

April 5, 2010

Mr. Edward G. Rolfe  
Chairman  
Town of Carlisle  
66 Westford Street  
Carlisle, MA 01741

RE: Nitsch Project #7976  
Traffic Peer Review  
40B - Benfield Farms  
Carlisle MA

Dear Chairman Rolfe,

The Town of Carlisle has retained Nitsch Engineering to conduct a peer review of the analysis and evaluation of the traffic impact and access study associated with the development of the Benfield Farms on South Street in Carlisle, Massachusetts. The Traffic Impact and Access Study (TIAS) was prepared by MS Transportation Systems Inc. As part of the Comprehensive Permit application, a site plan prepared by Meridian Associates was included. Per the site plan, access to Benfield Farms will be through two access driveways, one on the north side and one the south of the property along South Street.

The traffic study was completed according to current practices as stated in the TIAS, in consultation with the Town of Carlisle and the Massachusetts Department of Transportation (MassDOT), formerly known as Massachusetts Highway Department (MHD). Nitsch Engineering has reviewed the following documents as part of the peer review:

- Traffic Impact and Access Study, by MS Transportation Systems Inc.; dated December 2004, and,
- Site Plan Set, Comprehensive Permit Application, by Meridian Associates; dated March 2010.

The proponent's review of traffic impacts as part of the TIAS is adequate. The proponent's engineer has identified sight distance deficiency at the proposed south driveway of the project. Accordingly, the recommendation is to provide advanced signage on South Street and clear and visible stop control on the proposed south driveway. Overall, Nitsch Engineering concurs with the methodology, but recommends collecting traffic data from 2010 on South Street and comparing it to the 2004 volumes. This is an important step is analyzing the traffic impacts as they apply to the existing year and the future build conditions.

## **SITE AND PROJECT DESCRIPTIONS**

The project consists of a 28-unit residential development off of South Street. Access to the proposed development will be provided from South Street at approximately 1500 feet north of the intersection of South Street and West Street. Two driveways into Benfield farms, one on the north side and one on the south side of the property are proposed.

The traffic study area, as noted within the traffic study, includes the following intersections:

1. South Street at Concord Street
2. South Street at West Street

## **FIELD RECONNAISSANCE**

The TIAS report provided an assessment of the study area roadways South Street, West Street and Concord Street and two (2) intersections in the vicinity of the proposed site. The existing roadway characteristics such as number of travel lanes, lane configurations, and pavement markings described in this section are consistent and reflect the existing conditions. Pavement width and speed signage were also included in the roadway inventory. Nitsch Engineering concurs with the information provided.

## **EXISTING TRAFFIC VOLUMES**

The TIAS included manual Turning Movement Counts (TMC) that were collected during weekday morning peak hours (7:00 AM to 9:00 AM) and weekday evening peak period (4:00 PM to 6:00 PM), completed in December 2004 at the two (2) study intersections. The TIAS also used traffic numbers generated by Automatic Traffic Recorder (ATR) counts that were conducted in December 2008 on South Street near the project and on Concord Street, north of South Street.

Pedestrian and bicycle counts were not provided at any of the study intersections. If the intersections generally experience negligible pedestrian and bicycle activity, it should be mentioned in the report. Additionally, Nitsch Engineering recommends that the traffic analyses be updated with 2010 volumes to evaluate existing and future impacts.

## **SEASONAL ADJUSTMENTS**

The December 2004 traffic volumes were adjusted upwards to account for seasonal variation of traffic. Since December volumes are traditionally lower than the average month of the year, volumes were adjusted upwards by +4.7%, which is conservative but is considered standard practice. Nitsch Engineering concurs with the methodology used.

## **SIGHT DISTANCE**

The Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) have been calculated based on the guidelines in *A Policy on Geometric Design of Highways and Streets* by the American Association of State Highway and Transportation Officials (AASHTO). The SSD and ISD at the proposed north driveway is adequate for safe clearing of the intersections. However, the SSD and ISD at the proposed south driveway were found to be inadequate because of a horizontal curve just south of the intersection. Accordingly, the proponent's engineer recommends trimming of vegetation at the south driveway to increase visibility, placement of advance warning signs on South Street and clear and visible stop controls on the proposed south driveway. Traffic calming measures should also be considered if the Town wishes to pursue that option. Nitsch Engineering concurs with the methodology and the recommendations.

## **CRASH DATA AND SAFETY ANALYSIS**

The TIAS included reference to crash data obtained from the MHD records for the years 2000, 2001, and 2002. It also states that 6 crashes were reported at the two (2) intersections combined, of which about 60% were during wet or city conditions and 50% involved a fixed object. The crash rate analysis was completed, and neither of the intersections was found to have higher crash rates than the Statewide or district-wide average. Nitsch Engineering concurs with the methodology used in crash rate calculations.

