Liberty Lake Network Analysis Update 2025

Prepared for
The City of Liberty Lake

January 2026

Liberty Lake Network Analysis Update 2025

Prepared for

The City of Liberty Lake
22710 East Country Vista Drive
Liberty Lake, WA 99019

Prepared by

Parametrix
835 North Post, Suite 201
Spokane, WA 99201
T. 509.328.3371 F. 1.206.649.6353
www.parametrix.com

January 2026 | 377-7878-027

Citation

Parametrix. 2026. Liberty Lake Network Analysis Update 2025. Prepared for The City of Liberty Lake by Parametrix, Spokane, Washington. January 2026.

Contents

Contents

1. Introduction 1

2. Study Area 1
   2.1 Description of Major Roads 1
   2.2 Description of Major Intersections 3
   2.3 Transit 4
   2.4 Active Transportation 4

3. Data Collection 4
   3.1 Intersection Turning Movement Counts 5
   3.2 Roadway Volume Counts 5
   3.3 Active Transportation 8
   3.4 Golf Carts 8

4. Growth Assumptions 10
   4.1 Short-Term Growth (2028) 10
   4.2 Long-Term Growth (2046) 12
      4.2.1 Travel Demand Modeling 12

5. Operational Analysis 16
   5.1 Analysis Methodology 16
   5.2 Existing Conditions Analysis (2025) 17
   5.3 Short-Term Analysis (2028) 21
   5.4 Short-Term Mitigation Analysis (2028) 25
      5.4.1 Intersection 1: I-90 WB Off Ramp / E Country Vista Dr 25
      5.4.2 Intersection 6: N Liberty Lake Rd / Appleway Ave 25
      5.4.3 Intersection 7: N Liberty Lake Rd / E Country Vista Dr 25
      5.4.4 Intersection 8: E Mission Ave / E Country Vista Dr 25
      5.4.5 Intersection 20: N Harvard Rd/E Wellington Pkwy 26
      5.4.6 Intersection 21: E Mission Ave/N Signal Dr 26
      5.4.7 Short-Term (2028) Preferred Mitigation Summary 26
   5.5 Long-Term Analysis (2046) 28
   5.6 Long-Term Mitigation Analysis (2046) 32
      5.6.1 Intersection 2: N Kramer Pkwy / E Country Vista Dr 32
      5.6.2 Intersection 4: E Mission Ave / N Harvard Rd 32

5.6.3 Intersection 6: N Liberty Lake Rd / Appleway Ave 32
5.6.4 Intersection 7: N Liberty Lake Rd / E Country Vista Dr 32
5.6.5 Intersection 14: N Country Vista Blvd / E Appleway Ave 33
5.6.6 Intersection 21: E Mission Ave/N Signal Dr 33
5.6.7 Long-Term (2046) Preferred Mitigation Summary 33

6. Conclusion 36

APPENDICES

A Traffic Data
B Short-Term Growth Information
C Travel Demand Modeling
D Existing Conditions Analysis Results (2025)
E Short-Term Analysis Results (2028)
F Short-Term Mitigated Analysis Results (2028)
G Long-Term Analysis Results (2046)
H Long-Term Mitigated Analysis Results (2046)
I Cost Estimates

Figures

Figure 1 – Study Area 2
Figure 2 – Existing Traffic Volume (2025) 7
Figure 3 – Existing Golf Cart Volumes (2025) 9
Figure 4 – Short-Term Traffic Volume (2028) 11
Figure 5 – 2024 Refined SRTC TAZ MAP 13
Figure 6 – 2046 Refined SRTC TAZ MAP 14
Figure 7 – Long-Term Traffic Volume (2046) 15
Figure 8 – Existing LOS (2025) 19
Figure 9 – Short-Term LOS (2028) 23
Figure 10 – Short-Term Mitigated LOS (2028) 27
Figure 11 – Long-Term LOS (2046) 30
Figure 12 – Long-Term Mitigated LOS (2046) 35

Tables

Table 1 – Study Area Intersections 3
Table 2 – Turning Movement Count Locations 5
Table 3 – Roadway Volume Count Locations 6
Table 4 – Existing (2025) Peak Hour Pedestrian and Bicyclist Volumes 8
Table 5 – Level of Service 16
Table 6 – Existing LOS (2025) 18
Table 7 – Existing 95th Percentile Queue Lengths (2025) 20
Table 8 – Short-Term LOS (2028) 22
Table 9 – Short-Term 95th Percentile Queue Lengths (2028) 24
Table 10 – Preferred Short-Term (2028) Mitigations 26
Table 11 – Long-Term LOS (2046) 29
Table 12 – Long-Term 95th Percentile Queue Lengths (2046) 31
Table 13 – Preferred Long-Term (2046) Mitigations 34
Table 14 – Mitigation Summary 36

Acronyms and Abbreviations

HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
SRTC	Spokane Regional Transportation Council
STA	Spokane Transit Authority
TAZ	Traffic Analysis Zone
WSDOT	Washington Department of Transportation

1. Introduction

In February 2017, the City of Liberty Lake (the City) conducted a network analysis of the transportation system to identify short-term and long-term needs and in September 2020, the study was updated. Since that time, development and roadway project plans have evolved in key areas of the city. The purpose of this study is to update the 2020 network analysis. This study includes an analysis of existing conditions (2025), short-term growth conditions (2028), and long-term growth conditions (2046).

This report documents and summarizes the results and recommendations of the network analysis update. A description of the study area is provided followed by documentation of data collection methods and results. Next, the future land use and growth assumptions are discussed. The methods and results of the use of the Spokane Regional Transportation Council (SRTC) regional travel demand model are also provided. Traffic analysis methods are then presented including detailed traffic performance metrics for short-term (2028) and long-term (2046) conditions. Finally, the report identifies the network-wide mitigations.

2. Study Area

The study area for this analysis includes major roadways and intersections within the City boundaries. The boundaries of the City extend from the Spokane River on the north to Sprague Avenue on the south, and from Aladdin Road on the west to King James Lane on the east. While this analysis focuses on traffic operations, subsections of this section give an overview of transit and active transportation options in the City. **Figure 1** shows the study area roadway network and intersections for the analysis.

2.1 Description of Major Roads

There are several key roads within the City.

Country Vista Drive – is a major east-west roadway in the City. West of Mission Avenue, Country Vista Drive is a four-lane arterial with a two-way center turn lane that parallels I-90 to the south. East of Mission Avenue, Country Vista Drive becomes a two-lane roadway that circumnavigates the eastern residential areas of the City and eventually meets Appleway Avenue in the northeastern section of the city.

Liberty Lake Road – is a major north-south roadway that runs from the I-90 ramps on the north to the southern boundary of the City. Liberty Lake Road is four lanes with a center landscaped median between the I-90 ramps and Country Vista Drive. South of the Country Vista Drive intersection, Liberty Lake Road narrows to one lane in each direction.

Harvard Road – is a continuation of Liberty Lake Road north of the I-90 ramps and extends north to the northern city boundary. Harvard Road runs north-south as a two-lane roadway, before expanding out to four lanes with a landscaped median north of the roundabout at Mission Avenue.

Appleway Avenue – runs east to west from Liberty Lake Road to the eastern boundary of the City. It is a four-lane arterial with a landscaped center median and left-turn pockets. East of Molter Road, Appleway Avenue begins narrowing down to one lane in each direction as it continues east towards an interchange with I 90 outside of the city boundaries.

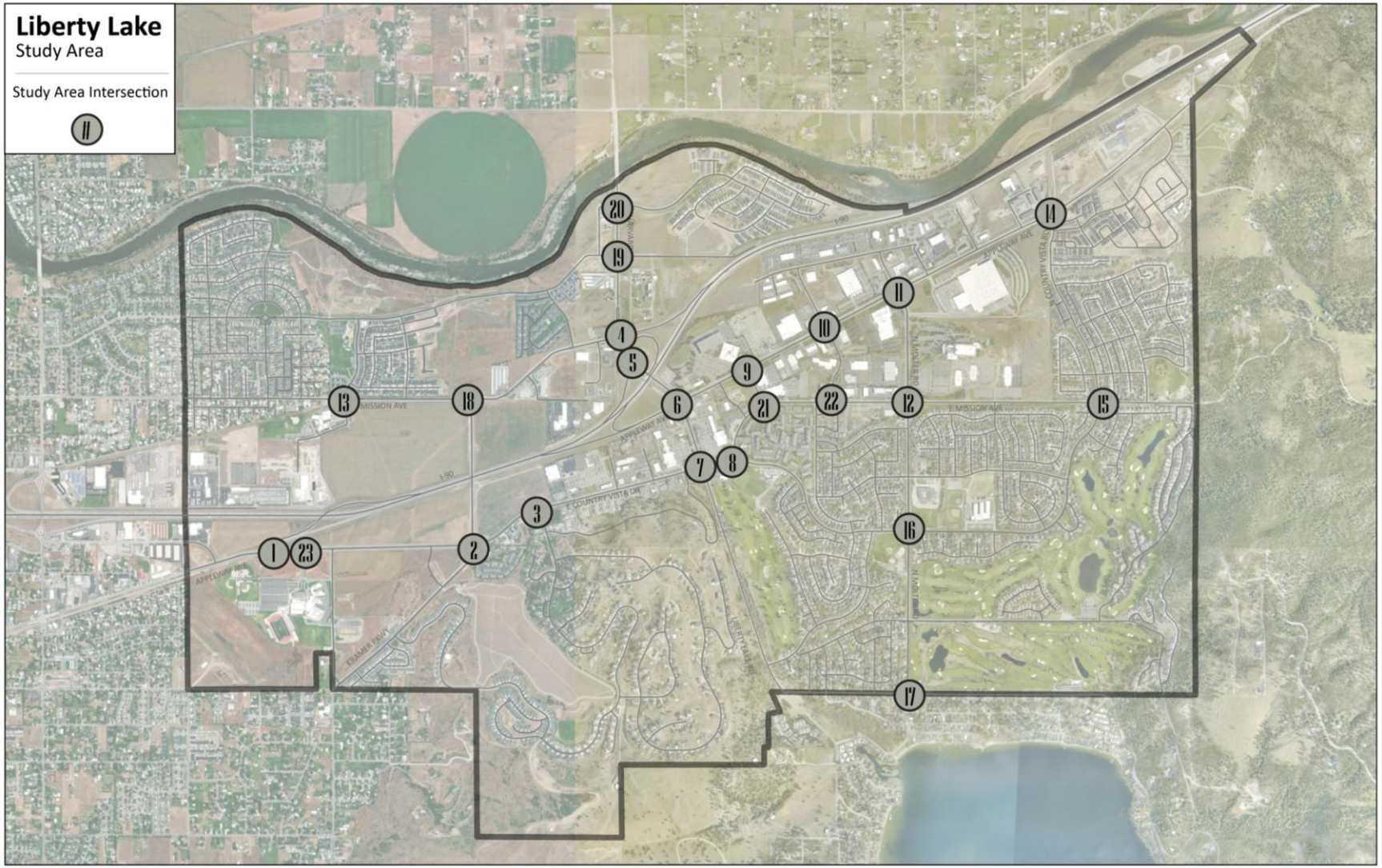

Figure 1 – Study Area

Mission Avenue – is an east-west roadway that has two sections, the western section runs from the western city boundary to Harvard Road as a two-lane roadway, paralleling I-90 to the north. The eastern section of Mission Avenue is a two-lane roadway that runs south of I-90 from an intersection with Country Vista Drive near the center of the City to the eastern city boundary.

Molter Road – is a north-south roadway on the eastern side of the city that runs from Knox Avenue on the north to Sprague Avenue and the southern city boundary on the south. Molter Road is a four-lane roadway with a two-way center turn lane between Appleway Avenue and Mission Avenue. South of the Mission Avenue intersection, Molter Road narrows to one lane in each direction with a two-way center turn lane for most of its length.

Kramer Parkway – is a north-south roadway on the west side of the City that runs from Mission Avenue on the north to Henry Road on the south. Kramer Parkway is a two-lane roadway that includes a bridge over I-90 connecting the northern and southern sides of the City.

2.2 Description of Major Intersections

There are 23 intersections within the City that were studied in this analysis. **Table 1** shows the 23 study area intersections and existing intersection control. The 23 intersections are also shown spatially in **Figure 1**.

