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August 27, 2020

Attention: Town of Newbury Planning Board
Planning Director

Town of Newbury Planning Board
12 Kent Way
Byfield, MA 01922

Subject: **Traffic Consulting Peer Review –**
Proposed Gas Station/Convenience Store, Newbury, MA

Dear Members of the Board:

In accordance with our Agreement, Stantec Consulting, Inc. is pleased to submit this peer review of a traffic impact study prepared for a gas station/convenience store proposed for 23 Central Street in the Byfield neighborhood of Newbury, Massachusetts. Currently occupied by a single-family residence, the site is zoned for Commercial Highway use and is located within 400 feet of the easterly on- and off-ramps serving Exit 55 on I-95.

Specifically, our peer review focuses on the Traffic Assessment for this development site. Dated March 11, 2020, its Traffic Assessment entitled '*Traffic Assessment Gas Station/Convenience Store 23 Central Street, Byfield, Massachusetts'* was prepared by Ron Muller & Associates. The development site is approximately 42,891 square feet in area. The site redevelopment will contain, among other elements, a canopied area with 12 fuel pumps and a convenience store 4,350 square feet in area including a drive through window for serving coffee and donuts. According to the site plan set, the drive through window can store up to 18 vehicles in queue before reaching the street

Gary L. Hebert, PE conducted the peer review. He has peer-reviewed more than 50 residential and commercial developments in communities throughout Massachusetts.

Review traffic/circulation study materials

Besides the Traffic Assessment cited above, the peer reviewer evaluated the site's proposed on- and off-site circulation features within the context of relevant traffic engineering and local analysis guidelines. Study materials included the Project Plan Set dated April 29, 2020 and the Project Narrative dated May 19, 2020, both prepared by AL Prime Energy Consultant, Inc. Pertinent traffic impact and parking elements of the Newbury Zoning and Subdivision bylaws, and the Town's 2006 Master Plan were also reviewed for context.

Site Visit

The peer reviewer visited the development site on August 19, 2020 during the 7-8 AM peak hour, the projected worst case for site generated traffic, as identified in the Traffic Assessment Report. He observed existing traffic volumes/speeds on Central Street, future sight lines at the two proposed driveways, traffic operations at the nearby Fruit Street and Central Central Court intersections with Central Street, and early morning bicycle/pedestrian activity on Central Street.

Based on observations and count data provided in the Traffic Assessment, existing traffic operates very well on Central Street with few delays. Even with slightly lower volumes due to the pandemic, the site visit confirms that Central Street has the capacity to accommodate projected future traffic demands from the proposed gas station with convenience store and drive through coffee/donut window. The site visit also confirms that existing Central Street traffic volumes shown in the Traffic Assessment are reasonable.

The Traffic Assessment does not include an evaluation of the two closest Central Street intersections on either side of the development site's proposed two driveways. The intersection of Central Court at Central Street is essentially opposite one of the site's two proposed driveways. Central Court is skewed at Central Street and serves at least 15 homes. The Fruit Street intersection is located 130 feet west – or roughly 6 car lengths – west of the proposed AL Prime site's west driveway. Central Street has sidewalks on both sides. Given the amount of traffic this site will generate, it is relevant to know how this site's development will affect them.

Additionally, the Traffic Assessment does not mention the existing bicycling and pedestrian environment associated with the site. There are sidewalks in the area, though Central Street is not considered to be 'bike friendly', as its paved curb-to-curb width to the east of the site is approximately 27' and pedestrian usage is low. A width of 30' curb-to-curb is considered 'bike-friendly' for a two-lane roadway. On its north side, sidewalks stop at a chain link fence west of Fruit Street. On the south side, sidewalks are continuous until Central Court During the early morning site visit, only 2 pedestrians and 2 cyclists were observed on Central Street.

Review Study Area and Existing Volumes

The Traffic Assessment did not specifically identify a 'study area', other than Central Street traffic volumes in front of the site. Central Street traffic counts were performed for a 48-hour period on November 20-21, 2019. According to MassDOT studies, November traffic volumes are 4% lower than average annual volumes so the Traffic Assessment increased counted traffic volumes by 4% to represent average annual traffic conditions. This analysis procedure is typical and reasonable.

Review Traffic Assessment sight distance measurements

Sight distance measurements reported in the Traffic Assessment were checked in the field during the field visit. As the Traffic Assessment indicates, adequate stopping sight distance (SSD) is available in both directions on Central Street and exceeds 400 feet in both directions. However, from the photos on page 2, the intersection sight distance (ISD) is constricted looking to the east from 10 feet back of the edge of pavement at the proposed driveway was affected by vegetation growth and a utility pole in front of the adjacent property. The horizontal and vertical curvature east of the site adversely affects the available intersection sight distance from that driveway (see photo on the next page).

