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TECHNICAL MEMORANDUM

Harris Teeter Fuel Center Traffic Impact Analysis Review

Date:	May 5, 2021	Project #: 21905.013
To:	Denise Harris	
From:	Zachary Bugg, PhD, PE; and Chris Tiesler, PE	

At the request of the Town of Warrenton, Virginia, Kittelson & Associates, Inc. (Kittelson) reviewed the traffic impact analysis (TIA) for the proposed Harris Teeter Fuel Center completed by Kimley Horn (Reference 1). We also reviewed the electronic (Synchro) analysis files. All analysis inputs and assumptions were reviewed according to VDOT TOSAM and requirements (Reference 2).

FINDINGS AND RECOMMENDATIONS

At the time the TIA was prepared, the latest version of the VDOT TOSAM had not yet been adopted. We reviewed the analysis files with this consideration, with the purpose of identifying any errors or assumptions which could substantially change the findings and results in the TIA. After detailed review, we generally agree with the findings and recommendations in the TIA. We identified the following errors and inconsistencies with VDOT TOSAM requirements in the TIA:

1. U-Turn volumes:
    - It appears the U-turn volumes in the model have been coded as left turns. Given the low U-turn demand and the limitations of the HCM 6th Edition methodology in Synchro, we are comfortable with this approach. We suggest updating the turning movement volumes in Figures 2-2, 3-1, and 4-4 to separate the U-turn and left-turn volumes.
2. Right turn on red volumes:
    - The HCM 6th Edition module in Synchro requires the user to input the hourly volume of right turns on red for each movement. The right turn on red volume has been left at zero for each scenario. We recommend increasing the number of right turns on red to a reasonable approximation of 10-50 vehicles per hour, or possibly more for heavy right turn movements. Similarly, the HCM 6th Edition module in Synchro does not accurately process right turn overlap movements. We recommend increasing the number of right turns on red to more accurately model right turn movements where right turn overlap signal phasing is provided, especially on eastbound Lee Highway at Fletcher Drive and on westbound Walker Road at Blackwell Road.

3. Peak hour factors:

    - The existing AM Synchro files uses the measured peak hour factors at the study intersections, while all other files use a peak hour factor of 1.0. The TOSAM requires the existing peak hour factor be used for existing conditions analysis and the higher of the existing peak hour factor or 0.92 (for urban environment) be used for future conditions. We recommend the peak hour factors be updated to match the TOSAM requirements. Peak hour factors should be calculated at each intersection based on the system peak hour.

4. Pedestrian volumes:

    - The raw traffic count data indicate pedestrians were counted on one or more approaches during the AM and PM peak hours, but no pedestrian demand was included in the Synchro models. We recommend adjusting the pedestrian demand and the number of pedestrian calls at signalized intersections in the Synchro model to reflect the raw pedestrian counts.

5. Grades:

    - We measured a rough estimate of +3% grade on the westbound Lee Highway approach to Fletcher Road, -5% on the northbound Fletcher Road approach to Lee Highway, -6% on the eastbound North Hill Drive approach to Blackwell Road, and -4% on the northbound Blackwell Road approach to North Hill Drive. We recommend these grades be coded into the Synchro model to reflect adjustments to the saturation flow rates.

6. Lane widths:

    - The default lane width of 12 feet was used systemwide in Synchro. We recommend reducing the lane width for the northbound and southbound Fletcher Road approaches at Lee Highway and the southbound Fletcher Road approach at Harris Teeter to 11 feet to match field conditions.

7. Signal timings:

    - It is unclear if existing signal timing information was coded into the Synchro models or not. If signal timing details are in fact represented in the models, this should be noted in the report. The following coordinated cycle lengths were modeled in Synchro and do not appear to align with conventional cycle lengths:
        - Lee Highway/Fletcher Road, PM Peak Hour: 161 second cycle length
        - Lee Highway/Fletcher Road, Saturday Peak Hour: 149 second cycle length
        - Blackwell Road/North Hill Drive, Saturday Peak Hour: 131 second cycle length

8. Queue lengths:

    - We recommend updating the headers in Table 5-1 to reflect the Saturday peak.

- The queue lengths provided in the summary in Table 5-1 do not reflect the HCM 6th Edition 95th-percentile queues provided by Synchro. We recommend updating the reported queue lengths to match the HCM 6th Edition Synchro output reports.

