TurnKey Consulting, LLC
Superior Project Leadership

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Grand Junction, CO 81506

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August 1, 2024

Marlin Eckhoff, Craig/Moffat County Building Official
City of Craig
300 W. 4th St.
Craig, CO 81501

Re: Traffic Assessment
Proposed Meadow Woods Apartments (Project), 235 Mack Lane in Craig

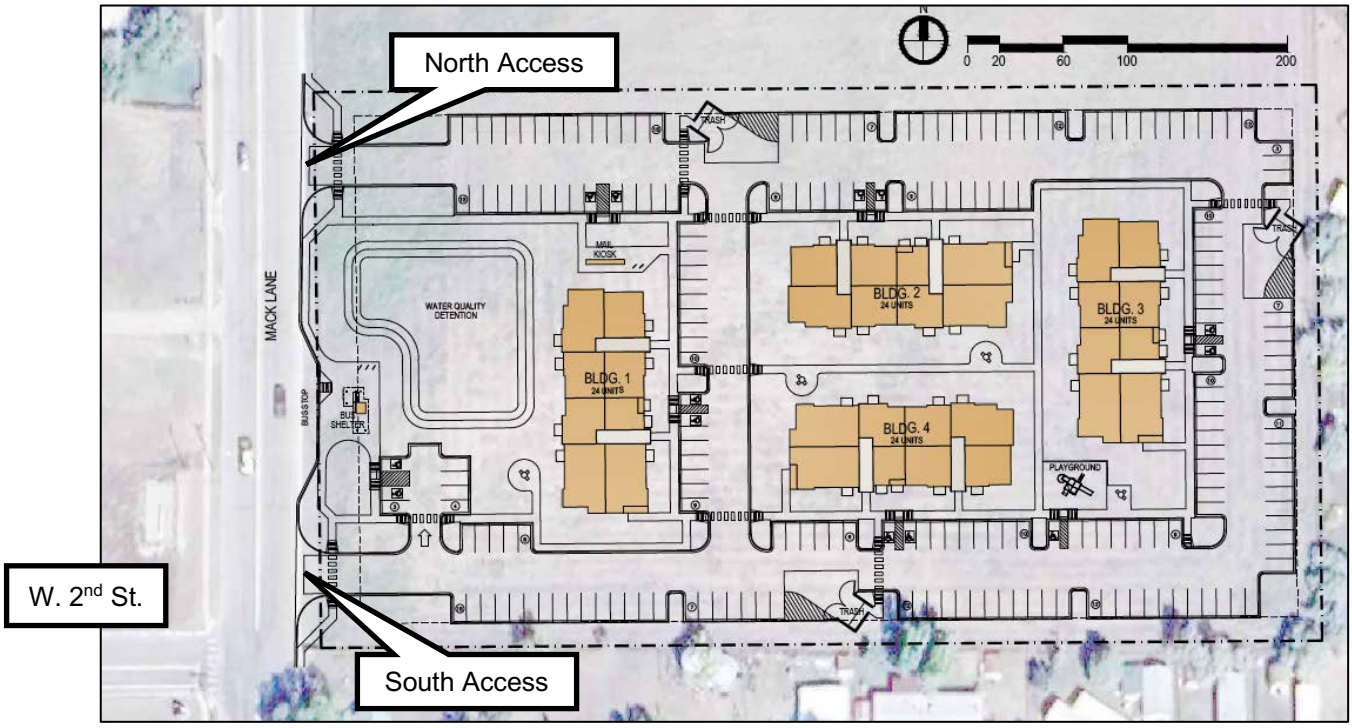
Mr. Eckhoff:

As shown on the following figure, the Project is located on the east side of Mack Ln between W. 1st St. and W. 3rd. St. The south property line aligns with W. 2nd St.

Project Location Map

As shown on the following figure, the Project would include 96 apartments and two access points on Mack Ln. A bus stop and shelter would be located on the east side of Mack Ln.