While AASHTO (American Association of State Highway and Transportation Officials) recommends measuring intersection sight lines 14.5-feet back from the edge of pavement, a 10-foot eye location was selected because it assumes motorist will typically try to move their vehicle as close to the edge of road as possible, especially if sight lines are impaired by vegetation or rare winter snow banks. The Traffic Assessment recommends keeping vegetation trimmed to retain good ISD. While this is a good strategy and practice, especially during winter months when snow banks may occur, this may not always be practical to achieve. The east driveway does not have this potential sight line issue.

Looking west on Central Street approximately 10 feet back from future west site driveway

Looking east on Central Street approximately 10 feet back from future west site driveway

Looking west on Central Street approximately 400 feet east of the site toward a hill and horizontal curvature

Review study methodology, trip generation, and trip distribution assumptions

The Traffic Assessment's trip generation assumptions for the average weekday, AM, and PM peak hours are generally acceptable and consistent with transportation industry practices. However, we caution that the trip generation estimates may be on the low-side, as the Institute of Transportation Engineers (ITE) land use code used (960-Super Convenience Market/Gas Station) does not mention a donut/coffee service with a drive-through window in its description of the use.

ITE provides trip generation estimates for the Super Convenience Center sites assuming several independent variables including building square footage, number of pumps, projected employees, the volume of traffic near the site during the AM and PM site peak hours, and the number of fueling positions-- the independent variable used in the Traffic Assessment. The fueling positions independent variable is acceptable, as its trip generation rates are based on a large sample size of sites.

There are two major sources of trip generation to and from this this site – and they are both classified as 'pass-by' trips. The passing I-95 corridor just west of the site is likely to be, by far, the largest source of its trip generation. Central Street in front of the site will be a much lower secondary source of trip generation. By point of reference, according to MassDOT information, I-95 carried from 74,000 to 77,000 vehicles per day, while Central Street carried approximately 6,750 vehicles per day. The Traffic Assessment November counts indicate a slightly higher Central Street average annual daily traffic volume of 7,250 vehicles per day.

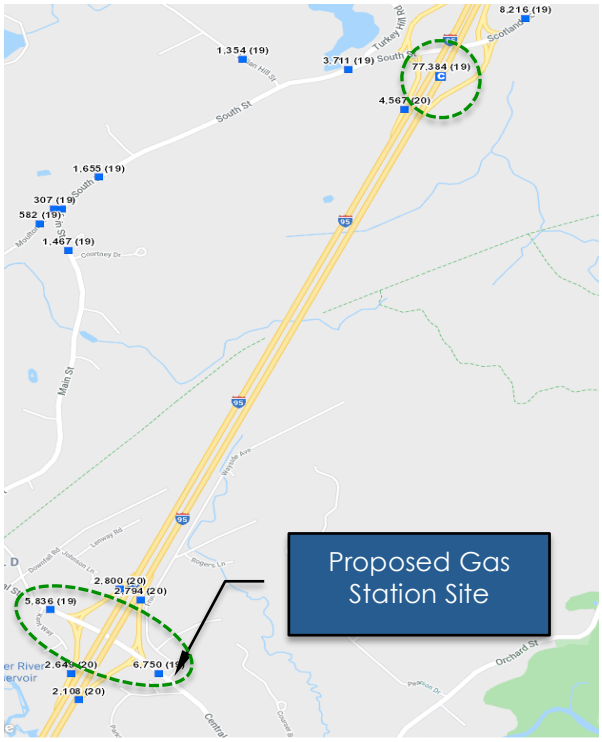
As noted in the Traffic Assessment, the distribution of trips to and from this site is likely to be based on the traffic amounts carried on nearby roads.

The Traffic Assessment assumes 60% of site-generated traffic will come directly from Central Street—30% east of the site and 30% west of the site, and 'at least' 40% from I-95. However, we anticipate a much stronger I-95 trip generation orientation, as I-95 carries are more than 10 times as many vehicles as Central Street. Also, there is likely to be new advertising on existing I-95 blue service signage (see right) prior to and at the Central Street exits from both directions. These signs already exist and have the capacity to accommodate

