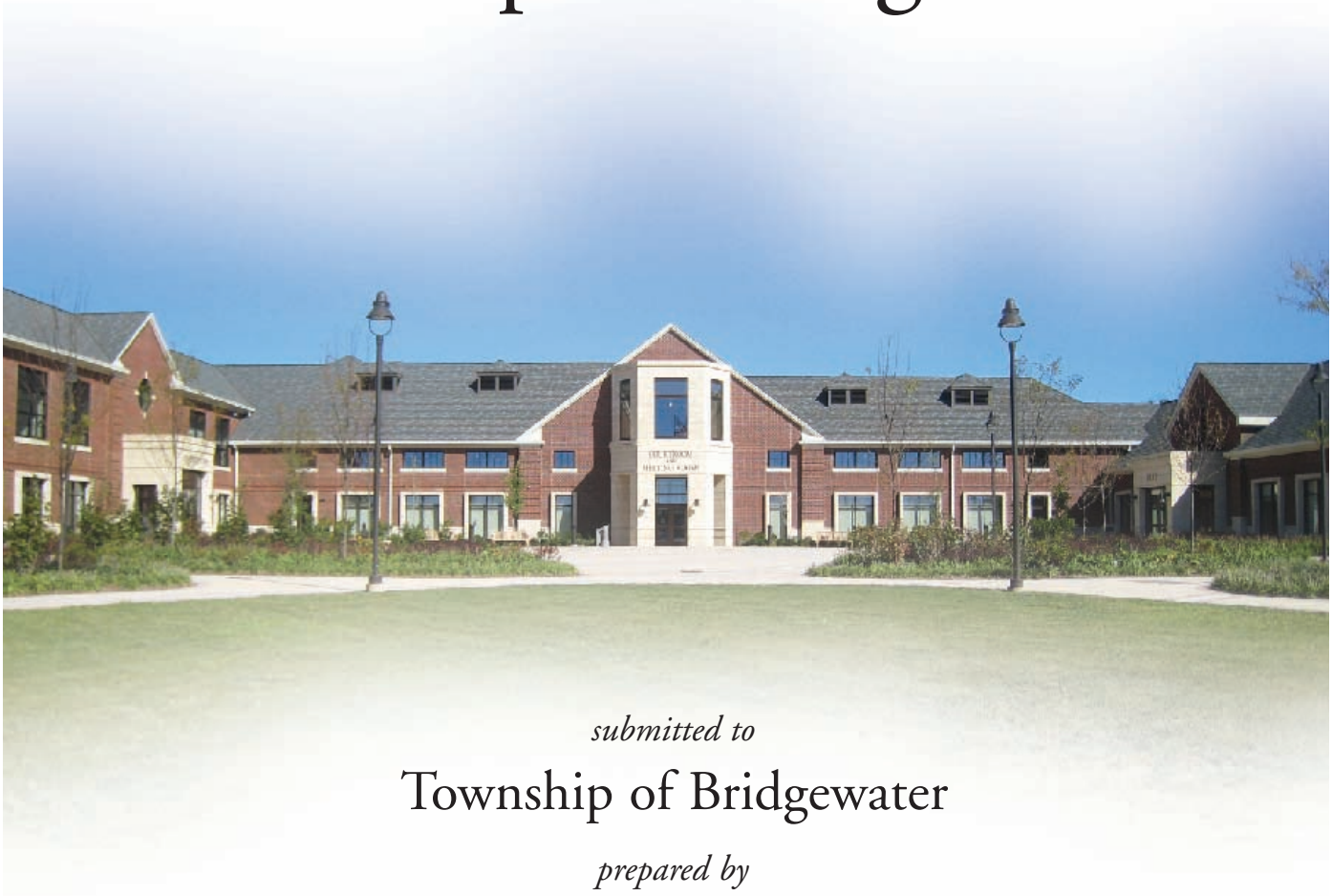
Amendment *to*

THE CIRCULATION ELEMENT OF MASTER PLAN & MASTER PLAN RE-EXAMINATION REPORT

Township of Bridgewater



submitted to

Township of Bridgewater

prepared by

The RBA Group Inc. *Engineers · Architects · Planners*

September, 2010

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1 OVERVIEW

Transportation within the Township of Bridgewater includes the movement of persons and goods. Movement of persons is accomplished primarily through automobile, but also by public transit, school bus, walking, and bicycle. Goods movement is primarily accomplished via truck.

The road network is the primary form of transportation infrastructure within the Township of Bridgewater, and it accommodates all travel within the Township. The road network within the Township of Bridgewater falls under the jurisdiction of the State, Somerset County, and the Township. US Route 22, US Route 202/206, NJ State Route 28, and Interstates 78 and 287 are State Highways, and are maintained by the State of New Jersey. Other roads within the Township are maintained either by Somerset County or the Township Public Works Department.

Roads include not only the pavement itself, but all drainage infrastructure, bridges, signing, striping, bus shelters, and traffic control devices (such as traffic signals and flashing signs). All traffic signals along routes under the jurisdiction of the New Jersey Department of Transportation (NJDOT), as well as traffic signals at ramps for such routes, are under the jurisdiction of the NJDOT. Any traffic signals on County roadways are under the jurisdiction of Somerset County, and maintained by County forces. At the time of writing, there were forty-one (41) signalized intersections in Bridgewater Township. Twelve (12) signalized intersections were under the jurisdiction of Somerset County, and five (5) were under the jurisdiction of the Township. The remainder are under the jurisdiction of the New Jersey Department of Transportation.

Bridgewater is bisected by the state and interstate road systems, and the Township contains three (3) major interchanges. Hence, while there is a heavy presence of state and interstate roadway system in the Township, there are very few direct connections from state-to-state or state-to-interstate connections within the Township limits. While these state and interstate roadways provide excellent access to Bridgewater, they also heavily influence travel patterns within the Township. Peak period congestion on the interstate system and some of the ramp connections for it lead to high traffic volumes using the arterial and local road system to circumvent congestion. Further, crashes on the interstate and state system frequently result in significant traffic diversions onto arterial and local roads in Bridgewater. Consequently, traffic operations on the arterial and local road system of Bridgewater is intertwined with the interstate system that traverses Bridgewater.

2 FUNCTIONAL CLASSIFICATION

The function of the roads within the Township somewhat parallel their jurisdiction. The New Jersey Residential Site Improvement Standards (RSIS) also include street classifications, although they only pertain to new residential streets. The following are the road classifications and their definitions for streets within the Township of Bridgewater:

Freeways/Expressways	Highest order of roadway, for which the primary purpose is moving high traffic volumes long distances at a high speed (55-65 miles per hour). Expressways are typically divided multi-lane roadways with access via grade-separated interchanges only. Any streets crossing the expressway have grade-separations. Interstates are always Freeways/Expressways.
Arterial Streets (Principal and Minor)	Next order of roadway, for which the primary purpose is moving high traffic volumes medium distances at a medium speed (35-50 miles per hour). Arterial streets have traffic signals at significant cross streets and stop signs on lesser cross streets. Arterial streets collect and distributes traffic to and from collector streets and/or expressways. Principal arterial streets are generally higher speed and capacity roadways (45-50 miles per hour, with four or more lanes).
Collector Streets	Collector streets provide both land access and traffic circulation within residential neighborhoods and commercial and industrial areas at lower speeds than arterial roadways (25-40 miles per hour). Collector streets collect traffic from local streets and either provide access to destinations or carry the traffic to higher or lower order roadways. **Major Collector Streets** (residential) are the higher order of residential streets. Compared to other collector and local roadways, Major Collector Streets carry the largest volume of traffic at higher speeds. Their function is to promote free traffic flow; therefore, parking should be prohibited and direct access to homes from this level of street should be avoided. Collectors should be designed so they cannot be used as shortcuts by non-neighborhood traffic. Maximum Average Daily Traffic = 7,500 vehicles per day. **Minor Collector Streets** (residential) are the middle order of residential streets. Provides frontage for access to lots and carries traffic of adjoining residential access streets. Designed to carry somewhat higher traffic volumes than lower-order streets such as residential access streets, with traffic limited to traffics having

origin or destination within the immediate neighborhood. It is not intended to carry regional traffic. Maximum Average Daily Traffic = 3,500 vehicles per day.

