Memorandum

To: Jeffrey Doolittle, P.E.
Town Engineer
Town of South Windsor

Date: September 17, 2020

Project #: 42598.00

From: Charles Baker, PE, PTOE

Re: One Buckland Center Access Review

As requested by the Town of South Windsor, VHB has performed an independent traffic engineering evaluation of the proposal to install a new traffic control signal on Buckland Road at the existing driveway for the One Buckland Center retail development. VHB's evaluation was based on a review of the following technical documents submitted by Bubaris Traffic Associates (Bubaris):

- "Evaluation of Improved Access Provisions" technical memorandum, dated August 27, 2020
- Buckland Road Improvement Plan (C-SP1), dated August 28, 2020

It should be noted that the technical memorandum referenced above is an update to a previous memorandum prepared by Bubaris (dated December 30, 2019) for submittal to the Town of South Windsor. The current technical memorandum has been updated to account for the proposed Costco development at Evergreen Walk and to account for the proposed signal improvements by the Town of Manchester at the intersection of Buckland Road at Pleasant Valley Road and Buckland Hills Drive.

VHB's focus on this review was to assess the accuracy and content of the technical information provided to the Town and to evaluate the proposal for compliance with Town, CTDOT, and industry standard traffic engineering practices. This review is intended to assist the Town in making an informed judgement of the proposal on a conceptual level. This document presents a summary of VHB's review.

Overview of Proposed Access Modifications

Access to One Buckland Center is currently provided by one right-in/right-out driveway on the west side of Buckland Road, which is only accessible by southbound traffic entering and exiting the site. A raised median island on Buckland Road physically prevents left-turning movements entering or exiting the site. Therefore, motorists approaching the site from the south must make a U-turn at one of the intersections north of the site to enter from the southbound direction.

The current proposal involves the installation of a new traffic control signal at the site driveway, installation of a northbound left-turn lane with 150-feet of storage, and a break in the median to allow northbound left-turns into the site. The proposed traffic control signal would operate with three phases: a northbound/southbound through phase (matching free flow conditions that exist presently); a northbound left-turning phase; and an eastbound phase for right-turns exiting the driveway. This operation would allow northbound through traffic to operate freely at all times (uncontrolled by proposed signal), while southbound traffic on Buckland Road would be stopped during the latter two phases.

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Memorandum

Technical Memorandum Review

In general, the technical analysis memorandum prepared by Bubaris in support of the proposed traffic control signal was prepared in a professional manner consistent with transportation industry standards. Key findings from VHB's review of the technical analysis memorandum are noted below.

- Bubaris notes that safety concerns have been raised regarding motorists making an illegal U-turn (northbound to southbound) at the end of the median island on Buckland Road north of the site. The proposed traffic signal at One Buckland Center would provide a legal alternative for this U-turn movement. VHB has researched the latest three-years of crash records at this location using the UConn Crash Data Repository website. According to these records, there were no crashes reported at the end of this median in the past three years (2017 – 2019). It should also be noted that the new median opening under this proposal would provide the potential for illegal U-turns in the southbound to northbound direction.
- Bubaris conducted a trip generation analysis to forecast the traffic volumes generated by One Buckland Center. VHB has conducted a cursory review of the trip generation forecast, and the methodology used to forecast the volumes appears to be reasonable and consistent with industry standards.
- VHB has conducted a cursory review of the background traffic volume networks, and it appears that Bubaris has appropriately accounted for the additional traffic volumes to be generated by the proposed Costco development.
- The capacity analyses conducted by Bubaris indicate that the proposed traffic control signal would not have a significant adverse impact on traffic operating conditions along Buckland Road. VHB has independently verified these capacity analyses using the Synchro model developed by VHB for the Buckland Road corridor and concurs with Bubaris' conclusion. If the new signal is properly coordinated with the intersection of Tamarack Avenue to the north, as suggested by Bubaris, then it is expected to have minimal impacts to vehicle progression along southbound Buckland Road.
- Buckland Road currently provides dual left-turn lanes in the southbound direction at the intersection with Pleasant Valley Road and Buckland Hills Drive in Manchester. The proposed median modifications would reduce the storage capacity of the left-most left-turn lane from approximately 610-feet under current conditions, to approximately 340-feet under proposed conditions. Based on the capacity analysis submitted by Bubaris and verified by VHB, vehicle queue lengths under normal traffic conditions are not expected to exceed the 340-feet of storage that would be provided under this proposal.
- The Bubaris memo does not provide traffic signal warrant analysis in accordance with the requirements in the Manual on Uniform Traffic Control Devices (MUTCD). Based on VHB's review of the projected traffic volumes documented in the technical analysis memo, this location does not meet the signal warrants outlined in the MUTCD.