The crashes and crash rates were reviewed in December 2004. Nitsch Engineering recommends that the latest three years of crashes i.e. 2006, 2007 and 2008, available through MassDOT be reviewed to identify any new safety deficiencies since the report was prepared.

## **NO-BUILD TRAFFIC VOLUMES**

The 2009 No-Build traffic volumes were established by increasing the existing 2004 traffic volumes by a 1.5% per year compounded annual growth rate and by adding the trips associated with other planned developments in the area. A summary of trips generated by other planned developments was also included. Nitsch Engineering concurs with the methodology, and recommends that if the existing traffic counts from 2010 are higher than the 2004 volumes, then the no-build traffic analyses should be updated accordingly.

## **VEHICLE TRIP GENERATION/DISTRIBUTION**

Vehicle trip generation calculations were performed for the proposed site based on the ITE's *Trip Generation* manual (7<sup>th</sup> Edition) using Land Use Codes (LUC) 230 – with dwelling units as the variable. The proposed development would have 28 condominiums/townhomes.

The Trip Generation Manual provides two (2) methods of trip estimation whenever sufficient data is available - the average rate and the fitted curve equation. The TIAS however does not mention which methodology was used. Nitsch Engineering recommends using the fitted curve equation if it was not already used as it has an R<sup>2</sup> upwards of 0.75. A higher R<sup>2</sup> value indicates that a higher number of data points are covered for a given equation.

The site-generated vehicle trips were then distributed on adjacent roadways using journey to work data from the 2000 census. The TIAS does not include a gravity model to support the proposed trip distribution. We concur with the methodology used and the results.

## **FUTURE TRAFFIC VOLUMES – BUILD CONDITIONS**

The 2009 Build conditions traffic volumes network was established by adding the 2009 No-Build traffic volumes and anticipated project related traffic. Nitsch Engineering concurs with the methodology, but would recommend updating the traffic analyses if the 2010 traffic counts are found to be higher than the 2004 volumes.

## **TRAFFIC OPERATIONAL ANALYSIS**

The TIAS included capacity analyses for the two (2) unsignalized intersections within the study area. The results of the analysis presented in the LOS summary table and analysis worksheet are comprehensive and include v/c ratios, delay and Level of Service (LOS). Nitsch Engineering concurs with the methodology

## **WARRANT ANALYSIS**

The volumes at the two (2) study intersections are low, and would not meet signal warrants. Additionally, the crash rates are low, indicating that there would be no immediate benefit to installing a signal. Nitsch Engineering recommends adding a section on warrant analyses to the TIAS to aid other projects planned in the area.

## **FAIR SHARE CONTRIBUTION**

The proponent's engineer has recommended addressing the site distance at the proposed south driveway by installing advance warning signs on South Street. Selective trimming of vegetation is also recommended and

warranted. The inclusion of stop controls on the proposed site driveway would not be considered mitigation as such controls would be required for the safe operation of driveway traffic.

## **SITE PLAN REVIEW and ACCESS CONDITIONS**

Nitsch Engineering has reviewed the site plan for adequate and safe access/egress conditions and on-site traffic circulation. The proposed site plan is adequate for addressing the access/egress requirements. Parking supply of 50 standard parking spaces is shown on the site plans. Nitsch Engineering concurs with the number of parking spaces provided for the residential component of the project. Nitsch Engineering recommends designating an accessible parking space near the north entrance into the building to provide a total of 3 accessible parking spaces.

It is suggested that a parking summary table and corresponding write-up be included in the TIAS under a parking section. The parking assessment during games in the recreation field should also be included. Six parking spaces ("soft" spaces) located near the walkway would not be sufficient to hold all game-related parking demand. Additionally, fire access and circulation requirements should be coordinated with the Fire Department.

## **CONCLUSION/RECOMMENDATIONS**

Nitsch Engineering has the following comments and recommendations based on our review of the traffic study, the site plan, and access conditions:

- Collect traffic data from 2010 on South Street and compare them to the 2004 volumes;
- Review crash data from the latest three years of data available with MassDOT;
- Include the type of ITE data – average vs. fitted curve, used to estimate site trips. Use the fitted curve equation if it was not used previously;
- Update the traffic analyses for No-Build and Build if the 2010 traffic counts are found to be higher than the 2004 volumes;
- Include a section on signal warrant analyses;
- Designate an accessible parking space near the north entrance into the building;
- Include a parking summary table and corresponding write-up in the TIAS under a parking section
- Include a parking assessment during games in the playing field; and
- Coordinate fire access and circulation requirements with the Fire Department.

If you have any questions or require additional clarifications, please call me.

Very truly yours,

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**Nitsch Engineering, Inc.**

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