Commercial Collector Streets provide access to commercial or industrial areas. Such roadways typically contain accesses to multiple commercial buildings, and generally access arterial roadways or freeways directly. These roads can have very high traffic volumes during peak hours, but have low traffic volumes at other times. Many such roadways have four or more lanes. Average Daily Traffic volumes on these roadways can approach 20,000 vehicles per day.

Local Streets

Local streets include all facilities not in one of the higher systems. Local streets generally provide land access with low traffic volumes at a low speed (15-25 miles per hour). Local streets generally carry traffic to higher order roadways.

Residential access streets are local streets, and these are the lowest order of residential streets (other than cul-de-sacs and other special types of streets). Provides frontage for access to lots and carries traffic with destination or origin on the street itself. Designed to carry the least amount of traffic at the lowest speed. All, or the maximum number of housing units, shall front on this class of street. Maximum Average Daily Traffic = 1,500 vehicles per day.

The roads within the Township fall within the classifications and jurisdictions that are shown in Table 1. As well, Figure 1 graphically depicts the functional classification of the roads within Bridgewater Township.

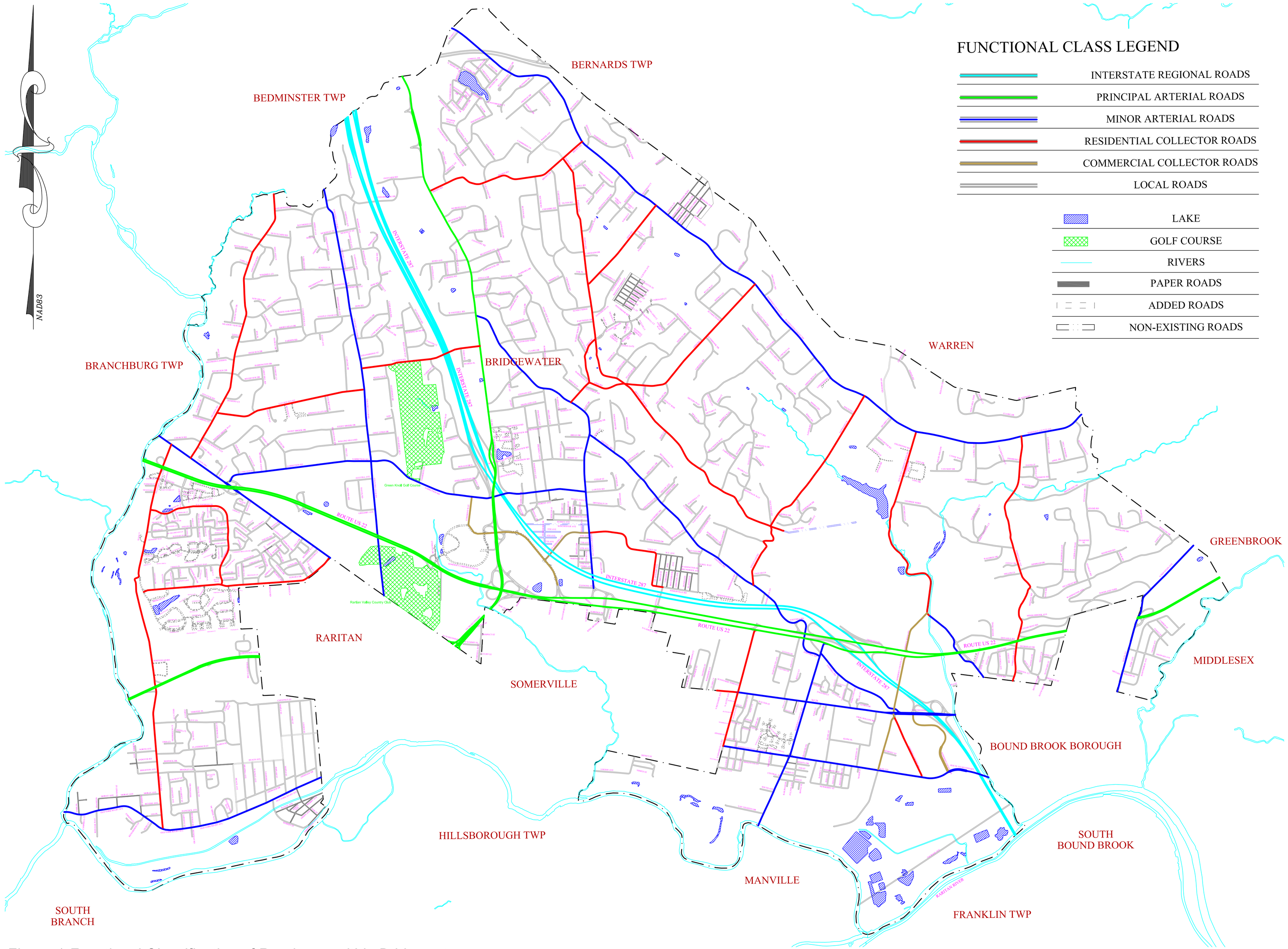

Figure 1-Functional Classification of Roadways within Bridgewater

PLANS PREPARED FOR:

TOWNSHIP OF BRIDGEWATER

BRIDGEWATER TOWNSHIP

SOMERSET COUNTY

NEW JERSEY

NOT FOR CONSTRUCTION

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REVISIONS

NO.	DATE	COMMENTS

GORDON E. METH, P.E.
NEW JERSEY LICENSE NO. 42257

FUNCTIONAL CLASSIFICATION MAP

DATE:	01-26-2010
JOB NUMBER:	J4253.00
SCALE:	N.T.S. (UNLESS INDICATED)
DRAWN BY:	TJK
CHK. BY:	GEM

SHEET NUMBER

of 1

Table 1 – Functional Classification of Roads in Bridgewater

	Roadway	Average Annual Daily Traffic (vehicles/day)	Length in Township (miles)	Vehicle-Miles Travelled		Lanes	Jurisdiction
				Daily	Annual (Millions)		
Freeways	Interstate 78	103,600	0.89	92,200	33.7	4-8	State
	Interstate 287	77,300	8.48	655,500	239.3	4-10	State
	Sub-Total		9.37	747,700	272.9		
Principal Arterials	Route 22	39,800-87,700	8.24	516,100	188.4	4-8	State
	Route 202 / 206	39,300-69,300	8.63	400,000	146.0	2-6	State
	Sub-Total		16.9	916,100	334.4		
Minor Arterials	Easton Tpke (Route 28)	10,800-20,200	2.51	47,800	17.4	2	State
	Union Av (Route 28)	15,000-23,400	2.18	37,000	13.5	2	State
	East Main St (CR 533 / 612)	13,400	1.34	17,900	6.5	4	County
	Easton Tpke (CR 614)	9,800	0.67	6,600	2.4	2-4	County
	Finderne Av (CR 533 / 633)	18,500	1.54	28,500	10.4	2-4	County
	Foothill Rd north of Bridge Street (CR 639)	5,000	1.38	6,900	2.5	2	County
	Foothill Rd south of Chimney Rock Road (CR 683)	6,900	0.52	3,600	1.3	2	County
	Mountain Av (CR 527)	12,300	1.41	17,300	6.3	2	County
	North Bridge St (CR 639)	15,400	1.23	18,900	6.9	2	County
	Old York Rd (CR 567)	5,700	2.21	12,600	4.6	2	County
	Thompson Av (CR 525)	8,600	0.69	5,900	2.2	2	County
	Washington Valley Road (CR 525 / 616 / 620)	5,100-14,800	6.38	38,500	14.1	2	County
	Country Club Rd	5,000-9,400	3.2	19,800	7.2	2	Township
	Foothill Rd, Chimney Rock Road to Finderne Avenue	2,000	0.75	11,200	4.1	2	Township
	Foothill Rd, Finderne Avenue to Ronson Road	14,900	0.42	6,300	2.3	2	Township
	Foothill Rd, Ronson Road to North Bridge Street	7,300	2.26	16,500	6.0	2	Township
	Woodlawn Av / Garretson Rd	7,000	2.95	20,700	7.6	2	Township
	Sub-Total		31.64	316,000	115.3		
Commercial Collector Roads	Chimney Rock Rd (CR 675), south of Thompson Av	3,700-6,600	0.93	4,800	1.8	2	County
	Promenade Blvd (CR 685)	7,300	0.66	4,800	1.8	4	County
	Prince Rodgers Avenue	4,600	0.45	2,100	0.8	2	Township
	Commons Way	16,500	1.30	21,500	7.8	4	Township
	Sub-Total		3.34	33,200	12.1		
Residential Collector Roads	Chimney Rock Rd (CR 525), north of Thompson Av	4,750	1.69	8,000	2.9	2	County
	Vogt Drive (CR 673)	1,400-1,700	0.95	1,400	0.5	2	County
	Adamsville Road	2,600	0.95	2,500	0.9	2	Township
	Brown Rd	3,200	1.36	4,400	1.6	2	Township
	Crim Rd	not available	1.90	7,600	2.8	2	Township
	Meadow Rd	not available	2.28	9,120	3.3	2	Township
	Milltown Rd	5,700-8,400	3.13	21,900	8.0	2	Township
	Mine Rd	not available	1.65	6,600	2.4	2	Township
	Mountain Top Rd / Papen Rd	not available	3.66	14,640	5.3	2	Township
	Steel Gap Rd / Newmans Ln	not available	1.86	7,440	2.7	2	Township
	Talamini Rd	5,100	0.96	4,900	1.8	2	Township
	Van Holten Rd	not available	1.20	4,800	1.8	2	Township
	Vanderveer Rd	not available	1.60	6,400	2.3	2	Township
	Vosseller Av	3,700-4,900	1.99	7,600	2.8	2	Township
	Waltersbrook Dr	not available	1.23	4,920	1.8	2	Township
	Sub-Total		26.41	112,220	41.0		
Local Roads	Various	not available	199.5	149,618	54.6	2	
	Total		**287.12**	**2,274,838**	**830.3**		

