SUNY Uptown Campus and Harriman State Office Campus Traffic Impact Study for the Emerging Technology and Entrepreneurship Complex (ETEC) Building

State University of New York at Albany

City of Albany, Albany Co., New York

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Prepared For:

State University Construction Fund
State University Plaza
353 Broadway
Albany, New York 12246

Prepared By:

Engineering and Land Surveying, P.C.

1533 Crescent Road
Clifton Park, NY 12065
Phone: 518.371.0799
Fax: 518.371.0822
mjelspc@mjels.com

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1.0 INTRODUCTION

This traffic impact study has been prepared to quantify and evaluate the effect of the construction of the proposed Emerging Technology and Entrepreneurship Complex (ETEC) Building on traffic circulation at the SUNY Albany Uptown Campus, Harriman State Office Campus and the interaction with regard to traffic mobility.

The proposed ETEC Building is currently planned to be located on a 12 acre vacant parcel at the southeast corner of the Harriman State Office Campus. Construction is anticipated to be completed in 2020.

FIGURE 1.1: SITE LOCATION

2.0 STUDY METHODOLOGY

The purpose of this study is to develop an understanding of existing traffic conditions and a baseline condition assessment of major intersections on the SUNY Albany Uptown Campus and the Harriman State Office Campus. The anticipated distribution of traffic as a result of new vehicular trips to the Harriman Campus is reflected in the proposed conditions assessment.

Traffic models were developed utilizing the traffic analysis software Synchro 8© which is an industry standard analysis package that analyzes traffic conditions at intersections to provide a measure of effectiveness in terms of Level of Service (LOS). Procedures for the analysis are in conformance with the Transportation Research Board of the National Academies Highway Capacity Manual (HCM). LOS is defined in terms of average delay per vehicle in seconds. The New York State Department of Transportation (NYSDOT) Highway Design Manual (HDM), Section 5.2.2.1, describes LOS as "a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Levels of service are given letter designations, from A to F, with LOS A representing the best operating condition and LOS F the worst."

Intersection design practice as determined by the NYSDOT strives to provide a minimum LOS D or better for each lane group in urban areas and LOS C in rural areas. Although LOS D is acceptable in urban environments, LOS C is the preferred minimum for overall approach LOS, with LOS D acceptable for specific low volume movements within an intersection.

INTERSECTION LEVEL OF SERVICE

Level of Service	Unsignalized Intersection Delay (sec/veh)	Description
A	≤ 10	Excellent
B	> 10 & ≤ 15	Very Good
C	> 15 & ≤ 25	Good
D	> 25 & ≤ 35	Acceptable
E	> 35 & ≤ 50	Poor
F	> 50	Failing

The results from the existing and proposed conditions analyses are compared to assess the effect on traffic circulation as a result of the construction of the ETEC Building.

3.0 EXISTING CONDITIONS

The data collection times used to assess existing turning movement volumes on the SUNY Uptown Campus were based on class schedule concentrations provided by SUNY Albany. Based on the information provided, the peak concentrations occur between 9:20 to 10:25am and 1:15 and 2:45pm on Tuesdays, Wednesdays and Thursdays. Class schedules for Mondays and Fridays were not considered due to the irregular traffic patterns caused by students and faculty coming back from or leaving for off-campus or out of town trips.

Additional data was recorded for the SUNY Albany and Harriman State Office campuses utilizing Automatic Traffic Recorders (ATRs) consisting of air tubes installed across the roadway to obtain data for a period of seven days from November 9 to November 16, 2016 and November 16 to November 23, 2016 respectively. Due to the State Office Campus ring road configuration, intersection turning movement counts were not performed. Since there are not any intersections and only driveways accessing the ring road, the required data can be obtained utilizing ATRs at 8 locations, and calculating the volumes for the remaining sections. See Figure 3.1 for ATR locations.

