

Traffic Study Memorandum

Project #
231351.000

TO: Brandon L. Kline, Architect
CC:
FROM: Dave Meyer, P.E.
DATE: April 11, 2024
RE: Weinland Park Development – Preliminary Traffic Study

The following summarizes a preliminary traffic study analysis performed for the proposed Weinland Park Development to be located on the northwest corner of the 5th Avenue intersection with 4th Street (US 23) in Columbus, Ohio. This analysis was performed without direct coordination with the City of Columbus but is in accordance with our knowledge of typical City of Columbus and Ohio standards. Direct coordination with Columbus will need to occur before preparing and submitting a traffic impact study to Columbus for review and approval.

Development Description

The development will include approximately 186 apartment residential dwelling units and approximately 4,740 SF of commercial/retail space. The development site will utilize 6th Avenue to access 4th Street as its primary site access. A secondary right-turn exit-only access to 5th Avenue is being considered.

Study Area and Traffic Count Data

The following four intersections were analyzed in this study.

- 5th Avenue at 4th Street
- 6th Avenue at 4th Street
- 7th Avenue at 4th Street
- Right-turn exit-only access to 5th Avenue

Traffic count data for the 5th Avenue and 7th Avenue intersections with 4th street is available on the Mid-Ohio Regional Planning Commission's (MORPC) website for the typical weekday AM and PM peak periods. The count data is from 2017 for 7th Avenue and 2019 for 5th Avenue. The count data at both intersections is included in summary tables attached to this memo. The AM and PM peak hour traffic volumes are presented in the attached Figure A.

Background Traffic Volumes

An annual growth rate was applied to counted traffic volumes to project opening year (2026) and horizon year (2036) background traffic volumes. The Ohio Department of Transportation's (ODOT) TIMS website contains future car growth rate projections along state and federal routes. On US 23 near the development site projected annual growth rates range from 0.97% to 1.84%. Therefore, a 1.50% annual growth rate was used to project background traffic volumes in the study area.

According to count data on MORPC's website, traffic volumes in the area of the development decreased between 2018 and 2022. For this analysis, we are assuming the 2017 and 2019 traffic count data is similar to existing (2024) traffic volumes. Therefore, the 1.5% annual growth rate was applied to the count data (Figure A) from 2024 to 2026 (1.03 factor) and from 2024 to 2036 (1.18 factor) to estimate future background volumes. The 2026 background volumes are presented in Figure B and the 2036 background volumes are presented in Figure C. These volumes represent the No-Build scenario condition for the traffic analyses.

Estimated Site Generated Trips

Site-generated trips for the proposed development were estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition) data. Data from ITE land use code 822 (Strip Retail Plaza) was used to estimate trips for 4,740 SF of commercial/retail space and data from land use code 221 (Multifamily Housing Mid-Rise) was used to estimate trips for 186 apartment units. Charts and calculations from the ITE Trip Generation Manual (OTISS Pro program) are attached to this memo.

Development trips were distributed at the study intersections. Since 4th Street is one-way northbound, all entering development trips will pass through the 5th Avenue signal and all exiting development trips will travel through the 7th Avenue signal. Development trips are presented in Figure D.

Total Traffic Volumes

The development trips were added to the projected background traffic volumes to derive the total traffic volumes. The projected 2026 total traffic volumes are presented in Figure E and the projected 2036 total traffic volumes are presented in Figure F. These volumes represent the Build scenario for the traffic analyses.

Traffic Analysis

HCS capacity analyses software was used to estimate delay and level of service at the three study intersections for the no-build and build scenarios. The LOS represents an intersection's measure of effectiveness and is used to determine the impacts on the intersection from the proposed development. LOS values range from "A" (best) to "F" (failing) and are based on the seconds delay an average vehicle experiences.

The two signalized intersections (5th Avenue and 7th Avenue) were analyzed with the projected No-Build and Build scenario traffic volumes in 2026 and in 2036. The tables on the following page summarize the results of the analysis. Note that in 2026 the 5th Avenue intersection is analyzed with one westbound approach lane as it currently exists due to construction. In 2036, a second westbound lane is analyzed.

According to the 2026 analysis, both signalized intersections are expected to operate effectively with the exception of the 5th Avenue intersection during the PM peak hour. During the PM peak hour, the westbound and northbound approaches to the 5th Avenue intersection are modeled to have unacceptable delays. However, in all scenarios the development traffic is not expected to have significant impact on the existing operation of the signalized intersections.

The unsignalized intersection of 6th Avenue was only analyzed with the 2036 build scenario traffic volumes. The analysis shows that the intersection is expected to operate acceptably with the development traffic volumes.

According to the 2036 analysis, both signalized intersections are expected to operate effectively during the AM peak hour but are modeled to have elevated delays during the PM peak hour. Again, in all scenarios the development traffic is not expected to have significant impact on the existing operation of the signalized intersections.

2026		Eastbound			Westbound			Northbound			Southbound			INT.
		LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	
5th Avenue at 4th Street No-Build	AM	13.6 B	10.0 B		32.1 C			22.4 C	22.6 C	25.8 C				24.0 C
	PM	32.5 C	19.6 B		108.6 F			20.5 C	68.4 F	20.3 C				62.2 E
5th Avenue at 4th Street Build	AM	13.9 B	10.0 B		33.0 C			22.4 C	22.7 C	25.8 C				24.3 C
	PM	35.2 D	19.6 B		125.4 F			20.5 C	73.5 F	20.3 C				70.6 E
7th Avenue at 4th Street No-Build	AM		25.9 C		24.5 C			7.5 A		7.6 A				10.9 B
	PM		45.9 D		31.1 C			22.2 C		22.3 C				25.3 C
7th Avenue at 4th Street Build	AM		26.5 C		24.6 C			7.8 A		7.9 A				11.2 B
	PM		45.9 D		31.1 C			24.6 C		25.2 C				27.2 C

Table A: 2026, Capacity Analyses Summary

2036		Eastbound			Westbound			Northbound			Southbound			INT.
		LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	
5th Avenue at 4th Street No-Build	AM	15.4 B	14.9 B		27.2 C	27.5 C		17.4 B	17.4 B	19.8 B				20.7 C
	PM	35.8 D	31.4 C		62.0 E	64.6 E		14.4 B	37.0 D	14.3 B				39.3 D
5th Avenue at 4th Street Build	AM	15.6 B	14.9 B		27.4 C	27.7 C		17.4 B	17.5 B	19.8 B				20.8 C
	PM	39.6 D	31.4 C		67.4 E	70.2 E		14.4 B	40.9 D	14.3 B				42.7 D
6th Avenue at 4th Street Build	AM	11.1 B						8.2 A						
	PM	39.1 E						8.3 A						
7th Avenue at 4th Street No-Build	AM		26.5 C		24.7 C			7.8 A		7.9 A				11.2 B
	PM		64.8 E		33.3 C			31.1 C		32.5 C				35.2 D
7th Avenue at 4th Street Build	AM		26.5 C		24.7 C			8.0 A		8.2 A				11.2 B
	PM		76.6 E		34.8 C			31.4 C		32.2 C				36.4 D