Note: Any street not shown by name is a local road. The traffic volumes shown herein were obtained from various peak period traffic counts obtained between 2005-2010, with adjustment factors for daily traffic. They are not intended to be exact, but instead to be used for guidance only.

The remainder of the roads within the Township are considered local roads or residential access streets, and are under the jurisdiction of the Township in the case of public roads.

2.1 Truck Routes

Truck travel is intended to take place on freeways, principal and minor arterial roadways, and commercial collector roadways only. Although not codified along all streets as of yet, the intention of the township is to prohibit trucks in excess of eight (8) tons gross weight from all residential collector and local streets except in cases where they are making a specific delivery in the area, such as a moving truck. It is noted that restricting trucks on roadways in New Jersey requires approval by the Commissioner of Transportation, regardless of the jurisdiction or classification of the road.

2.2 Transit Service

Regional rail service is provided via the Raritan Valley Rail line, which provides train service from High Bridge in Hunterdon County to Union County, Newark and Hoboken via approximately 25 trains per day per direction. The Bridgewater Station is located in the south-east corner of Bridgewater, adjacent to the Somerset Patriots baseball stadium. The station has parking for 474 vehicles. Rail stations in Somerville and Raritan are also located in close proximity to Bridgewater, and these stations have 714 parking spaces.

NJ Transit operates two long haul transit services that connect to Bridgewater, and one medium haul transit service. These transit services provide mobility to persons without automobiles, as well as offering enhanced service in peaks for commuters via lower headways between buses. These services are as follows:

NJ Transit Route 65 – This route has 2 buses in the morning that extend to Bridgewater Commons Mall, and 1 in the afternoon that starts at the Bridgewater Commons Mall. The route connects to Newark, and generally has similar destinations to NJ Transit Route 114 (see below).

NJ Transit Route 114 – This route connects Bridgewater Commons Mall to the Port Authority bus terminal in New York City, with stops along Route 28 (Union Avenue) in the Finderne section of Bridgewater. Headways are generally 60 minutes, with 30 minute headways on Saturdays and during the afternoon peak period.

NJ Transit Wheels Route 884 – This route connects Clinton in Hunterdon County to Somerville, with stops at Bridgewater Commons Mall. The service is continuous during the day. However, not all runs stop at the Bridgewater Commons Mall.

Somerset County operates the SCOOT short-range bus service in the local area, with all runs stopping at the Bridgewater Commons Mall. In total, there are 14 SCOOT buses per day, operating on 3 separate routes.

3 EXISTING TRAVEL PATTERNS IN BRIDGEWATER

3.1 Commuting Patterns

Bridgewater has a significant concentration of both workers and employment opportunities. According to the 2000 Census Journey-to-Work Survey, 27,243 persons are employed in Bridgewater, and 22,101 workers reside in Bridgewater (out of a total 2000 population of 42,940 persons, according to the Census). Note that it is estimated that actual employment in Bridgewater is far greater than indicated by the Census. This could be attributable to employment by the various retail chains in and around the Bridgewater Commons mall complex, as well as to employees of larger corporations whose place of work was classified as the corporate headquarters by the Census Survey. Table 2 contains a summary of the other end of the work-live relationship. As shown, approximately 4,330 persons both live and work in Bridgewater. This represents approximately 16% of all employment and approximately 21% of all workers. Approximately 31% of all other employment in Bridgewater is held by persons that reside in the rest of Somerset County. Approximately 29% of the workers residing in Bridgewater work in the rest of Somerset County.

Table 3 contains a summary of the overall directional distribution of employees and workers in Bridgewater. Within this table, the local area includes Bridgewater, as well as the adjacent communities of Bedminster, Warren Township, Bernards, Bernardsville Raritan, Somerville, Branchburg Township, Bound Brook, and Far Hills. The table highlights those persons who live and work within the immediate quad-state region. As a result, those persons who lived/worked beyond the bordering states (i.e. PA, NY, CT) were considered outliers, and were not included. As shown, approximately 40% of resident workers and 26% of employees in Bridgewater commute exclusively within the local area.

Table 2 – Home-Work Origin/Destinations for Bridgewater

Residence/Work Place	Workers in Bridgewater		Residents of Bridgewater	
Bridgewater	4,332	15.9%	4,332	19.6%
rest of Somerset County	7,893	29.0%	6,621	30.0%
Bergen County	326	1.2%	359	1.6%
Burlington County	58	0.2%	67	0.3%
Camden County	18	0.1%	9	0.0%
Cumberland County	2	0.0%	7	0.0%
Essex County	577	2.1%	967	4.4%
Gloucester County	0	0.0%	6	0.0%
Hudson County	155	0.6%	298	1.3%
Hunterdon County	2,625	9.6%	658	3.0%
Mercer County	411	1.5%	396	1.8%
Middlesex County	4,036	14.8%	3,103	14.0%
Monmouth County	713	2.6%	294	1.3%
Morris County	1,376	5.1%	1,731	7.8%
Ocean County	263	1.0%	42	0.2%
Passaic County	184	0.7%	136	0.6%
Sussex County	163	0.6%	45	0.2%
Union County	1,924	7.1%	1,803	8.2%
Warren County	670	2.5%	40	0.2%
New York City	321	1.2%	953	4.3%
rest of New York State	94	0.3%	67	0.3%
Pennsylvania	927	3.4%	70	0.3%
Connecticut	46	0.2%	0	0.0%
Beyond Bordering States (PA, NY, CT)	129	0.5%	97	0.4%
Total	**27,243**		**22,101**	

Source: 2000 U.S. Census Journey to Work Survey.

Table 3 – Commuting Direction of Travel for Bridgewater

Residence/Work Place	Workers in Bridgewater		Residents of Bridgewater	
Local Area	7,165	26.4%	8,706	39.6%
East	4,222	15.6%	4,905	22.3%
West	4,194	15.5%	768	3.5%
North	9,813	36.2%	1,894	8.6%
South	1,720	6.3%	5,731	26.0%
Total	**27,114**		**22,004**	

Source: 2000 U.S. Census Journey to Work Survey.

The 2000 Census survey gathers information on mode of travel for commuting purposes for residents of individual communities. Table 4 contains a summary of the means of

travel to work for residents of Bridgewater, based on the census. As shown, approximately 85% of Bridgewater residents commute to work by driving alone. Approximately 6.5% car pool, 3.5% use public transit, 1% commute by walking or bicycling, and 4% work at home. It is noteworthy that the public transit share of commuters is less than the number of commuters that work in New York City. The average automobile occupancy for commuting trips is approximately 1.05 persons per vehicle, according to the Census survey.