FIGURE 3.1: ATR COUNT LOCATIONS

On the SUNY Albany campus, University Drive, with a posted speed of 25 mph, loops around the campus and is a two-lane two-way roadway with curbs. Center Drive East, Indian Drive and Justice Drive are also two-lane two-way roadways that intersect University Drive. These roads service the UAlbany Campus Police, UAlbany Maintenance, a sculpture studio in addition to student, faculty and special parking areas within the area studied.

On the Harriman State Office campus, the ring roads, with a posted speed of 40 mph, loops around the campus with opposing directions (3-lanes each) separated by a ±200 ft grass median with curbs. Ramps connect the interior and exterior ring roads to allow for vehicles to perform u-turns with minimal interruption to traffic. The ring road services the State Police Facilities and the Department of Tax and Finance near the proposed ETEC site. The Average Annual Daily Traffic on the Harriman State Office campus Ring Roads in the vicinity of the proposed ETEC building are 4,560 for the outer ring and 3,020 for the inner ring road.

3.1 Establishing Existing Model

Existing turning movements were counted on Thursday November 12, 2015 from 8:30 to 10:30am and 1:00 to 3:00pm to capture students and faculty/staff arriving and departing for the highest class concentrations. These baseline traffic volumes were collected at three (3) intersections along University Drive East. The three (3) intersections are as follows and shown in Figure 3.2:

1. Center Drive East & University Drive East
2. Indian Drive & University Drive East
3. Justice Drive & University Drive East

Based upon the traffic count information, the peak hours generally occurred from 8:30 to 9:30am and 1:00 to 2:00pm on the UAlbany Campus. The ATR data obtained for University Drive supports these peak flow times.

These intersections were chosen for analysis to determine traffic volumes in the vicinity of the anticipated terminus of the proposed pedestrian boulevard.

The data collected for the existing turning movement volumes for the above intersections is included in Appendix A and depicted in Appendix B.

Historical data indicates that enrollment in the spring semester is typically lower than enrollment in the fall semester due to student attrition. Historical enrollment numbers show that fluctuations do occur on a year-by-year basis. The turning movement counts were performed in the fall, therefore; the existing volumes represent the anticipated worst case scenario.

FIGURE 3.2: INTERSECTION COUNT LOCATIONS

Synchro 8 is industry standard traffic analysis software with micro-simulation and animation capabilities. The software provides a useful tool to analyze and assess impacts of projects on the roadway network around a proposed project.

Turning movement volumes were entered into the traffic model developed in Synchro 8 to analyze the performance of the three (3) intersections. The traffic model was built to scale utilizing aerial imagery to obtain an accurate representation of the existing conditions at the Uptown Campus.

Results

Intersection movements controlled by a stop control device (i.e. stop or yield sign), along with movements that conflict with other movements (i.e. left turns), currently operate at acceptable levels of service between LOS A & B. Intersection Capacity Utilization (ICU) ranges from 20.5% to 33% and correlates to ICU LOS A. Based on these values, the intersections are currently operating below capacity and have the potential to accommodate increases in the traffic volumes.

The no-build option was not included in the analysis. The change in results would be negligible given the increase in traffic volumes for any given turning movement resulted in a maximum increase of 3 vehicles during the peak hour. With the ICU ranging from 20 to 33%, the functionality will not be adversely affected.

A table with the full results for the existing condition can be found in Appendix B.

