

V. CIRCULATION ELEMENT

INTRODUCTION

In colonial days, Princeton's location as the half-way point on the King's Highway between New York and Philadelphia was the source of economic advantage. Today, the two highways that bisect the town -- Route 27 (the old King's Highway) and Route 206 -- are sources of unwanted through truck traffic that threaten Princeton's historic core. Since the linkage of Route 287 with the New York Thruway two years ago, Princeton has become a throughway for commercial traffic headed for or coming from I-95 and I-295. Tree-lined streets designed to support two-lane car travel are jammed beyond capacity by inter-regional traffic. Harrison Street has become the de facto Princeton by-pass, linking Route 1 and Route 206. And the proposed Millstone By-pass may exacerbate the problems on Harrison Street by directing the flow of regional traffic through residential areas.

1996 POLICY STATEMENT

These regional pressures have placed the residential character of our roadways in jeopardy. The policy of the Planning Board in this Master Plan calls for: a) the development of a road system that will allow through-traffic to bypass Princeton; b) the reduction of automobile trips "in town" through more and better bikeways and sidewalks; c) the provision of more and better mass transit facilities.

In addressing the town's circulation problems, the Princeton Regional Planning Board has held a series of meetings with neighboring communities and with state and county officials to determine ways to divert inter-regional trucking to roadways that were designed for such traffic. In addition, this Master Plan calls for a reduction for all types of "through-traffic" trips. These are trips that neither begin nor end in Princeton. In establishing the 1996-2001 goals, the Circulation Element defines three distinct categories of mobility problems: Internal circulation addresses the mobility needs of Princeton residents and how they get to work, shopping, recreational and cultural areas within Princeton. Regional circulation addresses the mobility needs of those people who have one trip-end in Princeton; whether they are residents, employees, customers or persons utilizing Princeton's educational, cultural or recreational facilities. Interstate/inter-regional circulation addresses the mobility needs of those people whose final destination is not in Princeton but whose travel takes them through town.

1996 - 2001 GOALS

In order to implement this policy the following circulation goals are presented.

- I. Goals to manage traffic to protect and enhance the historic districts, downtown and business districts as well as residential neighborhoods in the Princeton Community.**
- II. Goals that require coordination with the State, with Mercer, Middlesex, and Somerset Counties, and with surrounding local communities.**
 - A. Regional Traffic Coordination**

1. Provide leadership in promoting regional traffic coordination in State, County, and municipal road projects.

B. Regional Traffic Distribution Goal

1. Promote a peripheral road system which will distribute traffic over several smaller two-lane roadways rather than creating larger four-lane roads.

C. Regional Land Use Goal

1. Balance land use with the capacity of the circulation system to ensure that proposed land uses will not overload the circulation system.

D. Interstate/Interregional Traffic Goal

1. Develop strategies to reduce interstate/interregional truck and automobile traffic in the area through the development of by-passes, especially ones with direct links to the turnpike.

E. Information Goal

1. Develop traffic data on employment and commuting patterns to evaluate circulation impacts from existing and new development.
2. Develop information on traffic management plans and policies.

III. Goals that require coordination with transportation providers.

A. Public Transit Goal

1. Encourage the further development, extension, and use of both public and private mass transit.

B. Specialized Transit Service Goal

1. Encourage the development of various specialized transit services for the elderly, disabled, and other transportation dependent persons.
2. Investigate the possibility of coordinating or integrating school children transportation services with other transportation services to better serve the transportation needs of the community.
3. Encourage the development of private transportation services such as taxis, shuttles, valet, and other services.

C. Transit Availability and Information Goal

1. Provide better information on available transit service using print and electronic media.

IV. Goals within our control.

A. Environmental Goal

1. Protect and improve the visual, historic, and human-scale qualities of Princeton's roadways, bridges, culverts, and other transportation facilities.

B. Pedestrian/Bicycle Mobility Goal

1. Provide a pedestrian and bicycle path network for maximum recreational and circulation use between neighborhoods, recreational areas, schools, and shopping areas.
2. Encourage the enforcement of pedestrian safety in signed and marked pedestrian zones and crosswalks.

C. Local Circulation Goal

1. Create by-passes and a peripheral road system which will distribute through traffic over several smaller two-lane roadways.
2. Improve parking opportunities for mass transit facilities.
3. Encourage the development of parking facilities and the coordination of shared parking facilities in appropriate areas of local business districts.

