

# Appendix A

## Traffic Report

## INTRODUCTION

Traffic analysis was performed at fourteen study intersections along US 50 between Pine Cone Road and Bryce Street/Chaves Road near Dayton, Nevada to evaluate existing conditions, and investigate alternatives to improve traffic operations to accommodate the 2040 forecasted traffic volumes. Traffic analysis was performed for 2020 existing conditions, 2040 No-Action, and three 2040 Build Alternatives. Traffic analysis was performed using Synchro 11 following the methodologies from Highway Capacity Manual (HCM 6<sup>th</sup> Edition). The following sections describe the details of the traffic volumes, forecasting methodology, and traffic operations results.

A *Summary of Traffic Forecasting Assumptions and Potential Developments* along the US 50 Study Area was submitted to and approved by NDOT and Lyon County in May 2020. This Traffic Report is a continuation of the traffic analysis for this project.

## 1. TRAFFIC VOLUMES

Intersection turning movement counts were collected in March 2020 at fourteen project intersections during for AM (7:00 to 9:00) and PM (4:00 to 6:00). The traffic counts are included in Appendix 1.

### 1.1. 2020 Existing Traffic Counts

The AM and PM peak-hour turning movement counts were extracted from the respective two-hour counts. Of the fourteen intersections, the intersection of Fortune Drive and US 50 is the only signalized intersection. All other intersections are unsignalized two-way stop controlled (TWSC). Existing traffic signal timing plans for Fortune Drive and US 50 were obtained from NDOT, and were used in the existing conditions analysis. The intersections along the study area are:

1. US 50 & Pine Cone Road
2. US 50 & Retail Road
3. US 50 & Fortune Drive
4. US 50 & Enterprise Way
5. US 50 & Occidental Drive (South)
6. US 50 & Cardelli Road/River Boat Road
7. US 50 & Occidental Drive (North)
8. US 50 & Ft Churchill Road/Six Mile Canyon Road
9. US 50 & LaFond Ave
10. US 50 & Mark Twain Ave
11. US 50 & Rainbow Drive (West)
12. US 50 & Pinenut Drive
13. US 50 & Rainbow Drive (East)
14. US 50 & Bryce Street/Chaves Road

Traffic counts were also collected at the intersection of US 50 and Neigh Road. However, this intersection was later removed from the project scope of work. The 2020 AM (PM) peak-hour intersection turning movement counts are shown in Figure 1.

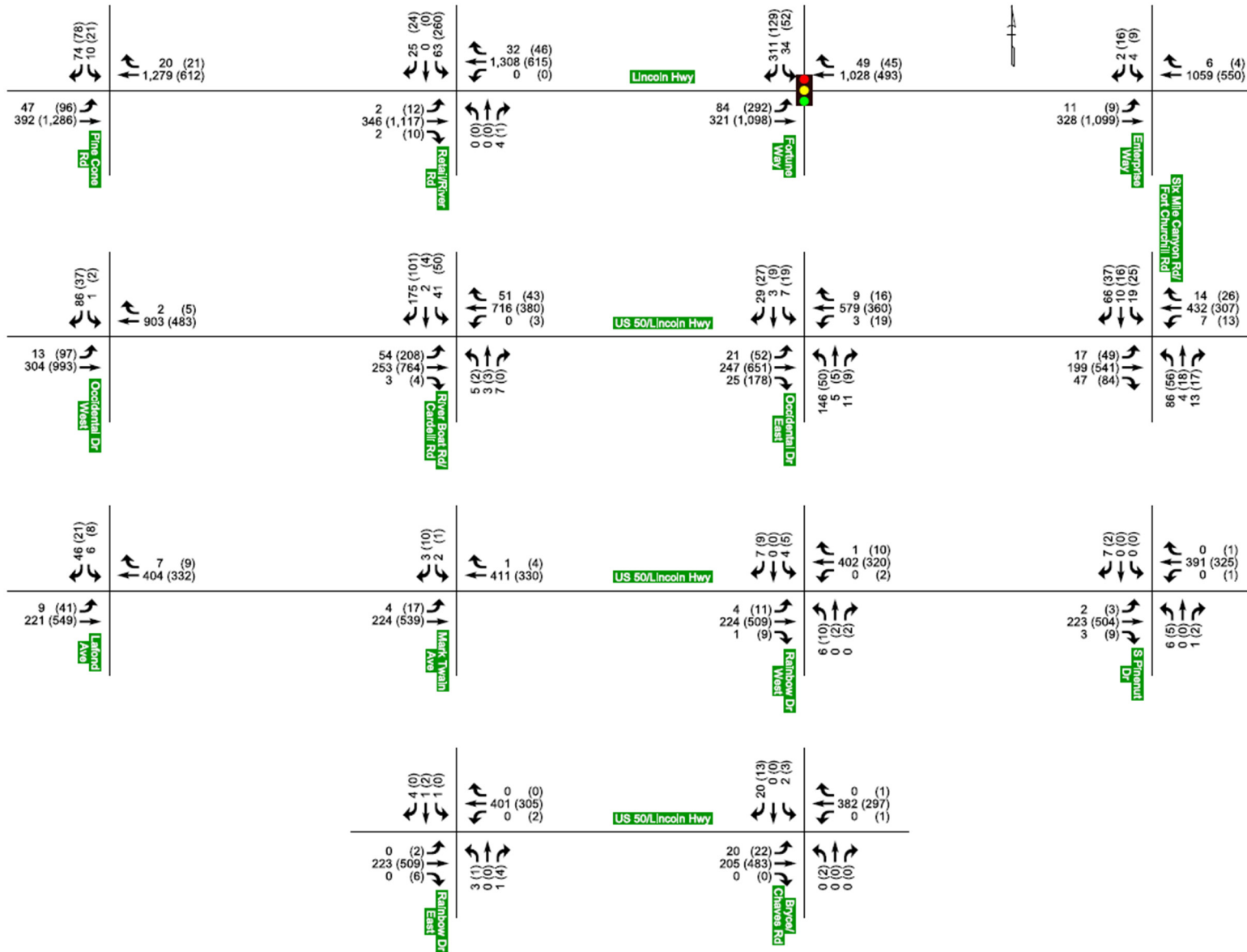


Figure 1. 2020 AM (PM) Peak-Hour Turning Movement Counts

### 1.2. Background Traffic Growth Rate

An annual growth rate of two percent per year was determined and applied to the 2020 existing traffic counts to forecast the 2040 Background traffic volumes. Historical AADT data along the corridor was obtained from NDOT TRINA for a ten-year period (2009 to 2018). The AADT from three NDOT count locations available within the project limits were reviewed (Table 1). The data for all three counters suggest that there was varied growth from 2009 to 2018, with an average annual growth rate of 1.96%, rounded to 2.0% for this study.

**Table 1: NDOT TRINA AADT Data**

Street	NDOT TRINA Count Location	2009 AADT	2018 AADT	Annual Growth Rate
US 50	0190012 – West of Pine Cone Rd	46,280	49,530	1.40%
	0190013 – West of Cardelli Rd	46,280	49,530	2.43%
	0190016 – East of Bryce St	24,185	27,610	2.04%
Average Annual Corridor Growth Rate				1.96%

The 2.0% annual growth rate was applied to the existing intersection traffic to determine the general growth in traffic from 2020 to 2040. The 2040 Background traffic growth calculated for each intersections is summarized in Appendix 2. The 2040 Background traffic growth volumes were increased at some intersections so that minimum turning movement volumes were calculated. These minimum intersection volumes included:

- 10 veh/hr for right and left turns from a side street onto US 50
- 10 veh/hr for right and left turns from US 50 onto a side street
- 5 veh/hr for side street through traffic across US 50

### 1.3. Future Development

In addition to the growth in existing traffic volumes, several new projects that are either approved or proposed to be developed within the US 50 corridor were identified by NDOT or Lyon County staff to potentially add traffic to the US 50 study area. The traffic studies for these proposed developments were provided by NDOT or Lyon County, and reviewed to determine the future traffic that could be added to the US 50 by these projects in 2040. The future developments reviewed for this study are summarized in Table 2.

**Table 2: Future Developments**

Development	Primary US 50 Access Location	Trip Generation (ADT) <sup>(1)</sup>
Sage Vista	East of Bryce St/Chaves Rd	20,110
Gold Country Estates Phase 1	Pine Cone Rd, Retail Rd	316
NNIC (TRIC)	East of Bryce St/Chaves Rd	3,764
Best Properties	Fortune Dr	7,516
Desert Wells	East of Bryce St/Chaves Rd	25,960
Gold Country 3	Retail Rd	426
Heritage Ranch	Retail Rd, Fortune Dr	2,320
Traditions	Pine Cone Rd, Retail Rd, Fortune Dr	5,284
Woodbridge	Lafond Ave, Mark Twain Ave, Rainbow Dr, Pinenut Dr	5,860
Canyon Estates	Six Mile Canyon Rd	6,224
Copper Canyon Estates	Rainbow Ave, Pinenut Rd, Chaves Rd	5,570
<b>Total (11 projects)</b>		<b>83,350</b>

<sup>(1)</sup> Trip Generation impacting US study area may be less than project’s total trip generation

#### 1.4. 2040 Traffic Volumes – No-Action Alternative

The traffic expected to be generated by the future developments listed above were added to the 2040 Background traffic to determine the forecasted 2040 No-Action traffic volumes. The detailed procedure and forecasting assumptions used are described in Appendix 3. Figure 3-2 shows the 2040 No-Action peak-hour turning movement volumes for AM and PM peak hours. The 2040 No-Action Alternative traffic volume calculations for each intersections are summarized in Appendix 2.

#### 1.5. 2040 Traffic Volumes – Build Alternatives

Three Build Alternatives were developed to meet the 2040 traffic demand for the US 50 corridor. For the intersections controlled by traffic signals, the timing splits and offsets were optimized for better coordination along US 50. The three Build Alternatives include:

- 2040 Arterial Alternative, which would widen US 50 to three lanes in each direction and add new traffic signals at intersections as needed to improve side street traffic operations.
- 2040 Parkway Alternative, that would widen US 50 to three lanes in each direction from the west end of the project limit to east of Six mile Canyon Road/Fort Churchill Road, after which the US 50 is 2 lanes in each direction. Traffic signals were added at key intersections and either restricting left-turn movements from minor streets by converting many of the existing intersections to unsignalized High-T, or right-in/right-out only.
- 2040 Controlled Access Alternative, which would widen US 50 to three lanes in each direction from west of Pine Cone Road to east of Fortune Drive. East of Fortune Drive to Bryce Street/Chaves Road, US 50 would be converted to a controlled access facility with two travel lanes in each direction and access provided at three traffic interchanges located at Traditions Parkway, Six Mile Canyon Road/Fort Churchill Road, and Bryce Street/Chaves Road.

