

CIRCULATION PLAN ELEMENT

TOWNSHIP OF HANOVER MASTER PLAN



Township of Hanover Planning Board

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Prepared by

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The original of this document has been signed and sealed in accordance with N.J.A.C. 13:41-1.3(b)

CIRCULATION PLAN

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INTRODUCTION AND PURPOSE

The primary purpose of the Circulation Plan is to establish policies and standards for the development and improvement of the Township's transportation network, and to coordinate transportation, land use and development policies.

The plan is intended to be responsive to the objectives of the Township in planning for its future growth, while at the same time addressing existing problems. The Circulation Plan establishes general policies, which will serve to guide the development and improvement of the circulation system. Transportation decisions that affect other agencies, such as the County of Morris and the New Jersey Department of Transportation (NJDOT), will need to be coordinated to ensure compatibility of development.

GOALS AND OBJECTIVES

The following goals and objectives provide an outline to accomplish this initiative.

- A. Goal: Promote a coordinated roadway plan that enables the safe and efficient movement of people and goods and minimizes the negative impact of regional traffic on local roads, especially in residential areas.

Policies:

1. Plan for a transportation network that is compatible with neighboring municipalities, the County, and the State.
 2. Establish a hierarchy of roads with appropriate physical characteristics, thus avoiding conflicts where the volume of traffic or the type of vehicle is inappropriate for a particular road (e.g. channeling regional traffic onto local streets).
 3. Support completion and upgrade of regional roadways and intersections to aid in improving local traffic circulation, particularly those improvements involving Route 10.
- B. Goal: Identify and prioritize transportation improvements.

Policy:

1. Continue application of off-site road and intersection improvements and pro-rata share obligations generated by new development.
- C. Goal: Encourage the development and use of alternative circulation modes and networks (e.g., pedestrian, bicycle, transit) for the convenience of the public and in order to reduce motor vehicle traffic on Township streets.

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Policies:

1. Provide and interconnect pedestrian and bicycle pathways throughout the Township, with particular emphasis on interconnections between recreational uses and schools.
2. Improve pedestrian accessibility in areas of the Township where pedestrian traffic is encouraged (i.e., business areas, community recreation areas, municipal campus).
3. Encourage the use of public transportation within the regional transportation system (i.e., public education of the opportunities available, installation of bus shelters).

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STREET INVENTORY

The Township of Hanover's roadway network is effectively established. Future addition to the street network is limited to creating local streets that serve new subdivisions. There is little or no opportunity remaining for the construction of new arterial or collector roadways that would interconnect neighborhoods or provide alternate routes of to provide congestion relief. The only apparent remaining major roadway expansion opportunities are discussed in a following section, entitled "Long-Term Potential Roadway Improvements."

There are a total of approximately eighty-one miles of streets and highways located within the Township. The roadways fall within various jurisdictions including; State, Federal, County, municipal and private. The Township maintains approximately 63 miles of roadway. The County maintains approximately 7 miles, the State maintains approximately 8 miles and, there is approximately 3 miles of roads that are privately owned. Table I below summarizes the existing miles of roadway within the Township, distinguished by authority and street classification.

TABLE I				
ROADWAY SYSTEM SUMMARY				
Authority	Classification	Right-Of-Way Width (feet)	Cartway Width (feet)	Cartway Length (miles)
Township	Minor Arterial	50 – 82	26 – 56	5.464
Township	Collector	50 – 80	24 – 46	11.779
Township	Local	25 – 70	18 – 46	45.420
Sub-Total 62.663 miles				
County	Minor Arterial	66	38 – 46	6.975
County	Local	40	25	0.190
Sub-Total 7.165 miles				
State	Principal Arterial	80 – 300	68 – 124	7.650
State	Local	50 – 80	30 – 50	0.440
Sub-Total 8.090 miles				
Private	Local	N/A	18 – 45	2.75
TOTAL 80.668 miles				

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TRAFFIC VOLUMES

Table II on the following page illustrates the daily traffic volumes, where available, on most of the major roads in the Township. The figures in the table represent the typical daily traffic volumes on the roadways. The table also identifies the approximate location and the year that the traffic data was collected.

As indicated in the table, I-287 and NJ Route 24 carry the highest volume of traffic through the Township. However, due to the type of roadway (limited access highway), the majority of that traffic is through traffic and does not engage the local street network.

NJ Route 10 carries the highest volume of traffic through the Township that allows direct access to the local street network and individual properties. Traffic counts conducted by the State since 2000 indicate a wide range of volumes, varying from 32,000 to 71,000 daily trips, depending upon location.

Columbia Turnpike and Hanover Avenue carry the highest volume of the county roads. Only a small portion of Columbia Turnpike is located in the Township. Whippany Road and Park Avenue are the next highest volume County roads.

South Jefferson Road and Ridgedale Avenue carry the highest volume of traffic on municipal roads. These two roadways are critical to the circulation plan of the Township. South Jefferson Road, with its access to NJ Route 10 and close proximity to I-287, is the primary commuter route serving the numerous office buildings along this corridor. Ridgedale Avenue is the primary roadway serving the Cedar Knolls section of the Township; it connects and provides access to NJ Route 10 and Hanover Avenue. Ridgedale Avenue also serves the numerous business and commercial establishments along the corridor and connects with the Township of Morris and Town of Morristown.

**TABLE II
TRAFFIC VOLUMES**

Street	Location	1979	1985	1986	1987	1988	1989	1990	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
I-287	At Cedar Knolls Road Bridge																		81,183	80,566	77,365	
NJ-24	At Park Avenue Bridge												75,380						86,545			
NJ-10	At Algonquin Parkway															39,050						
NJ-10	At Troy Hills Road											52,860										
NJ-10	At Whippany Road											53,690										
NJ-10	At Parsippany Rd. Bridge (1999); Bet. Parsippany & Whippany Rd. (2008)									36,806									36,068			
NJ-10	Bet. Parsippany & Jefferson Road											38,510							34,356	32,139	32,041	
NJ-10	At N./S. Jefferson Road											48,950										
NJ-10	At Ridgedale Avenue											70,910										
Columbia Turnpike	East of Park Ave.	17,751	23,347	25,883		29,531							26,295						29,059		29,241	
Hanover Avenue	Bet. Speedwell Ave. & American Rd.	18,124				22,512																20,500
Hanover Avenue	Bet. American Rd. & Horse Hill Rd.																					26,845
Hanover Avenue	Bet. Highview Ave. & Monroe St.																					20,655
Hanover Avenue	Bet. Monroe St. and Ridgedale Ave.														24,083						23,425	
Hanover Avenue	Ridgedale Avenue	17,722			23,029																	
Hanover Avenue	Bet. Whippany Rd. & Morris Library	12,270				16,402													19,634			21,200
Park Avenue	Bet. Columbia Tpk. and NJ-24	16,383	18,914	19,949	19,126	20,370							12,103						10,700			
Park Avenue	500' South of Columbia Turnpike	17,803		18,596	17,730	18,798												25,133				
Parsippany Road	South of Berkshire Street									7,614												
Parsippany Road	Bet. Kearny Ave. & Washington St.																				7,081	
Troy Hills Road	North of Route 10															6,550						
Whippany Road	Bet. Parsippany Road & NJ Rte. 10	9,943		11,242			12,908					16,810					18,606				11,279	
Whippany Road	NE of Eden Lane	12,531	14,992					17,342														
Whippany Road	Bet. Eden Lane & Vincent Terrace									16,595											13,364	
Whippany Road	Bet. Mt. Vernon Way & Birch Hill Dr.																				11,381	
Ridgedale Avenue	South of Route 10															15,930			16,854			
Ridgedale Avenue	North of Hanover Avenue										* 12,500											
South Jefferson Road	South of Route 10														12,147					15,008	11,515	
North Jefferson Road	North of Route 10															6,100						
Algonquin Parkway	North of Route 10															7,055						
Algonquin Parkway	South of Route 10											5,430										
Eden Lane	West of Whippany Road								* 9,700													
Ford Hill Road	East of Whippany Road											* 6,700										
Mt. Pleasant Avenue	West of Legion Place					4,471				3,814												
Mt. Pleasant Avenue	Bet. Parsippany Rd. & NJ Rte. 10									3,814									2,539			
Veteran's Place	North of Route 10															3,500						
McNab Avenue	West of Ridgedale Avenue														1,670							
Forest Way	East of American Way														913							
Leslie Court	East of Algonquin Parkway												868									
Sunset Drive	Runnymede Court									390												
Lafayette Court	North of Adams Drive											130										