1989 - 1996 CHANGES IN TRANSPORTATION

Traffic Patterns Changes

Since the 1989 Master Plan was adopted, Princeton has been subjected to a major shift in traffic patterns. The new through-traffic is of a different character from that of the past. It uses Princeton's roadways purely as a means to an end without an interest in an intermediate stopover. Residents of vast new developments north of Princeton are attracted to new employment and retail strips lining Route 1 in West Windsor and Lawrence Townships and have added large volumes of auto traffic onto Princeton's local streets.

Even more disturbing is the changed use of Route 206. It is now a critical connector for long-haul interstate traffic. With the completion of Interstate 287 connecting Northwestern New Jersey with New York State and the completion of the last missing segment of I-295 around Trenton, Route 206, along with Route 31 through Hopewell Township, bring long-haul traffic wishing to circumvent the congestion and high tolls of the New York metroplex. There has been a significant increase in the number of long-haul trucks utilizing Route 206 as a connector between I-287 and I-95 and I-295. Unfortunately, Princeton has no direct control over this traffic. Only through cooperation with NJDOT, the counties of Mercer, Middlesex and Somerset and surrounding communities can this new traffic be properly managed.

In the larger context, the NJDOT has seven projects which will affect the Princeton Community in varying degrees. Specifically, NJDOT is now addressing east-west traffic flows in mid-Jersey. Under the auspices of the New Jersey Turnpike Authority, Route 92 has been proposed. This toll

road would connect the Turnpike at exit 8A with Route 1 in South Brunswick. In addition, NJDOT is building the Hightstown Bypass, and planning to enlarge Route 571 through West Windsor and construct a Millstone Bypass that would remove traffic lights on Route 1 and terminate at Washington Road, east of the D & R Canal. The NJDOT is also proposing several north-south projects, including a bypass in South Brunswick and widening Route 206 from Somerville to the Montgomery Township border, which will increase traffic to Princeton.

Unfortunately, NJDOT has taken the position that each of these projects are stand-alone projects and in no way connected. As these projects are not in Princeton's jurisdiction, the right of review and comment is limited, even though they entail severe traffic and environmental implications for the Princeton community. It is important the community be vigilant and knowledgeable about each of the mid-Jersey projects. Every effort should be made to build coalitions to generate regional responses where possible and legal recourse where neighboring community priorities conflict with Princeton.

Legislative Changes

Central New Jersey has been designated as a non-attainment area for certain air quality standards. The amendment to the Federal Clean Air Act placed greater emphasis on reducing passenger vehicle miles and reducing the number of automobile trips as a way to combat air quality problems. In order to improve our air quality we must examine alternatives to driving single occupancy vehicles as well as encourage other modes of transportation.

The Intermodal Surface Transportation Efficiency Act (ISTEA) requires federal and state transportation agencies to examine alternatives to building new highways. ISTEA provides greater emphasis and funding for transit and non-traditional transportation modes such as walking and bicycling.

The New Jersey Department of Transportation (NJDOT) adopted a state highway access management code in 1992. This code applies to all state highways and limits access to state highways by promoting the use of shared driveways, access to secondary streets that intersect with state highways, and interconnected parking lots. NJDOT has also developed roadway design standards designating the number of lanes and roadway width.

Local Changes

The Princeton community has been successful in raising the awareness of motorists to pedestrian safety and rights. The Borough has made pedestrian crosswalks more visible and safer by constructing cross walks out of brick pavers. An aggressive signing program installing "yield to pedestrians" signs and enforcement policy have made the community a safer place to walk. A number of new traffic lights have been installed within the Princeton community. These new traffic lights have affected local traffic patterns and will need to be evaluated for their impact on local neighborhoods.

1996 - 2001 STRATEGIES

Given Princeton's central location between the Route 1 and Interstate 287 corridors, a cooperative effort between this community and neighboring communities is essential to moderate the expected traffic volumes. Channeling regional traffic onto local streets degrades residential areas. Transportation policy should shift some of the burden of through traffic away from the residential areas and congested core of Princeton by assembling an informal peripheral roadway system around the community. This informal peripheral roadway system can be accomplished by linking previously proposed highways in the surrounding communities, as well as by proposing new extensions to roads in Princeton, which will complete a peripheral system.