Table 1 – Study Area Intersections

#	Intersection	Existing Intersection Control
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB
2	N Kramer Pkwy / E Country Vista Dr	Signal
3	N Legacy Ridge Drive / E Country Vista Dr	Signal
4	E Mission Ave / N Harvard Rd	Roundabout
5	N Harvard Rd / I-90 WB On Ramp	Free
6	N Liberty Lake Rd / Appleway Ave	Signal
7	N Liberty Lake Rd / E Country Vista Dr	Signal
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB
9	N Signal Dr / E Appleway Ave	Signal
10	N Madson St / E Appleway Ave	Signal
11	N Molter Rd / E Appleway Ave	Signal
12	N Molter Rd / E Mission Ave	Roundabout
13	E Mission Ave / N Harvest Pkwy	Roundabout
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled
16	N Molter / E Country Vista Dr	All Way Stop-Controlled
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled
18	E Mission Ave / Kramer Pkwy	Roundabout
19	N Harvard Rd / E Indiana Ave	Signal
20	N Harvard Rd / E Wellington Pkwy	Stop-Controlled EB/WB
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB
22	E Mission Ave / N Madson St	Stop-Controlled SB
23	E Country Vista Dr / Ridgeline HS signal	Signal

2.3 Transit

The City is served by five Spokane Transit Authority (STA) bus routes. These include Route 7 (Valley/Airport), Route 93 (Molter Loop), Route 98 (Greenacres/Liberty Lake), Route 772 (Liberty Lake Express), and Route 724 (Liberty Lake Tech Express).

Route 7 connects the Spokane International Airport with Liberty Lake. This is a new route as of September 2025 that replaced route 74.

Route 93 is a revised version of the tail end of former Route 74, operating counterclockwise from the Mission Avenue Park and Ride along Molter Road, Appleway Avenue, and Signal Road before returning to the park and ride. This routing maintains local connectivity while improving efficiency and travel time reliability.

Route 98 connects the Valley Transit Center in Spokane Valley to the Liberty Lake Park & Ride via Sprague Avenue, Appleway Avenue, Country Vista Drive, and Mission Avenue. This route helps provide access to a portion of the city not currently served by the other bus routes, including some residential neighborhoods.

Route 722 is an express service connecting downtown Liberty Lake to downtown Spokane and the north bank of the Spokane River near the Spokane Arena. It replaces the former Route 172 and provides direct service along Riverside Avenue, continuing north on Monroe Street to the Spokane County Courthouse and Arena. The route also serves the Meadowood Technology Campus in Liberty Lake and operates primarily during peak periods for faster, limited-stop travel.

Route 724 is an express service operating between downtown Spokane and Liberty Lake via I-90, Appleway Avenue, Country Vista Boulevard, and Hawkstone. The route provides fast, limited-stop service focused on commuter travel during peak periods. In the morning, Route 724 operates outbound from Spokane and transitions into Route 722 for the inbound trip. In the afternoon, this pattern reverses, with Route 722 outbound and Route 724 providing the inbound return to Spokane.

2.4 Active Transportation

The Centennial Trail is a regional bikeway that follows the Spokane River and cuts through Liberty Lake. Improving bike lane connections to this trail can greatly improve its accessibility to surrounding communities. There are several bike lanes found along primary roads in Liberty Lake. These roads include Mission Ave (north of I-90), Liberty Lake Road, Country Vista Drive, Kramer Parkway, and Appleway Avenue. Most of these are painted bike lanes. There are a few local roads with bike lanes as well, but coverage can be extended. Liberty Lake has a large network of sidewalks across many of the major roads in the city.

Liberty Lake is currently working on updating their Parks and Recreation Master Plan. This plan will highlight existing active transportation infrastructure, as well as needed improvements.

3. Data Collection

To determine existing conditions both intersection turning movement counts and roadway volume counts were collected as part of this analysis. **Figure 2** summarizes existing traffic volume (2025) in the City including AM and PM peak hour turning movement volumes and peak hour and daily roadway segment volumes. Collected traffic data is included in **Appendix A**.

3.1 Intersection Turning Movement Counts

Quality Counts collected turning movement counts at 17 of the 23 study area intersections on Wednesday, April 30, 2025, in the AM peak period (7:00 AM to 9:00 AM) and the PM peak period (4:00 PM to 6:00 PM).

Turning movement counts for the other 6 study area intersections were collected as part of the "Spokane Valley Subarea Transportation Plan." Those turning movement counts were collected on Wednesday, May 8, 2024, in the AM peak period (7:00 AM to 9:00 AM) and the PM peak period (4:00 PM to 6:00 PM). Those turning movement counts were then adjusted to 2025 levels and some volume balancing was applied. Intersection turning movement count locations, including the date of data collection, are shown in **Table 2**.

Table 2 – Turning Movement Count Locations

#	Intersection	Date
1	I-90 WB Off Ramp / E Country Vista Dr	May 8, 2024
2	N Kramer Pkwy / E Country Vista Dr	April 30, 2025
3	N Legacy Ridge Drive / E Country Vista Dr	May 8, 2024
4	E Mission Ave / N Harvard Rd	April 30, 2025
5	N Harvard Rd / I-90 WB On Ramp	April 30, 2025
6	N Liberty Lake Rd / Appleway Ave	April 30, 2025
7	N Liberty Lake Rd / E Country Vista Dr	April 30, 2025
8	E Mission Ave / E Country Vista Dr	April 30, 2025
9	N Signal Dr / E Appleway Ave	April 30, 2025
10	N Madson St / E Appleway Ave	April 30, 2025
11	N Molter Rd / E Appleway Ave	April 30, 2025
12	N Molter Rd / E Mission Ave	April 30, 2025
13	E Mission Ave / N Harvest Pkwy	May 8, 2024
14	N Country Vista Blvd / E Appleway Ave	April 30, 2025
15	E Mission Ave / N Country Vista Blvd	April 30, 2025
16	N Molter / E Country Vista Dr	April 30, 2025
17	E Sprague Ave / N Molter Rd	April 30, 2025
18	E Mission Ave / Kramer Pkwy	April 30, 2025
19	N Harvard Rd / E Indiana Ave	May 8, 2024
20	N Harvard Rd / E Wellington Pkwy	May 8, 2024
21	E Mission Ave / N Signal Dr	April 30, 2025
22	E Mission Ave / N Madson St	April 30, 2025
23	E Country Vista Dr / Ridgeline HS signal	May 8, 2024

3.2 Roadway Volume Counts

Seventy-two-hour roadway tube counts were collected at 11 locations around the City from Tuesday, April 29, 2025 to Thursday, May 1, 2025. The count locations are shown in **Table 3**.

Table 3 – Roadway Volume Count Locations

Location	Date
E Country Vista Dr between Kramer Pkwy and City Limits	April 29, 2025 to May 1, 2025
E Mission Ave between N Harvard Rd and City Limits	April 29, 2025 to May 1, 2025
N Harvard Road between City Limits and E Mission Ave	April 29, 2025 to May 1, 2025
E Country Vista Dr between N Legacy Ridge Dr and N Liberty Lake Rd	April 29, 2025 to May 1, 2025
N Liberty Lake Rd south of E Country Vista Rd	April 29, 2025 to May 1, 2025
E Appleway Ave between N Signal Dr and N Madson St	April 29, 2025 to May 1, 2025
E Appleway Ave east of N Molter Rd	April 29, 2025 to May 1, 2025
N Molter Rd between E Mission Ave and E Country Vista Dr	April 29, 2025 to May 1, 2025
N Molter Rd between N Country Vista Dr and E Sprague Ave	April 29, 2025 to May 1, 2025
E Mission Ave between E Country Vista Blvd and N Molter Rd	April 29, 2025 to May 1, 2025
N Country Vista Blvd north of E Autumn Crossing	April 29, 2025 to May 1, 2025

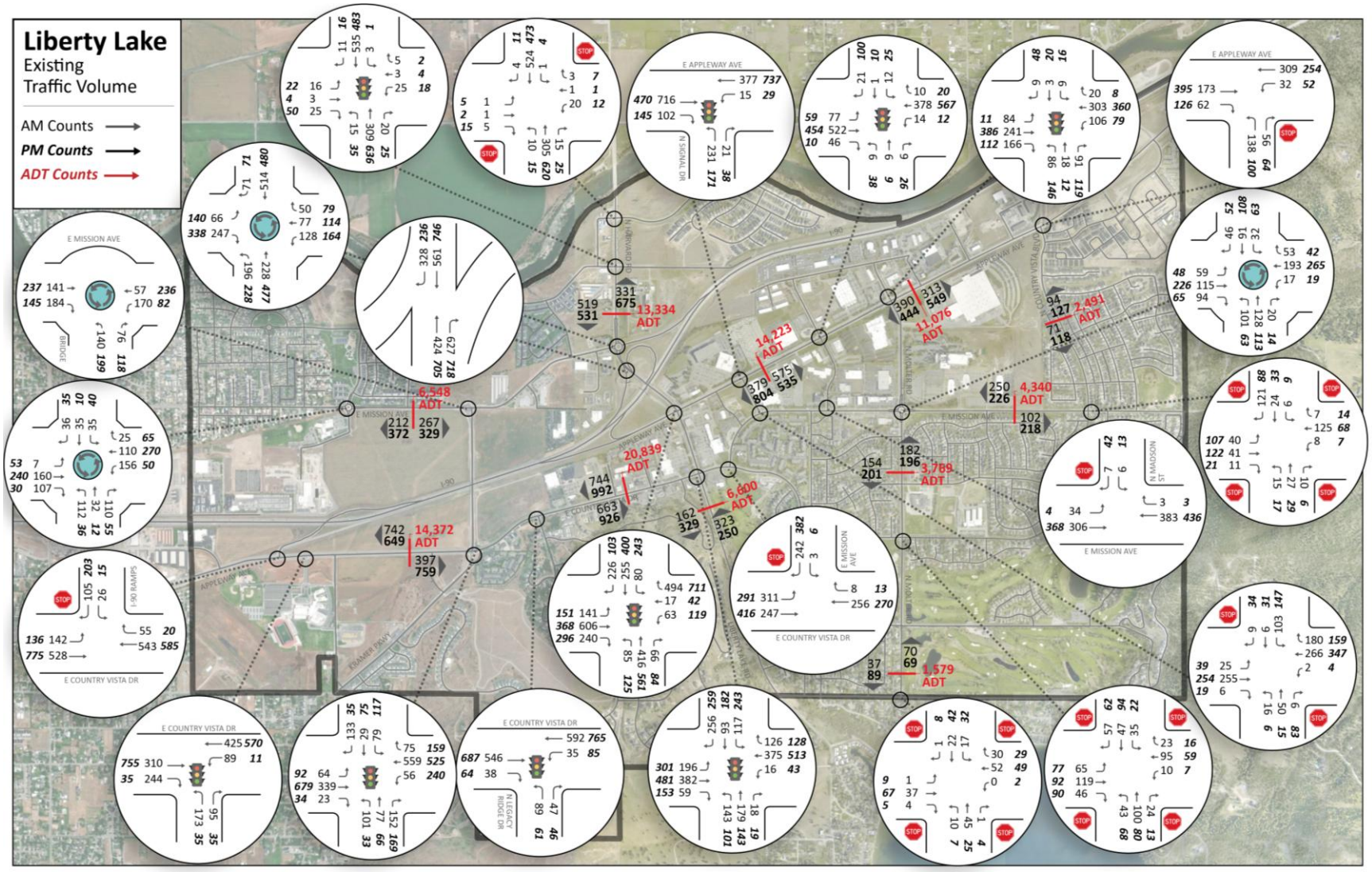

Figure 2 – Existing Traffic Volume (2025)

3.3 Active Transportation

Intersection turning movement counts also include data on pedestrians and bicyclists during peak times. **Table 4** shows AM and PM peak hour pedestrian and bicyclist volumes for each of the study area intersections.