The 2040 No-Action Alternative traffic volumes were re-distributed to the Build Alternative roadway based on the changes proposed in each Build Alternative. Figure 3 (Arterial), Figure 4 (Parkway), and Figure 5 (Controlled Access) show the 2040 Build Alternatives peak-hour turning movement volumes. The 2040 Build Alternative traffic volumes calculations for each intersections are included in Appendix 2.

The Arterial Alternative primarily maintains current access along US 50 with nine new traffic signals. The Parkway Alternative provides fewer access locations, traffic signals, and left-turn movements at unsignalized intersections than the Arterial Alternative. The Controlled Access Alternative maintains the Parkway concept on US 50 from Pine Cone Road to Fortune Drive. East of Fortune Drive, US 50 would be a controlled access facility with interchanges at Traditions Parkway, Six Mile Canyon Road/Fort Churchill Road, and Bryce Street/Chaves Road. The proposed changes in access or traffic control from the existing condition are compared in Table 3.

**Table 3. Intersection Access Comparison**

Intersections along US 50	Arterial	Parkway	Controlled Access
Pine Cone Road	New Traffic Signal	Right-in and Right-out	Unsignalized
Retail Road/River Road	New Traffic Signal	New Traffic Signal	New Traffic Signal
Fortune Drive	Existing Signalized High-T	Existing Signalized High-T	Existing Signalized High-T
Traditions Parkway/Segale Road	New Traffic Signal	New Signalized High-T	New full access Interchange
Enterprise Way West	Right-in and Right-out	Right-in and Right-out	No Direct Access to US 50
Occidental Dr West	Right-in and Right-out	Right-in and Right-out	
Riverboat Road/Cordelli Road	New Traffic Signal	New Traffic Signal	
Occidental Drive East	New Traffic Signal	Right-in and Right-out	
Six Mile Canyon Road/Fort Churchill Road	New Traffic Signal	New Traffic Signal	New full access Interchange
Lafond Avenue	New Traffic Signal	Right-in and Right-out	No Direct Access to US 50
Mark Twain Road	Right-in and Right-out	Right-in and Right-out	
Rainbow Drive West	Right-in and Right-out	Right-in and Right-out	
Pinenut Drive	New Traffic Signal	Unsignalized	
Rainbow Drive East	Existing unsignalized	Right-in and Right-out	
Bryce Street/Chaves Road	New Traffic Signal	New Traffic Signal	New full access Interchange