* - Average daily traffic volume calculated based on peak hour traffic data.

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STREET CLASSIFICATION

The Circulation Plan classifies all streets within the Township of Hanover according to five distinct functions, divided among five jurisdictions: Federal, State, County, Township and private. The functional classifications are: 1) principal arterials, 2) minor arterials, 3) major collectors, 4) minor collectors, and 5) local streets. The Street Classification map classifies the major roadways in the Township; those streets not designated by color on the map are classified as local streets. The classifications are based on the principles and definitions set forth by the American Association of State Highway and Transportation Officials (AASHTO), but modified to split collector roads in major and minor classifications. Descriptions of the street classification follow:

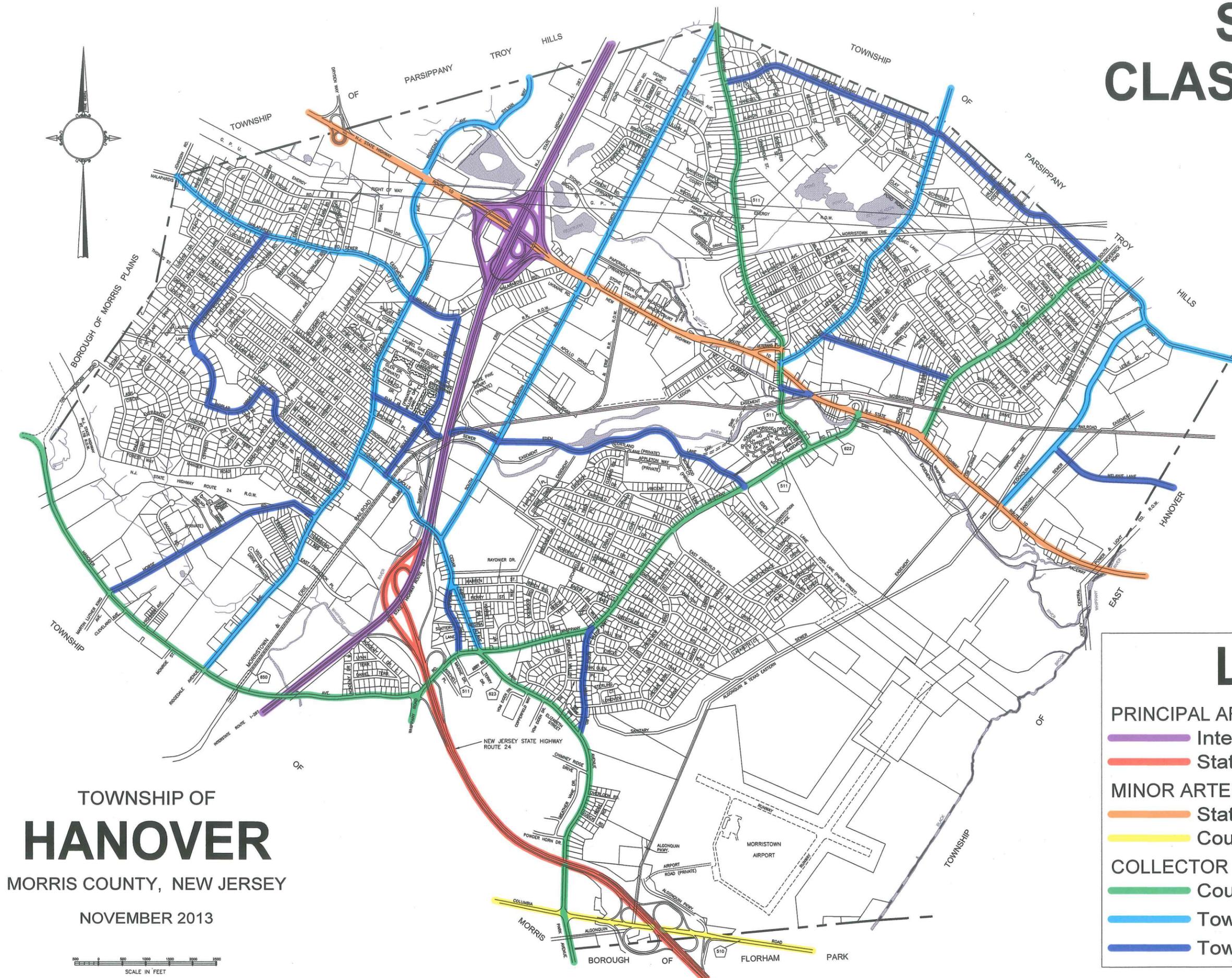
1. The principal arterial system serves the major metropolitan areas, the highest traffic volume corridors, provide limited access and generally carry the highest volume of inter-municipal and regional traffic.
2. The minor arterial system interconnects and augments the urban principal arterial system. This system provides continuity between neighboring communities, places more emphasis on providing access to land parcels and typically carries local bus routes.
3. The major collector street system provides service between the minor arterial system and the lower tier roadways. They provide land access and traffic circulation between residential, commercial, and industrial areas. They differ from the minor arterial system in that the collector system may penetrate residential neighborhoods. The major collector street system may also carry local bus routes.
4. The minor collector streets provide land access and carry traffic between adjoining local streets. The minor collector carries somewhat higher traffic volumes than lower tier local street system. It is not intended to carry regional traffic
5. The local street system provides direct access to residential, commercial and industrial parcels. Local streets are the lowest order of roadway identified in the Circulation Plan. The streets comprising the local street system are not designed or intended to accommodate inter-municipal through traffic or local bus routes.

In addition, the State has mandated standards for roads serving residential developments. Those standards are published in the New Jersey Residential Site Improvement Standards (RSIS). The Township is required to comply with the RSIS standards or file for a waiver when these standards are exceeded. The RSIS standards include a residential street hierarchy system as defined by road function and average daily traffic. These classifications include; major collectors, minor collectors, residential access, residential neighborhood, and special-purpose streets. The special-purpose street describes several different types of roads (i.e., rural, rural residential lane, alley, cul-de-sac and marginal access street).