Project Site Plan Concept



Project Trip Generation Estimate

The following table shows the Project trip generation per the ITE Trip Generation Manual (11th Edition), Land Use Code 220, multi-family housing. This vehicle trip estimate is conservative because it assumes that all trips would be made by car, without consideration of vehicle trips eliminated when riding the bus. This would be considered a low-volume Project, and other jurisdictions don't require a traffic impact study when there is less than 100 trips per hour. The detailed calculations are attached.

Total Project Trip Generation (96 DU)

Peak Hour	Trip Ends Per Hour		
	In	Out	Total
AM	9	29	38
PM	31	18	49

Project Trip Distribution Assumptions & Access Turning Volumes

It was assumed that Project traffic would be split evenly at the north and south access points. These would be considered low volume access points.

Project Trip Generation at Each Access Point (48 DU)

Peak Hour	Trip Ends Per Hour		
	In	Out	Total
AM	5	14	19
PM	16	9	25

Based on the existing traffic counts by the City on typical weekdays during recreational events (attached), 37% of existing traffic travels northbound and 63% travels southbound. Each Access Point would have the following turning volumes to/from Mack Ln., assuming both access points are full movement.

AM Peak Hour

- Southbound left turn inbound = 3 vph
- Northbound right turn inbound =2 vph
- Westbound left turn outbound = 9 vph
- Westbound right turn outbound = 5 vph

PM Peak Hour

- Southbound left turn inbound = 10 vph
- Northbound right turn inbound = 6 vph
- Westbound left turn outbound = 6 vph
- Westbound right turn outbound = 3 vph

Turn Lane Evaluation at Project Access Points

As a point of reference, the lowest possible CDOT turn lane warrant volume would be 11 vph. The maximum of any inbound or outbound traffic volumes would be 10 vph. In addition, some of the through volumes in each direction are less than the CDOT turn lane waiver volumes, meaning that the turn lane wouldn't be required even if the turning volume was above 11 vph. Therefore, exclusive turn lanes would not be warranted at either Project access point. However, the City could consider restriping Mack Ln. between W. 1st St. and W. 3rd St. as a three lane roadway. This would provide refuge for left turns in and out of the access points on this segment of road.

Access Intersection Configuration Considerations

The North Access configuration as a 3-leg full movement type intersection would operate without conflicting vehicle movements from other local road intersections. However, the South Access would be offset from the alignment of W. 2nd St. This would create an "offset tee" configuration that would create a short distance of conflicts between outbound left turns from each of the access connections. An intersection turning movement count at the intersection of Mack Ln and W. 2nd St. was not available, so it wasn't possible to fully evaluate the degree of conflict.

This conflict could be eliminated by restricting outbound left turns from the South Access, which could be done with traffic signs or raised islands on Mack Ln. and/or the throat of the South Access. It would be beneficial to do this without restricting outbound left turns from W. 2nd St. This would be easier to do in combination with the 3-lane restriping of Mack Ln. because the raised island features would be in the center turn lane. Project traffic desiring to turn left onto Mack Ln. could use the North Access.

Pedestrian Considerations

The site plan concept shows a proposed sidewalk along the east side of Mack Ln., which connects to a network of sidewalks within the Project. This includes pedestrian access to the bus stop. The City could consider installing a pedestrian crosswalk across Mack lane at the W. 2nd St./South access intersection. This would be enhanced in combination with the

3-lane restriping of Mack Ln. and left turn restrictions at the South Access because raised island features in the center turn lane could act as a pedestrian refuge area. This crosswalk should have the proper signage on Mack Ln., and it could possibly have electronic signs with push-button activated flashing yellow beacons.

Sight Distance Evaluation

Mack Lane is straight and flat in the areas near the Project Access points. Per the State Highway Access Code, the required stopping sight distance at 30 mph would be 200-ft. The required entering sight distance would be 390-ft. This distance would be available at the North Access in both directions and the view to the north at the South Access. Sight distance to the south at the South Access may be limited by a wood fence along the frontage of the property to the south.

In summary:

1. The Project would be categorized as low volume, as would the traffic volumes at each access point.

2. Turn Lanes on Mack Ln. would not be necessary, but the City could consider restriping Mack Ln. between W. 1st St. and W. 3rd St. as a three lane roadway.