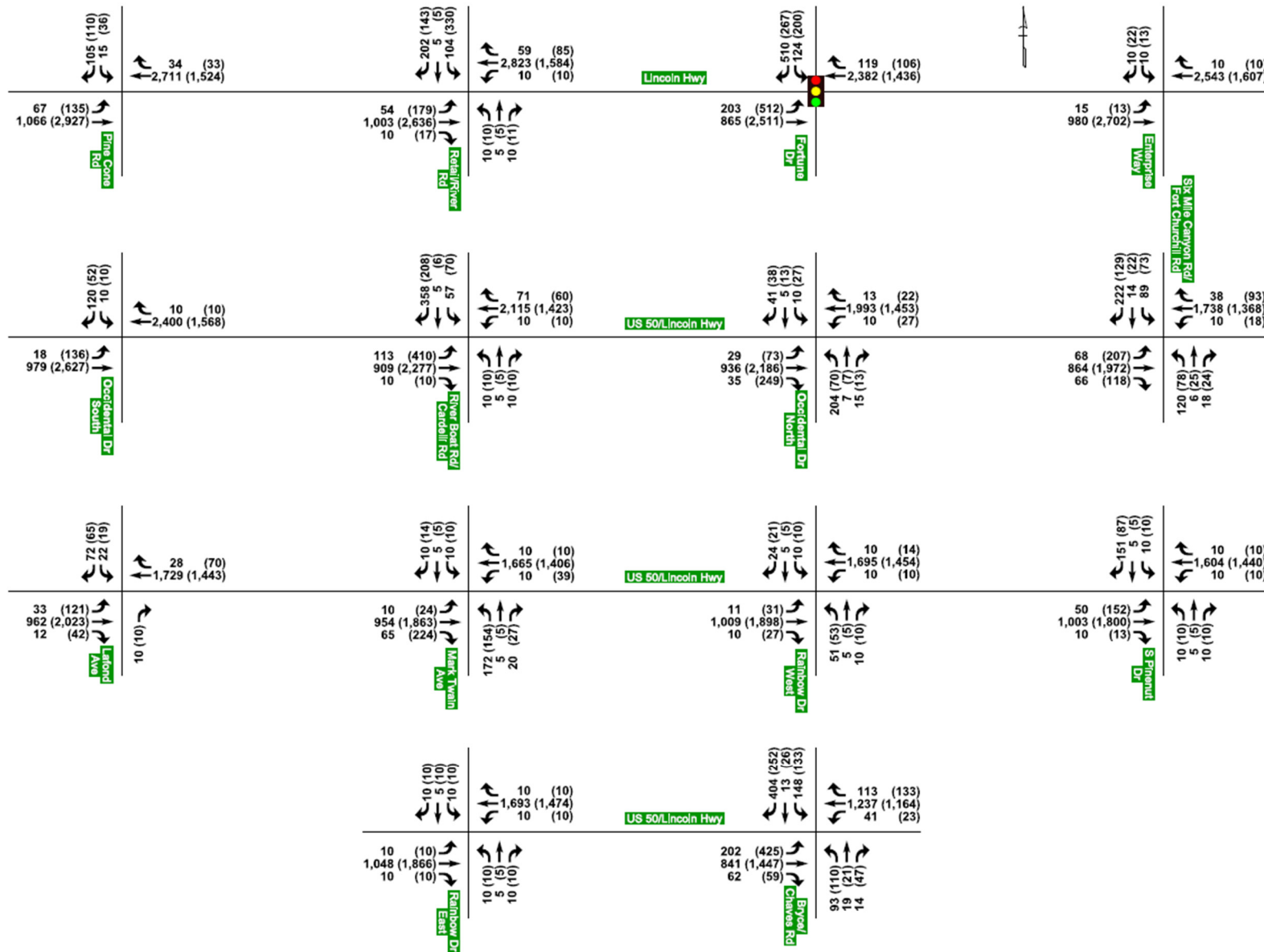


Figure 2: 2040 AM (PM) No-Action Peak-Hour Traffic Volumes

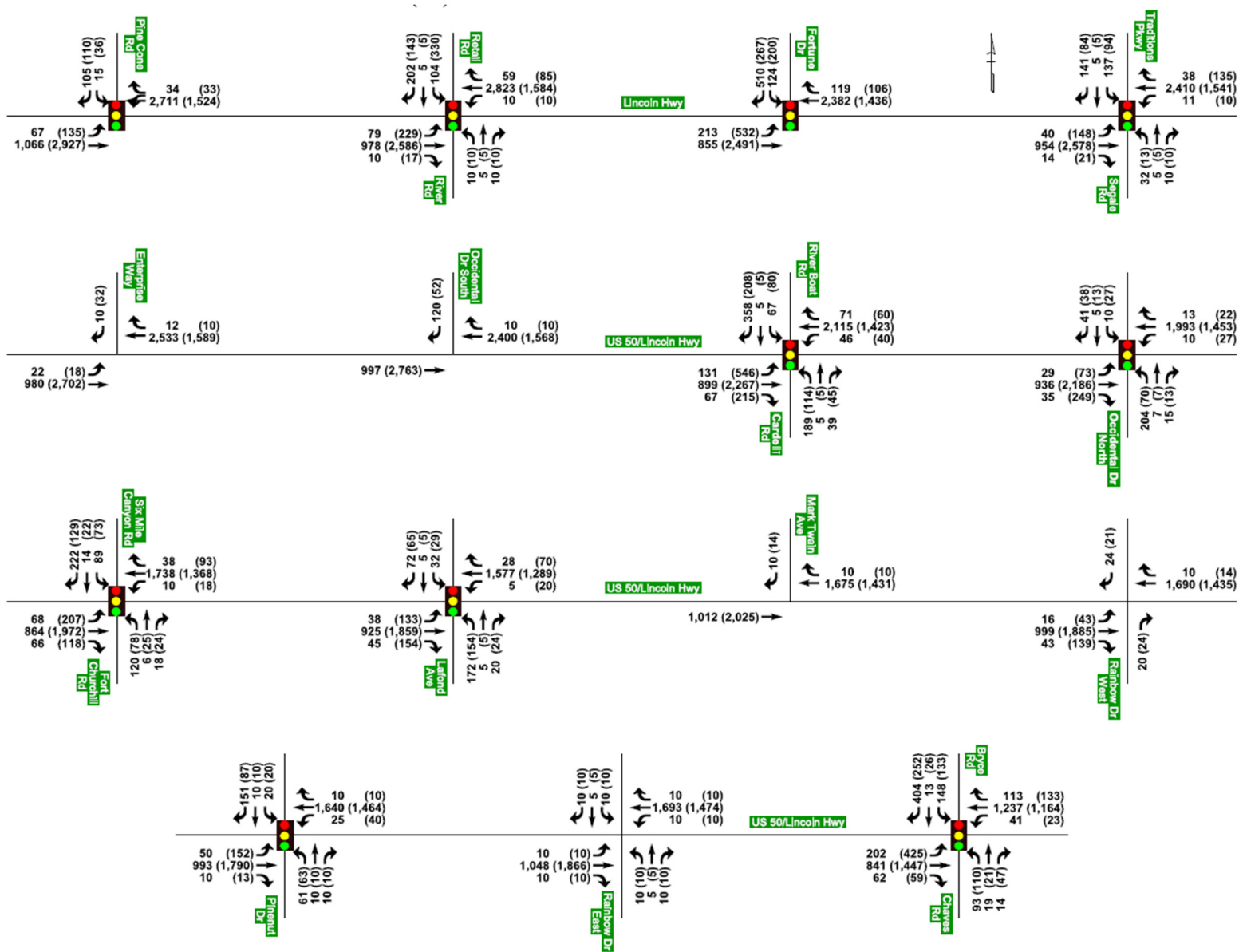


Figure 3: 2040 AM (PM) Arterial Alternative Peak-Hour Traffic Volumes



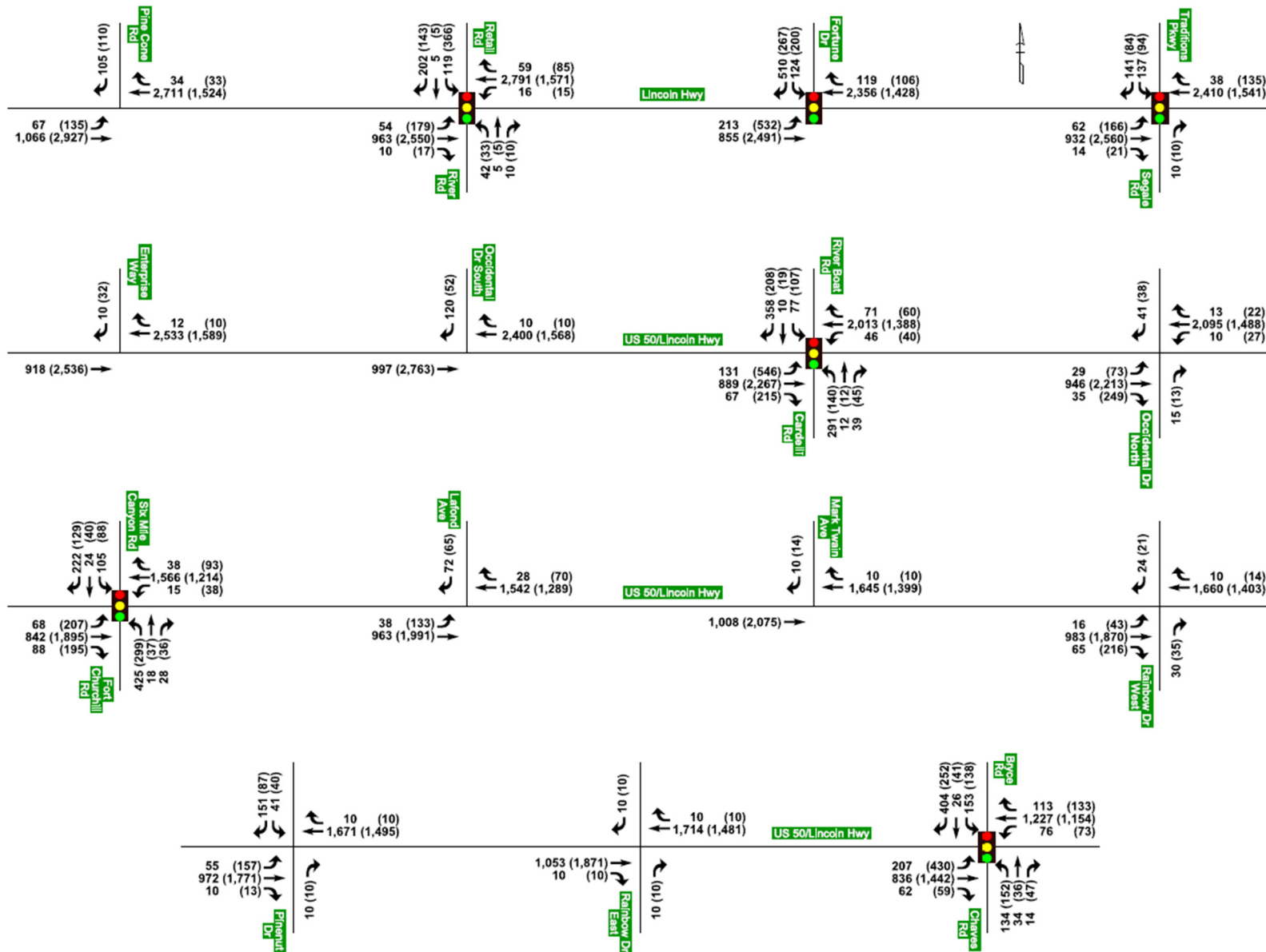


Figure 4: 2040 AM (PM) Parkway Alternative Peak-Hour Traffic Volumes

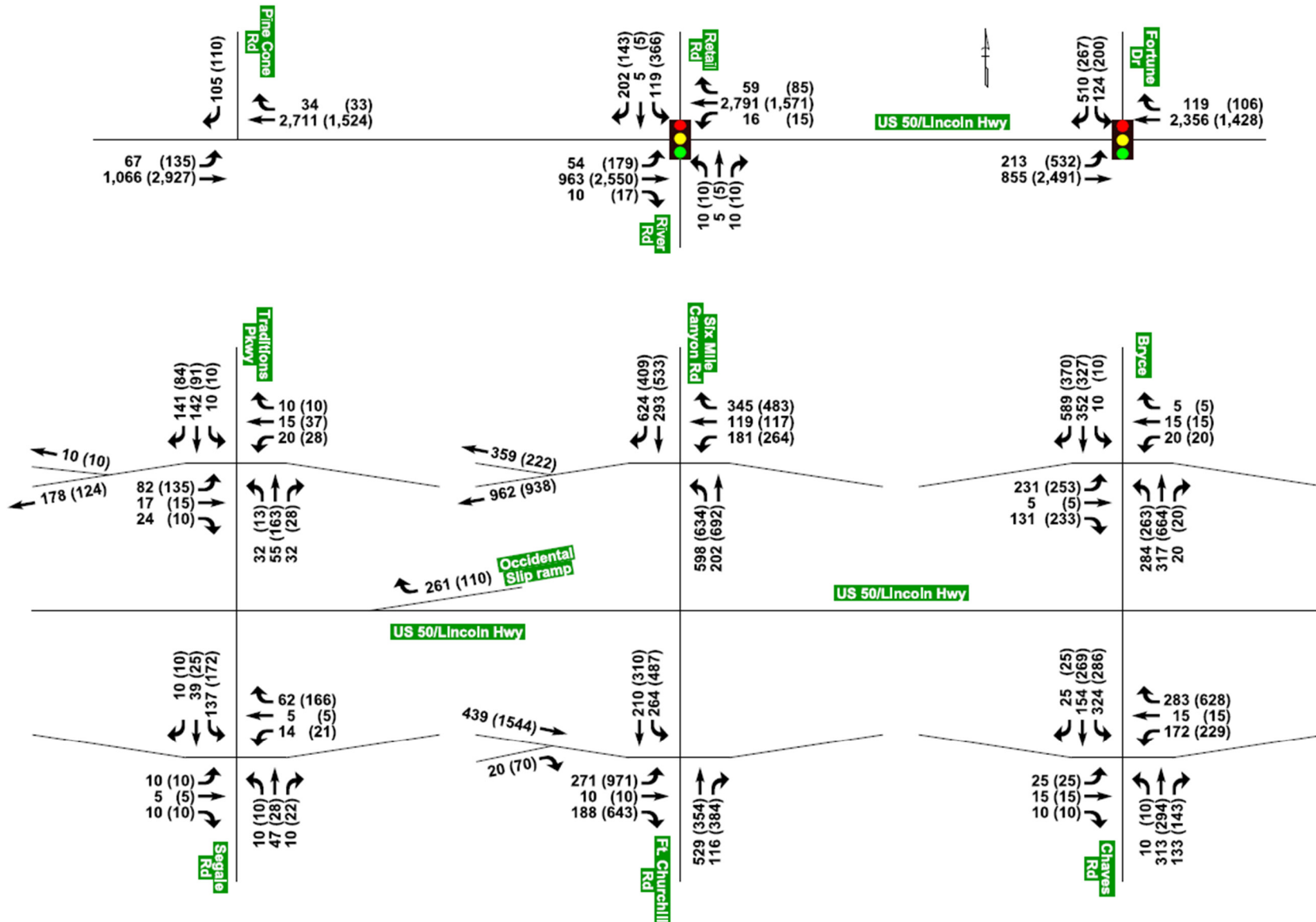


Figure 5: 2040 AM (PM) Controlled Access Alternative Peak-Hour Traffic Volumes

## 2. TRAFFIC OPERATIONS ANALYSIS

Traffic operations analyses was performed using Synchro 11 with information from existing topography/mapping, field visit, online resources such as Google Maps/Bing Maps. The various data included:

- Intersection geometry (Number of Right/Through/Left lanes, turn pockets lengths)
- Peak-Hour Volumes (Veh/hr)
- Traffic Signal Timing (RTC-FAST)
- Roadway Segment Length
- Percent Trucks
- Speed Limit

The intersection delay and level-of-service (LOS) were the measures of effectiveness (MOE) that were considered to evaluate the operations. The HCM LOS criteria for the signalized and unsignalized intersections is shown in Table 4 and Table 5. It should be noted that for TWSC, the LOS criteria applies to minor street approach and movements only. Intersection LOS as a whole is not reported for TWSC intersections. Based on the NDOT guideline, LOS of E or better for the overall intersection was used for this project. Traffic operations analysis were performed for both AM and PM peak hours for the 2020 existing, 2040 No-Action, and the 2040 Build Alternatives traffic conditions.

**Table 4: LOS Criteria for Signalized Intersection (HCM 6th Edition Exhibit 19-8)**

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio <sup>a</sup>	
	≤ 1.0	≥ 1.0
≤ 10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

Note: For approach-based and intersectionwide assessment, LOS is defined solely by control delay

**Table 5: LOS Criteria for Two Way Stop Controlled Intersection (HCM 6th Edition Exhibit 20-2)**

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c ≥ 1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

The 2020 peak-hour count and existing NDOT signal timings were input into the base model to analyze the 2020 traffic operations. This existing geometry with 2040 traffic volumes was used to determine the

2040 No-Action traffic operations. 2040 alternatives were evaluated with their respective geometry and forecasted volumes. Results from the traffic analyses are discussed in the following sections.

### 3. 2020 EXISTING CONDITIONS RESULTS

The 2020 existing condition worst-case minor street results are shown in Table 6. All of the study intersections are currently stop-controlled, with STOP signs on the side street approaches. The US 50/Lincoln Highway traffic is free-flow/uncontrolled with the exception of the signalized intersection at Fortune Drive. For the TWSC intersections, the worst of the minor street delay and LOS is reported. For signalized intersection, the overall intersection delay and LOS is reported. Most of the study intersections operate with delay less than 26 sec/veh and operate at LOS D or better, except for the intersection at River Boat Road/Cardelli Road, and Occidental Drive East that operate at LOS F and E, respectively during the PM peak-hour.