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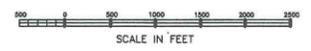
The roadway and right-of-way widths regulated by RSIS are less than what has historically been the Township's standard. The Township's standard for all local streets has been a thirty-foot roadway width, a fifty-foot right-of-way, and curbs and sidewalks on both sides. The Planning Board and Board of Adjustment, during the development review process, should seek to achieve an optimum level of service for the roadway network, which may require waiver of the RSIS standards. Consideration should be given to an increased roadway width, in order to provide shoulders and/or wider travel lanes for safety and to accommodate bicycles. In addition, there are locations where curbs may be needed to provide for improved stormwater drainage, a well-defined pavement edge, and a safety barrier for sidewalks. The Township's policy has always been to require sidewalks on all streets in order to encourage pedestrian mobility and provide a safe pedestrian environment.

STREET CLASSIFICATION



TOWNSHIP OF
HANOVER
MORRIS COUNTY, NEW JERSEY

NOVEMBER 2013



LEGEND

- PRINCIPAL ARTERIAL ROADWAYS
 - Interstate - Federal Highway
 - State Principal Arterial
- MINOR ARTERIAL ROADWAYS
 - State Minor Arterial
 - County Minor Arterial
- COLLECTOR ROADWAYS
 - County Major Collector
 - Township Major Collector
 - Township Minor Collector

ROADWAY ANALYSIS AND IMPROVEMENT RECOMMENDATIONS

Federal-State Roadways

All of the principal arterial roads within the Township are under Federal and/or State jurisdiction. As such, any improvements to these roads require the approvals of higher levels of government and are subject to a lengthy approval period, State/Federal funding, and regional prioritization schedules.

Principal Arterials

The principal arterials located within the Township are:

- Interstate 287
- New Jersey State Highway Route 24

There are no current improvement recommendations for I-287.

Similarly, there are no improvement recommendations for the main line of NJSH Route 24. The Township has acquired the right from NJDOT to install a passive nature/hiking trail in the undeveloped portion of the Route 24 right-of-way.

Minor Arterials

The only State minor arterial located within the Township is Route 10. The recommended improvements for Route 10 are as follows:

- Improvements at the intersections with Ridgedale Avenue, North/South Jefferson Road, Whippany Road and Algonquin Parkway, as discussed in the section below entitled, "Intersection Improvement Recommendations."
- Sidewalks in locations depicted on the Sidewalk Plan map and discussed in the section entitled, "Pedestrian and Bicycle Circulation."

County Roadways

Almost all of the roadways under Morris County's jurisdiction are classified as either Minor Arterials or Major Collectors. The only roadway not fitting these categories is Highview Avenue (Route 668). Highview Avenue is a local roadway, approximately 1,000 feet in length, which provides access to the County garage, other government facilities and a number of residential dwellings. No improvements are recommended for this roadway.

Minor Arterials

The only Minor Arterial under the County's jurisdiction is Columbia Turnpike (Route 510). Although only a small portion of Columbia Turnpike lies within the Township, it

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interconnects the surrounding municipalities, provides access to NJ Route 24 and Morristown Airport (located within the Township), and intersects with Park Avenue (Route 623), creating one of the busiest intersections in the Township. The only improvement recommended for Columbia Turnpike is at the intersection with Park Avenue, discussed in the section below entitled, "Intersection Improvement Recommendations."

Major Collectors

Major Collectors under County jurisdiction are:

- Hanover Avenue (Route 650)
- Parsippany Road (Route 511)
- Whippany Road (Route 511)
- Park Avenue (Route 623) from Whippany Road to the boundary the boundary with Florham Park
- Troy Hills Road (Route 637)

Hanover Avenue. Hanover Avenue provides access to NJ Route 24 to the east and extends west throughout the neighboring communities of Morris County. It intersects with Whippany Road and Ridgedale Avenue, major north-south collector roads that provide access to and from substantial areas of the Township. There are a number of vacant or nearly vacant former industrial properties with frontage on Hanover Avenue; these properties have significant redevelopment potential. Recently, the County commissioned a corridor study for Hanover Avenue, recognizing both the heavy traffic volumes on the roadway and the development potential of these properties, as well as the need for various improvements to the roadway. These improvements include intersection improvements, road widening, the provision of pathways for non-vehicular use and other improvements. This corridor study presents various alternative approaches and levels of improvements; the choice of which, if any of the alternatives has not yet been decided, and therefore these are not presented in this plan. Certain specific intersection and sidewalk improvements, however, are presented in greater detail later in this plan. Regardless of the choice of alternatives, the Township's development policies and review process must pay close attention to the traffic conditions on this roadway in order to maintain satisfactory roadway service levels and pedestrian access.

Parsippany Road. Parsippany Road is a north-south two lane, minor arterial, extending from Whippany Road to North Jefferson Road, and continuing north into the Township of Parsippany-Troy Hills. The design of Parsippany Road is currently substandard for its function. The recommended improvements for Parsippany Road include installation of curbs, sidewalks and suitable lane widths or shoulders to accommodate bicycles. Implementation of these improvements must be communicated to and approved by County Officials.

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Intersections. While the only main line improvement recommendation for any of the County's roads is for Parsippany Road, there are several intersections of County roads where improvements are recommended. These intersections include the following, which are discussed in a following section entitled "Intersection Improvements".

- Columbia Turnpike and Park Avenue
- Hanover Avenue and Horse Hill Road
- Hanover Avenue and Ridgedale Avenue
- Parsippany Road and North Jefferson Road
- Parsippany Road and Reynolds Avenue
- Parsippany Road and Mt. Pleasant Avenue
- Parsippany Road and Whippany Road
- Whippany Road and Eden Lane
- Whippany Road and Ford Hill Road
- Whippany Road and Park Avenue

Municipal Roadways

The municipal roads within the Township are comprised of three types: Major Collectors, Minor Collectors and Local Streets. Although collector roads may not carry as great a traffic volume as arterial roads, the collector roads combine to make up a greater percentage of the Township's roadway network, and are an integral part of the network, providing access and mobility for both vehicular and pedestrian traffic.

Major Collectors

The Township Major Collectors serve to provide access to the arterial roadway network, interconnect neighboring communities, and provide land access service to the major employment and commercial zones within the Township. The following table summarizes the principal elements of the Township's Major Collectors:

TABLE III			
Existing Characteristics-Township Major Collectors			
	Right-of-Way Width (feet)	Cartway Width (feet)	Number of Lanes
Algonquin Parkway	80	46	4
Reynolds Avenue	60	36	2
North Jefferson Road	50	26	2
South Jefferson Road	66	46	4
Ridgedale Avenue	70	46	4
Sylvan Way	82	55	4
Cedar Knolls Road	50	40	2
Troy Road	56 (varies)	40 24	2 2
Park Avenue	56	40	4
Malapardis Road	60	35	2

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Algonquin Parkway. Algonquin Parkway is a four-lane, north-south collector road extending from NJ Route 10 to Troy Road. It provides access to the many commercial properties along its frontage, to those along Melanie Lane, and a critical link to NJ Route 10. Currently there is no improvement recommendation; however, if traffic volumes increase signalization may be needed at the intersections of Algonquin Parkway with Melanie Lane and at its intersection with Troy Road.