3. There would be some level of vehicle conflicts at the intersection of Mack Ln. & W. 2nd St./South Access. This conflict could be eliminated by restricting outbound left turns from the South Access, which could be done with traffic signs or raised islands on Mack Ln. and/or the throat of the South Access.

4. The Project would provide multi-modal connections for pedestrians and bus riders. The City could consider installing a pedestrian crosswalk across Mack lane at the W. 2nd St./South access intersection.

5. Sight distance is generally good in 3 of 4 situations. But sight distance to the south at the South Access may be limited by a wood fence along the frontage of the property to the south.

Please contact me if you have any questions about this information.

Sincerely,

Skip Hudson

Barrie “Skip” Hudson, P.E.

Attachments

- Project Trip Generation calculations
- Mack Lane Traffic Data from City

ITETripGen Web-based App

Help | Barrie Hudson | Sign out

Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use *ITETripGen*

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Project Trip Generation Calculations

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE: 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

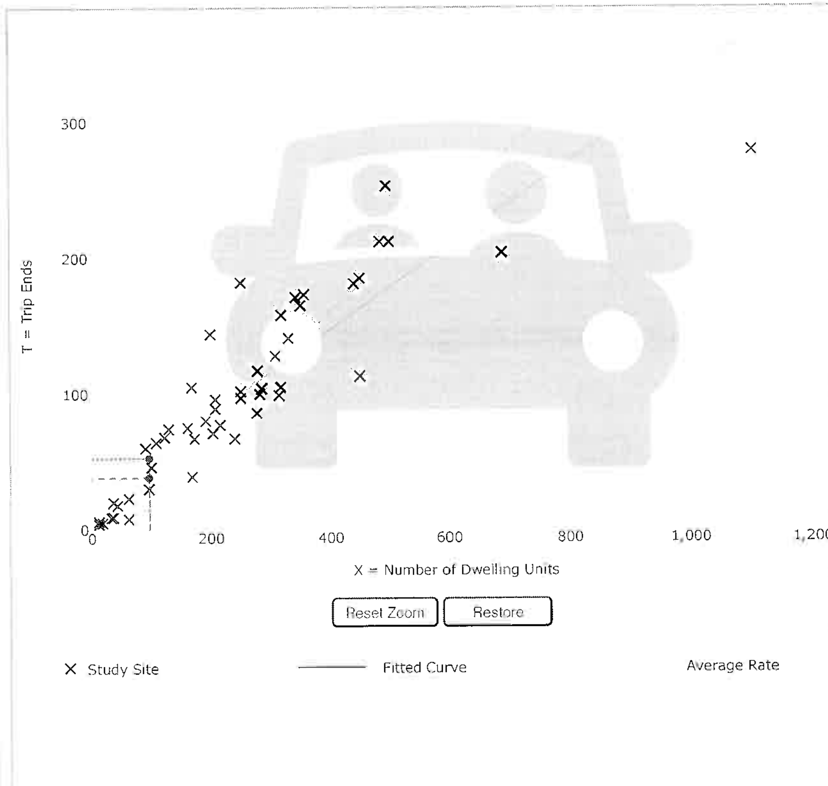
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traf

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 96 [Calculate]

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
49

Avg. Num. of Dwelling Units:
249

Average Rate:
0.40

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.12

Fitted Curve Equation:
T = 0.31(X) + 22.85

R^2:
0.79

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 38 (Total), 9 (Entry), 29 (Exit)
Fitted Curve: 53 (Total), 13 (Entry), 40 (Exit)

AM Peak

Add-ons to do more

1/2

Graph Look Up

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE: 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

