Harvey Yesowitz, P.E.
Consulting Traffic Engineer

March 8, 2018

Planning Board
Township of East Windsor
16 Lanning Blvd.
East Windsor, New Jersey 08520

Re: Aurobindo Pharma
Phase 2

Dear Board Members:

In accordance with a request by the applicant I have reviewed potential traffic impacts related to Phase 2 of the Aurobindo manufacturing and warehouse facility in East Windsor Township. As illustrated on the following page, the site is bound by Old Trenton Road to the west, Princeton-Hightstown Road to the north and Windsor Center Drive to the south and east. For the purpose of this report we will refer to the orientation of Old Trenton Road as north-south and Princeton-Hightstown Road as east-west.

The proposed project will provide manufacturing and packaging for Aurobindo's generic drug operation. Phase 1 has been constructed and will be fully operational in the near future. The new building will provide 170,100 square feet and will be primarily dedicated to manufacturing and warehouse uses. Access to the second building is proposed on Windsor Center Drive at a point approximately 770 feet south of Princeton-Hightstown Road.

Existing Conditions

Detailed field studies were conducted along area roadways in the vicinity of the site. Data was collected with respect to road and right-of-way widths, traffic control devices and land use. Following is a summary of our field reconnaissance:

Old Trenton Road extends northeast from the Mercerville section of Hamilton Township to its terminus at Main Street in Cranbury. Generally providing one travel lane in each direction this County Road provides access to Mercer County Park and Mercer County Community College. The posted speed limit was 50 mph at the time of our study.

The intersection of Old Trenton Road & Princeton-Hightstown Road is controlled by a semi-actuated multiphase traffic signal. Left turn lanes and separate signal phases are provided on all four approaches. In conjunction with the construction of Phase 1, Aurobindo has constructed channelization to better accommodate right turns from northbound Old Trenton Road to Windsor Center Drive.

Princeton-Hightstown Road is under Mercer County jurisdiction as CR 571, extending southeast from Washington Road, in the vicinity of the Princeton Junction train station, to Main Street in Hightstown Borough. This roadway generally provides two travel lane in each direction, west of Old Trenton Road, widening further in the area adjacent to the site. Princeton-Hightstown Road accommodates significant volumes of traffic between the Route 1 corridor and State Highway 133 which connects to the New Jersey Turnpike and points east via Route 33. The posted speed limit on this roadway was 50 mph at the time of our study.

Windsor Center Drive is a loop road that connects Old Trenton Road with Princeton Hightstown Road at a point opposite the terminus of State Highway 133. This roadway provides access to a residential community located south of the roadway as well as several office uses. The roadway is curbed throughout its length providing one travel lane in each direction. The posted speed limit on Windsor Center Drive is 35 mph.

