Traffic Impact Study - DRAFT

Arbor Subdivision

Caldwell, Idaho

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EXECUTIVE SUMMARY

Thompson Engineers, Inc. has been retained to prepare a traffic impact study (TIS) for the proposed Arbor Subdivision located north of Ustick Road between Midland Boulevard and Santa Ana Avenue in Caldwell, Idaho, as shown in **Figure 1**. The scope of this report was determined through coordination with the City of Caldwell with inputs from Canyon Highway District No. 4 (CHD4).

The TIS evaluates the potential traffic impacts resulting from background traffic growth, offsite developments in the area, and the proposed development, as well as identifies improvements to mitigate the impacts. **Table 1** summarizes the proposed mitigations.

For this study, the background traffic includes expected traffic growth and off-site traffic generated by the proposed Adam's Ridge Subdivision, Wagon Wheel Subdivision, and Harland Subdivision.

1.0 Proposed Development

1.1 At full build-out, Arbor Subdivision is estimated to include 475 residential dwelling units and 15,000 square feet of office use. The expected full build-out year is 2025 but may change depending on the market conditions.

1.2 Based on the ITE Trip Generation Manual 10th Edition, Arbor Subdivision is estimated to generate approximately 4,727 trips per day, 381 trips during the AM peak hour, and 508 trips during the PM peak hour.

- The development is not expected to retain a significant amount of internal capture trips within the site based on ITE methodologies. No trip reduction for internal capture trips was assumed in the analysis.

- The development is not expected to pass-by trips based on ITE pass-by rates. No pass-by trips were assumed in the analysis.

- All trips generated by the development were assumed to be made by personal or commercial vehicles. Some trips are expected to be by walking or bicycle with two existing schools within walking distance of the site.

- The estimated site traffic distribution patterns are:
  - 10% north of the site
  - 15% west of the site
  - 15% east of the site
  - 60% south of the site

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Table 1 – Proposed Intersection Improvements Summary

Intersection		2017 Existing Traffic	2025 Build-Out Year		2030 Horizon Year	
			Background Traffic	Total Traffic	Background Traffic	Total Traffic
1	Midland Blvd and Linden Rd	None	None	**Single-lane roundabout or signal**	**Single-lane roundabout or signal**	None beyond roundabout or signal
2	Middleton Rd and Spruce St	**SB left-turn lane**	None beyond SB left-turn lane	**NB right-turn lane**	**NB right-turn lane**	None beyond turn lanes
3	Santa Ana Ave And Spruce St	None	None	None	None	None
4	Middleton Rd and Ustick Rd	**Modified single-lane roundabout**	None beyond modified single-lane roundabout	None beyond modified single-lane roundabout	**Expand to multi-lane roundabout**	None beyond multi-lane roundabout
5	Santa Ana Ave and Ustick Rd	**Modified single-lane roundabout or signal**	None beyond roundabout or signal	None beyond roundabout or signal	None beyond roundabout or signal	None beyond roundabout or signal
6	Midland Blvd and Ustick Rd	**Modified single-lane roundabout**	**Expand to multi-lane roundabout**	None beyond multi-lane roundabout	None beyond multi-lane roundabout	None beyond multi-lane roundabout
7	Midland Blvd and Cherry Ln	None	None	None	None	None
8	N Access and Spruce St	NA	NA	None	NA	None
9	W Access and Santa Ana Ave	NA	NA	None	NA	None
10	E Access and Midland Blvd	NA	NA	**NB left-turn lane**	NA	None beyond turn lane
11	S Access and Ustick Rd	NA	NA	**EB left-turn lane WB right-turn lane**	NA	None beyond turn lanes
12	Laster Ln and Midland Blvd	NA	NA	NA	**Stop-controlled on Laster Ln with NB left-turn lane**	None

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2.0 Proposed Access

2.1 Arbor Subdivision is proposing full-movement accesses on Spruce Street, Santa Ana Avenue, Midland Boulevard, and Ustick Road:

- North access on Spruce Street extension
  - The development is planning to extend Spruce Street along the site frontage for site access.
  - The proposed access on Spruce Street extension is located approximately 920 feet west of Santa Ana Avenue.
  - With minimal traffic expected on Spruce Street extension, the proposed access is not expected to require turn lanes and is expected to meet minimum operational thresholds.

- West access on Santa Ana Avenue
  - Located approximately 250 feet south of Alpine Street
  - Is not expected to require turn lanes
  - Expected to meet minimum operational thresholds as a stop-controlled intersection

- East access on Midland Boulevard
  - Located approximately 1,100 feet north of Ustick Road, which is outside the influence area of the Midland Boulevard and Ustick Road roundabout
  - Requires northbound left-turn lane based on NCHRP 457 guidelines
  - Expected to meet minimum operational thresholds as a stop-controlled intersection

- South access on Ustick Road:
  - Located approximately 790 feet west of Midland Boulevard, which is outside the influence area of the Midland Boulevard and Ustick Road roundabout
  - Requires westbound right-turn lane and eastbound left-turn lane
  - Expected to meet minimum operational thresholds as a stop-controlled intersection

3.0 Improvements Needed to Mitigate 2017/2018 Existing Traffic

3.1 Three study area intersections exceed minimum operational thresholds with 2017/2018 existing traffic conditions analyzed with the existing intersection control and lane configurations. The intersections and improvements needed to mitigate 2017/2018 existing traffic are:

- Middleton Road and Ustick Road intersection
  - Modified single-lane roundabout

- Santa Ana Avenue and Ustick Road intersection – two options
  - Modified single-lane roundabout
  - Signal

- Midland Boulevard and Ustick Road intersection
  - Modified single-lane roundabout

3.2 One study area intersection needs turn lane based on NCHRP 457 guidelines:

- Middleton Road and Spruce Street
  - Southbound left-turn lane

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4.0 Improvements Needed to Mitigate 2025 Build-Out Year Background Traffic

4.1. One study area intersection is expected to exceed minimum operational thresholds with 2025 background traffic conditions analyzed with the existing intersection control and lane configurations or with the preceding improvements needed to mitigate 2017/2018 existing traffic. The intersection and improvements needed to mitigate the 2025 background traffic impacts are:

- Midland Boulevard and Ustick Road intersection
  - Expand to multi-lane roundabout

4.2. None of the study area intersections are expected to require additional turn lanes based on NCHRP 457 guidelines.

5.0 Improvements Needed to Mitigate 2025 Build-Out Year Total Traffic

5.1 One study area intersection is expected to exceed minimum operational thresholds with 2025 total traffic conditions analyzed with the existing intersection control and lane configurations for with the preceding improvements identified above for 2017/2018 existing traffic and 2025 background traffic. The intersection and improvements needed to mitigate the 2025 total traffic impacts are:

- Midland Boulevard and Linden Road intersection – two options
  - Single-lane roundabout
  - Signal with left-turn lanes on all approaches

5.2 One study area intersection is expected need turn lane based on NCHRP 457 guidelines:

- Middleton Road and Spruce Street intersection
  - Northbound right-turn lane

6.0 Improvements Needed to Mitigate 2030 Horizon Year Background Traffic

6.1 Two study area intersections are expected to exceed minimum operational thresholds with 2030 background traffic conditions analyzed with the existing intersection control and lane configurations or with the preceding improvements identified above for 2017/2018 existing traffic and 2025 background traffic. The intersections and improvements needed to mitigate the 2030 background traffic impacts are:

- Midland Boulevard and Linden Road intersection – two options
  - Single-lane roundabout
  - Signal with left-turn lane on all approaches

6.2 Two study area intersections are expected to need turn lane based on NCHRP 457 guidelines:

- Middleton Road and Spruce Street intersection
  - Northbound right-turn lane
- Laster Lane and Midland Boulevard intersection
  - Northbound left-turn lane

6.3 None of the study area intersections are expected to require additional turn lanes based on NCHRP 457 guidelines.

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7.0 Improvements Needed to Mitigate 2030 Horizon Year Total Traffic

7.1 All study area intersections are expected to meet minimum operational thresholds with 2030 total traffic conditions analyzed with the existing intersection control and lane configurations for with the preceding improvements identified above. As a result, no additional improvements beyond the preceding improvements are needed to mitigate 2030 total traffic.

7.2 None of the study area intersections are expected to require additional turn lanes based on NCHRP 457 guidelines.

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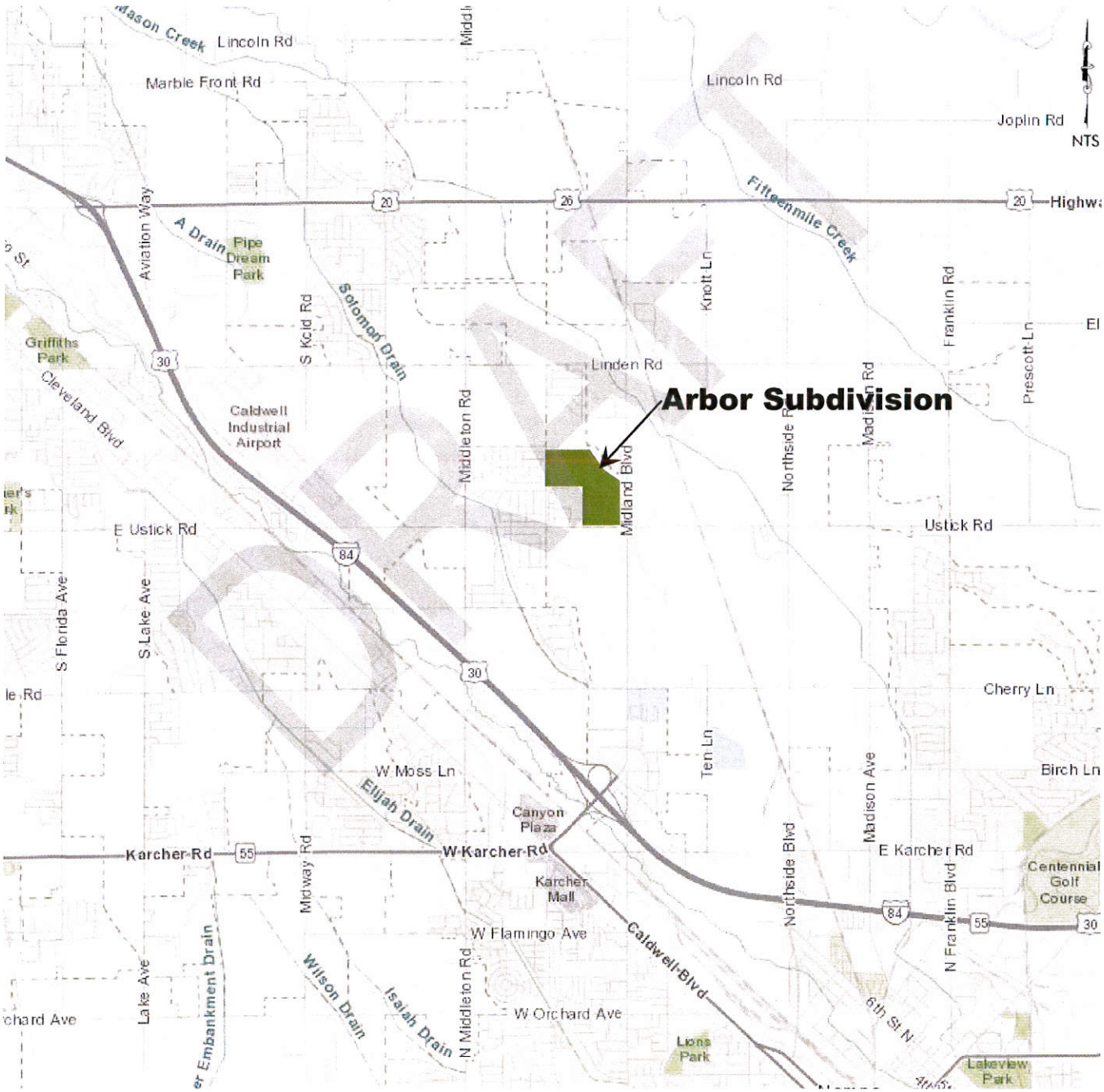
1.0 INTRODUCTION

Thompson Engineers, Inc. has been retained to prepare a traffic impact study for the proposed Arbor Subdivision development located north of Ustick Road between Midland Boulevard and Santa Ana Avenue in Caldwell, Idaho. **Figure 1.1** shows the site location and its vicinity. The TIS evaluates the potential traffic impacts resulting from background traffic growth, offsite developments in the area, and proposed development, and identify improvements to mitigate the impacts.

Figure 1.1 – Site Location and Vicinity



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1.1 Proposed Development

Arbor Subdivision is a proposed mixed-use development estimated to contain 475 residential dwelling units and 15,000 square feet of office space. **Figure 1.2** shows the preliminary site development plan with the proposed access locations. The expected build-out year is 2025, but may change depending on the market conditions.

Figure 1.2 – Preliminary Site Plan

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1.2 Study Approach

The study area intersections are located within jurisdictions of the City of Caldwell, CHD4, City of Nampa, and Nampa Highway District No. 1 (NHD1). The study area, specific parameters, and requirements for the study were verified with the City of Caldwell's staff with inputs from CHD4.

1.3 Study Area

The following study area intersections were identified for collecting peak hour turning movement counts and traffic impact analysis:

1. Midland Boulevard and Linden Road
2. Middleton Road and Spruce Street
3. Santa Ana Avenue and Spruce Street
4. Middleton Road and Ustick Road
5. Santa Ana Avenue and Ustick Road
6. Midland Boulevard and Ustick Road
7. Midland Boulevard and Cherry Lane
8. All proposed site access points

1.4 Study Period

The analysis periods will be weekday AM and PM peak hours of operation of the transportation system. The analysis years are:

- 2017/2018 existing traffic
- 2025 build-out year background traffic (without Laster Lane connection to Midland Boulevard)
- 2025 build-out year total traffic (without Laster Lane connection to Midland Boulevard)
- 2030 horizon year background traffic (with Laster Lane connection to Midland Boulevard)
- 2030 horizon year total traffic (with Laster Lane connection to Midland Boulevard)

1.5 Analysis Methods and Performance Measure Thresholds

Intersection capacity analysis was performed using Synchro 10 (10.1.2.20), which utilizes the 2010 Highway Capacity Manual methodologies. For roundabouts, the HCM 2016 methodologies were used which reflect the latest research on roundabout capacity. All parameters used in the analysis were based on existing data when available or Synchro default values, when not available. The level of service for the intersection is based on the average delay of vehicles traveling through the intersection. For this study, the minimum acceptable level of service is LOS D, which is consistent with the CHD4 minimum operational thresholds for suburban roadways and intersections, and also consistent with City of Nampa thresholds.

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2.0 EXISTING CONDITIONS

2.1 Roadway Network, Intersection Control and Lane Configuration

Table 2.1 summarizes the study area roadway characteristics. The roadway functional classification is based on the COMPASS 2040 Functional Classification Map. **Figure 2.1** summarizes the study area intersection control and lane configuration.

