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# TECHNICAL MEMORANDUM

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| Date: | April 9, 2021 |
| To: | Curtis & Stacy Blum, Blum Construction, LLC |
| From: | Cameron Bennett, E.I.; Nick Foster, AICP, RSP; & John Ringert P.E. |
| Project: | Blum Multifamily Development Turn Lane Analysis |
| Subject: | Traffic Analysis & Turn Lane Evaluation |

Project #: 26106


## INTRODUCTION

This memorandum summarizes the results of the traffic analysis and turn lane evaluation performed at the intersection of State Highway (SH) 55 and the proposed Blum multifamily housing development access driveway in New Meadows, Idaho. The following topics are addressed in this memorandum:

- Project description
- Existing traffic volumes
- Trip generation estimates for the proposed development
- Analysis of turn lane warrants at the access driveway intersection
- Evaluation of traffic operations at the access driveway intersection
- Conclusions

## DESCRIPTION

Blum Construction, LLC is proposing to build sixteen multifamily housing units (i.e., four fourplexes). Figure 1 shows the site vicinity and SH-55 / Driveway Access intersection. Because the project is in an early planning stage, no site plan was provided. The new development will utilize the existing driveway access onto SH-55 at the southernmost end of the site shown in Figure 1.

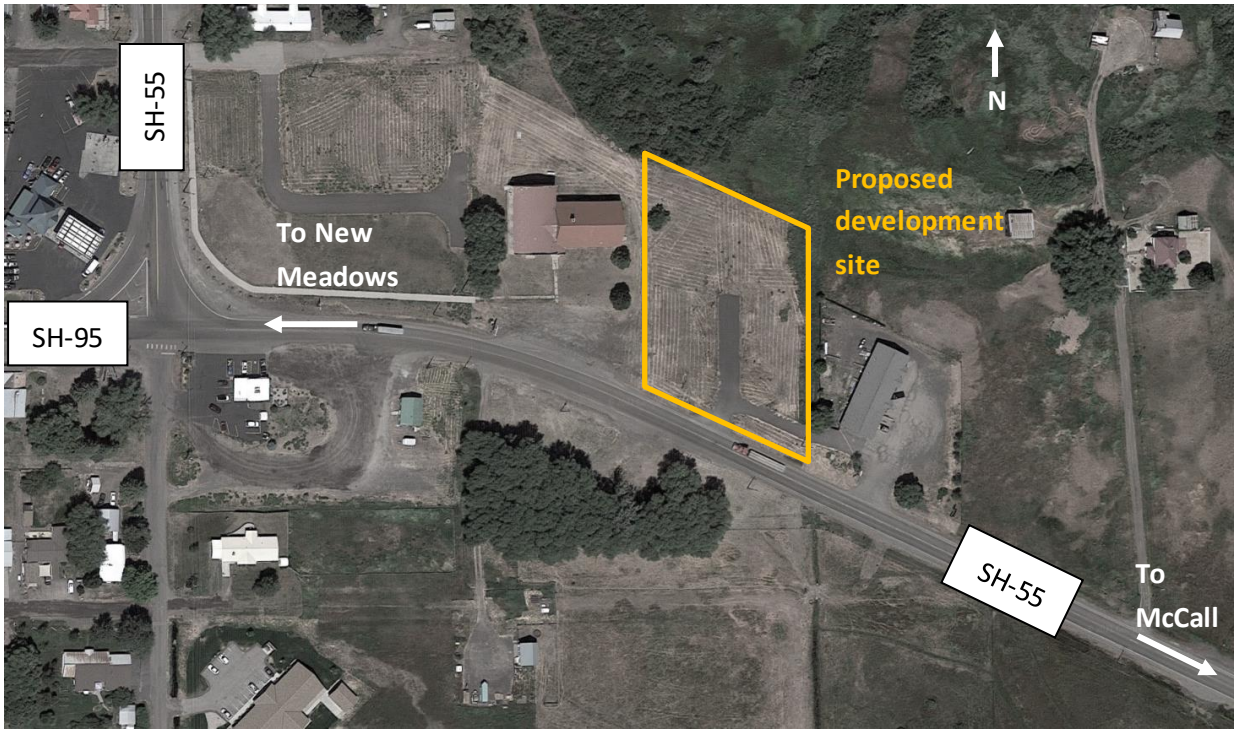


**Figure 1. Proposed Blum Development Location on SH-55**

## EXISTING CONDITIONS

Based on discussion with ITD staff, the traffic analysis focused on two weekday PM peak periods, which included:

- Thursday PM Peak Hour: mid-week PM peak hour
- Friday PM Peak Hour: weekday PM peak hour with higher through volumes on SH-55

The volumes on SH-55 from June 2019 and June 2020 were reviewed. June was chosen because it represents an average "summer" month with respect to traffic volumes on SH-55. Because year 2019 and 2020 volumes were similar, the future buildout year 2023 volumes were estimated by growing the 2020 volumes by a 2% annual growth rate.

