



August 21, 2020

Mr. David Aden
Town of Parker Public Works Traffic Engineer
20120 E Mainstreet
Parker, CO 80138-7734

Re: Parker and Pine Residential – SWC Pine Lane and Parker Road
Traffic Compliance Letter
Parker, Colorado

Dear Mr. Aden:

This traffic study letter has been prepared to provide a trip generation comparison to identify compliance with the original traffic impact study for the multifamily residential area to be developed as part of the Parker and Pine project in Parker, Colorado. An approximate 170 dwelling unit multifamily development is proposed within a portion of the Parker and Pine site. The proposed residential area is located in the southwest portion within the development on the southwest corner of the Pine Lane and Parker Road intersection (site plan attached). The site is currently undeveloped land. Kimley-Horn completed the “Parker and Pine Traffic Impact Study” in April 2020 which included this development area. The trip generation of this proposed residential development is compared with the trip generation for the applicable use evaluated as part of the original traffic study within the same development area. Applicable documents from the original traffic study are attached for reference.

Site Information and Trip Generation Comparison

The residential portion of the site is proposed to contain 170 multifamily dwelling units. The original Parker and Pine traffic study identified development of 175 multifamily dwelling units in the same development area. Therefore, the purpose of this letter is to summarize a comparison of the trip generation from the proposed residential uses to the originally studied residential uses in the same development area.

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*¹ published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses.

Trip generation for the original traffic study and the currently proposed land use is based on the ITE Trip Generation, 10th Edition (most current edition) fitted curve equations for Mid-Rise Multifamily Housing (ITE Land Use Code 221). The following table compares the trip generation from the original study compared to the expected trip generation for the proposed residential area of the site. The trip generation calculation sheets from the original traffic study, as well as from the current proposal are attached for reference.

¹ Institute of Transportation Engineers, *Trip Generation Manual*, Tenth Edition, Washington DC, 2017.

Trip Generation Comparison: Original Study vs. Current Proposal

Use and Size	Daily Vehicle Trips	Weekday Vehicle Trips					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Original Traffic Study							
Mid-Rise Multifamily Housing (ITE 221) – 175 Dwelling Units	952	15	44	59	46	30	76
Current Proposal							
Mid-Rise Multifamily Housing (ITE 221) – 170 Dwelling Units	926	15	43	58	45	29	74
Net Difference in Trips	-26	+0	-1	-1	-1	-1	-2

As summarized in the table, the residential area originally studied was anticipated to generate approximately 952 weekday daily trips, with 59 of these trips occurring during the morning peak hour, and 76 trips occurring during the afternoon peak hour. The currently proposed residential area of the Parker and Pine site is expected to generate 926 weekday daily trips, with 58 trips occurring during the morning peak hour, and 74 trips occurring during the afternoon peak hour according to the ITE trip equations based on number of dwelling units. The currently proposed residential area is anticipated to generate 26 fewer daily trips, with one (1) fewer trip during the morning peak hour and two (2) fewer trips during the afternoon peak hour than previously studied. Therefore, the currently proposed residential area is within the volume limits of the previous analysis and is in traffic compliance of the original traffic study.

Conclusions

Based on these results, development of 170 multifamily dwelling units within the Parker and Pine development generates less traffic than previously studied. Therefore, the proposed project is believed to be in traffic compliance with the original “Parker and Pine Traffic Impact Study” in April 2020. It is believed that all potential traffic impacts with the proposed project have been previously addressed and no further traffic analysis is needed due to this proposal. If you have any questions or require anything further, please feel free to call me at (720) 943-9962.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Jeffrey R. Planck, P.E.
Project Manager



Conceptual Site Plan

Trip Generation Calculations

Project Parker and Pine (Current Proposal)
 Subject Trip Generation for Multifamily Housing (Mid-Rise)
 Designed by JRP Date August 21, 2020 Job No. 096481002
 Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Fitted Curve Equations

Land Use Code - Multifamily Housing (Mid-Rise) (221)

Independent Variable - Dwelling Units (X)

$$X = 170$$

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Series 200 Page 74)

$\ln(T) = 0.98 \ln(X) - 0.98$	Directional Distribution:	26% ent.	74% exit.
$\ln(T) = 0.98 * \ln(170.0) - 0.98$	T = 58	Average Vehicle Trip Ends	
	15 entering	43	exiting
	15	+	43 = 58

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (Series 200 Page 75)

$\ln(T) = 0.96 \ln(X) - 0.63$	Directional Distribution:	61% ent.	39% exit.
$\ln(T) = 0.96 * \ln(170.0) - 0.63$	T = 74	Average Vehicle Trip Ends	
	45 entering	29	exiting
	45	+	29 = 74

Weekday (Series 200 Page 73)

$(T) = 5.45*(X) - 1.75$	Directional Distribution:	50% ent.	50% exit.
$(T) = 5.45 * 170 - 1.75$	T = 926	Average Vehicle Trip Ends	
	463 entering	463	exiting
	463	+	463 = 926

Peak Hour of Generator, Saturday (Series 200 Page 79)

$(T) = 0.42*(X) + 6.73$	Directional Distribution:	49% ent.	51% exit.
$(T) = 0.42 * 170 + 6.73$	T = 78	Average Vehicle Trip Ends	
	38 entering	40	exiting
	38	+	40 = 78

Original Traffic Study Documents

T R A F F I C I M P A C T S T U D Y

Parker and Pine

Parker, Colorado

Prepared for
Eisenberg Company
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April 2020

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anticipated during the weekday morning and afternoon peak hours, respectively. **Table 1** summarizes the estimated trip generation for the proposed Parker and Pine development. The trip generation worksheets are included in **Appendix D**.