Table 4 – Mode of Travel to Work for Bridgewater Residents

Means To Travel to Work	Persons	Share
Drove Alone	18,751	84.8%
Car Pooled	1,447	6.5%
Public Transit	775	3.5%
Bicycle	61	0.3%
Walked	155	0.7%
Other Means	69	0.3%
Worked at Home	843	3.8%
Total	**22,101**	

Source: 2000 U.S. Census Journey to Work Survey.

The Census survey contains information on average commuting time for resident workers in a given community. The distribution for residents of Bridgewater is shown in Table 5. As shown, over 38% of commuters have commute times that are less than 20 minutes. Over 55% of commuters have commute times that are less than 30 minutes. Note that this seems to correlate well with the number of residents that work in the local area. The weighted average commuting time for residents of Bridgewater is 27.8 minutes.

Table 5 – Commuting Time for Bridgewater Residents

Commuting Time	Workers	Share
Less than 5 minutes	330	1.6%
5 to 9 minutes	1,669	7.9%
10 to 14 minutes	3,251	15.3%
15 to 19 minutes	2,921	13.7%
20 to 24 minutes	2,513	11.8%
25 to 29 minutes	1,165	5.5%
30 to 34 minutes	2,871	13.5%
35 to 39 minutes	765	3.6%
40 to 44 minutes	1,126	5.3%
45 to 59 minutes	2,418	11.4%
60 to 89 minutes	1,336	6.3%
90+ minutes	893	4.2%
Total	**21,258**	

Source: 2000 U.S. Census Journey to Work Survey.

The Census survey also contains information on the departure time to work for residents of a community. Table 6 contains a summary of departure times to work for residents of Bridgewater. As shown, the busiest hour is 7:30-8:30 a.m., when approximately 35% of all residents depart for work. Approximately 27% of residents depart for work between 6:30-7:30 a.m. (the hour before the peak), and approximately 26% of residents depart for work after 8:30 a.m.

Table 6 – Departure Time to Work for Bridgewater Residents

Departure Time	Workers	Share
Before 6:30 am	2,550	12.0%
6:30-7:00	2,104	9.9%
7:00-7:30	3,583	16.9%
7:30-8:00	3,517	16.5%
8:00-8:30	4,046	19.0%
8:30-9:00	2,049	9.6%
after 9:00	3,409	16.0%
Total	**21,258**	

Source: 2000 U.S. Census Journey to Work Survey.

When combined, the above information means that the typical profile of travel to and from Bridgewater is short trips by automobile that take place within the typical peak commuting times. This of course excludes the profile of traffic that travels through Bridgewater, which is substantial.

3.2 Traffic Volumes

There are approximately 287 miles of roadway within Bridgewater Township. Through the various data collected as part of this project, it was possible to estimate the amount of travel taking place by class of road and jurisdiction.

Table 7 contains a summary of travel by class of roadway, while Table 8 contains a summary of travel by jurisdiction. As shown, approximately 2.2 million vehicle-miles of travel take place in Bridgewater on a typical day (approximately 798 million vehicle-miles of travel per year). The vast majority of travel takes place on Freeways and Principal Arterial roadways, which are under the jurisdiction of the New Jersey Department of Transportation. The various freeways in Bridgewater have an average annual daily traffic (AADT) of approximately 80,000 vehicles per day, while the principal arterials have an overall AADT of 54,000 vehicles per day. Minor arterial roadways are primarily under the jurisdiction of Somerset County (although some minor arterial roads are under state or township jurisdiction). Minor arterial roadways account for approximately 13% of travel in Bridgewater, and have an overall AADT of 9,100 vehicles per day on the average. Local roadways of various classifications account for

approximately 80% of roadways in Bridgewater, and account for approximately 11% of travel.

Table 7 – Summary of Vehicular Travel in Bridgewater by Road Type

	Length (miles)	Vehicle-Miles Travelled		Average AADT	Share of Travel	Share of Roads
		Daily	Annual (Millions)			
Freeways	9.4	747,700	272.9	79,543	32.9%	3.3%
Principal Arterials	16.9	916,100	334.4	54,207	40.3%	5.9%
Minor Arterials	31.6	316,000	115.3	10,000	13.9%	11.0%
Commercial Collectors	3.3	33,200	12.1	10,061	1.5%	1.1%
Residential Collectors	26.4	112,220	41.0	4,251	4.9%	9.2%
Local Roads	199.5	149,618	54.6	750	6.6%	69.5%
Total	**287.1**	**2,274,838**	**830.3**			

Note: The traffic volumes shown herein were obtained from various peak period traffic counts obtained between 2005-2009, with adjustment factors for daily traffic. They are not intended to be exact, but instead to be used for guidance only.

Table 8 – Summary of Vehicular Travel in Bridgewater by Jurisdiction

	Length (miles)	Vehicle-Miles Travelled		Average AADT	Share of Travel	Share of Roads
		Daily	Annual (Millions)			
State	31.0	1,748,600	638.0	56,406	76.9%	10.8%
County	21.0	170,900	62.0	8,138	7.5%	7.3%
Township	235.1	355,338	130.3	1,511	15.6%	81.9%
Total	**287.1**	**2,274,838**	**830.3**			

Note: The traffic volumes shown herein were obtained from various peak period traffic counts obtained between 2005-2009, with adjustment factors for daily traffic. They are not intended to be exact, but instead to be used for guidance only.

4.1 Overall Crash Patterns

Safety is of paramount importance to the transportation system, even to the point where safety features take precedence over traffic operations. For transportation systems, safety is generally measured in terms of traffic crashes. Traffic crashes cause considerable traffic delay in addition to the direct costs of the property damage. Further, traffic safety generally disproportionately impacts residents more than through traffic, since their exposure to the road system is greater.

The New Jersey Department of Transportation maintains a database of traffic crashes for New Jersey. Using information from said database, some overall measures of traffic safety could be determined. Since the database in question includes all crashes statewide, it does contain errors. However, it is sufficient for providing summary statistics on traffic safety for specific communities.

Crash severity is generally assessed in terms of being *fatal*, *injury*, or *property damage only* crashes. A *fatal* crash is one that involves a fatality. An *injury* crash is one that results in some form of injury to one or more participants (ranging from complaint of pain to a debilitating injury), but no fatalities. All other crashes are classified as *property damage only*. According to the Federal Highway Administration, the approximate cost to society of crashes (including adjustment factors for geography and inflation) are $3 Million, $35,000-40,000, and $6,000-$12,000 for fatal, injury, and property damage only crashes. Table 9 contains a summary of crashes in Bridgewater for 2004-2009 by severity. As shown, approximately 2,500 crashes occur per year (approximately 7 per day), with an average cost to society of approximately $45 million per year. Approximately 3 fatal crashes occur per year and approximately 474 injury crashes occur per year. The fatal crashes account for approximately 20% of the aggregate cost to society of these crashes.

Table 9 – Traffic Crashes by Severity in Bridgewater

Year	Fatal	Injury	Property Damage Only	Total	Approximate Cost to Society
2004	2	476	1,960	2,438	$42 Million
2005	5	475	1,980	2,460	$51 Million
2006	5	493	2,005	2,503	$52 Million
2007	2	472	2,233	2,707	$44 Million
2008	1	449	2,060	2,510	$38 Million
2009	4	478	2,116	2,598	$49 Million
Average	3	474	2,059	2,536	$46 Million

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

Figure 2 contains a summary of crashes by type of roadway. As shown, approximately 450 crashes per year occur on the interstate system, approximately 800 crashes per year occur on the principal arterial road system, approximately 600 occur on the minor arterial road system, approximately 75 occur on the commercial collector road system, approximately 140 on the residential collector road system, approximately 120 occur on the local road system, and approximately 350 occur on private property.

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

Figure 2 – Traffic Crashes by Type of Roadway in Bridgewater

Understanding the nature of crashes is important to determining the underlying pattern, and determining appropriate mitigations. Table 10 summarizes crash history in Bridgewater by crash type. As shown, rear end and sideswipe collisions account for approximately 50% of all crashes. These types of crashes are usually linked to traffic congestion, and tend to increase in frequency when there are standing queues of traffic. Fixed object crashes account for 13% of all crashes. Fixed object crashes tend to have more severity than other types of crashes, and consequently are of concern. Pedestrian and bicycle crashes account for 1% of crashes. While this may seem low, these types of crashes tend to have more severity than other types of crashes, and consequently are also of concern. Angle crashes account for 10% of all crashes. This is a common type of crash.