Listed below are the 1996 - 2001 circulation strategies which the Board recommends to deal with the burden caused by increasing demand on the circulation system and to lessen this impact.

Strategies To Address Circulation Goals

Regional Traffic Distribution Goal

- Protect existing neighborhoods from through traffic and lessen congestion on local streets by assembling an informal peripheral roadway system around the community.
- Develop a comprehensive strategy for Route 206 through Princeton that addresses noise, vibration, speed, safety, and size and weight of trucks.

Regional Land Use Goal

- Work with the state, surrounding communities, Mercer, Somerset and Middlesex counties to balance land use with the capacity of the circulation system.

Interstate/Interregional Traffic Goal

- Eliminate interstate truck traffic from local streets by imposing a four ton gross weight restriction on all local streets where permitted by state and county regulations.
- Encourage reduced weight limits on state and county roads to protect historic bridges.

Information Goal

- Maintain a data base of existing traffic counts.
- Develop a greater understanding of existing traffic patterns
- Develop a traffic management plan for the Princeton area.

Public Transit Goal

- Encourage convenient peripheral parking for CBD employees and locate parking garages and larger parking lots so that they are integrated into the circulation plan.
- Reduce auto dependency by providing traditional public bus and rail transportation as well as minibus and van services.

Specialized Transit Service Goal

- Promote and coordinate local bus service and specialized bus service for the elderly, handicapped, school aged children and other auto-dependent people.
- Review school bus transportation policies.

Transit Availability and Information Goal

- Provide better information on transit routes through the use of newspapers, cable television and other communication media.

Environmental Goal

- Protect scenic and natural settings by promoting the preservation of existing trees and the planting of new trees along existing and proposed roadways.
- Maintain and create scenic gateways identifying entrances into Princeton.
- Protect the visual and aesthetic values of the community by coordinating improvements to roadways and parking areas using the Urban Design Element.
- Monitor development plans for the Princeton Airport and take appropriate action(s) to limit noise impacts.

Pedestrian/Bicycle Mobility Goal

- Provide for safe crossings of pedestrian and bicycles at roadway intersections.
- Maintain and create bicycle and pedestrian linkages that reduce auto dependency.
- Develop, in conjunction with major corporations and institutions, an overall pedestrian, bicycle and vehicular circulation and parking plan.
- Develop a continuous pedestrian and bicycle circulation system throughout the community and encourage neighboring communities and corporations to become a part of this network.
- Investigate the integration of bicycle lanes on existing roadways.

Local Circulation Goal

- Plan new road connections only in those areas where the Land Use Element of the Master Plan projects increases in automobile traffic owing to the land-use designation.
- Limit roadway improvements to a scale that is compatible with surrounding neighborhoods. Roads through and around Princeton should be two-lane and tree-lined.
- Protect attractive and historic bridges to promote their rehabilitation and restoration.
- Limit curb cuts on heavily traveled streets to reduce vehicular conflicts.
- Designate and ordinance a hierarchy of roads.
- Investigate one-way street patterns and traffic calming techniques in neighborhoods which have been impacted by through traffic.
- Review the impact from new traffic lights on existing neighborhoods.

CURRENT STATE OF THE CIRCULATION SYSTEM

Travel Demand Patterns

To provide a basis for estimating travel demands and their impacts, the Princeton Regional Planning Board has commissioned Garmen Associates to update the existing travel model to simulate peak-hour travel in Princeton and nearby surrounding areas. The model will be used to predict future growth patterns and to evaluate the impact of various development projects which have come before the Planning Board.

The study will estimate the impacts of various alternatives on each of the three trip categories: internal circulation, regional circulation and interstate/interregional circulation. We need quantitative measures for each of these trip categories. For example, Princeton area residents should be surveyed to determine their circulation patterns for work, shopping, education and recreation. This survey would establish the internal circulation needs of our community and the home-based part of the regional circulation element.

More could be learned about the regional circulation element from the major employers in the area. General residential locations of the employees of the major companies, educational institutions and government agencies would provide valuable quantitative information about the geographic distribution of peak-hour demand. Interregional traffic is the most difficult and expensive to quantify; however, NJDOT has begun to survey truckers using Routes 206 & 31.