SITE LOCATION MAP

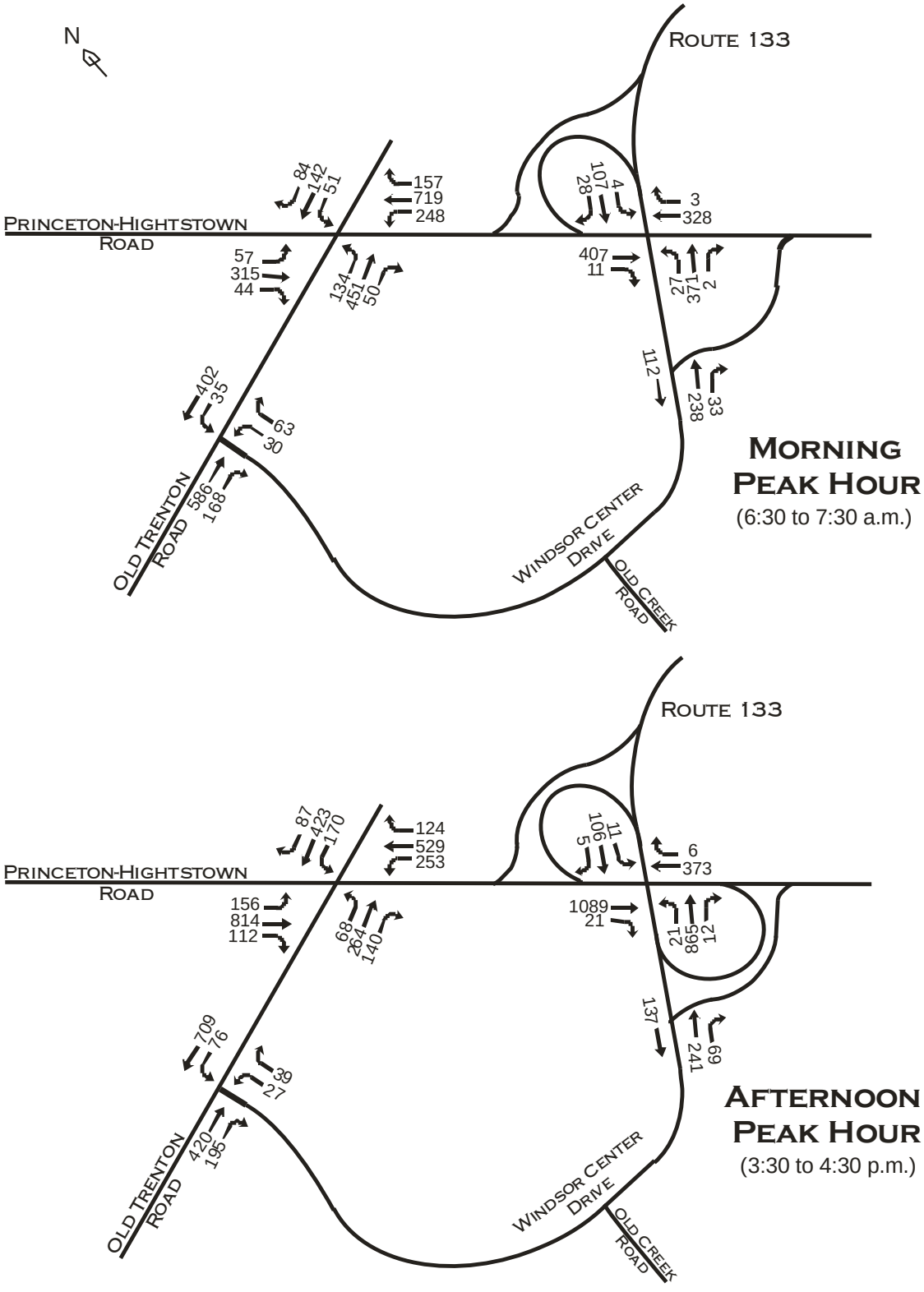
Traffic Volumes

In an effort to determine existing conditions, as they relate to the proposed development, traffic counts were updated in 2017 during both morning and afternoon peak traffic hours at the following locations:

- Intersection of Princeton-Hightstown Road & Old Trenton Road
- Intersection of Princeton-Hightstown Road & Windsor Center Drive/Rt. 133
- Intersection of Old Trenton Road & Windsor Center Drive

Data was collected at 15-minute intervals from 6:30 to 8:30 a.m. and 3:00 to 5:30 p.m. on Wednesday, May 24, 2018. In addition, we reviewed traffic data collected by the Delaware Valley Regional Planning Commission for various locations on the surrounding road network.

