

Cranbury Township
Circulation Plan Revision
August 1998

Prepared by:
Lehr & Associates, Inc.
Clarke Caton Hintz

To: Cranbury Township Planning Board

From: Melvin R. Lehr, PE and Carl Hintz, PP, AICP, CLA, ASLA

Re: Amendment to the Circulation Plan Element of the Cranbury Township Master Plan

Date: August 6, 1998

As the result of changes to development patterns east of Route 130 in the Township, the Planning Board requested that Lehr & Associates, Inc. and Clark Caton Hintz review the existing circulation element of the master plan. Based on our review we propose the attached document as a recommendation for modification to the circulation plan. This proposed revision is based on anticipated full build-out development in the area. It is intended to provide better accommodation of anticipated development and to improve overall circulation of transportation modes within and through the area..

This document incorporates the comments and remarks of the March 26, 1998 and May 7, 1998 work sessions and is consistent with the Planning Board's adoption of the Circulation Plan Revision at the July 9, 1998 public meeting.

VIII.(A) Circulation Plan Revision

A. Introduction

The purpose of this circulation plan revision is to modify those elements of the existing plan specifically as they pertain to portions of the Township located east of Route 130. The revisions have been made as the result of additional analysis performed on the area using current zoning requirements, anticipated future development east of Route 130 within the Township, and anticipated future travel volumes to and through the area.

B. Description of Circulation Plan Revision Area

The area covered by this plan revision is bounded on the west by New Jersey Route 130; on the north by the Cranbury Township boundary with South Brunswick and Monroe Townships; on the east by the Cranbury Township boundary with Monroe Township; and on the south by the Cranbury Township boundary with East Windsor Township. The area of the circulation revision encompasses the Township's "Research Office and Light Industrial" (RO/LI), "Light Industrial" (LI) and "Industrial/Light Impact" (I-LI) zone districts, as well as small areas of "GC" General Commercial and "HC" Highway Commercial zoning along the east side of Route 130.

The area covered by the plan revision has been delineated on **Figure 1 - *Developed and Developable Land***. Figure 1 consists of a number of layers each of which display different information for the area of the revision. The first layer is a base map which indicates the current roadway network and all tax lot parcels. Each of the blocks and lots are noted. The second layer indicates in gray color the lots that were developed or under construction at the time of the analysis. The third and final layer indicates freshwater wetlands as delineated by the New Jersey Department of Environmental Protection (NJDEP).

Figure 1 - Study Area Map

C. Analysis Utilized for Circulation Plan Revisions

In developing the revision to the circulation plan, analysis was completed in two distinct phases: 1) the estimation of build out potential within the area; and 2) determination of impacts and needed improvements to the roadway and pedestrian systems based on the estimation of developable acreage within the area.

1. Estimation of Build-Out Potential

a) Existing Land Uses

Existing land uses east of Route 130 within the Township were analyzed to determine existing development through use of a windshield survey on a lot-by-lot basis. In addition, aerial photographs of the study area were used to verify field observations. Finally, the Township Planner, Township Engineer and Township Planning Board office were consulted to further verify the existing land use conditions and approved developments. The findings of this effort are shown in Figure 1.

b) Wetlands Acreage

To determine potential development density, a computation of total freshwater wetlands acreage on vacant parcels was made using NJDEP wetlands information on a Geographic Information System. In addition, various site plans and subdivisions were reviewed which have studied the wetlands on their sites. In those cases where an LOI (Letter of Interpretation) has been issued by NJDEP, those wetlands maps were utilized instead of the NJDEP GIS maps. Field verification was completed to assess the feasibility of building a culvert across the wetlands area between Half Acre and Station Road for the North - South Connector Road. With that exception, NJDEP information was not field verified and may differ somewhat from actual conditions.

c) Estimation of Developable Acreage

The total freshwater wetlands acreage, including a 50' transition buffer, was then subtracted from the total acreage of each vacant lot to determine total developable acreage within the circulation revision review area.

d) Potential Development Build-Out

The potential density of development on the developable acreage was then estimated based on current zoning within the study area. Allowable square footages of development for vacant parcels within the Research Office Industrial zone ranges from 6,514,999 s.f. to 12,668,054 s.f. based on allowable maximum floor area ratios. In the I-LI zone the potential square footage of development on vacant parcels ranges from 3,269,352 s.f. of space to 4,904,028 s.f. of space based on allowable maximum floor area ratios.

