

Traffic Impact Assessment

For:

New Multi-Use Building

On:

1441 Commercial Street

In:

Weymouth, Massachusetts

Prepared For:

Hardy & Man Design Group
Weymouth, Mass.

Prepared By:



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Mixed-Use Building

1441 Commercial Street
Weymouth, Massachusetts

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EXECUTIVE SUMMARY

- . Commercial Street carries approximately 7,200 vehicles per day in the vicinity of the site. Approximately six percent of this daily volume occurs during the morning and over eight percent occurs during the evening peak hour.
- . This project is expected to generate approximately 22 morning driveway peak hour trips with 10 inbound and 12 outbound. This project is also expected to generate approximately 31 driveway evening peak hour trips with 20 inbound and 11 outbound.
- . This new restaurant / residential project will generate about 308 vehicle trips per day while the service station generated about 688 vehicle trips per day.
- . Increased traffic volume at the Commercial Street at Broad Street / High Street intersection is expected to result in virtually no noticeable increase in delay. The morning delay here is not expected to increase more than 0.1 seconds. The evening delay at this intersection is expected to increase only about 0.3 seconds. All approaches will continue to operate at their baseline or "Base" level. These Levels of Service indicate the intersection to have no noticeable increase in delay to Weymouth motorists travelling these roadways.
- . The un-signalized intersection of Commercial Street at Water Street will continue to result in no delay on Commercial Street or Water Street and there are sufficient gaps in this traffic stream to accommodate any increase in volumes from the site during both the morning and evening peak hours.
- . The required stopping sight distance at the site driveway intersection on both Commercial Street and Water Street is provided.
- . Crash data for the entire Study Area was researched from the Massachusetts Department of Transportation records over the latest available three-year period. While only one crash was reported at the Commercial Street driveway thirteen crashes were reported within the Study Area. There were no fatalities but four personal injury crashes were reported. Most crashes did involve property damage only and occurred during daylight hours on dry pavement. In essence, this new driveway intersection is not considered uniquely hazardous.

INTRODUCTION

Gillon Associates has evaluated the anticipated traffic impacts resulting from the construction of a quality restaurant and twenty-one (21) residential dwelling units to be located on the easterly side of the Commercial Street in Weymouth, Massachusetts (Figure 1).

The purpose of this report is to evaluate potential traffic impacts, which may be created by the expected addition of vehicular traffic either originating from or destined to the site. Specifically, this report assesses traffic operational characteristics of the following intersections:

- Commercial St. at Broad St. / High St.
- Commercial Street at Water Street / Site Access

This report provides an identification of the expected traffic generated by the project along with an assessment of existing, baseline, and projected traffic operating characteristics. Existing traffic volumes were obtained by obtaining new volume from PDI., a traffic counting sub-contractor and adhering to the MassDOT protocol for assessing roadway traffic volume during and after the Covid-19 Pandemic. Pre-Covid counts were identified by previous MassDOT counts just north of the site and were increased by an identified normal growth factor for existing conditions notwithstanding the decrease due to Covid.

Although we have identified previous traffic volume, no credit was taken for the previous gasoline service station with mechanic bay service. Site Generated traffic projections are based on similar land use and size.

PROJECT DESCRIPTION

The project includes demolishing an existing service station and then building a new structure where a new modern 75-seat restaurant and twenty-one (21) residential dwelling units will be built (Figure 2).

EXISTING TRAFFIC CONDITIONS

Regional Roadway Network

Commercial Street and Water Street will continue to serve the site and provide access to both local and regional roadway facilities. Commercial Street to the west provides linkage to the Jackson Square commercial area and to the north to the MBTA Commuter Rail Station at East Weymouth. Water Street also connects with Pleasant Street and points to the southwest.

Traffic Setting

The project is situated on the southeasterly side of Commercial Street at Water Street. Adjacent to the site, Commercial Street has one lane of traffic in each direction. Commercial Street has a roadway pavement width of approximately 37 feet adjacent to the site with a sidewalk on each side.

Existing Traffic Volumes

Commercial Street carries approximately 7,200 vehicles per day in the vicinity of the site (Figure 3). Morning and evening peak hour traffic volumes were obtained from the sub-consultant and are provided for both morning and evening peak hours on Figures 4 and 5 respectively.

Although these counts were obtained recently, we also looked at pre and post traffic counts obtained in Weymouth at the continuous traffic counting on both High Street and Main Street (Figure 6). These

counts showed about a twenty percent decrease in 2020 over the 2017 pre-covid counts. Therefore, the Commercial Street counts were increased by the 21.2 percent to conservatively adjust the Commercial Street post covid count. The manual Covid-19 adjusted upward morning and evening turning movement counts for 2022 are provided on Figures 7 and 8 respectively.

FUTURE TRAFFIC CONDITIONS

In order to assess the future traffic demands on the adjacent roadways, the latent demand or normal growth in traffic volumes which will occur prior to occupying the new apartments has to be identified. This growth in traffic volume will be associated with normal increases due to new development and an increase of licensed drivers, as well as employment opportunities in the area.

Background Traffic Growth

The normal growth rate was established after reviewing the closest MassDOT counting station to the site. A conservative positive increase of one percent growth rate per year was adopted for this analysis based on MassDOT Station #6745 and #7007. The Base year, seven years out in the year 2029, traffic flow onto which the site related traffic will be added for analysis purposes are shown for weekday morning and evening peak hours on Figures 9 and 10 respectively.