**Table 6: 2020 Existing Condition Minor Street Delay (LOS)**

Intersection	AM	PM
US 50 and Pine Cone Road	26.8 (D)	25.4 (D)
US 50 and Retail Road/River Road	15.3 (C)	13.2 (B)
US 50 and Fortune Drive*	16.2 (B)	13.8 (B)
US 50 and Enterprise Way	25.9 (D)	16.9 (C)
US 50 and Occidental Drive West	13.6 (B)	11.4 (B)
US 50 and River Boat Road/Cardelli Road	25.7 (D)	67.5 (F)
US 50 and Occidental Drive East	25.9 (D)	48.9 (E)
US 50 and Six Mile Canyon Road/Fort Churchill Road	16.1 (C)	25.5 (D)
US 50 and Lafond Avenue	10.5 (B)	11.5 (B)
US 50 and Mark Twain Avenue	11.1 (B)	9.9 (A)
US 50 and Rainbow Drive West	12.8 (B)	17.2 (C)
US 50 and S Pinenut Drive	12.1 (B)	15.1 (C)
US 50 and Rainbow Drive East	11.7 (B)	18.1 (C)
US 50 and Bryce Street/Chaves Road	10.0 (B)	17.2 (C)

\* Signalized Intersection

Detail results for the approach, individual movement, and LOS for the 2020 existing condition are shown in Table 7. The minor street approaches at US 50 and River Boat Road/Cardelli Road operate at delays greater than 55 sec/veh with LOS F. The shared left and through movement at US 50 at Occidental Drive East also operate at LOS F with delay of 55 sec/veh. All other approach and movements are operating with LOS D or better. The detailed Synchro output is included in Appendix 4.

**Table 7: 2020 Existing Condition Detail Results (Delay & LOS)**

Intersection		AM												PM													
		Eastbound			Westbound			Northbound			Southbound			Eastbound			Westbound			Northbound			Southbound				
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
US 50 and Pine Cone Road	Approach	-			-						26.8 (D)			-			-						25.4 (D)				
	Movement	13.2 (B)	-			-	-				26.8 (D)			9.4 (A)	-			-	-				25.4 (D)				
US 50 and Retail/River Road	Approach	-			-			9.4 (A)			15.3 (C)			-			-			13.2 (B)			10.7 (B)				
	Movement	12.9 (B)	-	-		-	-			9.4 (A)			15.3 (C)	9.1 (A)	-	-		-	-			13.2 (B)			10.7 (B)		
US 50 and Fortune Way*	Intersection	16.2 (B)												13.8 (B)													
	Approach	36.0 (D)			13.5 (B)						19.9 (B)			17.6 (B)			12.6 (B)						11.4 (B)				
US 50 and Enterprise Way	Movement	36.0 (D)	-			14.0 (B)	3.2 (A)				17.5 (B)		20.2 (C)	17.6 (B)	-			13.0 (B)	7.6 (A)				16.5 (C)		9.4 (A)		
	Approach	-			-						25.9 (D)			-			-						16.9 (C)				
US 50 and Occidental Drive West	Movement	11.1 (A)	-			-	-				25.9 (D)			8.7 (A)	-			-	-				16.9 (C)				
	Approach	-			-						13.6 (B)			-			-						11.4 (B)				
US 50 and River Boat Road/Cardelli Road	Movement	10.3 (B)	-			-	-				13.6 (B)			8.9 (A)	-			-	-				11.4 (B)				
	Approach	-			-			18.7 (C)			25.7 (D)			-			-			67.5 (F)			57.8 (F)				
US 50 and Occidental Drive East	Movement	9.9 (A)	-		0 (A)	-	-				18.7 (C)			9.1 (A)	-		9.5 (A)	-	-			67.5 (F)			57.8 (F)		
	Approach	-			-			25.9 (D)			13.4 (B)			-			-			48.9 (E)			21.9 (C)				
US 50 and Six Mile Canyon Road/Fort Churchill Road	Movement	8.9 (A)	-		7.9 (A)	-		27.1 (D)	9.2 (A)		13.4 (B)			8.3 (A)	-		9.9 (A)	-		55.0 (F)			11.6 (B)	21.9 (C)			
	Approach	-			-			16.1 (C)			12.0 (B)			-			-			25.5 (D)			16.1 (C)				
US 50 and Lafond Avenue	Movement	8.4 (A)	-	-	7.7 (A)	-	-	17.2 (C)	15.9 (C)	9.0 (A)	15.9 (C)	16.1 (C)	10.2 (B)	8.1 (A)	-	-	8.8 (A)	-	-	30.7 (D)	23.8 (C)	10.3 (B)	21.1 (C)	23.6 (C)	9.5 (A)		
	Approach	-			-						10.5 (B)			-			-						11.5 (B)				
US 50 and Mark Twain Avenue	Movement	8.3 (A)	-			-	-				10.5 (B)			8.2 (A)	-			-	-			11.5 (B)					
	Approach	-			-						11.1 (B)			-			-						9.9 (A)				
US 50 and Rainbow Drive West	Movement	8.3 (A)	-			-	-				11.1 (B)			8.1 (A)	-			-	-			9.9 (A)					
	Approach	-			-			12.8 (B)			11.3 (B)			-			-			17.2 (C)			11.7 (B)				
US 50 and S Pinenut Drive	Movement	8.3 (A)	-	-	0.0 (A)	-	-	12.8 (B)			11.3 (B)			8.1 (A)	-	-	8.6 (A)	-	-	17.2 (C)			11.7 (B)				
	Approach	-			-			12.1 (B)			9.6 (A)			-			-			15.1 (C)			9.3 (A)				
US 50 and Rainbow Drive East	Movement	8.2 (A)	-	-	0.0 (A)	-	-	12.1 (B)			9.6 (A)			8.0 (A)	-	-	8.6 (A)	-	-	15.1 (C)			9.3 (A)				
	Approach	-			-			11.7 (B)			11.2 (B)			-			-			11.4 (B)			18.1 (C)				
US 50 and Bryce/Chaves Road	Movement	0.0 (A)	-	-	0.0 (A)	-	-	11.7 (B)			11.2 (B)			8.0 (A)	-	-	8.6 (A)	-	-	11.4 (B)			18.1 (C)				
	Approach	-			-			0.0 (A)			10.0 (B)			-			-			17.2 (C)			10.4 (B)				
US 50 and Bryce/Chaves Road	Movement	8.3 (A)	-	-	0.0 (A)	-	-	0.0 (A)		14.1 (B)	0 (A)	9.6 (A)	8.0 (A)	-	-	8.5 (A)	-	-	17.2 (C)			15.2 (C)	0 (A)	9.3 (A)			

\* Signalized Intersection

#### 4. 2040 NO-ACTION RESULTS

The 2040 No-Action worst case minor street delay and LOS results are tabulated in Table 8. From Table 8, all the minor street delay are considerably high and operate at LOS F. For some of intersection, only LOS is reported as the delay is relatively higher (> 500 sec/veh). The signalized intersection at US 50 and Fortune Drive also showed higher delay that correspond to LOS F in the AM peak-hour.

**Table 8: 2040 No-Action Minor Street Delay (LOS)**

Intersection	AM	PM
US 50 and Pine Cone Road	F	F
US 50 and Retail Road/River Road	F	F
US 50 and Fortune Drive*	151.8 (F)	66.3 (E)
US 50 and Enterprise Way	F	F
US 50 and Occidental Drive West	F	F
US 50 and River Boat Road/Cardelli Road	F	F
US 50 and Occidental Drive East	F	F
US 50 and Six Mile Canyon Road/Fort Churchill Road	F	F
US 50 and Lafond Avenue	F	F
US 50 and Mark Twain Avenue	F	F
US 50 and Rainbow Drive West	F	F
US 50 and S Pinenut Drive	F	F
US 50 and Rainbow Drive East	F	F
US 50 and Bryce Street/Chaves Road	F	F

\*Signalized Intersection

Detail 2040 No-Action results for approach, individual movement, and LOS are shown in Table 9. Delays along all minor streets are significantly higher and are operating with LOS F for both AM and PM peak hours. The detailed Synchro output is included in Appendix 5.

**Table 9: 2040 No-Action Detail Results (Delay & LOS)**

Intersection		AM												PM											
		Eastbound			Westbound			Northbound			Southbound			Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
US 50 and Pine Cone Road	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Movement	74.3 (F)	-	-	-	-	-	-	-	-	-	-	4273.5 (F)	20 (C)	-	-	-	-	-	-	-	-	-	-	9381.6 (F)
US 50 and Retail/River Road	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	82.8 (F)	-	-	10.8 (B)	-	-	-	-	4185.4 (F)	(F)	3182.5 (F)	29.6 (D)	-	-	36.3 (E)	-	-	-	-	39 (E)	168100.6 (F)	-	30.2 (D)	
US 50 and Fortune Way*	Intersection	151.8 (F)												66.3 (E)											
	Approach	41.8 (D)			183.7 (F)			-			40.4 (D)			165.2 (F)			40.9 (D)			-			36.9 (D)		
US 50 and Enterprise Way	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	41.8 (D)	-	-	190.4 (F)	2.0 (A)	-	-	-	35.4 (D)	-	42.0 (D)	165.2 (F)	-	-	43.0 (D)	8.6 (A)	-	-	-	-	-	-	52.6 (D)	21.2 (C)
US 50 and Occidental Drive West	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	34.3 (D)	-	-	-	-	-	-	-	-	-	-	1278.7 (F)	15.7 (C)	-	-	-	-	-	-	-	-	-	958.5 (F)	
US 50 and Occidental Drive East	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	30.4 (D)	-	-	-	-	-	-	-	-	-	-	805.5 (F)	21.3 (C)	-	-	-	-	-	-	-	-	-	1669.8 (F)	
US 50 and River Boat Road/Cardelli Road	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	47.6 (E)	-	-	10.3 (B)	-	-	-	-	-	-	-	(F)	110.6 (F)	-	-	26 (D)	-	-	-	-	-	-	(F)	
US 50 and Occidental Drive East	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	22.3 (C)	-	-	0.1 (A)	-	-	-	17951.1 (F)	12.5 (B)	-	(F)	16.1 (C)	-	-	33.1 (D)	-	-	-	(F)	32.3 (D)	-	-	(F)	
US 50 and Six Mile Canyon Road/Fort Churchill Road	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	20.0 (C)	-	-	10.1 (B)	-	-	-	621.1 (F)	11.9 (F)	9681.4 (F)	992.6 (F)	77.6 (F)	20.9 (C)	-	-	21.2 (C)	-	-	(F)	18365.6 (F)	23.9 (F)	(F)	16842.2 (F)	21.5 (C)
US 50 and Lafond Avenue	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	18.7 (C)	-	-	-	-	-	-	12.5 (B)	-	-	703.2 (F)	19.3 (C)	-	-	-	-	-	-	-	-	-	-	2416.3 (F)	
US 50 and Mark Twain Avenue	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	16.5 (C)	-	-	10.9	-	-	3916.3 (F)	99.9 (F)	-	-	607.1 (F)	14.2 (B)	-	-	25.8 (D)	-	-	(F)	881.6 (F)	-	-	-	(F)	
US 50 and Rainbow Drive West	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	16.9 (C)	-	-	11 (B)	-	-	-	1662.8 (F)	-	-	634.2 (F)	14.9 (B)	-	-	19.9 (C)	-	-	-	-	-	-	-	(F)	
US 50 and S Pinenut Drive	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	17.4 (C)	-	-	10.9 (B)	-	-	-	1093.5 (F)	-	-	673.3 (F)	19.9 (C)	-	-	18.2 (C)	-	-	-	-	-	-	-	(F)	
US 50 and Rainbow Drive East	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	16.8 (C)	-	-	11.2 (B)	-	-	-	462.8 (F)	-	-	764.3 (F)	14.5 (B)	-	-	19.1 (C)	-	-	-	-	-	-	-	(F)	
US 50 and Bryce/Chaves Road	Approach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Movement	17.8 (C)	-	-	10.6 (B)	-	-	-	(F)	-	-	(F)	40.9 (E)	-	-	15.1 (C)	-	-	-	-	-	-	-	30947.7 (F)	

\* Signalized Intersection

## 5. 2040 ALTERNATIVE RESULTS

The intersection access and traffic control summary for each of the Build Alternatives are discussed in Section 1.5. Traffic signal timing splits, offsets and cycle length were optimized for better coordination along US 50. The cycle length of 105 seconds currently used by NDOT at the US 50 and Fortune Drive traffic signal was used for the 2040 Build Alternative signalized intersections for the PM peak-hour analysis. The cycle time was increased to 120 seconds for the AM peak-hour to provide improved traffic operations. The cycle times were kept same at all signalized intersections to provide co-ordination along the entire corridor. The results of the traffic analysis for each of the three 2040 Build Alternatives are explained in the next sections.