Hourly traffic counts for the month of June were obtained for SH-55 near the project site from the ITD Packer John permanent traffic counter (ATR #244, Reference 1). Based on a conversation with ITD, it was assumed that this counter would show similar through volumes on SH-55 to those at the project site, given the lack of major access points in between the counter and the site. The counts used for the analysis represent an average of the volumes reported for each day of the week over the course of four weeks (e.g., the values utilized for this analysis represent an 'average' Thursday and 'average' Friday afternoon in June). Table 1 shows the traffic counts and estimated 2023 traffic volumes used for the analysis. *Attachment A contains the traffic counts summary sheets.*

**Table 1. Traffic Volumes on SH-55**

| Year | Thursday PM | | | Friday PM | | |
|---|---|---|---|---|---|---|
| | Total | EB | WB | Total | EB | WB |
| 2019 | 408 | 249 | 159 | 413 | 207 | 205 |
| 2020 | 405 | 242 | 163 | 410 | 227 | 182 |
| **Estimated 2023** | **422** | **252** | **170** | **425** | **236** | **189** |

# TRIP GENERATION OF THE PROPOSED DEVELOPMENT

The proposed development will be composed of low-rise multifamily housing in the form of fourplexes. The ITE Trip Generation Manual 10th Edition (Reference 2) was utilized to provide an estimate of trips entering and exiting the development during the weekday PM peak hour. The ITE Trip Generation Manual estimates that 63% of generated trips will be entering the site during the PM peak hour, while 37% will be exiting.

### *Trip Distribution*

Trip distribution was estimated based on the directionality of the counts obtained from the Packer John permanent traffic counter during non-weekend hours and a review of the location of the site with respect to New Meadows and McCall. Based on this review it was assumed that 60% of the trips would be to/from the west (towards New Meadows) and 40% to/from the east (towards McCall) on SH-55.

Table 2 shows the estimated trip generation for the proposed development.

*Attachment B contains the trip generation calculations.*

**Table 2. Estimated Trips from Blum Multifamily Housing Development**

| Fourplexes | Developed Units | PM Peak Hour Generated Trips | Trips Entering | Left-turns into the Site (EB) | Right-turns into the Site (WB) |
|---|---|---|---|---|---|
| 4 | 16 | 12 | 7 | **4** | **3** |

## Turn Lane Warrant Analysis

An analysis to determine the potential need for left-turn and right-turn lanes on SH-55 was performed for the site access intersection.

### *Eastbound Left-Turn Lane Warrant Evaluation*

For the evaluation of eastbound left-turn lane, the ITD Traffic Manual requires the use of the warrant procedure recommended in American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets (Reference 3). That procedure was developed based on a benefit-cost evaluation that considered safety and operational improvements

resulting from installation of left-turn lanes. Because the project site is located downstream of the speed reduction to 25 miles per hour as SH-55 enters New Meadows, the site was evaluated against AASHTO warrants for both rural highways and urban arterials. The warrants procedure for two-lane rural highways is shown in Figure 2.