Table 2.1 – Existing Roadway Characteristics

Roadway	Functional Classification	Number of Lanes	Posted Speed Limit(mph)	Pedestrian Facilities
Middleton Rd	Principal Arterial	2	50	• Partial sidewalks
Santa Ana Ave	(Not Classified) Collector Street	2	No posted speed limit sign	• Partial sidewalks
Midland Blvd	Principal Arterial	2-5	45	• Partial sidewalks • Partial bicycle lanes
Linden Rd	Principal Arterial	2	50	• Partial sidewalks
Spruce St	(Not Classified) Collector Street	2	No posted speed limit sign	• Partial sidewalks
Ustick Rd	Principal Arterial	2	50	• Partial sidewalks
Cherry Ln	Principal Arterial	2	45	• Partial sidewalks

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Figure 2.1 – Existing Intersection Control and Lane Configuration

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2.2 Existing Traffic Volumes

Weekday AM and PM peak hour traffic counts were obtained at the study intersections between December 2017 and May 2018. The peak hour intersection turning movement counts were collected on a weekday for a 2-hour period at 15-minute intervals between 7:00 and 9:00 during the AM peak travel period hour and between 4:00 and 6:00 during the PM peak travel period. Existing turning movement counts are included in the appendix. **Figure 2.2** and **Figure 2.3** summarize the existing peak hour traffic volumes.

8.4 School Routes

Two existing schools are located in the vicinity of the site: Desert Springs Elementary School and Sage Valley Middle School. Ustick Road has sidewalks on both sides of the road west of Santa Ana Avenue and along the school frontages. Santa Ana Avenue has sidewalks on both sides north of Ustick Road and along the developed frontages south of Ustick Road. There are unsignalized pedestrian crosswalks on Santa Ana Avenue along the school frontages. There is one pedestrian signal on Ustick Road located approximately 600 feet west of Santa Ana Avenue. There are also school signing and pavement markings on the adjacent roadways. These existing pedestrian facilities provide a connected school routes as well as crossing opportunities between the existing developments in the area and school sites.

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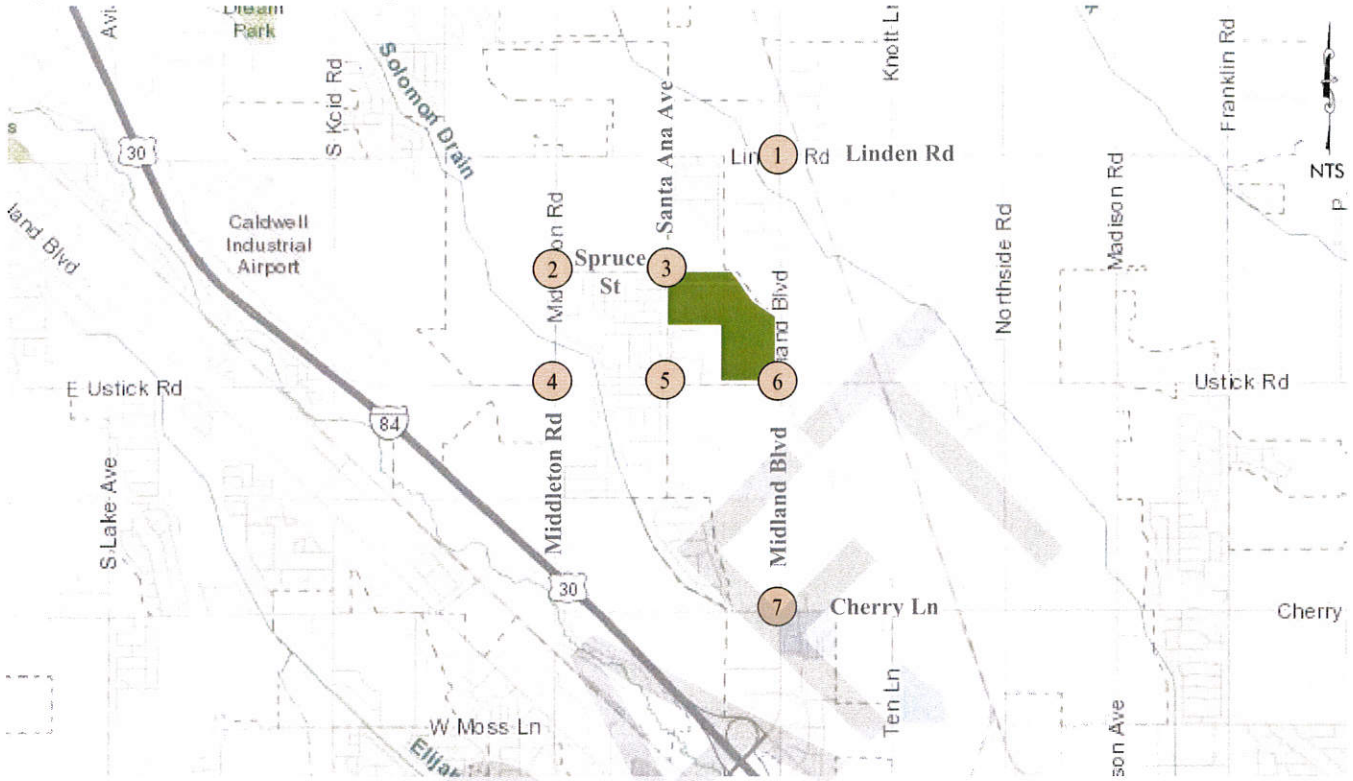
Figure 2.2 – 2017/2018 Existing AM Peak Hour Traffic



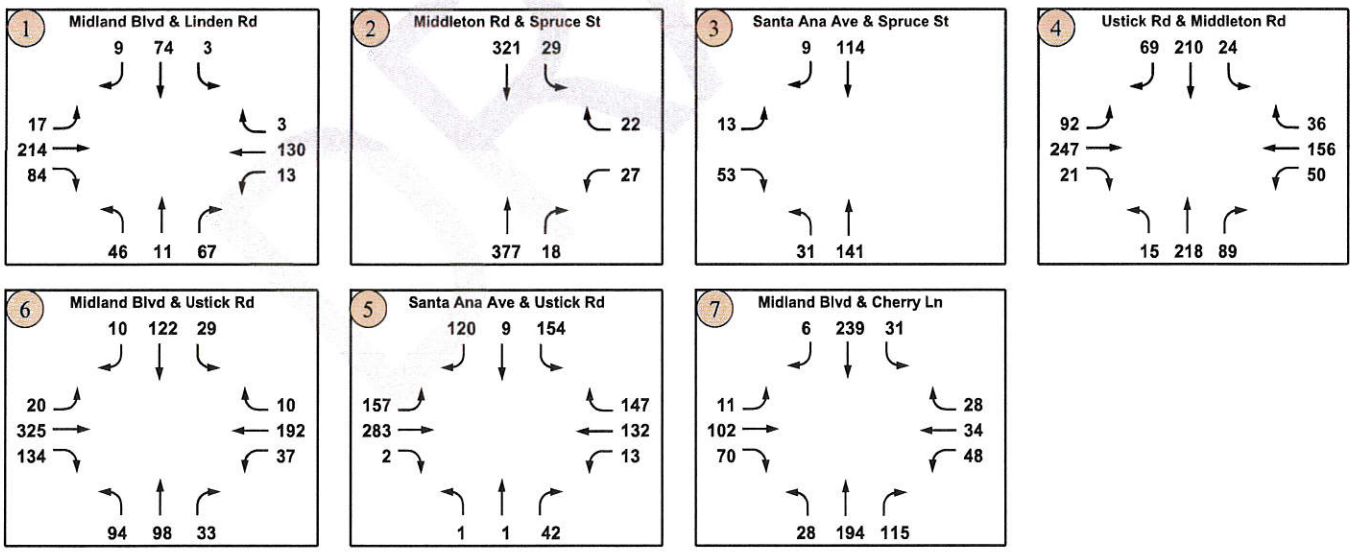


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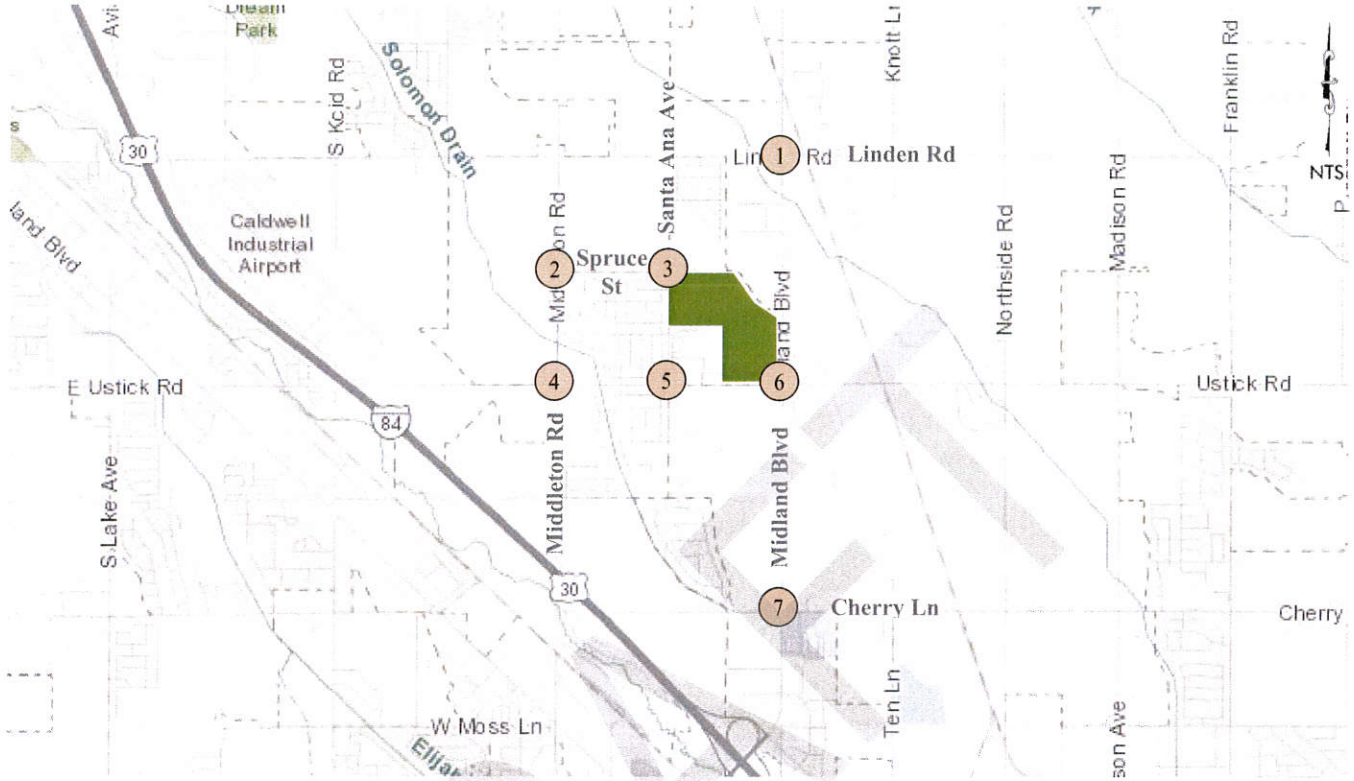
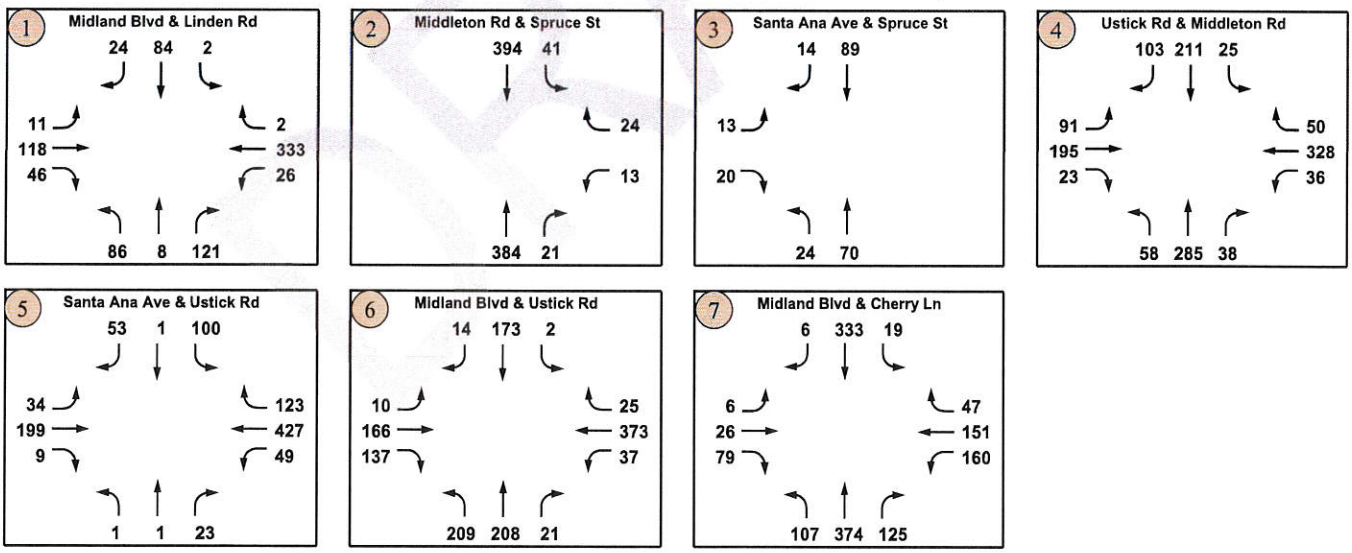
Figure 2.3 – 2017/2018 Existing PM Peak Hour Traffic





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2.3 Intersection Crash Data

The most current five-year crash data (2012-2016) was obtained from the Local Highway Technical Assistance Council (LHTAC) website (http://gis.lhtac.org/safety/). **Table 2.2** summarizes the crash data statistics for the study area intersections. Three study area intersections have crash rates exceeding the base crash rates. All other study area intersections have crash rates below the base crash rates.

Table 2.2 – Intersection Crash Data (2012-2016)

Intersection		Total Crashes	Crash Severity			Base[1] Crash Rate (ACC/MV)	Existing Crash Rate (ACC/MV)
			Property Damage Only	*Injury*	*Fatal*		
1	Midland Boulevard and Linden Road	12	*7*	*5*	*0*	1.30 (Type 5)	**1.51**
2	Middleton Road And Spruce Street	4	*2*	*2*	*0*	0.58 (Type 6)	0.26
3	Santa Ana Avenue and Spruce Street	*No Report Crashes*					
4	Middleton Road and Ustick Road	26	*9*	*5*	*21*	0.58 (Type 6)	**0.80**
5	Santa Ana Avenue and Ustick Road	10	*8*	*2*	*0*	0.58 (Type 33)	0.58
6	Midland Boulevard And Ustick Road	16	*9*	*7*	*0*	0.58 (Type 6)	**0.66**
7	Midland Boulevard And Cherry Lane	9	*3*	*6*	*0*	0.58 (Type 33)	0.41

[1]Based on similar roadway type, width, and volume.