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- It should be noted that the proposed traffic signal could potentially induce additional U-turning traffic for motorists traveling to the Plaza at Buckland Hills shopping center. These induced U-turns would generate additional traffic through the Town of South Windsor that currently turns at the Pleasant Valley Road intersection in Manchester. The traffic volume networks in the Bubaris memo for the combined condition (including the full build out of One Buckland Center and construction of the proposed signal) assume 25 – 74 U-turns per hour at the proposed traffic signal during the peak traffic periods. However, the Bubaris memo does not include a narrative discussing the assumptions used to forecast these volumes. Understanding the volume of U-turning traffic is essential to evaluating the potential operation of the proposed traffic signal. Therefore, additional information should be provided to support the U-turning volume projections.

Conclusions and Recommendations

The analysis provided by Bubaris and verified by VHB indicates that installation of a new traffic control signal at One Buckland Center would not have a significant adverse impact on surrounding traffic operating conditions. However, the traffic volumes forecast for this location would not meet the traffic signal warrants outlined in the MUTCD unless the signal induces a significant volume of U-turning traffic, which would be undesirable.

Installation of a new traffic control signal in the state of Connecticut must be approved by the Office of the State Traffic Administration (OSTA). Research has shown that installation of unwarranted traffic signals can increase crash frequency, delays, and potentially lead to driver disobedience. As such, OSTA generally requires analysis documenting that any new traffic control signal meets the Four-Hour or Eight-Hour Volume Warrants outlined in the MUTCD, except under special circumstances for which engineering judgement is used to justify installation of the signal.

Bubaris notes that installation of a traffic control signal at the driveway would alleviate safety risks caused by illegal U-turning maneuvers that occur at the end of the median north of the site. However, based on VHB's research, no crashes involving illegal U-turns have been reported at this location within the last three years. As such, there does not appear to be evidence that accommodating this relatively low volume of U-turning traffic would address a safety issue significant enough for OSTA to consider the installation of an unwarranted traffic control signal.

VHB does not recommend approving the installation of a traffic control signal at One Buckland Center without additional analyses demonstrating that the development generates sufficient traffic to meet the signal warrants outlined in the MUTCD.

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Zarambo, Lauren L.

From: Duchesne, Christopher
Sent: Friday, September 18, 2020 12:19 PM
To: Doolittle, Jeffrey; Lipe, Michele; Lindstrom, Kristian; Eckblom, Brian
Cc: Zarambo, Lauren L.
Subject: RE: [External] FW: One Buckland Center - revised plans and traffic

Good afternoon, we have reviewed VHB's memo and concur with their concerns / recommendations.

- No data on how many cars might stack waiting to turn left into 1 Buckland
- Signal at 1 Buckland Rd will turn Red for Buckland Rd S/B traffic for cars turning right out of plaza? (p.4 2nd paragraph)- Only with Tamarack light or independently?
- 2 southbound turn lanes (onto Buckland Hills Drive) were OSTA required for Evergreen Walk development, would reduce the length of at least one lane.
- VHB review of new plan required
- Traffic study by Bubaris does appear to meet OSTA traffic light warrants
- Also how does this affect the OSTA approval for Evergreen Walk?