4.0 PROPOSED CONDITIONS

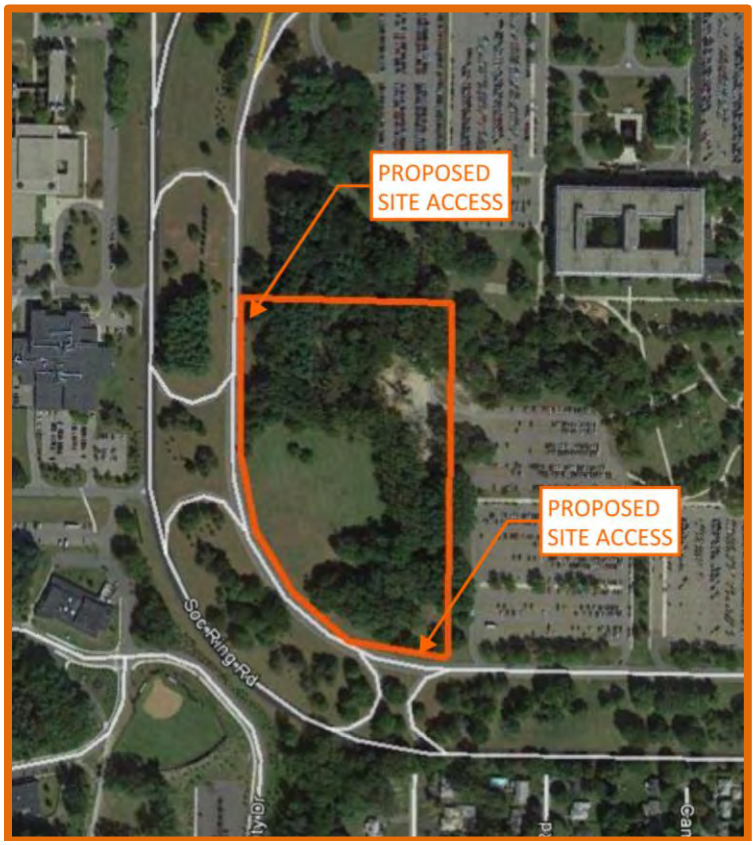
The new ETEC Building is a combination of classroom, university research and development facilities along with relocated on-campus facilities, relocated department offices and third party utilization consisting of office and research and development usage.

The building will be approximately 235,000 gross square feet with approximately 134,000 of program space. Proposed occupants of the proposed ETEC building at the time of this report are as follows:

1. Department of Atmospheric and Environmental Sciences
2. Atmospheric Science Research Center
3. Small Business Development Center & VBR Business Development
4. Private Partnership
5. Classrooms
6. Tech Services Support
7. Lounge & Conference Rooms
8. Chemistry/CAS Sciences
9. Physics
10. College of Emergency Preparedness, Homeland Security and Cyber Security

There are two points of access to the on-site parking lots located on the southeast and northwest corners of the proposed 12 acre site. See Figure 4.1 for proposed access.

FIGURE 4.1: PROPOSED SITE ACCESS



The current UAlbany Shuttle service will potentially run between the UAlbany and Harriman campuses utilizing the access behind the sculpture studio to access the existing outer ring road and utilize the existing ring road system to access the ETEC site.

4.1 New Vehicular Trips

The Institute of Transportation Engineers, Trip Generation Manual, 9th Edition was utilized to determine new trips for the proposed ETEC Building (See Appendix D for information). A combination of Land Use Codes for Office and Research & Development facilities were used to determine vehicular trips anticipated for the new ETEC Building based on anticipated building area and usage. One (1) trip is equivalent to one (1) vehicular trip with an assumed occupancy of one (1) driver.

Based upon the proposed building area and usage, 1,647 daily trips are estimated to be generated. Since the proposed uses for the ETEC Building include programs already on campus, a portion of the proposed trip generation was removed from the projected total new trips. The occupants on the following list are anticipated to have some or all of their program space moved to the proposed ETEC building:

1. Department of Atmospheric and Environmental Sciences
2. Atmospheric Science Research Center
3. Chemistry/CAS Sciences
4. Physics

An estimated 459 trips are considered relocated trips from the Uptown Campus and are removed from the total of 1,647 anticipated trips. As such, the projected trip total for persons utilizing the proposed ETEC building is estimated to be 1,188 anticipated daily trips. Of the projected 1,188 daily trips, a portion of the trips are considered to be internal trips to the Uptown Campus that utilize other forms of transportation to reach their destination. Other forms of transportation include, but are not limited to, students and faculty that are already on campus for other reasons, walking, public transportation, bicycle and university supplied shuttle buses. For the purposes of this study, MJ assumed that the internal trips will not add additional vehicular traffic to either the UAlbany or Harriman campus. The internal trip percentage was assessed by adding up the anticipated number of trips arriving at ETEC using alternative modes of transportation based on Capital District Transportation Authority (CDTA), UAlbany shuttle service and other trip data provided by UAlbany. The total reductions noted above account for approximately 32% of the daily 1,188 trips, or 383 daily trips. Under those assumptions, 805 total new daily vehicular trips are projected to be associated with the proposed ETEC building.