2.4 Intersection Level of Service

To determine the existing traffic impacts, the study area intersections were analyzed with the existing intersection control and lane configuration and 2017/2018 existing peak hour traffic. Copies of the analysis reports are included in the appendix. **Table 2.3** summarizes the intersection capacity analysis results. All study area intersections meet ITD or ACHD minimum operational thresholds, with the exception of three intersections:

- Middleton Road and Ustick Road intersection
- Santa Ana Avenue and Ustick Road intersection
- Midland Boulevard and Ustick Road intersection

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Table 2.3 – Intersection Level of Service – 2017/2018 Existing Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	All-Way Stop	Intersection LOS	B	B
			Intersection Delay (s/v)	11	13
			Worst Lane Group LOS	B (EB)	B (WB)
2	Middleton Road And Spruce Street	Stop (Spruce)	LOS (WB)	B	B
			Delay (s/v) (WB)	15	14
			Worst Lane Group LOS	B (WB)	B (WB)
3	Santa Ana Avenue and Spruce Street	Stop (Spruce)	LOS (EB)	A	B
			Delay (s/v) (EB)	10	10
			Worst Lane Group LOS	A (EB)	B
4	Middleton Road and Ustick Road	All-Way Stop	Intersection LOS	**E**	**F**
			Intersection Delay (s/v)	37	**> 50**
			Worst Lane Group LOS	**E (EB)**	**F (WB)**
5	Santa Ana Avenue and Ustick Road	2-Way Stop (Santa Ana)	LOS (NB / SB)	B / **F**	B / E
			Delay (s/v) (NB / SB)	11 / **> 50**	10 / 37
			Worst Lane Group LOS	**F (SBL)**	**E (SBL)**
6	Midland Boulevard and Ustick Road	All-Way Stop	Intersection LOS	C	**F**
			Intersection Delay (s/v)	20	**>50**
			Worst Lane Group LOS	D (EB)	**F (NB)**
7	Midland Boulevard and Cherry Lane	Signal	Intersection LOS	C	C
			Intersection Delay (s/v)	28	26
			Worst Lane Group LOS	D (SBL)	D (SBL)

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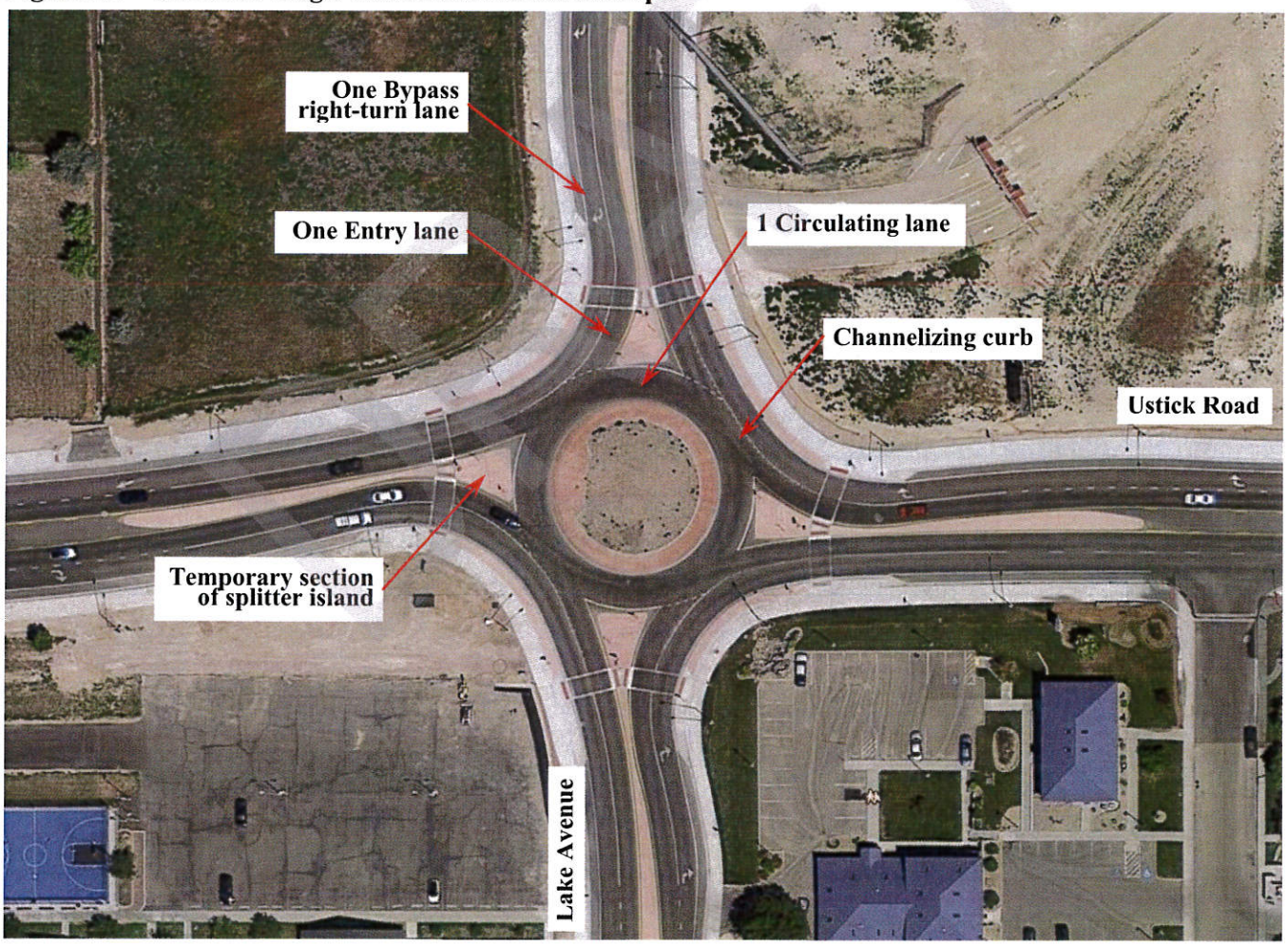
2.5 Mitigation

The proposed intersection improvements discussed below are expected to mitigate 2017/2018 existing traffic to meet the minimum operational thresholds. Turn lane analysis was evaluated at unsignalized intersections using NCHRP 457 guidelines. **Table 2.6** summarizes the analysis results for the proposed mitigation.

Middleton Road and Ustick Road Intersection

The City of Caldwell is planning to reconstruct the Middleton Road and Ustick Road intersection as a multi-lane roundabout in the year 2021. Intersection control evaluation and design has been completed for the intersection improvement. As a result, a roundabout is proposed to mitigate 2017 existing traffic. For operational and safety effectiveness, the roundabout should be initially constructed as a modified single-lane roundabout within the ultimate multi-lane footprints in the interim years. This will allow the roundabout to be readily expandable to a multi-lane roundabout when traffic demand warrants. An existing example of a modified single-lane roundabout is the recently constructed Ustick Road and Lake Avenue roundabout. It has one by-pass right-turn lane and one shared lane for through and left-turn movements on all approaches.

Figure 2.4 – Modified Single-Lane Roundabout Example



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Santa Ana Avenue and Ustick Road Intersection

Currently, there are no plans to improve the Santa Ana Avenue and Ustick Road intersection. However, the Santa Ana Avenue and Ustick Road intersection is exceeding minimum operational thresholds during the peak hours. As a result, two mitigation options are proposed to mitigate 2017 existing traffic at the Santa Ana Avenue and Ustick Road intersection:

- Traffic signal
  - Utilize existing lane configuration
  - A traffic signal would have minimum impact on the intersection footprints and will not require major road widening.
  - There are planned roundabouts on Ustick Road within one-half mile east and west of the intersection. A traffic signal may not be appropriate with the adjacent roundabouts on Ustick Road.
- Roundabout
  - A modified single-lane roundabout with one shared lane on the northbound and southbound approaches, and one bypass right-turn lane and one shared lane for through and left-turn movements on the eastbound and westbound approaches.
  - A roundabout would be appropriate on Ustick Road roundabout corridor.
  - With the existing schools, a roundabout would be an optimal intersection control.
  - A roundabout will require roadway widening and may require additional right-of-way.

Midland Boulevard and Ustick Road Intersection

The City of Caldwell along with CHD4, City of Nampa, and NHD1 is planning to reconstruct the Midland Boulevard and Ustick Road intersection as a multi-lane roundabout. The intersection improvement is currently under design. As a result, a roundabout is proposed to mitigate 2017 existing traffic. As discussed above, the roundabout should be initially constructed as a modified single-lane roundabout within the ultimate multi-lane footprints for the interim years and expanded to a multi-lane roundabout when traffic demand warrants.

Middleton Road and Spruce Street Intersection

The Middleton Road and Spruce Street intersection currently meets minimum operational thresholds. However based on NCHRP 457 turn-lane guidelines, the following turn lane is warranted:

- Southbound left-turn lane

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Table 2.4 – Intersection Level of Service – 2017/2018 Existing Traffic Mitigation

Intersection		Mitigation	MOEs	AM Peak Hour	PM Peak Hour
2	Middleton Road And Spruce Street	Southbound Left-Turn Lane	LOS (WB)	B	B
			Delay (s/v) (WB)	12	13
			Worst Lane Group LOS	B (WB)	B (WB)
4	Middleton Road and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	6	7
			Worst Lane Group LOS	A (EBLT)	A (WBLT)
5	Santa Ana Avenue and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	6	5
			Worst Lane Group LOS	A (EBLT)	A (SBLT)
		Signal	Intersection LOS	A	A
			Intersection Delay (s/v)	7	6
			Worst Lane Group LOS	A (SBTR)	A (SBTR)
6	Midland Boulevard and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	5	7
			Worst Lane Group LOS	A (EBLT)	B (WBLT)

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3.0 2025 BUILD-OUT YEAR BACKGROUND TRAFFIC CONDITIONS

3.1 Roadway Network

The study area roadways and intersections are expected to remain the same as the existing conditions with the exception of the intersection improvements needed to mitigate 2017/2018 existing traffic as discussed in the previous section. There are also planned improvements for the study area roadways and intersections summarize in **Table 3.1**. These improvements were considered as mitigation options for 2025 background traffic when necessary.

The Adam's Ridge Subdivision, if approved, is expected to widen and improve Laster Lane along their site frontages. The development is not planning to extend Laster Lane to Midland Boulevard because they don't own the right-of-way to construct this connection. However, the Laster Lane connection to Midland Boulevard could be constructed sooner if the parcel to the south is developed. For 2025 conditions, Laster Lane is assumed to not be extended to Midland Boulevard.

Table 3.1 – Planned Improvements Within the Study Area

Identified Improvements (Year)	Agency and Transportation Plan
Ustick Road • Widen from 2 to 5 lanes from Midland Blvd to McDermott Rd (2020 • Widen from 5 to 6 lanes from Midland Blvd to McDermott Rd (2035)	City of Nampa Citywide Transportation Plan
Midland Boulevard • Widen from 2 to 5 lanes from Marketplace Blvd to Cherry Ln (2015) • Widen from 2 to 5 lanes from Cherry Ln to Ustick Rd (2015)	City of Nampa Citywide Transportation Plan
Cherry Lane • Reconstruct/ widen from 2 to 5 lanes from Midland Boulevard to Franklin Road (2015) • Culd-du-sac Cherry Ln at Middleton Rd; connect Laster Ln to Midland Blvd (2010-2019)	City of Nampa Citywide Transportation Plan
Northside Boulevard • Widen from 2 to 3 lanes from Karcher Rd to Ustick Rd (2025)	City of Nampa Citywide Transportation Plan
Middleton Road • Widen from 2 to 3 lanes from Lake Lowell Ave to I-84 (2035)	City of Nampa Citywide Transportation Plan
Midland Blvd and Cherry Lane Intersection (2015) • Add lanes	City of Nampa Citywide Transportation Plan
Ustick Road and Northside Boulevard Intersection (2020) • Add signal and turn lanes	City of Nampa Citywide Transportation Plan
Ustick Road and Midland Boulevard Intersection (2020) • Add signal and turn lanes	City of Nampa Citywide Transportation Plan
Ustick Road and Midland Boulevard Intersection (TBD) • Improve the intersection as a multi-lane roundabout	City of Caldwell, CHD4, Nampa, NHD1
Ustick Road and Middleton Road Intersection (2021) • Improve the intersection as a multi-lane roundabout	City of Caldwell Comprehensive Plan

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3.2 Background Traffic

Future background traffic was estimated by extrapolating the 2017/2018 existing traffic counts by the following annual growth rates:

- 4.0% per year on Ustick Road and Linden Road
- 2.0% per year on Middleton Road, Midland Boulevard, Spruce Street, Santa Ana Avenue, and Cherry Lane

These growth rates are based on historical traffic counts on these roadways, COMPASS forecasts, and our review of other traffic studies in the area. **Figure 3.1** and **Figure 3.2** summarize the 2025 build-out year peak hour background traffic.