In addition, LT. Eckblom and I measured the distance from the end of the median to the crest of the hill with Tamarack Ave this week and it was 604 feet. That exceeds the statutory requirement of 500 feet as referenced below. That being said, one option to address illegal U-Turns that are already occurring (seemingly without incident as accident history would indicate) and at the same time address some (not all) of the access issue would be to remove the U-Turn prohibition sign. If that is what is decided I would suggest a trial period and possibly putting conditions on it such as if there is an increase in accidents related to that movement then improvements would be mandated such as a left turn lane or if warranted the proposed signal if it meets MUTCD and OSTA requirements (which at this point it does not).

Here is what MUTCD says about U-Turn prohibition signs (not really a lot of guidance with this one – below in blue). It really talks more about placement than anything. Here is what the state law CGS **14-242(d) says - No person shall turn a vehicle so as to proceed in the opposite direction upon any curve, or upon the approach to, or near the crest of, a grade, where such vehicle cannot be seen by the driver of any other vehicle approaching from either direction within five hundred feet, or at any location where signs prohibiting U-turns are posted by any traffic authority.**

Section 2B.19 Turn Prohibition Signs (R3-1 through R3-4, and R3-18)
Standard:
Except as noted in the Option, where turns are prohibited, Turn Prohibition signs shall be installed.
Guidance:
Turn Prohibition signs should be placed where they will be most easily seen by road users who might be intending to turn.
If No Right Turn (R3-1) signs (see Figure 2B-3) are used, at least one should be placed either over the roadway or at a right corner of the intersection.
If No Left Turn (R3-2) signs (see Figure 2B-3) are used, at least one should be placed either over the roadway, at the far left corner of the intersection, on a median, or in conjunction with the STOP sign or YIELD sign located on the near right corner.
Except as noted in the Option, if NO TURNS (R3-3) signs (see Figure 2B-3) are used, two signs should be used, one at a location specified for a No Right Turn sign and one at a location specified for a No Left Turn sign.
If No U-Turn (R3-4) signs (see Figure 2B-3) are used, at least one should be used at a location specified for No Left Turn signs.
If combination No U-Turn/No Left Turn (R3-18) signs (see Figure 2B-3) are used, at least one should be

used at a location specified for No Left Turn signs.
Option:
If signals are present:
A. The No Right Turn sign may be installed adjacent to a signal face viewed by road users in the right lane.
B. The No Left Turn (or No U-Turn or combination No U-Turn/No Left Turn) sign may be installed adjacent to a signal face viewed by road users in the left lane.
2003 Edition Page 2B-13
Sect. 2B.17 to 2B.19
Page 2B-14 2003 Edition
Sect. 2B.19 to 2B.21
C. A NO TURNS sign may be placed adjacent to a signal face viewed by all road users on that approach, or two signs may be used.
If signals are present, an additional Turn Prohibition sign may be ground mounted to supplement the sign mounted overhead.
Where ONE WAY signs are used (see Section 2B.32), Turn Prohibition signs may be omitted.
When the movement restriction applies during certain time periods only, the following Turn Prohibition signing alternatives may be used and are listed in order of preference:
A. Changeable message signs, especially at signalized intersections.
B. Permanently mounted signs incorporating a supplementary legend showing the hours and days during which the prohibition is applicable.
C. Portable signs, installed by proper authority, located off the roadway at each corner of the intersection. The portable signs are only to be used during the time that the turn prohibition is applicable.
Turn Prohibition signs may be omitted at a ramp entrance to an expressway or a channelized intersection where the design is such as to indicate clearly the one-way traffic movement on the ramp or turning lane.
If both left turns and U-turns are prohibited, the R3-18 sign may be used instead of separate R3-2 and R3-4 signs.