Trip Generation and Distribution

It is expected that the proposed mixed-use development will exhibit the same general trip generating characteristics as in other suburban residential communities. In addition to local rates observed and compiled by this firm, the Institute of Transportation Engineers (ITE) provides data on a variety of land uses and there is a considerable amount of empirical data available. The ITE-Land-Use Code 931 was used for the restaurant and no credit was taken for the existing facility. Figure 11 provides a trip generation summary listing the ITE equations along with the resulting trip generation values for the new 75-seat restaurant and 21-unit development site. This project is expected to generate approximately 22 morning driveway peak hour trips with 10 inbound and 12 outbound. This project is also expected to generate approximately 31 driveway evening peak hour trips with 20 inbound and 11 outbound.

Although the anticipated traffic impact did not take credit for the previous gasoline service station, we did note that use had 42 morning peak hour trips and 56 evening peak hour trips. Moreover, this new restaurant / residential project will generate about 308 vehicle trips per day while the service station generated about 688 vehicle trips per day.

Directional distribution trip assignments are shown on Figure 12. This projected directional distribution reflects the existing arrival and departure patterns at the site and the relation of major commuting corridors and the Interstate system and have been checked with Journey to Work Criteria. Site generated weekday morning and afternoon traffic volumes associated with the project are shown on Figures 13 and 14 respectively.

Projected weekday morning and evening peak hour traffic volumes representing a build condition for the site in the year 2028 for this mixed-use project are provided on Figures 15 and 16 respectively.

TRAFFIC OPERATIONAL ANALYSIS

This section of the report provides a quantitative analysis of anticipated traffic operational characteristics for the build scenarios. These series of capacity analyses were conducted for weekday morning and evening peak hours to determine the potential impact of the proposed mixed-use project.

Analysis Methodology and Findings

The analysis is based on the "Highway Capacity Manual" for both signalized and non-signalized intersections. This manual has been published by the Transportation Board of the National Research Council and approved by the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine. The latest Synchro Software version 10 was utilized in the assessment.

At un-signalized intersections the manual assumes that the through and right-turn movements along any main street will operate unrestricted but conflicting movements will be subjected to various periods of delay depending primarily on the frequency of adequate safe gaps to complete these movements. These periods of delay are generally categorized in "Levels of Service" (LOS) ranging from "A" for very short or no delays through "F" for extensive delays. The Massachusetts Highway Design Manual indicates that a "D" Level of Service is acceptable on roadways such as those in the study area. A table comparing levels of service and seconds of delay is provided in the Appendix of this report.

Commercial Street at Broad Street / High Street

As can be seen on Figure 17 and the calculations provided herein, increased traffic volume at this Commercial Street at Broad Street / High Street intersection is expected to result in virtually no noticeable increase in delay. The morning delay here is not expected to increase more than 0.1 seconds. The evening delay at this intersection is expected to increase only about 0.3 seconds. All approaches will continue to operate at their baseline or "Base" level. These Levels of Service indicate the intersection to have no noticeable increase in delay to Weymouth motorists travelling these roadways.

Commercial Street at Water Street / Site Driveway

This un-signalized intersection will continue to result in no delay on Commercial Street or Water Street and there are sufficient gaps in this traffic stream to accommodate any increase in volumes from the site during both the morning and evening peak hours.

SIGHT DISTANCE EVALUATION

The approaching northeast bound and southwest bound vehicle on Commercial Street must be able to stop in time to avoid making contact with a vehicle slowing or stopping at the site entrance driveway. The required stopping sight distance from either a minor street or driveway is obtained from "A Policy on Geometric Design of Highways and Streets" as published by the American Association of State Highway and Transportation Officials (AASHTO) 7th Edition published in 2018.

Unlike the minimum safe stopping distance (MSSD) along a section of roadway, stopping sight distance at a driveway is not measured along either the center line or gutter line of a roadway. On page 9-29 of the American Association of State Highway and Transportation Officials (AASHTO) manual, it is stated "If the available sight distance for an entering or crossing vehicle (at an intersection corner) 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."

The motorist leaving the minor roadway or driveway has an eye height of 3.5 feet and he must be able to see another object (approaching vehicle) with a height of 3.5 feet. The required stopping distance for each minor roadway or driveway is based on the formula on the following page.

$$d = 1.47 Vt + 1.075 \frac{V^2}{a}$$

Where: V = Speed in miles per hour (mph)
t = perception & Reaction time (2.5 seconds)
a = deceleration of vehicle (11.2 ft/sec.2)

A speed survey was conducted on Commercial Street where both the average northerly and southerly speed was calculated as 26 mph (Figure 18). However, the 85th percentile speed or speed at which all motorists were traveling at or below in both directions was 29 mph northbound and 30 mph southbound. This characteristic is commonly used as the roadway design speed. Therefore, the required stopping sight distance for the Commercial Street driveway is computed as shown below:

$$d = 1.47 * 30 * 2.5 + 1.075 * \frac{(30)^2}{11.2}$$

$$d = 110 \text{ ft} + 86.4 = 196.4 \text{ feet}$$

There is over 250 feet of stopping sight distance available to the north and 235 feet available to the south. Therefore, all through motorists, do have clear stopping sight distance and the driveway onto Commercial Street is safe.

CRASH ASSESSMENT

Crash data for the entire Study Area was researched from the Massachusetts Department of Transportation records over the latest available three-year period. While only one crash was reported at the Commercial Street driveway thirteen crashes were reported within the Study Area (Figure 19). There were no fatalities but four personal injury crashes were reported. Most crashes did involve property damage only and occurred during daylight hours on dry pavement.

Study Area Crashes	
Period	Number of Crashes
2021	5
2020	1
2019	7
Total	13
Average	4.33

As can be seen on Figure 19, this new driveway intersection is not considered unusually high or uniquely hazardous.