



Ref.: 19046

November 1, 2020

Mr. Anthony Guba  
A.L. Prime Energy Consultant, Inc.  
18 Lark Avenue  
Saugus, MA 01906

Reg.: Response to October 7, 2020 Planning Board Comments  
Gas Station Development, 23 Central Street, Byfield, MA

Dear Tony:

***Ron Müller & Associates*** (RMA) has prepared this letter to respond to the traffic-related comments made at the October 7, 2020 Byfield Planning Board hearing by both board members and the general public. The comments generally revolved around the following issues:

- The timing of the traffic counts and study
- Speeds along Central Street
- The location of the proposed access driveway and ability to accommodate traffic
- General safety of the road and impacts on school children

While the traffic study is dated March 11, 2020, all traffic counts conducted for the study were collected in November 2019, well before the current coronavirus pandemic. These counts were further upwardly adjusted by 4 percent to reflect annual average-month conditions, consistent with state requirements for traffic impact studies. At the request of the town's peer review consultant, Stantec Consulting Services, Inc. (Stantec), additional counts were collected in September 2020 at the Fruit Street and Central Court intersections with Central Street. These counts were compared with the November 2019 volumes collected for the original study and were upwardly adjusted to again reflect pre-coronavirus conditions. Accordingly, the traffic counts evaluated for this project reflect normal traffic conditions on Central Street with all area schools in session.

Capacity analyses were performed at the Central Street intersections with Fruit Street, Central Court, and the proposed site driveways both with and without the proposed gas station

development. The analyses assumed a distribution of traffic as recommended by Stantec with the majority of traffic to/from I-95. However, the analysis also assumed that local traffic along Central Street would access the site, such as high school students that may wish to get a cup of coffee prior to school start. The results of the capacity analyses indicate that acceptable traffic operations will be maintained along Central Street and at all nearby intersecting streets with the addition of the gas station project and the proposed roadway improvements. Stantec has confirmed these conclusions.

Comments were made by the public that vehicle speeds along Central Street are excessive and could lead to safety concerns with the increase in traffic. Vehicle speeds were recorded in November 2019 on Central Street adjacent to the site and were documented in our March 2020 study. These speed studies indicate that actual (85<sup>th</sup> percentile) speeds on Central Street are consistent with the posted speed limit of 35 mph and average speeds are in fact lower at approximately 30 mph. The higher of the observed speeds were used in all sight distance calculations, which indicated that safe operation of the new driveways can be achieved.

The site driveways to the gas station development have been redesigned based on comments from the peer review consultant. This included narrowing the driveways and making the easterly driveway entrance-only and the westerly driveway exit-only. These changes minimize turning movement conflicts along Central Street and in particular at the Central Court intersection. Comments were made by the Planning Board that the use of the enter- and exit-only driveways needs to be better defined and we concur that “Exit Only” signs should be installed at the exit driveway facing the street and “Do Not Enter” signs should be installed on the entrance drive facing into the site. These signs should be in addition to the stop line and arrow pavement markings already shown on the site plan.

In addition and again based on the recommendations from the peer review consultant, Central Street will be widened and restriped to allow eastbound through traffic to bypass any vehicles that may need to wait for a gap in traffic to make a left turn into the station. This will allow a minimum 17-foot wide eastbound travel width (centerline to curb) from Fruit Street to the entrance drive that could accommodate up to 8 vehicles in queue. Based on analysis of projected operating conditions, the expected maximum queue of left-turning vehicles during peak traffic hours is 2 vehicles.

The widening will also create 4-foot wide shoulders that can be used by bicyclists to more safely navigate the road and the Central Court intersection will be realigned to create a 90-degree intersection with Central Street. This realignment will push the Central Court intersection further away from the horizontal and vertical curvature of Central Street to the east and thereby improve sight lines from Central Court that have been mentioned by residents as a concern. These improvements and the increase in traffic due to the gas station do not in any way impact the school bus stop adjacent to Central Court. It is state law that all traffic in both directions has to stop when school buses pick up or drop off school children. This condition will not change with this project.