9. Trip assignment:

   - The directional distribution in Figure 4-1 indicates 17% of trips will be assigned to the northbound left turn on Blackwell Road at North Hill Drive and 16% of trips will be assigned to westbound Walker Drive at Blackwell Road, but there are a higher number of PM peak hour trips (4) assigned to westbound Walker Drive than the northbound left turn on Blackwell Road (3) in Figure 4-2. The same is true in the opposite direction. We recommend swapping the volume of trips assigned to these movements to more closely match the assumed directional distribution.
   - Assuming a 2% trip distribution to North Hill Drive west of Fletcher Drive, the trip assignment to the movements to/from the west leg of North Hill Drive/Fletcher Drive would be zero (0) trips. Unless it is desired to maintain a minimum of one trip at these movements, we recommend reassigning the single trip elsewhere within the network.
   - Some of the pass-by trips shown in Figure 4-3 have been assigned as diverted trips from Lee Highway. Due to the low existing through volumes on Fletcher Drive near the site, we recommend that all pass-by trips be assigned as diverted trips from Lee Highway. Typically pass-by trips would represent no more than 15 percent of the total through volume on Fletcher Drive. The table below identifies the existing northbound through traffic volume on Fletcher Drive and the assumed pass-by percentage associated with the northbound movement, as well as the maximum recommended northbound pass-by volume:

Time Period	NB Through Volume (vph)	NB Pass-Bys (vph)	Percent Pass-Bys Assumed	Recommended NB Pass-Bys (vph)
AM	12	7	58%	2
PM	39	6	15%	6
SAT	27	6	22%	4

The following comments are related to our review of the TIA documentation and site plan drawings:

10. Truck turning movements:

    - From the site plan it is unclear where the fuel tanks will be located and/or how fuel trucks will access the site. We recommend providing truck turning movements/path for fuel truck access.

11. On-site circulation:

    - Town staff have noted issues with existing on-site circulation as a result of the site layout, which funnels all ingress and egress traffic through the drive aisles directly in front of the strip mall, leading to concerns that adding a fuel station could exacerbate these issues. Inbound vehicles must make a 180-degree right turn to continue circulating the parking areas away from the drive aisle in front of Harris Teeter. The proposed site plan will provide a short one-way inbound drive aisle to connect the access road with the fuel center area. We recommend the TIA report be expanded to address existing issues with on-site circulation and how these will be improved with the addition of the fuel center and new one-way inbound drive aisle.

12. Parking:

    - The concept site plan notes the addition of the fuel center will result in a net loss of 66 parking spaces on-site. While the number of parking spaces provided will continue to meet the Town's minimum parking requirement, Town staff have raised concerns that existing parking demand favors the southern end of the site (nearer to the proposed fuel center) due to proximity to the single access road and the location of the strip mall. The image below was taken by Town staff during midday on a typical Thursday in March 2021 and documents the high parking demand in this area (directly in front of the optometrist / dental offices). We recommend the TIA report be expanded to address site circulation to other parking areas on the north side of the site that will become more heavily utilized after the proposed fuel center removes parking on the south side of the site. The attached site plan markup provides an alternative to improve inbound circulation to the fuel center and relocate parking to other areas of the site—this is intended to reduce underutilized parking near the fuel center and mitigate potential conflicts between the fuel center and parking areas, while retaining necessary landscaping minimums.

Thank you for the opportunity to review. If you have any questions, please contact us at 571-384-2943.