Table 1 – Parker and Pine Traffic Generation

Land Use	Quantity	Daily Trips	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Total Trips								
Mid-Rise Multifamily Residential (ITE 221)	175 Units	952	15	44	59	46	30	76
Day Care Center (ITE 565)	13,000 SF	620	74	69	143	68	77	145
Shopping Center (ITE 820)	17,000 SF	642	10	6	16	31	34	65
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,414	62	59	121	51	47	98
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,414	62	59	121	51	47	98
Gas Station w/ Convenience (ITE 945)	16 Positions	3,286	102	98	200	114	110	224
Automated Car Wash (ITE 948)	5,400 SF	760	38	38	76	38	38	76
Total	-	9,088	363	373	736	399	383	782
Total Trips After Internal Capture (ITE Methodology)								
Mid-Rise Multifamily Residential (ITE 221)	175 Units	857	14	40	53	41	27	68
Day Care Center (ITE 565)	13,000 SF	558	67	62	129	61	69	131
Shopping Center (ITE 820)	17,000 SF	642	10	6	16	31	34	65
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,273	56	53	109	46	42	88
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,273	56	53	109	46	42	88
Gas Station w/ Convenience (ITE 945)	16 Positions	2,957	92	88	180	103	99	202
Automated Car Wash (ITE 948)	5,400 SF	684	34	34	68	34	34	68
Total	-	8,244	329	336	664	362	347	710
Non Pass-By Trips								
Mid-Rise Multifamily Residential (ITE 221)	175 Units	857	14	40	53	41	27	68
Day Care Center (ITE 565)	13,000 SF	558	67	62	129	61	69	131
Shopping Center (ITE 820)	17,000 SF	546	9	5	14	26	29	55
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,082	48	45	93	39	36	75
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	1,082	48	45	93	39	36	75
Gas Station w/ Convenience (ITE 945)	16 Positions	2,513	78	75	153	88	84	172
Automated Car Wash (ITE 948)	5,400 SF	684	34	34	68	34	34	68
Total	-	7,322	298	306	603	328	315	644
Pass-By Trips								
Shopping Center (ITE 820)	17,000 SF	96	0	0	0	5	5	10
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	191	8	8	16	7	6	13
Fast Food Restaurant w/ D.T. (ITE 934)	3,000 SF	191	8	8	16	7	6	13
Gas Station w/ Convenience (ITE 945)	16 Positions	444	14	13	27	15	15	30
Total	-	922	30	29	59	34	32	66

Note: ITE does not provide AM trip generation information for Automated Car Wash (ITE 948) although car washes are open in the morning. Therefore, the PM trip generation was duplicated for the AM trip generation.

Project Parker and Pine
 Subject Trip Generation for Multifamily Housing (Mid-Rise)
 Designed by JRP Date October 07, 2019 Job No. 096502001
 Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Fitted Curve Equations

Land Use Code - Multifamily Housing (Mid-Rise) (221)

Independent Variable - Dwelling Units (X)

$$X = 175$$

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Series 200 Page 74)

$\ln(T) = 0.98 \ln(X) - 0.98$	Directional Distribution:	26% ent.	74% exit.
$\ln(T) = 0.98 * \ln(175.0) - 0.98$	T = 59	Average Vehicle Trip Ends	
	15 entering	44	exiting
	15 + 44 = 59		

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (Series 200 Page 75)

$\ln(T) = 0.96 \ln(X) - 0.63$	Directional Distribution:	61% ent.	39% exit.
$\ln(T) = 0.96 * \ln(175.0) - 0.63$	T = 76	Average Vehicle Trip Ends	
	46 entering	30	exiting
	46 + 30 = 76		

Weekday (Series 200 Page 73)

$(T) = 5.45*(X) - 1.75$	Directional Distribution:	50% ent.	50% exit.
$(T) = 5.45 * 175 - 1.75$	T = 952	Average Vehicle Trip Ends	
	476 entering	476	exiting
	476 + 476 = 952		

Peak Hour of Generator, Saturday (Series 200 Page 79)

$(T) = 0.42*(X) + 6.73$	Directional Distribution:	49% ent.	51% exit.
$(T) = 0.42 * 175 + 6.73$	T = 80	Average Vehicle Trip Ends	
	39 entering	41	exiting
	39 + 41 = 80		