3.3 Off-Site Development Traffic

In additional to the traffic growth, traffic generated by three proposed off-site developments located in the vicinity of the site was also included in the background traffic:

- Adam's Ridge Subdivision located south of Ustick Road south of the site
- Wagon Wheel Subdivision located west of Middleton Road between US 20-26 and Linden Road
- Hartland Subdivision located in the northeast quadrant of Ustick Road and Northside Boulevard intersection

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Figure 3.1 – 2025 Build-Out Year AM Peak Hour Background Traffic

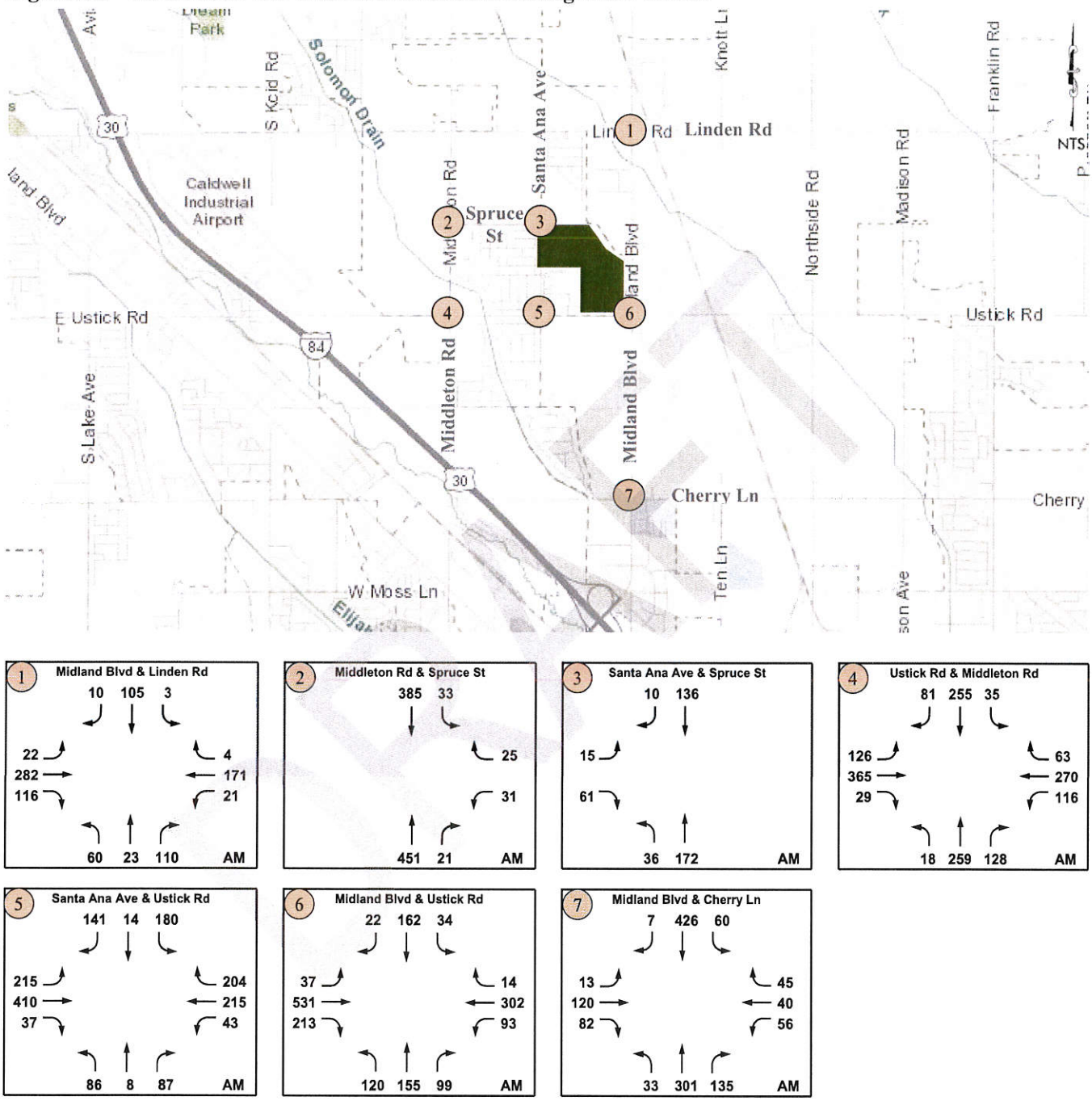

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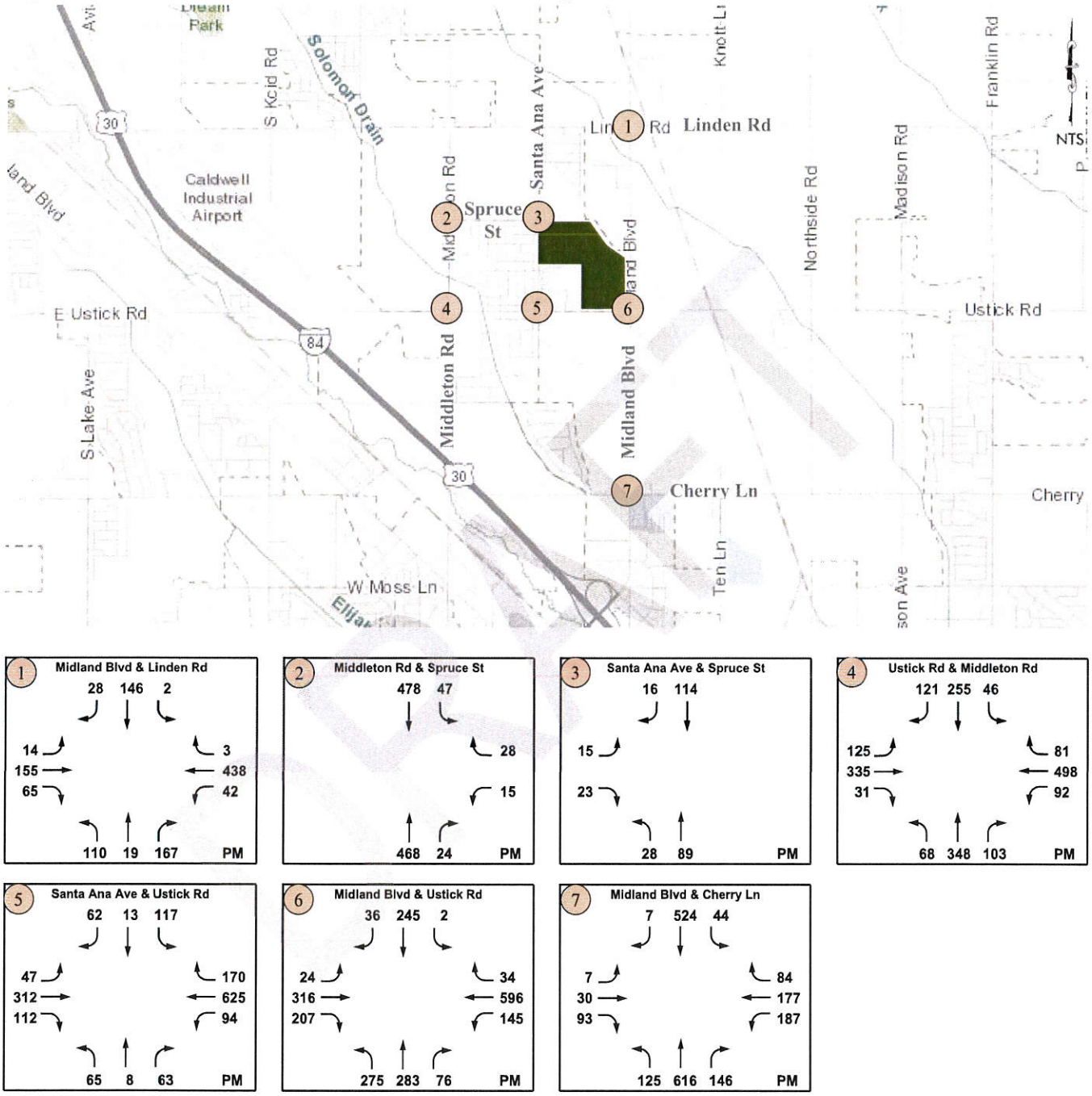
Figure 3.2 – 2025 Build-Out Year PM Peak Hour Background Traffic



3.4 Intersection Level of Service

To determine the 2025 background traffic impacts, the study area intersections were analyzed with the existing intersection control and lane configuration or with the preceding improvements needed to mitigate 2018 existing traffic. Copies of the analysis reports are included in the appendix. **Table 3.2** summarizes the intersection capacity analysis results. One study area intersection is expected to exceed minimum operational thresholds and will require improvements to mitigate 2025 background traffic:

- Midland Boulevard and Ustick Road intersection

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Table 3.2 – Intersection Level of Service – 2025 Build-Out Year Background Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	All-way Stop	Intersection LOS	B	D
			Intersection Delay (s/v)	15	28
			Worst Lane Group LOS	C (EB)	E (WB)
2	Middleton Road And Spruce Street	Stop (Spruce)	LOS (WB)	B	B
			Delay (s/v) (WB)	14	14
			Worst Lane Group LOS	B (WB)	B (WB)
3	Santa Ana Avenue and Spruce Street	Stop (Spruce)	LOS (EB)	A	B
			Delay (s/v) (EB)	10	11
			Worst Lane Group LOS	A (EB)	B (EB)
4	Middleton Road and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	B
			Intersection Delay (s/v)	10	13
			Worst Lane Group LOS	B (EBLT)	C (WBLT)
5	Santa Ana Avenue and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	9	8
			Worst Lane Group LOS	B (EBLT)	B (WBLT)
		Signal	Intersection LOS	B	A
			Intersection Delay (s/v)	11	7
			Worst Lane Group LOS	B (NB)	B (NB)
6	Midland Boulevard and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	A	D
			Intersection Delay (s/v)	8	32
			Worst Lane Group LOS	B (EBLT)	**F (WBLT)**
7	Midland Boulevard and Cherry Lane	Signal	Intersection LOS	C	C
			Intersection Delay (s/v)	28	26
			Worst Lane Group LOS	D (SBL)	D (SBL)

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3.5 Mitigation

One study area intersection is expected to exceed minimum operational thresholds with 2025 background traffic. The proposed intersection improvements discussed below are expected to mitigate 2025 background traffic to meet minimum operational thresholds. Turn lane analysis was evaluated at unsignalized intersections using NCHRP 457 guidelines. **Table 3.3** summarizes the analysis results for the proposed mitigations.

Midland Boulevard and Ustick Road Intersection

The Midland Boulevard and Ustick Road intersection is expected to exceed minimum operational thresholds as a modified single-lane roundabout with 2025 background traffic. To meet 2025 background traffic demand, the roundabout should be expanded to a multi-lane roundabout by removing the channelizing curb and modifying sections of the splitter islands. With these modifications, the roundabout will have two entry lanes and two exit lanes on all approaches.

None of the study area intersections are expected to warrant turn lanes.

Table 3.3 – Intersection Level of Service – 2025 Build-Out Year Background Traffic Mitigation

Intersection		Mitigation	MOEs	AM Peak Hour	PM Peak Hour
6	Midland Boulevard and Ustick Road	Multi-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	7	9
			Worst Lane Group LOS	A (EBLT)	B (WBLT)

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4.0 2025 BUILD-OUT YEAR TOTAL TRAFFIC CONDITIONS

4.1 Roadway Network Improvements

The 2025 roadway network within the study area is expected to remain the same as existing with the exception for the improvements needed to mitigate 2017/2018 existing traffic and 2025 background traffic as discussed in the previous sections. Arbor Subdivision is planning to extend Spruce Street from Santa Ana Avenue along the site frontage for access, and does not connect to Midland Boulevard.

4.2 Site Traffic

4.2.1 Trip Generation

Site trip generation is estimated using the procedures recommended in the latest edition of the Trip Generation Manual (10th edition), published by the Institute of Transportation Engineers. The site trip generation is obtained by applying the trip generation rates obtained from the manual for the proposed land uses within the 2025 development. **Table 4.1** summarizes the site trip generation. The proposed 2025 development is estimated to generate approximately 4,727 trips per day, 381 trips during the AM peak hour and 508 trips during the PM peak hour.

Table 4.1 – 2025 Site Trip Generation Summary

Land Use	ITE Code	Size	Unit	Trip Rate per Unit	Total Trips	Internal Capture Trips	Pass-by Trips	Primary Trips				
								Total	Entering		Exiting	
Weekday Daily (vpd)												
Single-Family Residential	210	475	DU	9.44	4,484	--	--	4,484	50%	2,242	50%	2,242
Office	712	15	TSF	16.19	243	--	--	243	50%	121	50%	121
Weekday Daily Total Trips					**4,727**	--	--	**4,727**		**2,363**		**2,363**
Weekday AM Peak Hour (vph)												
Single-Family Residential	210	475	DU	0.74	352	--	--	352	25%	88	75%	264
Office	712	15	TSF	1.92	29	--	--	29	83%	24	17%	5
Weekdy AM Peak HourTotal Trips					**381**	--	--	**381**		**112**		**269**
Weekday PM Peak Hour (vph)												
Single-Family Residential	210	475	DU	0.99	471	--	--	471	63%	297	37%	174
Office	712	15	TSF	2.45	37	--	--	37	32%	12	68%	25
Weekday PM Peak HourTotal Trips					**508**	--	--	**508**		**309**		**199**

4.2.2 Trip Capture

Based on the proposed land uses, the development is not expected to retain a significant amount of the trips within the site. No reduction for internal capture trips was assumed in the traffic analysis.

4.2.3 Pass-by Trips

Based on the proposed land uses, the development is not expected to attract pass-by trips. No pass-by trips were assumed in the traffic analysis.

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4.2.4 Modal Split

With two existing schools within walking distance of the development, some walking or bicycle trips are expected. For the traffic analysis purposes, all trips generated by the development were assumed to be made by personal and commercial vehicles.

4.2.5 Trip Distribution and Assignment

Site traffic was distributed and assigned to the external roadway system based on the current travel patterns, site layout and the general location of the site within the area. Traffic forecasts from the COMPASS models were also considered. **Figure 4.1** summarizes the expected site traffic distribution patterns. **Figure 4.2** and **Figure 4.3** summarize the estimated 2025 peak hour site traffic with the proposed access as shown in concept site plan.

4.3 Total Traffic

The 2025 site traffic is then added to the 2025 background traffic as determined above to obtain the 2025 total traffic. **Figure 4.4** and **Figure 4.5** summarize the estimated 2025 weekday peak hour total traffic at each intersection.

Figure 4.1 – Site Traffic Distribution Patterns

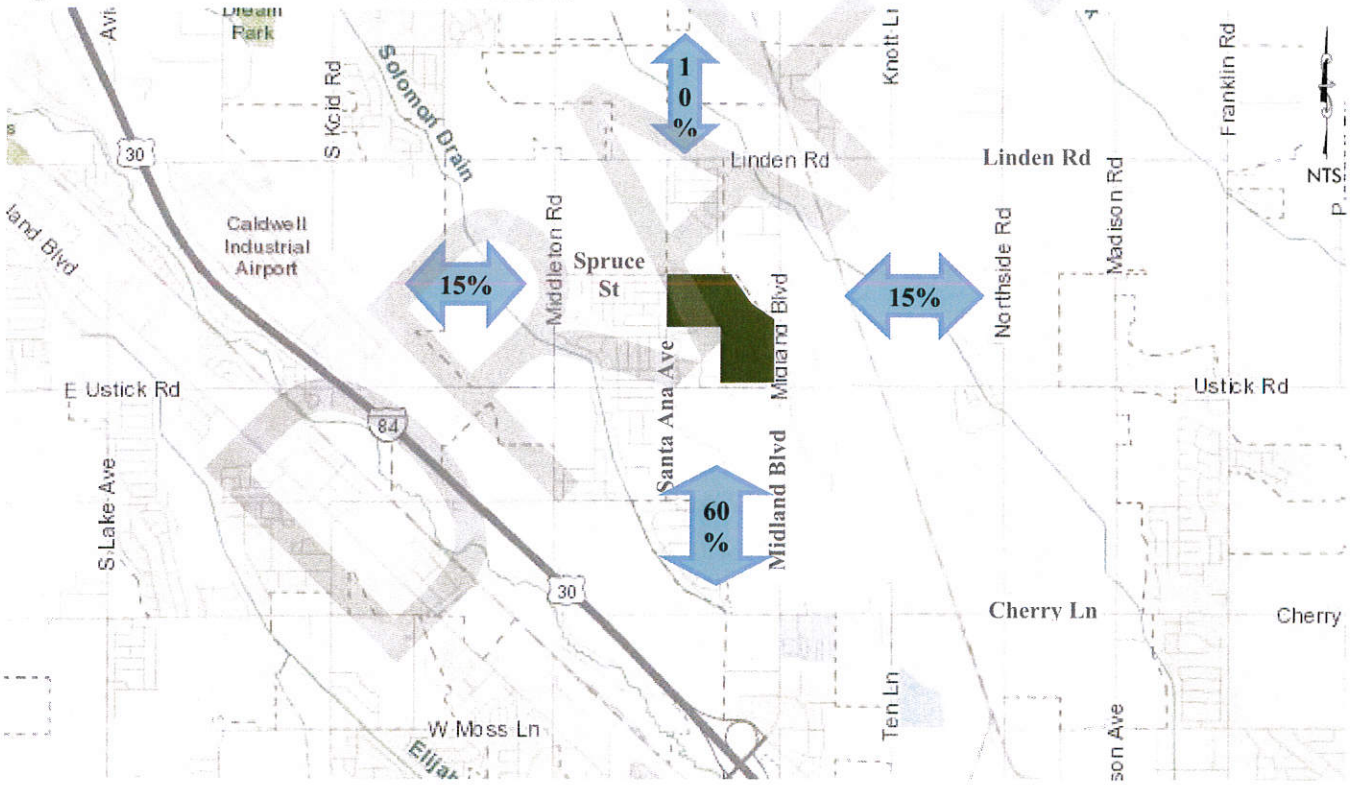

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Figure 4.2 – 2025 AM Peak Hour Site Traffic