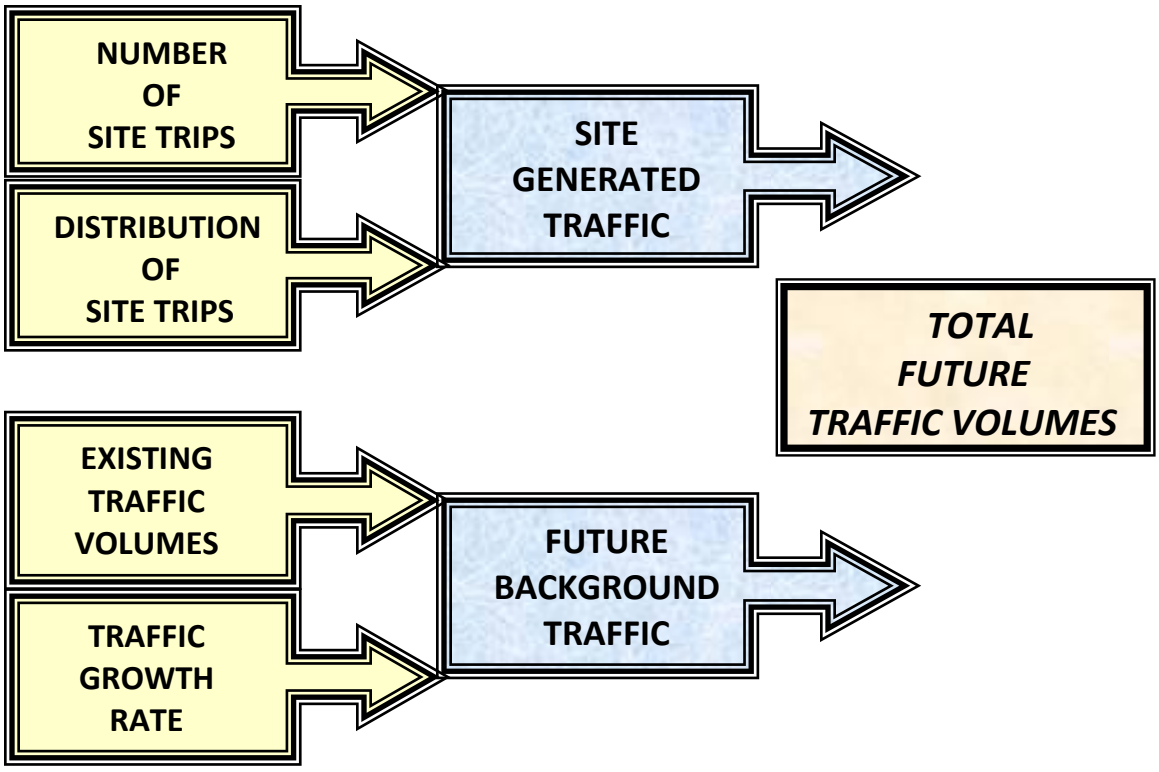
Peak traffic activity for the Aurobindo facility will occur outside of the peak hours for the surrounding road network. The nearby signalized intersections generally experience their highest volumes from 7:30 to 8:30 a.m. while most Aurobindo traffic will arrive between 6:30 and 7:30 a.m. Figure 1 provides a summary of existing peak hour traffic at the locations identified above. The illustration reflects traffic volumes during the peak hours of activity projected for the Aurobindo facility. Detailed count summaries are provided in the Appendix.



EXISTING TRAFFIC VOLUMES FIGURE 1

FUTURE CONDITIONS

Once a framework of existing conditions has been established, we must then project the number and orientation of new trips resulting from the proposed development. The flow chart shown below illustrates the methodology utilized in projecting future traffic volumes. The impacts of future traffic are then evaluated through a modeling procedure known as capacity analysis.



Because there are several distinct functions within the proposed facility the net effect, as it relates to traffic, is a company with staggered work hours. Shown below are the arrival and departure times for the various components of the proposed operation.

Office Employees	8:30 a.m. to 5:00 p.m.
Warehouse 1st Shift	7:30 a.m. to 4:00 p.m.
Warehouse 2d shift	1:00 p.m. to 930 p.m.
Manufacture 1st shift	7:00 a.m. to 3:30 p.m.
Manufacture 2d shift	3:00 p.m. to 11:30 p.m.

