



SM ROCHA, LLC

TRAFFIC AND TRANSPORTATION CONSULTANTS

June 18, 2024

Kendall Goodman
RealArchitecture Ltd. / UnrealConstruction LLC
2899 N Speer Boulevard, Suite 102
Denver, Colorado 80211

**RE: Springhill Suites at Painted Prairie / Traffic Generation Analysis
Aurora, Colorado**

Dear Kendall,

SM ROCHA, LLC is pleased to provide traffic generation information for the development entitled Springhill Suites at Painted Prairie. This development is located near the southwest corner of E 64th Avenue and N Lisbon Street in Aurora, Colorado.

This information has been revised to address City Staff review comments provided via email dated May 3, 2024, regarding the re-evaluation of E 64th Avenue and N Jericho Street traffic operations.

The intent of this analysis is to present traffic volumes likely generated by the proposed development, provide a traffic volume comparison to previous land use assumptions approved for the development site, and consider potential impacts to the adjacent roadway network.

The following is a summary of analysis results.

Site Description and Access

Land for the development is currently vacant and surrounded by open space and a mix of residential, commercial, lodging, and institutional land uses. The proposed development is understood to entail the new construction of a hotel supporting 140 rooms.

Proposed access to the development is provided at the following locations: one full-movement access onto the future N Kirk Street on the east side of the property (referred to as Access A), and one full-movement access onto the future E 63rd Drive on the south side of the property (referred to as Access B).

General site and access locations are shown on Figure 1. A site plan, as prepared by RealArchitecture Ltd., is shown on Figure 2. This plan is provided for illustrative purposes only.