Historic Roads and Bridges

Some of the historic roads and bridges in Princeton are in need of repair. These historic roads and bridges are often the gateways into the community and are the principle view that both residents and visitors have of our community. Care should be taken to protect the historic character of these roads and bridges through the sensitive selection of materials and a design that provides a width, scale and appearance in keeping with the surrounding neighborhood. It is the Board's policy to urge the State and County to develop alternative design standards which preserve and protect the historic elements of these roadways and bridges.

Emergency Access

It is the Board's policy to require a secondary means of site access for any new development creating twenty-five or more residential lots. New developments creating over fifteen lots should provide a secondary means of access for emergency vehicles.

Roadway Design Standards

Trees are a critical component to all of Princeton's roadways; where they exist, every effort should be made to preserve them, where they are absent, new plantings should be provided in appropriate size, spacing, and species. Roadway design must be compatible with the surrounding neighborhood in terms of width, scale, appearance and selection of construction material.

The roadway geometric design standards in Princeton Borough and Princeton Township are shown in Table 1, found in Appendix B. As construction or improvements are required, street design will be based on the established standards for that particular street classification. However, the standards are intended as a general guide since flexibility should be retained in the road design of new developments. The actual paving width, for example, may vary between the minimum and maximum shown depending on the road location and the need for curbs, walks, parking or shoulders, and bike paths.

The Board will consider exceptions to the standard for road width when environmental considerations warrant such consideration. Whenever a narrower width is permitted, a grass stabilized shoulder should be provided to ensure safe emergency vehicle access and operation. Alternate standards are recommended for secondary arterials and major collectors which recognize the sensitive historic, residential, and environmental areas they traverse. In those constrained locations, narrower shoulder widths and parking restrictions are proposed.

Roadway Classification Standards

Existing and proposed streets are classified according to their traffic-carrying function and are identified on the Roadway Classification Map. Six street classifications are listed on the map: primary arterials, secondary arterials, major collectors, minor collectors, local streets, and cul-de-sacs. It is recommended that these roadway classifications be ordinance.

Primary Arterials - are under State jurisdiction and provide for major local and intermunicipal movements. These roads will be expected to handle substantial volumes of local and through traffic. Primary arterial roadways will generally handle most of the interstate/inter-regional and regional traffic that traverse Princeton. In order to preserve their traffic carrying capacity, the number of intersections, driveways, and frontage activity should be minimized along these streets.

Secondary Arterials - are under County and local jurisdiction and also provide for intermunicipal movements but at lower capacity levels than primary arterial streets. Although these streets may handle significant traffic volumes, adjoining land use is often residential in character. Secondary arterial roadways will generally handle most of the regional traffic that traverse Princeton. In order to preserve their traffic carrying capacity, the number of intersections, driveways, and frontage activity should be minimized along these streets.

Major Collectors - are under County and local jurisdiction and provide access and circulation between various points within the community for moderate volumes of traffic. Because their function is to promote free traffic flow major collectors should minimize parking and access driveways since these activities interrupt the flow of traffic. Collector roadways will generally be utilized by persons making regional and local trips. Major collectors should be designed for a maximum average daily traffic (ADT) of about 3,000 vehicles.

Minor Collectors - provide access to fronting properties and also collect traffic from developments and carry it to major collectors or arterials. The traffic on these streets should be limited to vehicles collected from intersecting local streets and the small amount generated on the street itself. Minor collectors are not intended to service interstate/inter-regional, regional, or cross-town traffic. They should be designed to discourage short cutting by through traffic from outside the neighborhood.

Local Streets - ideally they serve to provide access to land activities that front upon them (primarily residential) and serve no network function in terms of long distance or intra- regional linkages. They are designed to carry only the traffic generated on the street itself. Private substandard streets are discouraged since they do not permit sufficient emergency access, and other public services.

Cul-de-sacs - are useful in some instances to provide local access to residential lots. Their use should be discouraged in cases where they cause circuitous traffic patterns or difficult access for emergency vehicles. Private or substandard cul-de-sacs should not be allowed.

Additional and/or different roadway classification may be required in the future to address how a roadway functions and impacts the Princeton community. Examples include Faculty Road which is Princeton University's access road as well as a distributor of traffic among Harrison Street, Washington Road and Alexander Road.