### 5.1 2040 Arterial Alternative Analysis Results

Arterial alternative considered converting the control type at some of the project intersections to a traffic signal option to improve traffic operations. An additional signalized intersection at US 50 and Segale Road/Transitions Parkway was also considered. The delay and LOS are as shown in Table 10. It should be noted that for signalized intersection, the delay corresponds to the overall intersection delay but for a TWSC intersection, the worst of the minor street is tabulated. The results indicate that the intersection of US 50 at Rainbow Drive East, the minor street had higher delays and operated at LOS F. All signalized intersections operated with delay less than 35 sec/veh with LOS C or better. Detail delay and LOS for approach and movements at all intersections are shown in Table 11. The detailed Synchro output is included in Appendix 6.

**Table 10: 2040 Arterial Alternative Delay (LOS)**

Intersection	AM	PM
US 50 and Pine Cone Road	20.8 (C)	15.4 (B)
US 50 and Retail Road/River Road	22.7 (C)	21.4 (C)
US 50 and Fortune Drive	40.3 (D)	30.1 (C)
US 50 and Segale Road/Traditions Parkway	22.6 (C)	24.4 (C)
US 50 and Enterprise Way*	39.5 (E)	21.3 (C)
US 50 and Occidental Drive West*	11.0 (B)	9.4 (A)
US 50 and River Boat Road/Cardelli Road	26.4 (C)	22.5 (C)
US 50 and Occidental Drive East	20.7 (C)	8.7 (A)
US 50 and Six Mile Canyon Road/Fort Churchill Road	9.0 (A)	25.8 (C)
US 50 and Lafond Avenue	12.1 (B)	7.6 (A)
US 50 and Mark Twain Avenue*	20.8 (C)	18.1 (C)
US 50 and Rainbow Drive West*	22.2 (C)	18.5 (C)
US 50 and S Pinenut Drive	19.2 (B)	20.1 (C)
US 50 and Rainbow Drive East*	F	F
US 50 and Bryce Street/Chaves Road	29.2 (C)	27.1 (C)

\*TWSC intersections



**Table 11: 2040 Arterial Alternative Detail Results (Delay & LOS)**

Intersection		AM											PM												
		Eastbound			Westbound			Northbound			Southbound			Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
US 50 and Pine Cone Road	Intersection	20.8 (C)											15.4 (B)												
	Approach	7.0 (A)			25.3 (C)			51.4 (D)			13.7 (B)			16.3 (B)			41.8 (D)								
	Movement	51.0 (D)	4.3 (A)		25.3 (C)	0.0 (A)		43.7 (D)		52.5 (D)	49.9 (D)	12.1 (B)		16.3 (B)	0.0 (A)		37.2 (D)		43.3 (D)						
Lincoln Highway and Retail/River Road	Intersection	22.7 (C)											21.4 (C)												
	Approach	4.1 (A)			28.3 (C)			43.5 (D)			52.1 (D)			10.8 (B)			31.6 (C)			29.7 (C)			58.5 (E)		
	Movement	51.4 (D)	0.3 (A)	0.0 (A)	51.1 (D)	26.0 (C)	32.1 (C)	43.6 (D)	43.4 (D)	52.5 (D)	43.2 (D)	35.1 (D)	8.6(A)	0.0 (A)	48.3 (D)	30.2 (C)	33.9 (C)	29.8 (D)	29.7 (C)	58.9 (E)	29.4 (C)				
US 50 and Fortune Way	Intersection	40.3 (D)											30.1 (C)												
	Approach	52.2 (D)			38.3 (D)			45.4 (D)			52.0 (D)			19.7 (B)			40.7 (D)								
	Movement	52.2 (D)			35.2 (D)	43.9 (D)		43.2 (D)		46.2 (D)	52.0 (D)			19.3 (B)	20.6 (C)		54.1 (D)		27.3 (C)						
US 50 and Seagale Rd/ Traditions Pkwy	Intersection	22.6 (C)											24.4 (C)												
	Approach	13.6 (B)			24.5 (C)			40.4 (D)			47.6 (D)			26.1 (C)			20.5 (C)			36.3 (D)			41.1 (D)		
	Movement	52.1 (D)	12.1 (B)	9.5 (A)	51.3 (D)	23.1 (C)	26.6 (C)	40.6 (D)	39.0 (D)	0.0 (A)	47.9 (D)	39.0 (D)	0.0 (A)	47.0 (D)	25.0 (C)	9.7 (A)	42.9 (D)	19.8 (B)	21.4 (C)	36.4 (D)	35.8 (D)	0.0 (A)	41.3 (D)	35.8 (D)	0.0 (A)
Lincoln Highway and Enterprise Way*	Intersection	-											-												
	Approach	-			-			39.5 (E)			-			-			21.3 (C)								
	Movement	126.9 (F)	-		-	-			39.5 (E)	28.6 (D)	-		-	-	-		21.3 (C)								
US 50 and Occidental Drive West*	Intersection	-											-												
	Approach	-			-			11.0 (B)			-			-			9.4 (A)								
	Movement		-		-	-			11.0 (B)		-		-	-			9.4 (A)								
US 50 and River Boat Road/Cardelli Road	Intersection	26.4 (C)											22.5 (C)												
	Approach	21.4 (C)			27.0 (C)			39.7 (D)			36.3 (D)			18.8 (B)			26.4 (C)			41.6 (D)			43.1 (D)		
	Movement	53.2 (D)	16.8 (B)	0.0 (A)	51.4 (D)	26.4 (C)	0.0 (A)	41.1 (D)	0.0 (A)	33.2 (C)	36.6 (D)	32.0 (C)	0.0 (A)	36.2 (D)	14.6 (B)	0.0 (A)	48.3 (D)	25.8 (C)	0.0 (A)	43.0 (D)	0.0 (A)	38.1 (D)	43.6 (D)	35.8 (D)	0.0 (A)
US 50 and Occidental Drive East	Intersection	20.7 (C)											8.7 (A)												
	Approach	1.8 (A)			27.2 (C)			40.6 (D)			33.7 (C)			2.5 (A)			14.8 (B)			38.6 (D)			39.2 (D)		
	Movement	46.5 (D)	0.4 (A)	0.0 (A)	51.1 (D)	26.1 (C)	28.8 (C)	41.5 (D)	32.6 (C)	33.7 (C)	38.9 (D)	1.3 (A)	0.0 (A)	45.2 (D)	13.9 (B)	14.7 (B)	39.1 (D)	36.5 (D)	39.2 (D)						
US 50 and Six Mile Canyon Road/Fort Churchill Road	Intersection	9.0 (A)											25.8 (C)												
	Approach	15.4 (B)			1.2 (A)			43.0 (D)			42.5 (D)			20.5 (C)			32.4 (C)			37.8 (D)			39.0 (D)		
	Movement	54.5 (D)	12.3 (B)	0.0 (A)	45.6 (D)	1.0 (A)	0.0 (A)	43.3 (D)	38.2 (D)	0.0 (A)	43.2 (D)	38.5 (D)	0.0 (A)	53.1 (D)	17.0 (B)	0.0 (A)	47.4 (D)	32.2 (C)	0.0 (A)	38.5 (D)	35.4 (D)	0.0 (A)	40.0 (D)	35.6 (D)	0.0 (A)
US 50 and Lafond Avenue	Intersection	12.1 (B)											7.6 (A)												
	Approach	0.6 (A)			14.7 (B)			33.3 (C)			43.1 (D)			1.6 (A)			11.9 (B)			29.6 (C)			36.0 (D)		
	Movement	8.2(A)	0.3 (A)	0.0 (A)	9.4 (A)	14.7 (B)	0.0 (A)	34.0 (C)	0.0 (A)	28.5 (C)	42.4 (D)	0.0 (A)	43.6 (D)	12.7 (B)	0.8 (A)	0.0 (A)	10.4 (B)	11.9 (B)	0.0 (A)	30.3 (C)	0.0 (A)	25.5 (C)	35.5 (D)	0.0 (A)	36.4 (D)
US 50 and Mark Twain Avenue*	Intersection	-											-												
	Approach	-			-			20.8 (C)			-			-			18.1 (C)								
	Movement		-		-	-			20.8 (C)		-		-	-			18.1 (C)								
US 50 and Rainbow Drive West*	Intersection	-											-												
	Approach	-			-			14.2 (B)			22.2 (C)			-			-			25.7 (D)			18.5 (C)		
	Movement	33.0 (D)	-	-		-	-		14.2 (B)		22.2 (C)	28.4 (D)	-	-		-	-	25.7 (D)		18.5 (C)					
US 50 and S Pinenut Drive	Intersection	19.2 (B)											20.1 (C)												
	Approach	15.1 (B)			17.9 (B)			41.6 (D)			46.3 (D)			16.2 (B)			22.7 (C)			39.4 (D)			40.3 (D)		
	Movement	51.7 (D)	13.4 (B)	10.3 (B)	53.2 (D)	17.4 (B)	10.7 (B)	41.6 (D)	46.3 (D)	37.6 (D)	14.4 (B)	8.3 (A)	46.6 (D)	22.1 (C)	14.2 (B)	39.4 (D)	40.3 (D)								
US 50 and Rainbow Drive East*	Intersection	-											-												
	Approach	-			-			242.2 (F)			364 (F)			-			-			(F)			(F)		
	Movement	31.8 (D)	-	-	16.4 (C)	-	-	242.2 (F)	364 (F)	24.9 (C)	-	-	38.9 (E)	-	-	(F)	(F)								
US 50 and Bryce/Chaves Road	Intersection	29.2 (C)											27.1 (C)												
	Approach	27.6 (C)			29.1 (C)			33.6 (C)			37.0 (D)			24.9 (C)			26.8 (C)			39.5 (D)			42.3 (D)		
	Movement	54.8 (D)	21.1 (C)	0.0 (A)	54.2 (D)	28.3 (C)	0.0 (A)	34.5 (C)	30.9 (C)	30.8 (C)	37.6 (D)	30.8 (C)	0.0 (A)	40.8 (D)	20.2 (C)	0.0 (A)	44.8 (D)	26.5 (C)	0.0 (A)	41.7 (D)	34.8 (C)	35.6 (D)	43.8 (D)	34.9 (C)	0.0 (A)