Because of the wide array of potential variables for development under the existing code and to be conservative in the analysis, the following assumptions were made in regard to applicable land use:

(1) Highway Commercial and General Commercial Classifications

For the purposes of the plan revision analysis, these classifications were determined to be fully developed.

(2) Development of Parcels North of Half Acre Road

Conceivably, under existing zoning provisions, as much as 100% of the developable acreage from Half Acre Road to the north could be built as office space. However, because of the close proximity and easy access to the New Jersey Turnpike, the availability of larger parcels in the area not subject to wetlands constraints and existing trends of development, it was determined that a development scenario using a 70% warehouse and 30% office mix would provide a reasonable representation of development for the purposes of this analysis.

(3) Development of Parcels South of Half Acre Road

In the area south of Half Acre Road there is currently less development activity and parcels in this area are generally smaller and/or more oddly shaped than those in the northern portion of the study area. In addition, this area is located further from Exit 8A of the New Jersey Turnpike and motorists from this area have to travel through more traffic signals on Route 130 to access the Exit. There is also less likelihood of "Big-Box" warehouse development due to environmental and wetlands constraints on many of the parcels. As a result, at the present time there is less certainty about the nature of development below Half Acre Road. Thus, it was determined for analysis purposes that

the vacant parcels below Half Acre Road, exclusive of known development projects, would be projected assuming that the vacant parcels would be used as an Industrial Park area.

2. Determination of Potential Transportation Impacts in the Circulation Plan Revision Area.

To assess future transportation requirements and necessary circulation plan revisions, the impact of potential future development on the existing roadway network need to be determined.

The analysis began with a review of existing traffic volumes on the existing roadways, as well as a review of the circulation plan as approved in the November 1993 Master Plan.

a) Existing Traffic Conditions

A field review of the area was completed during periods of peak period operation. In addition, available traffic impact study and prior circulation plan work were reviewed to: 1) determine existing levels of service on study area roadways; 2) obtain past observations about traffic patterns and flows; and 3) establish baseline traffic volumes for the purposes of future analysis.

(1) Existing Traffic Volumes

There were a number of traffic impact studies (TIS's) completed in 1997. Traffic counts from these studies were used as baseline volumes for analysis of existing and future conditions.

(2) Existing Capacity Deficiencies

Capacity calculations conducted for intersections within the area show that there are currently poor level of service conditions and deficiencies at the following intersections:

- **Route 130/Dey Road**
- **Route 130/Half Acre Road**
- **South River Road and Prospect Plains Road**
- **South River and Dey Road**

Observation and capacity calculations show that Route 130's intersections with Dey Road, the South River Jughandle, and Half Acre Road are all currently experiencing significant delays and need additional intersection capacity in order to operate at acceptable levels of service.

Existing deficiencies in capacity at South River Road's intersection with Prospect Plains Road were shown to be correctable with the addition of a protected/permitted southbound left turn phase and other signal timing modifications.

South River Road's intersection with Dey Road is also correctable with modifications to signal timing.

b) Trips Generated By Developable Acreage

Knowing the status of existing traffic conditions, the next step in the analysis was to project the number of additional trips that would be generated to and from the area based on the potential development.¹

(1) Pipeline Trips

To estimate the number of additional trips that will be generated, it was assumed that any proposed development project that has come before the planning board to receive preliminary approval would be analyzed as a project in the pipeline². In the case of pipeline projects the square footage and trip generation estimates as provided in the accompanying project TIS reports were used.

(2) Additional Trips Generated - Half Acre Road and North

Trips were then generated for vacant parcels not currently in the pipeline using a projected 70% warehouse, 30% office mix. To provide consistency with current development efforts, trip generation rates similar to those used in recent traffic impact studies were used to generate the additional trips for this portion of the circulation area review.