Roadway Inventory

The following roadways have been classified as Primary Arterials:

Route 27

Route 206

The following roadways have been classified as Secondary Arterials:

Cherry Valley Road

Bunn Drive (if connected)

River Road

Province Line Road

Mercer Street/Princeton Pike

Washington Road

The following roadways have been classified as Major Collectors:

The Great Road - Elm Road

Rosedale Road

Hodge Road

Alexander Street

University Place

Faculty Road

Harrison Street

Wiggins Street-Hamilton Avenue

Paul Robeson Place

Ewing Street

Witherspoon Street

Quaker Road

Cherry Hill Road

The following roadways have been classified as Minor Collectors:

Snowden Lane

Herrontown Road

Mountain Avenue

Terhune Road

Poor Farm Road

Pretty Brook Road

Jefferson Road

Moore Street

Lovers Lane

Hutchinson Drive

Prospect Avenue

Valley Road

Stuart Road from The Great Road to Cherry Hill Road

Mount Lucas Road north of Ewing Street

Proposed roads or new extensions of existing roads listed above as new major or minor collectors are:

Road A from Bunn Drive to Mount Lucas Road

SUGGESTED HIGHWAY IMPROVEMENTS

Most of the roadway improvements suggested in the master plan are minor improvements to the existing system or involve overlays of existing roadways. A few major highway improvements will be needed to maintain a reasonable level of service on the Borough and Township's streets, while retaining roadway size at a level that is within the scale and character of Princeton. It is recognized that some improvements can be accomplished more easily than others. The suggested improvements are grouped as State and Regional proposals and local proposals.

STATE AND REGIONAL PROPOSALS

Princeton By-Pass/Route 92 - This roadway was originally proposed by the New Jersey Department of Transportation to be a four-lane divided highway connecting the New Jersey Turnpike with Route 206, just north of Princeton. Currently, the New Jersey Turnpike Authority has taken over the project and is beginning the design work to construct Route 92 from the New Jersey Turnpike, Exit 8A, to Route 1. The Board supports the construction of this first phase, including its extension to Route 27, and supports the continuation of Route 92, as a two lane roadway to Route 206.

Routes 27 and 206 - These roadways should be maintained as two-lane roadways and additional curb cuts discouraged wherever practical. Any plans to widen either of these roads in adjoining communities must be carefully reviewed for their impact on Princeton. Routes 27 and 206 can not be widened in Princeton and should not be allowed to empty four lanes of traffic onto a two lane road.

Historic Bridges and Culverts - The communities historic bridges and culverts should be rehabilitated and preserved rather than replaced with new structures. New structures should be compatible with the historic area in which they are located.

Route 1 Improvements - Improvements to Route 1 such as widening and construction of grade separated interchanges at Alexander Road, the Millstone By-pass, and Scudders Mill Road are necessary to meet current traffic demand. Pedestrian and bicycle access over these interchanges should be provided. The size and scale of the overpasses and any new roads serving them should be consistent with the Board's policy of two lane tree lined roadways. Any road design which negatively impacts Carnegie Lake or the D & R Canal should be discouraged.

LOCAL ROAD IMPROVEMENTS

Cherry Valley Road System

Cherry Valley Road Improvement - With the expected increase of traffic volume, Cherry Valley Road will require safety improvements: such as adequate shoulder on each side, straightening of several sharp curves, regrading of a few sharp vertical curves, improved sight distance on some of the curves, and drainage improvements to eliminate dangerous ditches and sheet ice in winter. The intersection of Route 206 and Cherry Valley Road should be examined for possible improvement. This road should remain as a two-lane roadway.

Hillside Avenue and Route 206 Study Area - Circulation improvements will be needed in this area to service Griggs Farm, several new office buildings, and development in Montgomery Township. The relationship of Hillside Avenue, Cherry Valley Road, Route 206 and proposed Duffy Place should be evaluated in the future.

Province Line Road System

Province Line Road Extension - Province Line Road should be improved and extended from Rosedale Road to Cherry Valley Road, with two lanes and shoulders. The bridge over the Stony Brook should be replaced or repaired. The proposed extension of Province Line Road must maintain the scenic and rural character of this roadway.

Province Line Road/Cherry Valley Road Intersection - This intersection will require improvement after the restoration of the Province Line Road bridge and at that time may require signalization. A cooperative effort will be needed with Montgomery Township to align both legs of Province Line Road.