\* TWSC Intersection

### 5.2 2040 Parkway Alternative Analysis Results

Parkway Alternative considered converting a number of unsignalized full-access intersections to unsignalized right-in/right-out from the minor street. Parkway Alternative provides fewer access locations, signalized intersections, and left-turn movements at unsignalized intersections than the Arterial Alternative. The delay and LOS results are as shown in Table 12. The table shows overall intersection delay for signalized intersections, and worst of the minor street delay and LOS for TWSC intersections. The intersection of US 50 at Pine Cone Road and Pinenut Drive showed higher delays and operate at LOS F.

**Table 12: 2040 Parkway Alternative Delay (LOS)**

Intersection	AM	PM
US 50 and Pine Cone Road*	217.3 (F)	27.9 (D)
US 50 and Retail Road/River Road	24.5 (C)	36.9 (D)
US 50 and Fortune Drive	41.4(D)	30.1 (C)
US 50 and Traditions Pkwy	29.0 (C)	24.5 (C)
US 50 and Enterprise Way*	39.5 (E)	21.3 (C)
US 50 and Occidental Drive West*	10.7 (B)	9.3 (A)
US 50 and River Boat Road/Cardelli Road	27.5 (C)	22.9 (C)
US 50 and Occidental Drive East*	34.5 (D)	31.1 (D)
US 50 and Six Mile Canyon Road/Fort Churchill Road	35.4 (D)	33.3 (C)
US 50 and Lafond Avenue*	20.6 (C)	16.6 (C)
US 50 and Mark Twain Avenue*	18.2 (C)	15.8 (C)
US 50 and Rainbow Drive West*	19.1 (C)	16.1 (C)
US 50 and S Pinenut Drive*	F	F
US 50 and Rainbow Drive East*	19.0 (C)	16.5 (C)
US 50 and Bryce Street/Chaves Road	33.7 (C)	29.4 (C)

\*TWSC intersections

Detail delay and LOS for approach and movements are shown in Table 13. The results also indicate that at the intersection of US 50 and Occidental Drive East, delay for eastbound left-turn during AM, and westbound left-turn during the PM is higher than 50 sec/veh (LOS F). During the PM peak-hour, southbound left-turn at the intersection of US 50 and Pinenut Drive Road operate at LOS F. The detailed Synchro output is included in Appendix 7.

**Table 13: 2040 Parkway Alternative Detail Results (Delay & LOS)**

Intersection		AM												PM																													
		Eastbound			Westbound			Northbound			Southbound			Eastbound			Westbound			Northbound			Southbound																				
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right																		
US 50 and Pine Cone Road*	Intersection	-																																									
	Approach	-						-						217.3 (F)						-						27.9 (D)																	
	Movement	608.0 (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.9 (D)																	
US 50 and Retail/River Road	Intersection	24.5 (C)												36.9 (D)																													
	Approach	12.0 (B)			27.2 (C)			44.5 (D)			54.0 (D)			34.9 (C)			33.0 (C)			29.6 (C)			70.1 (E)																				
	Movement	53.2 (D)	9.7 (A)	0.0 (A)	51.8 (D)	25.1 (C)	30.8 (C)	44.9 (D)	43.4 (D)	54.4 (D)	43.2 (D)	41.8 (D)	34.4 (C)	0.0 (A)	51.5 (D)	31.4 (C)	35.4 (D)	29.8 (C)	0.0 (A)	28.9 (C)	70.6 (E)	28.7 (C)	0.0 (A)																				
US 50 and Fortune Way	Intersection	41.4 (D)												30.1 (C)																													
	Approach	50.6 (D)			39.6 (D)			-			46.4 (D)			52.0 (D)			19.7 (B)			-			40.7 (D)																				
	Movement	50.6 (D)	-	-	36.5 (D)	45.4 (D)	-	-	-	43.4 (D)	47.3 (D)	52.0 (D)	-	-	19.3 (B)	20.6 (C)	-	-	-	-	-	54.1 (D)	-	27.3 (C)																			
US 50 and Seagale Rd / Traditions Pkwy	Intersection	29.0 (C)												24.5 (C)																													
	Approach	50.5 (D)			27.6 (C)			-			44.8 (D)			53.8 (D)			20.3 (C)			-			46.5 (D)																				
	Movement	50.5 (D)	-	-	26.3 (C)	30.0 (C)	-	-	-	44.8 (D)	0.0 (A)	53.8 (D)	-	-	19.8 (B)	21.4 (C)	-	-	-	-	-	46.5 (D)	-	0.0 (A)																			
US 50 and Enterprise Way*	Intersection	-																																									
	Approach	-						-						39.5 (E)						-						21.3 (C)																	
	Movement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.3 (C)																	
US 50 and Occidental Drive West*	Intersection	-																																									
	Approach	-						-						10.7 (B)						-						9.3 (A)																	
	Movement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.3 (A)																	
US 50 and River Boat Road/Cardelli Road	Intersection	27.5 (C)												22.9 (C)																													
	Approach	21.4 (C)			26.6 (C)			49.6 (D)			36.5 (D)			18.8 (B)			26.3 (C)			44.6 (D)			45.4 (D)																				
	Movement	53.2 (D)	16.8 (B)	0.0 (A)	50.9 (D)	26.0 (C)	0.0 (A)	51.9 (D)	33.2 (C)	37.1 (D)	32.2 (C)	0.0 (A)	36.2 (D)	14.6 (B)	0.0 (A)	48.4 (D)	25.7 (C)	0.0 (A)	46.9 (D)	0.0 (A)	38.4 (D)	47.0 (D)	36.4 (D)	0.0 (A)																			
US 50 and Occidental Drive East*	Intersection	-																																									
	Approach	-						-						13.6 (B)						34.5 (D)						-						31.1 (D)						20.5 (C)					
	Movement	66.2 (F)	-	-	14.8 (B)	-	-	-	13.6 (B)	-	34.5 (D)	34.5 (D)	36.9 (E)	-	-	76.7 (F)	-	-	-	-	-	31.1 (D)	-	20.5 (C)																			
US 50 and Six Mile Canyon Road/Fort Churchill Road	Intersection	35.4 (D)												33.3 (C)																													
	Approach	28.7 (C)			40.0 (D)			36.2 (D)			23.2 (C)			33.7 (C)			32.6 (C)			35.8 (D)			27.3 (C)																				
	Movement	54.4 (D)	26.6 (C)	0.0 (A)	54.4 (D)	39.9 (D)	0.0 (A)	36.9 (D)	20.9 (C)	0.0 (A)	23.7 (C)	21.1 (C)	0.0 (A)	47.9 (D)	32.1 (C)	0.0 (A)	46.6 (D)	32.2 (C)	0.0 (A)	37.2 (D)	24.9 (C)	0.0 (A)	28.3 (C)	25.2 (C)	0.0 (A)																		
US 50 and Lafond Avenue*	Intersection	-																																									
	Approach	-						-						20.6 (C)						-						16.6 (C)																	
	Movement	15.9 (C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.6 (C)																	
US 50 and Mark Twain Avenue*	Intersection	-																																									
	Approach	-						-						18.2 (C)						-						15.8 (C)																	
	Movement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.8 (C)																	
US 50 and Rainbow Drive West*	Intersection	-																																									
	Approach	-						-						12.9 (B)						19.1 (C)						23.3 (C)						16.1 (C)											
	Movement	16.7 (C)	-	-	-	-	-	-	12.9 (B)	-	19.1 (C)	14.7 (B)	-	-	-	-	-	-	-	-	-	23.3 (C)	-	16.1 (C)																			
US 50 and S Pinenut Drive*	Intersection	-																																									
	Approach	-						-						12.5 (B)						386.3 (F)						19.7 (C)						1960.9 (F)											
	Movement	18.7 (C)	-	-	-	-	-	-	12.5 (B)	1680.1 (F)	35.0 (E)	21.7 (C)	-	-	-	-	-	-	-	-	-	19.7 (C)	6180.7 (F)	20.8 (C)																			
US 50 and Rainbow Drive East*	Intersection	-																																									
	Approach	-						-						13.0 (B)						19.0 (C)						21.1 (C)						16.5 (C)											
	Movement	-	-	-	-	-	-	-	13.0 (B)	-	19.0 (C)	-	-	-	-	-	-	-	-	-	-	21.1 (C)	-	16.5 (C)																			
US 50 and Bryce/Chaves Road	Intersection	33.7 (C)												29.4 (C)																													
	Approach	29.1 (C)			32.8 (C)			38.1 (D)			44.1 (D)			24.9 (C)			27.8 (C)			46.9 (D)			46.7 (D)																				
	Movement	49.7 (D)	24.0 (C)	0.0 (A)	52.3 (D)	31.6 (C)	0.0 (A)	40.4 (D)	31.3 (C)	30.8 (C)	38.7 (D)	31.1 (C)	48.0 (D)	41.0 (D)	20.1 (C)	0.0 (A)	52.7 (D)	26.2 (C)	0.0 (A)	52.2 (D)	35.3 (D)	35.6 (D)	45.6 (D)	35.5 (D)	49.9 (D)																		

\*TWSC Intersection

### 5.3 2040 Controlled Access Alternative Analysis Results

Controlled Access alternative considered eliminating closely spaced intersections and providing three new interchanges along the project corridor. This alternative maintains the Parkway concept along US 50 from Pine Cone Road to Fortune Drive. East of Fortune Drive, US 50 would be a controlled access facility with interchanges at Traditions Parkway, Six Mile Canyon Road/Fort Churchill Road, and Bryce Street/Chaves Road. The delay and LOS for the Controlled Access Alternative are shown in Table 14. For TWSC, delay and LOS are reported only for the worst of the minor street, whereas for the signalized intersection, the overall intersection delay and LOS is reported. The TWSC intersection at US 50 and Pine Cone Road showed significantly higher delay in the AM peak-hour showing the minor street operated with LOS F. All other intersections operated with delay of less than 40 sec/veh with LOS D or better.