Reynolds Avenue. Reynolds Avenue is a two-lane, north-south roadway with a right-of-way width of 60 feet, containing a pavement width of 36 feet. The design and improvements in the section of Reynolds Avenue from Highland Avenue to Parsippany Road are substandard. The recommended improvements consist of constructing a 36-foot wide pavement section with granite block curb, continuation of the sidewalk, and improvements to the storm sewer system. The improvement of Reynolds Avenue will include the improvement of its intersection with Parsippany Road, as discussed in greater detail in the following Street Intersection Improvements section of this plan.

North Jefferson Road. North Jefferson Road is a two-lane, north-south roadway, connecting NJ Route 10 and Parsippany Road. The predominant right-of-way width is 50 feet with a pavement width of 26 feet. There are portions of the road that have been improved consistent with the roadway classification, but other portions remain substandard. The recommended improvements to North Jefferson Road include acquiring additional right-of-way to provide a complete a 66-foot wide right-of-way, construction of a 46-foot roadway width including curb, sidewalk and drainage improvements. The limits of these recommended improvements extended from Fanok Road to Parsippany Road. The improvement of North Jefferson Road will include the improvement of its intersection with Parsippany Road, as discussed in greater detail in the following Street Intersection Improvements section of the Circulation Plan.

South Jefferson Road. South Jefferson Road is a four-lane, north-south roadway, extending from NJ Route 10 to Cedar Knolls Road. The right-of-way width is 66 feet with a pavement width of 46 feet. The only improvements recommended include the intersections with Route 10 and Eden Lane, and sidewalks as noted on the sidewalk plan.

Troy Road. Troy Road is the natural extension of Bee Meadow Parkway. It is a two-lane, east-west roadway extending from Troy Hills Road to the Township's boundary with East Hanover, into which the road continues. The northerly curb line is the Township boundary with the Township of Parsippany-Troy Hills. There are two configurations of the road; from the Township boundary to approximately Algonquin Parkway, Troy Road contains a 56-foot right-of-way with a 40-foot pavement width, and from Algonquin Parkway to Troy Hills Road the right-of-way width is inconsistent, ranging from 45 feet to 65 feet, with a 24-foot pavement width. This substandard section of Troy Road should be reconstructed to provide a 30-foot pavement width, including curbs, drainage and sidewalk improvements.

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Other. The remaining Major Collector roadways have appropriate and consistent right-of-ways and pavement widths. The condition of the pavement for all the major collectors has been rated from good to fair. At this time, there are no recommended improvements beyond sidewalks, as depicted on the Sidewalk Plan map, and typical maintenance activities.

Minor Collectors

Table IV summarizes the principal elements of the Township’s Minor Collector roadways:

TABLE IV			
Existing Characteristics-Township Minor Collectors			
	Right-Of-Way Width (feet)	Cartway Width (feet)	Number of Lanes
Horse Hill Road	50	40	2
Boulevard Road	50	24	2
Highland Avenue	56	36	2
Eden Lane	60	40	2
Elm Place	66	30	2
Bee Meadow Parkway	66	46	2
Ford Hill Road	66	46	2
	66	30	2
Melanie Lane	70	40	2

Eden Lane. Eden Lane is a two-lane, east-west collector road extending from Boulevard Road to Independence Drive. It is primarily improved with a 60-foot right-of-way containing a 40-foot pavement width. However, the section from Boulevard Road to the bridge over the Whippany River is substandard for its function. The recommended improvements include constructing a 30-foot wide pavement section with granite block curb, continuation of the sidewalk and improvements to the storm sewer system. The improvement of Eden Lane should also include the improvement of its intersection with South Jefferson Road, as discussed in greater detail in the following Street Intersection Improvements section.

Of particular relevance is the former Whippany Paperboard Company property on Eden Lane between South Jefferson Road and Whippany Road, now mostly vacant and unused. The redevelopment of this property may impact the future level of service of the proximate roadway network.

Boulevard Road. Boulevard Road parallels Ridgedale Avenue and as a result is regularly utilized as a cut-through by commuter traffic to avoid the congestion associated with Ridgedale Avenue. Currently Boulevard Road is substandard,

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containing no curbs or sidewalks, with a pavement width that varies from 20 to 24 feet. Additionally, land uses along the road are completely residential. The Township has imposed turn restrictions onto Boulevard Road from Eden Lane and Cedar Knolls Road during commuter peak hours to minimize the amount of cut-through traffic and provide a measure of relief to the residents.

The recommended improvements consist of constructing a 30-foot wide pavement section with granite block curb, construction of sidewalk, and improvements to the storm sewer system.

Bee Meadow Parkway. Bee Meadow Parkway is a two-lane, east-west roadway extending from Troy Hills Road to Parsippany Road for a length of approximately one and a half miles. Land use along the road is solely residential.

The configuration of Bee Meadow Parkway contains a 46-foot wide pavement section, which is excessively wide for the road's function. As a result of this excessive width, motorists have a tendency to exceed the posted speed limit. The posted speed limit from Parsippany Road to Reynolds Avenue is 25 MPH and from Reynolds Avenue to Troy Hills Road is posted as 35 MPH. A consistent speed limit for the entire road should be established, depending upon its ultimate configuration. In addition, consideration should be given to reducing the pavement width in an appropriate "traffic calming" manner. The excessive width would allow the establishment of bicycle lane. In addition, the cost for repair per lane mile is increased due to the added width. Further, the existing condition of the asphalt surface is poor for most sections of the roadway.

Other. No improvements are recommended for the remaining Township Minor Collectors, except for those sidewalks depicted on the Sidewalk Plan map.

Local Roads

The local roadway system makes up the majority of the Township's roads. Local roads are the lowest classification roads in the Township and are designed to carry low volumes of traffic and to provide access to individual properties. These roads typically have a 30-foot wide roadway width and 50-foot right-of-way width.

No street-specific improvements are recommended these roads in this plan, although certain streets are identified as substandard. Rather, the plan provides general policies for improvements to local roads.

Substandard Local Roads. The following list of local municipal roads has predominately substandard and inconsistent roadway width, provide no curb, in some cases do not provide sidewalks, and require substantial storm sewer system improvements.

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- Malapardis Road – Ridgedale Avenue to Route 10
- Ukraine Road – entire length
- Legion Place – entire length
- Mt. Pleasant Avenue – entire length
- Nye Avenue – entire length
- Quinlisk Road – southern end

Traffic Calming. Where it is appropriate traffic calming measures should be implemented to respond to public concerns about speeding and cut-through traffic, particularly on residential streets. Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. The immediate purpose of traffic calming is to reduce the speed and volume of traffic to appropriate levels for the functional class of the street and different measures address the specific problems.

For example, if speeding is the problem, as on Bee Meadow Parkway, then the measures that could be investigated include roadway narrowing (i.e., intersection neckdowns, center islands, bicycle lanes), traffic circles, speed tables, raised intersections or textured pavements.