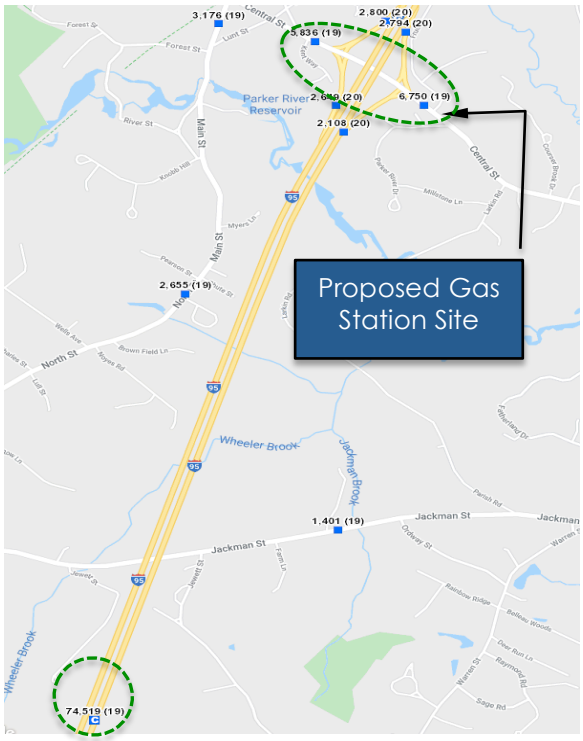
Existing I-95 service sign

information about the new site.

Therefore, in the context of MassDOT's available 2019 counts, we estimate approximately 8% of site-generated traffic will come from existing Central Street traffic – 4% to and from the east and 4% to and from the west, while 92% -- 47% to and from the south and 45% to and from the north -- will come from I-95.



Excerpt: Site northward from MassDOT's interactive Traffic Volumes Map



Excerpt: Site southward from MassDOT's interactive Traffic Volumes Map

While not 'new' trips in the sense that they come from separate origins and destinations, these 'diverted linked' pass-by trips will be entirely 'new' to the short Central Street link between the ramps and the site. An attachment to this letter illustrates the difference between the 'diverted-linked' pass-by trips and Central Street pass-by trips for accessing this particular site. We agree with the Traffic Assessment that this site will generate few trips that are 'new' to I-95 and Central Street.

As projected in the Traffic Assessment, site driveways will be accommodating nearly 2,770 vehicle trip ends during a typical weekday, 337 trip ends during the morning peak hour and 276 trip ends during the evening peak hour. Assuming the trip distribution pattern provided in the Traffic Assessment, 'diverted-linked' trips should account for approximately 146 trips– 73 in each direction -- that will be 'new' to Central Street between the I-95 ramps and the site. Approximately 86-89 trips cited were cited as added to Central Street in the Traffic Assessment, while only 38 new trips cited in the May 16, 2020 Project Narrative.

However, if one distributes traffic according to the relative traffic volumes in the area, trips 'new' to Central Street could represent approximately 92% of the trips to and from the future gas station during the worst-case morning peak hour, the peak hour of the day. Put another way, up to 307 of the 337 vehicle trip ends to and from the site during the AM peak hour are likely to be 'new' to the segment of Central Street between the I-95 east ramp terminal and the site driveways. Approximately 96% of the traffic entering the site would be turning left into the site and 96% of the traffic exiting the site would be turning right out of the site. Nonetheless, we anticipate that traffic operations, even with this assumed trip distribution change, will be acceptable at the site driveways.

Review accident analysis

Historic crash data in the site vicinity is not provided in the Traffic Assessment. Traffic Assessments usually provide this information. Newbury does not have specific requirements for a crash evaluation. A review of MassDOT interactive crash portal data indicates that this is not a high crash area. During the past five years between 08/21/2015 and 08/21/2020, there were 4 reported crashes at the Fruit Street intersection, one reported crash near the Central Court intersection, and one on the southbound off-ramp terminus heading west on Central Street. Historic rash rates for Central Street are relatively low.

Review background traffic growth

Background traffic growth was not estimated in the Traffic Assessment, nor was a future build out year projected and estimated. Normally, a Traffic Assessment projects and identifies traffic conditions at the site driveway intersections five years after the site is constructed and occupied, the typical projection threshold for traffic impact studies. Suggested analyses are at the Board's discretion. Guidance on this issue is not addressed in Town's Special Permit requirements. We recommend that the Town consider defining what a generic traffic study should include and specific criteria for requiring one. MassDOT's March 13, 2014 Traffic Impact Assessment (TIA) guidelines that are updated regularly for developments that exceed minimum Environmental Notification Form (ENF) or Environmental Impact Report (EIR) traffic thresholds and require some state action (e.g., a curb cut permit on a state highway layout). This site would not meet the applicable thresholds, because most of its trips will be either primary or diverted-linked pass-by trips.