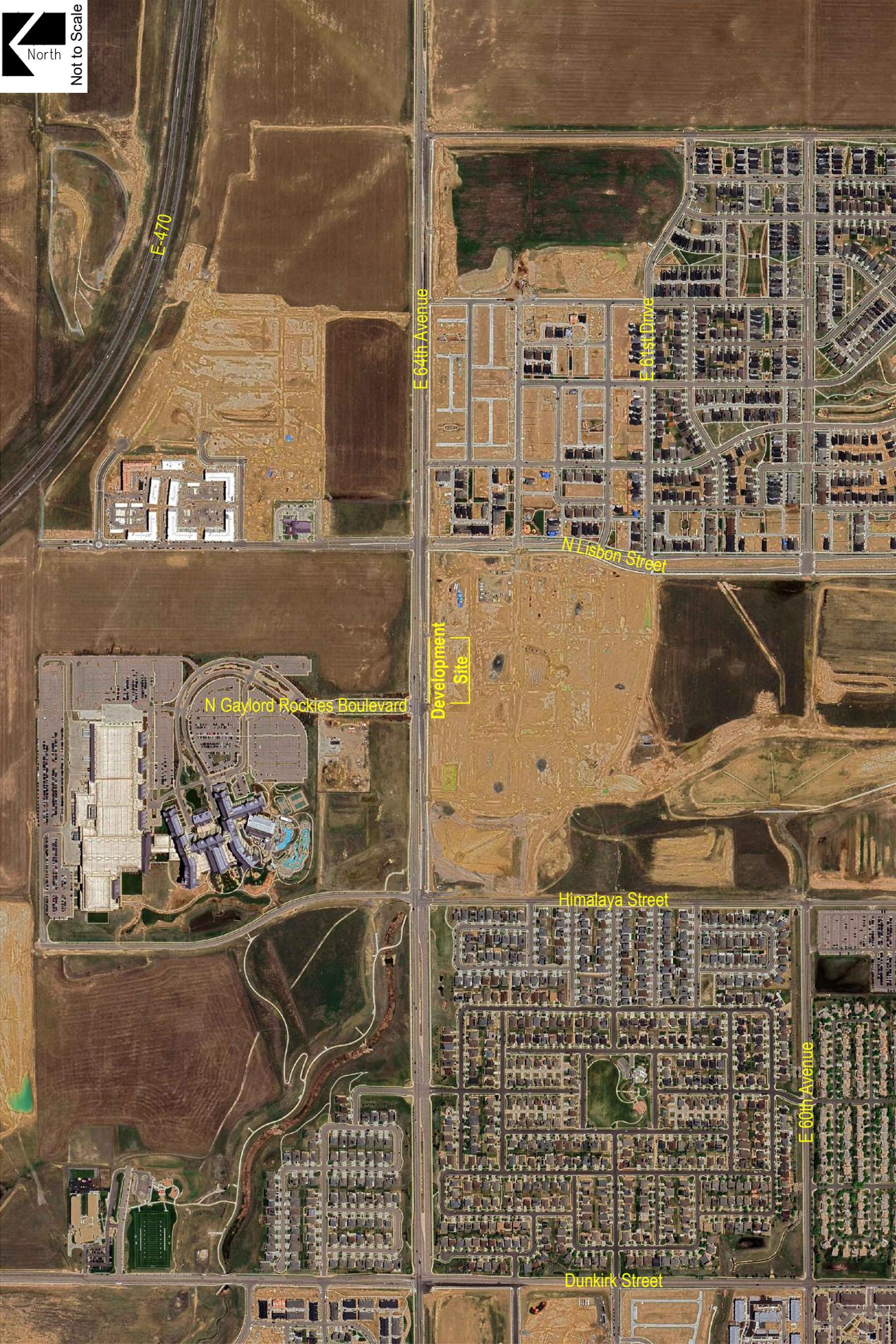


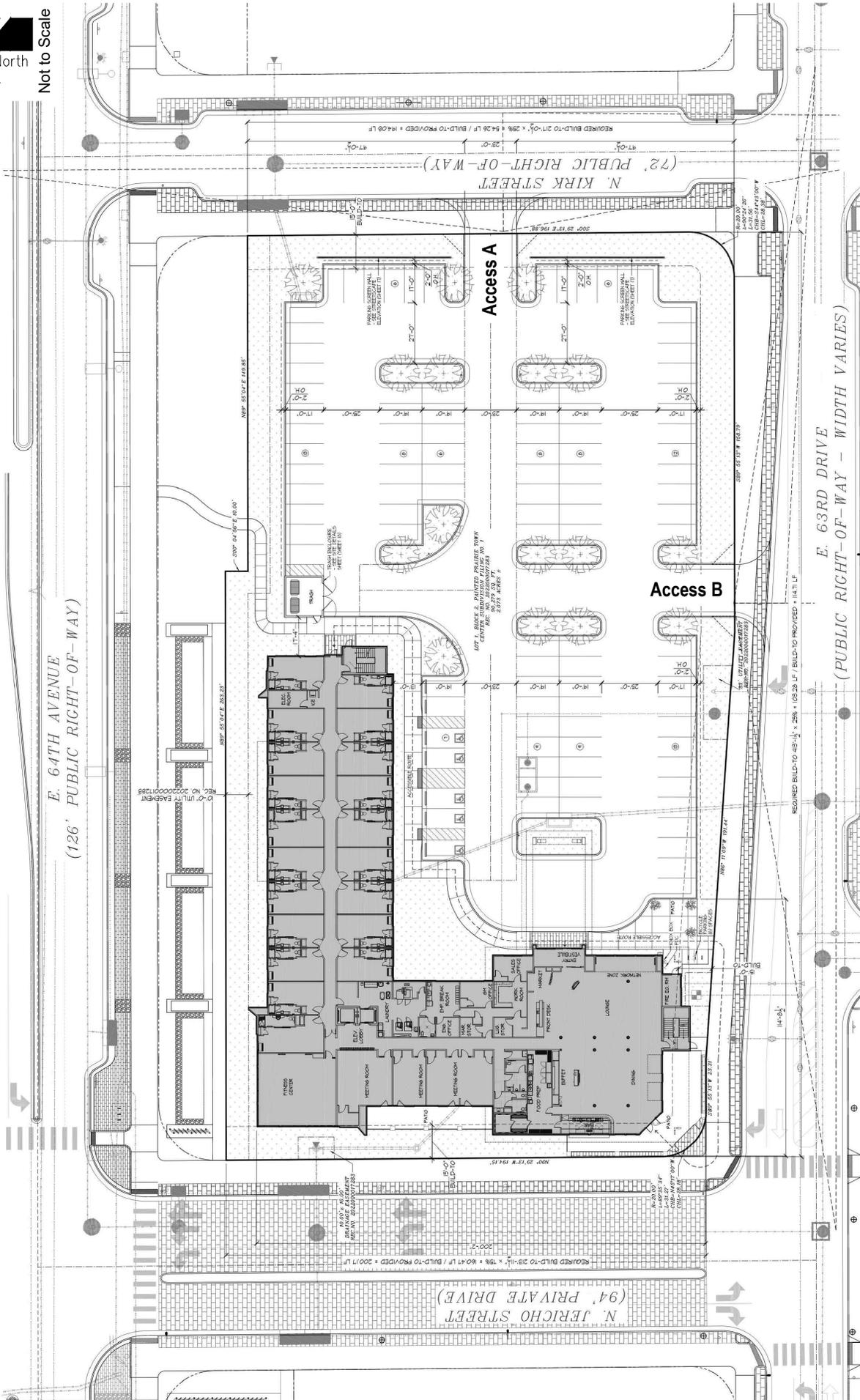
Figure 1
SITE LOCATION
June 2024
Page 2

SPRINGHILL SUITES AT PAINTED PRAIRIE
Traffic Generation Analysis
SM ROCHA, LLC
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Not to Scale



SPRINGHILL SUITES AT PAINTED PRAIRIE
 Traffic Generation Analysis

Figure 2
SITE PLAN

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Vehicle Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 11th Edition, were applied to the proposed land use in order to estimate the average daily traffic (ADT) and peak hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from point of origin to point of destination.

The approved traffic study¹ for the overall Town Center at Painted Prairie used trip generation rates from ITE's Trip Generation Manual, 10th Edition and included "Hotel" land use in the same development area as currently proposed with this project.

Table 1 presents average trip generation rates for the development area proposed. Use of average trip generation rates presents a conservative analysis. ITE land use code 310 (Hotel) was used for analysis because of its conservative rates and best fit to the proposed land use.

Table 1 – Trip Generation Rates

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
310	Hotel	RMS	7.99	0.26	0.20	0.46	0.30	0.29	0.59

Key: RMS = Rooms.

Note: All data and calculations above are subject to being rounded to nearest value.

Table 2 summarizes the projected ADT and peak hour traffic volumes likely generated by the land use area proposed and provides comparison to traffic volume estimates for the previously approved land use.

Table 2 – Trip Generation Summary

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
<u>Site Development - Previously Approved</u> *									
310	Hotel	125 RMS	984	34	23	57	35	33	68
<i>Previously Approved Total:</i>			984	34	23	57	35	33	68
<u>Site Development - Proposed</u>									
310	Hotel	140 RMS	1,119	36	28	64	42	40	83
<i>Proposed Total:</i>			1,119	36	28	64	42	40	83
<i>Difference Total:</i>			135	2	5	7	7	7	15

Key: RMS = Rooms.

* = Trip generation referenced from Town Center at Painted Prairie: Traffic Impact Analysis, Felsburg Holt & Ullevig, September 2020.