Table B: 2036, Capacity Analyses Summary

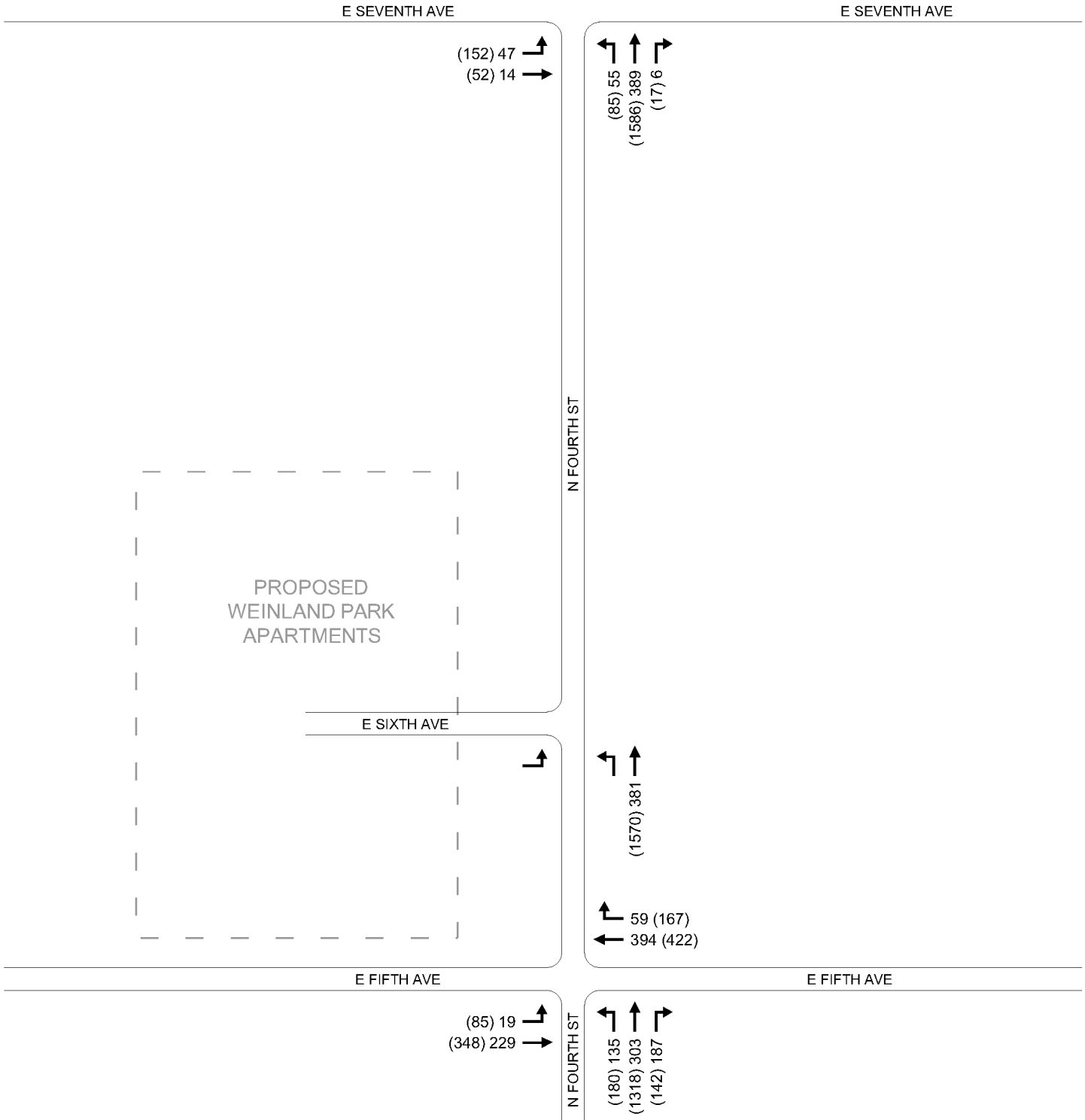
Conclusions

The following conclusions are determined from an evaluation of projected development traffic volumes.

1. The 6th Avenue intersection with 4th Street will serve as the primary roadway access for the development. According to the analysis, the intersection will operate effectively with stop control where traffic on 4th Street does not stop. On-street parking is currently restricted on the west side of 4th Street south of 6th Avenue. The on-street parking restriction should remain in place for a distance of at least 50 feet south of the southern edge of 6th Avenue to provide visibility of northbound vehicles and bicycles and to generally maintain smooth access to 6th Avenue.
2. The development traffic is not expected to have significant impact to the signalized intersections of 5th Avenue and 7th Avenue near the development site. No changes to those intersections are recommended as part of this development.
3. A desire for a right-turn exit-only access driveway onto 5th Avenue has been expressed for the development. Presuming that the driveway can be effectively restricted as planned, installing the driveway will not have a negative impact to the operations of 5th Avenue. The driveway will have not impact on the operations of the 5th Avenue intersection with 4th Street. The greatest impact of the driveway will be the reduction in development trip on 7th Avenue westbound from 4th Street. This study estimated those trips to be 24 in the AM peak hour and 17 during the PM peak hour. If provided, the driveway should be properly signed as exit only including “Do Not Enter” (R5-1) signs facing 5th Avenue. Due to geometric restrictions, it will likely be difficult to construct a proper right turn only driveway. Signs should direct drivers not to turn left.

LEGEND:

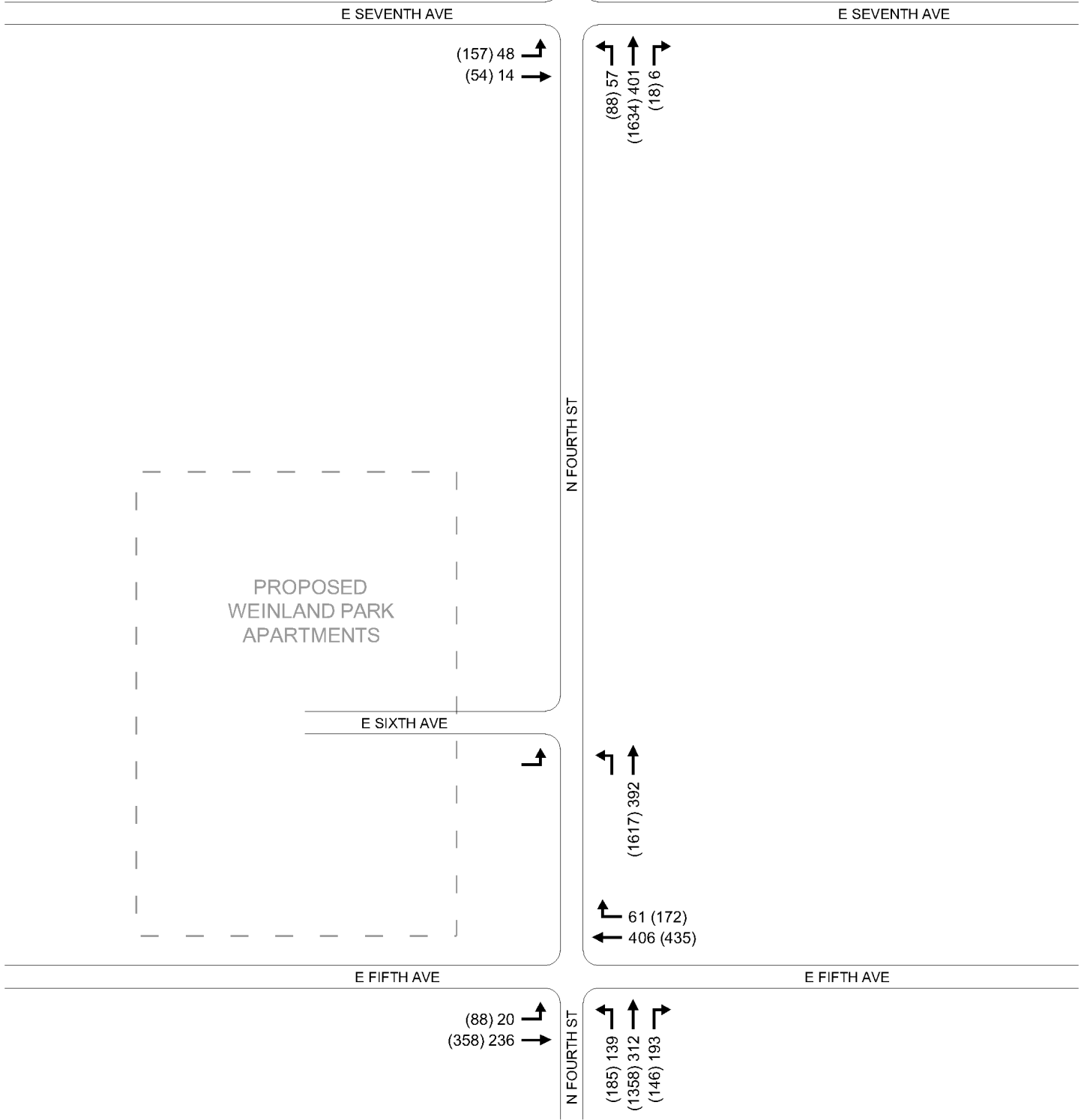
- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



Counted Traffic Volumes

LEGEND:

- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



2026 Background Volumes

LEGEND:

- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



↖ 13 (24)
 ← 38 (54)

E SEVENTH AVE

E SEVENTH AVE

(179) 55 ↗
 (61) 17 →

↖ (100) 65
 ↑ (1871) 459
 ↗ (20) 7

N FOURTH ST

PROPOSED
 WEINLAND PARK
 APARTMENTS

E SIXTH AVE



↖ (1853) 450
 ↑

↖ 70 (197)
 ← 465 (498)