Using the data collected from the automatic traffic recorders (ATRs), approximately 9% of the total trips (or 76 peak hour trips) occur during the peak hours (8:30 AM to 9:30 AM & 1:00 PM to 2:00 PM). It is anticipated that as many as six (6) trips will originate from the UAlbany campus and arrive at the proposed ETEC building. As such, the total number of trips that were added to the new baseline traffic volumes was 82 peak hour trips.

VEHICULAR TRIP SUMMARY	
Description	**Amount**
Total Trips from ITE Trip Gen, 9th Edition	1,647 trips
Trips from Relocated Departments and Facilities	459 trips
Subtotal	1,188 trips
Internal Trip Reduction (%)	32%
Internal Trip Reduction	383 trips
Subtotal	805 trips
Peak Hour Volume (% of AADT)	9.4%
Total Peak Trips	76
Non-Student Trips from UAlbany Campus	6
Total Peak Trips	82

The CDTA is currently exploring a new route for the Bus Rapid Transit (BRT) service along the Western Avenue corridor. It is MJ's understanding that the route will travel through the Harriman campus and access the UAlbany campus to the north of the sculpture studio. Since the proposed layout of the route has not been progressed beyond the concept phase, MJ did not include the projected impact in this impact study. It is projected that there will be a BRT station stop adjacent to the proposed ETEC site resulting in additional pedestrian traffic crossing the Harriman Campus ring roads.

MJ understands that the Harriman State Office campus is currently exploring the option to sell some of the land on the east end to a developer. Since the development of that portion of the Harriman campus is in the preliminary phase, impacts associated with the future development are not included in this impact study.

4.2 Proposed Model

The proposed traffic model consisted of anticipated turning movement volumes that were assessed by adding the new trips to the SUNY Albany Uptown Campus and Harriman State Office Campus roadway networks.

Based upon information provided by UAlbany, enrollment is projected to increase by approximately 2,700 students between the existing condition (2015) and proposed condition (2020). Since the specific impacts that the projected enrollment increase will have on the functionality of University Drive are unknown, the effect was not quantified in this analysis. A growth rate of 0.5% was utilized to account for traffic growth associated with the roadway network outside of the SUNY Campus.

MJ understands that the plans for the ETEC building include a future expansion of 80,000 gross square feet (GSF). Based on the current building GSF compared to the net square footage (NSF), the future expansion would have an approximate area of 45,000 NSF of usable program space. This is approximately 33% of the ETEC building gross area and MJ assumed that the future expansion would increase existing uses proportionally. If and when the expansion occurs, a traffic impact study should be conducted to assess the effects, if any, on the adjacent roadway network. Without a definable timetable for the expansion and the unknown proposed developments in the area around the campuses, those future expansions were not included in this impact study.

Results

Based upon the traffic modeling, the intersection LOS with the completion of the ETEC Building impacts does not alter the existing LOS designation. The delay is projected to increase a maximum of 0.4 seconds and the LOS remains the same for all controlled or conflicting turning movements at the three (3) intersections evaluated.

A table with the full results of this analysis is included in Appendix E.

5.0 RESULTS COMPARISON

Based on the results of the LOS analyses performed for the existing and proposed conditions in relation to the internal roadway network for the Uptown campus, the functionality of the three (3) study area intersections will not be adversely affected by the proposed ETEC Building construction and the resultant change in traffic flows associated with the new trips for the peak hours studied.