Table 4 – Existing (2025) Peak Hour Pedestrian and Bicyclist Volumes

Int #	Intersection Name	Total Pedestrians		Total Bicyclists	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	I-90 WB Off Ramp / E Country Vista Dr	1	0	0	1
2	N Kramer Pkwy / E Country Vista Dr	4	4	7	2
3	N Legacy Ridge Drive / E Country Vista Dr	4	3	0	0
4	E Mission Ave / N Harvard Rd	4	5	3	1
5	N Harvard Rd / I-90 WB On Ramp	0	0	0	1
6	N Liberty Lake Rd / Appleway Ave	8	3	2	3
7	N Liberty Lake Rd / E Country Vista Dr	4	18	5	9
8	E Mission Ave / E Country Vista Dr	15	23	3	7
9	N Signal Dr / E Appleway Ave	6	0	1	7
10	N Madson St / E Appleway Ave	2	4	0	5
11	N Molter Rd / E Appleway Ave	3	5	3	5
12	N Molter Rd / E Mission Ave	12	18	5	7
13	E Mission Ave / N Harvest Pkwy	7	11	0	0
14	N Country Vista Blvd / E Appleway Ave	2	5	2	2
15	E Mission Ave / N Country Vista Blvd	18	17	0	5
16	N Molter / E Country Vista Dr	50	40	19	11
17	E Sprague Ave / N Molter Rd	12	13	4	4
18	E Mission Ave / Kramer Pkwy	1	12	2	1
19	N Harvard Rd / E Indiana Ave	5	1	0	0
20	N Harvard Rd / E Wellington Pkwy	4	5	0	2
21	E Mission Ave / N Signal Dr	9	3	12	1
22	E Mission Ave / N Madson St	10	28	4	5
23	E Country Vista Dr / Ridgeline HS signal	2	4	0	1

3.4 Golf Carts

Golf cart counts were collected at several of the study area intersections during the AM peak period (7:00 AM to 9:00 AM) and the PM peak period (4:00 PM to 6:00 PM). Golf cart volumes during the AM and PM peak periods are shown in **Figure 3**.

Golf cart volumes were highest in the residential areas in the southwest part of the city, with the highest counted intersection being N Molter / E Country Vista Dr with 11 golf carts between 7:00 AM and 9:00 AM and 20 golf carts between 4:00 PM and 6:00 PM.

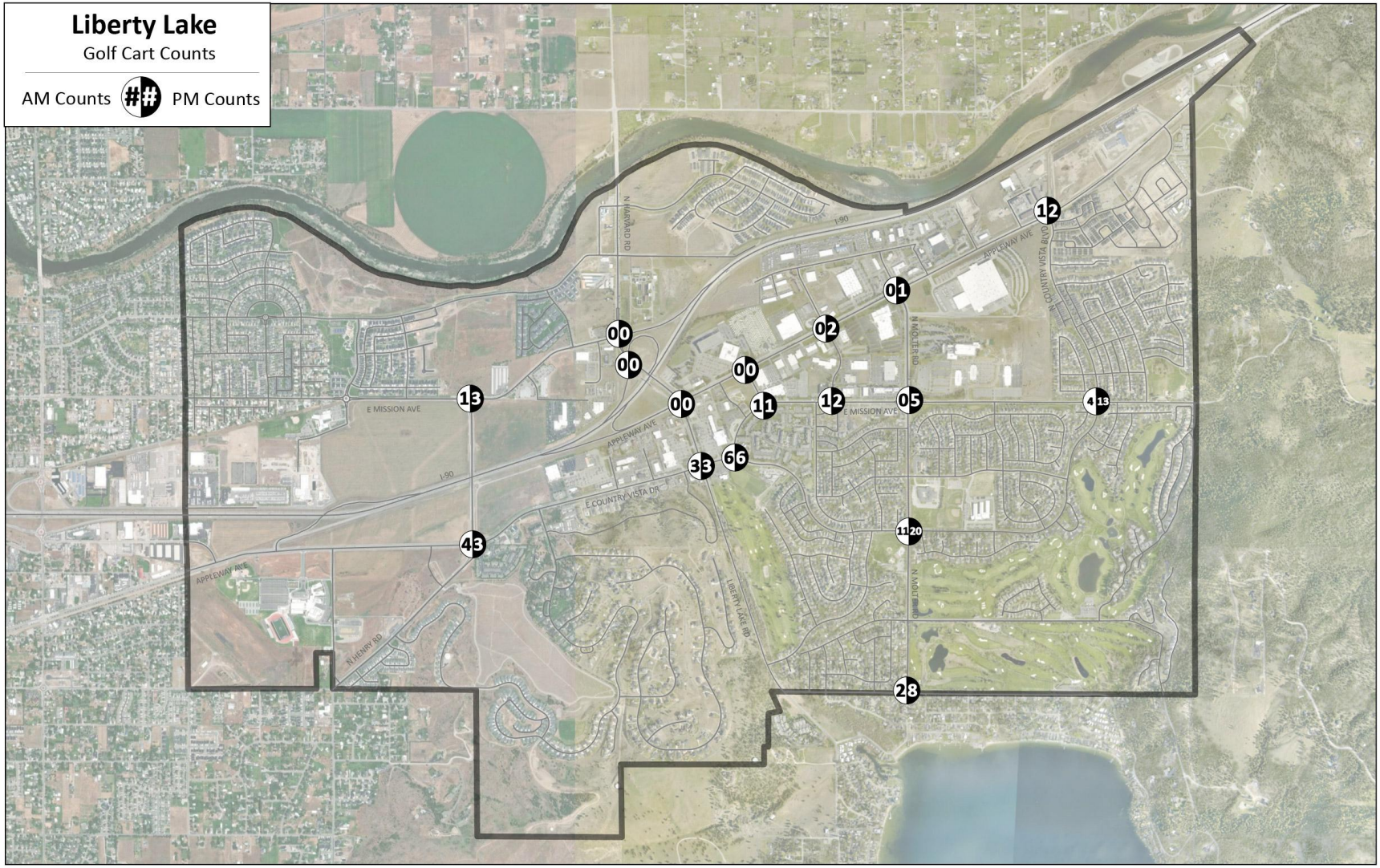

Figure 3 – Existing Golf Cart Volumes (2025)

4. Growth Assumptions

Growth assumptions set the stage for forecasting future traffic volumes at study area intersections and thus understanding transportation system deficiencies. Parametrix conducted an analysis of growth assumptions for both short-term (2028) and long-term (2046) conditions. The primary sources of information to determine the growth assumptions included information about pending and planned developments provided directly by City staff, the Liberty Lake Land Capacity Analysis (February 2025), and socioeconomic forecasts provided within the SRTC regional travel demand model (SRTC model).

4.1 Short-Term Growth (2028)

Parametrix worked closely with City staff to develop assumptions about pending or likely developments in the city within the next three years. Sixteen development areas were identified city-wide and included known or ongoing development and more generic land use growth assumptions for areas likely to develop but where specific plans are unclear or not available at this time.

Parametrix conducted a trip generation analysis to estimate the number of trips new developments would add to city roadways. Where trip generation letters were available for developments, Parametrix used trip generation from those letters. Where trip generation letters were not available for developments, Parametrix used The Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition to select trip generation rates for the planned developments. The trip generation rates are based on studies conducted nationwide.

For each future development, trip generation was calculated for the AM peak hour and the PM peak hour. The trip generation calculation is derived from the square footage or number of dwelling units of a given development.

A build-out adjustment was applied to developments that were anticipated to be partially constructed by 2028. The build-out adjustment was based on the estimated build-out percentage of the future land use in the short-term (2028).

In all, the assumed developments added 1,604 new AM peak hour trips, 2,206 new PM peak hour trips, and 26,511 new daily trips to the Liberty Lake roadway network. Note that a single trip is from an origin to a destination and may go through multiple intersections.

Parametrix then distributed the peak hour trips throughout the road network. Trip distribution for developments was based on trip generation letters that contained development distribution where available and by logical origin and destination pairs and land use patterns where development trip distribution was not available in trip generation letters.

Combining the distributed short-term growth trips with existing traffic counts, Parametrix developed the short-term traffic volumes (2028). **Figure 4** summarizes the short-term traffic volumes (2028). Development trip generation and location assumptions are included in **Appendix B**.

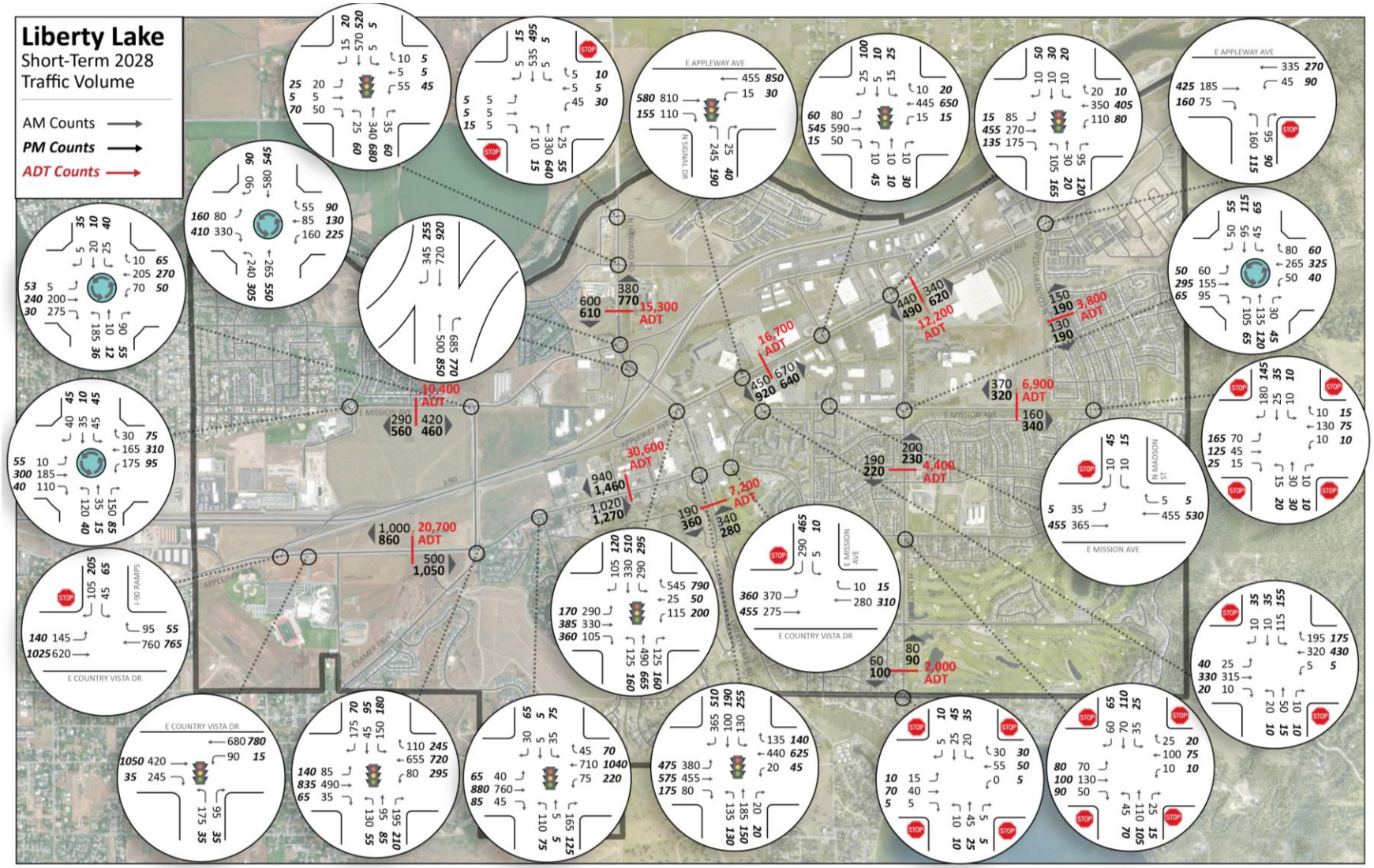

Figure 4 – Short-Term Traffic Volume (2028)

4.2 Long-Term Growth (2046)

Long-term growth projections were guided by the city planning documents previously mentioned, coordination with city staff, as well as the SRTC model. Parametrix used data from the City of Liberty Lake and the SRTC model to analyze the population and employment growth in the city. The SRTC model has a base year of 2022 and a forecast year of 2050. Parametrix used 2024 as a base year and interpolated population and employment data for the analysis year of 2046.

Parametrix worked closely with City staff to understand the planned and desired growth patterns for employment and housing in the city. Parametrix incorporated all this information to refine the SRTC model and generate long-term traffic forecasts as discussed in the following section.