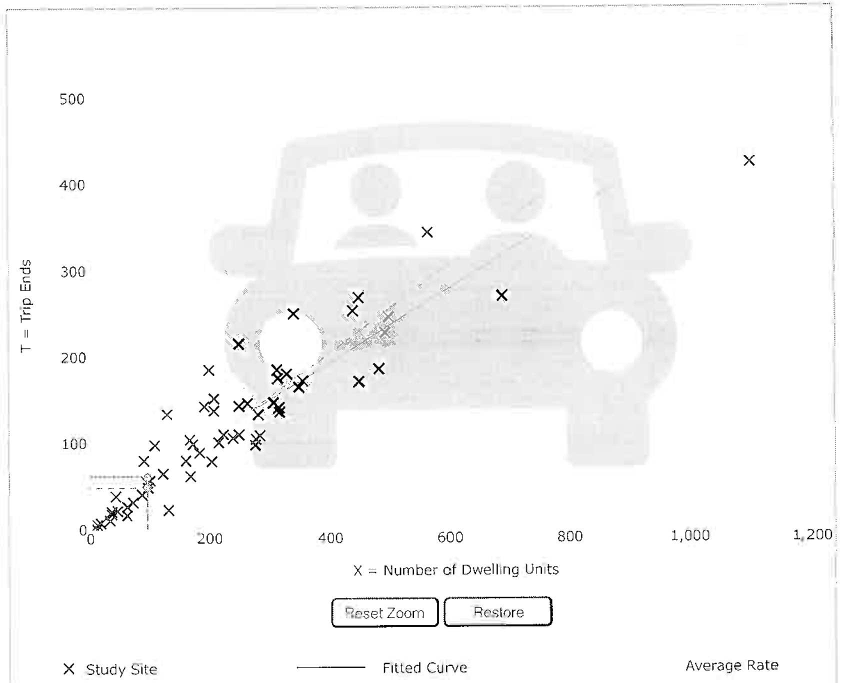
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traf

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 96 [Calculate]

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
59

Avg. Num. of Dwelling Units:
241

Average Rate:
0.51

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.15

Fitted Curve Equation:
$T = 0.43(X) + 20.55$

R^2:
0.84

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 49 (Total), 31 (Entry), 18 (Exit)
Fitted Curve: 62 (Total), 39 (Entry), 23 (Exit)

PM Peak

Add-ons to do more

2/2

Mack lane Traffic Counts

Place Currently Not Set
Traffic Summary Week

By City

Location: Mack Ln 1st St to 3rd
6/24/2024 to 6/30/2024
Exclude zero counts

Zone: Other
Travel Direction: N

Northbound

	Mon 24 Jun	Tue * 25 Jun	Wed * 26 Jun	Thu * 27 Jun	Fri 28 Jun	Sat 29 Jun	Sun 30 Jun	Weekday Average	Weekend Average
Midnight	0	1	1	3	10	4	0	3	4
1:00	0	1	2	2	3	6	0	2	6
2:00	0	2	5	1	2	2	0	2	2
3:00	0	1	0	0	3	1	0	2	1
4:00	0	10	6	13	8	3	0	9	3
5:00	0	24	24	29	23	18	0	25	18
6:00	0	53	44	41	42	39	0	45	39
7:00	0	56	63	59	59	45	0	59	45
8:00	5	67	81	69	67	67	0	57	67
9:00	65	58	76	51	72	73	0	64	73
10:00	79	64	84	74	77	77	0	75	77
11:00	84	92	77	93	86	68	0	86	68
12:00	107	102	80	119	80	64	0	97	64
13:00	86	88	89	95	86	0	0	88	0
14:00	77	89	56	116	80	0	0	83	0
15:00	83	60	63	85	88	0	0	75	0
16:00	116	109	128	158	115	0	0	125	0
17:00	144	117	171	148	132	0	0	142	0
18:00	113	111	126	147	121	0	0	123	0
19:00	105	104	159	90	91	0	0	109	0
20:00	91	82	118	71	88	0	0	90	0
21:00	54	81	65	39	80	0	0	63	0
22:00	34	28	51	29	54	0	0	39	0
23:00	12	16	17	12	26	0	0	16	0
Totals	1255	1416	1586	1544	1493	467	0	1458	467

AM Pk → 8:00

PM Pk → 17:00

* Park Activities

Mack lane Combined (Maximum Counted)