The existing and proposed levels of service are comparable with localized maximum increases in delay of 0.4 seconds occurring during the peak hours from 8:30 to 9:30am and 1:00 to 2:00pm on the UAlbany Campus.

6.0 PEDESTRIAN & BICYCLE ACCESS

6.1 Pedestrian Access

Pedestrian facilities are proposed from the SUNY Campus in the vicinity of the Indian East Student Parking lot along a southeasterly alignment to the north of the existing SUNY Sculpture Studio and connecting to the outer ring road on the Harriman Campus south of the entrance to the State Police facilities. The pedestrian access is proposed to be an extension of the SUNY campus by constructing a wide pedestrian boulevard. See the map below for the anticipated route of the pedestrian connection from SUNY Albany to the Harriman Campus. See Figure 6.1 for anticipated pedestrian route.

FIGURE 6.1: PEDESTRIAN ROUTE

The traffic volumes on the ring road for the anticipated crossing points of the pedestrian access are as follows:

AM Peak – Outer Ring Road = 370 veh / hr
AM Peak – Inner Ring Road = 254 veh / hr
PM Peak – Outer Ring Road = 380 veh / hr
PM Peak – Inner Ring Road = 253 veh / hr

Pedestrian volumes are anticipated to be a maximum two-way total of 1,030 based on the Program Re-Validation performed by Cannon Design. The classrooms proposed for the ETEC facility can hold a maximum of 515 students. Typically, classes at UAlbany have ten (10) minute breaks between classes.

As such, the worst case pedestrian volume is projected to be the full 1,030 students coming and going from classes. It is likely that some of the students will remain at the ETEC facility to attend the next class, study, or use one of the common areas for other reasons. For the purpose of this impact analysis, MJ assumes the worst case scenario to be conservative.

NYSDOT Pedestrian Facility Design guidance in HDM Chapter 18 for 3-lane roadways with vehicular AADT less than 9,000 and a speed limit of 40 mph, states that a "possible increase in pedestrian crash risk may occur if crosswalks are added without adequate design features and/or traffic control devices." For the purpose of this analysis, a conservative speed of 50 mph is utilized as actual operating speeds approach 50 mph based on field investigations. These locations should be studied and monitored to ensure the proper design elements are included for the specific site conditions. NYSDOT recommends that a minimum of 20 pedestrian crossings per hour exist at a location before placing a high priority on the installation of a marked crosswalk alone. The anticipated pedestrian volumes at the proposed location will most likely be above the 20 crossing threshold given the student volumes alone and will further increase with the installation of a BRT station.

The AASHTO Guide for the Development of Bicycle Facilities, 2012, Fourth Edition and NYSDOT HDM Chapter 8 both state that marked crosswalks alone should not be installed where speed limits exceed 40 mph. The speed limit on the Harriman campus is 40 mph, with actual operating speeds higher than this posted speed limit.

The Manual on Uniform Traffic Control Devices (MUTCD) contains warrants with minimum volume requirements that if satisfied, are one step in determining whether a traffic signal is warranted. The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

The MUTCD Pedestrian Warrant 4 would be met if the worst case pedestrian volumes assumed above occur at the proposed crossing location. Figure 4C-8 in Section 4C.05 was utilized for the warrant since the posted speed is over 35 mph as stated in paragraph 3 of the same section. Although the pedestrian and vehicular volume requirements are met, an engineering study is required to justify the need for the signal per MUTCD.

Pedestrian At-Grade Crossing (Non-Signalized)

According to Institute of Transportation Engineers (ITE) and MUTCD standards, the average walking speed of pedestrians is between 3.5 and 4.0 feet per second, respectively. The inner and outer ring roads consist of three (3) travel lanes, each 12 feet wide resulting in a total width of 36 feet. This results in pedestrian crossing times of 9.0 and 10.3 seconds for walking speeds of 4.0 and 3.5 feet per second, respectively.