Province Line Road Bridge - It is proposed that the bridge over Stony Brook which is currently out of service, be restored to a two-lane bridge to provide a traffic corridor along Princeton's western border in order to reduce the volume of traffic passing through the center of Princeton.

Province Line Road Improvement - This road is proposed to be reconstructed and extended from Rosedale Road to Cherry Valley Road, with two lanes and shoulders. It is a key component of an evolving peripheral circulation system.

Province Line Road/Rosedale Road Intersection - This intersection is to be signalized with left turning lanes.

Route 206 System

Quaker Road/Route 206 Intersection - This intersection should be better aligned with an improved left turn lane on Route 206, and improved sight distance. Improvements to this intersection must reflect the historic character and sensitivity of the area.

Lovers Lane/Route 206 Intersection - A traffic signal is proposed which would be coordinated with signals at Lovers Lane/Mercer Street and Elm Road/Route 206.

Mercer Street/Route 206/Bayard Lane/Nassau Street Intersection - This intersection needs some improvement in realignment, where possible, and in coordinating signal timing with other intersections on Nassau Street. However, cutting through the property of Trinity Church is opposed.

Mountain Avenue/Route 206 - Some minor geometric improvements will be needed to allow more freedom of traffic movement.

Witherspoon/Wiggins/Hamilton Streets/Robeson Place System

Minor widening on both sides of Witherspoon Street is recommended in front of the Arts Council and cemetery to allow for a dedicated left turn lane onto Wiggins/Hamilton Streets. Minor widening along the south side of Wiggins Street is recommended to provide a longer turning lane onto Witherspoon Street heading towards Nassau Street.

Elm Road/Great Road System

Rosedale Road/Elm Road Intersection - Some minor geometric improvements will be needed to allow more freedom of traffic movement.

Mountain Avenue/Great Road Intersection - Some minor geometric improvements will be needed to allow more freedom of traffic movement and the need for a traffic signal investigated.

Pretty Brook Road/Great Road Intersection - Pretty Brook Road should be improved on its approach to Great Road with minor geometric improvements and Great Road requires a left turning lane.

Stuart Road/Great Road Intersection - This intersection needs further study to correct a safety problem.

Great Road/Cherry Valley Road Intersection - This intersection is proposed to be signalized with left turning lanes on all approaches.

Ewing Street/Harrison Road System

Mount Lucas Road/Ewing Street Intersection - A traffic signal will be required with turning lanes on all approaches.

Ewing Street/Route 206 Intersection - This intersection requires a traffic signal with geometry on Ewing Street and a left turning lane on Route 206.

Bunn Drive/Ewing Street/Harrison Street Intersection - This intersection is proposed to be realigned and signalized. Turning lanes are required on both Bunn Drive and Harrison Street.

Snowden Lane System

Snowden Lane/Route 27 - This signalized intersection will require geometric improvements to provide better movement of traffic.

Snowden Lane Roadway Improvement - Safety improvements are required on Snowden Lane such as widening to 12 foot traffic lanes with shoulders, and improvement of sight distances consistent with posted speed limits.

Proposed Extensions

Bunn Drive Extension - Bunn Drive is developing as the major research and office corridor within Princeton and the recommended extension will allow the roadway to serve the traffic generated by the office development. If Route 92 is extended to Route 206, Bunn Drive should be connected to the new Route 92. Bunn Drive is recommended to be two lanes wide.

Farrand Drive Extension - The Farrand Drive right-of-way connecting Russell Estates to Rosedale Road should be retained for emergency vehicular purposes as well as pedestrian and bicycle access. The alignment within Russell Estates indicated on the 1996 Circulation Plan Maps shall be corrected to reflect the actual right-of-way dedication shown on the Township tax map. The listing of the

Farrand Drive Extension under the category “Local Road Improvements – Proposed Extensions” is removed from the Circulation Plan Map and the text of the Circulation Element.

Road A Extension - Road A would connect Mount Lucas Road to Bunn Drive.

Traffic Flow Improvements

Nassau Street Improvement - This street between Murray Place and Moore Street needs to be examined and improved to allow safe and efficient traffic flow.