Table 10 – Traffic Crashes by Crash Type in Bridgewater

Crash Type	2004	2005	2006	2007	2008	2009	Total	Share (%)
Same Direction - Rear End	891	912	928	1039	949	1030	**5749**	38%
Same Direction - Sideswipe	310	320	305	389	296	316	**1936**	13%
Angle	277	295	235	212	198	233	**1450**	10%
Opposite Direction (Head-On)	38	43	32	25	23	22	**183**	1%
Opposite Direction (Sideswipe)	0	0	19	17	19	15	**70**	0%
Struck Parked Vehicle	144	184	177	179	163	129	**976**	6%
Left Turn / U-Turn	83	53	68	86	75	78	**443**	3%
Backing	42	48	132	142	187	179	**730**	5%
Encroachment	0	0	7	2	2	0	**11**	0%
Overturned	8	9	20	20	15	17	**89**	1%
Fixed Object	338	320	345	357	306	340	**2006**	13%
Animal	149	163	168	161	186	157	**984**	6%
Pedestrian	7	10	10	21	9	11	**68**	0%
Pedalcyclist	6	6	7	4	5	4	**32**	0%
Non-fixed Object	32	18	45	31	46	40	**212**	1%
Unknown	113	79	5	22	31	27	**277**	2%
Total	**2438**	**2460**	**2503**	**2707**	**2510**	**2598**	**15216**	**100%**

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

4.2 Fatal Crashes

Table 11 contains a summary of the 19 fatal crashes in the Township between 2004-2009. While the difference between a fatal crash and severe injury crash is sometimes a matter of circumstance, it is still useful to look for patterns, given the higher cost to society of these types of crashes. As shown, fixed object crashes account for 11 fatal crashes and collisions with pedestrians accounted for 5 fatal crashes. Over one third (8) fatal crashes occurred on I-287, with many at common locations.

Table 11 – Fatal Traffic Crashes in Bridgewater

Date	Time	Location	Crash Type	Light Conditions
7/3/2009	145	Foothill Rd near Ronson Rd	Fixed Object	Dark
6/26/2009	1625	Route 22 near Vosseller Av	Fixed Object	Daylight
2/19/2009	1748	Washington Valley Rd near Blossom Dr	Fixed Object	Dusk
2/15/2009	2230	Foothill Rd near Steele Gap Rd	Fixed Object	Dark
1/27/2008	1239	Route 22 @ Gaston Av	Angle	Daylight
8/7/2007	1937	I-287 south of I-78	Same Direction - Rear End	Dusk
5/26/2007	1530	I-287 near Gaston Av	Fixed Object	Daylight
11/23/2006	1553	I-287 near Foothill Rd	Pedestrian	Daylight
10/13/2006	52	I-287 near Route 22 merge	Fixed Object	Dawn
7/8/2006	1955	I-287 near Foothill Rd	Fixed Object	Daylight
5/28/2006	519	107 Reading Circle	Fixed Object	Dark
1/5/2006	1044	I-287 south of I-78	Fixed Object	Daylight
11/27/2005	1914	East Main Street (CR 533) near Chimney Rock Rd	Pedestrian	Dark
11/25/2005	1735	Milltown Rd @ Walters Brook Dr	Pedestrian	Dark
10/7/2005	1414	Mountain Av (CR 527) north of Woodland Ter	Fixed Object	Daylight
9/11/2005	1959	Route 22 near Milltown Rd	Pedestrian	Dark
2/21/2005	735	I-287 near Gaston Av	Fixed Object	Daylight
11/18/2004	215	East Main Street (CR 533) near Chimney Rock Rd	Pedestrian	Daylight
1/11/2004	702	15 Polhemus Ln	Struck Parked Vehicle	Daylight

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

4.3 Pedestrian/Cycle Crashes

As indicated earlier, 100 pedestrian or pedalcyclist crashes occurred in the Township between 2004-2009. While the share of all crashes is low (1%), the severity tends to be high. Five (5) of these crashes resulted in a fatality, and this accounts for 1/3 of all fatal crashes in the Township during that period. A total of 75 of these crashes resulted in an injury, and said injuries would tend to be more severe than other injuries (since those involved have far less protection). Lighting is a key factor in these types of crashes. Table 12 summarizes pedestrian and bicycle crashes relative to lighting conditions. As shown, approximately 40% of all pedestrian crashes occur in darkness. Table 13 summarizes pedestrian/bicycle crashes by road system. As shown, the State and County system account for nearly half of pedestrian/bicycle crashes, while accounting for only a fraction of the miles travelled.

Table 12 – Pedestrian/Pedalcycle Crashes by Light Condition

	Daylight	Darkness	Unknown	Total
Pedestrian	40	27	1	68
Bicycle	25	7	0	32
Total	**65**	**34**	**1**	**100**

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

Table 13 – Pedestrian/Pedalcycle Crashes by Road System

	State	County	Local	Private	Total
Pedestrian	11	12	13	32	68
Bicycle	6	16	9	1	32
Total	**17**	**28**	**22**	**33**	**100**

Source: New Jersey Department of Transportation Web-based Statewide Crash Record Database.

The following clusters of bicycle/pedestrian crashes were identified. These areas should be targeted for bicycle and pedestrian improvements and lighting improvements. It is noted that sidewalk was recently installed on Route 28 by the State of New Jersey, meaning that this hot-spot may have been addressed.

- Route 28 from Pearl Street to I-287 SB ramps (6 crashes)
- Promenade Boulevard (9 crashes)
- Commons Way (8 crashes)
- East Main Street (CR 533) (6 crashes)
- Finderne Avenue (CR 533) (5 bicycle crashes, 1 pedestrian crash)

4.4 Safety Hot Spots

To identify potential traffic crash hot spots, crash records for the year 2006-2008 were reviewed in detail (i.e. a subset of available crashes). A total of 7,720 crashes occurred during this period. The following hot spots were identified:

- The area bound by the interchange of Route 202 with Route 22 to Route 202 and First Avenue/Country Club Road, including the Somerville Circle (this area had 1,137 crashes, or nearly 15% of all crashes in Bridgewater)
- Route 22 from Route 202 to I-287 (this area had 604 crashes, or nearly 8% of all crashes in Bridgewater)
- I-287 (I-287 had 1209 crashes, or nearly 16% of all crashes in Bridgewater)
- Route 28 between Chimney Rock Road and Bound Brook (this area had 268 crashes, or over 3% of all crashes in Bridgewater)

4.5 Hazardous Routes to School

New Jersey law (NJSA 18A:39 and NJAC 6A:27) requires school districts to provide busing for students living beyond 1.25 miles from school for elementary school students, 2.0 miles from school for middle school students, and 2.5 miles from school for high school students. Under NJSA 18A:39, school districts are obligated to provide busing for students living within these limits when there are specific identified impediments to walking or bicycling. Lack of sidewalks and crosswalks and high traffic volumes are among the hazards that qualify a route for busing within the radii cited.

State law (NJSA 18A:39) requires school districts to adopt a policy to address hazard busing and to identify criteria for designating hazardous routes. School districts and municipalities are to collaborate to identify criteria and provide busing. Municipalities have a financial responsibility to pay for safety busing.

Rising transportation costs and constrained school district budgets limit the financial feasibility of providing hazard or courtesy busing. Focusing improvements to pedestrian circulation in proximity of schools and neighborhoods where hazard busing is currently provided can mitigate the need for – and costs of – hazard busing in the future.

The cul de sac formation of residential developments poses connectivity problems for walking and bicycling through these neighborhoods to access school destinations. Establishing off-road pathways to connect cul de sac neighborhoods may be an option to facilitate direct access to schools.

Hazardous Routes within Bridgewater are surveyed annually by the Bridgewater Police Department, and approved by council. The Bridgewater Police Department maintains the list. Defining and addressing the specific impediments to walking and bicycling are in the best interest of all concerned. Likely causes are the lack of pedestrian facilities, such as sidewalks and crosswalks along school access routes, high traffic volumes and poor visibility (blind curves).