Review and evaluate level of service (LOS) analyses

This information was not provided in the Traffic Assessment. While not provided, we performed a quick evaluation of traffic operations during the AM and PM peak hours using the trip distribution assumptions contained in the Traffic Assessment. We also performed a quick evaluation of traffic operations based on our anticipated traffic distribution pattern more strongly oriented toward I-95 than estimated in the Traffic Assessment. Based on both evaluations, the site driveways should operate acceptably during the morning peak hour, the worst of the typical weekday. With the trip distribution pattern in the Traffic Assessment assumes nearly 25% of the traffic approaching the site eastbound would be turning left into the site. With our alternate distribution, 33% of the traffic approaching the site on Central Street would be turning left into the site. From a traffic operations perspective, one of the benefits of the alternate distribution is that far fewer left turns would be occurring out of the site driveways. Left turns are always the most difficult movements at the site driveways.

Using the data provided in the Traffic Assessment and on-site peak hour observations, levels of service and typical traffic operations at the site driveway intersections with Central Street will likely be acceptable. Nonetheless, given the amount of anticipated site turning movements, it is suggested that the Board request the Applicant to provide peak hour level of service analyses for review, especially to assess the likelihood of whether left turn movements will block traffic entering or exiting from Fruit Street. Based on our evaluation, we believe such blockages will be rare.

Assess the adequacy of proposed traffic mitigation measures

Other than the portion of the site driveways/landscaping constructed in the public layout, no traffic or circulation mitigation measures are proposed at this site.

Based on our review of the Traffic Assessment, we recommend a few mitigation measures the Board and the Applicant should consider to improve the future safety of all modes approaching the site. These include:

- **Consider making the east driveway one way in and the west driveway one way out** to enhance the safety of site operations safety and concurrently reduce the width of the two driveway openings to the minimum necessary to accommodate large truck entries and exits. This would resolve the potential easterly sight line issue associated with the easterly driveway with two-way operations. It also maximizes the queue length available for left turns from Central Street into the site and minimizes future driver confusion about which of the two driveways should be used for left or right turns into and out of the site. This is a primary recommendation.

- **Consider providing some bypass opportunity for eastbound through traffic approaching the site from the I-95 interchange**. Our review of left lane warrants indicates that consideration of such a bypass is warranted based on the site's projected trip generation estimates as contained in the Traffic Assessment. Such delays will not be continuous, but will be occasional, causing some delays during peak arrival periods from 5-10 seconds. The need for this bypass or a left turn lane increases further if we assume I-95 will be the largest source of trips to and from the site. Three site access options, A, B and C d are attached to this letter. The goal of these options is to create a visual slow point on Central Street in the site vicinity. Each has pros and cons. These are identified on the sketches and all provide a visual slow point in front of the site. All are preferable to leaving the existing access condition as is.

- **Consider provision of a sidewalk on the site frontage just east of the crosswalk on Central Street to the west driveway and on site bike storage for at least two bikes.** As a convenience store with coffee and donuts, this site should encourage access by pedestrians and cyclists who use Central Street. This will connect the crosswalk to the site and ultimately to the convenience store/coffee/donut shop.

Looking west on Central Street just east of Central Court
to AM peak hour bicyclists

Check the adequacy of the future site plan circulation features

Ideally, as recommended above, a one-way site circulation flow pattern should be established to enhance the safety of on- and off-site circulation. Our review of parking features indicates the supply should be adequate to meet projected parking demands. Parking spaces are designed in accordance with Newbury requirements for sizes and backing areas. Based on the proposed parking supply, the site is only required to provide one van accessible space to comply with ADA and MAAB requirements. Two are shown on the plan.

While we do not usually comment on the site plan's general configuration, we were asked by the Town whether there would be any traffic benefits if the site building were to be relocated to the front of the site, instead of to the rear, the usual design condition as proposed. Hypothetically, there could be a few traffic benefits with such a change. The drive through window would have a longer queuing space to accommodate a huge influx of drive-through traffic. Also, locating the building closer to the street encourages pedestrian access/bicycle access by reducing their on-site vehicle conflicts to and from the building. Locating the building closer to Central Street would slow traffic on the adjacent street compared to siting a building to the rear of a lot.

The Traffic Assessment and site plans evaluated site queuing. The data provided shows that the building as located on the site plans could more than accommodate on-site queuing.

Also, relocating the building would require setting it back far enough to ensure good sight lines for exiting motorists/trucks and adequate turning movements for fuel delivery trucks. However, other than minor adjustments to the site access strategy at the street cited above and possible provision of a couple of on-site bike storage racks and a short sidewalk linkage, the site design plans as proposed are acceptable.

Summary and Conclusions

A far higher proportion of site-generated pass by traffic is likely come from I-95 than assumed in the Traffic Assessment, but the site's AM, PM, and weekday trip generation driveway volume estimates are acceptable and reasonable.

Overall, by converting to a one-way in and one-way out operation, the development of this site, as gas station with a convenience store and drive through coffee/donut shop should be able to operate safely and efficiently for all its future users.