Note: All data and calculations above are subject to being rounded to nearest value.

¹ Town Center at Painted Prairie: Traffic Impact Analysis, Felsburg Holt & Ullevig, September 2020.

As Table 2 shows, the proposed development area has the potential to generate approximately 1,119 daily trips with 64 of those occurring during the morning peak hour and 83 during the afternoon peak hour. Compared to the previously approved land use, this represents a potential increase in site generation of approximately 135 daily trips with 7 of those occurring during the morning peak traffic hour and 15 during the afternoon peak traffic hour.

Adjustments to Trip Generation Rates

A development of this type is not likely to attract trips from within area land uses nor pass-by or diverted link trips from the adjacent roadway system, therefore no trip reduction was taken in this analysis.

Trip Generation Distribution and Assignment

Overall directional distribution of site-generated traffic was determined based on existing area land uses, the site location within the City, the available roadway network, approved distribution patterns illustrated within the Town Center at Painted Prairie traffic study, and in reference to historical traffic count data provided by the Colorado Department of Transportation's (CDOT) Traffic Count Database System (TCDS)². Site-generated traffic is anticipated to be distributed through each proposed access. Distribution along E 64th Avenue is general and assumed to be 50 percent to/from the east and west.

Traffic assignment is how the site-generated and distributed trips are expected to be loaded on the roadway network. Applying assumed trip distribution patterns to site-generated traffic provides the peak hour trip volume assignments for the proposed accesses. These volumes are then divided further upon travel through adjacent roadways serving the overall development area. Table 3 below uses the difference in trip generation volumes from Table 2 and denotes projected traffic volumes at each proposed access and adjacent intersections.

² Transportation Data Management System, MS2, 2022.