Traffic Signal Coordination - Signals should be coordinated one to the other in their timing where appropriate. In addition individual lights should be adjusted to the traffic characteristics according to the time of day. All impacts from new traffic lights should be evaluated including impact on adjacent residential neighborhoods.

Traffic Flow Improvements - A systematic review of intersections should be undertaken to determine whether traffic flow could be improved by permitting right turn on red where currently prohibited, prohibiting left turns on certain roads during peak hours, and providing minor widening or stripping to facilitate turning movements. Traffic-calming techniques should be evaluated to determine if they are appropriate to relieve traffic impacts on residential streets. Suggested roads to be analyzed include Wiggins-Hamilton-Paul Robeson Place, Witherspoon Street, Edgehill, Library Place, Lovers Lane and the intersection of Route 206-Nassau Street-Mercer Street.

Other Capital Road improvements - Table A lists minor road improvements which have been identified as necessary to ensure safe traffic flow within the Borough and Township.

Princeton University Circulation

University Circulation - The University should provide an internal traffic circulation plan to handle traffic that will result from new buildings and modifications to existing facilities. Faculty Road is crucial to the community's circulation system and we ask that the University keep it open in perpetuity. Future buildings, parking lots and garages should use Faculty Road for egress and ingress.

Washington Road Tunnel - Over the years several proposals have appeared that suggested the underground placement of Washington Road between College Walk and Williams Street. Such a tunnel would remove congested traffic from the center of the Princeton University. It would substantially reduce a major pedestrian safety problem and improve the serenity of the Princeton University campus. The elimination of substantial pedestrian interaction would facilitate the smoother flow of traffic between Nassau Street and Route 1. It would allow Washington Road to absorb a larger portion of the inevitable increase in traffic between Nassau Street and Route 1. It would also reduce the pressure on Harrison Street and Alexander Road.

Other Improvements

Gateways - The entrances to Princeton should be visually recognizable as marking a transition to an area with a distinctive character.

Parking - Any plans for new parking garages should be accompanied with a street capacity analysis. Adequate parking should be provided by all new developments, especially downtown. New Princeton University garages should be oriented to use Faculty Road as an access street rather than Nassau Street.

TRANSIT IMPROVEMENTS

It is recommended that a community Jitney Service be considered to address the following transit improvement measures.

Bus and Vanpooling - The following strategies are recommended: development of van pooling in the high density office areas, providing bus shelters where appropriate, encouraging additional peripheral parking outside the CBD with shuttle services, extensions of bus service to accommodate higher density commercial and residential zones, and providing a shuttle system between the "Dinky" rail station, the CBD, and other areas of the community.

Rail System - The mass transit rail system should be vigorously supported between Princeton and the Princeton Junction Railroad Station. The Circulation Improvement Plan suggests a future location of a second Princeton rail station adjacent to the Faculty Road grade crossing. A stop at this location (south of Faculty Road) could be eliminated if another suitable site in an adjacent community is provided. This would be a more favorable alternative because it would be close to the source of traffic generation.

Traffic Reduction Measures - The Planning Board supports innovative efforts to reduce peak hour traffic volumes. Employers in Princeton will be encouraged to adopt traffic demand reduction measures such as ride sharing, flex time, parking limitations, as well as mixed-use developments which would reduce peak demands on the roadway system and minimize the roadway capacity needed to service the peak demand. Parking requirements should be modified to allow businesses to take credit for vanpooling, ride sharing or other documented transit strategies.

School Buses - At present a substantial amount of money is spent on the school bus transportation program. A fresh look should be made of this transportation mode to determine if some of its excess capacity, if it exists, could be utilized to serve a non-school population during peak-hour demand.

PEDESTRIAN AND BICYCLE IMPROVEMENTS

The Princeton community is served by a comprehensive system of pedestrian and bicycle paths. The policy of the Regional Planning Board of Princeton is to promote bicycling as a safe choice for personal transportation. In order to achieve this policy it is necessary to plan and provide appropriate facilities which will accommodate all levels of bicycling skill. Roadways, sidewalks and bike paths should be designed to meet current state and federal requirements, where appropriate.