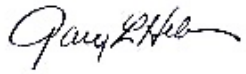
With a couple of minor 'traffic calming' changes on Central Street in front of the site, future pedestrian and bike access to this site will be enhanced without compromising necessary auto and truck access.

Stantec appreciates the opportunity to assist the Town of Newbury Planning Board with its review of this proposed gas station with a convenience market and a coffee/donut drive-through window operation.

If you have any questions regarding this traffic peer review letter or its findings, please do not hesitate to contact me. I will also be available to address questions that arise at the scheduled September 2, 2020 video-conferencing meeting.

Regards,

Stantec Consulting Services, Inc.



Gary L. Hebert, P.E.
Consultant/Peer Reviewer
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Email: Gary.Hebert@stantec.com

Attachments:
1) Trip generation estimates by fuel pumps and building square footage as independent variables;
2) Illustration of diverted-linked pass-by vs. Primary pass-by trips to site.
3) Left (bypass) lane warrant analysis; and
4) Alternate access option sketches

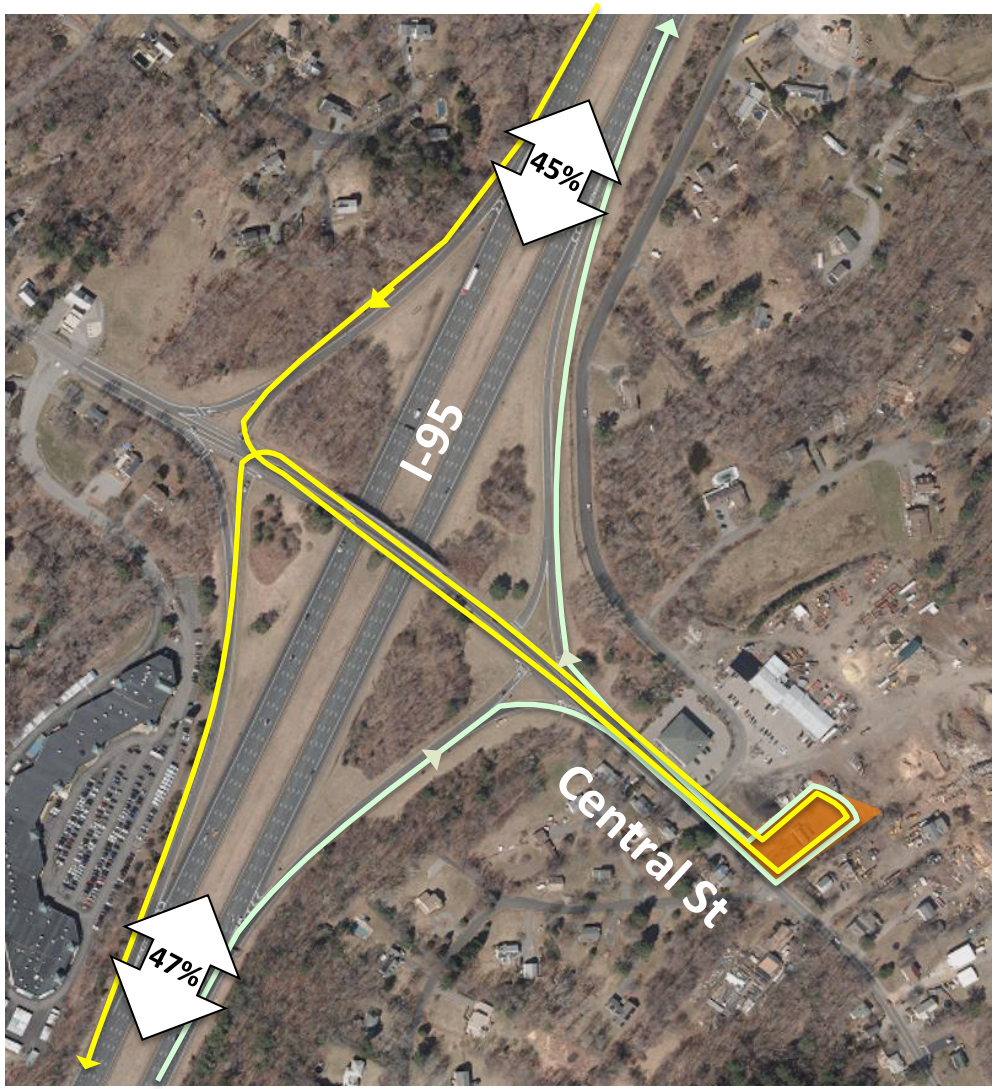
Projected Trip Generation - Gas Station with Drive Through Coffee Shop and Convenience Store*