The number of trips that will be generated by the proposed Aurobindo facility can be estimated through use of existing data sources, particularly publications by the Institute of Transportation Engineers. This organization has published a handbook titled “Trip Generation", which contains extensive data for various types of land use. Available information is the result of numerous studies conducted for similar land use development.

Summarized below are projected traffic volumes for morning and afternoon peak hours for each land use. It should be noted that trip projections are based on the size of the various components, in accordance with the ITE's Trip Generation Handbook, and are greater than anticipated by Aurobindo's manpower requirements. Also, there may be some variation in the space allocation between manufacturing and warehouse functions, depending on requirements at the time of construction. However, such variation would have no significant affect on total trip generation and would not alter the findings presented in this report.

TRIP GENERATION

		AM Peak Hour		PM Peak Hour	
Phase2	**Size in Sq. Ft.**	**In**	**Out**	**In**	**Out**
Office	8,000	11	1	2	10
Warehouse	85,000	20	5	7	20
Manufacturing	77,100	44	12	20	36

Since the traffic volumes shown above do not arrive or depart at the same time we analyzed the number of trips that would occur during each 1/2 hour segment based on arrival and departure times for each land use component. It is assumed that all arrivals will occur within the 1/2 hour before the shift starts and all departures will take place within 1/2 hour of the end of a shift. Based on discussions with the applicant it is anticipated that the second shift will be about 1/2 as large as the first shift. The table below provides a summary of arrivals and departures throughout the peak periods of traffic activity.

PROJECTED ARRIVALS & DEPARTURES

TIME	IN	OUT	TOTAL
6:30 to 7:00 am	44	12	56
7:00 to 7:30	20	5	25
7:30 to 8:00	0	0	0
8:00 to 8:30	11	1	12
8:30 to 9:00	0	0	0
2:30 to 3:00 p.m.	22	6	28
3:00 to 3:30	0	0	0
3:30 to 4:00	20	36	56
4:00 to 4:30	7	20	27
4:30 to 5:00	0	0	0
5:00 to 5:30	2	10	12

Within the volumes shown above, it is anticipated that approximately 4 trucks will enter or exit during the period of peak commuter activity.

Trip Distribution

Having projected the volume of traffic that would occur it is then necessary to assign them to the adjacent roadways. While it is impossible to predict with certainty where people working at the subject site will live, distributions can be established through an evaluation of existing travel patterns and potential commuter routes. In this case Route 133 will accommodate the greatest percentage of site generated traffic providing access to the New Jersey Turnpike and areas to the east via Route 33. Shown below are projections for the distribution of site generated traffic.

