

Mr. Matt Oates, P.E.  
Director, Engineering  
Benderson Development  
570 Delaware Avenue  
Buffalo, New York 14202

July 30, 2021

**RE: Proposed Mixed-Use Project, 4548-4564 Main Street, Town of Amherst, NY**  
Traffic Engineering Assessment Letter

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Dear Mr. Oates:

The purpose of this technical letter is to provide a traffic engineering assessment related to the proposed mixed-use project located at 4548-4564 Main Street in the Town of Amherst, NY for informational purposes and to understand the possible traffic impacts resulting from the proposed project. The concept site plan, figures, and supporting data are included in the attachments. This letter evaluates:

- Projected trip generation estimates and discusses the thresholds for completing a Traffic Impact Study (TIS).
- Southbound queuing on Fruehauf Avenue during the AM and PM peak periods.
- Sight line evaluation at the Main Street/Fruehauf Avenue intersection.

### **PROJECT DESCRIPTION**

The proposed project consists of developing 57 units of one and two-bedroom apartment units, a  $\pm 3,628$  square foot (SF) quality restaurant, and a  $\pm 3,137$  SF fast casual restaurant in a three-story building. Access is provided via two full access driveways: one along Chateau Terrace which accesses a parking lot with 50 spaces and one along Fruehauf Avenue which accesses a parking lot with 20 spaces. Chateau Terrace is posted as a “No Outlet” street while Fruehauf Avenue is posted as a “Dead End” street. On-street parking is available along Main Street. Sidewalks are present throughout the adjacent neighborhood.

### **TRIP GENERATION**

Data contained in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10<sup>th</sup> Edition) was used to project the volume of the traffic generated by the proposed project. Data published by the ITE is the nationally accepted standard for generating trips for new uses. Given the functional characteristics of the corridors and the land uses proposed for the site, the peak hours selected for analysis are the weekday morning (AM) and weekday evening (PM) peak periods. The combination of site traffic and adjacent street traffic produces the greatest demand during these peak periods.

The proposed project as depicted on the site plan consists of two different land uses (residential and restaurant) and is considered mixed-use (multi-use). According to the Institute of Transportation Engineers Trip Generation Handbook (3<sup>rd</sup> Edition), “...a multi-use development is typically a single real-estate project that consists of two or more ITE land use classifications between which trips can be made without using the off-site road system. Because of the nature of these land uses, the trip-making

characteristics are interrelated, and some trips are made among the on-site uses. This capture of trips internal to the site has the net effect of reducing vehicle trip generation between the overall development site and the external street system (compared to the total number of trips generated by comparable, standalone sites).” “In some multi-use developments, these internal trips can be made by walking or by vehicles entirely on internal pathways or internal roadways without using streets external to the site.”

The Handbook indicates internal capture rates for trips within a multi-use development to vary between residential, office, retail, restaurant, and entertainment and recreational uses during the AM and PM peak hours. Given the proposed land use components and interconnection between these components, multi-use total volume trips will likely occur.

Methodology contained in National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Development was consulted to perform the mixed-use adjustment. The NCHRP 684 model reported an internal baseline capture percentage of 0% during the AM peak hour and 10% during the PM peak hour.

These multi-use trip projection adjustments were applied to the respective site generated trips and subtracted from the traffic entering and exiting the site during the PM peak period. The internal capture calculation considers baseline mode shares and vehicle occupancy factors for the proposed land uses, as described in the Handbook.

For certain types of developments, the total number of trips generated is different from the amount of new traffic added to the adjacent highway network by the generator. Service/retail-oriented developments (i.e., shopping centers, gas stations, coffee/donut shops, and restaurants) often locate adjacent to busy streets to attract the motorists already passing the site on the adjacent street. These sites attract a portion of their trips from traffic passing the site. The “pass-by” traffic refers to the amount of existing traffic already on the roadway adjacent to the site that, as it “passes by” the site, will enter the site driveways to patronize the project site. The quantifying of “pass-by” trips has the net result of reducing the volume of new traffic that is added to the site driveways and/or adjacent roadways.

This site is likely to exhibit some level of pass-by traffic. The ITE Trip Generation Handbook (3<sup>rd</sup> Edition) was used as a reference to determine pass-by rates. For quality restaurants, the ITE data reports a range of rates during the PM peak period from 26% to 82% with an average pass-by rate of 44%. No data is available for the AM peak period. To remain conservative, this study used a 20% pass-by rate during the PM peak period.

The ITE does not have data for fast casual restaurants. Therefore, fast food restaurants with drive-thru was considered a comparable use. The ITE data reports a range of rates during the PM peak period from 25% to 71% with an average pass-by rate of 50%. To remain conservative, this study used a 20% pass-by rate during the PM peak period.