	INDEPENDENT VARIABLE	
Super Convenience Market/Gas Station	**Fueling Positions (12)**	**Building Square Footage (4,350 SF)**
Weekdays		
AM Peak Trip Generation	168 IN/169 OUT - TOTAL 337**	181 IN/181 OUT - TOTAL 362
PM Peak Trip Generation	138 IN/138 OUT - TOTAL 276**	150 IN/151 OUT - TOTAL 301
Daily Peak Trip Generation	1,383 IN/1,383 OUT - TOTAL 2,766**	1,821 IN/1,822 OUT - TOTAL 3,643
Saturdays		
All-day Saturday Trip Generation	1,750 IN/1,750 OUT - TOTAL 3,500	1,522 IN/1,523 OUT - TOTAL 3,045
Saturday Peak Trip Generation	139 IN/140 OUT - TOTAL 279	139 IN/139 OUT - TOTAL 278

*Calculated by Stantec Consulting, Inc. Average Rates from ITE Trip Generation, 10th Edition, Land Use Code 960. Fueling positions and building square footage from AL Prime Energy Consultants, Inc. site plan 4/29/2020.

** Rates assumed in the Traffic Assessment Study, Gas Station/Convenience Store, 23 Central Street, Byfield, MA, RMA, 3/11/2020

Peer Reviewer – Site Trip Distribution Estimates



‘Diverted Linked’ Pass-by Trips
(possibly 92% of all site trips w/47% to and from the south and 45% to and from the north)

Direct or ‘Primary’ Pass-by Trips
(possibly 8% of all site trips w/4% to and from the east and 4% to and from the west)

Left Lane Warrant Analysis

Central Street EB at Proposed Gas Station – AM Street Peak Hour

Build Peak 2020*

Early Peak Hour 7:00-8:00 AM

Exhibit 6-23
Criteria for Left Turn Lanes

A. Unsignalized Intersections, Two-Lane Roads and Streets:

Design Speed	Opposing Volume (motor vehicles per hour)	Advancing Motor Vehicle Volume (vehicles per hour) 5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
40 mph	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
50 mph	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
60 mph	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215

Central St EB 85th percentile design speed 36 MPH – AM Peak Hour at least 25% left turns. With interpolation:

Opposing volumes: **338***

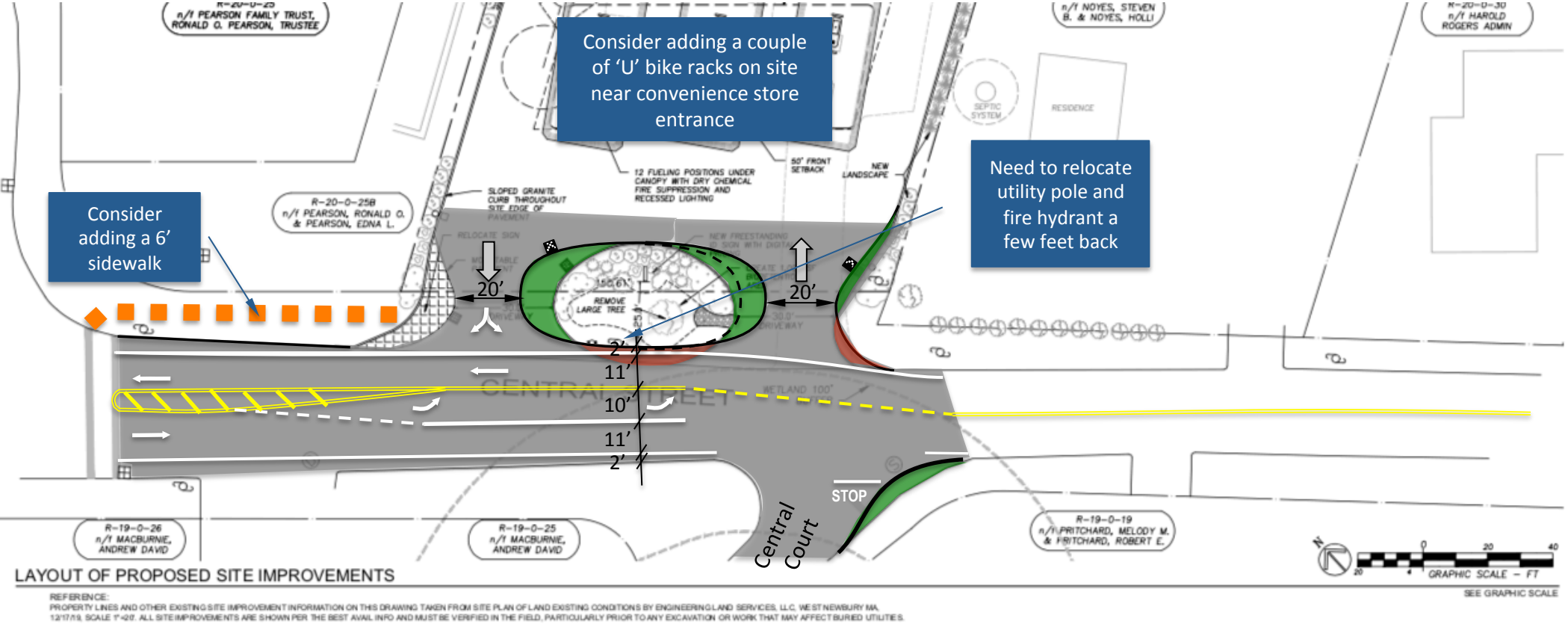
Advancing volumes: **479***

Conclusion: Exclusive left lane warrants met: **YES**

Table Source: MassDOT Project Development and Design Guide (2006), as amended.

* Volumes based on trip generation/trip distribution in *Traffic Assessment, Gas Station/Convenience Store 23 Central Street, Byfield, Massachusetts, RMA, March 11, 2020.*

Central St. Traffic Calming Visual Slow Point - Option A – Exclusive Left Lane



Potentially added landscaping (to dashed area if needed for fuel or fire truck access)

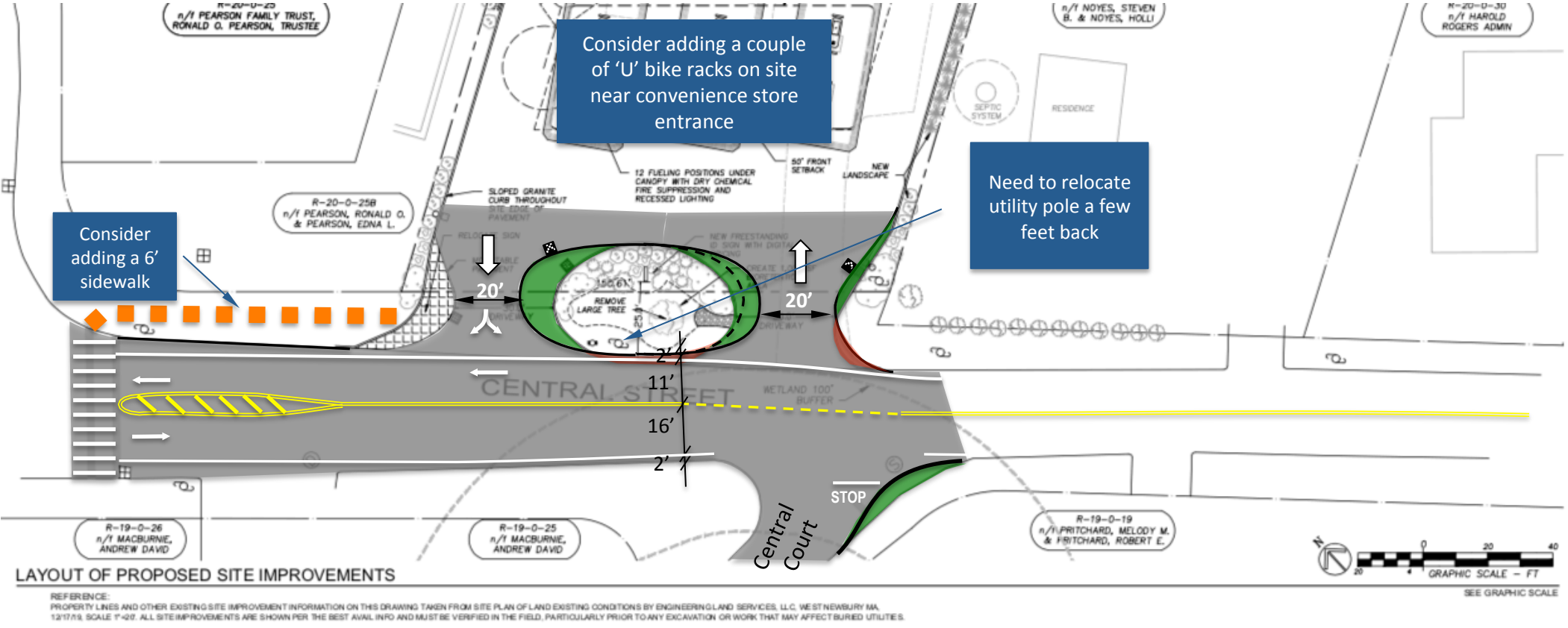
Potentially reduced landscaping

Potential Access Mitigation Measure Concept Sketch

Notes: best for left lane bypass, least bike friendly, may be less compatible with rural character

Base map source: AL Prime Energy Consultant, Inc., Site Layout, C-1.0, 5/19/2020.

