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URBITRAN ASSOCIATES

Memo

To West Windsor Township Planning Board

From, Gary W. Davies, PE, PP

Re Route 571 Concept Plan -- Princeton Junction

Date March 7, 2005.

The Township of West Windsor has retained Urbitran Associates to prepare a concept plan for improvements to County Route 571, also known as Princeton – Hightstown Road. The limits of the section under consideration extend from south of Clarksville Road to the Amtrak Northeast Corridor overpass. The overall objectives of the plan are to provide improved levels of service for vehicles; to support safe usage by pedestrians and bicyclists; and to meet the Township's objectives for a roadway that is consistent in scale with its vision for development in the Princeton Junction community.

History of the Project

Improvements to Route 571 through Princeton Junction have been considered an important part of the Township's and Mercer County's circulation plans for literally decades.

Beginning in the late 1980's, Mercer County began to examine alternatives for improving Route 571. This led to a traffic study and preparation of Phase 1 and Phase 2 engineering drawings by the County's consultant, Travers Associates, in the early 1990's. This round of plans featured four through lanes (two in each direction) plus turn lanes for the entire length of the section. Because of the Township's opposition to this arrangement, the plans were tabled in about 1995.

The Township then sponsored a concept-development study by Garmen Associates (now Urbitran Associates) in 1996-1997 that examined in greater detail the implications of a plan with a single through lane in each direction, plus turn lanes. Working in consultation with the Township Planning Board, a concept was developed that advanced the Township's objective for a reduced number of lanes, landscaped median islands, and management of turns into and out of access driveways. It was originally the objective to have extensively landscaped median islands and limited number of lanes throughout the section. However it was found and agreed that the large number of existing properties and driveways, and lack of opportunity for u-turns, required extensive breaks in the median. Essentially what was originally conceived as a nearly continuous landscaped median became, of necessity, a series of small islands separating long continuous left turn lanes. A 10-foot wide shoulder was provided to serve traffic turning into and out of driveways and to accommodate breakdowns, perhaps parking, and possibly a bike lane. It was also found and agreed that at the intersection of Route 571 with Wallace / Cranbury Road, it would be necessary to provide a five-lane width: two lanes in each direction on Route 571, plus a single left turn lane in each direction. This recognized that Route 571 already essentially operates as a four-lane facility at this location, and that left turn lanes would be

needed to provide even a minimal accommodation to traffic growth. The intersection at Clarksville Road was not addressed, although it was anticipated that improvement and widening would be needed there as well.

This three-lane concept was presented to the County, and the County agreed to support the reduced width if a traffic study could support the transportation benefits of such a section. The study was prepared by Parsons Brinckerhoff, and as a result the County petitioned the NJDOT to retain the project in its capital funding program, and to progress the project as a three-lane section without returning to the scoping stage of project development. However the NJDOT and DVRPC did not program the project for continued development, and at this time the project has been removed from the region's Transportation Improvement Program (TIP).

In 2001-2002 the Township updated its Master Plan, including the Circulation Plan Element. Improvement of Route 571 through Princeton Junction is a key element of the Circulation Plan. It is consistent with the Plan's goals, such as "pursu(ing) a coordinated road plan which enables the safe and efficient movement of people and goods and minimizes the negative impact of regional traffic on local roads, particularly in residential areas". A key Policy of the Plan is to "establish a hierarchy of roads with appropriate geometric characteristics and capacity, thus avoiding channeling regional traffic onto local streets resulting in the degradation of residential areas and community centers". And another Policy is to "emphasize development of final major connections and local roadway improvements to aid in east-west traffic movement". With respect to Princeton Junction specifically, the Plan outlines several improvements:

- The railroad bridge on Route 571 should be widened to four travel lanes;
- The intersections of Rout 571 with Wallace Road, Clarksville Road and Alexander Road should be improved to include turn lanes on all approaches and optimal signal timing, phasing and coordination; and
- Route 571 between Clarksville Road and Wallace Road / Cranbury Road needs to be widened to two travel lanes with a center turn lane and shoulders, to accommodate projected traffic volumes and provide adequate pedestrian and bicycle safety amenities.