E FIFTH AVE

E FIFTH AVE

(100) 22 ↗
 (411) 270 →

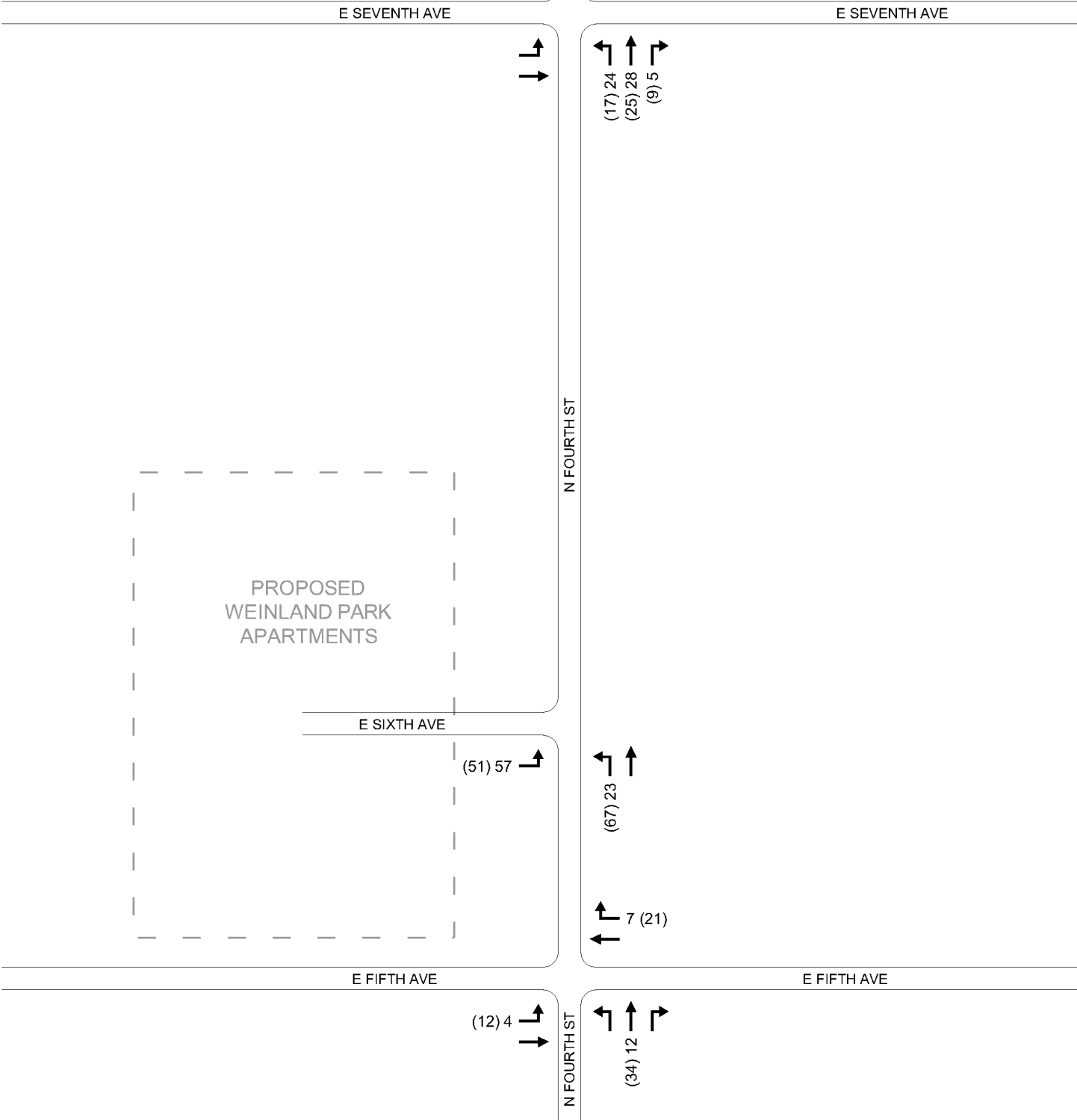
N FOURTH ST

↖ (212) 159
 ↑ (1555) 358
 ↗ (168) 221

2036 Background Volumes

LEGEND:

- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



Development Generated Trips

LEGEND:

- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



↖ 11 (21)
 ← 33 (47)

E SEVENTH AVE

E SEVENTH AVE

(157) 48 ↗
 (54) 14 →

↖ (105) 81
 ↑ (1659) 429
 ↗ (27) 11

N FOURTH ST

PROPOSED
 WEINLAND PARK
 APARTMENTS

E SIXTH AVE

(51) 57 ↗

↖ (67) 23
 ↑ (1617) 392

↖ 68 (193)
 ← 406 (435)

E FIFTH AVE

E FIFTH AVE

(100) 24 ↗
 (358) 236 →

N FOURTH ST

↖ (185) 139
 ↑ (1392) 324
 ↗ (146) 193

2026 Build Volumes

LEGEND:

- xx → AM PEAK VOLUMES
- (xx) → PM PEAK VOLUMES



↖ 13 (24)
 ← 38 (54)

E SEVENTH AVE

E SEVENTH AVE

(179) 55 ↗
 (61) 17 →

↖ (117) 89
 ↑ (1896) 487
 ↗ (29) 12

N FOURTH ST

PROPOSED
 WEINLAND PARK
 APARTMENTS

E SIXTH AVE

(51) 57 ↗

↖ (67) 23
 ↑ (1869) 450

↖ 77 (218)
 ← 465 (498)

E FIFTH AVE

E FIFTH AVE

(112) 26 ↗
 (411) 270 →

N FOURTH ST

↖ (212) 159
 ↑ (1589) 370
 ↗ (168) 221

2036 Build Volumes

MORPC Counts Summary Table

Location: 5th Ave @ 4th Street

Date of Counts: 7/9/2019



The Kleingers Group

6219 Centre Park Drive, West Chester, OH 45069

513-779-7851

Data from: MORPC

AM	EB 5th Ave				WB 5th Ave				NB 4th Street				SB			
	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED
7:00 to 7:15 am	1	45	0		0	66	6		27	67	24					
7:15 to 7:30 am	12	36	0		0	99	22		39	81	24					
7:30 to 7:45 am	1	50	0		0	99	17		33	69	47					
7:45 to 8:00 am	4	69	0		0	107	19		31	70	40					
8:00 to 8:15 am	8	66	0		0	89	11		36	82	53					
8:15 to 8:30 am	6	44	0		0	99	12		35	82	47					
8:30 to 8:45 am	3	69	0		0	114	9		31	81	54					
8:45 to 9:00 am	3	59	0		0	103	9		26	82	42					
AM Peak Hr Vol.	19	229	0	0	0	394	59	0	135	303	187	0	0	0	0	0
Peak Hr Factor	0.59	0.83				0.92	0.78		0.94	0.92	0.88					

PM	EB 5th Ave				WB 5th Ave				NB 4th Street				SB			
	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED	LEFT	THRU	RIGHT	PED
4:00 to 4:15 pm	12	96	0		0	90	34		41	266	45					
4:15 to 4:30 pm	10	88	0		0	83	34		42	301	47					
4:30 to 4:45 pm	15	87	0		0	94	38		48	332	35					
4:45 to 5:00 pm	27	98	0		0	90	43		54	320	43					
5:00 to 5:15 pm	20	88	0		0	113	39		41	328	37					
5:15 to 5:30 pm	23	75	0		0	125	47		37	338	27					
5:30 to 5:45 pm	29	76	0		0	114	59		46	312	41					
5:45 to 6:00 pm	16	58	0		0	105	42		65	298	44					
PM Peak Hr Vol.	85	348	0	0	0	422	167	0	180	1318	142	0	0	0	0	0
Peak Hr Factor	0.79	0.89				0.84	0.89		0.83	0.97	0.83					

Peak Hour Times: AM 7:30 to 8:30 PM 4:30 to 5:30

Heavy Vehicle Volumes

HV - AM	EB 5th Ave			WB 5th Ave			NB 4th Street			SB		
	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT
7:00 to 7:15 am												
7:15 to 7:30 am												
7:30 to 7:45 am												
7:45 to 8:00 am												
8:00 to 8:15 am												
8:15 to 8:30 am												
8:30 to 8:45 am												
8:45 to 9:00 am												
AM Peak HV	0	0	0	0	0	0	0	0	0	0	0	0
% Peak HV												
HV - PM	EB 5th Ave			WB 5th Ave			NB 4th Street			SB		
	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT
4:00 to 4:15 pm												
4:15 to 4:30 pm												
4:30 to 4:45 pm												
4:45 to 5:00 pm												
5:00 to 5:15 pm												
5:15 to 5:30 pm												
5:30 to 5:45 pm												
5:45 to 6:00 pm												
AM Peak HV	0	0	0	0	0	0	0	0	0	0	0	0
% Peak HV												

PROJECT DETAILS

Project Name: Weinland Park	Type of Project:
Project No:	City:
Country:	Built-up Area(Sq.ft):
Analyst Name: Travis Hunt	Clients Name:
Date: 3/22/2024	ZIP/Postal Code:
State/Province:	No. of Scenarios: 3
Analysis Region:	

SCENARIO SUMMARY

Scenarios	Name	No. of Land Uses	Phases of Development	No. of Years to Project Traffic	User Group	Estimated New Vehicle Trips		
						Entry	Exit	Total
Scenario - 1	Weekday Daily	2	1	0		637	637	1274
Scenario - 2	AM Peak	2	1	0		23	57	80
Scenario - 3	PM Peak	2	1	0		67	51	118

Scenario - 1

Scenario Name: Weekday Daily

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
221 - Multifamily Housing (Mid-Rise) - Not Close	General Urban/Suburban	Dwelling Units	186	Weekday	Average	422	422	844
Data Source: Trip Generation Manual, 11th Ed					4.54	50%	50%	
822 - Strip Retail Plaza (<40k)	General Urban/Suburban	1000 Sq. Ft. GLA	4.74	Weekday	Best Fit (LIN)	215	215	430
Data Source: Trip Generation Manual, 11th Ed					T = 42.20(X) + 229.68	50%	50%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100	100	1	1	50	50
822 - Strip Retail Plaza (<40k)	100	100	1	1	50	50

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	422	422	0	0	422	422
	844		0		844	
822 - Strip Retail Plaza (<40k)	215	215	0	0	215	215
	430		0		430	

VEHICLE TRIPS AFTER MULTI-MODAL ADJUSTMENT

MODE SHARE:

Land Use	Personal Passenger Vehicle		Truck		Other Modes	
	Entry (%)	Exit (%)	Entry (%)	Exit (%)	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100%	100%	0%	0%	0%	0%
822 - Strip Retail Plaza (<40k)	100%	100%	0%	0%	0%	0%