Table 3 – Site Generated Trip Assignment

DEVELOPMENT ACCESS TURNING MOVEMENTS	AM PEAK HOUR		PM PEAK HOUR	
	Inbound Volume	Outbound Volume	Inbound Volume	Outbound Volume
Access A / N Kirk Street Eastbound Left Northbound Left	- 0	3 -	- 1	3 -
Access B / E 63rd Drive Eastbound Left Eastbound Through Southbound Right	2 0 -	- - 2	6 1 -	- - 4
E 64th Avenue / N Kirk Street Westbound Through Northbound Right	1 -	- 3	4 -	- 3
E 64th Avenue / N Jericho Street Eastbound Right Westbound Left Northbound Left	1 1 -	- - 2	3 4 -	- - 4

Development Impacts

As Tables 2 and 3 show, there is an increase in peak hour traffic volumes anticipated for the proposed development. However, these volumes are considered minor and are not likely to negatively impact operations of adjacent roadways or intersections.

Peak Hour Intersection Levels of Service – Total Traffic - Year 2040

The previously approved Town Center at Painted Prairie Traffic Impact Analysis concluded the future signalized intersection of E 64th Avenue and N Jericho Street was to operate with overall level of service (LOS) B operations during the AM and PM peak hours of adjacent street traffic by Year 2040. The approved traffic study also anticipated maximum 95th percentile vehicle queue lengths of approximately 213 feet per lane for the dual northbound left turn lanes.

A re-analysis of the intersection was conducted to verify that proposed site-generated vehicle traffic does not adversely affect the intersection. The re-analyses and procedures described within were performed in accordance with the Highway Capacity Manual (HCM) 7th Edition and are based upon the conditions analyzed within the Town Center at Painted Prairie traffic study.

Upon re-analyses of long-term total traffic conditions, LOS results for the intersection of E 64th Avenue and N Jericho Street remain unaffected by the potential increase in traffic from the proposed Springhill Suites at Painted Prairie development. Similar to results provided within the Town Center at Painted Prairie traffic study, the study intersection is projected to have overall LOS C and B operations during the AM and PM peak hours of adjacent street traffic, respectively.

Intersection capacity worksheets developed for this analysis, referenced from the previously approved traffic study, are provided in Attachment A.

Queue Length Analysis – E 64th Avenue N Jericho Street

Northbound left turn queue lengths for the E 64th Avenue and N Jericho Street intersection were re-analyzed by incorporating proposed site generated trips with Year 2040 total traffic conditions from the previously approved Town Center at Painted Prairie traffic study. The analysis yields estimate of 95th percentile queue lengths which only have a five percent probability of being exceeded during the analysis time period. Queue lengths were modeled and are included with the Synchro worksheets in Attachment A.

Re-analysis of 95th percentile queue lengths concludes that the study intersection is not impacted by the minor change in site-generated trip estimates. The dual northbound left turn approach lanes along N Jericho Street still have sufficient storage to accommodate projected 95th percentile queues, and analysis results provided within the approved Town Center at Painted Prairie traffic study remain valid.

Conclusion

This analysis assessed traffic generation for the Springhill Suites at Painted Prairie development, provided a traffic volume comparison to previous land use assumptions approved for the development site, and considered potential impacts to the adjacent roadway network.

It is our professional opinion that the proposed site-generated traffic resulting from the development is expected to create no negative impact to traffic operations for the surrounding roadway network and proposed site accesses, nor at the E 64th Avenue intersections with the future N Jericho Steet and N Kirk Street. Analysis of site-generated traffic concludes that proposed development traffic volumes are minor. All conclusions and recommendations presented in the Town Center at Painted Prairie traffic study remain valid.

We trust that our findings will assist in the planning and approval of the Springhill Suites at Painted Prairie development. Please contact us should further assistance be needed.