Intersection improvements at Wallace / Cranbury Roads, at Alexander Road, and at Clarksville Road appear in the Circulation Map and Capital Improvement Map.

The study described herein, and the alternative concepts that are presented, have been prepared in response to and furtherance of the above Master Plan objectives.

Design Objectives

The improvements to Route 571 have been developed with several objectives in mind:

- To provide improved levels of service for vehicular traffic. Besides meeting an obvious circulation need, providing an overall level of service improvement is a necessary prerequisite to obtaining state and federal funding for the project;
- Consistent with the Township's Master Plan and policies, provide a three-lane width (one lane in each direction plus left turn lanes), except at the major intersections with Clarksville and Wallace / Cranbury provide a five-lane width (two lanes in each direction plus left turn lanes). Provide shoulder wherever possible.
- To support safe usage by pedestrians and bicyclists. This would include passage along the road, using continuous crosswalks and/or bikeways; and passage across the road at appropriate designed signalized intersections;

- To provide a roadway design that is compatible with and supportive of the development of a Princeton Junction land use plan that is distinctive, appealing, and conducive to business, retail, and other activities; and
- To minimize disruption to existing businesses due to access limitations. To the extent possible, preserve access via existing driveways to existing businesses. By contrast, alternative access to future or redeveloped business properties is an acceptable action. Provide sufficient flexibility in the plan that, as properties develop, the plan can be adjusted and access modifications provided.

Alternative Configurations

While the policies and objectives described above provide general guidance as to the overall layout of the proposed Route 571 improvement, there are significant variations possible in the details of roadway and shoulder layout, as well as the use of raised islands and left turn lane configurations. As a result several alternative configurations are possible.

This report presents several alternative configurations for the Planning Board's consideration. To organize these alternatives, the corridor is divided into two segments: The NORTHERLY segment is from a point approximately midway between Clarksville Road and Alexander Road, northward (or westward) to the railroad; and the CLARKSVILLE segment is from the same point southward (or eastward) through the Clarksville Road intersection.

For the NORTHERLY end, three schemes are presented. All of the schemes provide virtually the same traffic service, with the same number of through and turning lanes in each. The differences relate to the configuration of median islands and turn lanes.

At the Wallace Road / Cranbury Road intersection, two through lanes are provided in each direction on Route 571, plus a single left turn lanes is provided in each direction. On Wallace and Cranbury the intersection approaches are widened to provide separate left, through, and right turn lanes. The two Ellsworth shopping center driveways located closest to the intersection are proposed to be removed.

At the Sherbrooke Drive / Acme Center intersection it is proposed to provide crosswalks and, possibly, a future traffic signal. At this time minimum volume warrants for a signal do not appear to be met, although development/redevelopment of the adjacent properties could increase traffic sufficiently that a signal would be needed and warranted. The short spacing with the Alexander Road signal is problematic, however, and will be closely scrutinized by the County and State.

The Alexander Road intersection is configured essentially the same as it is today, with a single northbound left turn lane on Route 571 to Alexander. Widening and setbacks to be provided by the approved G&B Mobil site have been accounted for in this plan.

The following roadway schemes are shown in the attached drawings:

Scheme I: 60' Cartway with raised islands: This scheme attempts to maximize the number of raised median islands in the center of the roadway in order to provide landscaping opportunities. As was discussed above, original thinking at the time of the 1996-97 design studies sought to provide lengthy raised median islands with substantial landscaping. However the realities of driveway placement and access needs were such that only very limited islands are possible. While this scheme gives some opportunity for landscaping on the islands, that opportunity is limited and the islands provide little additional benefit. In fact, the islands have been shrunk to the point that they could pose a maintenance and snow-removal problem. It should be noted that this Scheme features a full-width 10-foot wide shoulder on each side of the road. A continuous bike lane is proposed on both sides, and it is suggested that the bikeway could use the shoulder in areas away from major intersections, similar to

the New Village Road bikeway. A five-foot wide planting strip is provided between the curb and sidewalk or bikeway.