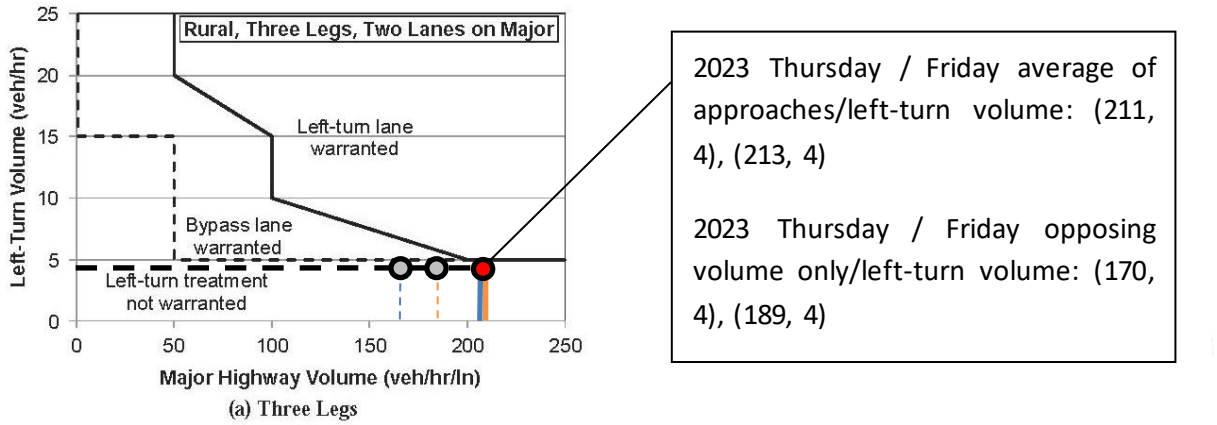


*Figure 2. Recommended left-turn treatment warrants for intersections on rural two-lane highways.*

**Figure 2. Eastbound Left-Turn Lane Warrant on SH-55, Rural AASHTO Warrant**

As shown in Figure 2, a left-turn lane is warranted for *5 or more hourly left turning vehicles* when the through volume is greater than 200 vehicles/lane/hour. Table 2 shows that there are expected to be four left-turns into the site during the weekday p.m. peak hour. Therefore, a left-turn lane into the site is not warranted.

Since the site is located in an area with a posted speed limit of 25 miles per hour (MPH), the left-turn lane warrant for intersections on arterials in urban areas found in the AASHTO Policy on Geometric Design of Highways and Streets was also evaluated. The procedure for this warrant is shown in Figure 3.

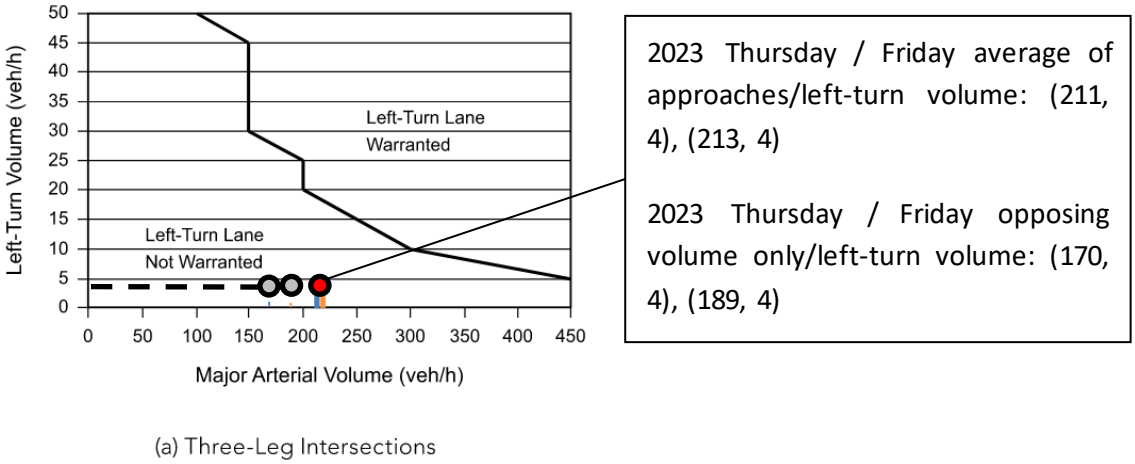


**Figure 3. Eastbound Left-Turn Lane Warrant on SH-55, Urban AASHTO Warrant**

As shown in Figure 3, a left-turn lane is warranted for 19 or more left turning vehicles at the anticipated 2023 Friday p.m. peak hour through volumes. Therefore, a left-turn lane is not warranted for the proposed development if the urban arterial warrant is used, either.

### *Westbound Right-Turn Lane Warrant Evaluation*

For the evaluation of the westbound right-turn lane, the right-turn lane warrant procedure provided in the ITD Traffic Manual was used (Reference 4). Figure 4 shows the warrant graph.