4.2.1 Travel Demand Modeling

The SRTC model was used to develop traffic volume forecasts for 2046 conditions within the City. The SRTC model is a region-wide forecasting tool covering the greater Spokane area from the City of Airway Heights on the west to the City of Liberty Lake on the east. The model utilizes the four-step travel demand forecasting process to evaluate the relationship between land use and the transportation network and thus generate travel pattern predictions for future conditions.

Because of the regional setting of the SRTC model, refinements were made to target results for the smaller scale of this study. Refinements included updates and modifications to base year and horizon year roadway network representations and land use assumptions. For example, Kramer Parkway bridge over I-90 was added in the base year network.

As mentioned previously, land use assumptions for the City in the SRTC model were reviewed with city staff to identify adjustments to better reflect current conditions and plans. The SRTC model divides the region into subareas called traffic analysis zones (TAZs) which contain population, household and employment estimates for their geography. Household and employment values were first modified to better match base year conditions. Then the horizon year population and employment values were adjusted to reflect city land use plans, zoning, and known development proposals. Finally, because the TAZ structure within the city is quite large, additional TAZ centroid connectors were added to represent the travel patterns of smaller TAZs, thus creating virtual TAZ splits. Figure 5 and Figure 6 show the virtual TAZ splits, including households and employment, for the refined SRTC model for 2024 and 2046. Additional documentation of the SRTC model refinement is contained in **Appendix C**.

Finally, with long-term forecasts from the refined SRTC model, Parametrix developed long-term AM and PM intersection turning movement forecasts.

The 2025 existing collected traffic volumes were compared to 2024 base travel demand model outputs forecasts and the 2046 travel demand model outputs to determine the adjustment to apply to 2025 existing collected traffic volumes to forecast 2046 forecasted traffic volumes based on the methodology in National Cooperative Highway Research Program (NCHRP) report 756. Forecasted long-term volumes (2046) were also checked against short-term volumes and increased where necessary. **Figure 7** shows the peak hour long-term traffic volume (2046) at study area intersections.

Figure 5 – 2024 Refined SRTC TAZ MAP

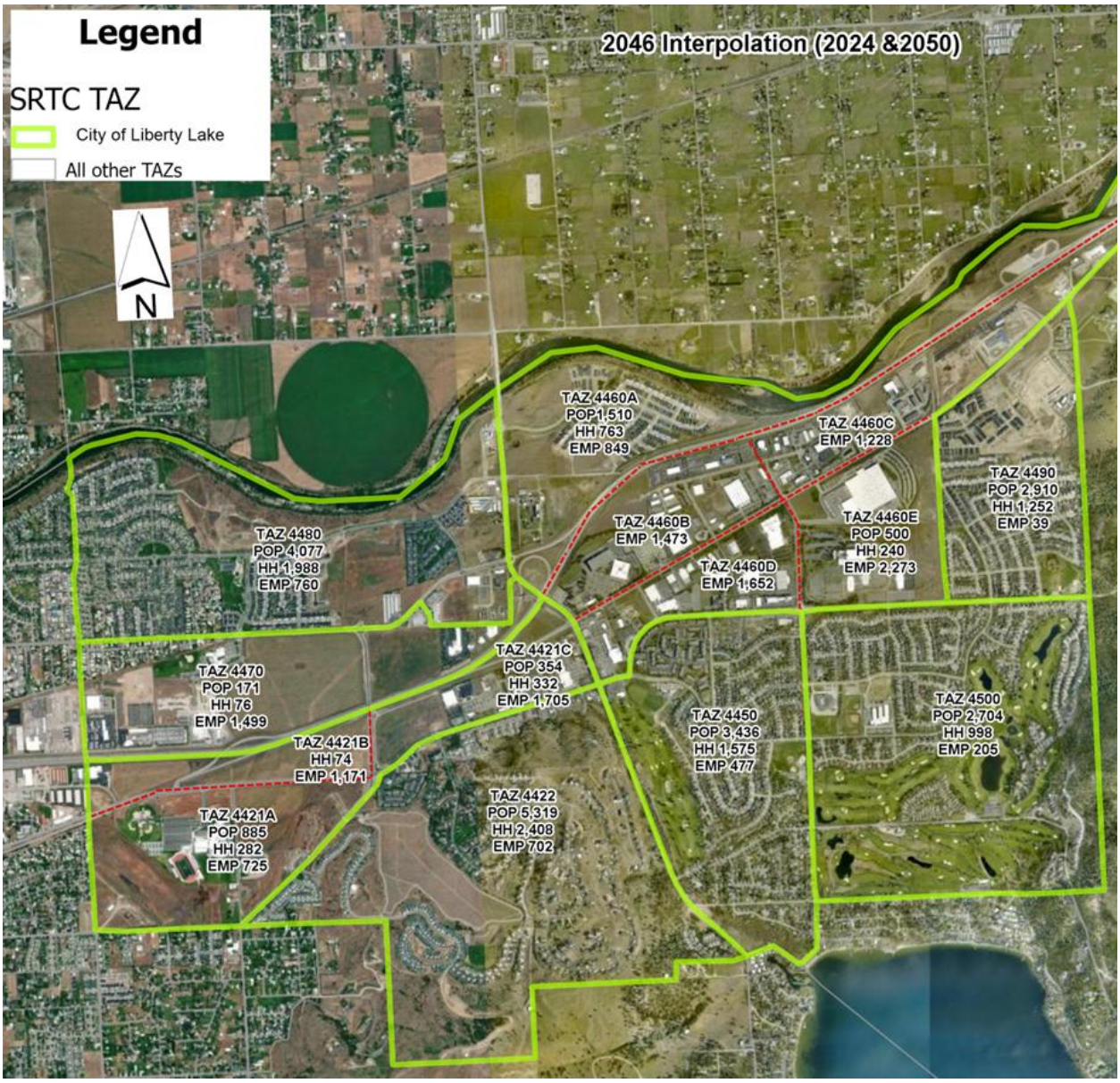

Figure 6 – 2046 Refined SRTC TAZ MAP

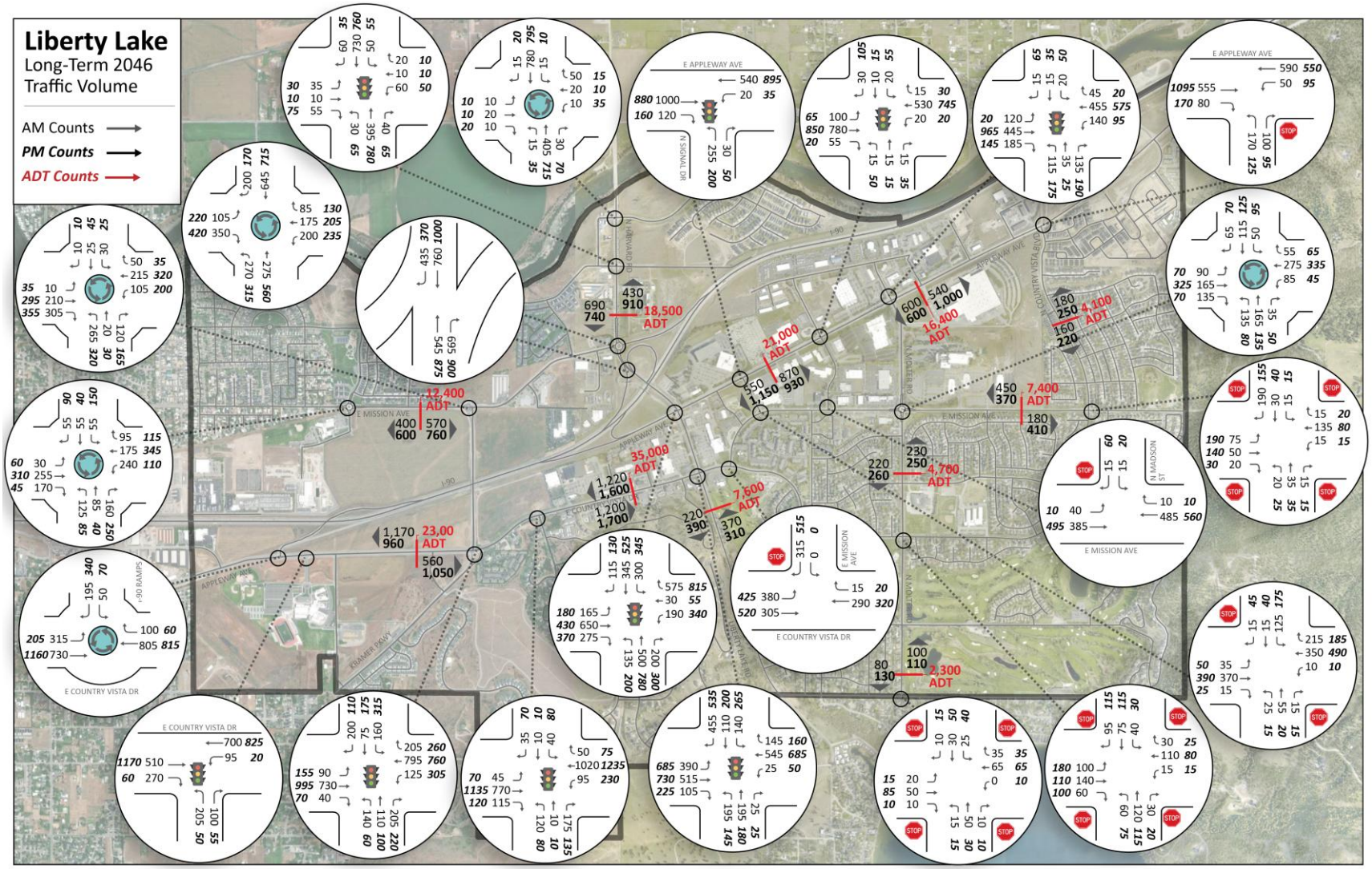

Figure 7 – Long-Term Traffic Volume (2046)

5. Operational Analysis

Parametrix performed an operational analysis on each of the study intersections within Liberty Lake. Intersections were analyzed for three time periods: existing conditions (2025), short-term (2028) and long-term (2046). Mitigation analyses were conducted for short-term (2028) and long-term (2046) conditions. The list of intersections evaluated as part of this analysis was shown previously in **Table 1**.

Traffic volumes used in the existing conditions (2025) analysis can be found in **Figure 2**, traffic volumes used in the short-term (2028) analysis can be found in **Figure 4**, and traffic volumes used in the long-term analysis (2046) can be found in **Figure 7**.

5.1 Analysis Methodology

Vehicular performance at intersections is often defined by the concept of intersection Level of Service (LOS). LOS is defined by average vehicle delay (seconds per vehicle) and is associated with a letter grade on a scale from A (free flowing traffic) to F (intersection failure, major delays). LOS D is often used as a threshold of acceptable traffic operations. In this analysis, mitigations were recommended when intersection performance fell below LOS D.

- A – free flow operation
- B – reasonably unimpeded operation
- C – stable operation
- D – small increases in flow may cause substantial delay
- E – operates with significant delays
- F – operates with extremely slow speeds and/or intersection failures

Parametrix calculated LOS for signalized and stop-controlled intersections using Synchro 11, a traffic engineering software program published by Trafficware using Highway Capacity Manual (HCM) 6th Edition methodology. Where HCM 6th Edition methodology did not provide intersection analysis results, Synchro methodology results were used. **Table 5** illustrates the LOS definitions for unsignalized intersections and signalized intersections.

Table 5 – Level of Service

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

1. Reported for the worst performing movement for minor stop control, reported as the overall intersection for all-way stop-control.

Parametrix utilized the traffic analysis program SIDRA 9 to evaluate the roundabout intersections. SIDRA supports several methodologies for roundabout analysis including the SIDRA standard roundabout model as well as the HCM 6th Edition methodology. For this analysis, Parametrix reported results using the SIDRA methodology which is the methodology supported by the Washington Department of Transportation (WSDOT). SIDRA methodology reports LOS and average delay based on

the signalized intersection thresholds. Volume to capacity ratios (V/C) above 0.9 at roundabouts are called out.

5.2 Existing Conditions Analysis (2025)

Traffic volumes used in the existing conditions (2025) analysis can be found in **Figure 2**. Existing (2025) AM and PM peak hour LOS and delay are shown **Table 6**. Existing (2025) LOS is also shown spatially in **Figure 8**. Existing (2025) 95th percentile queue lengths by approach (longest 95th percentile queue for each approach) are shown in **Table 7**. Analysis outputs are included in **Appendix D**.