If cut-through traffic is the problem, then the measures may include full or half street closures, diverters of various types, one-way streets, turn restrictions, and forced turn islands.

There are benefits and detriments for every traffic-calming measure; therefore, identifying the nature and extent of the traffic-related problem is critical. In addition, the following practices should be followed to ensure the success of a project:

- Test complex area-wide treatments before implementing them permanently.
- Assess public support for the treatment.
- Conduct before-and-after studies of traffic impacts.
- Include traffic accidents among the impacts studied.
- Involve emergency services to address their concerns.
- Choose the most conservative designs that will address the issue.

Through traffic. The Township should proactively minimize the negative impact of regional traffic on local roads, especially in residential areas, through the use signage and appropriate traffic regulations. Of specific concern is traffic that utilizes the local street network of the Trailwoods residential development as a cut through to avoid congestion on regional roadways, including Ridgedale Avenue, Hanover Avenue, Malapardis Road and Route 202.

Privately-owned Roads

The majority of the privately owned roads within the Township are those located within the various condominium communities. The only privately-owned roadway that is not

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part of a condominium development is Fanok Road. The residents of Fanok Road have petitioned The Township to assume ownership. If the Township assumes jurisdiction over this road, then the need and nature of improvements will need to be evaluated.

INTERSECTION IMPROVEMENT RECOMMENDATIONS

Intersections, as a critical part of the roadway network, should be designed to provide for the safe and efficient movement of vehicles and pedestrian traffic. Intersection design should incorporate five basic elements: 1) human factors, 2) traffic considerations, 3) physical elements, 4) economic factors, and 5) the functional intersection area. A review of the Township roadway network has identified the following intersections for which improvements are recommended; further study is needed to determine the timing, specific improvements and appropriate design criteria.

NJ Route 10 and Ridgedale Avenue – This signalized intersection is one the heaviest traveled intersections within the Township. In terms of vehicular capacity, the intersection currently operates at a satisfactory level. Development of the remaining vacant property in the business campus located north of Route 10 between Littleton Road and Route 287 will place additional traffic demands on this intersection. To respond to this demand, recommended improvements include provisions for additional turning movements to the intersection. Additional measures should include pedestrian facilities (pedestrian signals, crosswalks, curb ramps and sidewalks).

NJ Route 10 and North/South Jefferson Road – The intersection of NJ Route 10 and Jefferson Road is in all probability the most congested intersection in the Township. The recommended improvements are intended to address increased vehicular capacity and geometry deficiencies caused by insufficient curb radii and improper roadway alignment conditions.

It is recommended that Route 10 be widened at the intersection in order to provide three westbound lanes and a re-configured jughandle, three eastbound through lanes, a fourth lane for the reverse jughandle, and a right turn lane for movements onto South Jefferson Road. It is recommended that the North Jefferson Road leg of the intersection be widened to provide one dedicated left-turn lane, two through lanes, a dedicated right-turn lane, and two departure lanes. The South Jefferson Road leg of the intersection should include two dedicated left-turn lanes, two through lanes, and two departure lanes. The right turn from South Jefferson Road to eastbound Route 10 should be accommodated within the reverse jug-handle, thus widening the jughandle to provide two-way traffic. The concept plan for this improvement is on file at the Township Engineering Department.

Related to the above intersection improvements is the need to provide improved access to Jefferson Road and/or Route 10 by the residents living on Malapardis Road and Ukraine Road east of Route 287. Due to the close proximity of the Ukraine Road/South Jefferson Road intersection to the Route 10/Jefferson Road intersection, and the congestion experienced at the intersection, vehicles trying to enter and exit Ukraine Road experience extended delays in making needed turns. Currently, this intersection is the only means of access for these residents. The improvements proposed above should also provide a measure of relief for these residents by reducing the level of congestion at the intersection. Additionally, alternative access solutions for these

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residents should be investigated to provide a secondary means of access to these streets.

NJ Route 10 and Whippany Road – A traffic impact study for the Novartis corporate expansion in neighboring East Hanover has recommended that NJ Route 10 be widened to provide an additional through lane in each approach.

NJ Route 10 and Algonquin Parkway – The Township and the State, along with the majority of the surrounding business establishments, have an approved concept plan that would provide a westbound jughandle on the northwest quadrant of the intersection. The proposed jughandle would provide westbound motorist the opportunity to turn around and travel eastbound rather than continue on Route 10 and utilize the Whippany Road jughandle.

Parsippany Road and North Jefferson Road – The intersection of Parsippany Road and North Jefferson Road is a signalized three-legged intersection. Intersection capacity is reduced on the North Jefferson Road approach due to the angle of approach. In the northbound Parsippany Road approach a designated left turn lane is required, since through vehicles frequently attempt to squeeze past vehicles waiting to make the left turn. A redesign of the intersection is recommended to improve the intersection geometry. Parsippany Road is a County road and thus this improvement would require County involvement.

Parsippany Road and Reynolds Avenue – A number of factors combine to make this un-signalized intersection very dangerous to negotiate. The horizontal and vertical alignment of the street approaches, in conjunction with the side slope of the adjacent property and the Parsippany Road bridge parapet wall, serve to create an intersection with very limited sight distance. In addition there are no sidewalks present; thus, the intersection is very difficult for pedestrians to negotiate. The traffic capacity analysis for the redevelopment of the former Alcatel-Lucent campus on Whippany Road has recommended that the operational issues at the intersection be mitigated by providing signalization. Parsippany Road is a County road and thus would require County involvement. In addition, the signal must be warranted, and consideration must be given to the proximity to the existing traffic signal at Veteran's Place. Additional study is required to best define the appropriate design.

Parsippany Road and Mount Pleasant Avenue - The traffic capacity analysis for the redevelopment of the former Alcatel-Lucent campus on Whippany Road has recommended creating additional turn lanes within the existing roadway to create additional vehicular capacity. Additional measures should be included to encourage pedestrian mobility as the surrounding land uses include many retail stores that would benefit from promoting pedestrian activity.

Parsippany Road and Whippany Road – The operational limiting factor at this intersection is the high left turn volume from Whippany Road northbound to Parsippany Road. The traffic capacity analysis for the redevelopment of the former Alcatel-Lucent

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campus on Whippany Road has recommended the realignment of the existing driveway for the former Alcatel-Lucent site to a location opposite Parsippany Road at its intersection with Whippany Road, with some movements being reconfigured. Property acquisition would be required for this improvement. Morris County involvement would also be required as Parsippany Road and Whippany Road are both under their jurisdiction.

Whippany Road and Eden Lane – There appears to be sufficient vehicular capacity at this intersection. Any operational issues that may arise from the redevelopment of area properties that would impact this intersection could be addressed through traffic signal timing adjustments.

Whippany Road and Ford Hill Road – The intersection of Whippany Road and Ford Hill Road is un-signalized and contains numerous channelizing islands. The northbound Ford Hill Road approach requires motorists making a right turn onto Whippany Road to look back over their shoulder to determine if they can enter the intersection. The improvement should center on alleviating this condition. In addition, removal of some of the islands may be appropriate because there is potential for confusion for motorists on Whippany Road making a left turn onto Ford Hill Road. Whippany Road is a County road and thus would require County involvement.