Scheme J: 60' Cartway without raised islands: This scheme removes the raised islands from the median. It provides a continuous center left turn lane in most locations, and painted islands at intersections. Similar to Scheme I, the plan retains the 10-foot wide shoulders on both sides, with opportunity for the bikeway to be located on either the shoulder (away from intersections) or outside the curb. The result of this scheme is limited area for greenery (a 5-foot wide planting strip between the curb and sidewalk).

Scheme K: 50' Cartway without raised islands: This scheme is similar to Scheme J, in that it has no raised median islands. However it narrows the shoulders from 10-feet (in Schemes I and J) to 6-feet; and it narrows the center left turn lane from 16 feet to 14 feet. This width reduction allows a narrower cartway (50 feet instead of 60 feet). The result is that within the same 90-foot right of way it is possible to reduce the pavement width (resulting in a less obtrusive footprint). It is also possible to provide a 10-foot wide planting strip between the curb and sidewalk, as compared to only a 5-foot wide strip presented in Schemes I and J. This 10-foot planting strip will be far more conducive to trees and other plantings as well as street furniture. The bikeway is relocated from the shoulder to outside of the curb.

For the CLARKSVILLE segment, four schemes are presented: Providing one or two left turn lanes from Route 571 Northbound to Clarksville: and providing either painted or raised islands. The schemes are numbered as follows:

- Scheme 1: One left turn lane, raised islands
- Scheme 2: Two left turn lanes, raised islands
- Scheme 3: One left turn lane, painted islands
- Scheme 4: Two left turn lanes, painted islands

These are essentially interchangeable with the alternatives to the north, at the Match Line located between Clarksville and Alexander Roads.

Design Parameters

The following guiding characteristics were followed during the development of the Plan:

- Cartway width: 66 feet at major intersections; 50 or 60 feet otherwise, depending on the alternative.
- Right-of way: 15 feet beyond outside curbline (Schemes I and J), or 20 feet beyond outside curbline (Scheme K); i.e. 90-96 feet total width
- Configuration: Four lanes with center left turn lane at major intersections; two lanes with shoulders/bike lanes and median or two-way center left turn lane, otherwise.
- Lane widths: 11 feet, except 12 feet for thru lanes adjacent to a curb (median or outside).
- Pathway widths: Four-foot sidewalks; eight foot mixed bike/ped paths.

- Bike lanes will not be carried through signalized intersections within the roadway; rather, they will be routed onto a mixed bike/ped path in advance of the intersection, then returned to the roadway beyond it.

Access

Access to adjacent properties is a complex matter as there are three types of concern:

- Existing commercial;
- Pending or approved commercial; and
- Existing Residential

Existing commercial access presents the greatest challenge as on-site circulation may allow only minimal or no changes to existing driveway locations and/or directions. At this time, these are proposed to be handled with a combination of two-way center left turn treatments or median breaks. While it is possible that redevelopment of some or all properties will occur in the future, the plan accommodates the present driveway arrangement. If these properties should be redeveloped, it is anticipated that there is sufficient median width throughout the section so that islands and turns could be rearranged as part of the site plan process.

Pending or approved commercial access, on the other hand, has been or will be established with some degree of access management, including turn restrictions as well as placement considerations. There are presently four properties that have received site plan approval or are in various stages of concept or site plan review. Access to these properties will generally be handled with median left turn lanes or no median openings, and relocation of some or all access to side streets, if possible.

Existing Residential access presents a mixed challenge in that driveways are generally closely spaced, but have very low volumes. At this time, these were handled with two-way center left turn lanes. It should be pointed out, however, that all of the residential uses are located between Clarksville Road and Alexander Road, and that, over time, some or all of these properties may eventually become commercial uses. If properties are assembled or converted, it is anticipated that access arrangements and limitations will be handed in the site plan review. There is sufficient median width to construct islands if appropriate.

Traffic and Levels of Service

Peak hour traffic volumes were obtained from ground counts, developers' reports and other sources. The resulting set of existing (2004) peak hour volumes is illustrated in Figures 1A and 1B for the morning and evening peak hours, respectively. Between Clarksville and Alexander the peak flow is about 1,445 vehicles northbound during the morning peak hour and 1,250 vehicles southbound during the evening peak hour. Between Alexander and Wallace / Cranbury Road (north of Sherbrooke), the peak flow is about 905 vehicles northbound during the morning peak hour, and 1,135 vehicles southbound during the evening peak hour.