Finally, to assess if there are currently any safety issues along Central Street within the study area, crash data for the study area intersections were obtained from the Massachusetts Department of Transportation (MassDOT) for the period between 2013 and 2017, the latest five years of available data. A summary of the MassDOT crash data at the study area intersections is provided in Table 1. In addition to the summary, crash occurrence should also be compared to the volume of traffic through a particular intersection to determine any significance. Accordingly, a crash rate was calculated for each intersection and compared with the statewide and district-wide averages.

An intersection crash rate is a measure of the frequency of crashes compared to the volume of traffic through an intersection and is presented in crashes per million entering vehicles (crashes/MEV). For unsignalized intersections, both the statewide average crash rate and the district-wide (MassDOT District 4) crash rate is 0.57 crashes/MEV. A comparison of the calculated crash rate to the statewide and district-wide averages can be used to establish the significance of crash occurrence and whether or not potential safety problems exist. The crash rate worksheets are attached to this letter.

**Table 1**  
**Crash Summary**

| Location                  | Number of Crashes |            |                         | Severity <sup>a</sup> |    |   | Crash Type <sup>b</sup> |    |    |    |    |    | % During Wet/Icy Conditions |
|---------------------------|-------------------|------------|-------------------------|-----------------------|----|---|-------------------------|----|----|----|----|----|-----------------------------|
|                           | Total             | Avg./ Year | Crash Rate <sup>c</sup> | PD                    | PI | F | CM                      | RE | SW | HO | SV | RR |                             |
| Central St. at Fruit St.  | 4                 | 0.80       | 0.27                    | 4                     | 0  | 0 | 1                       | 0  | 2  | 0  | 1  | 0  | 50%                         |
| Central St. at Central Ct | 1                 | 0.20       | 0.07                    | 1                     | 0  | 0 | 0                       | 1  | 0  | 0  | 0  | 0  | 0%                          |

Source: MassDOT Traffic Operations Safety Management System – 2013 through 2017 data.

<sup>a</sup> PD = property damage only; PI = personal injury; F = fatality.

<sup>b</sup> CM = cross movement/angle; RE = rear end; SW = sideswipe; HO = head-on; SV = single vehicle; RR = rear-to-rear.

<sup>c</sup> Measured in crashes per million entering vehicles.

As shown in Table 1, the intersection of Central Street at Fruit Street had an average of less than one crash per year and a crash rate of 0.27 crashes/MEV over the five-year analysis period. Of the four total collisions, none involved injuries. One of the crashes was a cross movement/angle collision, two crashes were sideswipe type collisions and the fourth crash was a single vehicle crash. Half of the crashes occurred under wet or icy/snowy roadway conditions. At the intersection of Central Street at Central Court, only one crash was reported over the 5-year period and that one crash was a rear-end type collision that did not involve any injuries.

The calculated crash rates both of the study area intersections are far lower than both the statewide and district-wide averages for unsignalized intersections, which is 0.57 crashes/MEV. In addition,

the study intersections are not listed as a Highway Safety Improvement Program (HSIP) High Crash Clusters, indicating that the intersections do not fall within the top 5 percent of High Crash Locations within the regional planning commission area.

We hope the above adequately address the comments made at the October 7<sup>th</sup> Planning Board meeting. Please feel free to contact me or Kirsten Braun (774-573-3727) if you have any questions.

Sincerely,

***Ron Müller & Associates***

A handwritten signature in black ink, appearing to read 'Ronald Müller', written in a cursive style.

Ronald Müller, P.E.  
Principal

Attachments

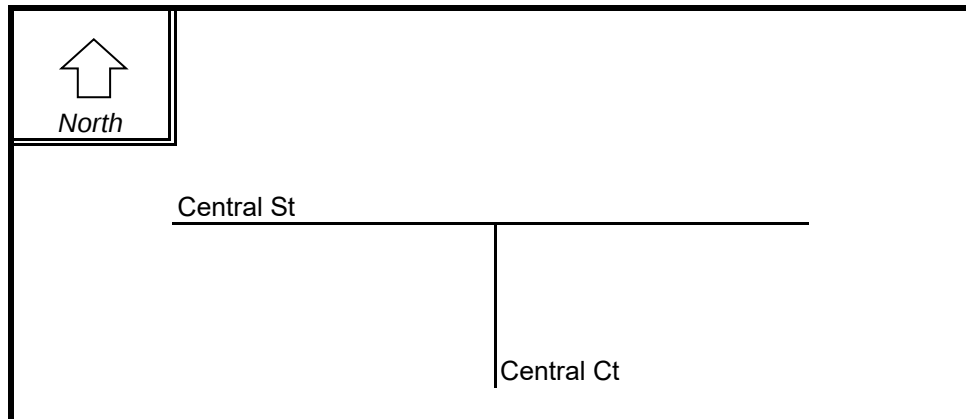
## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Byfield COUNT DATE : Sept. 20  
 DISTRICT : 4 UNSIGNALIZED : ☒ x SIGNALIZED : ☐