OCCUPANCY:

Land Use	Vehicle	
	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	1.00	1.00
822 - Strip Retail Plaza (<40k)	1.00	1.00

ADJUSTED VEHICLE TRIPS:

Land Use	Entry				Exit			
	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips
221 - Multifamily Housing (Mid-Rise) - Not Close	422	100%	1.00	422	422	100%	1.00	422
822 - Strip Retail Plaza (<40k)	215	100%	1.00	215	215	100%	1.00	215

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	422	422	844
822 - Strip Retail Plaza (<40k)	215	215	430

Land Use	New Vehicle Trips (PPV)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	422	422	844
822 - Strip Retail Plaza (<40k)	215	215	430

Land Use	New Vehicle Trips (Truck)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	0	0	0
822 - Strip Retail Plaza (<40k)	0	0	0

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	637	637	1274
Vehicle Trips After Multi-modal Adjustment	637	637	1274
External Vehicle Trips	637	637	1274
New Vehicle Trips	637	637	1274
PPV	637	637	1274
Truck	0	0	0
Person Trips by Other Modes	0	0	0

Scenario - 2

Scenario Name: AM Peak

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
221 - Multifamily Housing (Mid-Rise) - Not Close	General Urban/Suburban	Dwelling Units	186	Weekday, Peak Hour of Adjacent Street Traffic,	Average	16	53	69
Data Source: Trip Generation Manual, 11th Ed					0.37	23%	77%	
822 - Strip Retail Plaza (<40k)	General Urban/Suburban	1000 Sq. Ft. GLA	4.74	Weekday, Peak Hour of Adjacent Street Traffic,	Average	7	4	11
Data Source: Trip Generation Manual, 11th Ed					2.36	60%	40%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100	100	1	1	23	77
822 - Strip Retail Plaza (<40k)	100	100	1	1	60	40

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	16	53	0	0	16	53
	69		0		69	
822 - Strip Retail Plaza (<40k)	7	4	0	0	7	4
	11		0		11	

VEHICLE TRIPS AFTER MULTI-MODAL ADJUSTMENT

MODE SHARE:

Land Use	Personal Passenger Vehicle		Truck		Other Modes	
	Entry (%)	Exit (%)	Entry (%)	Exit (%)	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100%	100%	0%	0%	0%	0%
822 - Strip Retail Plaza (<40k)	100%	100%	0%	0%	0%	0%

OCCUPANCY:

Land Use	Vehicle	
	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	1.00	1.00
822 - Strip Retail Plaza (<40k)	1.00	1.00

ADJUSTED VEHICLE TRIPS:

Land Use	Entry				Exit			
	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips
221 - Multifamily Housing (Mid-Rise) - Not Close	16	100%	1.00	16	53	100%	1.00	53
822 - Strip Retail Plaza (<40k)	7	100%	1.00	7	4	100%	1.00	4

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	16	53	69
822 - Strip Retail Plaza (<40k)	7	4	11

Land Use	New Vehicle Trips (PPV)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	16	53	69
822 - Strip Retail Plaza (<40k)	7	4	11

Land Use	New Vehicle Trips (Truck)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	0	0	0
822 - Strip Retail Plaza (<40k)	0	0	0

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	23	57	80
Vehicle Trips After Multi-modal Adjustment	23	57	80
External Vehicle Trips	23	57	80
New Vehicle Trips	23	57	80
PPV	23	57	80
Truck	0	0	0
Person Trips by Other Modes	0	0	0

Scenario - 3

Scenario Name: PM Peak

User Group:

Dev. phase: 1

No. of Years to Project 0

Traffic :

Analyst Note:

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
221 - Multifamily Housing (Mid-Rise) - Not Close	General Urban/Suburban	Dwelling Units	186	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN)	44	28	72
Data Source: Trip Generation Manual, 11th Ed					T = 0.39(X) + 0.34	61%	39%	
822 - Strip Retail Plaza (<40k)	General Urban/Suburban	1000 Sq. Ft. GLA	4.74	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	23	23	46
Data Source: Trip Generation Manual, 11th Ed					Ln(T) = 0.71Ln(X) + 2.72	50%	50%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100	100	1	1	61	39
822 - Strip Retail Plaza (<40k)	100	100	1	1	50	50

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	44	28	0	0	44	28
	72		0		72	
822 - Strip Retail Plaza (<40k)	23	23	0	0	23	23
	46		0		46	

VEHICLE TRIPS AFTER MULTI-MODAL ADJUSTMENT

MODE SHARE:

Land Use	Personal Passenger Vehicle		Truck		Other Modes	
	Entry (%)	Exit (%)	Entry (%)	Exit (%)	Entry (%)	Exit (%)
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	100%	100%	0%	0%	0%	0%
822 - Strip Retail Plaza (<40k)	100%	100%	0%	0%	0%	0%

OCCUPANCY:

Land Use	Vehicle	
	Entry	Exit
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	1.00	1.00
822 - Strip Retail Plaza (<40k)	1.00	1.00

ADJUSTED VEHICLE TRIPS:

Land Use	Entry				Exit			
	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehicle Trips
221 - Multifamily Housing (Mid-Rise) - Not Close	44	100%	1.00	44	28	100%	1.00	28
822 - Strip Retail Plaza (<40k)	23	100%	1.00	23	23	100%	1.00	23

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	44	28	72
822 - Strip Retail Plaza (<40k)	23	23	46

Land Use	New Vehicle Trips (PPV)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	44	28	72
822 - Strip Retail Plaza (<40k)	23	23	46

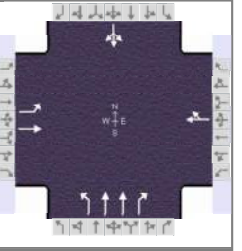
Land Use	New Vehicle Trips (Truck)		
	Entry	Exit	Total
221 - Multifamily Housing (Mid-Rise) - Not Close to Rail Transit	0	0	0
822 - Strip Retail Plaza (<40k)	0	0	0

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	67	51	118
Vehicle Trips After Multi-modal Adjustment	67	51	118
External Vehicle Trips	67	51	118
New Vehicle Trips	67	51	118
PPV	67	51	118
Truck	0	0	0
Person Trips by Other Modes	0	0	0

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM No Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2026 aNo Bld_5th Ave_AM.xus				
Project Description	2026 No Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	20	236			406	61	139	312	193	0	0	0

Signal Information				Signal Timing (s)						Signal Phases				
Cycle, s	80.0	Reference Phase	2	Green	24.0	9.0	29.0	0.0	0.0	0.0	1	2	3	4
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

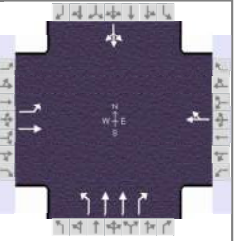
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	15.0	50.0		35.0		30.0		30.0
Change Period, (Y+R _c), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s	2.5	7.9		22.5				
Green Extension Time (g _e), s	0.0	1.5		1.1		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	0.00	0.00		0.22				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	22	262			519		154	347	214		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1813		1767	1766	1572		0	
Queue Service Time (g _s), s	0.5	5.9			20.5		5.4	6.1	8.8		0.0	
Cycle Queue Clearance Time (g _c), s	0.5	5.9			20.5		5.4	6.1	8.8		0.0	
Green Ratio (g/C)	0.50	0.55			0.36		0.30	0.30	0.30			
Capacity (c), veh/h	382	1021			657		620	1060	472			
Volume-to-Capacity Ratio (X)	0.058	0.257			0.790		0.249	0.327	0.455		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	10	105			380		105	116	161		0	
Back of Queue (Q), veh/ln (95 th percentile)	0.4	4.1			14.9		4.1	4.5	6.3		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00		0.70	0.00	2.15		0.00	
Uniform Delay (d ₁), s/veh	13.4	9.4			22.8		21.5	21.7	22.7			
Incremental Delay (d ₂), s/veh	0.3	0.6			9.4		1.0	0.8	3.1		0.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0			0.0		0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	13.6	10.0			32.1		22.4	22.6	25.8			
Level of Service (LOS)	B	B			C		C	C	C			
Approach Delay, s/veh / LOS	10.3	B		32.1	C		23.5	C		0.0		
Intersection Delay, s/veh / LOS			24.0						C			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.24	B	1.91	B	1.69	B	1.92	B
Bicycle LOS Score / LOS	0.96	A	1.34	A	1.08	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM No Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2026 aNo Bld_5th Ave_PM.xus				
Project Description	2026 No Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	88	358			435	172	185	1358	146	0	0	0

Signal Information				Signal Timing (s)						Signal Phases				
Cycle, s	100.0	Reference Phase	2	Green	41.0	7.0	34.0	0.0	0.0	0.0	1	2	3	4
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

