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Engineers, Surveyors, Planners, Scientists

May 12, 2022

Mr. Michael A. Love, P.E.
Deputy Development Engineer
Delaware County Engineer's Office
50 Channing Street
Delaware, Ohio 43015

Subject: The Courtyards at Big Walnut - Traffic Access Study

Mr. Love,

This report has been prepared for the Delaware County Engineer's Office to review as a summary of traffic access study methodologies and results associated with the development referenced above. The scope of this study was approved on April 22, 2022 as attached.

Study Area and Proposed Development

The Courtyards at Big Walnut consists of 95 detached home sites in the northwest quadrant of the State Route 3 (N State Street)/Big Walnut Road intersection in Genoa Township, Delaware County, Ohio. While designed for senior-adult buyers, land use category 210 "Single Family Detached Housing" provided by the Trip Generation Manual 11th edition (Institute of Transportation Engineers, 2021) is utilized for analysis. The Study Area is limited to one access point on Big Walnut Road. The site location is shown in **Figure 1** and a site exhibit is attached.

Figure 1: Location Map

Existing Conditions

Big Walnut Road is an east-west, 2-lane roadway signed at 45 miles per hour speed limit within Genoa Township. It is classified as a major arterial roadway.

Data Collection
Background traffic volumes were determined from ODOT certified traffic prepared for the I-71/Big Walnut Road IJS (DEL-71-3.55). Additional ADT data was obtained from ODOT TIMS. ODOT shows a current (2021) ADT of 6,280 vpd. Assuming a 2023 opening year/2033 design year and applying growth linearly from 2021 to 2033 suggests a 2033 ADT of 12,370 vpd. Applying the provided "K" and "D" factors produces 2033 PM Design Hourly Volumes of 694 vehicles per hour (vph) eastbound and 544 vph westbound in front of the proposed site. EMH&T performed a single weekday turning movement count at the intersection of Big Walnut Road and Satinwood Drive/Ketterington Lane on April 25th, 2022. The purpose of this count was to determine the peak hour directional distribution of traffic from a similar development.

Trip Generation and Assignment
This study estimated new trips generated by the development according to the data and procedures contained in the Trip Generation Manual, 11th ed. (Institute of Transportation Engineers, 2021). EMH&T used Land Use Code 210 (detached single family) to comply with the Delaware County Engineer Office's requirements and calculate vehicle trips generated by the development. The summary of trip generation is shown in **Table 1**. Peak hour trips were assigned to the existing street system according to the traffic distribution observed during the count program.

Table 1: Trip Generation for Courtyards at Big Walnut

Land Use	Square Feet or Units	ITE Code	Time Period	ITE Formula	Total Trips	Trips Entering	Trips Exiting
Single Family - Detached	95 units	210	ADT	$Ln(T)=0.92Ln(x)+2.68$	964	482	482
			AM Peak	$Ln(T)=0.91Ln(x)+0.12$	72	18	54
			PM Peak	$Ln(T)=0.94Ln(x)+0.27$	96	60	36

Traffic Projections
Future traffic volumes were projected to the opening year (2023) and the horizon year (2033) conditions using linear growth rates determined from ODOT projected values. These background traffic elements are collectively referred to as background traffic volumes. Site development traffic with projected background traffic volumes were added to determine future build traffic volumes. The traffic volume calculation plates are attached.

Traffic Analyses

Turn Lane Warrants
EMH&T evaluated right turn lane warrants at the proposed site access point. The turn lane evaluation complies with the guidelines set forth in the Location and Design Manual § 400 (Ohio Department of Transportation). The results of the analysis show that forecasted traffic conditions do warrant a westbound right turn lane at the proposed site access point. The turn lane warrant graphs are attached for reference.

A left turn lane is required based on the classification of Big Walnut Road as a major arterial roadway in the Delaware County Thoroughfare Plan and the existing legal speed limit over 40 mph. Therefore, a left turn lane warrant analysis is not relevant.

Turn Lane Lengths
Turn lane length calculation is in accordance with the guidelines set forth in the Location and Design Manual § 401 (Ohio Department of Transportation). The warranted westbound right turn lane at Big Walnut Road and the proposed, east-most site access point is calculated at 175 feet based on design speed and anticipated traffic volumes.

Due to proximity to existing three-lane portions of Big Walnut Road at Satinwood Drive/Ketterington Lane and at SR 3, the left turn improvement associated with this development will result in a consistent 3 lane pavement width with a two-way-left-turn-lane. Modifications will start at the east end of the existing dedicated left turn lane at Satinwood Drive/Ketterington Lane and end at the west end of the existing dedicated left turn lane approaching SR 3. Accordingly, turn lane length calculations are not required for the left turn movement at the proposed site access because the area will be marked as a two-way-left-turn-lane. Signing and pavement markings should be updated according to Delaware County Engineer's standards.

Conclusions and Recommendations

Turn lane warrant analysis shows that one, 175-foot (including a 50-foot diverging taper), westbound right turn lane is required on Big Walnut Road at the site access drive. Additionally, a two-way-left-turn-lane from the east end of the existing dedicated left turn lane at Satinwood Drive/Ketterington Lane to the west end of the existing dedicated left turn lane approaching SR 3 is required. No other roadway improvements are recommended.

If you have questions during your review of this matter, please feel free to contact me at (614) 775-4643 at your convenience.

Sincerely,

Charles Wu

Charles Wu, PE
Senior Traffic Engineer

Attachments: TAS scope, Site plan, ODOT certified traffic, 2021 ADT, Traffic count data, Traffic Volume calculations, Turn lane warrant analysis, and Turn lane length calculations