mentioned earlier: large traffic volumes, numerous trucks, and parallel parking on the shoulders.

To the west of Heber City is a series of routes that have moderate ridership. The use of these routes indicates demand for north-south mobility to the west of town and within the approximate vicinity of the Heber Valley Railroad.

Figure 18: Heber Valley Crowd-sourced Mobile App Bicycle Activity



Future Facilities

Several of the fragmented existing AT facilities in the Heber Valley are planned to be linked together in the future. The projects outlined in the WCRTMP, Railroad Trail Feasibility Study, and Region 3 Bicycle Pedestrian Plan are displayed in Figure 17.

Wasatch County Regional Trails Master Plan

Completed in 2016, the Wasatch County Regional Trails Master Plan proposes a series of improvements that will create a comprehensive AT network in the Heber Valley. One significant component of this plan is a proposed multi-use pathway to the west of Heber, that connects to the south of the US-40/US-189 intersection and loops to the eastern existing multi-use trail. This trail would be an important component of a loop route that will ring the city as well as connect the existing improved multi-use trails. Similar AT facilities are proposed to improve connectivity to other communities within Wasatch County and beyond. A grid of improved pedestrian trails, bike lanes, and shared lane pavement markings (sharrows) are proposed to further enhance AT mobility within Heber City.

Region Plans and Studies

The Provo River Parkway is a route that will eventually connect the Wasatch Front to the Wasatch Back. The trail is currently paved from the mouth of Provo Canyon to Vivian Park. The MAG 2050 RTP proposes to improve the unpaved sections and fill gaps that exist in the route between Vivian Park and the Deer Creek Trail trailhead. This project has since received funding and started design. Following the western shore of the reservoir--from the trailhead to Soldier Hollow--the Deer Creek trail is currently unpaved. The UDOT Region 3 Bicycle Pedestrian Plan proposes to pave this segment of the trail. From Soldier Hollow, the trail would extend further east and eventually connect to western Heber City by following the route of the Heber Valley Railroad. The Railroad Trail Feasibility Study proposes a paved multi-use trail following the existing tracks to Soldier Hollow, providing a direct connection to these recreation areas. Once all three projects are completed a paved trail will connect Heber City to Provo.

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