Assuming the heaviest volume of 380 vehicles per hour during the PM peak on the outer ring of the Harriman Campus Road, one (1) vehicle will pass every 9.5 seconds on average. Given that students will utilize this crossing, a walking speed of 4.0 feet per second can be assumed. This duration is above the 9.0 second walking time required to cross three (3) 12 foot lanes. Based on field observations, vehicles travel on the ring road in platoons rather than being evenly spaced. As such, longer durations for pedestrian platoons to cross safely are anticipated.

Mid-Block Signalized Pedestrian Crossing

With a pedestrian activated signal, MJ has assumed that two (2) separate signals will be installed, one on each ring road, that will act independently of each other due to the approximately 200 foot-wide median separation. A continuation of the pedestrian boulevard would be required across this median with accessible curb ramps installed adjacent to the ring roads for access to the crosswalks.

Pedestrian Signal Timing

Pursuant to the MUTCD and ITE standards, the required timing for the pedestrian signal was assessed. A pedestrian signal consists of three (3) intervals; Pedestrian Walk Interval, Pedestrian Clearance Interval, Pedestrian Do Not Walk Interval. Many municipalities utilize standard walking speeds of 3.0 to 3.5 ft/sec with the MUTCD recommending a speed of 4.0 ft/sec. For the purposes of this traffic study, an average walking speed of 3.5 ft/sec was assumed.

The pedestrian walk interval, represented by the man symbol, must be adequate for pedestrians to perceive the walk indication and depart the curb prior to the start of the clearance interval. MUTCD standards require this interval to be a minimum of seven (7) seconds. This time is deemed insufficient for the anticipated pedestrian volumes at this location due to the potential for groups of students walking to the proposed ETEC building for various activities. For areas with higher pedestrian volumes, the typical range is 10 to 15 seconds. For the proposed crossing location, MJ assumed that ten (10) seconds is an appropriate walk interval since students usually travel in groups throughout campus. The sizes of the groups are anticipated to be at numbers that will be served by the ten (10) second walk interval.

The Pedestrian Clearance Interval, represented by the flashing hand symbol, is estimated using the distance from the curb to the far side of the ring road per MUTCD standards. Assuming a walking speed of 3.5 ft/sec and a distance of 40 feet, the clearance interval was estimated to be 12 seconds.

The Pedestrian Do Not Walk Interval, represented by the steady hand symbol, will display until a pedestrian activates the push button.

Vehicular Signal Timing

A vehicular traffic signal consists of three (3) intervals; the Green Interval, Yellow Change Interval and Red Clearance Interval.

The Green Interval will be programmed to rest in green until the pedestrian push button is activated. If the pushbutton is not activated, the signal will stay green indefinitely and traffic will flow uninterrupted.

The Yellow Change Interval is estimated utilizing ITE standards to be five (5) seconds for an approach speed of 50 mph. Although the posted speed is 40 mph, speeds on the ring roads were observed to exceed this speed. As such, a conservative approach speed of 50 mph was utilized.

The Red Clearance Interval occurs when the red indication on the vehicular traffic signal and the steady hand symbol on the pedestrian signal are displayed concurrently. This is known as the All Red Interval and has been calculated per ITE standards as one (1) second.

The vehicular phase of the proposed mid-block crossing signal will have a minimum green time associated with it before the signal will return to the pedestrian phase. Preliminary timings were developed to assess the efficiency of the signal in transferring pedestrians across the Harriman campus ring roads during the ten (10) minute break between classes. MJ assumed that pedestrians traveling in opposite directions will arrive at the mid-block crossing at approximately the same patterns.

If the min green time was 30 seconds, it would take eight (8) pedestrian signal cycle lengths (or approximately seven (7) minutes) to allow for all 515 pedestrians to cross the road based on average arrival times. This would affect approximately 50 vehicles.

If the min green time was 45 seconds, it would take seven (7) pedestrian signal cycle lengths (or approximately 6.2 minutes) to allow for all 515 pedestrians to cross the road based on average arrival times. This would affect approximately 42 vehicles.