All study intersections operate at LOS D or better in the AM peak hour. Most intersections operate at LOS D or better in the PM peak hour except for the following:

- E Mission Ave / E Country Vista Dr (intersection 8): the southbound stop-controlled left turn lane operates at LOS E.
- E Mission Ave/N Signal Dr (intersection 21): the southbound stop-controlled approach operates at LOS F.

Table 6 – Existing LOS (2025)

#	Intersection	Existing Intersection Control	LOS (Delay in sec/veh)	
			AM	PM
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB	C (24)/SBL	C (19)/SBL
2	N Kramer Pkwy / E Country Vista Dr	Signal	B (19)	B (19)
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	A (6)	A (6)
4	E Mission Ave / N Harvard Rd	Roundabout	A (9)	B (11)
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	C (27)	D (38)
7	N Liberty Lake Rd / E Country Vista Dr	Signal	B (16)	B (18)
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	D (33)/SBL	**E (36)/SBL**
9	N Signal Dr / E Appleway Ave	Signal	A (10)	A (7)
10	N Madson St / E Appleway Ave	Signal	A (9)	B (10)
11	N Molter Rd / E Appleway Ave	Signal	B (12)	B (13)
12	N Molter Rd / E Mission Ave	Roundabout	A (6)	A (6)
13	E Mission Ave / N Harvest Pkwy	Roundabout	A (7)	A (6)
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	B (15)/NBL	C (17)/NBL
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	A (9)	A (9)
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	B (11)	B (10)
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	A (8)	A (8)
18	E Mission Ave / Kramer Pkwy	Roundabout	A (6)	A (6)
19	N Harvard Rd / E Indiana Ave	Signal	A (9)	A (10)
20	N Harvard Rd / E Wellington Pkwy	Stop-Controlled EB/WB	C (18)/EBL	D (28)/WBL
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	D (28)/SB	**F (>50)/SB**
22	E Mission Ave / N Madson St	Stop-Controlled SB	B (12)/SB	B (12)/SB
23	E Country Vista Dr / Ridgeline HS signal	Signal	C (30)	C (21)

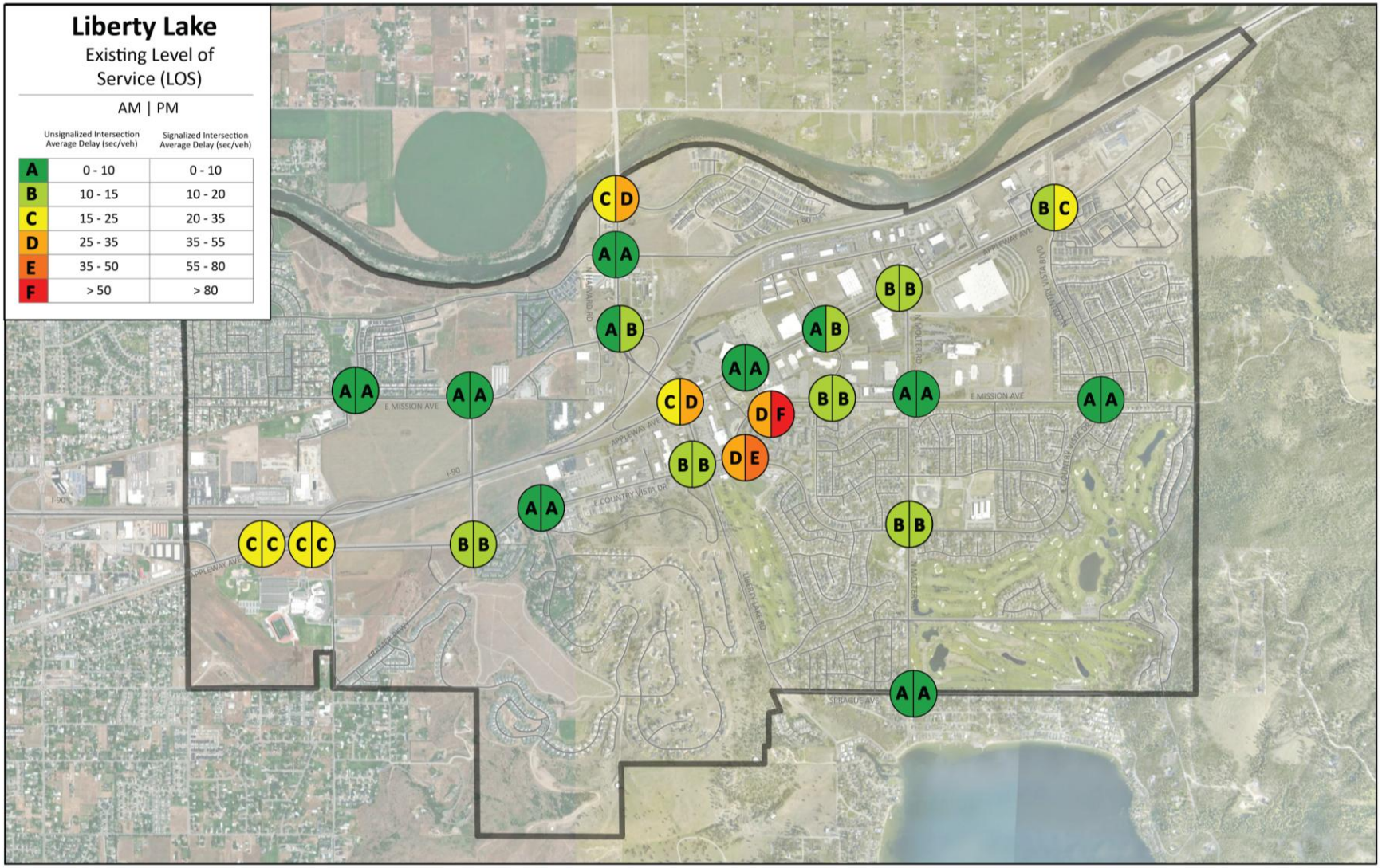

Figure 8 – Existing LOS (2025)

Table 7 – Existing 95th Percentile Queue Lengths (2025)

#	Intersection	Existing Intersection Control	95th Percentile Queues (feet)							
			AM				PM			
			NB	SB	EB	WB	NB	SB	EB	WB
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB	-	25	25	-	-	25	0	-
2	N Kramer Pkwy / E Country Vista Dr	Signal	175	125	100	200	150	50	200	150
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	25	-	50	0	25	-	50	0
4	E Mission Ave / N Harvard Rd	Roundabout	75	150	75	50	150	150	150	150
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-	-	-	-	-	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	150	200	200	200	275	300	275	375
7	N Liberty Lake Rd / E Country Vista Dr	Signal	50	125	100	125	50	150	150	175
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	-	25	25	-	-	75	25	-
9	N Signal Dr / E Appleway Ave	Signal	100	-	100	25	50	-	50	25
10	N Madson St / E Appleway Ave	Signal	0	0	50	50	25	25	50	100
11	N Molter Rd / E Appleway Ave	Signal	25	0	50	50	50	25	75	50
12	N Molter Rd / E Mission Ave	Roundabout	25	25	25	25	25	25	50	50
13	E Mission Ave / N Harvest Pkwy	Roundabout	25	25	25	25	25	25	50	50
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	25	-	-	0	25	-	-	0
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	0	25	0	25	0	25	25	0
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	25	25	50	25	25	25	50	0
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	0	0	0	0	0	0	0	0
18	E Mission Ave / Kramer Pkwy	Roundabout	25	-	50	25	50	-	50	50
19	N Harvard Rd / E Indiana Ave	Signal	25	50	0	0	50	50	0	25
20	N Harvard Rd / E Wellington Pkwy	Stop-Controlled EB/WB	0	0	0	0	0	0	0	0
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	25	50	0	0	0	150	0	0
22	E Mission Ave / N Madson St	Stop-Controlled SB	-	0	0	-	-	0	0	-
23	E Country Vista Dr / Ridgeline HS signal	Signal	200	-	200	150	25	-	250	125

5.3 Short-Term Analysis (2028)

Traffic volumes used in the short-term (2028) analysis can be found in **Figure 4**. Short-term (2028) AM and PM peak hour LOS and delay are shown **Table 8**. Short-term (2028) LOS is also shown spatially in **Figure 9**. Short-term (2028) 95th percentile queue lengths by approach (longest 95th percentile queue for each approach) are shown in **Table 9**. Analysis outputs are included in **Appendix E**.

All study intersections operate at LOS D or better in the AM peak hour except for the following:

- I-90 WB Off Ramp / E Country Vista Dr (intersection 1): the southbound stop-controlled left turn lane operates at LOS E.
- E Mission Ave / E Country Vista Dr (intersection 8): the southbound stop-controlled left turn lane operates at LOS E.
- E Mission Ave/N Signal Dr (intersection 21): the southbound stop-controlled approach operates at LOS F.

All study intersections operate at LOS D or better in the PM peak hour except for the following:

- N Liberty Lake Rd / Appleway Ave (intersection 6): the intersection operates at LOS E.
- N Liberty Lake Rd / E Country Vista Dr (intersection 7): the intersection operates at LOS E.
- E Mission Ave / E Country Vista Dr (intersection 8): the southbound stop-controlled left turn lane operates at LOS F.
- N Harvard Rd/E Wellington Pkwy (intersection 20): the westbound stop-controlled left turn lane operates at LOS E.
- E Mission Ave/N Signal Dr (intersection 21): the southbound stop-controlled approach operates at LOS F.

Table 8 – Short-Term LOS (2028)

#	Intersection	Existing Intersection Control	LOS (Delay in sec/veh)	
			AM	PM
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB	**E (42)/SBL**	D (32)/SBL
2	N Kramer Pkwy / E Country Vista Dr	Signal	C (30)	C (30)
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	B (11)	B (12)
4	E Mission Ave / N Harvard Rd	Roundabout	A (10)	B (16)
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	D (37)	**E (57)**
7	N Liberty Lake Rd / E Country Vista Dr	Signal	C (29)	**E (61)**
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	**E (47)/SBL**	**F (>50)/SBL**
9	N Signal Dr / E Appleway Ave	Signal	B (10)	A (8)
10	N Madson St / E Appleway Ave	Signal	A (9)	B (11)
11	N Molter Rd / E Appleway Ave	Signal	B (13)	B (14)
12	N Molter Rd / E Mission Ave	Roundabout	A (7)	A (7)
13	E Mission Ave / N Harvest Pkwy	Roundabout	A (7)	A (6)
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	C (16)/NBL	C (20)/NBL
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	A (10)	B (10)
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	B (13)	B (11)
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	A (8)	A (8)
18	E Mission Ave / Kramer Pkwy	Roundabout	A (7)	A (7)
19	N Harvard Rd / E Indiana Ave	Signal	B (11)	B (11)
20	N Harvard Rd / E Wellington Pkwy	Stop-Controlled EB/WB	C (20)/EBL	**E (37)/WBL**
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	**F (>50)/SB**	**F (>50)/SB**
22	E Mission Ave / N Madson St	Stop-Controlled SB	B (14)/SB	B (14)/SB
23	E Country Vista Dr / Ridgeline HS signal	Signal	C (33)	B (19)