Central St. Traffic Calming Visual Slow Point - Option B – Larger Centerline Offset



LAYOUT OF PROPOSED SITE IMPROVEMENTS

REFERENCE:
PROPERTY LINES AND OTHER EXISTING SITE IMPROVEMENT INFORMATION ON THIS DRAWING TAKEN FROM SITE PLAN OF LAND EXISTING CONDITIONS BY ENGINEERING LAND SERVICES, LLC, WEST NEWBURY MA, 12/17/19, SCALE 1"=20'. ALL SITE IMPROVEMENTS ARE SHOWN PER THE BEST AVAIL INFO AND MUST BE VERIFIED IN THE FIELD, PARTICULARLY PRIOR TO ANY EXCAVATION OR WORK THAT MAY AFFECT BURIED UTILITIES.

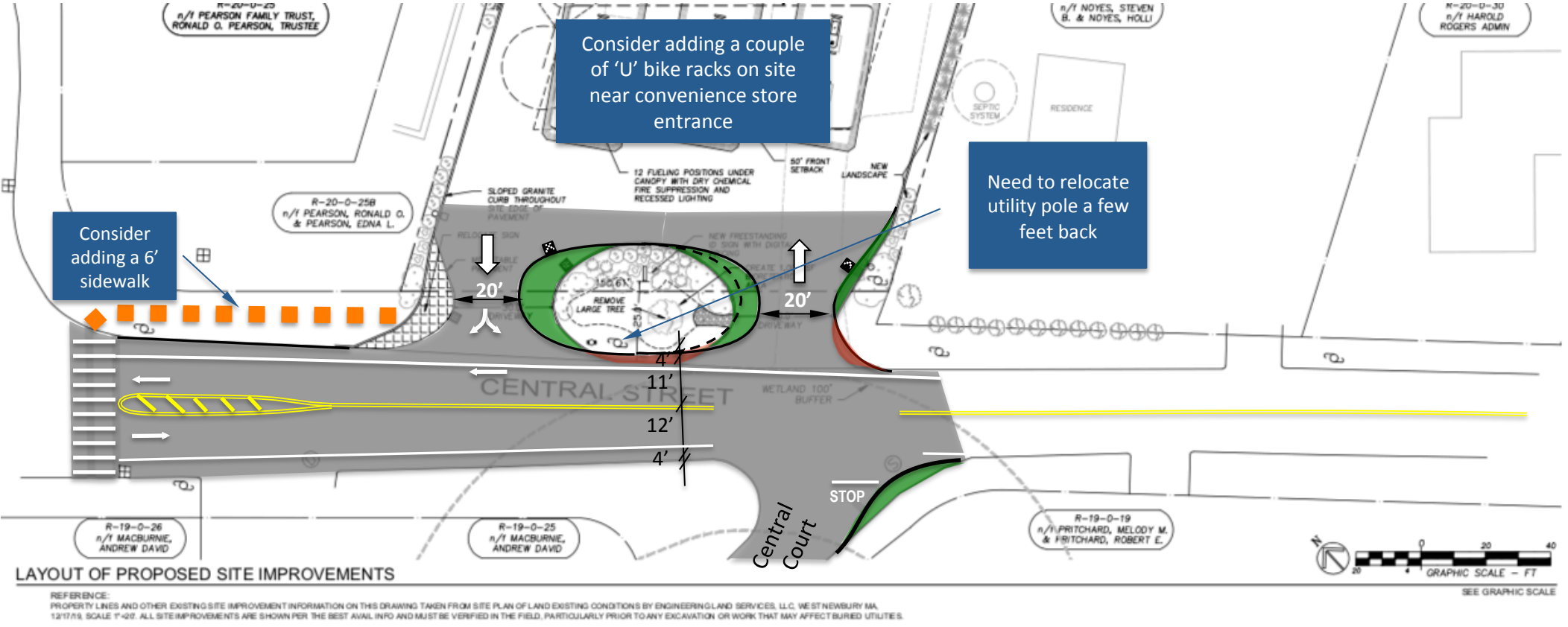
- Potentially added landscaping (to dashed area if needed for fuel or fire truck access)
- Potentially reduced landscaping

Potential Access Mitigation Measure Concept Sketch

Notes: Better for left turn bypass potential, less bike friendly, consistent with rural character

Base map source: AL Prime Energy Consultant, Inc., Site Layout, C-1.0, 5/19/2020.

Central St. Traffic Calming Visual Slow Point - Option C – Slight Centerline Offset



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- Potentially added landscaping (to dashed area if needed for fuel or fire truck access)
- Potentially reduced landscaping

Potential Access Mitigation Measure Concept Sketch

Notes: Occasional left turn bypass, most bike friendly, most compatible with rural character

Base map source: AL Prime Energy Consultant, Inc., Site Layout, C-1.0, 5/19/2020.