Projected Trip Distribution

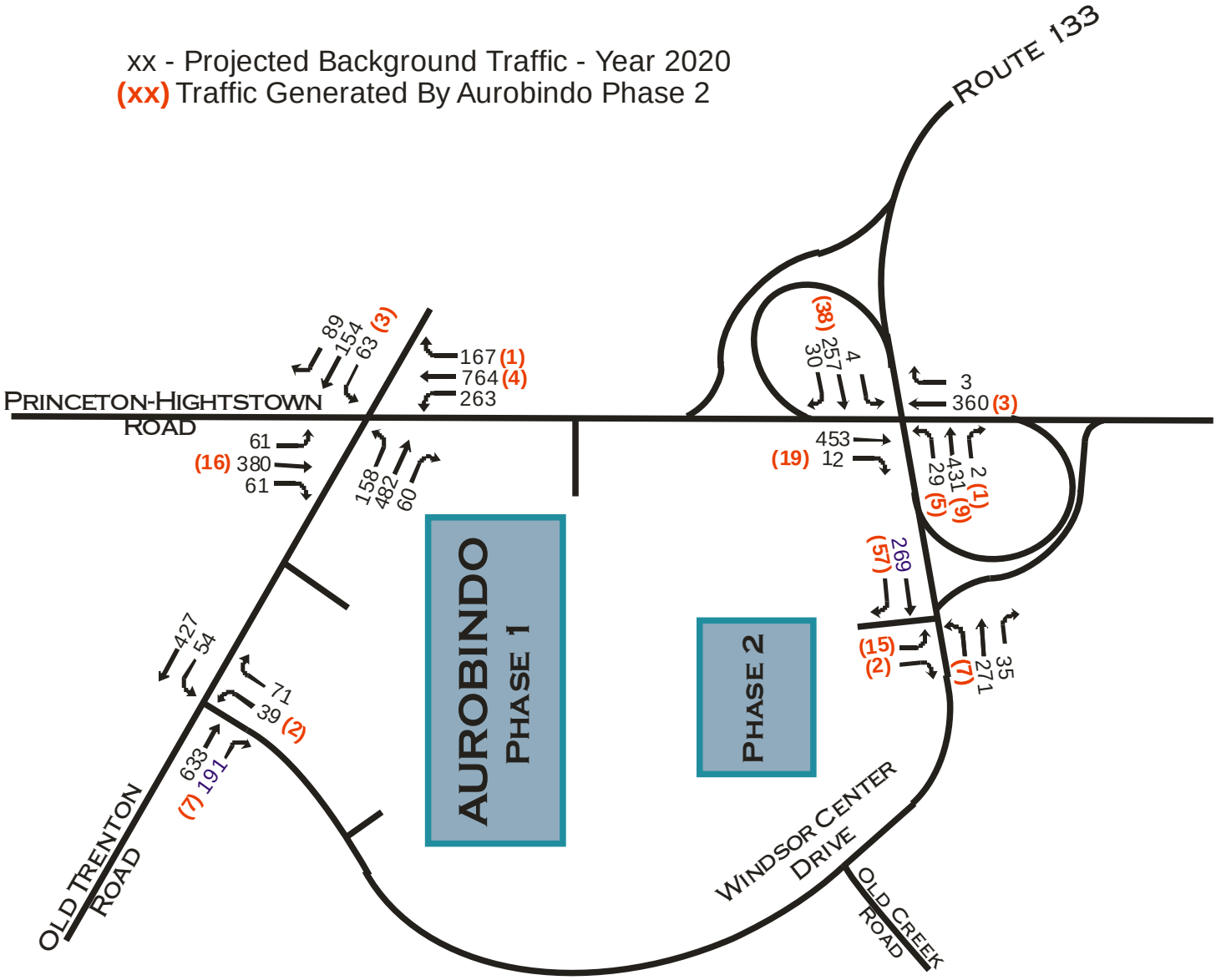
To and From	
Princeton Hightstown Rd. - West	25%
Princeton Hightstown Rd. -East	5%
Old Trenton Road - North	5%
Old Trenton Road - South	10%
Route 133	55%

Traffic Growth

The number of motorists traveling area roadways is increasing as development takes place throughout this corridor. Individual projects in East Windsor and West Windsor, as well as development in other nearby communities, add to the overall level of traffic activity. Since it is impossible to isolate the impact of each individual project, throughout the study area, we have projected an annual growth rate of 2% over the next three years.

This rate of growth is in conformance with projections provided by the New Jersey Department of Transportation. They recently published growth projections that fall in the 1% to 2% range for various roadway types throughout the state. Utilizing the higher 2% growth rate provides a more conservative analysis of potential impacts. In addition we added the traffic volumes projected for the Phase 1 building as reflected in our Traffic Impact Assessment dated October 8, 2015.

Illustrated in Figures 2 & 3 are projected traffic volumes during morning and afternoon peak traffic hours in Year 2020 after construction of the proposed Phase 2 Aurobindo facility. The figures in black represent projected volumes based on a 6% total increase in background traffic combined with projected traffic from Aurobindo's Phase 1 building. The figures in red reflect traffic generated by the proposed Phase 2 development.