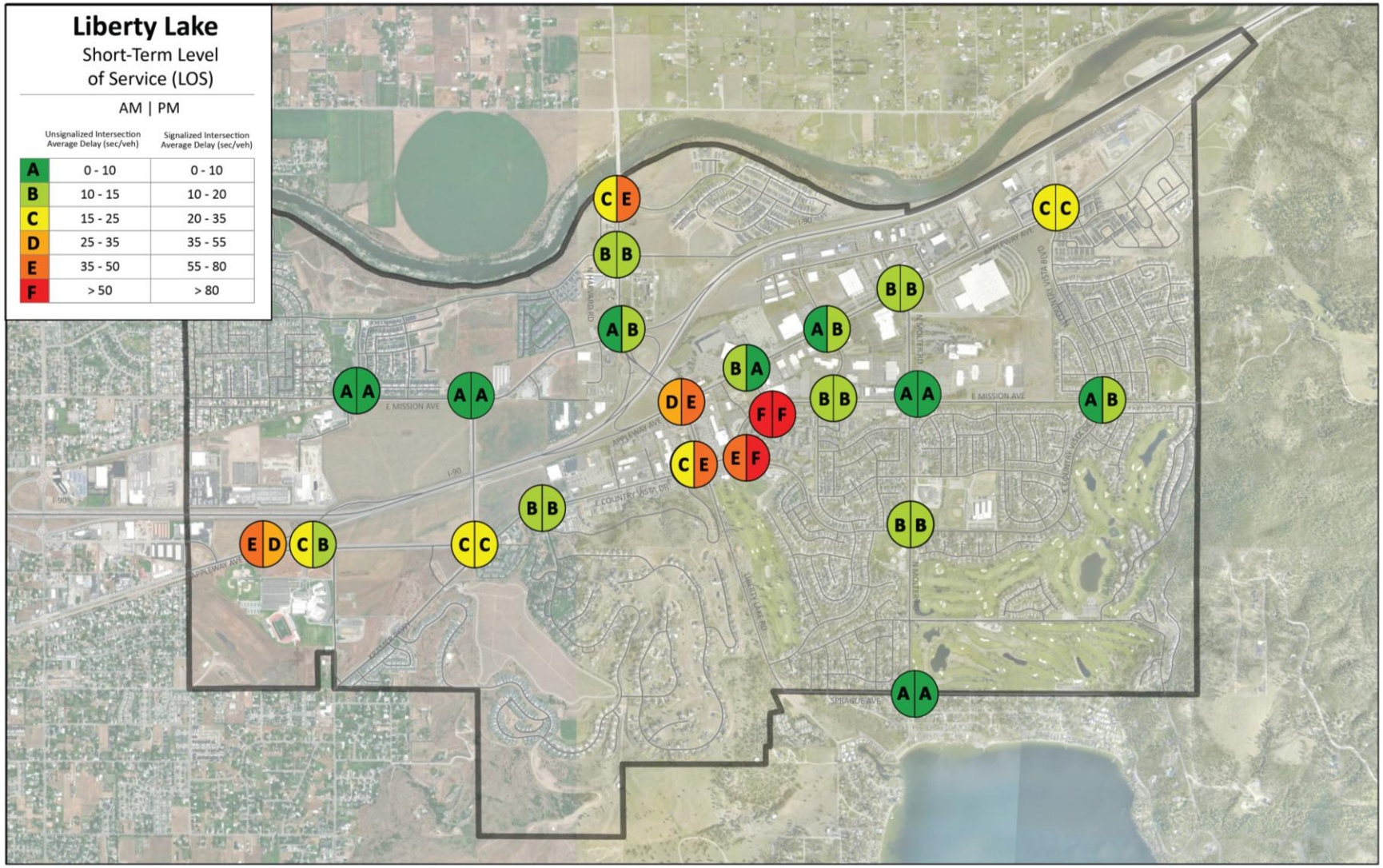

Figure 9 – Short-Term LOS (2028)

Table 9 – Short-Term 95th Percentile Queue Lengths (2028)

#	Intersection	Existing Intersection Control	95th Percentile Queues (feet)							
			AM				PM			
			NB	SB	EB	WB	NB	SB	EB	WB
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB	-	50	25	-	-	50	25	-
2	N Kramer Pkwy / E Country Vista Dr	Signal	300	200	225	375	250	100	350	230
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	75	25	250	225	75	50	175	175
4	E Mission Ave / N Harvard Rd	Roundabout	75	200	150	75	200	250	300	300
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-	-	-	-	-	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	250	350	275	275	400	475	450	575
7	N Liberty Lake Rd / E Country Vista Dr	Signal	100	350	300	275	125	700	775	525
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	-	50	50	-	-	100	25	-
9	N Signal Dr / E Appleway Ave	Signal	125	-	150	25	75	-	75	50
10	N Madson St / E Appleway Ave	Signal	0	25	75	50	50	50	75	100
11	N Molter Rd / E Appleway Ave	Signal	25	0	75	50	50	25	100	75
12	N Molter Rd / E Mission Ave	Roundabout	50	25	50	75	50	50	75	75
13	E Mission Ave / N Harvest Pkwy	Roundabout	50	25	50	50	25	25	75	50
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	50	-	-	0	50	-	-	0
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	0	25	25	25	0	25	25	25
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	25	25	75	25	25	25	50	25
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	0	0	0	0	0	0	0	0
18	E Mission Ave / Kramer Pkwy	Roundabout	50	0	75	50	75	0	75	75
19	N Harvard Rd / E Indiana Ave	Signal	50	75	25	25	75	75	50	25
20	N Harvard Rd / E Wellington Pkwy	Stop-Controlled EB/WB	0	0	0	25	0	0	0	25
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	25	100	0	0	25	275	0	0
22	E Mission Ave / N Madson St	Stop-Controlled SB	-	0	0	-	-	25	0	-
23	E Country Vista Dr / Ridgeline HS signal	Signal	200	-	300	250	50	-	375	175

5.4 Short-Term Mitigation Analysis (2028)

Intersections that operated below LOS D under short-term (2028) conditions were evaluated for mitigations. The following sections document the short-term (2028) mitigation analysis. Analysis outputs are included in Appendix F.

5.4.1 Intersection 1: I-90 WB Off Ramp / E Country Vista Dr

The I-90 WB Off Ramp / E Country Vista Dr intersection southbound stop-controlled left turn lane operates at LOS E in the AM peak hour in short-term (2028) conditions. This intersection is under the jurisdiction of WSDOT and is about 500 feet west of the E Country Vista Dr /Ridgeline HS signal intersection.

Parametrix analyzed a multi-lane roundabout and a signal at the intersection. Both are mitigation options at the intersection. The multi-lane roundabout alternative would operate at LOS A in both the AM and PM peak hour and the signal alternative would operate at LOS B in the AM and PM peak hours. However, because this is a WSDOT intersection, coordination with WSDOT will be needed in order to determine the preferred mitigation alternative.

5.4.2 Intersection 6: N Liberty Lake Rd / Appleway Ave

The N Liberty Lake Rd / Appleway Ave intersection operates at LOS E in the PM peak hour. With the added development volumes under short-term (2028) conditions, the westbound right turn volume at the intersection approaches 800 vehicles in the PM peak hour. There are currently dual westbound right turn lanes at the intersection with protected right turn phasing.

Implementing an overlap phase for the westbound right turn would allow the westbound right turning vehicles to have a green arrow during the protected southbound left turn phase. This would provide the westbound right turning vehicles additional green time during the signal cycle to turn right and would decrease delay and queuing at the intersection. With a westbound right turn overlap phase, the intersection operates at LOS C (32 sec/veh) in the AM peak hour and LOS D (45 sec/veh) in the PM peak hour.

5.4.3 Intersection 7: N Liberty Lake Rd / E Country Vista Dr

The N Liberty Lake Rd / E Country Vista Dr intersection operates at LOS E in the PM peak hour. With the added development volumes under short-term (2028) conditions, the eastbound left turn volume at the intersection approaches 500 vehicles in the PM peak hour. Currently there is a single eastbound left turn lane.

Constructing an additional eastbound left-turn lane allows the intersection to operate at LOS C (25 sec/veh) in the AM peak hour and LOS D (45 sec/veh) in the PM peak hour.

5.4.4 Intersection 8: E Mission Ave / E Country Vista Dr

The E Mission Ave / E Country Vista Dr intersection southbound stop-controlled left-turn lane operates at LOS F in both the AM and the PM peak hour. All other movements operate at acceptable levels.

There are minimal southbound left turning vehicles (5 in the AM peak hour and 10 in the PM peak hour) and minimal southbound left turn queuing. However, due to conflicting turning movements, finding a gap in traffic is difficult for southbound left turners. Signage could be installed to instruct

motorists to not take a southbound left turn during peak hours. With restricted southbound left turns during peak hours the worst movement at the intersection is the southbound right turning movement which operates at LOS B (12 sec/veh) in the AM peak hour and LOS C (16 sec/veh) in the PM peak hour.

5.4.5 Intersection 20: N Harvard Rd/E Wellington Pkwy

The N Harvard Rd/E Wellington Pkwy intersection westbound stop-controlled left turn lane operates at LOS E in the PM peak hour. Based on discussions with Liberty Lake staff, planned improvements at this intersection include a multi-lane roundabout with two approach lanes north and south and one approach lane east and west or a signal. The improvement is developer driven.

With the multi-lane roundabout the intersection operates at LOS A (4 sec/veh) in the AM peak hour and LOS A (3 sec/veh) in the PM peak hour. With a signal the intersection operates at LOS A (6 sec/veh) in the AM peak hour and LOS A (6 sec/veh) in the PM peak hour.

5.4.6 Intersection 21: E Mission Ave/N Signal Dr

The E Mission Ave/N Signal Dr intersection southbound approach operates at LOS F in both the AM and PM peak hour. This poor LOS is due to southbound volume (left turners in particular) having a hard time finding gaps due to conflicting turning movements.

Several alternatives were evaluated that addressed LOS concerns including restricting southbound left and through movements, signalization, and the construction of a roundabout. However, the northwest corner of the intersection is the planned development site for a new library. In coordination with Liberty Lake staff, it was determined that the alternative evaluation for this intersection would coincide with the development of the library and that the preferred mitigation for this analysis would be no-build.

5.4.7 Short-Term (2028) Preferred Mitigation Summary

The preferred short-term (2028) mitigations are shown in **Table 10**. LOS for the short-term (2028) mitigated conditions is shown in **Figure 10**.

Table 10 – Preferred Short-Term (2028) Mitigations

#	Intersection	Preferred Short-Term (2028) Mitigations	LOS (Delay in sec/veh)	
			AM	PM
1	I-90 WB Off Ramp / E Country Vista Dr	Multi-Lane Roundabout	A (6)	A (6)
		Signal	15 (B)	19 (B)
6	N Liberty Lake Rd / Appleway Ave	WBR Overlap Phase	C (32)	D (45)
7	N Liberty Lake Rd / E Country Vista Dr	Dual EBL Turn Lanes	C (25)	D (45)
8	E Mission Ave / E Country Vista Dr	Restrict SBL Turns	B (12)/SBR	C (16)/SBR
20	N Harvard Rd / E Wellington Pkwy	Developer Driven Multi-Lane Roundabout	A (4)	A (3)
		Developer Driven Signal	A (6)	A (6)
21	E Mission Ave / N Signal Dr	No-Build	F (>50)/SB	F (>50)/SB