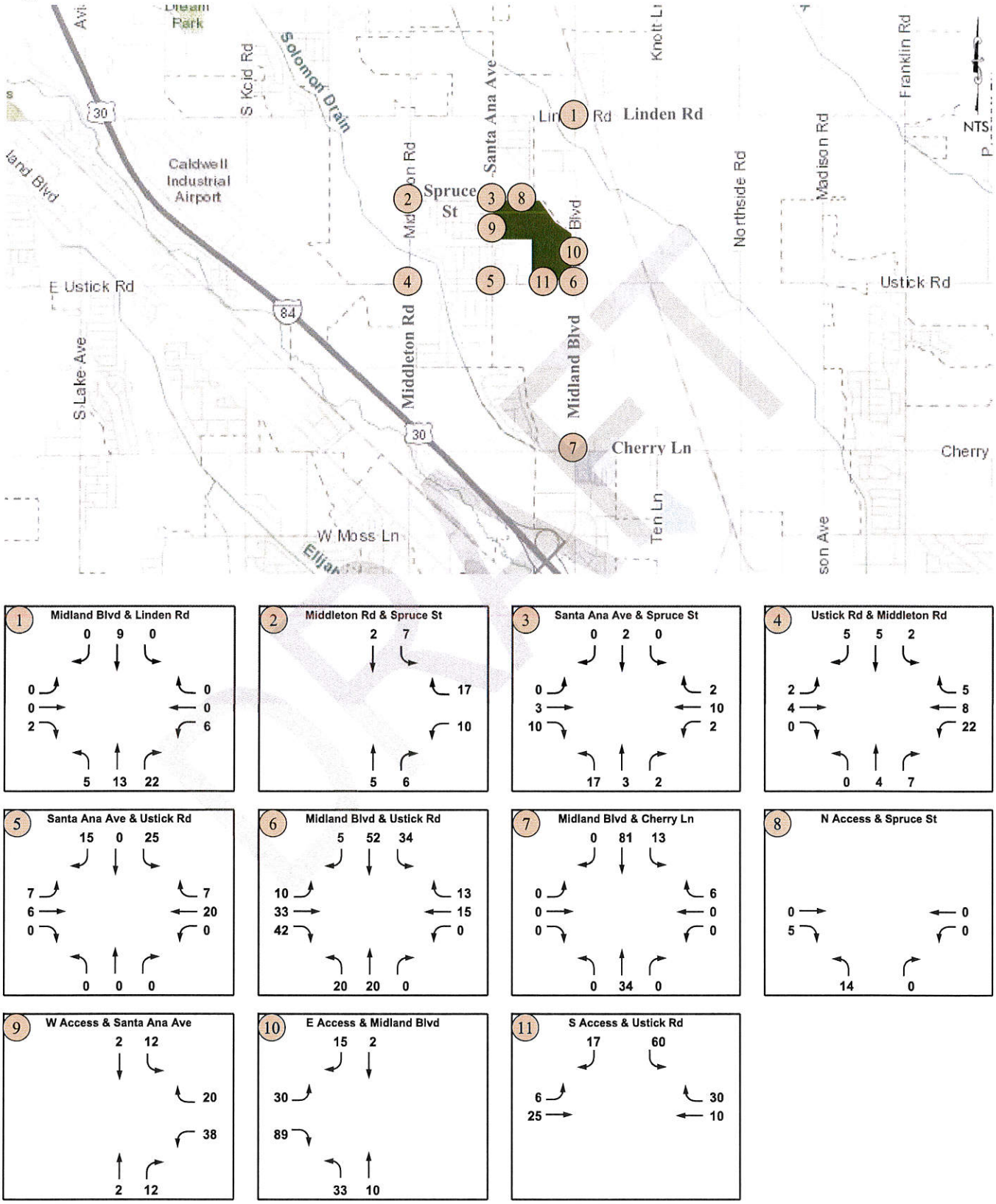

Figure 4.3 – 2025 PM Peak Hour Site Traffic

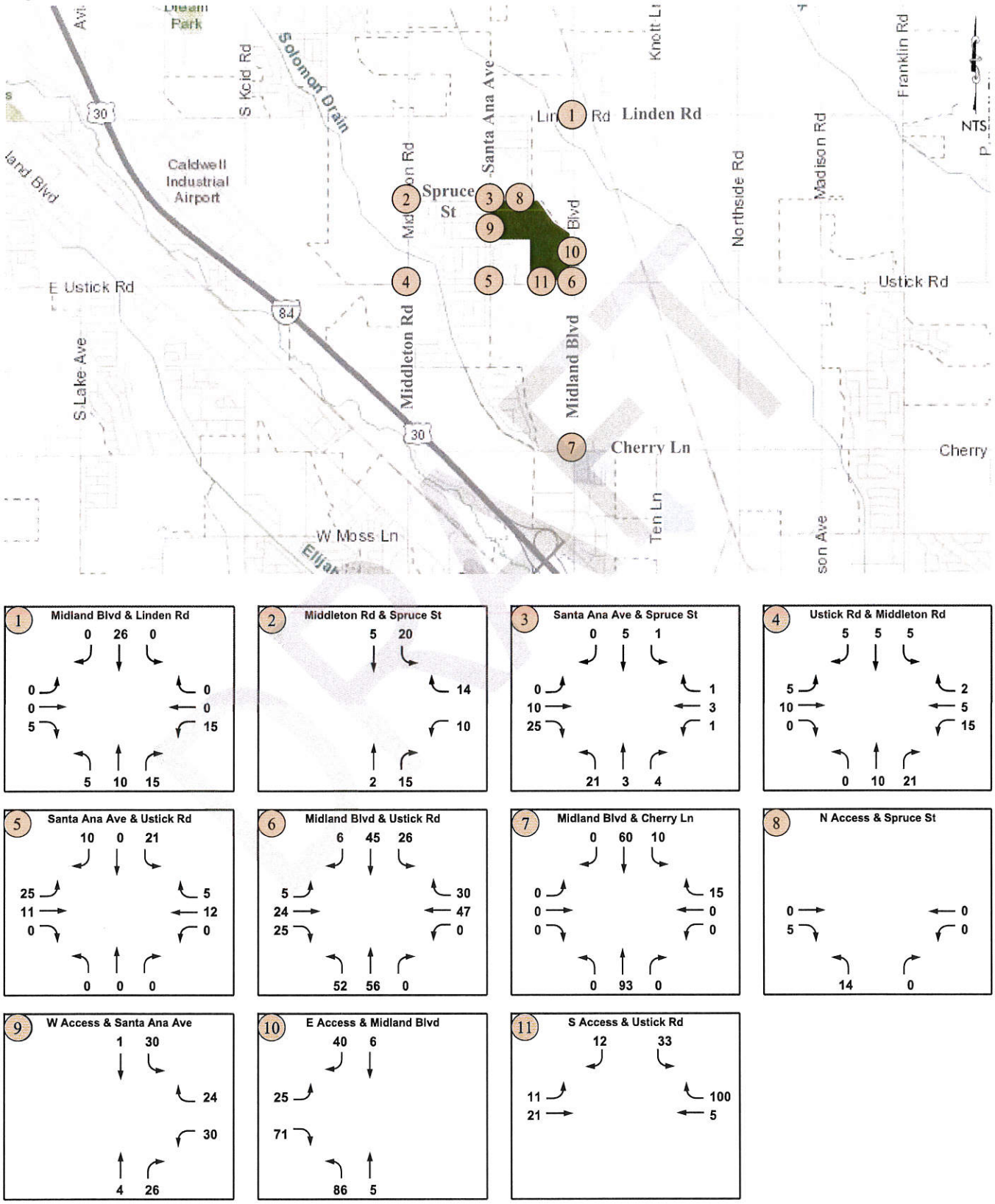

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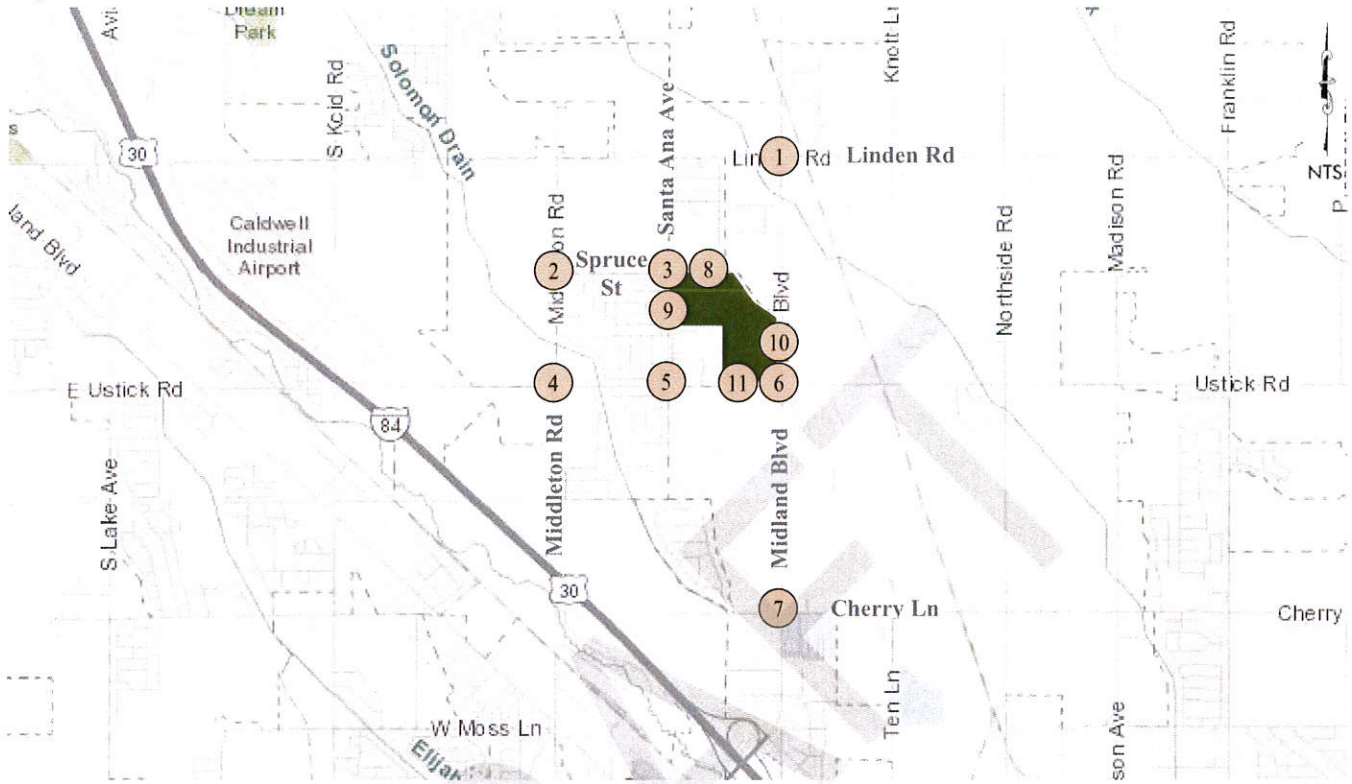
Figure 4.4 – 2025 Build-Out Year AM Peak Hour Total Traffic