1. In addition to the generation of trips to and from the study area it is also a common practice to project growth in background traffic to account for through traffic increases at some future development year. In order to be conservative with our trip generation estimates, only new site generated traffic was projected for future trips. No background growth for through trips was used for this analysis.

2 Pipeline projects included Trammell Crow, Cranbury Corporate Campus, Cranbury Business Park, Morris Cranbury Associates, and Cranbrook Corporate Park. Although the Prudential site is now operational, because it was a projected development at the time that traffic counts were made, it is included as pipeline development for trip generation purposes.

(3) Additional Trips Generated - South of Half Acre Road

For the area south of Half Acre Road the 6th Edition of the ITE Trip Generation Manual was used to generate rates for Industrial Parks acreage. Trip generation rates used for the analysis are summarized in Table 1 below.

Pipeline Development		Trips Generated per TIS Reports			
• Half Acre Road and North (70% warehouse/30% Office)		AM Peak		PM Peak	
		Trips In	Trips Out	Trips In	Trips Out
	Warehouse/1000sq.ft	.16	.03	.03	.17
	Office /1,000 sq. ft	.42	.06	.08	.38
• South of Half Acre Road (Industrial Park)		ITE Trip Generation Manual 6 th Edition Category (130) Pages 145 and 146			

Table 2 provides a summary of the total trips generated for the analysis based on projected development square footage.

	Square Footage	AM TRIPS	PM TRIPS
Pipeline	5,677,567	2,350	2,300
Build-Out	18,981,399	11,750	11,150

c) Trip Distribution and Traffic Assignment for Developable Acreage

Once the total number of new trips to and from the area were estimated, the next step in the analysis was to distribute the trips from surrounding areas and to assign those trips onto the existing roadway network.

(1) Trip Distribution

To maintain consistency with existing traffic impact studies, distribution percentages generally in line with those of the studies were utilized as follows:

(a) FOR TRIPS TO SITES AT HALF ACRE ROAD AND NORTH

- Trips to/from the North 45%
- Trips to/from the South 35%
- Trips to/from East - 10-15%
- Trips to/from West - 5-10%

(b) FOR TRIPS TO SITES SOUTH OF HALF ACRE ROAD

- Trips to/from the North 35%
- Trips to/from the South 45%
- Trips to/from East - 10-15%
- Trips to/from West - 5-10%

(2) Trip Assignment and Capacity Analysis

Total future build-out trips, including projected pipeline trips, were then assigned to the existing roadway network during both the a.m. and p.m. peak periods consistent with the distribution noted above.

These a.m. and p.m. future build-out trips were then assigned to the network, and capacity analyses were conducted. Roadway improvements were then incrementally added to the system until acceptable levels of service were established.

D. Summary of Circulation Plan Revisions

Based on the analysis, findings and discussions with the Planning Board, the following modifications to the roadway network and intersection improvements are incorporated as elements of the Circulation Plan Revision. These revisions are noted on **Figure 2, Revision to the Circulation Plan**.

Figure 2 – revised circulation plan

1. Major Arterials

a) Route 130

- 3 through lanes each direction.
- Cross-road intersection improvements and cross street widening at Dey, Half Acre, and Station Roads.

b) South River Road (CR 535)

- 4 through lanes from Route 130 to Route 32 and a center turn lane for driveways.

c) Access Management Plans

- The Township will work with the New Jersey Department of Transportation and Middlesex County respectively to implement Access Management Plans along Route 130 and South River Road.

2. Minor Arterials

Subject to County Approval, Recommendation Not to Implement Dey Road/Prospect Plains Road Realignment

While the county plan and existing Township circulation plan both called for the realignment of Dey Road to intersect with Prospect Plains Road at South River Road, analysis shows that this realignment would not benefit traffic for the following reasons:

- There is a projected increase in north/south trips along South River Road.
- The realigned intersection would create complex turning movements that would create a need for a multi-phase signal and cause greater delay.
- A wide cross-section would be needed to accommodate the re-alignment.