5.1 Roadway Design

Table 14 contains a summary of recommended roadway design parameters by class of roadway. These should be included in all new roadways or privately driven redeveloped roadways. Further, any new developments that require reconstruction of their frontage shall be required to conform to these requirements. The recommendations of the table below result from the NJDOT's *Smart Transportation Guidebook* (March 2008), *Residential Site Improvement Standards*, and other appropriate sources. The recommendations presented below address some concerns for the desire of "Complete Streets" within Bridgewater. Exceptions to these recommended dimensions may be considered in specific instances due to the need to reduce impacts caused by social or natural environmental constraints. With respect to minor arterials, it is the intent of this circulation element to limit adding additional vehicular lanes to said roadways, due to the negative consequences to pedestrians and bicyclists, and otherwise compromises the quality of life for the residents of Bridgewater for the sake of regional traffic.

Table 14 – Summary of Design Dimensions by Road Type for Bridgewater

Class of Roadway	Minimum Right of Way (feet)	Maximin Number of Lanes	Roadway Width	Intended Speed (mph)	Sidewalk Requirements	Medians / Shoulders	Bicycle Lanes	Traffic Calming Consideration[1]		
								A	B [3]	C
Principal Arterials	148	6	116	45	off road	median dividers with 12 foot shoulders	off road only	No	No	No
Minor Arterials - state/county	84	4	64	35	2 sides	8 foot shoulders	Allowed [2]	Yes	No	No
Minor Arterials - municipal	50	2	24-34	30	2 sides	0-5 foot shoulders	Allowed	Yes	No	No
Commercial Collectors	90	4	36-48	25	2 sides	planted medians required	Allowed	Yes	Yes	No
Residential Collectors	50	2	28	25	2 sides	8 foot parking on one side	Allowed	Yes	Yes	Yes [4]
Local Roads	50	2	28	25	1 side minimum	8 foot parking on one side	Shared lanes	Yes	Yes	Yes [4]

Note: Traffic Calming, Level A = Education, Enforcement, Engineering (3E's), flashing beacons/driver feedback signs, signing, striping, roundabouts
Traffic Calming, Level B = multi-way stops, pavement markings, islands
Traffic Calming, Level C = vertical or horizontal deflections (bulb-outs, chicanes, speed humps, raised intersections, etc.)

[1] Bridgewater has a policy in place prohibiting new traffic calming, with preference given to Education, Enforcement, Engineering (3E's). The guidance below is provided in case the ordinance is modified or repealed.

[2] not at the expense of travel lanes

[3] multi-way stops are only permitted where the ratio of major street volume to minor street volumes does not exceed four (4)

[4] vertical and horizontal deflections are only permitted where significant problems, such as excessive speeds or high cut through traffic, exist

5.2 Roadway Connectivity

All freeways and arterial roadways are intended to provide connectivity to adjacent communities. Where possible, it is encouraged for collector roads to adjoin with adjacent communities. Otherwise, it is the intent of the master plan to self-contain all residential local roads, and not provide connections to adjacent communities (except where already present). It is intended for all roads to provide connectivity to the greatest extent possible for non-motorized travel modes. Consequently, cul-de-sac design is discouraged.

5.3 Traffic Operations

It is the intent of the Master Plan to reduce, or at worst maintain, traffic operations at present levels. The specific objectives are as follows:

- Reduce peak hour delay on the road system by 10% through the various planned traffic improvements.
- Require all new major developments (more than 50 peak hour vehicles) to assess traffic operations and provide off-tract contributions to maintain traffic operations at the levels described above).
- For residential areas adjacent to commercial areas, improve the ability to access the arterial road system without introducing additional cut-through traffic.
- Ensure that new and modified commercial developments have adequate space for delivery trucks to maneuver on site.
- Where possible, provide cross-access agreements and connections between commercial developments off-road.

5.4 Traffic Safety

Traffic crashes have a significant impact on the quality of life in Bridgewater. In addition to direct impacts to those involved in crashes (including some loss of life), traffic congestion from crashes on the regional road system often spill back onto the residential road system and otherwise increase travel times for all road users.

The specific goals of the Master Plan consist of the following:

- Achieve a 10% reduction in the number of crashes in Bridgewater through the various planned traffic improvements included herein.
- Ensure that traffic safety is appropriately considered for new developments, and that appropriate mitigations be required by any development that impacts traffic safety.
- Where possible, provide cross-access agreements and connections between commercial developments off-road.
- Ensure that pedestrian safety and circulation is given specific consideration in any new significant commercial developments that have high parking turnover.
- Pursue pedestrian accommodations on higher order roadways.
- Maintain street lighting at 0.6 footcandles in any area where pedestrians can be expected to routinely cross arterial roadways.

5.5 Transit

Promotion of the ability to utilize transit is an objective of this master plan. The specific transit objectives are as follows:

- Pursue the creation of transit hubs where transfers between transit can take place and where passengers can wait in areas with amenities, such as the Bridgewater Commons Mall.
- Provide shuttle bus service between the Bridgewater and other train stations, and Bridgewater Commons Mall and large concentrations of commercial space, such as sanofi aventis, the Somerset Corporate Center, and Met-Life.

- Consider ordinances that favor transit oriented design where appropriate.
- Continue to seek opportunities for creating new park and ride facilities and expanding existing ones.

5.6 Walking/Bicycle

It is recognized that providing opportunities for walking and bicycling is a significant quality of life factor for Bridgewater. It is recognized that providing walking/bicycling infrastructure can aid in improving the physical health of residents, and provide an alternative means of travel for short trips. One example of a significant pedestrian enhancement is the pedestrian overpass to the Bridgewater Commons Mall that was completed a few years ago. Specific objectives in this area are as follows:

- Eliminate hazardous routes to school through targeted pedestrian improvements.
- Provide new bicycle/pedestrian connections across the various physical barriers in Bridgewater (such as the aforementioned pedestrian overpass).
- Complete a network of bicycle/pedestrian paths for Bridgewater.
- Provide sidewalks along higher classes of roadway and in the vicinity of all schools.
- Provide direct pedestrian connections where possible.
- Require new commercial developments that are retail in nature to provide bicycle/pedestrian links to adjacent neighborhoods and adjacent commercial developments, and provide bicycle parking.
- Encourage walking and bicycling travel modes to replace short vehicle trips by prioritizing walking and bicycling improvements in the vicinity of schools, recreational facilities, shopping and retail destinations, employment centers, public destinations such as libraries and post offices, and senior centers.
- Provide secure bicycle parking devices at priority public destinations.
- Provide off-road facilities for bicycling and/ or walking where possible, prioritizing facilities that connect neighborhoods with public destinations.
- Prioritize walking and bicycling improvements along roadways that connect trails to public destinations.
- Maintain shoulders or provide bicycle lanes along roadways that are part of the designated bikeways network.

5.7 Goods Movement

While goods movement is a vital part of the local economy, the vehicles used for goods movement are often incompatible with residential neighborhoods and bicycles and pedestrians. Accordingly, it is the objective of this Master Plan to contain non-local goods movement to the freeway and arterial road system. Another objective of this Master Plan is to ensure that goods movement deliveries be accommodated off-street to the best extent possible. There are a number of rail sidings within Bridgewater, and these should be protected and use encouraged, enable the movement of goods and work in progress by modes more efficient than trucks along. Where efficiencies can be achieved, efficiency rail links should be pursued.

5.8 Emergency Services

It is recognized that response time is vital to emergency services operations. It is further recognized that emergency services in Bridgewater include many volunteers that must drive to their emergency vehicles. For these reasons, the following specific objectives are included for emergency services:

- Where possible, provide pre-emption for emergency vehicles in traffic control devices
- Whenever possible, provide congestion bypass routes for emergency vehicles.
- Require new developments to incorporate design that enhances emergency vehicle accessibility.