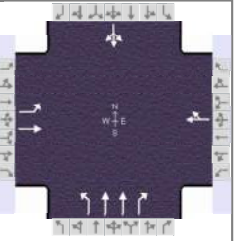
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	53.0		40.0		47.0		47.0
Change Period, (Y+R _c), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s	5.3	16.5		36.0				
Green Extension Time (g _e), s	0.0	2.3		0.0		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	1.00	0.00		1.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	98	398			674		206	1509	162		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1765		1767	1766	1572		0	
Queue Service Time (g _s), s	3.3	14.5			34.0		7.8	41.0	6.8		0.0	
Cycle Queue Clearance Time (g _c), s	3.3	14.5			34.0		7.8	41.0	6.8		0.0	
Green Ratio (g/C)	0.43	0.47			0.34		0.41	0.41	0.41			
Capacity (c), veh/h	196	872			600		797	1449	645			
Volume-to-Capacity Ratio (X)	0.500	0.456			1.124		0.258	1.042	0.252		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	82	266			963		151	826	118		0	
Back of Queue (Q), veh/ln (95 th percentile)	3.2	10.4			37.6		5.9	32.3	4.6		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00		1.00	0.00	1.58		0.00	
Uniform Delay (d ₁), s/veh	23.7	17.9			33.0		19.7	29.5	19.4			
Incremental Delay (d ₂), s/veh	8.8	1.7			75.6		0.8	35.3	0.9		0.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0			0.0		0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	32.5	19.6			108.6		20.5	64.8	20.3			
Level of Service (LOS)	C	B			F		C	F	C			
Approach Delay, s/veh / LOS	22.1	C		108.6	F		56.1	E		0.0		
Intersection Delay, s/veh / LOS	62.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	1.92	B	1.69	B	1.91	B
Bicycle LOS Score / LOS	1.31	A	1.60	B	2.04	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2026 Build_5th Ave_AM.xus				
Project Description	2026 Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	24	236			406	68	139	324	193	0	0	0

Signal Information				Signal Phases								
Cycle, s	80.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	24.0	9.0	29.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
		Red	2.0	2.0	2.0	0.0	0.0	0.0				

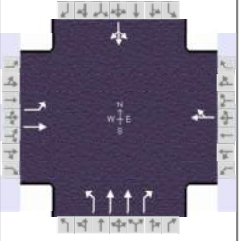
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	15.0	50.0		35.0		30.0		30.0
Change Period, (Y+R _c), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s	2.6	7.9		22.9				
Green Extension Time (g _e), s	0.0	1.5		1.0		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	0.00	0.00		0.28				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	27	262			527		154	360	214		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1809		1767	1766	1572		0	
Queue Service Time (g _s), s	0.6	5.9			20.9		5.4	6.4	8.8		0.0	
Cycle Queue Clearance Time (g _c), s	0.6	5.9			20.9		5.4	6.4	8.8		0.0	
Green Ratio (g/C)	0.50	0.55			0.36		0.30	0.30	0.30			
Capacity (c), veh/h	376	1021			656		620	1060	472			
Volume-to-Capacity Ratio (X)	0.071	0.257			0.803		0.249	0.340	0.455		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	12	105			390		105	121	161		0	
Back of Queue (Q), veh/ln (95 th percentile)	0.5	4.1			15.2		4.1	4.7	6.3		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00		0.70	0.00	2.15		0.00	
Uniform Delay (d ₁), s/veh	13.5	9.4			22.9		21.5	21.8	22.7			
Incremental Delay (d ₂), s/veh	0.4	0.6			10.1		1.0	0.9	3.1		0.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0			0.0		0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	13.9	10.0			33.0		22.4	22.7	25.8			
Level of Service (LOS)	B	B			C		C	C	C			
Approach Delay, s/veh / LOS	10.4		B	33.0		C	23.6		C	0.0		
Intersection Delay, s/veh / LOS	24.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.24	B	1.91	B	1.69	B	1.92	B
Bicycle LOS Score / LOS	0.96	A	1.36	A	1.09	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2026 Build_5th Ave_PM.xus				
Project Description	2026 Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	100	358			435	193	185	1392	146	0	0	0

Signal Information				Signal Phases								
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
Green	41.0	7.0	34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

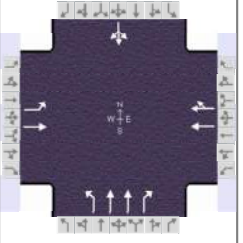
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	53.0		40.0		47.0		47.0
Change Period, (Y+R _c), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s	5.8	16.5		36.0				
Green Extension Time (g _e), s	0.0	2.4		0.0		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	1.00	0.00		1.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	111	398			698		206	1547	162		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1758		1767	1766	1572		0	
Queue Service Time (g _s), s	3.8	14.5			34.0		7.8	41.0	6.8		0.0	
Cycle Queue Clearance Time (g _c), s	3.8	14.5			34.0		7.8	41.0	6.8		0.0	
Green Ratio (g/C)	0.43	0.47			0.34		0.41	0.41	0.41			
Capacity (c), veh/h	196	872			598		797	1449	645			
Volume-to-Capacity Ratio (X)	0.568	0.456			1.167		0.258	1.068	0.252		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	98	266			1072		151	896	118		0	
Back of Queue (Q), veh/ln (95 th percentile)	3.8	10.4			41.9		5.9	35.0	4.6		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00		1.00	0.00	1.58		0.00	
Uniform Delay (d ₁), s/veh	23.8	17.9			33.0		19.7	29.5	19.4			
Incremental Delay (d ₂), s/veh	11.4	1.7			92.4		0.8	44.0	0.9		0.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0			0.0		0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	35.2	19.6			125.4		20.5	73.5	20.3			
Level of Service (LOS)	D	B			F		C	F	C			
Approach Delay, s/veh / LOS	23.0	C		125.4	F		63.3	E		0.0		
Intersection Delay, s/veh / LOS	70.6						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	1.92	B	1.69	B	1.91	B
Bicycle LOS Score / LOS	1.33	A	1.64	B	2.07	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM No Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2036 aNo Bld_5th Ave_AM.xus				
Project Description	2036 No Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	22	270			465	70	159	358	221	0	0	0

Signal Information				Signal Timing (s)						Signal Phases			
Cycle, s	80.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	31.0	7.0	24.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

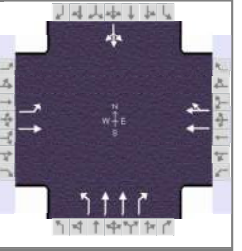
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	43.0		30.0		37.0		37.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g_s), s	2.7	10.3		13.0				
Green Extension Time (g_e), s	0.0	1.7		1.5		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	0.09	0.00		0.04				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	24	300			303	291	177	398	246		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1856	1770	1767	1766	1572		0	
Queue Service Time (g_s), s	0.7	8.3			10.9	11.0	5.4	6.2	9.1		0.0	
Cycle Queue Clearance Time (g_c), s	0.7	8.3			10.9	11.0	5.4	6.2	9.1		0.0	
Green Ratio (g/C)	0.41	0.46			0.30	0.30	0.39	0.39	0.39			
Capacity (c), veh/h	377	858			557	531	775	1369	609			
Volume-to-Capacity Ratio (X)	0.065	0.350			0.545	0.548	0.228	0.291	0.403		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	13	158			225	214	102	113	156		0	
Back of Queue (Q), veh/ln (95 th percentile)	0.5	6.2			8.8	8.6	4.0	4.4	6.1		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.68	0.00	2.08		0.00	
Uniform Delay (d_1), s/veh	15.1	13.8			23.4	23.5	16.7	16.9	17.8			
Incremental Delay (d_2), s/veh	0.3	1.1			3.8	4.0	0.7	0.5	2.0		0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	15.4	14.9			27.2	27.5	17.4	17.4	19.8			
Level of Service (LOS)	B	B			C	C	B	B	B			
Approach Delay, s/veh / LOS	14.9	B		27.4	C		18.1	B		0.0		
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	1.92	B	1.91	B	2.10	B
Bicycle LOS Score / LOS	1.02	A	0.98	A	1.16	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM No Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2036 aNo Bld_5th Ave_PM.xus				
Project Description	2036 No Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	100	411			498	197	212	1555	168	0	0	0

Signal Information				Signal Phases										
Cycle, s	100.0	Reference Phase	2											
Offset, s	0	Reference Point	End	Green	51.0	7.0	24.0	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0.0	0.0				

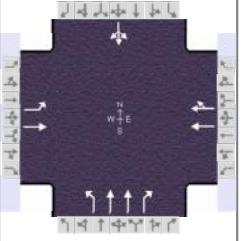
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	43.0		30.0		57.0		57.0
Change Period, (Y+R _c), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s	6.5	22.6		23.3				
Green Extension Time (g _e), s	0.0	2.3		0.3		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	1.00	0.04		1.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	111	457			405	367	236	1728	187		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1856	1676	1767	1766	1572		0	
Queue Service Time (g _s), s	4.5	20.6			20.7	21.3	7.5	46.9	6.6		0.0	
Cycle Queue Clearance Time (g _c), s	4.5	20.6			20.7	21.3	7.5	46.9	6.6		0.0	
Green Ratio (g/C)	0.33	0.37			0.24	0.24	0.51	0.51	0.51			
Capacity (c), veh/h	214	687			445	402	973	1802	802			
Volume-to-Capacity Ratio (X)	0.519	0.665			0.909	0.913	0.242	0.959	0.233		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	108	378			466	428	139	733	109		0	
Back of Queue (Q), veh/ln (95 th percentile)	4.2	14.8			18.2	17.1	5.4	28.6	4.3		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.93	0.00	1.46		0.00	
Uniform Delay (d ₁), s/veh	27.1	26.3			36.9	37.0	13.9	23.5	13.6			
Incremental Delay (d ₂), s/veh	8.7	5.0			25.1	27.6	0.6	13.5	0.7		0.0	
Initial Queue Delay (d ₃), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	35.8	31.4			62.0	64.6	14.4	37.0	14.3			
Level of Service (LOS)	D	C			E	E	B	D	B			
Approach Delay, s/veh / LOS	32.2	C		63.2	E		32.5	C		0.0		
Intersection Delay, s/veh / LOS	39.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	1.93	B	1.90	B	2.09	B
Bicycle LOS Score / LOS	1.42	A	1.12	A	2.26	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2036 Build_5th Ave_AM.xus				
Project Description	2036 Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	26	270			465	77	159	370	221	0	0	0