Table 1 shows the total site generated trips for the peak hours of study with the pass-by trip adjustment.

**TABLE 1: SITE GENERATED TRIPS AND ADJUSTMENTS**

DESCRIPTION	ITE LUC	SIZE	AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multi-family Residential	220	57 units	6	22	23	13
Quality Restaurant	931	±3,628 SF	1	1	19	9
Fast Casual Restaurant	930	±3,137 SF	4	2	24	20
<b>Sub-Total Trips</b>			<b>11</b>	<b>25</b>	<b>66</b>	<b>42</b>
<i>Mixed-Use Adjustment</i>			0	0	-5	-5
<b>Sub-Total Driveway Trips</b>			<b>11</b>	<b>25</b>	<b>61</b>	<b>37</b>
<i>Pass-by Adjustment</i>			0	0	-9	-6
<b>Total Primary (New) Vehicle Trips</b>			<b>11</b>	<b>25</b>	<b>52</b>	<b>31</b>

Note:

1. ITE LUC = ITE Land Use Code.

Prior to considering mixed-use and pass-by adjustments, the proposed project is expected to generate 11 entering/25 exiting vehicle trips during the AM peak hour and 66 entering/42 exiting vehicle trips during the PM peak hour. When considering ITE published mixed-use and pass-by trip rates and our professional judgement, the proposed project is expected to generate the following new vehicle trips: 11 entering/25 exiting vehicle trips during the AM peak hour and 52 entering/31 exiting vehicle trips during the PM peak hour.

**TRIP DISTRIBUTION**

The cumulative effect of site-generated traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the driveways serving the site. The proposed arrival/departure distribution of traffic generated by the proposed project is considered a function of several parameters, including:

- Commercial/employment and residential centers in the area using US Census Data (e.g., OnTheMap).
- Site access locations.
- Hourly traffic patterns using most recent available Annual Average Daily Traffic (AADT) data obtained from the New York State Department of Transportation (NYSDOT) along Main Street.
- Turning movement counts using the most recent available data obtained from the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) at the intersections of Main Street/Chateau Terrace/Bernhardt Drive and Main Street/Lamarck Drive/Livingston Parkway.
- Existing traffic controls.

Figure 1 shows the anticipated trip distribution pattern percentages for the traffic from the proposed project for the residential program while Figure 2 illustrates the trip distribution for the restaurant program. Figure 3 illustrates the residential peak hour site generated traffic based on the percentages in Figure 1. Figures 4-5 illustrate the restaurant peak hour site generated traffic based on the percentages in Figure 2 for the project’s primary and pass-by trips, respectively. Figure 6 illustrates the total site generated trips. The roads anticipated to be used by the additional trips generated by the proposed project are listed in Table 2.

To remain conservative, all site generated traffic was assumed to enter and exit the site via the proposed driveways along Fruehauf Avenue and Chateau Terrace. A portion of site visitors may use available on-street parking along Main Street (notably the restaurant patrons); thus, reducing the projected number of vehicle trips entering and exiting Fruehauf Avenue and Chateau Terrace.

TABLE 2: EXISTING HIGHWAY SYSTEM

ROADWAY <sup>1</sup>	CLASS <sup>2</sup>	AGENCY <sup>3</sup>	SPEED LIMIT <sup>4</sup>	# OF TRAVEL LANES <sup>5</sup>	TRAVEL PATTERN	EST. AADT <sup>6</sup> & SOURCE <sup>7</sup>
Main Street (NY-5)	14	NYS DOT	40	4	Two-way/ East-West	21,436 NYSDOT (2019)
Chateau Terrace	19	Town	30	2	Two-way/ North-South	No Data Available
Fruehauf Avenue	19	Town	30	2	Two-way/ North-South	No Data Available

**Notes:**

1. Route Name and Number.
2. State Functional Classification of Roadway: 14 = Urban Principal Arterial, 19 = Local.
3. Jurisdictional Agency of Roadway.
4. Posted or Statewide Limit in Miles per Hour (mph).
5. Excludes turning/auxiliary lanes developed at intersections.
6. Estimated AADT in Vehicles per Day (vpd).
7. AADT Source (Year).

**THRESHOLDS FOR THE REQUIREMENT OF A TRAFFIC IMPACT STUDY**

Many reviewing agencies, including the NYSDOT and Erie County Department of Public Works (ECDPW), use a guideline in determining whether a project warrants the preparation of a Traffic Impact Study (TIS). The applicable guideline is that if a proposed project is projected to add 100 or more site generated vehicles per hour (vph) to an adjacent intersection during either peak study period, then that intersection should be studied for potential traffic impacts.