5.9 Traffic Calming

Coupled with providing opportunities for walking and bicycling for Bridgewater is the need to provide non-motorized users with at least a satisfactory degree of comfort with respect to vehicle interaction along the roadway. Traffic calming techniques are intended to lower motorists' speeds by law (i.e., regulatory signs) and by physical impediments such as road narrowing and speed tables. Such measures are implemented to ensure that motorists travel at or below the intended travel speeds along roadways without the need for police enforcement. Bridgewater presently has a policy in place prohibiting the use of new traffic calming devices, with preference given to Education, Enforcement, and Engineering (the 3 E's). The guidance below is provided in case the policy is modified or repealed in the future. Measures are as follows, in groupings based on impacts:

Group A – Measures that may be implemented on any level of roadway:

- Flashing Beacons, including rectangular rapid flashing beacons
- Install driver feedback signs (speed radar)
- Traffic signs and striping.
- Colored/textured pavements for crosswalk areas with high pedestrian volumes to enhance visibility.
- Rumble stripes in advance of intersections and high pedestrian crossing locations.
- Roundabouts

Group B – Measure that may be implemented on collector or local roads:

- Multi-way stop signs (only where the ratio of major road traffic to minor road traffic does not exceed 4, and the installation otherwise complies with the Manual on Uniform Traffic Control Devices).
- Medians to be used as pedestrian refuge and as speed deterrents in high-speed areas.
- Provide textured or colored pavement markings

Group C – Measures that may be implemented on residential collector or local roads where significant problems have been demonstrated (such as excessive speeding and/or high cut-through traffic, with the resulting volume exceeding RSIS thresholds):

- Curb extensions at intersections at the end of parking lanes.
- Chicanes

- Speed tables, speed humps, and/or raised intersections in areas with high pedestrian volumes, but only on self contained streets with less than 3,000 vehicles per day, and with posted speeds of 30 miles per hour or slower.

5.10 Parking Efficiency

Surface parking lots constitute one of the more prevalent land uses in Bridgewater, and are a significant contributor to the phenomenon of "heat islands" (i.e. where pavement absorbs solar energy, and increases the temperature locally). Further, the paving of parking lots increases the total volume of stormwater that must be attenuated through detention facilities, and treated for water quality. For these reasons, it is recommended that parking requirements be as low as is practical, and used as much as possible. It is noted that most parking ordinance requirements are based on a statistical maximum demand for a given land use (i.e. 85th percentile demand), thereby leaving many parking spaces unused. We recommend the following revisions in order to improve parking efficiencies:

- Revise parking design standards to reflect the minimum acceptable standards in the industry.
- Require land banking of parking spaces (i.e. space for parking spaces is reserved, but not built), based on the difference between average parking demand and statistical maximum demand (i.e. 85th percentile demand).
- Encourage the use of shared parking, particularly for land uses that are used only once a week or less frequently, such as religious institutions.
- Encourage the creation of shared parking facilities for contiguous smaller retail centers, so that aisle width needs can be reduced and costs can be lowered.
- Permit the leasing of retail parking areas for use as park and ride lots for transit during weekdays (since parking requirements are generally based on Saturday demand).
- Impose maximum parking provisions for certain land uses to avoid over intensification.
- Consider permitting parking credits for shared parking in mixed use developments and transit oriented developments, and encourage shared parking provisions for all land uses which demonstrate ability to share parking facilities during peak demand periods.
- Encourage parking lots to interconnect where possible.

5.11 Land Use Compatibility

Land use regulations can have a significant impact on the ability of modes other than automobile to be facilitated. Isolation of land uses, large building set-backs, front yard parking, and the lack of sidewalk can all reduce the potential for trips by bicycling or walking. Low densities make it difficult for transit to service areas. Creation of affordable housing should be preferred in areas serviced by transit and employment centers. All new roads should have connectivity requirements (i.e. no cul de sacs). Since a large portion of Bridgewater has already been developed, it is recommended that Bridgewater focus on the creation of mixed commercial-use centers in areas of

redevelopment that are both transit friendly and pedestrian/bicycle friendly. These centers should include a focused effort to provide bus transit and a sidewalk infrastructure which would encourage these modes of transportation. We recommend that ordinances be reviewed to incorporate as many smart growth features as feasible, in keeping with preserving the quality of life for residents of Bridgewater. We note that some smart growth zones have been established along Route 22 already. The centers in question are as follows:

- Chimney Rock Road in the vicinity of Route 22 (which is expected to undergo substantial redevelopment once the interchange is completed). This area is not viewed as appropriate for industrial-type uses.
- Route 28 between Adamsville Road and I-287
- East Main Street between Adamsville Road and I-287
- Route 22 between US 202/206 and I-287

5.12 NJDOT Access Management Code

Access via state highways is controlled by the New Jersey Department of Transportation (NJDOT) Access Management Code. The NJDOT Access Management Code contains both an outline of ultimate desired typical sections for roads, as well as regulations regarding the type of access to be provided along those roads. Access level defines the type of access. Access levels are as follows:

Access Level 1 – limited access highways, no access
Access Level 2 – access only provided if access to no other street is possible
Access Level 3 – right-in/right-out access only
Access Levels 4-6 – full movement access permitted

The classification of the various roads in Bridgewater are as follows:

Road	Access Level	Desired Typical Section
I-78	1	8 lanes
I-287	1	8-10 lanes
Route 22	3	4-6 lanes
Easton Turnpike (Route 28)	4	2 lanes
Union Avenue (Route 28)	4	2-4 lanes
Route 202/206 north of I-287 (Exit 17)	4	4 lanes
Route 202/206 south of I-287 (Exit 17)	3	4 lanes

It is recommended that Bridgewater apply for reclassification of Route 202/206 north of I-287, and attempt to lower the speed limit to 35 miles per hour through appropriate design treatments. The desired typical section for the road is out of character with its use as primarily a land access road. Turning left onto the roadway is a significant issue for the roadway for the residents of the area, and this issue needs resolution. The creation of additional traffic signals at residential streets to provide direct access to Route 202/206 would be the preferred approach.

6 RECOMMENDED ORDINANCE REVISIONS/RE-EXAMINATIONS

6.1 Parking

It is recommended that ordinance requirements for certain land uses be revised, as shown in Table 15. It is recommended in all of these cases that two provisions be created – one to be implemented on approval of the project, and a second that is technically land banked. Land banking requires that land be reserved to build parking and money be put on bond to construct parking, but that the parking is not constructed unless it is demonstrated after completion of the project that there are parking shortages.

Table 15 – Recommended Revisions to Parking Requirements

Land Use	Current Requirement	Recommended Requirement	
		Base	Total with Land Banking
Offices	1 space / 250 sf	1 space / net 300 sf	**Min:** 1 space / net 300 sf **Max:** 1 space / net 250 sf
Medical/Dental Offices	4 spaces / doctor or dentist + 1 space / 100 sf	3 spaces / 1,000 sf	4.5 spaces / 1,000 sf
Medical/Dental Clinics	4 spaces / doctor or dentist + 1 space / 100 sf	4.5 spaces / 1,000 sf	5 spaces / 1,000 sf
Supermarkets	<2,000 sf: 1 space / 150 sf >2,000 sf: 1 space / 175 sf	4 spaces / 1,000 sf	5 spaces / 1,000 sf
Other Retail	<2,000 sf: 1 space / 150 sf >2,000 sf: 1 space / 175 sf	3.5 spaces / 1,000 sf	4 spaces / 1,000 sf
Banks	greater of 1 space / 100 sf or 10 spaces per teller	4 spaces / 1,000 sf	5.7 spaces / 1,000 sf
Restaurants, eateries	1 space / 2.5 seats	0.5 spaces / seat	0.7 spaces / seat
Hotels, Motels	1 space / room + requirement for other uses	greater of 0.9 spaces / room and requirement for other uses	greater of 1.2 spaces / room and requirement for other uses

It is recommended that bicycle parking requirements be provided for as well for certain land uses, such as offices and retail facilities.

It is also recommended that 90 degree parking have a 24 foot aisle width (which will match driveway widths). It is also recommended that developers be entitled to take a 2 foot credit from parking stall depth if the parking abuts an island or curb where overhang of vehicles is feasible, so long as no landscaping, plantings or obstructions are placed in the area of the overhang.

It is recommended that shared parking be recognized in the ordinance and encouraged where sufficient parking for on site uses is demonstrated to the satisfaction of the reviewing board. Religious institutions in particular should be encouraged to utilized shared parking.

It is recommended that retail plazas be permitted to lease any parking spaces above 3 per 1,000 sf during weekdays for park and ride usage.