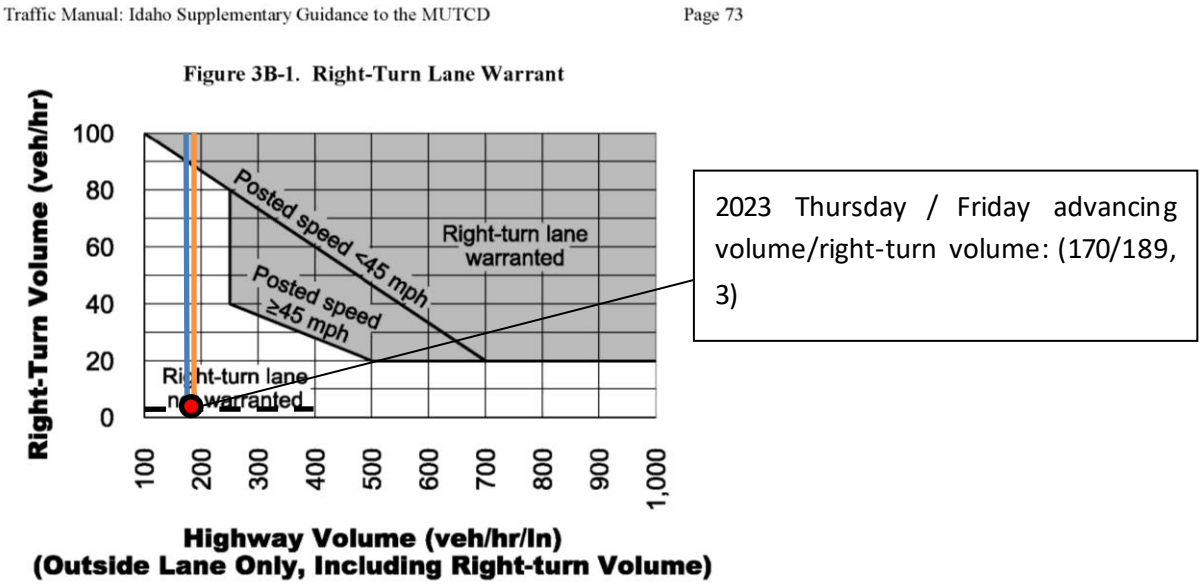


**Figure 4. Westbound Right-Turn Lane on SH-55**

As shown in Figure 4, turning volumes in excess of 80 entering vehicles would be required to warrant a right-turn lane at the site driveway with through volumes in the range of 130-190 vehicles/hour/lane. Table 2 shows that there is expected to be only three right-turns into the site during the weekday p.m. peak hour. Therefore, a right-turn lane is not warranted.

## PEAK HOUR TRAFFIC OPERATIONS

The level of service (LOS) analyses for the unsignalized intersections described in this memorandum were performed in accordance with the procedures outlined in the Highway Capacity Manual 6th Edition (Reference 5), using Synchro 10 to implement the Highway Capacity Manual 6th methodology.

ITD District 3 requires intersections operate at LOS D or better with a maximum volume-to-capacity ratio of 0.90 for the overall intersection and for each lane group.

Table 3 summarizes the existing conditions level of service analysis results for the SH-55 / Blum Development Access intersection under the future year 2023 June conditions.

*Attachment B contains the level of service worksheets.*

**Table 3. SH-55 / Blum Development Access 2023 Projected LOS Conditions**

| Time Period | Lane Group | Lane Group | | |
|---|---|---|---|---|
| | | V/C | LOS | Delay (s) |
| Thursday PM Peak Hour | EBLT | 0.00 | A | 7.6 |
| | SBLR | 0.01 | B | 10.2 |
| Friday PM Peak Hour | EBLT | 0.00 | A | 7.7 |
| | SBLR | 0.01 | B | 10.3 |

As shown in Table 3, the SH-55 / Blum Development Access intersection is projected to operate acceptably during the weekday and Friday PM peak hours.

## CONCLUSION

The site access to the proposed Blum Multifamily Housing Development is projected operate acceptably in its current configuration. Turn lane warrants are not projected to be met for the development of four fourplexes (i.e., 16 total units).

# REFERENCES

1. Idaho Transportation Department, Automatic Traffic Recorder #244, 2019 & 2020 Monthly Average Hourly Traffic Reports, https://apps.itd.idaho.gov/apps/roadwaydata/counters/244/index.html
2. Institute of Transportation Engineers, Trip Generation Manual, 10th Edition.
3. American Association of State Highway and Transportation Officials, Policy on Geometric Design of Highways and Streets, September 2018.
4. Idaho Department of Transportation, Traffic Manual: Idaho Supplementary Guidance to the MUTCD, December 2016.
5. Transportation Research Board. Highway Capacity Manual 6th Edition. 2016.

Attachment A Traffic Count Data

# Attachment B  Level-of-Service Worksheets