**Table 14: 2040 Controlled Access Alternative Delay (LOS)**

Intersection	AM	PM
US 50 and Pine Cone Road*	217.3 (F)	28.7 (D)
US 50 and Retail Road/River Road	36.4 (D)	36.4 (D)
US 50 and Fortune Drive	39.3 (D)	30.1 (C)
Westbound US 50 (Ramp 2) and Traditions Parkway	26.3 (C)	16.9 (B)
Eastbound US 50 Ramp 3) and Segale Road	17.7 (B)	9.0 (A)
Eastbound US 50 (Ramp 6) and Fort Churchill Road	26.7 (C)	34.4 (C)
Westbound US 50 (Ramp 7) and Fort Churchill Road	37.4 (D)	36.3 (D)
Westbound US 50 (Ramp 10) and Bryce Street/Chaves Road	35.6 (D)	25.0 (C)
Eastbound US 50 (Ramp 11) and Bryce Street/Chaves Road	39.0 (D)	31.2 (C)

\*TWSC Intersection

Detail delay and LOS for approach and movements are shown in Table 15. The eastbound left-turn along US 50 at the intersection of Pine Cone Road showed higher delay in both AM and PM peak-hour with LOS F. The westbound left-turn along US 50 at the intersection of Retail Road/River Road operate with a delay of around 63 sec/veh with LOS E. All other movements and approaches at signalized intersections operated with LOS D or better. The detailed Synchro output is included in Appendix 8.

**Table 15: 2040 Controlled Access Alternative Detail Results (Delay & LOS)**

Intersection		AM												PM														
		Eastbound			Westbound			Northbound			Southbound			Eastbound			Westbound			Northbound			Southbound					
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right			
US 50 and Pine Cone Road*	Intersection	-																										
	Approach	-			-						217.3 (F)			-			-						28.7 (D)					
	Movement	608.0 (F)	-		-	-								217.3 (F)			72.4 (F)	-		-	-							
US 50 and Retail/River Road	Intersection	36.4 (D)												36.4 (D)														
	Approach	15.4 (B)			43.5 (D)			37.7 (D)			44.5 (D)			32.8 (C)			39.0 (D)			26.7 (C)			51.7 (D)					
	Movement	54.6 (D)	13.2 (B)	0.0 (A)	51.8 (D)	40.1 (D)	49.4 (D)	37.7 (D)	37.6 (D)	44.8 (D)	37.4 (D)	0.0 (A)		41.8 (D)	32.2 (C)	0.0 (A)	63.1 (E)	36.8 (D)	42.4 (D)	26.8 (C)	26.7 (C)		52.0 (D)	26.5 (C)	0.0 (A)			
US 50 and Fortune Way	Intersection	39.3 (D)												30.1 (C)														
	Approach	52.2 (D)			36.9 (D)						45.4 (D)			52.0 (D)			19.7 (B)						40.7 (D)					
	Movement	52.2 (D)				34.0 (C)	42.1 (D)				43.2 (D)		46.2 (D)	52.0 (D)				19.2 (B)	20.6 (C)				54.1 (D)		27.3 (C)			
Westbound US 50 (Ramp 2) and Traditions Pkwy	Intersection	26.3 (C)												16.9 (B)														
	Approach	39.4 (D)			36.4 (D)			21.4 (C)			21.7 (C)			46.3 (D)			37.7 (D)			3.6 (A)			3.8 (A)					
	Movement	39.4 (D)	0.0 (A)		36.3 (D)	36.5 (D)		24.3 (C)	20.3 (C)	20.9 (C)	21.8 (C)	21.6 (C)		46.3 (D)	0.0 (A)		37.4 (D)	37.9 (D)		4.2 (A)	3.6 (A)		3.8 (A)	3.9 (A)	3.5 (A)			
Eastbound US 50 (Ramp 3) and Seagale Rd	Intersection	17.7 (B)												9.0 (A)														
	Approach	42.7 (D)			43.0 (D)			12.0 (B)			13.8 (B)			50.2 (D)			51.7 (D)			0.9 (A)			1.2 (A)					
	Movement	42.6 (D)	42.9 (D)		43.0 (D)	0.0 (A)		12.1 (B)	12.0 (B)	14.4 (B)	11.8 (B)	0.0 (A)		49.2 (D)	51.0 (D)		51.7 (D)	0.0 (A)		0.8 (A)	0.9 (A)		1.3 (A)	0.8 (A)	0.0 (A)			
Eastbound US 50 (Ramp 6) and Fort Churchill Rd	Intersection	26.7 (C)												34.4 (C)														
	Approach	35.9 (D)						30.7 (C)			16.9 (B)			27.6 (C)						32.9 (C)			43.3 (D)					
	Movement	35.9 (D)	0.0 (A)						30.7 (C)	0.0 (A)	25.9 (C)	5.4 (A)		27.6 (C)	0.0 (A)						32.9 (C)	0.0 (A)	54.1 (D)	26.2 (C)				
Westbound US 50 (Ramp 7) and Fort Churchill Rd	Intersection	37.4 (D)												36.3 (D)														
	Approach				47.8 (D)			40.1 (D)			19.3 (B)						27.7 (C)			40.1 (D)			33.0 (C)					
	Movement				50.1 (D)	44.3 (D)	0.0 (A)	52.1 (D)	4.7 (A)								29.1 (C)	24.6 (C)	0.0 (A)	54.7 (D)	26.8 (C)					33.0 (C)	0.0 (A)	
Westbound US 50 (Ramp 10) and Bryce	Intersection	35.6 (D)												25.0 (C)														
	Approach	50.6 (D)			44.0 (D)			32.5 (C)			30.3 (C)			53.5 (D)			53.0 (D)			16.0 (B)			25.6 (C)					
	Movement	50.6 (D)	0.0 (A)		44.0 (D)	43.9 (D)		51.6 (D)	16.3 (B)	31.4 (C)	30.2 (C)	0.0 (A)		53.5 (D)	0.0 (A)		53.4 (D)	52.7 (D)		30.3 (C)	9.4 (A)		30.1 (C)	25.4 (C)	0.0 (A)			
Eastbound US 50 (Ramp 11) and Bryce	Intersection	39.0 (D)												31.2 (C)														
	Approach	44.3 (D)			48.9 (D)			37.4 (D)			35.8 (D)			53.3 (D)			54.3 (D)			31.5 (C)			19.4 (B)					
	Movement	44.3 (D)	44.3 (D)		48.9 (D)	0.0 (A)		30.3 (C)	37.7 (C)	0.0 (A)	47.5 (D)	14.2 (B)		53.3 (D)	53.2 (D)		54.3 (D)	0.0 (A)		26.6 (C)	31.7 (C)	0.0 (A)	31.2 (C)	7.8 (A)				

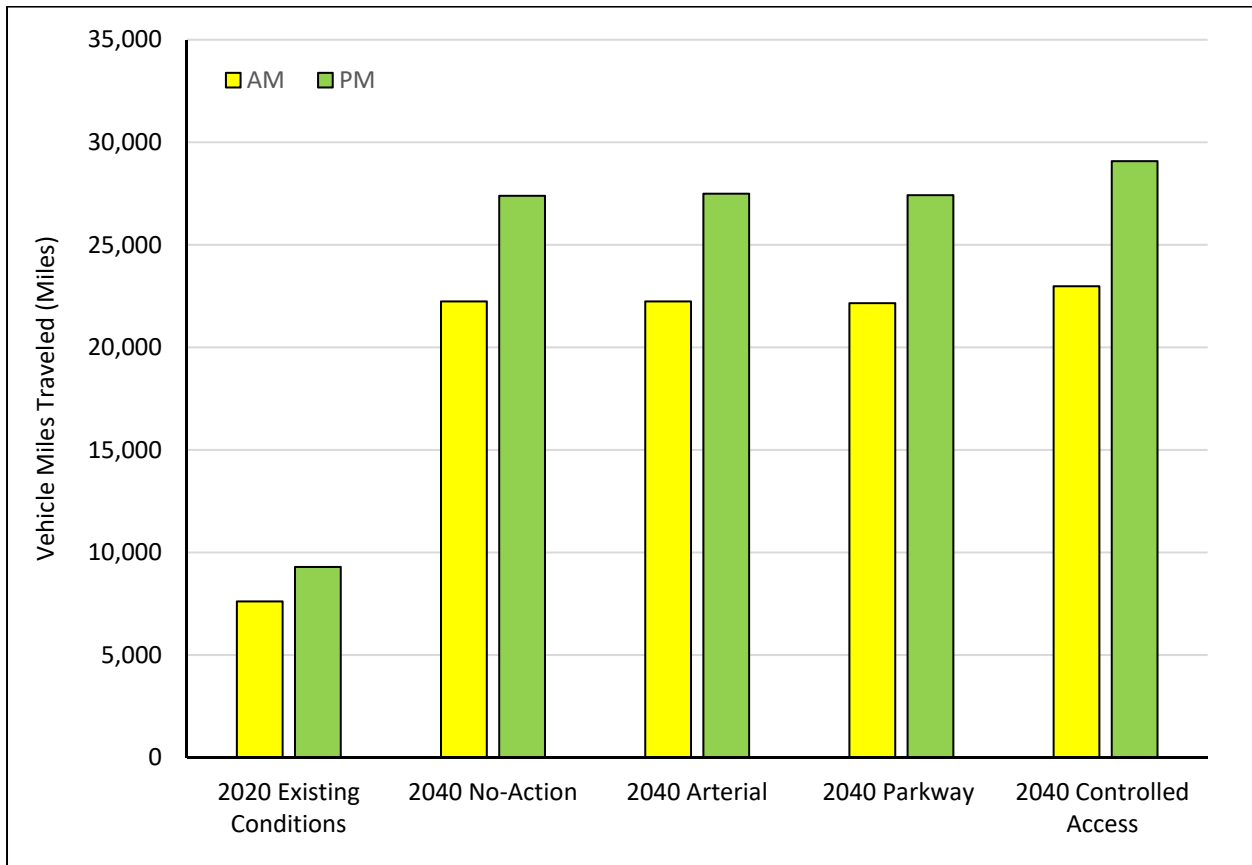
\*TWSC Intersection

**6. COMPARISON OF ALTERNATIVES**

In addition to the intersection LOS and delay presented in the previous sections, the vehicle miles traveled (VMT), vehicle hours travelled (VHT) and total delay were also extracted from Synchro. The VMT for each scenario are presented in Table 16. Figure 6 represents the comparison of the vehicle mile travelled between all scenarios. The 2040 Build Alternatives have higher VMT except for the AM Parkway Alternative, which is slightly less than the 2040 No-Action Alternative. The Controlled Access alternative has highest VMT indicating better traffic flow.