AM		PM	
SB ↓	NB ↑	SB ↓	NB ↑
121 vph	81 vph	342 vph	171 vph

Existing Trip Distribution → 60% 40% 67% 33%

use

63% ↓ 37% ↑

1/2

Place Currently Not Set
Traffic Summary Week

Location: Mack Ln 3rd to 1st SB
7/5/2024 to 7/11/2024

Zone: Other
Travel Direction: S

Southbound

	Fri 05 Jul	Sat 06 Jul	Sun 07 Jul	Mon 08 Jul	Tue * 09 Jul	Wed * 10 Jul	Thu * 11 Jul	Weekday Average	Weekend Average
Midnight	32	14	31	14	14	3	5	13	22
1:00	19	22	11	4	3	1	5	6	16
2:00	2	4	10	1	7	5	1	3	7
3:00	2	0	3	2	3	5	4	3	1
4:00	4	10	3	9	13	11	10	9	6
5:00	18	21	12	33	35	38	39	32	16
6:00	42	36	18	77	89	74	0	56	27
7:00	69	42	28	103	121	121	0	82	35
AM Pk → 8:00	69	65	39	87	86	98	0	68	52
9:00	86	70	68	90	98	97	0	74	69
10:00	89	96	70	90	123	97	0	79	83
11:00	110	117	112	101	114	149	0	94	114
12:00	156	105	109	124	133	132	0	109	107
13:00	99	104	102	123	154	111	0	97	103
14:00	124	119	96	97	101	141	0	92	107
15:00	94	107	91	163	144	96	0	99	99
16:00	139	111	110	235	246	226	0	169	110
PM Pk → 17:00	129	114	105	319	254	342	0	208	109
18:00	135	129	106	222	161	212	0	146	117
19:00	105	116	107	166	172	174	0	123	111
20:00	122	109	135	132	163	155	0	114	122
21:00	87	94	76	99	135	87	0	81	85
22:00	65	51	33	43	29	45	0	36	42
23:00	50	46	10	18	30	10	0	21	28
Totals	1847	1702	1485	2352	2428	2430	64	1824	1593

* park Activities

Place Currently Not Set
Traffic Survey Summary

Location: Mack Ln 1st St to 3rd
Start Date: 6/24/2024
End Date: 6/29/2024

Zone: Other
Start Time: 08:57:10
End Time: 12:48:14
Travel Direction: N

Speed	1 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	30 - 31	32 - 33	34 - 35	36 - 37	38 - 39	40 - 999
Volume	2241	707	796	891	932	882	588	371	186	92	43	32
% of Total	28.87%	9.1%	10.25%	11.48%	12%	11.36%	7.57%	4.78%	2.39%	1.18%	0.55%	0.41%
									Total Vehicles: 7761			

Speed Statistics		10 MPH Pace		Number Exceeding Limit				
Posted	30	Pace Speed	20 to 29	Speed	30+	40+	50+	Total
#At/Under Limit	6770	# in Pace	4208	Number	969	19	3	991
# Over Limit	991	% in Pace	54.21%	Percent	12.48%	0.24%	0.03%	12.76%
Average Speed	23.29	85% Percentile	30					

North bound

Mack Ln Speed Summary
By City

Place Currently Not Set
Traffic Survey Summary

Location: Mack Ln 3rd to 1st SB
Start Date: 6/29/2024
End Date: 7/11/2024

Zone: Other
Start Time: 14:14:29
End Time: 05:53:31
Travel Direction: S

Speed	1 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	30 - 31	32 - 33	34 - 35	36 - 37	38 - 39	40 - 999
Volume	5458	1140	1313	1575	2286	2977	3056	2482	1643	854	377	315
% of Total	23.24%	4.85%	5.59%	6.7%	9.73%	12.68%	13.01%	10.57%	6.99%	3.63%	1.6%	1.34%
									Total Vehicles: 23476			

Speed Statistics		10 MPH Pace		Number Exceeding Limit				
Posted	30	Pace Speed	25 to 34	Speed	30+	40+	50+	Total
#At/Under Limit	16339	# in Pace	12611	Number	6913	209	15	7137
# Over Limit	7137	% in Pace	53.71%	Percent	29.44%	0.89%	0.06%	30.4%
Average Speed	25.69	85% Percentile	33					

Southbound