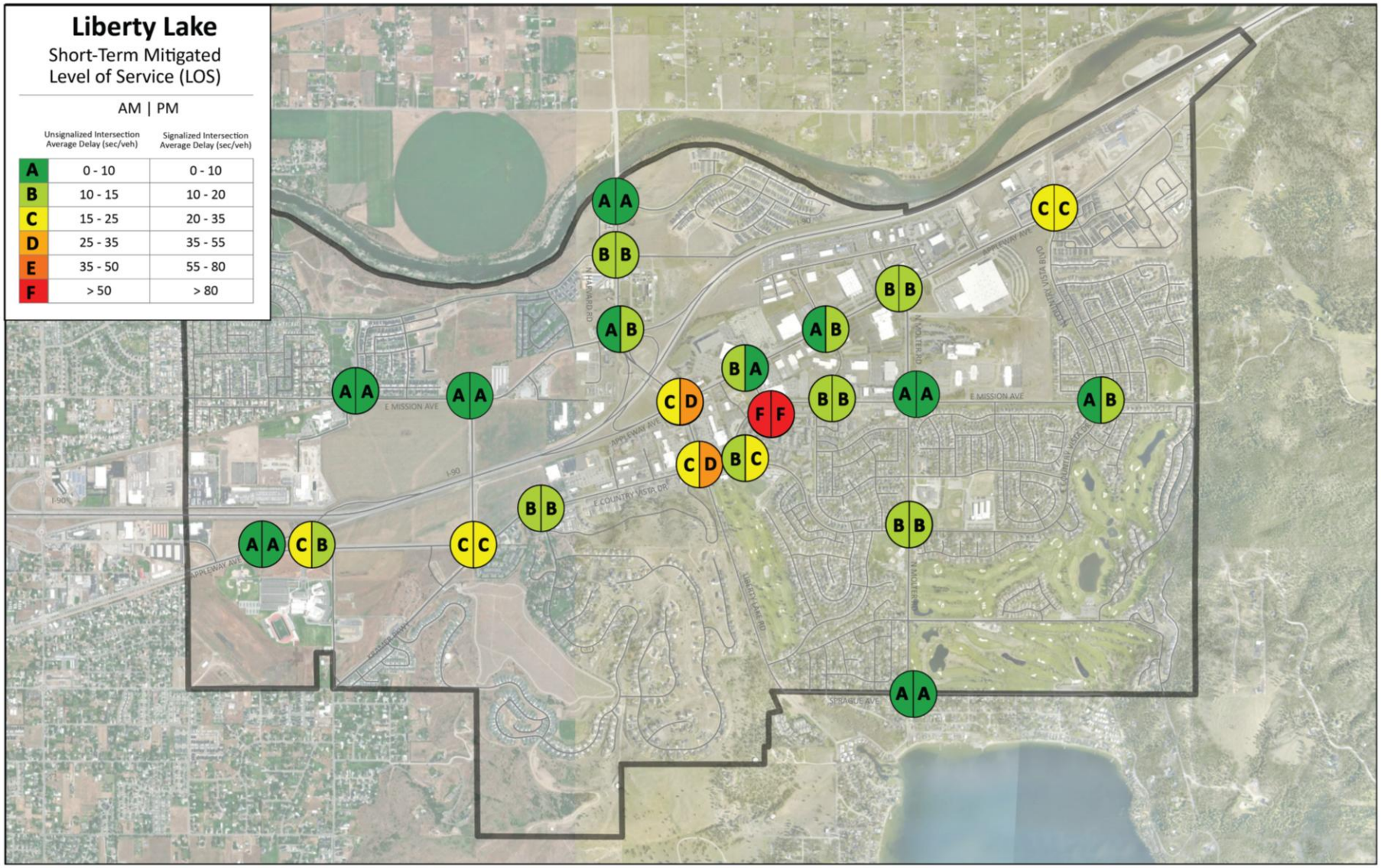

Figure 10 – Short-Term Mitigated LOS (2028)

5.5 Long-Term Analysis (2046)

The long-term (2046) analysis assumes the construction of the short-term (2028) preferred mitigations shown in **Table 10**. Traffic volumes used in the long-term (2046) analysis can be found in **Figure 7**. Long-term (2046) AM and PM peak hour LOS and delay are shown **Table 11**. Long-term (2046) LOS is also shown spatially in **Figure 11**. Long-term (2046) 95th percentile queue lengths by approach (longest 95th percentile queue for each approach) are shown in **Table 12**. Analysis outputs are included in **Appendix G**.

All study intersections operate at LOS D or better in the AM peak hour except for the following:

- E Mission Ave / N Harvard Rd (intersection 4): the intersection has a V/C ratio greater than 0.9.
- N Kramer Pkwy / E Country Vista Dr (intersection 2): the intersection operates at LOS E.
- N Country Vista Blvd / E Appleway Ave (intersection 14): the northbound stop-controlled left turn lane operates at LOS E.
- E Mission Ave/N Signal Dr (intersection 21): the southbound stop-controlled approach operates at LOS F.

All study intersections operate at LOS D or better in the PM peak hour except for the following:

- E Mission Ave / N Harvard Rd (intersection 4): the intersection operates at LOS E and has a V/C ratio greater than 0.9.
- N Liberty Lake Rd / Appleway Ave (intersection 6): the intersection operates at LOS E.
- N Liberty Lake Rd / E Country Vista Dr (intersection 7): the intersection operates at LOS E.
- N Country Vista Blvd / E Appleway Ave (intersection 14): the northbound stop-controlled left turn lane operates at LOS F.
- E Mission Ave/N Signal Dr (intersection 21): the southbound stop-controlled approach operates at LOS F.

Table 11 – Long-Term LOS (2046)

#	Intersection	Short-Term Mitigated Intersection Control	LOS (Delay in sec/veh)	
			AM	PM
1	I-90 WB Off Ramp / E Country Vista Dr	Roundabout	A (8)	A (7)
2	N Kramer Pkwy / E Country Vista Dr	Signal	**E (64)**	D (51)
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	B (13)	B (15)
4	E Mission Ave / N Harvard Rd	Roundabout	C (23)*	**E (58)***
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	D (41)	**E (72)**
7	N Liberty Lake Rd / E Country Vista Dr	Signal	D (42)	**E (68)**
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	B (13)/SBR	C (18)/SBR
9	N Signal Dr / E Appleway Ave	Signal	B (13)	A (9)
10	N Madson St / E Appleway Ave	Signal	A (10)	B (13)
11	N Molter Rd / E Appleway Ave	Signal	B (15)	C (27)
12	N Molter Rd / E Mission Ave	Roundabout	A (7)	A (7)
13	E Mission Ave / N Harvest Pkwy	Roundabout	A (8)	A (8)
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	**E (38)/NBL**	**F (>50)/NBL**
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	B (10)	B (11)
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	C (17)	C (16)
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	A (8)	A (8)
18	E Mission Ave / Kramer Pkwy	Roundabout	A (7)	A (9)
19	N Harvard Rd / E Indiana Ave	Signal	B (12)	B (12)
20	N Harvard Rd / E Wellington Pkwy	Roundabout	A (4)	A (4)
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	**F (>50)/SB**	**F (>50)/SB**
22	E Mission Ave / N Madson St	Stop-Controlled SB	B (14)/SB	B (15)/SB
23	E Country Vista Dr / Ridgeline HS signal	Signal	D (40)	C (23)

*Roundabout V/C ratio above 0.9.

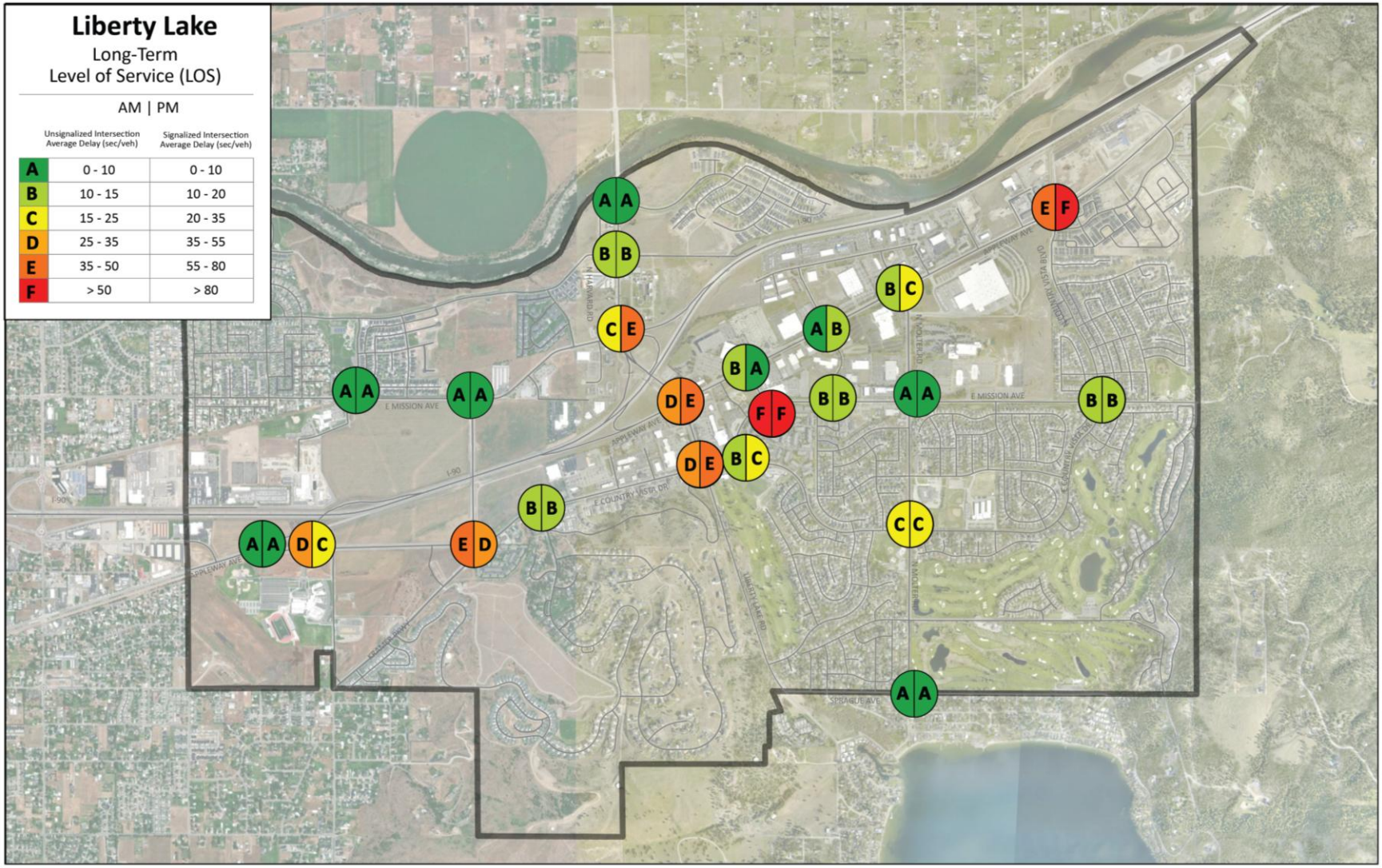

Figure 11 – Long-Term LOS (2046)

Table 12 – Long-Term 95th Percentile Queue Lengths (2046)

#	Intersection	Short-Term Mitigated Intersection Control	95th Percentile Queues (feet)							
			AM				PM			
			NB	SB	EB	WB	NB	SB	EB	WB
1	I-90 WB Off Ramp / E Country Vista Dr	Stop-Controlled SB	-	75	125	150	-	100	125	75
2	N Kramer Pkwy / E Country Vista Dr	Signal	375	275	450	850	300	300	575	450
3	N Legacy Ridge Drive / E Country Vista Dr	Signal	125	25	175	200	100	50	300	275
4	E Mission Ave / N Harvard Rd	Roundabout	100	800	250	125	250	1125	750	1200
5	N Harvard Rd / I-90 WB On Ramp	Free	-	-	-	-	-	-	-	-
6	N Liberty Lake Rd / Appleway Ave	Signal	275	450	350	275	575	775	525	750
7	N Liberty Lake Rd / E Country Vista Dr	Signal	150	550	250	450	125	800	525	675
8	E Mission Ave / E Country Vista Dr	Stop-Controlled SB	-	50	50	-	-	150	50	-
9	N Signal Dr / E Appleway Ave	Signal	125	-	225	50	100	-	150	50
10	N Madson St / E Appleway Ave	Signal	25	25	100	75	50	50	175	150
11	N Molter Rd / E Appleway Ave	Signal	75	0	125	100	125	50	375	125
12	N Molter Rd / E Mission Ave	Roundabout	70	50	50	75	50	50	75	75
13	E Mission Ave / N Harvest Pkwy	Roundabout	50	25	75	75	75	50	75	100
14	N Country Vista Blvd / E Appleway Ave	Stop-Controlled NB	100	-	-	0	125	-	-	25
15	E Mission Ave / N Country Vista Blvd	All Way Stop-Controlled	0	50	25	25	25	50	50	25
16	N Molter / E Country Vista Dr	All Way Stop-Controlled	50	50	150	50	25	50	150	25
17	E Sprague Ave / N Molter Rd	All Way Stop-Controlled	0	0	0	25	0	25	25	25
18	E Mission Ave / Kramer Pkwy	Roundabout	50	0	75	50	100	25	175	125
19	N Harvard Rd / E Indiana Ave	Signal	50	125	50	50	125	125	75	25
20	N Harvard Rd / E Wellington Pkwy	Roundabout	25	50	0	0	50	50	0	0
21	E Mission Ave / N Signal Dr	Stop-Controlled NB/SB	50	200	0	0	25	500	0	0
22	E Mission Ave / N Madson St	Stop-Controlled SB	-	0	0	-	-	25	0	-
23	E Country Vista Dr / Ridgeline HS signal	Signal	225	-	375	250	75	-	525	200

5.6 Long-Term Mitigation Analysis (2046)

Intersections that operated below LOS D under long-term (2046) conditions were evaluated for mitigations. The following sections document the long-term (2046) mitigation analysis. Analysis outputs are included in Appendix H.