Sincerely,

SM ROCHA, LLC
Traffic and Transportation Consultants



Zac Trotter, EIT
Traffic Engineer



Fred Lantz, PE
Traffic Engineer

ATTACHMENT A

Capacity Worksheets

Timings

2: Street C/Gaylord East Driveway & E 64th Ave

05/31/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	252	752	51	65	712	100	348	13	28	77	14	100
Future Volume (vph)	252	752	51	65	712	100	348	13	28	77	14	100
Satd. Flow (prot)	1770	3507	0	1770	3472	0	3433	1673	0	1770	1617	0
Flt Permitted	0.184			0.325			0.301			0.728		
Satd. Flow (perm)	343	3507	0	605	3472	0	1088	1673	0	1356	1617	0
Satd. Flow (RTOR)		6			14			30			109	
Lane Group Flow (vph)	274	872	0	71	883	0	378	44	0	84	124	0
Turn Type	pm+pt	NA										
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	48.0		12.0	48.0		35.0	48.0		12.0	25.0	
Total Split (%)	10.0%	40.0%		10.0%	40.0%		29.2%	40.0%		10.0%	20.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effct Green (s)	80.6	70.9		59.5	52.2		30.4	19.3		16.7	7.9	
Actuated g/C Ratio	0.67	0.59		0.50	0.44		0.25	0.16		0.14	0.07	
v/c Ratio	0.53	0.42		0.19	0.58		0.60	0.15		0.38	0.59	
Control Delay (s/veh)	13.8	15.6		9.2	21.4		41.0	20.6		39.5	25.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	13.8	15.6		9.2	21.4		41.0	20.6		39.5	25.0	
LOS	B	B		A	C		D	C		D	C	
Approach Delay (s/veh)		15.2			20.5			38.9			30.9	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	72	182		13	155		129	10		52	11	
Queue Length 95th (ft)	162	298		39	220		154	40		84	70	
Internal Link Dist (ft)		572			389			189			520	
Turn Bay Length (ft)	200			200			200			200		
Base Capacity (vph)	514	2075		380	1519		894	625		221	366	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.53	0.42		0.19	0.58		0.42	0.07		0.38	0.34	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow												
Natural Cycle: 75												
Control Type: Actuated-Coordinated												

Timings

2: Street C/Gaylord East Driveway & E 64th Ave

05/31/2024

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 21.9

Intersection LOS: C

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Street C/Gaylord East Driveway & E 64th Ave

 Ø1 12 s	 Ø2 48 s	 Ø3 12 s	 Ø4 (R) 48 s	
 Ø5 35 s	 Ø6 25 s	 Ø7 12 s	 Ø8 (R) 48 s	

Timings

2: Street C/Gaylord East Driveway & E 64th Ave

05/31/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1240	48	52	1110	100	245	11	14	101	15	100
Future Volume (vph)	100	1240	48	52	1110	100	245	11	14	101	15	100
Satd. Flow (prot)	1770	3518	0	1770	3497	0	3433	1708	0	1770	1619	0
Flt Permitted	0.123			0.121			0.425			0.724		
Satd. Flow (perm)	229	3518	0	225	3497	0	1536	1708	0	1349	1619	0
Satd. Flow (RTOR)		4			10			15			109	
Lane Group Flow (vph)	109	1400	0	57	1316	0	266	27	0	110	125	0
Turn Type	pm+pt	NA										
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	58.0		12.0	58.0		25.0	38.0		12.0	25.0	
Total Split (%)	10.0%	48.3%		10.0%	48.3%		20.8%	31.7%		10.0%	20.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effct Green (s)	82.4	75.1		78.2	71.4		22.2	11.7		20.1	7.9	
Actuated g/C Ratio	0.69	0.63		0.65	0.60		0.19	0.10		0.17	0.07	
v/c Ratio	0.40	0.63		0.24	0.63		0.52	0.15		0.39	0.59	
Control Delay (s/veh)	11.2	17.2		9.3	14.4		44.8	28.1		43.2	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	11.2	17.2		9.3	14.4		44.8	28.1		43.2	25.2	
LOS	B	B		A	B		D	C		D	C	
Approach Delay (s/veh)		16.8			14.3			43.3			33.7	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	23	330		10	197		91	9		73	12	
Queue Length 95th (ft)	54	525		m27	304		118	34		112	71	
Internal Link Dist (ft)		572			389			189			520	
Turn Bay Length (ft)	200			200			200			200		
Base Capacity (vph)	271	2203		247	2084		657	487		276	366	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.64		0.23	0.63		0.40	0.06		0.40	0.34	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

Timings

2: Street C/Gaylord East Driveway & E 64th Ave

05/31/2024

Maximum v/c Ratio: 0.64

Intersection Signal Delay (s/veh): 19.2

Intersection LOS: B

Intersection Capacity Utilization 64.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Street C/Gaylord East Driveway & E 64th Ave

 Ø1 12 s	 Ø2 38 s	 Ø3 12 s	 Ø4 (R) 58 s	
 Ø5 25 s	 Ø6 25 s	 Ø7 12 s	 Ø8 (R) 58 s	