### ~ INTERSECTION DATA ~

MAJOR STREET : Central St  
 MINOR STREET(S) : Central Ct

**INTERSECTION  
 DIAGRAM**  
 (Label Approaches)



### PEAK HOUR VOLUMES

| APPROACH :                 | 1  | 2   | 3  | 4   | 5 | Total Peak Hourly Approach Volume |
|----------------------------|----|-----|----|-----|---|-----------------------------------|
| DIRECTION :                | SB | WB  | NB | EB  |   |                                   |
| PEAK HOURLY VOLUMES (PM) : |    | 343 | 25 | 387 |   | 755                               |

" K " FACTOR : **0.101** INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME : **7,475**

TOTAL # OF CRASHES : **1** # OF YEARS : **5** AVERAGE # OF CRASHES PER YEAR ( A ) : **0.20**

**CRASH RATE CALCULATION :**

**0.07**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT Crash Portal 2013-2017

Project Title & Date: \_\_\_\_\_

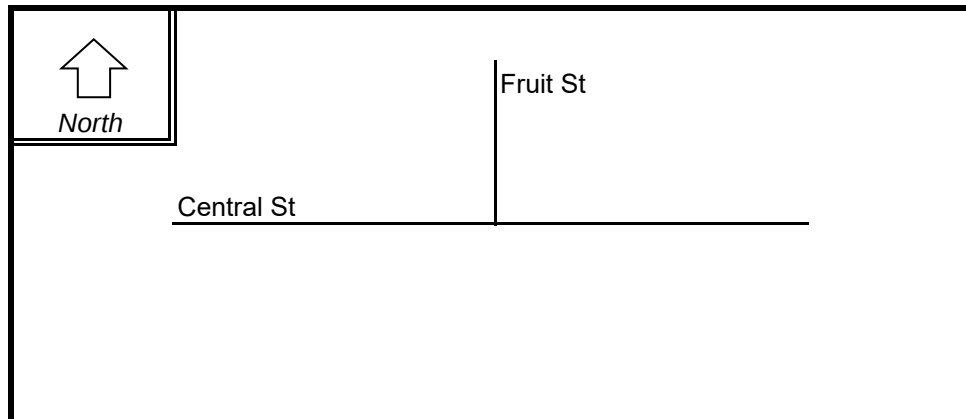
## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Byfield COUNT DATE : Sept. 20  
 DISTRICT : 4 UNSIGNALIZED : ☒ x SIGNALIZED : ☐

### ~ INTERSECTION DATA ~

MAJOR STREET : Central St  
 MINOR STREET(S) : Fruit St

**INTERSECTION  
 DIAGRAM**  
 (Label Approaches)



### PEAK HOUR VOLUMES

|                            |    |     |    |     |   |                                   |
|----------------------------|----|-----|----|-----|---|-----------------------------------|
| APPROACH :                 | 1  | 2   | 3  | 4   | 5 | Total Peak Hourly Approach Volume |
| DIRECTION :                | SB | WB  | NB | EB  |   |                                   |
| PEAK HOURLY VOLUMES (PM) : | 53 | 364 |    | 417 |   | 834                               |

" K " FACTOR : **0.101** INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME : **8,257**

TOTAL # OF CRASHES : **4** # OF YEARS : **5** AVERAGE # OF CRASHES PER YEAR ( A ) : **0.80**

**CRASH RATE CALCULATION :**

**0.27**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT Crash Portal 2013-2017

Project Title & Date: \_\_\_\_\_