Based upon the ITE trip generation projections and the resulting traffic assignment estimates shown in Figure 6, the projected new vehicle trips are added to the following intersections during the AM and PM peak hours:

- Main Street/Chateau Terrace/Bernhardt Drive: 29 (58)
- Main Street/Fruehauf Drive: 23 (83)
- Fruehauf Drive/Proposed Driveway: 14 (80)
- Chateau Terrace/Proposed Driveway: 22 (33)

Given that fewer than 85 peak hour trips are added to a single intersection during the peak hours studied, a TIS is not warranted.

**PEAK HOUR QUEUING ASSESSMENT**

A peak hour queuing assessment was performed along Fruehauf Avenue during the AM and PM peak hours to measure the frequency of southbound vehicles that block the proposed driveway. The centerline of the proposed driveway is located approximately 38 feet from the stop bar. Given this distance, the driveway is located approximately 1.7 vehicle lengths from the stop bar.

Our firm documented southbound queues at the intersection of Main Street/Fruehauf Avenue on Thursday, July 22, 2021, from 7:00-9:00 AM and 4:00-6:00 PM. The peak hours generally occurred from 8:00-9:00 AM and 4:30-5:30 PM. Based on this field investigation during the peak hours of study, the proposed driveway location was blocked once during the AM peak hour for a duration of five seconds and was blocked once during the PM peak hour for a duration of three seconds.

### SIGHT LINE EVALUATION

Based upon a review of the attached site plan, the proposed building is projected to be built in approximately the same footprint as the existing structures fronting Main Street. There is a marked stop bar for traffic exiting Fruehauf Avenue.

In this case, the primary concern is with the proposed building at the existing Main Street/Fruehauf Avenue intersection. The attached figure illustrates the sight line evaluation performed at the intersection to the east of the intersection.

Sight distance is provided at intersections to allow drivers to perceive the presence of potentially conflicting vehicles. This should occur in sufficient time for a motorist to stop or adjust their speed, as appropriate, to avoid a collision at the intersection. Sight distance is also provided at intersections to allow the drivers of stopped vehicles a sufficient view of the intersecting highway to anticipate and avoid potential incidents. If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions.

A Policy on Geometric Design of Highways and Streets (2011) published by the American Association of State Highway and Transportation Officials (AASHTO), was used as a reference to establish the required Stopping Sight Distance (SSD) and desirable Intersection Sight Distance (ISD) for the adjacent driveway location. Table 3 depicts the results of the sight distance evaluation at the Main Street/Fruehauf Avenue intersection.

TABLE 3: SIGHT LINE EVALUATION

DESCRIPTION	VALUE
POSTED SPEED	40 MPH
DESIGN SPEED <sup>1</sup>	45 MPH
REQUIRED SSD	360 feet
DESIRABLE ISD	500 feet
AVAILABLE SIGHT DISTANCE TO THE EAST	SSD >360 feet ISD 385 feet (no vehicles) 145 feet (parked vehicles)

Note:

1. Design speed equals posted speed plus 5 MPH.

The required SSD is satisfied to the east of the study intersection. However, the desirable ISD is not satisfied. The existing and proposed ISD sight distance will be the same and the proposed building will not impact the existing sight distance.

It is noted that the intersection is in an urbanized area with numerous side roads where drivers expect traffic to be entering and exiting. Further, the intersection is located downstream of the signalized intersection of Main Street/Chateau Terrace/Bernhardt Drive and motorists turning out of Fruehauf Avenue will be afforded gap opportunities when the Main Street approaches are in the red phase. As this distance is not satisfied, potential relief consists of installing intersection warning signage for westbound traffic.

## CONCLUSIONS AND RECOMMENDATIONS

The following sets forth the findings and recommendations of this assessment:

1. When considering ITE published mixed-use and pass-by trip rates and our professional judgement, the proposed project is expected to generate the following new vehicle trips: 11 entering/25 exiting vehicle trips during the AM peak hour and 52 entering/31 exiting vehicle trips during the PM peak hour.
2. Given the projected site traffic distribution, it is our firm's professional opinion that the adjacent intersections and surrounding roadway network will not experience significant adverse traffic impacts. Given these conditions, no further study is warranted nor recommended at this time.
3. Based upon documentation of southbound queues at the intersection of Main Street/Fruehauf Avenue during the peak hours of study, the proposed driveway location was blocked once during the AM peak hour for a duration of five seconds and was blocked once during the PM peak hour for a duration of three seconds.
4. Based upon a sight line evaluation at the Main Street/Fruehauf Avenue intersection, the required SSD is satisfied to the east. However, the desirable ISD is not satisfied. The existing and proposed ISD sight distance will be the same and the proposed building will not impact the existing sight distance. As this distance is not satisfied, potential relief consists of installing intersection warning signage for westbound traffic.

If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,  
SRF Associates, D.P.C.



David Kruse, AICP, PTP  
Transportation Planner

Attachments