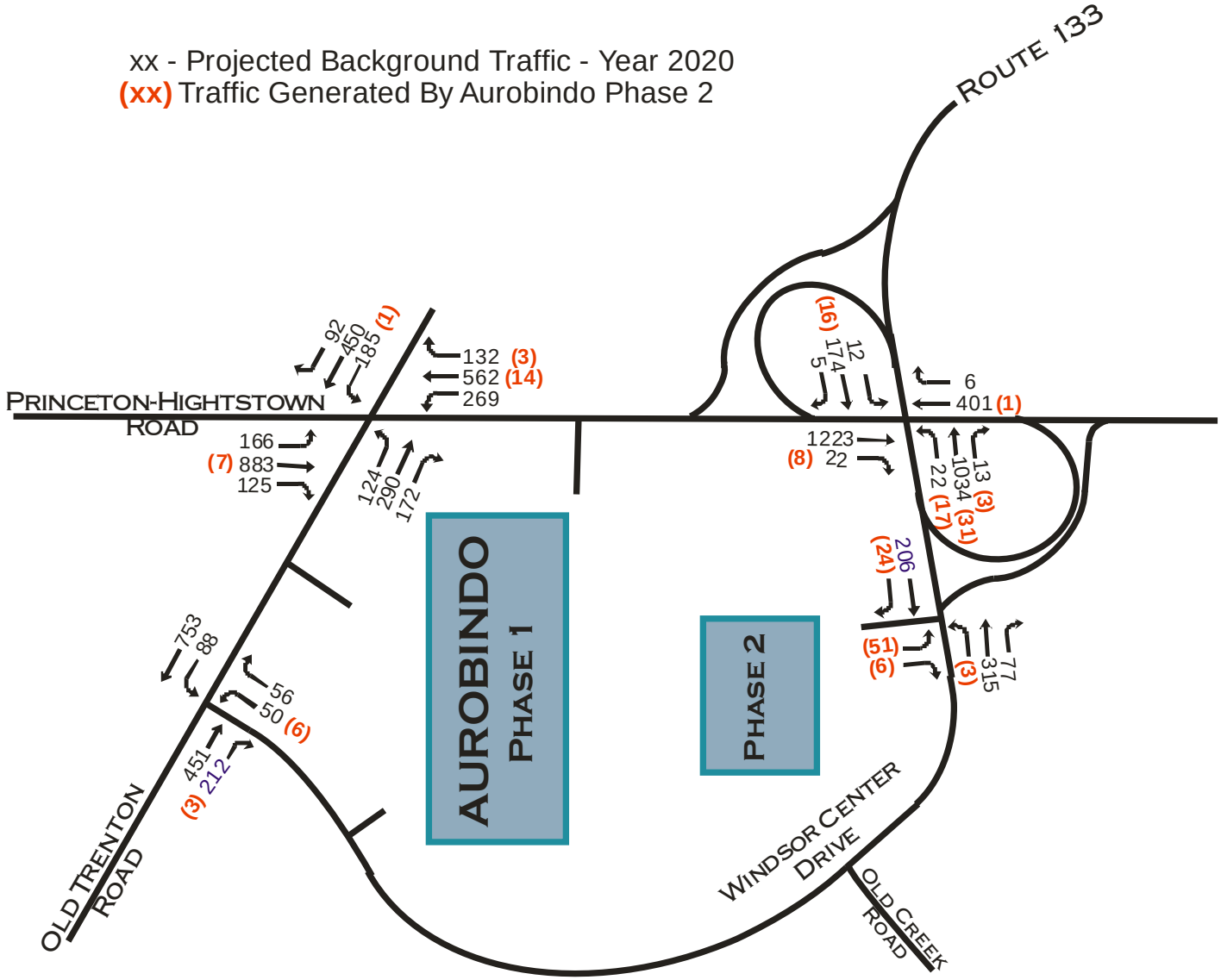


MORNING PEAK HOUR

(6:30 to 7:30 a.m.)

PROJECTED TRAFFIC VOLUMES

FIGURE 2



AFTERNOON PEAK HOUR

(3:30 to 4:30 p.m.)