Bicyclists in Princeton form a diverse group and range from highly experienced riders who ride frequently to more casual riders who are less comfortable riding in traffic to young children who have not developed adequate judgment to ride in the street. To meet the needs of this diverse group a variety of facilities are needed. Advanced bicyclists are best served by streets and highways which have been designed for cars and bicycles to share the road. Casual riders may prefer a separate path or marked bike lane which encourages bicycle usage. Young children need separate paths or to share sidewalks due to their limited riding skills.

The Planning Board recommends that a community-wide bicycle system that addresses all levels of bicycle riding ability be developed. Special attention should be given to developing routes which allow school aged children to safely ride bicycles to and from school, parks, the library and other areas in the community. Proposed bike routes and areas to have sidewalks are indicated on the Bike Route Plan and Sidewalk Plan.

Listed below are improvements which we have identified as necessary to further bicycle and pedestrian mobility.

Pedestrian Crossing Princeton Pike at Stony Brook - A pedestrian bridge should be constructed over the Stony Brook to facilitate pedestrian and bicycle traffic along the existing Princeton Pike bike path system which connects to the path system in Washington Oaks development. Mercer County has committed to fund the construction of this project.

Bike Path Extensions - The existing bike path along Rosedale Road should be extended to Province Line Road. The bike path along Cherry Hill Road should be extended along Route 206 south to Mountain Avenue, including a bridge over Mountain Brook. This path should also cross Route 206 and continue on the western side of Mount Lucas Road to the intersection of Valley Road and Witherspoon Street. The Mercer Street bike path should be extended from the Heatherstone development to Gallup Road. A bike path extending from the Institute for Advanced Study on Olden Lane through the Institute lands and over the Stony Brook and D & R Canal linking the County Park, Seminary Apartments and Market Fair Shopping Center should be considered. The Guyot Avenue bikepath should be extend and improved from Moore Street crossing Witherspoon Street to Community Park. Also the existing bikepath along Cherry Valley Road should be extended from Billie Ellis Lane crossing Route 206 to connect with the path along Princeton Avenue. Both of these path extensions will require the relocation of utility poles.

Sidewalks, bikeways, and paths - The Planning Board encourages development of a continuous network of sidewalks, bikeways and paths to create linkages between neighborhoods, open spaces, recreational areas, and schools as well as providing an alternative to motorized vehicular traffic. Sidewalks, bicycle paths or pedestrian paths should be provided along all major roadways. Since 1989 many of the sidewalks, bikeways and paths recommended in the Master Plan have been constructed. The remaining sidewalks, bikeways and paths indicated in the 1989 plan remain valid and should be constructed when feasible. The sidewalk plan indicates the existing as well as proposed sidewalks, bikeways, and paths.

Pedestrian Enhancement - Areas of high pedestrian activity should be studied to determine what actions are appropriate to better protect and encourage pedestrian activity. Pedestrian crossing markings and signage should be enhanced where appropriate. Stricter enforcement of pedestrian safety rules should be encouraged. A community wide pedestrian safety program should be developed.

TRUCK MOVEMENTS

The concept of limiting truck-delivery hours in the downtown area should be studied. Limiting large truck deliveries to off-peak traffic periods if feasible could reduce traffic congestion. It is recommended that the Borough Council study the possibility of an ordinance that would limit deliveries to the downtown area by large trucks to off-peak traffic periods.

Interstate truck traffic should be routed around Princeton. A coordinated strategy with surrounding communities should be developed to keep interstate traffic on interstate highways or four-lane highways and away from residential streets.

INFORMATION IMPROVEMENTS

Data collection regarding supply and demand for roads and transportation services/availability should be improved by beginning to systematically collect traffic volume data on major roadways throughout the community.

CONCLUSION

The Circulation Element recognizes that the design and scale of roadways set the standard of livability and historic appearance (or lack thereof) for the Princeton Community. To this end the report has identified various improvements to meet the anticipated increase in both development and its accompanying increase in traffic demands. The findings have resulted in the proposed Circulation Plan and a Roadway Improvement Program list for inclusion into Princeton's Master Plan Traffic Circulation Element.

The details of roadway and intersection improvements need to be established as improvement plans are developed, since the precise sequencing and timing of projects cannot be defined at this time. This Circulation Master Plan is intended to provide an identification of future street and highway needs, and to provide a frame-work for identifying the priorities, magnitude, and responsibility for improvement projects.

Appendix B - Capital Improvement Road Projects for Township & Borough, Roadway Design Standards (Table 1).