Signal Information				Signal Timing (s)						Signal Phases			
Cycle, s	80.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	31.0	7.0	24.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0			

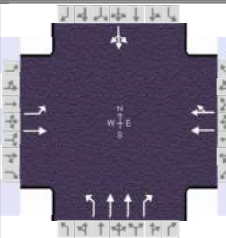
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	43.0		30.0		37.0		37.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g_s), s	2.8	10.3		13.2				
Green Extension Time (g_e), s	0.0	1.7		1.5		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	0.12	0.00		0.05				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	29	300			308	295	177	411	246		0	
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856			1856	1763	1767	1766	1572		0	
Queue Service Time (g_s), s	0.8	8.3			11.1	11.2	5.4	6.5	9.1		0.0	
Cycle Queue Clearance Time (g_c), s	0.8	8.3			11.1	11.2	5.4	6.5	9.1		0.0	
Green Ratio (g/C)	0.41	0.46			0.30	0.30	0.39	0.39	0.39			
Capacity (c), veh/h	374	858			557	529	775	1369	609			
Volume-to-Capacity Ratio (X)	0.077	0.350			0.553	0.557	0.228	0.300	0.403		0.000	
Back of Queue (Q), ft/ln (95 th percentile)	15	158			229	217	102	117	156		0	
Back of Queue (Q), veh/ln (95 th percentile)	0.6	6.2			8.9	8.7	4.0	4.6	6.1		0.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00			0.00	0.00	0.68	0.00	2.08		0.00	
Uniform Delay (d_1), s/veh	15.2	13.8			23.5	23.5	16.7	17.0	17.8			
Incremental Delay (d_2), s/veh	0.4	1.1			3.9	4.2	0.7	0.6	2.0		0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	
Control Delay (d), s/veh	15.6	14.9			27.4	27.7	17.4	17.5	19.8			
Level of Service (LOS)	B	B			C	C	B	B	B			
Approach Delay, s/veh / LOS	15.0	B		27.6	C		18.2	B		0.0		
Intersection Delay, s/veh / LOS	20.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.26	B	1.92	B	1.91	B	2.10	B
Bicycle LOS Score / LOS	1.03	A	0.98	A	1.18	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM Build	PHF	0.90		
Urban Street	N 4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	E 5th Ave	File Name	2036 Build_5th Ave_PM.xus				
Project Description	2036 Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	112	411			498	218	212	1589	168	0	0	0

Signal Information												
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	51.0	7.0	24.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
		Red	2.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4		8		2		6
Case Number	1.0	4.0		8.3		5.0		8.0
Phase Duration, s	13.0	43.0		30.0		57.0		57.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s	3.1	3.1		3.1		0.0		0.0
Queue Clearance Time (g_s), s	7.1	22.6		24.3				
Green Extension Time (g_e), s	0.0	2.4		0.0		0.0		0.0
Phase Call Probability	1.00	1.00		1.00				
Max Out Probability	1.00	0.05		1.00				

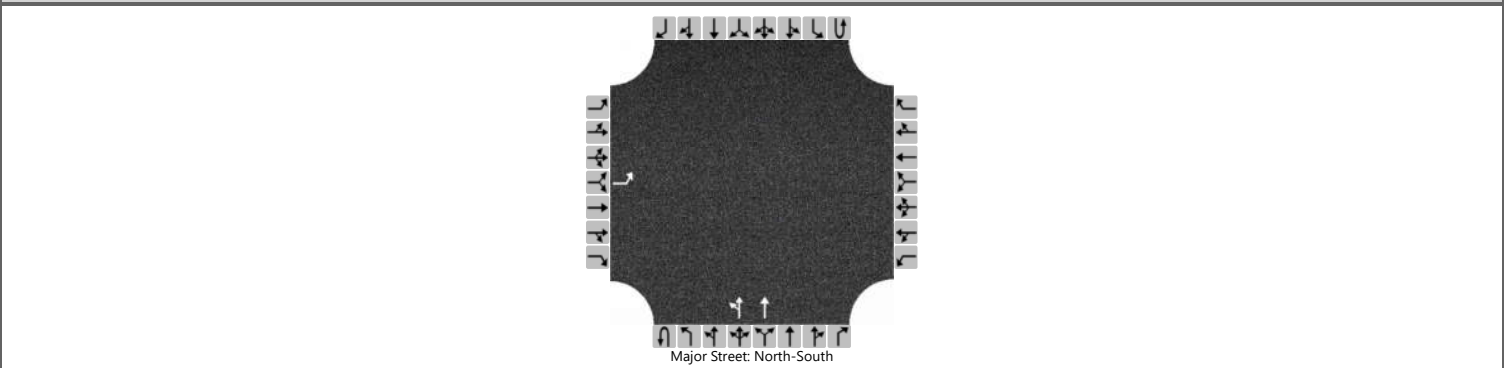
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	124	457		419	377	236	1766	187		0		
Adjusted Saturation Flow Rate (s), veh/h/ln	1767	1856		1856	1663	1767	1766	1572		0		
Queue Service Time (g_s), s	5.1	20.6		21.5	22.3	7.5	48.9	6.6		0.0		
Cycle Queue Clearance Time (g_c), s	5.1	20.6		21.5	22.3	7.5	48.9	6.6		0.0		
Green Ratio (g/C)	0.33	0.37		0.24	0.24	0.51	0.51	0.51				
Capacity (c), veh/h	208	687		445	399	973	1802	802				
Volume-to-Capacity Ratio (X)	0.600	0.665		0.941	0.944	0.242	0.980	0.233		0.000		
Back of Queue (Q), ft/ln (95 th percentile)	128	378		498	455	139	783	109		0		
Back of Queue (Q), veh/ln (95 th percentile)	5.0	14.8		19.5	18.2	5.4	30.6	4.3		0.0		
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00	0.93	0.00	1.46		0.00		
Uniform Delay (d_1), s/veh	27.4	26.3		37.3	37.3	13.9	24.0	13.6				
Incremental Delay (d_2), s/veh	12.2	5.0		30.1	32.9	0.6	16.9	0.7		0.0		
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0		
Control Delay (d), s/veh	39.6	31.4		67.4	70.2	14.4	40.9	14.3				
Level of Service (LOS)	D	C		E	E	B	D	B				
Approach Delay, s/veh / LOS	33.1	C		68.7	E	35.8	D		0.0			
Intersection Delay, s/veh / LOS	42.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	1.93	B	1.90	B	2.09	B
Bicycle LOS Score / LOS	1.45	A	1.14	A	2.29	B	0.49	A

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	D Meyer			Intersection	4th Street at 6th Ave		
Agency/Co.	The Kleingers Group			Jurisdiction	Columbus		
Date Performed	4/11/2024			East/West Street	6th Avenue		
Analysis Year	2036			North/South Street	4th Street		
Time Analyzed	AM Peak Build			Peak Hour Factor	0.92		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	2036 Build AM						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		1	0	0		0	0	0		0	2	0		0	0	0	
Configuration		L								LT	T						
Volume (veh/h)		57								23	450						
Percent Heavy Vehicles (%)		3								3							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized																	
Median Type Storage		Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5								5.3						
Critical Headway (sec)		6.86								5.36						
Base Follow-Up Headway (sec)		3.5								3.1						
Follow-Up Headway (sec)		3.53								3.13						

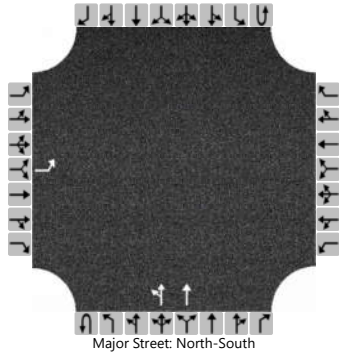
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		62								25						
Capacity, c (veh/h)		653								1150						
v/c Ratio		0.09								0.02						
95% Queue Length, Q ₉₅ (veh)		0.3								0.1						
95% Queue Length, Q ₉₅ (ft)		7.7								2.6						
Control Delay (s/veh)		11.1								8.2	0.2					
Level of Service (LOS)		B								A	A					
Approach Delay (s/veh)		11.1										0.6				
Approach LOS		B										A				