PROJECTED TRAFFIC VOLUMES FIGURE 3

Capacity Analysis

The impact of traffic is best expressed in terms of its affect on the capacity of a roadway or the intersection between roadways. The latter is generally the controlling factor, providing the greatest limitation on traffic flow. The accepted source of information on the subject of capacity is the Highway Capacity Manual published by the Transportation Research Board.

Levels of Service are utilized as a measure of effectiveness for signalized intersections. Levels range from “A” to “F” reflecting conditions that vary from very little delay ("A") to conditions with significant delay ("F") where motorists may wait more than one change of signal cycle before passing through an intersection.

Because of staggered work hours, as well as arrival and departure times that occur outside of peak street traffic, the Aurobindo facility will have a reduced impact on the surrounding roadways and intersections. Based on our capacity analyses of the traffic volumes shown in Figures 2 & 3 the intersections of Route 571 & Old Trenton Road and Route 571 & Rt. 133/Windsor Center Drive will experience no significant increase in overall delay during morning and afternoon peak hours as a result of the Aurobindo Phase 2 development. Detailed computer printouts of our capacity analyses are provided in the Appendix.

At stop controlled locations the capacity of specific movements depends largely on the volume of conflicting traffic traveling on the through street. The assumption is made that major street traffic, which has the right-of-way, is not affected by minor street movements. Based on our analysis, traffic entering and exiting the proposed driveway on Windsor Center Drive will operate at Level of Service "C" or better during all timeframes. Details of our analysis are provided in the Appendix.

One traffic movement that will experience increased delay is the left turn from Windsor Center Drive to Old Trenton Road. Because of the high volume of traffic along the County road that movement will experience delay during the afternoon peak hour. It should be noted that Phase 2 of the Aurobindo development is projected to increase that movement by just 6 trips during the critical afternoon peak. Also, in conjunction with the construction of Phase 1, Aurobindo has constructed a channelizing island to accommodate right turns from northbound Old Trenton Road to Windsor Center Drive. This addition also assists motorists turning left from Windsor Center Drive by better defining conflicting vehicles traveling north on the county road.

Access and Circulation

Access to Phase 2 of the Aurobindo development is proposed from Windsor Center Drive with internal access provided to all driveways constructed as part of the Phase 1 development. Two-way travel aisles will provide access to parking as well as provide circulation through the site. Proposed parking has been designed to meet East Windsor's standards and will provide safe and efficient circulation throughout the site.

Buildings 1 & 2 are connected by a single roadway at the southwest end of the Phase 2 development. Connections are limited by an area of wetlands that separates the two phases.

Truck activity is located in a way as to minimize visibility from the adjacent streets. Loading areas and travel aisles have been designed to safely accommodate truck activity throughout the site.

Safety

In evaluating the adequacy and safety of access to the development, a primary consideration is sight distance. Intersection sight distance should be maximized to permit a motorist exiting the site to enter the roadway without requiring approaching traffic to reduce speed. Our field inspection indicates that motorists exiting the Phase 2 site onto Windsor Center Drive will have excellent visibility in both directions. Appropriate sight triangles must be maintained to ensure an unobstructed line of sight for motorists exiting the subject property. Based on the 35 mph speed limit, sight triangles should be measured from a point 15' back from the edge of roadway to the center of the oncoming lanes at a distance of 335' to the left and 390' to the right.

SUMMARY OF FINDINGS AND CONCLUSIONS

Based on the studies and analyses presented in the body of this report we have reached the following conclusions:

- The driveway serving the proposed Phase 2 development will operate at Level of Service "C" or better during all timeframes.

- The two signalized intersections, most impacted by the proposed development, will experience no significant increase in overall delay as a result of Aurobindo's Phase 2 building.

- Our review of internal circulation and parking indicates that the proposed design meets accepted engineering and planning standards.

Should there be any questions regarding the information provided please feel free to call.

Very truly yours,

Harvey Yesowitz
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