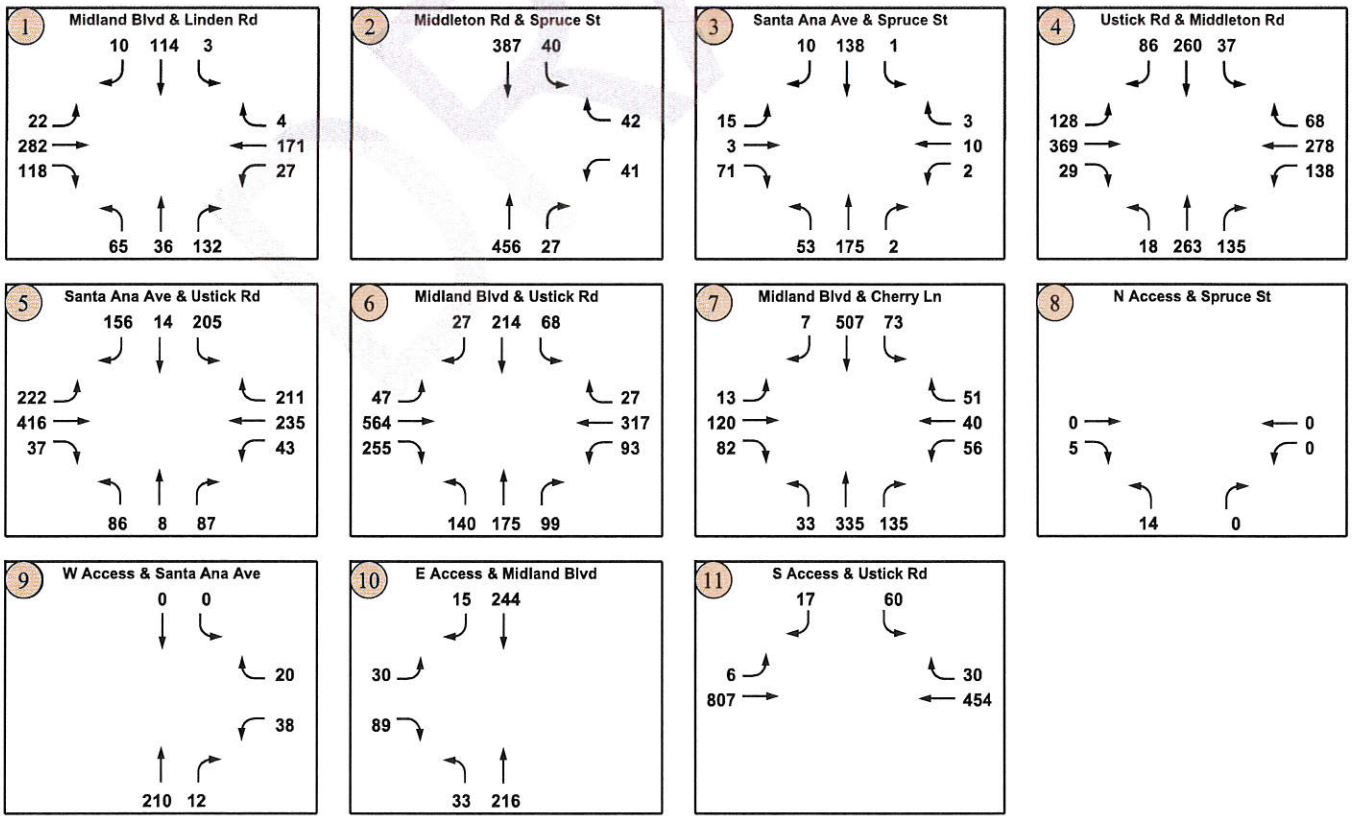


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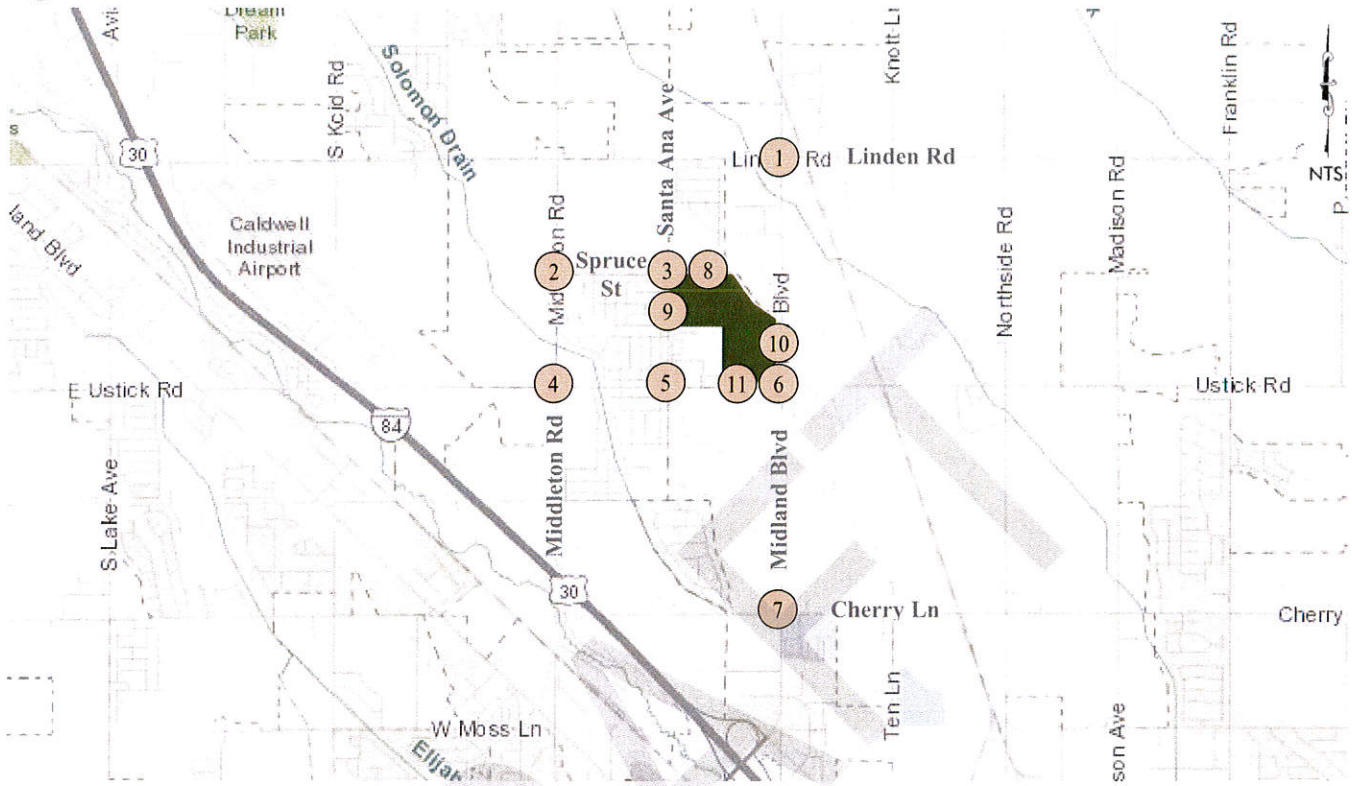
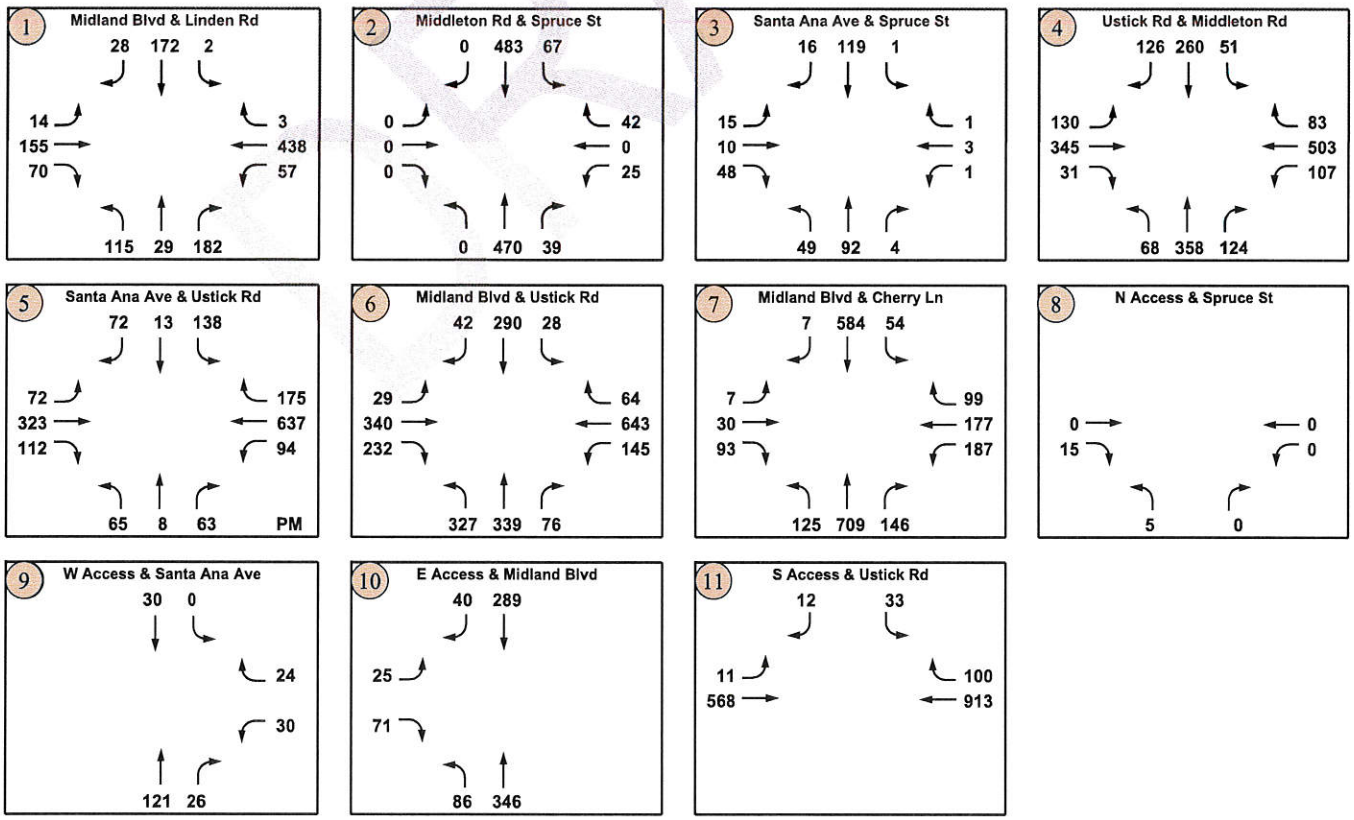
Figure 4.5 – 2025 Build-Out Year PM Peak Hour Total Traffic





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4.4 Intersection Level of Service

To determine the 2025 total traffic impacts, the study area intersections were analyzed with the existing intersection control and lane configuration or with the preceding improvements needed to mitigate 2017/2018 existing traffic and 2025 background traffic. Copies of the analysis reports are included in the appendix. **Table 4.3** summarizes the intersection capacity analysis results. One study area intersection is expected to exceed minimum operational thresholds and will require improvements to mitigate 2025 total traffic:

- Midland Boulevard and Linden Road intersection

4.5 Mitigation

One study area intersection is expected to exceed minimum operational thresholds with 2025 total traffic. The proposed intersection improvements discussed below are expected to mitigate 2025 total traffic to meet minimum operational thresholds. Turn lane analysis was evaluated at unsignalized intersections using NCHRP 457 guidelines. **Table 4.3** summarizes the analysis results for the proposed mitigations.

Midland Boulevard and Linden Road Intersection

There are no plans to improve the Midland Boulevard and Linden Road intersection. However, the intersection is expected to exceed minimum operational thresholds as an all-way stop with 2025 total traffic. As a result, two mitigation options are proposed to mitigate 2025 total traffic at the Midland Boulevard and Linden Road intersection:

- Single-lane roundabout
- Signal with left-turn lanes on all approaches

Both of these mitigation options are expected to mitigate 2025 total traffic to meet minimum operational thresholds. However, there is an existing irrigation canal at the intersection crossing the south and west legs, which may restrict the mitigation options. These mitigation options should be further evaluated to determine the preferred option in terms of costs, operational and safety benefits, right-of-way impact, and cost/benefit ratio as well as other factors.

Middleton Road and Spruce Street Intersection

The Middleton Road and Spruce Street intersection is expected to meet minimum operational thresholds with 2025 total traffic. However based on NCHRP 457 turn-lane guidelines, the following turn lane is warranted:

- Northbound right-turn lane

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Table 4.2 – Intersection Level of Service – 2025 Build-Out Year Total Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	All-way Stop	Intersection LOS	C	**E**
			Intersection Delay (s/v)	17	**38**
			Worst Lane Group LOS	C (EB)	**F (WB)**
2	Middleton Road And Spruce Street	Stop (Spruce)	LOS (WB)	B	C
			Delay (s/v) (WB)	15	16
			Worst Lane Group LOS	B (WB)	C (WB)
3	Santa Ana Avenue and Spruce Street	Two-way Stop (Spruce)	LOS (EB / WB)	B / B	B / B
			Delay (s/v) (EB / WB)	11 / 12	12 / 13
			Worst Lane Group LOS	B (WB)	B(WB)
4	Middleton Road and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	B	B
			Intersection Delay (s/v)	11	14
			Worst Lane Group LOS	C (EBLT)	D (WBLT)
5	Santa Ana Avenue and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	B	B
			Intersection Delay (s/v)	12	10
			Worst Lane Group LOS	C (EBLT)	B (SB)
		Traffic Signal	Intersection LOS	B	A
			Intersection Delay (s/v)	13	7
			Worst Lane Group LOS	B (SBL)	B (NB)
6	Midland Boulevard and Ustick Road	Multi-Lane Roundabout	Intersection LOS	A	B
			Intersection Delay (s/v)	8	12
			Worst Lane Group LOS	A (EBLT)	C (WBLT)
7	Midland Boulevard and Cherry Lane	Signal	Intersection LOS	C	C
			Intersection Delay (s/v)	25	22
			Worst Lane Group LOS	D (SBL)	D (SBL)

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Table 4.3 – Intersection Level of Service – 2025 Build-Out Year Total Traffic Mitigation

Intersection		Mitigation	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	7	8
			Worst Lane Group LOS	A (EB)	B (WB)
		Signal	LOS (WB)	A	A
			Delay (s/v) (WB)	8	9
			Worst Lane Group LOS	B (NBL)	B (NBL)
2	Middleton Rd and Spruce St	NB right-turn lane	LOS (WB)	B	C
			Delay (s/v) (WB)	14	15
			Worst Lane Group LOS	B (WB)	C (WB)

4.6 Site Access and Circulation

The development is proposing site access on Santa Ana Avenue, Midland Boulevard, Ustick Road, and extending Spruce Street along the site frontage as shown in **Figure 4.6**.

Turn lane warrants were evaluated at the proposed site access intersections using guidelines from the NCHRP 457. See the appendix for turn lane warrant worksheets. The following turn lanes are needed:

- East Access on Midland Boulevard
  - Northbound left-turn lane
- South Access on Ustick Road
  - Eastbound left-turn lane
  - Westbound right-turn lane

Table 4.4 summarizes the proposed site access intersections operations. All proposed site access intersections are expected to operate at LOS C or better with a with 2025 total traffic.

4.7 School Crossing

The site is located next to two existing schools – Sage Valley Middle School and Desert Springs Elementary School. The development is planning to construct sidewalks on Santa Ana Avenue and Ustick Road along the site frontages. This will provide connected sidewalks from the site to the schools. The development is also providing multi-use paths from the site to the school boundaries. Schoolchildren walking from the site to the existing schools will not be crossing any roadways.

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Figure 4.6 – Proposed Site Access Locations

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Table 4.4 – Site Access Intersection Level of Service – 2025 Build-Out Year Total Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
8	N Access and Spruce St	Stop (N Access)	LOS (NB)	A	A
			Delay (s/v) (NB)	9	9
			Worst Lane Group LOS	A (NB)	A (NB)
9	W Access And Santa Ana Ave	Stop (W Access)	LOS (WB)	B	B
			Delay (s/v) (WB)	12	11
			Worst Lane Group LOS	B (WB)	B (WB)
10	E Access and Midland Blvd	Stop (E Access)	LOS (EB)	B	B
			Delay (s/v) (EB)	11	12
			Worst Lane Group LOS	B (EB)	B (EB)
11	S Access and Ustick Road	Stop (S Access)	LOS (SB)	C	C
			Delay (s/v) (SB)	16	20
			Worst Lane Group LOS	C (SB)	C (SB)

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5.0 2030 HORIZON YEAR BACKGROUND TRAFFIC CONDITIONS

2030 horizon year analysis evaluated the long-term impacts beyond the build-out year with and without the proposed development.

5.1 Roadway Network

The study area roadways and intersections are expected to remain the same as the existing conditions with the exception of the intersection improvements needed to mitigate 2017/2018 existing traffic and 2025 background traffic as discussed in the previous sections. There are also planned improvements for the study area roadways and intersections as summarized in **Table 3.1** in the previous section. These improvements were considered as mitigation options for 2030 background traffic if necessary.

For 2030 conditions, Laster Lane is assumed to be extended to Midland Boulevard. With a multi-lane roundabout at the Midland Boulevard and Ustick Road intersection, Midland Boulevard is expected to be widened to five lanes from Cherry Lane to Ustick Road, which is a planned project in the City of Nampa transportation plan.

5.2 Background Traffic

Future background traffic was estimated by extrapolating the 2017/2018 existing traffic counts by the following annual growth rates:

- 4.0% per year on Ustick Road and Linden Road
- 2.0% per year on Middleton Road, Midland Boulevard, Spruce Street, Santa Ana Avenue, and Cherry Lane

These growth rates are based on historical traffic counts on these roadways, COMPASS forecasts, and our review of other traffic studies in the area. **Figure 5.1** and **Figure 5.2** summarize the 2030 horizont year peak hour background traffic.