Whippany Road and Park Avenue - There appears to be sufficient vehicular capacity at this intersection. Any operational issues that may arise from the redevelopment of proximate properties could be addressed through the addition of a northbound lead left turn signal phase.

Whippany Road and Hanover Avenue – The intersection suffers from excessive queuing and delays in the eastbound Hanover Avenue approach. The highest level of improvement concluded in the County's East Hanover Avenue corridor traffic study recommends providing two through lanes in the eastbound Hanover Avenue approach and adding a second receiving lane to the NJ Route 24 on-ramp.

Hanover Avenue and Ridgedale Avenue – The intersection operates at an unsatisfactory level with excessive delay and vehicular queuing. Existing roadway constraints require split-phase operation. The highest level of improvement alternative in the East Hanover Avenue corridor traffic study recommends providing dedicated left turn lanes on the Hanover Avenue approaches. The improvements should also provide a dedicated right turn lane on the southbound Ridgedale Avenue approach and two left turn lanes, one thru lane and one shared through/right lane for the northbound approach. These recommendations require right-of-way acquisitions.

Hanover Avenue and Horse Hill Road – This intersection operates at an unsatisfactory level with excessive delay and vehicular queuing. Existing roadway constraints require split-phase operation. The improvements to be installed as part of a recently approved shopping center development include the addition of left turn lanes to the eastbound

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and westbound Hanover Avenue approaches, thus eliminating the need for the split-phased signal operation.

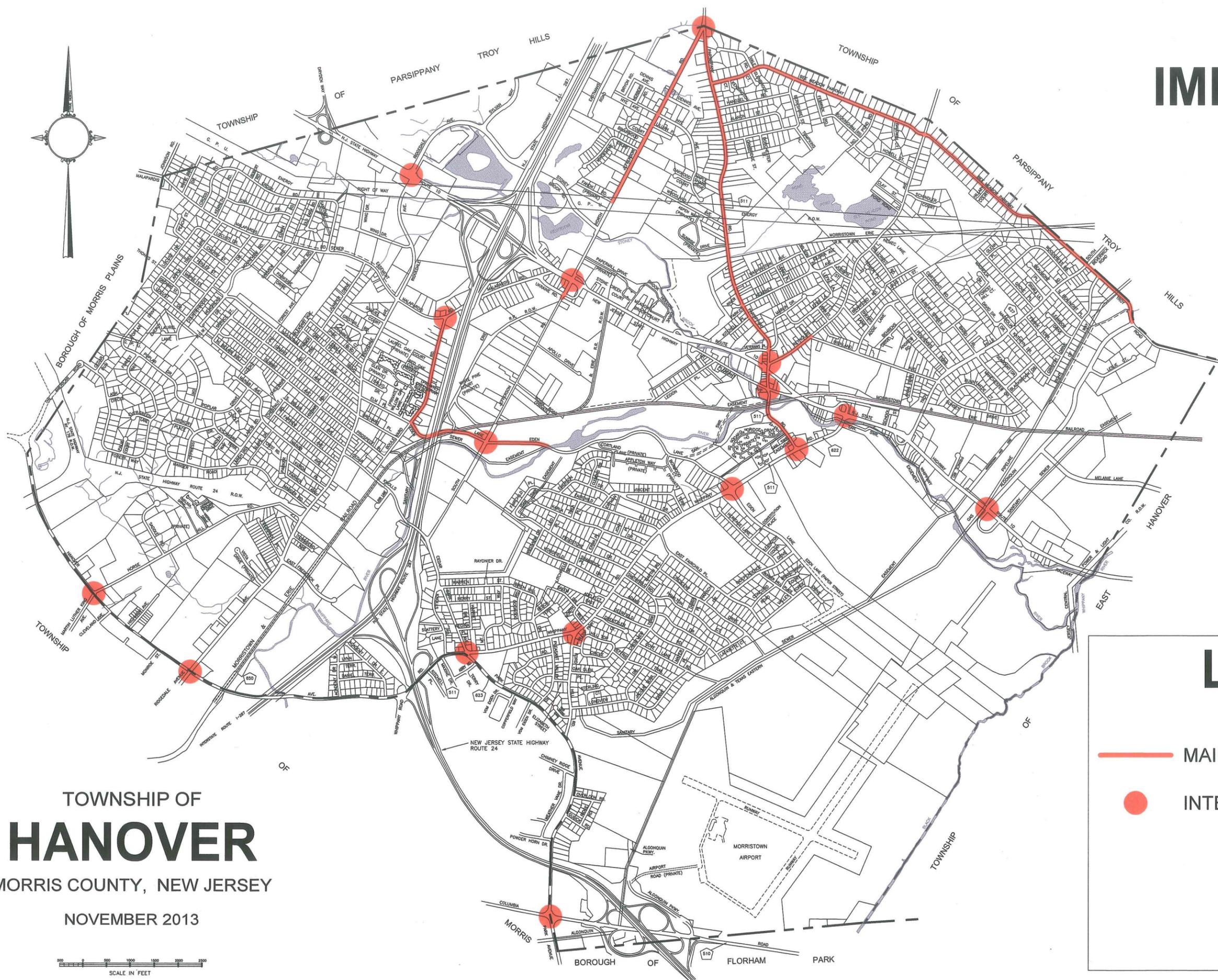
Columbia Turnpike and Park Avenue – The intersection is heavily-travelled and has been improved with multiple through- and turn lanes on all approaches. The excessive congestion is a function of the large volume of vehicles. As a result of the redevelopment of properties in neighboring communities, a concept plan has been recommended to provide a bypass road that would take the eastbound Route 24 off-ramp to Columbia Turnpike and provide a flyover to exit onto Park Avenue at the former Red Oak Bank in Hanover Township. The concept would eliminate the majority of left turn vehicles in the southbound Columbia Turnpike approach. Further study of the concept is required with County and NJDOT officials.

Eden Lane and South Jefferson Road – The intersection of Eden lane and South Jefferson Road is a four-legged signalized intersection with a skewed alignment. The recommended improvement intends to address the misalignment of the Eden Lane approaches. The misalignment requires an unusual lane use designation in the eastbound approach. The eastbound approach lanes are currently striped as a shared left/through lane and a right turn lane. A more appropriate configuration would include a left turn lane and a shared through/right lane. However, this cannot be accomplished simply by restriping; it requires the realignment and reconstruction of the entire intersection, including relocating the traffic signal equipment.

Boulevard Road and Malapardis Road – The intersection is substandard in that both roadways are narrow, the intersection angle is skewed, the turning radius is small and a large utility pole is in close proximity to the edge of the roadway. Evidence that the intersection is substandard is apparent by the visible damage to the utility pole, located on the corner, caused by conflicts with motor vehicles. The intersection should be redesigned to provide a more standard design that improves the alignment, increases the lane widths and increases the curb radii.