5.6.1 Intersection 2: N Kramer Pkwy / E Country Vista Dr

The N Kramer Pkwy / E Country Vista Dr intersection operates at LOS E in the AM peak hour. As traffic volumes increase at the intersection in long-term (2046) conditions, the existing cycle length of 90 seconds is too low.

Increasing the cycle length at the signal to 120 seconds, which matches many other signals in the city, in conjunction with adjusting phase splits will allow the signal operations to improve in the future. With the increased cycle length and optimized phase splits, the signalized intersection operates at LOS D (41 sec/veh) in the AM peak hour and LOS D (45 sec/veh) in the PM peak hour.

5.6.2 Intersection 4: E Mission Ave / N Harvard Rd

The E Mission Ave / N Harvard Rd roundabout operates at LOS E in the PM peak hour and experiences extensive queuing in both the AM and PM peak hours. The intersection V/C ratio is above 0.9 in both the AM and PM peak hours. The three worst performing approaches are the southbound, the eastbound, and the westbound approaches.

N Harvard Rd has a five-lane cross-section north of the roundabout. E Mission Ave also has a five-lane cross section west of the intersection. Expanding the roundabout to include two lanes approaching and two lanes exiting the roundabout on the southbound and eastbound approaches, a second exit lane on the northbound approach, and expanding the I-90 westbound approach to be two lanes would address the operation deficiencies at the roundabout. Also, based on the dimensions of the roundabout it appears that the roundabout was originally constructed with space to be converted to a multi-lane roundabout.

The expanded roundabout operates at LOS A (8 sec/veh) in the AM peak hour and LOS B (11 sec/veh) in the PM peak hour.

5.6.3 Intersection 6: N Liberty Lake Rd / Appleway Ave

The N Liberty Lake Rd / Appleway Ave intersection operates at LOS E in the PM peak hour. In long-term (2046) conditions both the southbound left turn and westbound left turn volumes approach 350 vehicles in the PM peak hour. A single left turn lane on both the southbound and westbound approaches is no longer sufficient for traffic volumes.

With the addition of a second southbound left turn lane and a second westbound left turn lane the intersection operates at LOS C (29 sec/veh) in the AM peak hour and LOS D (43 sec/veh) in the PM peak hour.

5.6.4 Intersection 7: N Liberty Lake Rd / E Country Vista Dr

The N Liberty Lake Rd / E Country Vista Dr intersection operates at LOS E in the PM peak hour. Southbound right turning volumes exceed 450 vehicles in the AM peak hour and approach 550 vehicles in the PM peak hour leading to poor LOS and extensive queuing.

The southbound approach of the intersection currently has a left turn lane and two through lanes, the outer through lane being a shared right turn lane. With the high long-term (2046) southbound right turning volumes the intersection needs a dedicated southbound right turn lane. This could be accomplished by either constructing a southbound right turn lane or by converting one of the two southbound through lanes into a southbound right turn lane. Converting a southbound through lane into a southbound right turn lane works because of the relatively low southbound through volume.

In addition to a dedicated southbound right turn lane, the implementation of a southbound right turn overlap phase would allow the southbound right turning vehicles to get a green arrow during the eastbound left turn phase. The eastbound left turning movement and the southbound right turning movement are the highest volume turning movements at the intersection in long-term (2046) conditions.

With the implementation of a dedicated southbound right turn lane and southbound overlap right turn phasing, the intersection operates at LOS C (29 sec/veh) in the AM peak hour and LOS D (43 sec/veh) in the PM peak hour.

5.6.5 Intersection 14: N Country Vista Blvd / E Appleway Ave

The N Country Vista Blvd / E Appleway Ave intersection northbound left turn lane operates at LOS E in the AM peak hour and LOS F in the PM peak hour. As volumes grow in long-term (2046) conditions, gaps for northbound left turning vehicles become more difficult to find and stop-control no longer operates at an acceptable LOS.

Both a single lane roundabout and a signal were considered as mitigation options for this intersection, however, only the signal operated with an acceptable LOS. The signal would include an eastbound right turn lane, a westbound left-turn lane, and separate northbound right and left turn lanes. A signal at the intersection operates at LOS A (8 sec/veh) in the AM peak hour and LOS B (13 sec/veh) in the PM peak hour

5.6.6 Intersection 21: E Mission Ave/N Signal Dr

The E Mission Ave/N Signal Dr intersection southbound approach operates at LOS F in both the AM and PM peak hour. This poor LOS is due to southbound volume (left turners in particular) having a hard time finding gaps due to conflicting turning movements.

Several alternatives were evaluated that addressed LOS concerns including signalization and the construction of a roundabout. However, the northwest corner of the intersection is the planned development site for a new library. In coordination with Liberty Lake staff, it was determined that the alternative evaluation for this intersection would coincide with the development of the library.

5.6.7 Long-Term (2046) Preferred Mitigation Summary

The preferred long-term (2046) mitigations are shown in **Table 13**. LOS for the long-term (2046) mitigated conditions is shown in **Figure 12**.

Table 13 – Preferred Long-Term (2046) Mitigations

#	Intersection	Preferred Long-Term (2046) Mitigations	LOS (Delay in sec/veh)	
			AM	PM
2	N Kramer Pkwy / E Country Vista Dr	Increase Cycle Length and Adjust Signal Timings	D (41)	D (45)
4	E Mission Ave / N Harvard Rd	Expand Roundabout: Two-Lane SB & EB Approaches /Exits, Two Lane WB Approach, and Two Exit Lanes on NB Approach	A (8)	B (11)
6	N Liberty Lake Rd / Appleway Ave	Dual SBL and Dual WBL Turn Lanes	C (29)	D (43)
7	N Liberty Lake Rd / E Country Vista Dr	Separate SBR Turn Lane and SBR Overlap Phase	C (29)	D (43)
14	N Country Vista Blvd / E Appleway Ave	Signalize Intersection	A (8)	B (13)
21	E Mission Ave / N Signal Dr	Roundabout	A (4)	A (5)
		Signal	A (7)	A (8)

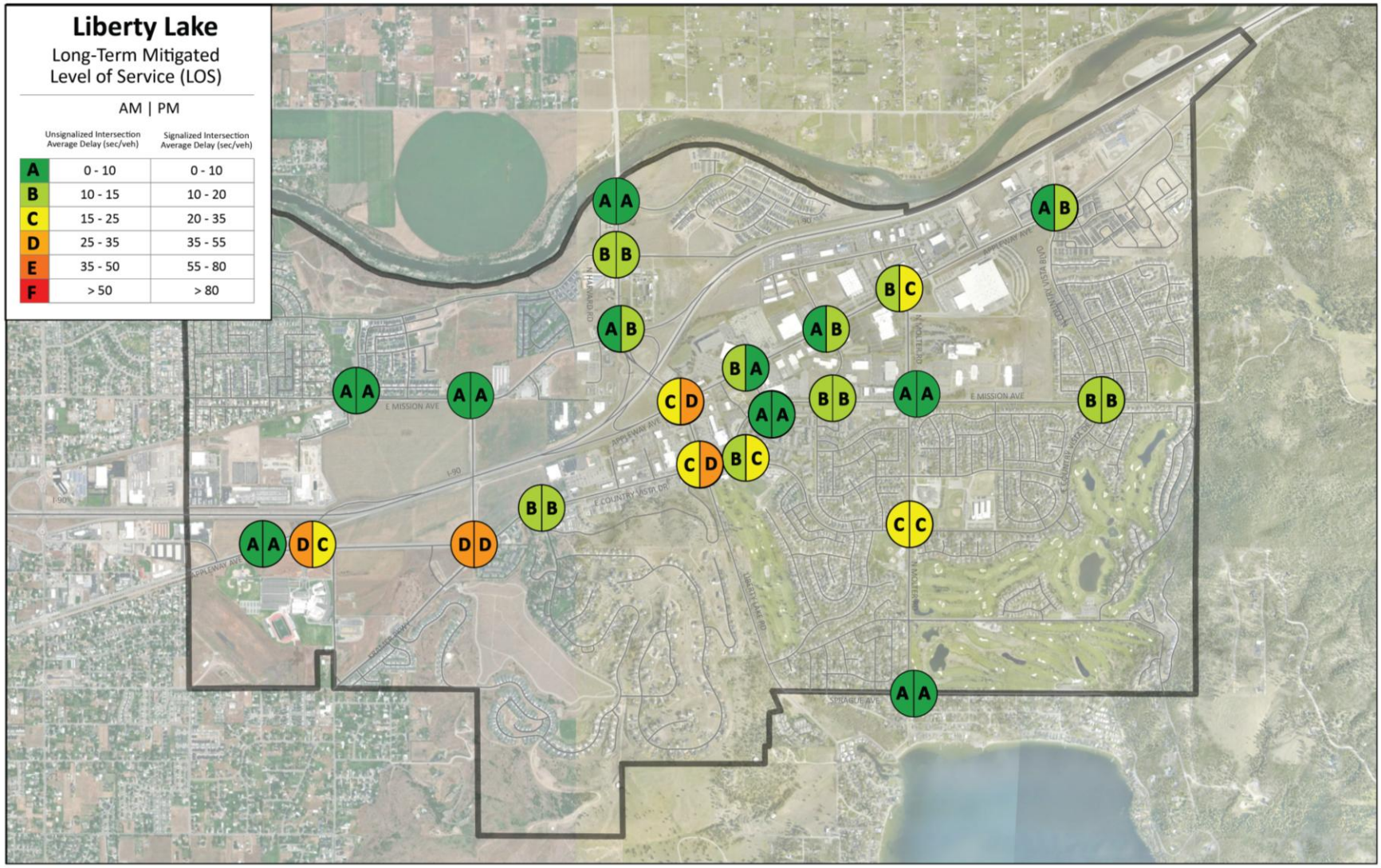

Figure 12 – Long-Term Mitigated LOS (2046)

6. Conclusion

The City of Liberty Lake has been proactive in developing projects to address traffic issues and provide a complete transportation network within the city. Many of the intersections within Liberty Lake remain at acceptable conditions through 2046. In coordination with city staff, Parametrix developed mitigations for several intersections over both the short-term and over the long-term.

In addition to intersections identified for mitigation in Liberty Lake, coordination with WSDOT identified intersections in neighboring jurisdictions with known traffic issues. These locations include the Appleway Avenue / Spokane Bridge Road intersection and the I-90 / Spokane Bridge Road interchange to the east of Liberty Lake in Spokane County, as well as the I-90 / Barker Road interchange to the west of Liberty Lake in the City of Spokane Valley. As needed, the City of Liberty Lake will coordinate with Spokane County and the City of Spokane Valley to share available data to support their analyses of these roadway facilities.

Table 14 provides a summary of mitigations for short-term (2028) and long-term (2046) conditions. Cost estimates for mitigation measures are included in **Appendix I**.

Table 14 – Mitigation Summary

Time Frame	#	Intersection	Mitigation
Short-Term (2028)	1	I-90 WB Off Ramp / E Country Vista Dr	Multi-lane roundabout or signal*
	6	N Liberty Lake Rd / Appleway Ave	WBR Overlap Phase
	7	N Liberty Lake Rd / E Country Vista Dr	Dual EBL Turn Lanes
	8	E Mission Ave / E Country Vista Dr	Restrict SBL Turns
	20	N Harvard Rd / E Wellington Pkwy	Developer Driven Multi-Lane Roundabout or Signal
	21	E Mission Ave / N Signal Dr	No-Build**
Long-Term (2046)	2	N Kramer Pkwy / E Country Vista Dr	Increase Cycle Length and Adjust Signal Timings
	4	E Mission Ave / N Harvard Rd	Expand Roundabout: Two-Lane SB & EB Approaches /Exits, Two Lane WB Approach, and Two Exit Lanes on NB Approach
	6	N Liberty Lake Rd / Appleway Ave	Dual SBL and Dual WBL Turn Lanes
	7	N Liberty Lake Rd / E Country Vista Dr	Separate SBR Turn Lane and SBR Overlap Phase
	14	N Country Vista Blvd / E Appleway Ave	Signalize Intersection
	21	E Mission Ave / N Signal Dr	Roundabout or signal**

*To be determined in coordination with WSDOT

**To be determined in conjunction with library development