ATTACHMENT

A. Site Plan Markup

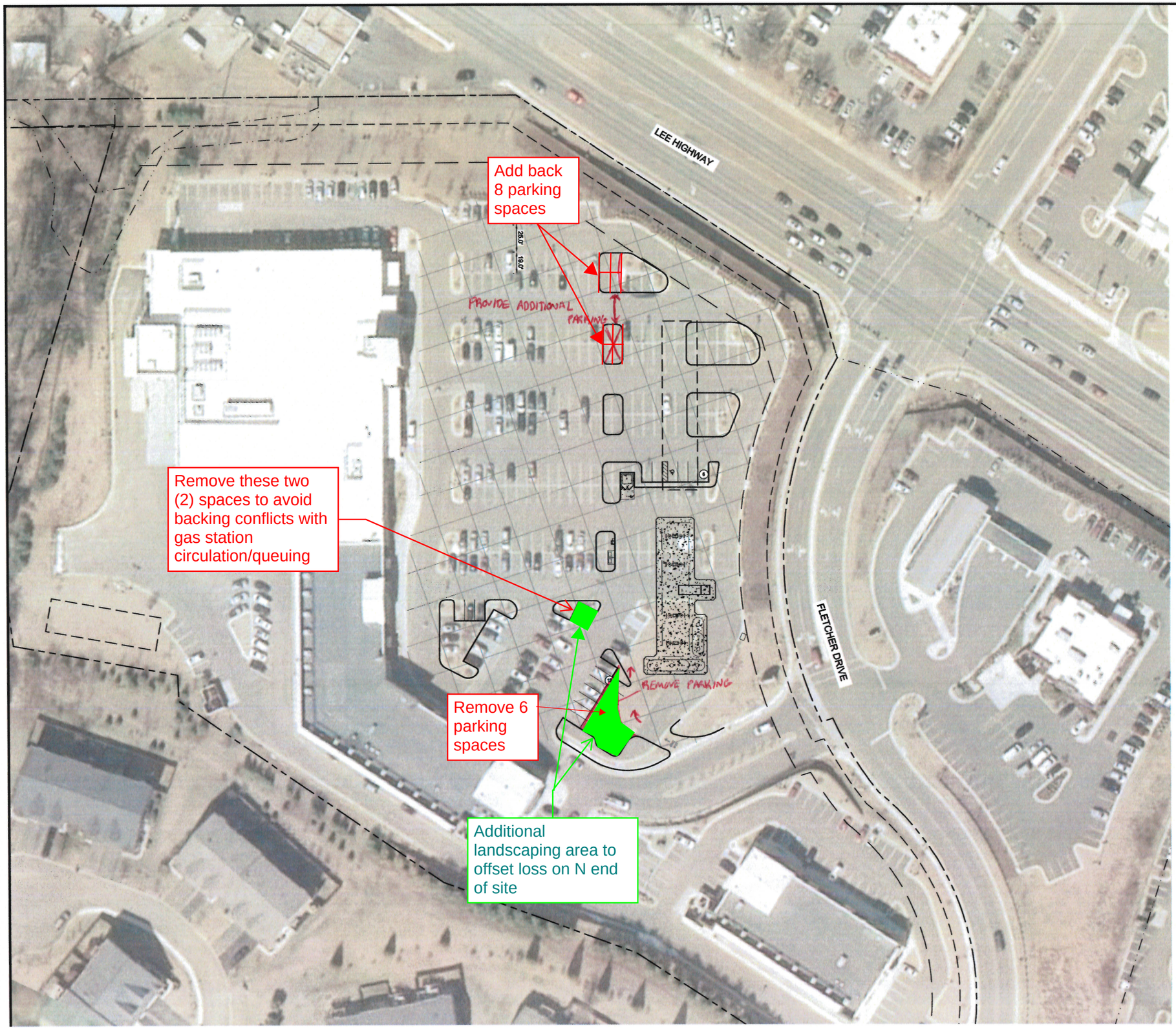
REFERENCES

1. Kimley Horn. Harris Teeter Fuel Center Traffic Impact Analysis. January 2020.
2. Virginia Department of Transportation. Traffic Operations and Safety Analysis Manual (TOSAM) – Version 2.0. February 2020.

DISCLAIMER

This memorandum prepared by KITTELSON & ASSOCIATES INC. merely represents our professional, unbiased opinion with regard to the deliverable. This opinion is based solely on KITTELSON & ASSOCIATES, INC.'S evaluation of the information provided by the Town of Warrenton, and should not be considered an exhaustive review, insurance against errors or omissions in the deliverable, or advocacy of the intended project. The Town of Warrenton agrees that the purpose and intent of KITTELSON & ASSOCIATES, INC.'S evaluation of the deliverable is to reduce the risk of errors or omissions only and not to eliminate such risk. KITTELSON & ASSOCIATES, INC. offers no warranty or guarantee with regard to this plan review.

Attachment A
Site Plan Markup



ZONING

- ZONE: PUD
- USE: SHOPPING CENTER
- PARCEL ACREAGE: 11.67 ACRES

PARKING

- EXISTING PARKING SPACES WITHIN DELINEATED PARKING FIELD: 281
- EXISTING COMMERCIAL USE (HARRIS TEETER AND ADJACENT STRIP RETAIL) SF: 78,534 SF
- PROPOSED COMMERCIAL USE (HARRIS TEETERS, ADJACENT STRIP RETAIL AND HARRIS TEETER GAS STATION) SF: 81,570 SF
- PARKING REQUIREMENT PER CURRENT ZONING ORDINANCE: 1 PER 300 SF FOR FIRST 12,000 SF, 2 PER ADDITIONAL 1,000 SF
- REQUIRED PARKING: 179 SPACES
- PARKING SPACES TO BE REMOVED: 85
- PARKING SPACES PROPOSED W/GAS STATION: 19
- TOTAL PROVIDED WITHIN DELINEATED PARKING FIELD: 215
- PROPOSED PARKING RATE FOR AREA DELINEATED 2.64 SPACES PER 1,000 SF OF GFA
- INTERIOR LANDSCAPING REQUIREMENTS: 10% OF PARKING LOT
- INTERIOR LANDSCAPING PROVIDED: ±10.1%

GRAPHIC SCALE IN FEET
0 20 40 80

NORTH

Kimley»Horn
11400 COMMERCE PARK DRIVE,
SUITE 400
RESTON, VIRGINIA 20191
PHONE #: 703-674-1300

NO.	DATE	REVISIONS

CLIENT: HARRIS TEETER

PROJECT: HARRIS TEETER FUEL CENTER
STORE #329 - WARRENTON
FLETCHER DRIVE
WARRENTON, VIRGINIA

OVERALL CONCEPT PLAN

DESIGNED BY:	CAH
DRAWN BY:	CAH
CHECKED BY:	KB
DATE:	05/28/2019
PROJECT#:	015640126

EX-1