**Table 16: Vehicle Miles Traveled (VMT) in miles**

Scenario	AM Peak-Hour	PM Peak-Hour
2020 Existing Conditions	7,613	9,293
2040 No-Action	22,239	27,390
2040 Arterial Alternative	22,241	27,495
2040 Parkway Alternative	22,155	27,421
2040 Controlled Access Alternative	22,980	29,079

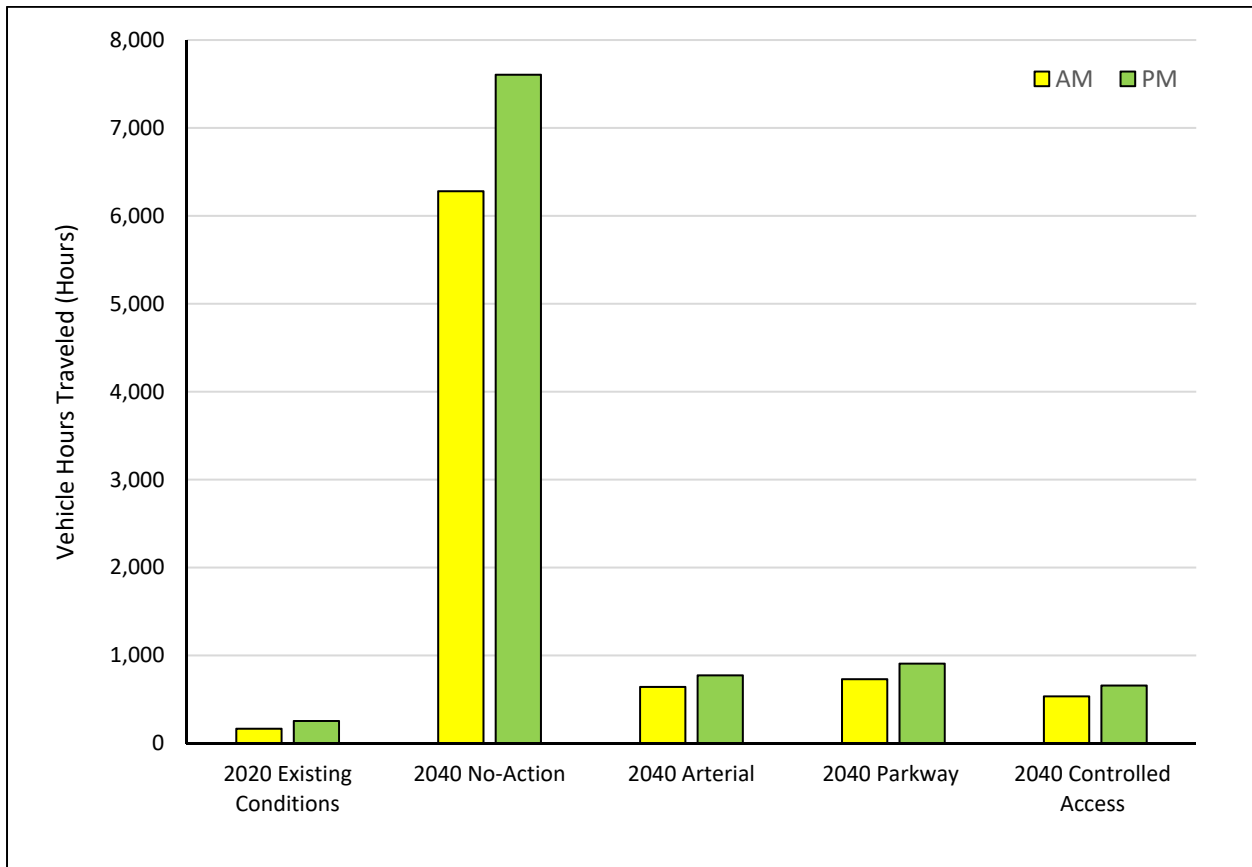


**Figure 6. Comparison of Vehicle Miles Traveled (VMT) in miles**

The VHT is tabulated in Table 17 and the comparison graph is shown in Figure 7. The 2040 No-Action VHT is significantly higher than in the 2020 existing condition both during AM and PM peak. All three Alternatives have significantly reduced VHT compared to 2040 No-Action. The 2040 Controlled Access Alternative had the lowest VHT among the three Alternatives.

**Table 17: Vehicle Hours Traveled (VHT) in hours**

Scenario	AM Peak-Hour	PM Peak-Hour
2020 Existing Conditions	167	255
2040 No-Action	6,280	7,605
2040 Arterial Alternative	642	774
2040 Parkway Alternative	730	907
2040 Controlled Access Alternative	535	658

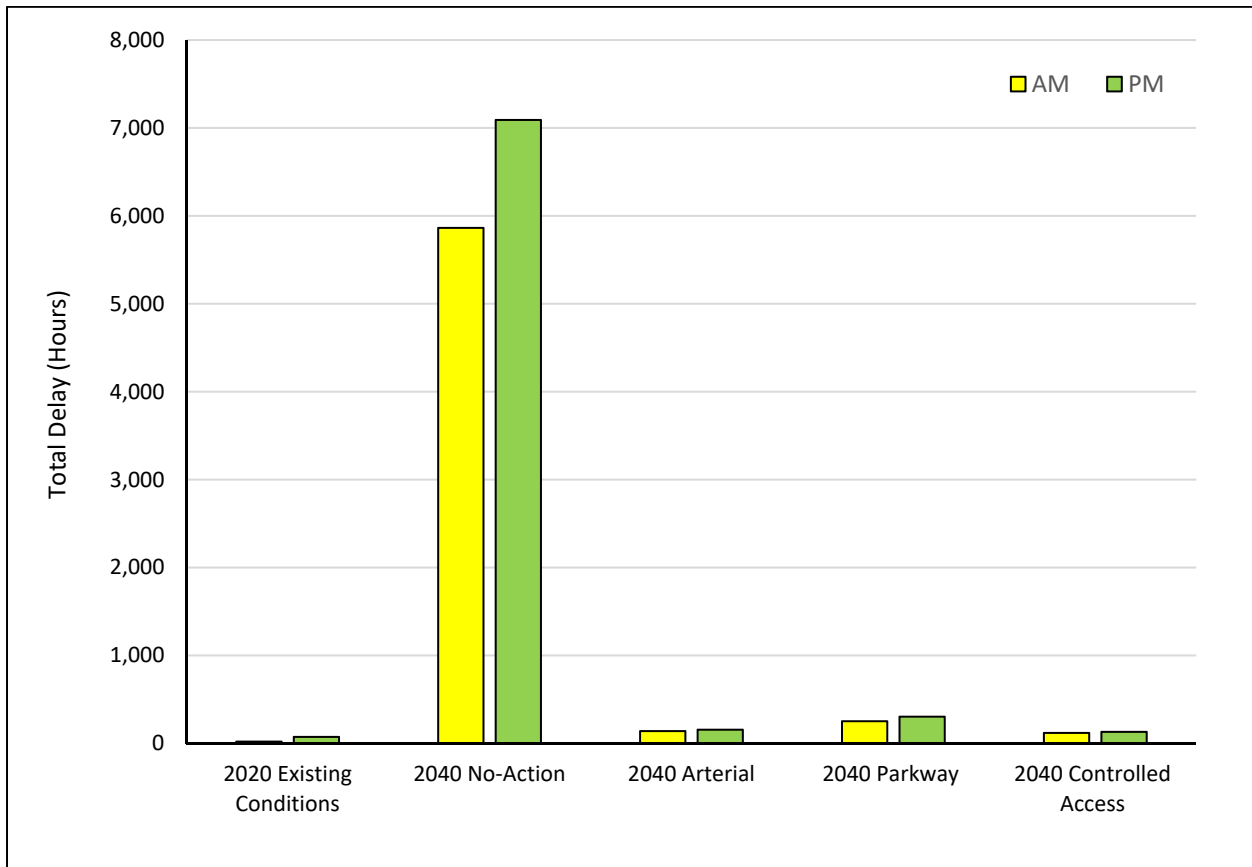


**Figure 7. Comparison of Vehicle Hours Traveled (VHT) in hours**

The total delay for all the scenarios are represented in Table 18 and comparison graphs in Figure 8. The total delay in the 2040 No-Action is extremely high compared to the 2020 existing conditions. The three Build Alternatives significantly reduced the delay indicating less congestion within the network. Among the three Alternatives, Controlled Access Alternative showed the lowest delay.

**Table 18: Total Delay (Hours)**

Scenario	AM Peak-Hour	PM Peak-Hour
2020 Existing Conditions	20	74
2040 No-Action	5,863	7,091
2040 Arterial Alternative	140	156
2040 Parkway Alternative	252	304
2040 Controlled Access Alternative	119	131



**Figure 8. Comparison of Total Delay in Hours**



## 7. SUMMARY AND CONCLUSION

Traffic analysis indicated that the 2040 No-Action showed that all project intersections functions with at least one movement operating with considerably higher delay and with LOS F. The network wide MOE also showed lower VMT, higher VHT and higher delay for 2040 No-Action.

The three Build Alternatives; Arterial, Parkway and Controlled Access were considered to evaluate the traffic operations. All three Build Alternatives showed better intersection operations at all signalized intersections operating with LOS D or better. In Arterial Alternative, at the intersection of US 50 and Rainbow Drive East, only the minor street movement failed with LOS F. The Parkway Alternative also showed the minor street movements at the intersections of US 50 at Pine Cone Road and at Pinenut Drive failed with LOS F. In Controlled Access Alternative, the minor street movement at US 50 and Pine Cone Road failed with LOS F as well.

The higher VMT, lower VHT and lower total delay in all three Build Alternatives indicate improved traffic operations compared to the 2040 No-Action. However, the Controlled Access Alternative showed better performance in traffic operations compared to the other two Alternatives.

## 7. LIST OF APPENDICES

- Appendix 1 – Traffic Count Data
- Appendix 2 – Traffic Volume Calculations
- Appendix 3 – 2040 Traffic Forecasting and Assumptions
- Appendix 4 – 2040 Existing Conditions Synchro Output
- Appendix 5 – 2040 No-Action Synchro Output
- Appendix 6 – 2040 Arterial Alternative Synchro Output
- Appendix 7 – 2040 Parkway Alternative Synchro Output
- Appendix 8 – 2040 Controlled Access Alternative Synchro Output