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	D Meyer			Intersection	4th Street at 6th Ave		
Agency/Co.	The Kleingers Group			Jurisdiction	Columbus		
Date Performed	4/11/2024			East/West Street	6th Avenue		
Analysis Year	2036			North/South Street	4th Street		
Time Analyzed	PM Peak Build			Peak Hour Factor	0.92		
Intersection Orientation	North-South			Analysis Time Period (hrs)	0.25		
Project Description	2036 Build PM						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	0	0	
Configuration		L								LT	T						
Volume (veh/h)		51								67	1869						
Percent Heavy Vehicles (%)		3								3							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized																	
Median Type Storage		Undivided															

Critical and Follow-up Headways

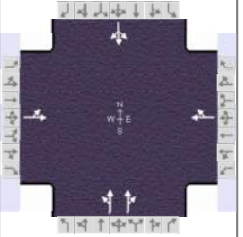
Base Critical Headway (sec)		7.5								5.3						
Critical Headway (sec)		6.86								5.36						
Base Follow-Up Headway (sec)		3.5								3.1						
Follow-Up Headway (sec)		3.53								3.13						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		55								73							
Capacity, c (veh/h)		160								1150							
v/c Ratio		0.35								0.06							
95% Queue Length, Q ₉₅ (veh)		1.4								0.2							
95% Queue Length, Q ₉₅ (ft)		35.8								5.1							
Control Delay (s/veh)		39.1								8.3	1.1						
Level of Service (LOS)		E								A	A						
Approach Delay (s/veh)		39.1								1.4							
Approach LOS		E								A							

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM No Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2026 aNo Bld_7th Ave_AM.xus				
Project Description	2026 No Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	48	14			33	11	57	401	6	0	0	0

Signal Information				EB				WB				NB				SB							
Cycle, s	80.0	Reference Phase	2	Green	49.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On																				

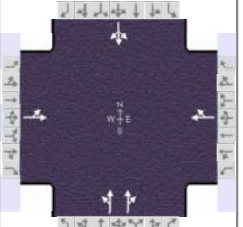
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		25.0		25.0		55.0		55.0
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.1		3.1		0.0		0.0
Queue Clearance Time (g_s), s		6.1		3.7				
Green Extension Time (g_e), s		0.1		0.2		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.00		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	69			49			266			250		
Adjusted Saturation Flow Rate (s), veh/h/ln	1362			1776			1741			1680		
Queue Service Time (g_s), s	2.4			1.7			0.0			5.4		
Cycle Queue Clearance Time (g_c), s	4.1			1.7			5.2			5.4		
Green Ratio (g/C)	0.24			0.24			0.61			0.61		
Capacity (c), veh/h	403			422			1122			1029		
Volume-to-Capacity Ratio (X)	0.171			0.116			0.237			0.243		
Back of Queue (Q), ft/ln (95 th percentile)	52			35			86			82		
Back of Queue (Q), veh/ln (95 th percentile)	2.0			1.4			3.4			3.2		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d_1), s/veh	25.0			23.9			7.0			7.1		
Incremental Delay (d_2), s/veh	0.9			0.6			0.5			0.6		
Initial Queue Delay (d_3), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	25.9			24.5			7.5			7.6		
Level of Service (LOS)	C			C			A			A		
Approach Delay, s/veh / LOS	25.9	C		24.5	C		7.6	A		0.0		
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.60	A	0.57	A	0.91	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM No Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2026 aNo Bld_7th Ave_PM.xus				
Project Description	2026 No Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	157	54			47	21	88	1634	18	0	0	0

Signal Information				Signal Timing (s)								Signal Phases				
Cycle, s	100.0	Reference Phase	2	Green	64.0	24.0	0.0	0.0	0.0	0.0	0.0	0.0	1	2	3	4
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On													

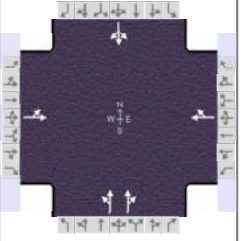
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		30.0		30.0		70.0		70.0
Change Period, (Y+R _c), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.2		3.2		0.0		0.0
Queue Clearance Time (g _s), s		20.6		5.4				
Green Extension Time (g _e), s		0.2		0.5		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.80		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	234			76			1013			920		
Adjusted Saturation Flow Rate (s), veh/h/ln	1245			1758			1807			1682		
Queue Service Time (g _s), s	15.2			3.4			37.3			43.5		
Cycle Queue Clearance Time (g _c), s	18.6			3.4			45.8			43.5		
Green Ratio (g/C)	0.24			0.24			0.64			0.64		
Capacity (c), veh/h	362			422			1196			1076		
Volume-to-Capacity Ratio (X)	0.648			0.179			0.847			0.855		
Back of Queue (Q), ft/ln (95 th percentile)	261			70			649			595		
Back of Queue (Q), veh/ln (95 th percentile)	10.2			2.8			25.3			23.2		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d ₁), s/veh	37.2			30.2			14.6			14.3		
Incremental Delay (d ₂), s/veh	8.7			0.9			7.5			8.7		
Initial Queue Delay (d ₃), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	45.9			31.1			22.2			23.0		
Level of Service (LOS)	D			C			C			C		
Approach Delay, s/veh / LOS	45.9	D		31.1	C		22.5	C		0.0		
Intersection Delay, s/veh / LOS	25.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.65	B	1.65	B
Bicycle LOS Score / LOS	0.87	A	0.61	A	2.08	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2026 Build_7th Ave_AM.xus				
Project Description	2026 Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	55	17			38	11	81	429	11	0	0	0

Signal Information												
Cycle, s	80.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	49.0	19.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

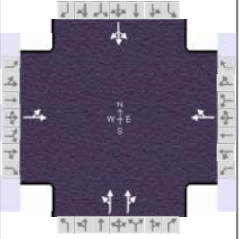
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		25.0		25.0		55.0		55.0
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.1		3.1		0.0		0.0
Queue Clearance Time (g_s), s		6.8		3.9				
Green Extension Time (g_e), s		0.2		0.2		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.00		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		80			54		296		283		0	
Adjusted Saturation Flow Rate (s), veh/h/ln		1349			1783		1707		1675		0	
Queue Service Time (g_s), s		2.9			1.9		1.5		6.3		0.0	
Cycle Queue Clearance Time (g_c), s		4.8			1.9		6.0		6.3		0.0	
Green Ratio (g/C)		0.24			0.24		0.61		0.61			
Capacity (c), veh/h		400			424		1104		1026			
Volume-to-Capacity Ratio (X)		0.200			0.129		0.268		0.275		0.000	
Back of Queue (Q), ft/ln (95 th percentile)		61			39		98		95		0	
Back of Queue (Q), veh/ln (95 th percentile)		2.4			1.5		3.8		3.7		0.0	
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.00		0.00	
Uniform Delay (d_1), s/veh		25.3			24.0		7.2		7.2			
Incremental Delay (d_2), s/veh		1.1			0.6		0.6		0.7		0.0	
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0		0.0	
Control Delay (d), s/veh		26.5			24.6		7.8		7.9			
Level of Service (LOS)		C			C		A		A			
Approach Delay, s/veh / LOS	26.5	C		24.6	C		7.8	A		0.0		
Intersection Delay, s/veh / LOS	11.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.62	A	0.58	A	0.97	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2026	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2026 Build_7th Ave_PM.xus				
Project Description	2026 Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	157	54			47	21	105	1659	27	0	0	0

Signal Information				Signal Timing and Phases								
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	64.0	24.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

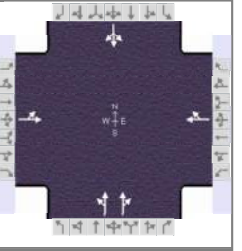
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		30.0		30.0		70.0		70.0
Change Period, (Y+R _c), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.2		3.2		0.0		0.0
Queue Clearance Time (g _s), s		20.6		5.4				
Green Extension Time (g _e), s		0.2		0.5		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.80		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	234			76			1044			946		
Adjusted Saturation Flow Rate (s), veh/h/ln	1245			1758			1798			1679		
Queue Service Time (g _s), s	15.2			3.4			43.5			46.5		
Cycle Queue Clearance Time (g _c), s	18.6			3.4			49.7			46.5		
Green Ratio (g/C)	0.24			0.24			0.64			0.64		
Capacity (c), veh/h	362			422			1191			1075		
Volume-to-Capacity Ratio (X)	0.648			0.179			0.877			0.881		
Back of Queue (Q), ft/ln (95 th percentile)	261			70			701			640		
Back of Queue (Q), veh/ln (95 th percentile)	10.2			2.8			27.4			25.0		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d ₁), s/veh	37.2			30.2			15.3			14.8		
Incremental Delay (d ₂), s/veh	8.7			0.9			9.2			10.4		
Initial Queue Delay (d ₃), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	45.9			31.1			24.6			25.2		
Level of Service (LOS)	D			C			C			C		
Approach Delay, s/veh / LOS	45.9	D		31.1	C		24.9	C		0.0		
Intersection Delay, s/veh / LOS	27.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.65	B	1.65	B
Bicycle LOS Score / LOS	0.87	A	0.61	A	2.13	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM No Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2036 aNo Bld_7th Ave_AM.xus				
Project Description	2036 No Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	55	17			38	13	65	459	7	0	0	0