Intersection Improvements for Pedestrian & Bicycle Connectivity Plan – In addition to the improvements identified above, this plan recognizes and supports improvements at intersections as may be needed to implement the Pedestrian & Bicycle Connectivity Framework Plan adopted as part of this Circulation Plan Element (see appendix). Such improvements may include, but are not limited to crossing signals, designated crosswalks, barrier-free access modifications, sight distance improvements, etc. The specific improvements needed for each intersection will vary and will be determined as part of the detailed design studies for the plan. (Added 11-12-13)

STREET IMPROVEMENT PLAN



TOWNSHIP OF
HANOVER
MORRIS COUNTY, NEW JERSEY
NOVEMBER 2013



LEGEND

-  MAINLINE IMPROVEMENTS
-  INTERSECTION IMPROVEMENTS

LONG-TERM POTENTIAL ROADWAY IMPROVEMENTS

In addition to the specific and general roadway improvements discussed earlier in this report, there are several more extensive improvements that have been discussed for many years, but have not yet been implemented for various reasons. These improvements are described below for informational purposes and as considerations for long-term transportation policy.

NJ Route 24 Extension - The State maintains an undeveloped right-of-way through the Cedar Knolls section of the Township for the future westward extension of NJ Route 24. Within the Township, the right-of-way extends for approximately one mile from the current terminus interchange with I-287 to the Township boundary at Hanover Avenue. The extension is planned to provide direct access to/from Morristown to/from points east.

While the State has no current plan to construct the Route 24 extension, the arguments for and against the extension are periodically discussed among State, County, and municipal officials and other stakeholders.

Ridgedale Avenue I-287 Flyover - The Ridgedale Avenue Flyover is planned to provide access to I-287 northbound from the extension of Ridgedale Avenue north of Route 10. As recently as 2002, the Department of Transportation presented a concept plan illustrating the extension of Ridgedale Avenue crossing over I-287 and connecting to Eastman's Road. A previous proposal showed the flyover connecting to Stoney Brook Road. The Township has rejected both concepts on the basis of traffic and environmental concerns.

Algonquin Parkway Extension - In previous versions of the Township's Master Plan and Official Map, the Township proposed the extension of Algonquin Parkway from its current terminus at NJ Route 10 south to Columbia Turnpike. It does not appear that an easement or deed has been recorded for the proposed extension. Moreover, with the acquisition of the Muscarelle Tract by the Township for open space purposes, the New Jersey Green Acres Program has required that the Township execute a deed based on the most current survey, which will:

- Specify that the entire property is encumbered by Green Acres restrictions
- Record by metes and bounds which lands are and which lands are not subject to Army Corp of Engineers restrictions
- Record that the proposed Algonquin Parkway extension is now encumbered by Green Acres restrictions and is no longer part of the Township's proposed transportation plan

As a result of this requirement, an extension of Algonquin Parkway is uncertain. In accordance with the Green Acres restrictions, the extension has been removed from this plan; however, as development pressures and related traffic increase within the Township and region, the extension would provide a number of benefits to both the

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region and the Township, including the reduction of traffic volumes on Park Avenue, Whippany Road and possibly Jefferson Road, and provision of improved access and egress to/from Morristown Airport. Should such future traffic demands warrant construction of the extension, the Township has the option to appeal the State's restriction to the State House Commission.

Notwithstanding the Green Acres and Army Corps restrictions, the proposed alignment may also be useful for the purpose of creating a pedestrian trail or bike path. Due to the restrictions placed by the NJDEP on the property, the feasibility of creating such a path would need to be investigated further.

PEDESTRIAN AND BICYCLE CIRCULATION

Sidewalk Facilities

Accommodating pedestrian needs has always been viewed as important for the Township. There are many existing locations, however, where sidewalks do not exist. The Sidewalk Plan map illustrates the existing sidewalk locations and gaps throughout the Township. These gaps in the existing sidewalk networks should be completed, especially for connections to major trip attractions such as schools, parks, town centers, or other retail/commercial and employment centers.

The Sidewalk Plan map identifies those locations where first priority should be given to future sidewalk construction. Additionally, sidewalks should be required along all street frontages of new developments.

All sidewalk projects in the Township must conform to the Americans with Disabilities Act, including the provision of barrier-free ramps at all intersections and other crossings of traveled ways.

The location, timing and amount of sidewalk construction is subject to a variety of factors, including pedestrian volume, safety considerations, budget considerations and the prioritization of other projects.

Bicycle Facilities (Amended 11-12-13)

The bicycle has become an important mode of transportation. Bicycle traffic may not constitute a significant portion of the total traffic on the roadway network; however, consideration for bicyclists is important, given the presence of bicyclists within the roadway network and their vulnerability to injury, and the need to support and promote alternative modes transportation and reduce the dependency on motor vehicles.

There are two distinct directions that may be taken in bicycle planning and design. The first is to do nothing and allow the existing street network to function along with the bicycle. The second is to develop a bicycle and pedestrian plan that specifically accommodates and encourages the use of bicyclists and pedestrians. The Township has essentially followed the first option heretofore. Where this policy is to continue, then minimally, the following roadway improvements should be implemented or maintained in appropriate locations to enhance the safety of the roadway network for bicycle traffic:

- Provide wider outside lanes, 14 feet wide minimum, on multilane streets
- Install bicycle-safe inlet grates
- Maintain a smooth, clean riding surface

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If the Township decides to develop dedicated bicycle routes, these routes should preliminarily be considered along the following Township roads:

- Malapardis Road
- Ridgedale Avenue
- Mountain Avenue
- Cedar Knolls Road
- Park Avenue
- Elm Place
- Eden Lane
- North Jefferson Road
- South Jefferson Road
- Whippany Road
- Parsippany Road
- Reynolds Avenue
- Highland Avenue
- Sunset Drive
- Troy Hills Road
- Bee Meadow Parkway
- Algonquin Parkway
- Ford Hill Road

Pedestrian & Bicycle Connectivity Framework Plan (Amended 11-12-13)

In December of 1998 the Morris County Planning Board formally adopted a Bicycle and Pedestrian Element as part of the Morris County Master Plan. The County's Plan identifies Whippany Road and Parsippany Road as shared roadways in the Bicycle network.

Additionally, in October 2004 the New Jersey Department of Transportation (NJDOT) presented the updated New Jersey Statewide Bicycle & Pedestrian Master Plan. The document provides a blueprint for improving bicycling and pedestrian conditions throughout the State.

The Pedestrian & Bicycle Connectivity Framework Plan, prepared by Arterial Consultants (see appendix), is intended to serve as the basis for establishing a Township-wide network of on-road and off-road trails that link key attractors including population centers, common destinations, schools, the Township's municipal complex and public parks and open space.

PUBLIC TRANSPORTATION

Bus

Bus service within the Township of Hanover can be described as local service. This service is characterized by frequent stops along routes within Morris County and to neighboring counties.

Implementing a policy to improve bus facilities is needed, to increase ridership by enabling passengers to safely and conveniently utilize the bus lines.

The Township should work with the County and New Jersey Transit to install bus shelters at needed locations. The shelters should be equipped with signage, schedules and fare information.

The Township should also cooperate and work actively with the County to assist in meeting the long term public transportation goals set forth in the Morris County Master Plan Circulation Element, as outlined below:

- Preserve, maintain, and improve NJ Transit's passenger rail facilities
- Maintain, improve, and extend passenger rail service
- Maintain and improve bus facilities throughout the County
- Maintain, improve, and expand bus service
- Improve transportation services for senior and disabled residents
- Maintain the quality of para-transit services
- Expand existing and develop new park and ride facilities

While some of the County's goals are not appropriate for the Township, it is recommended that the Township be actively involved with the County to help guide the plan on a regional basis and emphasize the need for a coordinated circulation element.