If the min green time was 60 seconds, it would take six (6) pedestrian signal cycle lengths (or approximately 5.2 minutes) to allow for all 515 pedestrians to cross the road based on average arrival times. This would affect approximately 36 vehicles.

Impact to Vehicular Traffic

If a vehicle arrived at the onset of the yellow change interval, the vehicle would have to wait a total of 29 seconds until the light changed to green. As stated in the report, during both peak hours analyzed, vehicles are anticipated to arrive at the proposed crossing location at an average interval of approximately ten (10) seconds on the outer ring road and an average interval of approximately (14) seconds on the inner ring road. It can be assumed that two (2) to three (3) cars will queue at the mid-block pedestrian crossing during the 29 second delay for the pedestrian signal based on the average arrival times during the peak hours. This impact to the vehicular traffic on the ring road is not considered a considerable reduction in operation. If it is determined that a mid-block pedestrian crossing will provide more safety for the travelling public, the vehicular traffic on the ring roads will not be adversely affected.

6.2 Bicycle Access

Bicycle use will be supported on the pedestrian boulevard along the route from the SUNY Campus to the Harriman Campus as described above in Section 6.1.

Bicyclists, if walking the bike across the road, will require the same amount of time as pedestrians. As noted above, it is anticipated that sufficient time would be available for crossing of the ring road for the same reasons stated above.

6.3 Recommendations

MJ recommends, at a minimum, that an at-grade marked crosswalk with advance signing on the Harriman ring roads be provided to safely allow pedestrian access to the proposed ETEC site.

The MUTCD 1-hour Pedestrian Warrant volumes have been satisfied for a midblock signal installation utilizing the worst case scenario of 515 one-way pedestrians and 1,030 two-way pedestrian volumes during the break between classes.

With the proposed crossing location in an academic setting where heavy pedestrian traffic is not anticipated by drivers, a higher level of safety should be considered. There is a trend among higher education institutions to provide a higher level of student pedestrian safety in university settings.

The posted speed of 40 mph on the ring road is just below the threshold for high speed roadways where marked crosswalks alone are acceptable. The actual operating speeds are higher than the posted speed.

For these reasons, it would be reasonable and warranted to install a mid-block traffic signal to offer the safer and more efficient movement of pedestrians across the Harriman campus ring roads.

In either case, marked crosswalks, pedestrian crossing signing installed in advance of and at the crosswalk along with roadway markings to alert drivers that pedestrians will be crossing shall be provided. Signing includes advance warning of pedestrians on the ring roads. Pavement markings include a bicycle and or pedestrian symbols with letters "XING" for added emphasis of the approaching crossing on the ring roads.

Signing and pavement markings should be provided in accordance with AASHTO Guide for the Development of Bicycle Facilities, 2012, Fourth Edition for a mid-block crossing.

7.0 CONCLUSIONS / RECOMMENDATIONS

The existing intersection evaluated for the Uptown Campus will not be adversely impacted with regard to decreased functionality. The existing and proposed levels of service are within acceptable standards as determined by the NYSDOT with LOS ranging from A to B for both existing and proposed conditions. No improvements are anticipated for the intersections on the SUNY Uptown Campus.

The Harriman Campus Ring Road is functioning below capacity, as confirmed by field observations and the volume data collected. No improvements are anticipated for vehicular traffic on the Harriman Campus.

Pedestrians will be travelling between the SUNY Uptown campus and the proposed ETEC building on the Harriman State Office Campus. Pedestrian crossings will need to be provided on both the outer and inner ring roads of the Harriman Office Campus.

This impact study determined that painted crosswalk with advance warning signing and pavement markings to alert drivers to the presence of pedestrians in an area otherwise not expected is sufficient.

With the proposed crossing located in an academic setting, a higher level of student pedestrian safety is expected. Given the higher operating speeds on the Harriman Campus ring roads in conjunction with the pedestrian to vehicular volume ratios expected, installation of a pedestrian signal is reasonable and warranted.