5.3 Off-Site Development Traffic

In additional to the traffic growth, traffic generated by three proposed off-site developments located in the vicinity of the site was also included in the background traffic:

- Adam's Ridge Subdivision located south of Ustick Road south of the site
- Wagon Wheel Subdivision located west of Middleton Road between US 20-26 and Linden Road
- Hartland Subdivision located in the northeast quadrant of Ustick Road and Northside Boulevard intersection

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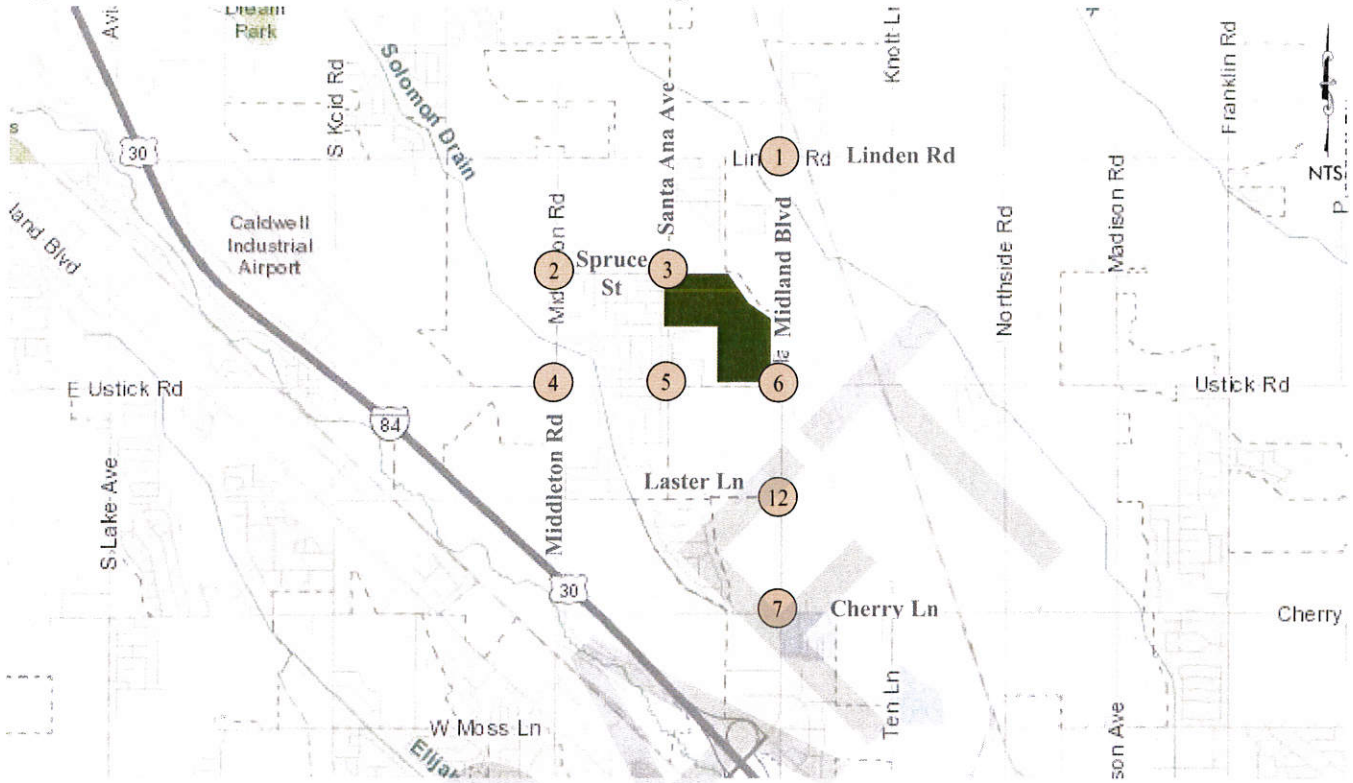
Figure 5.1 – 2030 Horizon Year AM Peak Hour Background Traffic



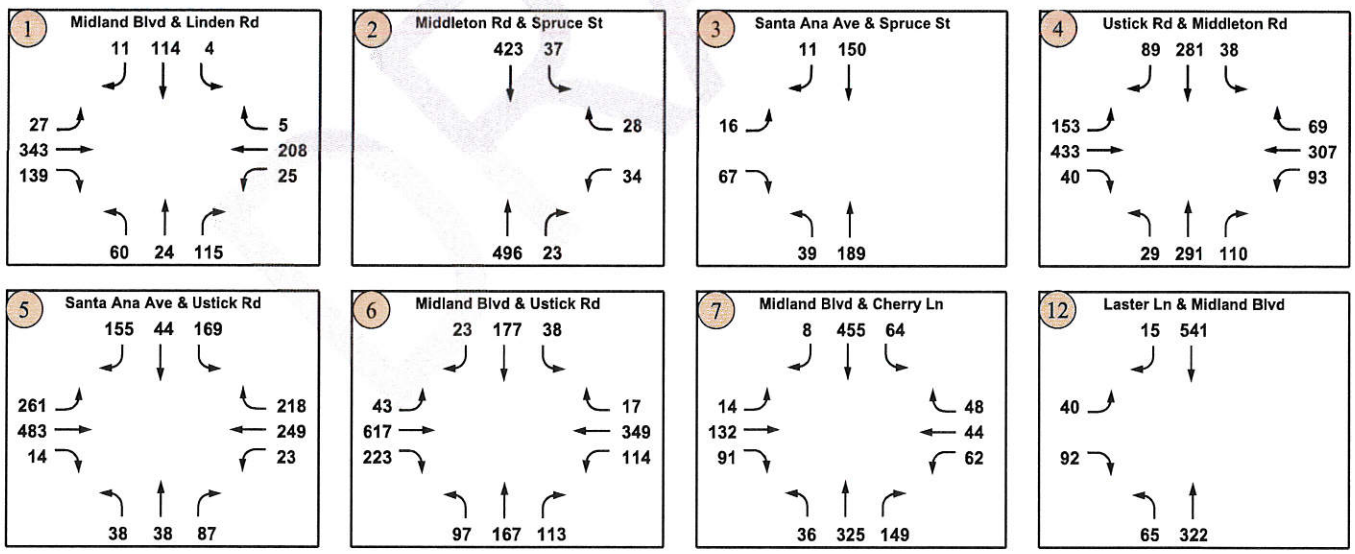


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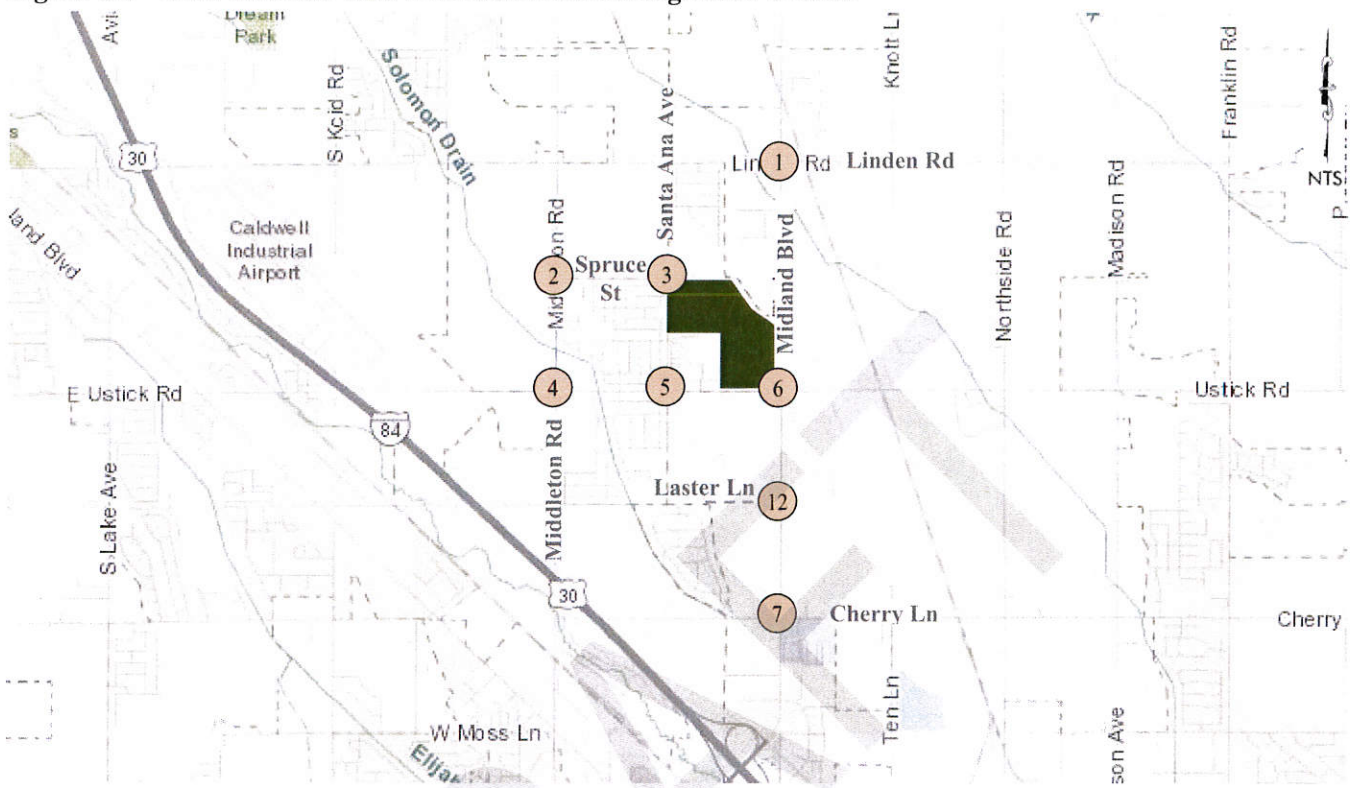
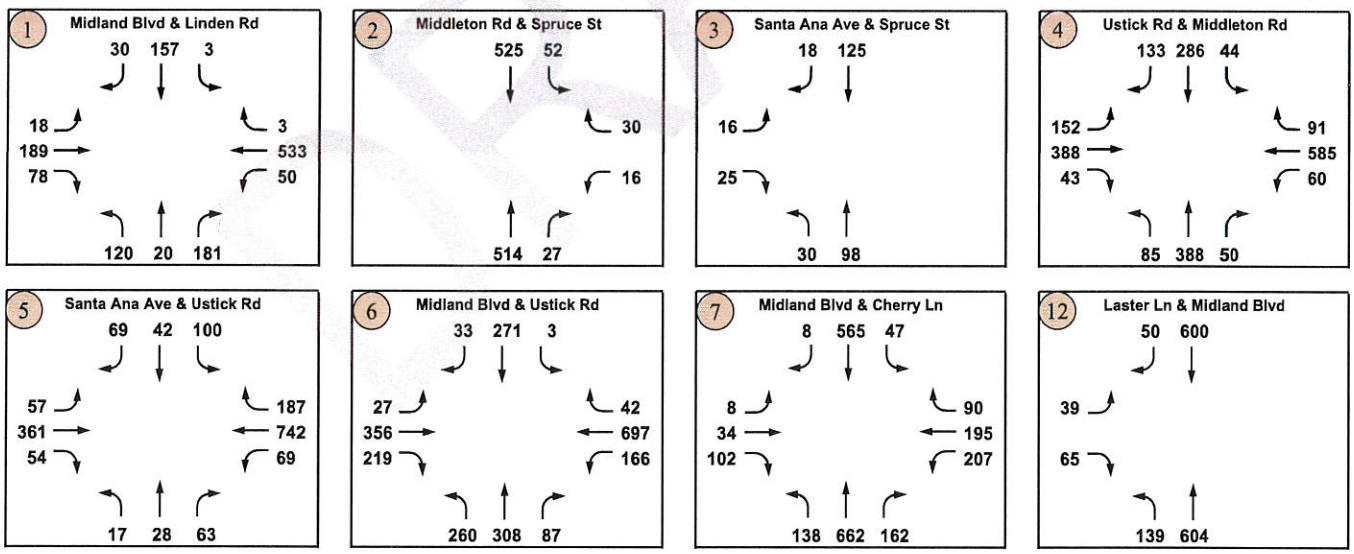
Figure 5.2 – 2030 Horizon Year PM Peak Hour Background Traffic





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5.4 Intersection Level of Service

To determine the 2030 background traffic impacts, the study area intersections were analyzed with the existing intersection control and lane configuration or with the preceding improvements needed to mitigate 2018 existing traffic and 2025 background traffic. Copies of the analysis reports are included in the appendix. **Table 3.2** summarizes the intersection capacity analysis results. Two study area intersections are expected to exceed minimum operational thresholds and will require improvements to mitigate 2030 background traffic:

- Midland Boulevard and Linden Road intersection
- Middleton Road and Ustick Road intersection

5.5 Mitigation

Two study area intersections are expected to exceed minimum operational thresholds with 2030 background traffic. The proposed intersection improvements discussed below are expected to mitigate 2030 background traffic to meet minimum operational thresholds. Turn lane analysis was evaluated at unsignalized intersections using NCHRP 457 guidelines. **Table 3.3** summarizes the analysis results for the proposed mitigations.

Midland Boulevard and Linden Intersection

The Midland Boulevard and Linden Road intersection is expected to exceed minimum operational thresholds as an all-way stop with 2030 background traffic. Two mitigation options are proposed to mitigate 2030 background traffic:

- Single-lane roundabout
- Signal with left-turn lanes on all approaches

As discussed in the previous section, there is an existing irrigation canal located adjacent to the intersection; thus, the proposed mitigation options should be further evaluated with multiple criteria to determine the prefer option.

Middleton Road and Ustick Road Intersection

The Middleton Road and Ustick Road intersection is expected to exceed minimum operational thresholds as a modified single-lane roundabout with 2030 background traffic. To meet the 2030 background traffic demand, the roundabout should be expanded to a multi-lane roundabout by removing the channelizing curb and modifying sections of the splitter islands. With these modifications, the roundabout will have two entry lanes and two exit lanes on all approaches.

Middleton Road and Spruce Street Intersection

The Middleton Road and Spruce Street intersection is expected to meet minimum operational thresholds with 2030 background traffic. However, based on NCHRP 457 turn-lane guidelines, the following turn lane is warranted:

- Northbound right-turn lane

The Santa Ana Avenue and Ustick Road intersection is expected to meet minimum operational thresholds as a modified single-lane roundabout. However with multi-lane roundabouts at the intersections of Middleton Road and Midland Boulevard on Ustick Road, the Santa Ana Avenue and Ustick Road roundabout will also need to be expanded to have two entry and exit lanes on the Ustick Road approaches for lanes to balance.