The Township's traffic forecast model was used to analyze the growth potential in this corridor. It indicated that over the next 10-year period (2005 to 2015) an average growth rate of 3 percent per year could occur, or an overall rate of 38 percent over the ten-year period. The land use assumptions of the model are aggressive, however, and 3 percent per year is a higher rate than is typically being observed in the vicinity. It was concluded that using a 38 percent growth factor would be appropriate, but that the resulting traffic volumes could occur as soon as 10 years from now at 3 percent per year, or as long as 20 years from now at 1 percent per year. The later horizon is a more likely condition.

Using this 38 percent growth factor, the future traffic volumes shown in Figures 2A and 2B were estimated. Between Clarksville and Alexander the morning peak northbound volume will increase from

1,445 to 2000 vehicles per hour. At the same location the evening peak southbound volume will increase from 1,250 to 1,730 vehicles per hour. Between Alexander and Wallace / Cranbury (north of Sherbrooke) the morning northbound volume will increase from 905 to 1,250 vehicles per hour, and the evening southbound volume will increase from 1,135 to 1,570 vehicles per hour.

The resulting levels of service are shown in Figure 3 for existing, future without improvements, and future with improvements.

Existing levels of service are reasonable at the Wallace / Cranbury and Alexander Road intersections, with all movements operating at Level of Service D or better. At the Clarksville Road intersection the northbound left turn to Clarksville fails (Level of Service F) in the morning, and in the evening all movements operate at Level of Service D.

With the above growth added and without improvements, both the Wallace / Cranbury and Clarksville intersections will fail. The Alexander intersection will operate reasonably well, with only the northbound left turn from Route 571 to Alexander falling to Level of Service E in the morning peak hour.

With the proposed improvements added, the intersection of Route 571 with Wallace / Cranbury will improve to Level of Service B in the morning and D in the evening.

The Alexander intersection will essentially be unchanged, with an overall Level of Service D in the morning and evening peak hours.

The design of the Route 571 / Clarksville intersection is constrained to what would be acceptable to the community. Additional turn lanes are added to the intersection and, in two of the alternatives, median islands are added to provide pedestrian refuge. The Township has taken the position, however, that additional turn lanes – especially a double left turn from Route 571 Northbound to Clarksville Westbound – would be out of character with the community and are not desired. The resulting Level of Service for the overall intersection will be D in the morning peak hour, with the northbound continuing to fail (Level of Service F) and the southbound operating at Level of Service E. During the evening peak hour overall traffic volumes in the intersection will be higher, and the overall intersection Level of Service will be F. The northbound Route 571, eastbound Clarksville, and westbound Grovers Mill approaches will all operate at Level of Service F. If a dual left turn lane is constructed on Route 571 Nrothbound, then the levels of service will improve. The eastbound left turn from Route 571 to Grovers Mill, which failed in the single-left-turn scenarios, will improve from Level of Service F to E. In the evening several of the severely failing movements will improve somewhat.

It should be noted that the 3-lane wide concepts presented herein are consistent with the Township's policy that there only be one through lane in each direction through the business district. The peak hour volumes between Alexander and Wallace / Cranbury will be in the range of 1,250 to 1,570 vehicles per hour. it is likely that the 1,250 (morning, northbound) vehicles per hour can be served by a single lane without signal interruption, but the 1,570 (evening, southbound) vehicles per hour will exceed the single-lane capacity. Between Clarksville and Alexander the peak hour volumes will be in the range of 1,730 to 2,000 vehicles per hour. The 2,000 (morning, northbound) vehicles clearly will exceed the single lane capacity, as will the 1,730 (evening, southbound) vehicles in the other direction.

Notwithstanding these issues, it is the Township's position that substantial benefit can be obtained by providing the proposed improvement, and that a balanced operation among the intersections and roadway segments will be possible. The project as proposed is consistent with the Township's vision for the Princeton Junction business district, and as proposed will provide a clear improvement to the overall character of the area.