Rail

There are no commuter rail stops within the Township of Hanover. The closest rail station is located in the Township of Morris Plains.

Rail activity within the Township is limited to the operations of the M&E Railroad. The M&E Railroad is a short line freight railroad, serving customers in Morris and Essex counties. In total, the railroad operates a 158-mile system of tracks. In addition, the railroad operates a maintenance yard on South Jefferson Road, near Eden Lane. The Railroad also maintains a close affiliation with the Whippany Railroad Museum.

In addition to the freight services the railroad runs seasonal events for the public, and makes their rail cars available for charter for business and private events.

CIRCULATION PLAN

MORRISTOWN AIRPORT

Located in the southeastern corner of the Township on Columbia Turnpike, Morristown Airport provides private, corporate and charter aviation services. Morristown Airport has two 150-foot wide runways. The runways are 4,000 feet and 6,000 feet long, capable of handling airplanes as large as the Boeing 727 and 737. In addition to the airplane volume of traffic, in more recent years the volume of helicopter air traffic has increased.

Development review for new development within the airport is limited to only a cursory review by the Planning Board of the Township of Hanover.

The Township should maintain a working dialogue with the airport officials to address the needs and quality of life issues of the community (i.e., noise abatement, safety, traffic concerns).

References and Sources:

A Policy on Geometric Design of Highways and Streets, 4th Edition, 2001, American Association of State Highway and Transportation Officials

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Traffic Calming, State of the Practice, 1999, Reid Ewing

Morris County Master Plan Circulation Element, County of Morris Department of Planning & Development, 1992

67 Whippany Road Redevelopment Traffic Capacity Analysis Report, prepared by the RBA Group, Inc., dated September 30, 2012

New Jersey Department of Transportation Concept Review Application Traffic Impact Study - Proposed Novartis Corporate Campus Expansion NJ Route 10 and Ridgedale Avenue, East Hanover Township, Morris County, prepared By TRC Engineers, Inc., dated July 20, 2010

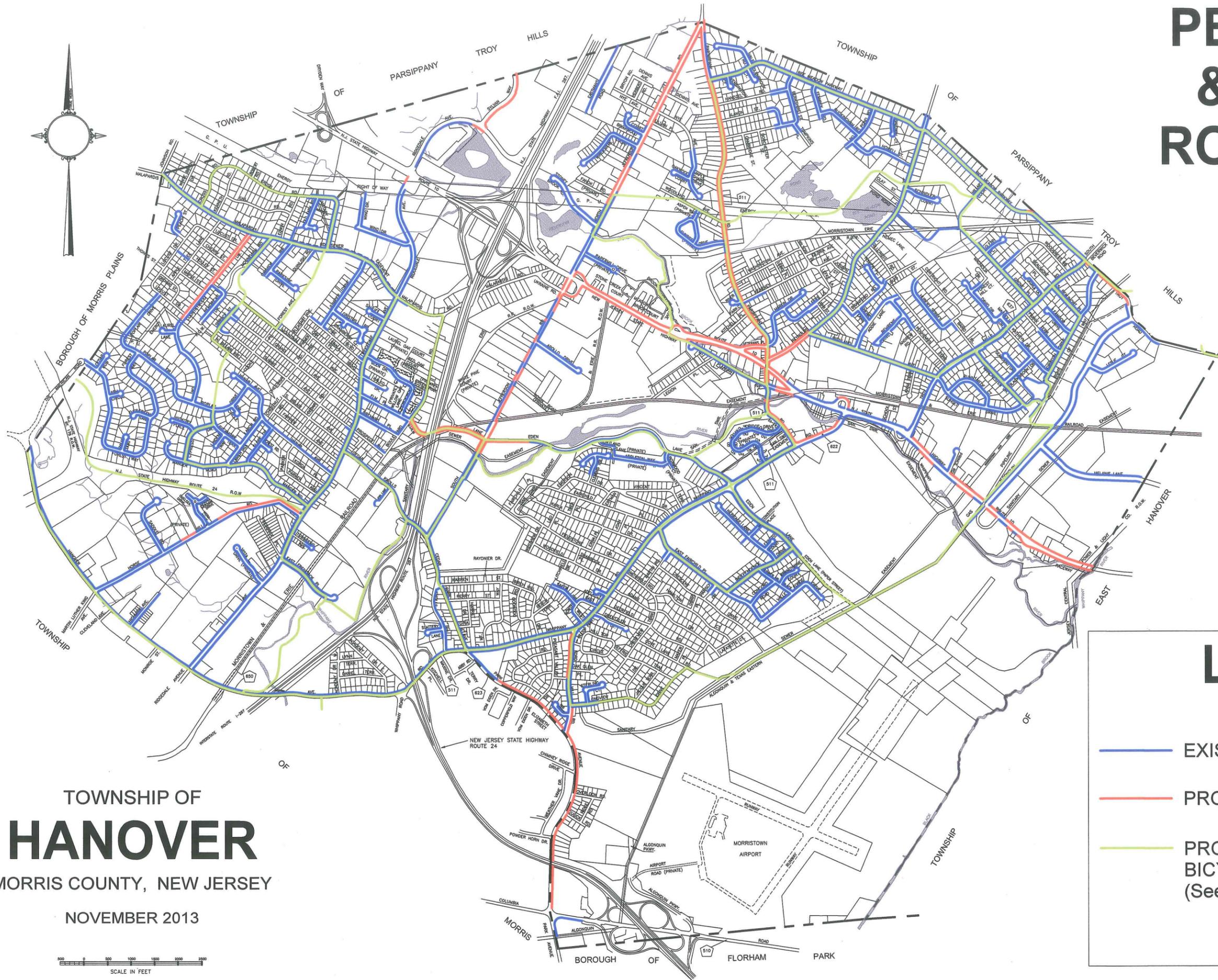
East Hanover Avenue Corridor Traffic Study, Alternatives Analysis Report (draft), prepared by Stantec, dated September 2012

Updated New Jersey Statewide Bicycle & Pedestrian Master Plan, New Jersey Department of Transportation

Bicycle and Pedestrian Element, Morris County Master Plan, prepared by Morris County Planning Board, dated December 1998

Traffic counts conducted by the New Jersey Department of Transportation and Morris County

PEDESTRIAN & BICYCLE ROUTES PLAN

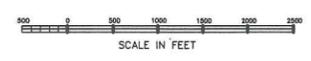


LEGEND

- EXISTING SIDEWALKS
- PROPOSED PRIORITY SIDEWALKS
- PROPOSED PEDESTRIAN & BICYCLE PATH ROUTES
(See Appendix - Connectivity Plan)

TOWNSHIP OF
HANOVER
MORRIS COUNTY, NEW JERSEY

NOVEMBER 2013



APPENDIX

PEDESTRIAN & BICYCLE CONNECTIVITY FRAMEWORK PLAN

prepared by Arterial, LLC

(Added 11-12-13)