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Table 5.1 – Intersection Level of Service – 2030 Horizon Year Background Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	All-way Stop	Intersection LOS	C	**F**
			Intersection Delay (s/v)	25	**65**
			Worst Lane Group LOS	E (EB)	**F (WB)**
2	Middleton Road and Spruce Street	Stop (Spruce)	LOS (WB)	B	C
			Delay (s/v) (WB)	15	15
			Worst Lane Group LOS	B (WB)	C (WB)
3	Santa Ana Avenue and Spruce Street	Stop (Spruce)	LOS (EB)	B	B
			Delay (s/v) (EB)	10	11
			Worst Lane Group LOS	B (EB)	B (EB)
4	Middleton Road and Ustick Road	Modified Single-Lane Roundabout	Intersection LOS	B	C
			Intersection Delay (s/v)	13	20
			Worst Lane Group LOS	B (NBLT)	**E (WBLT)**
5	Santa Ana Avenue and Ustick Road[1]	Modified Single-Lane Roundabout	Intersection LOS	B	A
			Intersection Delay (s/v)	11	10
			Worst Lane Group LOS	C (EBLT)	B (WBLT)
6	Midland Boulevard and Ustick Road	Multi-Lane Roundabout	Intersection LOS	A	B
			Intersection Delay (s/v)	8	12
			Worst Lane Group LOS	A (EBLT)	B (WBLT)
7	Midland Boulevard and Cherry Lane	Signal	Intersection LOS	C	C
			Intersection Delay (s/v)	27	23
			Worst Lane Group LOS	D (SBL)	D (SBL)
12	Laster Ln and Midland Boulevard	Stop (Laster)	LOS (EB)	B	C
			Delay (s/v) (EB)	14	19
			Worst Lane Group LOS	B (EB)	C (EB)

[1]LOS B or better with signal

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Table 5.2 – Intersection Level of Service – 2030 Horizon Year Background Traffic Mitigation

Intersection		Mitigation	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	Single-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	7	10
			Worst Lane Group LOS	A (EB)	B (WB)
		Signal	Intersection LOS	A	A
			Intersection Delay (s/v)	8	10
			Worst Lane Group LOS	B (NBL)	B (NBL)
2	Middleton Road and Spruce Street	NB right-turn lane	LOS (WB)	B	C
			Delay (s/v) (WB)	15	15
			Worst Lane Group LOS	B (WB)	C(WB)
4	Middleton Road and Ustick Road	Multi-lane roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	8	9
			Worst Lane Group LOS	A (NBLT)	B (WBLT)

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6.0 2030 HORIZON YEAR TOTAL TRAFFIC CONDITIONS

6.1 Roadway Network Improvements

The 2030 roadway network within the study area is expected to remain the same as existing with the exception for the improvements needed to mitigate 2017/2018 existing traffic and 2025 and 2030 background traffic as discussed in the previous sections. Arbor Subdivision is planning to extend Spruce Street from Santa Ana Avenue along the site frontage for access, but will not connect it to Midland Boulevard.

6.2 Site Traffic

Site traffic is estimated as discussed in Section 4.2 above and summarized in **Figure 4.2** and **Figure 4.3**. The proposed Laster Lane extension to Midland Boulevard is not expected to change the site traffic distribution patterns or route.

6.3 Total Traffic

The 2025 site traffic is then added to the 2030 background traffic as determined above to obtain the 2030 total traffic. **Figure 6.1** and **Figure 6.2** summarize the estimated 2030 peak hour total traffic at each intersection.

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Figure 6.1 – 2030 Horizon Year AM Peak Hour Total Traffic

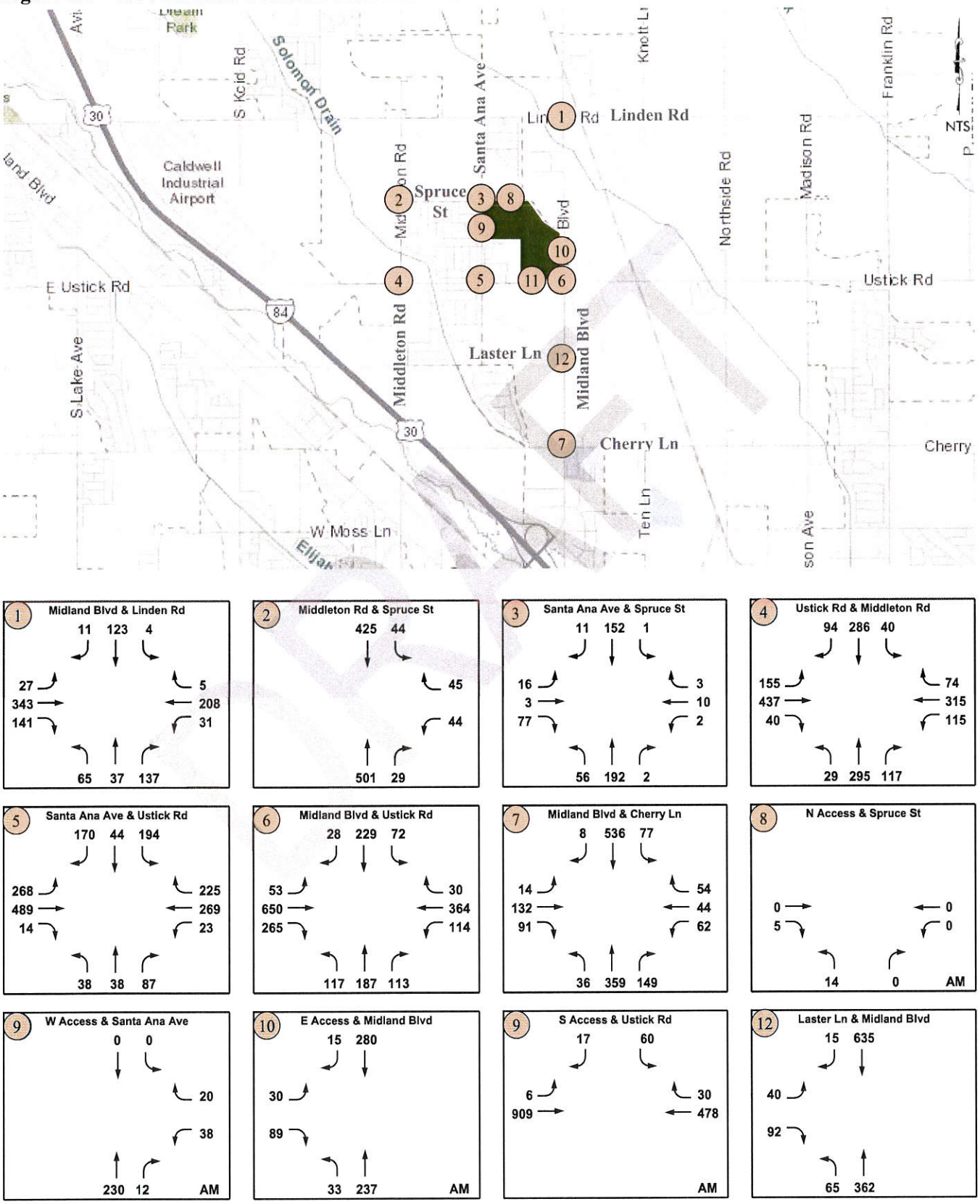

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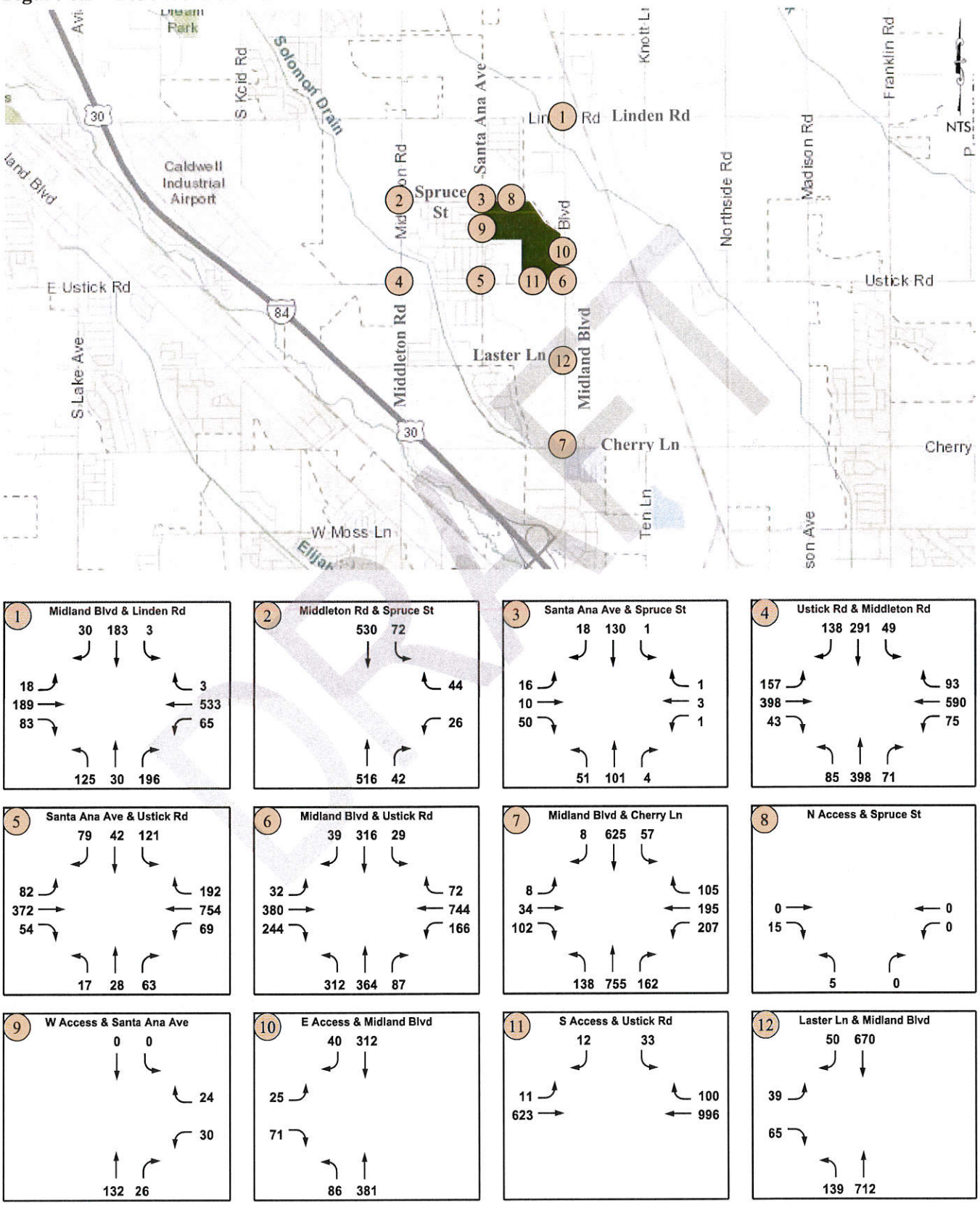
Figure 6.2 – 2030 Horizon Year PM Peak Hour Total Traffic



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6.4 Intersection Level of Service

To determine the 2030 total traffic impacts, the study area intersections were analyzed with the existing intersection control and lane configuration or with the preceding improvements needed to mitigate 2017/2018 existing traffic and 2025 and 2030 background traffic. Copies of the analysis reports are included in the appendix. **Table 4.3** summarizes the intersection capacity analysis results. All study area intersections are expected to meet minimum operational thresholds.

Table 6.1 – Intersection Level of Service – 2030 Horizon Year Total Traffic

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
1	Midland Boulevard and Linden Road	Single-Lane Roundabout	Intersection LOS	A	
			Intersection Delay (s/v)	8	38
			Worst Lane Group LOS	A (EB)	F (WB)
		Signal	Intersection LOS	A	B
			Intersection Delay (s/v)	8	10
			Worst Lane Group LOS	B (NBL)	B (NBL)
2	Middleton Road And Spruce Street	Stop (Spruce)	LOS (WB)	C	C
			Delay (s/v) (WB)	16	17
			Worst Lane Group LOS	C (WB)	C (WB)
3	Santa Ana Avenue and Spruce Street	Two-Way Stop (Spruce)	LOS (EB / WB)	B / B	D / D
			Delay (s/v) (EB / WB)	11 / 13	31 / 26
			Worst Lane Group LOS	B (WB)	B(WB)
4	Middleton Road and Ustick Road	Multi-Lane Roundabout	Intersection LOS	A	A
			Intersection Delay (s/v)	8	10
			Worst Lane Group LOS	A (NBLT)	B (WBLT)
5	Santa Ana Avenue and Ustick Road[1]	Modified Multi-Lane Roundabout	Intersection LOS	A	B
			Intersection Delay (s/v)	8	10
			Worst Lane Group LOS	B (NBLT)	B (SB)
		Traffic Signal	Intersection LOS	B	A
			Intersection Delay (s/v)	14	8
			Worst Lane Group LOS	B (WBTR)	B (SBL)

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Table 6.1 – Intersection Level of Service – 2030 Horizon Year Total Traffic (Continued)

Intersection		Control	MOEs	AM Peak Hour	PM Peak Hour
6	Midland Boulevard and Ustick Road	Multi-Lane Roundabout	Intersection LOS	A	B
			Intersection Delay (s/v)	9	15
			Worst Lane Group LOS	B (EBLT)	C (WBLT)
7	Midland Boulevard and Cherry Lane	Signal	Intersection LOS	C	C
			Intersection Delay (s/v)	23	22
			Worst Lane Group LOS	D (SBL)	D (SBL)
8	N Access and Spruce St	Stop (N Access)	LOS (NB)	A	A
			Delay (s/v) (NB)	9	9
			Worst Lane Group LOS	A (NB)	A (NB)
9	W Access And Santa Ana Ave	Stop (W Access)	LOS (WB)	B	B
			Delay (s/v) (WB)	12	11
			Worst Lane Group LOS	B (WB)	B (WB)
10	E Access and Midland Blvd	Stop (E Access)	LOS (EB)	B	B
			Delay (s/v) (EB)	12	13
			Worst Lane Group LOS	B (EB)	B (EB)
11	S Access and Ustick Road	Stop (S Access)	LOS (SB)	C	C
			Delay (s/v) (SB)	17	23
			Worst Lane Group LOS	C (SB)	C (SB)
12	Laster Ln and Midland Boulevard	Stop (Laster)	LOS (EB)	C	C
			Delay (s/v) (EB)	16	22
			Worst Lane Group LOS	C (EB)	C (EB)

6.5 Mitigation

All study area intersections are expected to meet minimum operational thresholds with 2030 total traffic. As a result, no additional improvements beyond the preceding improvements discussed in the previous sections are needed to mitigate 2030 total traffic.

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APPENDIX A: SCOPE

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APPENDIX B: TRAFFIC COUNTS

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APPENDIX C: COMPASS FORECASTS

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APPENDIX D: 2017/2018 SYNCHRO REPORTS

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APPENDIX E: 2025 SYNCHRO REPORTS

APPENDIX F: 2030 SYNCHRO REPORTS

APPENDIX G: TURN-LANE WARRANTS WORKSHEETS