Signal Information				Signal Timing (s)								Signal Phases			
Cycle, s	80.0	Reference Phase	2	Green	49.0	19.0	0.0	0.0	0.0	0.0	1	2	3	4	
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	0.0	0.0	0.0	0.0	5	6	7	8	
Uncoordinated	No	Simult. Gap E/W	On	Red	2.0	2.0	0.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On												

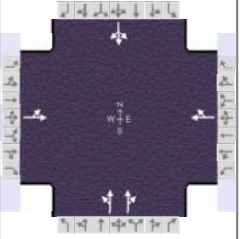
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		25.0		25.0		55.0		55.0
Change Period, (Y+R _c), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s		6.9		4.0				
Green Extension Time (g _e), s		0.2		0.2		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.00		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	80			57			303			287		
Adjusted Saturation Flow Rate (s), veh/h/ln	1339			1774			1742			1680		
Queue Service Time (g _s), s	2.9			2.0			0.0			6.4		
Cycle Queue Clearance Time (g _c), s	4.9			2.0			6.1			6.4		
Green Ratio (g/C)	0.24			0.24			0.61			0.61		
Capacity (c), veh/h	397			421			1122			1029		
Volume-to-Capacity Ratio (X)	0.201			0.134			0.270			0.279		
Back of Queue (Q), ft/ln (95 th percentile)	61			41			100			96		
Back of Queue (Q), veh/ln (95 th percentile)	2.4			1.6			3.9			3.8		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d ₁), s/veh	25.4			24.0			7.2			7.2		
Incremental Delay (d ₂), s/veh	1.1			0.7			0.6			0.7		
Initial Queue Delay (d ₃), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	26.5			24.7			7.8			7.9		
Level of Service (LOS)	C			C			A			A		
Approach Delay, s/veh / LOS	26.5	C		24.7	C		7.8	A		0.0		
Intersection Delay, s/veh / LOS	11.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.62	A	0.58	A	0.97	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	PM No Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2036 aNo Bld_7th Ave_PM.xus				
Project Description	2036 No Build PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	179	61			54	24	100	1871	20	0	0	0

Signal Information												
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	66.0	22.0	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	2.0	2.0	0.0	0.0	0.0	0.0				

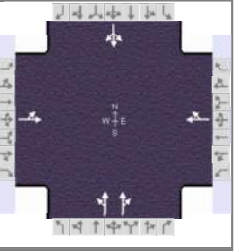
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		28.0		28.0		72.0		72.0
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.2		3.2		0.0		0.0
Queue Clearance Time (g_s), s		24.0		6.0				
Green Extension Time (g_e), s		0.0		0.6		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		1.00		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	267			87			1160			1052		
Adjusted Saturation Flow Rate (s), veh/h/ln	1149			1758			1806			1682		
Queue Service Time (g_s), s	18.0			4.0			53.8			56.8		
Cycle Queue Clearance Time (g_c), s	22.0			4.0			61.0			56.8		
Green Ratio (g/C)	0.22			0.22			0.66			0.66		
Capacity (c), veh/h	316			387			1232			1110		
Volume-to-Capacity Ratio (X)	0.845			0.224			0.942			0.948		
Back of Queue (Q), ft/ln (95 th percentile)	340			84			865			791		
Back of Queue (Q), veh/ln (95 th percentile)	13.3			3.3			33.8			30.9		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d_1), s/veh	41.5			32.0			16.1			15.4		
Incremental Delay (d_2), s/veh	23.3			1.3			15.0			17.1		
Initial Queue Delay (d_3), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	64.8			33.3			31.1			32.5		
Level of Service (LOS)	E			C			C			C		
Approach Delay, s/veh / LOS	64.8	E		33.3	C		31.7	C		0.0		
Intersection Delay, s/veh / LOS	35.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.93	A	0.63	A	2.31	B	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	The Kleingers Group			Duration, h	0.250		
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other		
Jurisdiction	Columbus	Time Period	AM Build	PHF	0.90		
Urban Street	4th Street	Analysis Year	2036	Analysis Period	1 > 7:00		
Intersection	7th Avenue	File Name	2036 Build_7th Ave_AM.xus				
Project Description	2036 Build AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	55	17			38	13	89	487	12	0	0	0

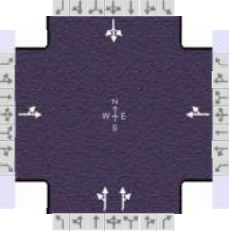
Signal Information				Signal Phases								
Cycle, s	80.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	49.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		25.0		25.0		55.0		55.0
Change Period, (Y+R _c), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.1		3.1		0.0		0.0
Queue Clearance Time (g _s), s		6.9		4.0				
Green Extension Time (g _e), s		0.2		0.2		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		0.00		0.00				

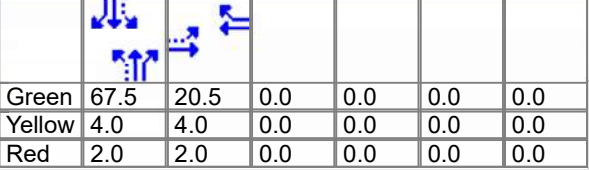
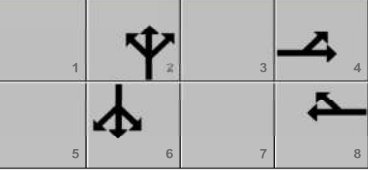
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	80			57			334			319		
Adjusted Saturation Flow Rate (s), veh/h/ln	1339			1774			1711			1676		
Queue Service Time (g _s), s	2.9			2.0			2.3			7.3		
Cycle Queue Clearance Time (g _c), s	4.9			2.0			7.0			7.3		
Green Ratio (g/C)	0.24			0.24			0.61			0.61		
Capacity (c), veh/h	397			421			1106			1027		
Volume-to-Capacity Ratio (X)	0.201			0.134			0.302			0.311		
Back of Queue (Q), ft/ln (95 th percentile)	61			41			113			110		
Back of Queue (Q), veh/ln (95 th percentile)	2.4			1.6			4.4			4.3		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d ₁), s/veh	25.4			24.0			7.3			7.4		
Incremental Delay (d ₂), s/veh	1.1			0.7			0.7			0.8		
Initial Queue Delay (d ₃), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	26.5			24.7			8.0			8.2		
Level of Service (LOS)	C			C			A			A		
Approach Delay, s/veh / LOS	26.5	C		24.7	C		8.1	A		0.0		
Intersection Delay, s/veh / LOS	11.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.62	A	0.58	A	1.03	A	0.49	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	The Kleingers Group			Duration, h	0.250	
Analyst	Dave M	Analysis Date	4/4/2024	Area Type	Other	
Jurisdiction	Columbus	Time Period	PM Build	PHF	0.90	
Urban Street	4th Street	Analysis Year	2036	Analysis Period	1 > 7:00	
Intersection	7th Avenue	File Name	2036 Build_7th Ave_PM.xus			
Project Description	2036 Build PM					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	179	61			54	24	117	1896	29	0	0	0

Signal Information											
Cycle, s	Reference Phase	Reference Point	End								
100.0	2	End									
Offset, s	0	End									
Uncoordinated	No	Simult. Gap E/W	On								
Force Mode	Fixed	Simult. Gap N/S	On								
Green	67.5	20.5	0.0								
Yellow	4.0	4.0	0.0								
Red	2.0	2.0	0.0								

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		8.0		8.0
Phase Duration, s		26.5		26.5		73.5		73.5
Change Period, ($Y+R_c$), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		3.2		3.2		0.0		0.0
Queue Clearance Time (g_s), s		22.5		6.1				
Green Extension Time (g_e), s		0.0		0.6		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		1.00		0.00				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4			8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	267			87			1190			1079		
Adjusted Saturation Flow Rate (s), veh/h/ln	1124			1758			1798			1680		
Queue Service Time (g_s), s	16.4			4.1			58.2			58.4		
Cycle Queue Clearance Time (g_c), s	20.5			4.1			63.6			58.4		
Green Ratio (g/C)	0.20			0.20			0.68			0.68		
Capacity (c), veh/h	293			360			1254			1134		
Volume-to-Capacity Ratio (X)	0.909			0.240			0.949			0.952		
Back of Queue (Q), ft/ln (95 th percentile)	366			87			884			800		
Back of Queue (Q), veh/ln (95 th percentile)	14.3			3.4			34.5			31.2		
Queue Storage Ratio (RQ) (95 th percentile)	0.00			0.00			0.00			0.00		
Uniform Delay (d_1), s/veh	42.9			33.2			15.5			14.8		
Incremental Delay (d_2), s/veh	33.7			1.6			15.8			17.4		
Initial Queue Delay (d_3), s/veh	0.0			0.0			0.0			0.0		
Control Delay (d), s/veh	76.6			34.8			31.4			32.2		
Level of Service (LOS)	E			C			C			C		
Approach Delay, s/veh / LOS	76.6	E		34.8	C		31.8	C		0.0		
Intersection Delay, s/veh / LOS	36.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	1.94	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.93	A	0.63	A	2.36	B	0.49	A