3. Intersections

a) South River Road And Dey Road

- **Northbound** - Left turn lane and 2 through lanes
- **Southbound** - Right turn lane and 2 through lanes
- **Eastbound** - Right turn lane and a left turn lane

b) South River Road and Prospect Plains Road

- **Northbound** - 2 through lanes and a right turn lane
- **Southbound** - 2 through lanes and two left turn lanes
- **Westbound** - 2 left turn lanes and 2 right turn lanes

4. Circulation Roadways

These roadways will be developed to accommodate pipeline and full build-out development and provide adequate levels of service on the roadway network east of Route 130.

The proposed alignment of the various circulation roads shown on the revised circulation plan are generalized locations and subject to a detailed engineering study based upon existing environmental and topographical constraints. For example, the minor arterial road which is proposed from South River Road to Half Acre Road to Station Road and then to Route 130 to meet Old Trenton Road is conceptual and subject to minimizing the crossing of wetlands and filling of the 100-year floodplain. The plan conceptualizes these roads and indicates them as running along property lines to share impacts to the extent possible. The specific design should also minimize the impact on the developability of each parcel.

a) North/South Minor Arterial Road (South River Road to a connection with Route 130 and Old Trenton Road)

(1) Roadway Characteristics

- Minor Arterial Road.
- Minimum 56 foot cross-section, two lanes in each direction, flaring at intersections and driveways to provide for left turn lanes and acceleration/deceleration lanes where appropriate.
- Signalization at Prospect Plains connector road, Half Acre Road, Station Road and connecting into the Old Trenton Road signal at Route 130.

(2) Benefits of Roadway

- Will serve as a minor arterial to provide relief on major arterials for study area traffic.
- Provides better access into the parcels south of Half Acre Road and as a result make them more desirable for development.
- Provides congestion relief to the Route 130/Station Road intersection.
- Potentially provides through traffic by-pass of the Village Center if developed as an alternate to CR 535.

(3) Alignment Considerations

- Provides the least intrusion into wetlands acreage.
- The location is at a centralized point along Half Acre Road between Route 130 and the New Jersey Turnpike.
- Security Capital has currently dedicated 30 feet of right of way north of Half-Acre Road for this roadway.

(4) Roadway Design and Implementation Considerations

- To preserve the potential for designating the route as an alternate to the current CR 535 through the Village, the road should be constructed to meet minimum county design standards and right of way standards.
- At the present time the roadway could be constructed from South River Road to Half Acre Roadway as a two lane roadway with signalization at South River Road.
- The timing for extension of the roadway from Half Acre south to Station Road and then continuing to Old Trenton Road is dependent on actual location and intensity of development to the south, although completion of the road as an alternate routing for CR 535 at this time may provide benefits to the Village and may act as an attractor to development.

b) Campus Drive between Route 130 and South River Road

(1) Roadway Characteristics

- Collector road.
- 32 foot cross-section flaring at intersections and driveways to provide for left turn lanes and acceleration/deceleration lanes where appropriate.
- Signalization of its intersections with Route 130 and South River Road.

(2) Benefits of Campus Drive

- Provides a more direct route between Route 130 and South River
- Provides relief to intersection of Dey & South River Road
- Provides relief to intersection of Dey & Route 130

c) North-South Road between Dey Road and Campus Drive.

(1) Roadway Characteristics

- Collector road.
- 32 foot cross-section flaring at intersections and driveways to provide for left turn lanes and accel/decel lanes where appropriate.

(2) Benefits of Roadway

- Provides additional access into and out of development parcels in the area.

d) Circulation Road from Prospect Plains Road to North/South Minor Arterial Road and then continuing on to South River Road

(1) Roadway Characteristics

- Collector road
- 32 foot cross section flaring at intersections and driveways to provide for left turn lanes and accel/decel lanes where appropriate.
- Signalization at its intersection with the north-south connector road

(2) Benefits of Roadway

- To provide access to Prospect Plains Road to the east to avoid South River/Prospect Plains intersection
- To provide better and additional access to parcels south of Prospect Plains Road
- Located centrally on Prospect Plains Road between Route 130 and the New Jersey Turnpike