6.2 Planned Commercial Development/Corporate Office Park Standards

Ordinance 126-345.1 was added to Bridgewater Ordinances in 1983. Section O, paragraph 8 contains requirements for a new interchange with Route 287/Route 202-206 when development in the Planned Commercial Development exceeded 500,000 square feet of floor area. It further required that if said interchange was not built, Route 202-206 would have to be maintained at Level of Service "C" with development traffic. Since said ordinance was adopted, the New Jersey Department of Transportation adopted the Access Management Code (which was adopted in 1992). Said Access Management Code sets forth the rules for analyzing traffic impacts on state highways, and defines how fair share contributions for improvements are to be calculated. The Access Management Code supersedes all local ordinances. Further, a new interchange with I-287 is no longer feasible since it would violate current regulations regarding the spacing of interchanges on interstate highways. Accordingly, the SED zone and Ordinance 126-345.1 should be updated to be consistent with these factors.

7 PLANNED IMPROVEMENTS

7.1 Overview

Since roadways under the jurisdiction of the New Jersey Department of Transportation (NJDOT) generally serve regional through traffic, maintaining and upgrading their system is generally left to them, with some local input. Typically, improvements to roadways under the State jurisdiction is left to the NJDOT as well, since these improvements are generally very expensive and beyond the resources of Bridgewater to independently finance. However, having an efficient state road system is in the best interest of Bridgewater, since spillover from this system impacts several local roads.

7.2 Planned Road Improvements – State System

At the time of writing, several transportation improvement projects were in various stages of development for the New Jersey Department of Transportation. Below is a synopsis of these improvements:

Route 22 Short-Term Safety Improvements – At the time of writing, the NJDOT was advancing final design plans for the elimination of two U-Turns on Route 22, along with the addition of one eastbound lane on Route 22 through the Route 22/Route 202/206 Interchange. The project also will include several access improvements and other minor improvements to accommodate the loss of the U-Turn openings.

Chimney Rock Road Interchange with Route 22 – Somerset County is leading the efforts to create a new Route 22 Interchange at Chimney Rock Road. The project is expected to begin construction in the near future. In addition to providing new connectivity across Route 22, the project is expected to spur significant redevelopment in the area. Chimney Rock Road improvements will include bicycle and pedestrian accommodations.

Route 202/206 from Route 28 to Route 22, Including the Route 202/206 and I-287 Interchange (Exit 17) – At the time of writing, the New Jersey Department of Transportation was undertaking a traffic safety and operational analysis of the entire area of Route 202/206 from the Somerville Circle to I-287. It is expected to develop both short term and long term safety and capacity improvements. The project was in the early stages at the time of writing.

Route 22 Long Term Improvements – There is a Somerset County led initiative to evaluate the feasibility of improving Route 22 between US 202/206 and I-287.

Route 22 and Country Club Road – There is an obligation by SJP Properties to widen Route 22 through Country Club Road to three lanes as a condition of their New Jersey Department of Transportation Access Permit when they complete their final building.

7.3 Planned Road Improvements – County System

At the time of writing, Somerset County had two road improvement projects being studied in Bridgewater, over and above those mentioned earlier:

Easton Turnpike and Meadow Road Intersection – The County is studying the signalization of this intersection.

Foothill Road and Mine Road Intersection – The County is studying the signalization of this intersection.

7.4 Planned Road Improvements – Local System

At the time of writing, one major project was planned:

Milltown Road Underpass of NJ Transit – The Town of Bridgewater has long contemplated improvements to the underpass of NJ Transit on Milltown Road. Presently, this is a single lane underpass, and both traffic and bicyclists/pedestrians have to alternate flow. However, no formal plans for improvement presently exist. *It is recommended that said improvement consist of signalization, and that it accommodate pedestrians and bicyclists with an exclusive phase. Alternatively, a new pedestrian and bicycle tunnel would be a viable alternative, depending on costs.*

7.5 Planned Transit Improvements

At the time of writing, only one transit improvement was planned:

NJ Transit Bus Service Study – At the time of writing, NJ Transit was planning on reviewing all bus routes for service improvements/enhancements. As noted earlier, NJ Transit has only one major bus route serving Bridgewater, with a few runs of another bus route and a wheels bus route supplementing said bus service.

7.6 Planned Improvements for Other Modes

There are several significant off-road facilities for bicycling and walking that are in various stages of planning. Off road trails can serve transportation functions when they provide connections between public destinations, residential neighborhoods and transit facilities. The following regional greenway and trail facilities can become the spine of a regional walking and bicycling network connecting many public destinations.

Peters Brook Greenway - The Peters Brook Greenway is a planned corridor of open space following a stream corridor that will include a bicycle and walking trail in Bridgewater and Somerville. The Greenway will extend from the confluence of Peters Brook and the Raritan River in Bridgewater, through Somerville, to the Bridgewater/Raritan High School at Garretson Road in Bridgewater. Portions of the Greenway have been constructed in Somerville and the Somerset County Bridge

Department is currently designing a pedestrian and bicycle bridge that will extend the Peters Brook Greenway across 202.

Raritan River Greenway - The Raritan River Greenway is a planned corridor of open space following the river corridor that will include a bicycle and walking trail in Bridgewater, Raritan and Somerville. The Greenway will extend from the Raritan Power Canal from Red Oak Way in Bridgewater to Bound Brook. The Torpey Athletic Complex and Finderne Farms Wetlands Mitigation Project are also part of the Raritan River Greenway. It is intended that the Raritan River Greenway will connect redevelopment projects along the River, such as the Somerville Landfill/Train Station and Wyeth properties.

Somerset County Regional Center Pedestrian, Bicycle and Greenways Systems Connection Plan, June 2009 - This Plan includes portions of Bridgewater and recommendations that should be incorporated into Bridgewater's plans for improving bicycle, pedestrian and greenways circulation. The Greenways Plan proposes a Conceptual Greenways System of walking and bicycling facilities along roadway corridors and greenway (off-road) corridors. The objective is to provide improved walking and bicycle access to public destinations in the Regional Center.

Priorities for pedestrian and bicycle improvements:

- Access to schools
- Access to shopping malls/ "downtown" areas
- Access to employment centers
- Access to transit

Three priority "core activity areas" with a concentration of public destinations to focus bicycle and pedestrian circulation improvements are:

- Bridgewater Promenade/ TD Bank Ballpark/ Train Station
- Bridgewater Raritan High School, Bridgewater Commons, Somerset Corporate Center, Somerset County Library, U.S. Post Office.
- Frank "Nap" Torpey Athletic Complex

Three "Linkage Improvement Concepts" for Bridgewater included in the Plan are:

1. East Main Street Corridor from Pearle Street, Bridgewater to Tea Street, Bound Brook (connecting the Finderne neighborhood to the Bridgewater Promenade and Bound Brook)

2. Garretson Road, Woodlawn Avenue, Commons Way, Prince Rodgers Avenue, North Bridge Street (connecting the Bridgewater Raritan High School to the County Library and other public destinations along the way)

3. Milltown Road at railroad underpass (connecting the Vanderhaven Farms neighborhood with North Branch Park and the 4-H Center).

In addition, Bridgewater is referenced in another Linkage Improvement Concept prepared for Somerville to improve access to the Torpey Athletic Complex. Bicycle and pedestrian improvements are recommended along the primary access on Loeser and Nimetz Streets in Bridgewater, and from Finderne Avenue, with the development of an off-road trail.

7.7 Additional Improvement Needs

The following road improvement needs are present within Bridgewater due to either traffic safety or operational concerns:

Union Avenue (Route 28) between Chimney Rock Road and I-287 – The stretch of Union Avenue (Route 28) between Chimney Rock Road and I-287 has a high number of crashes. This may be partially due to complicated signal operations. Improvements at this location should be prioritized.

I-287 – A safety study should be conducted on I-287 to determine if improvements to reduce the frequency and severity of crashes are feasible, especially in the vicinity of Exit 17.

Transit Services – SCOOT or other bus service should be enhanced between the Bridgewater Commons Mall and the nearest rail station (Somerville Station). A new transit hub should be formed at the Bridgewater Commons Mall.

8 TOWN-WIDE PEDESTRIAN/BICYCLE LINKAGE IMPROVEMENTS

The National Bicycle and Pedestrian Documentation Project conducted surveys indicating that adults will on average walk up to two miles (round trip) and will bicycle on average up to five miles (round trip) in place of vehicle trips. This suggests that priorities for walking improvements should be made within one mile of targeted public destinations and within 2.5 miles for bicycling improvements. Providing improvements to pedestrian and bicycle circulation can provide three important benefits, as illustrated below:

Provides residents with an alternative to using automobiles for local trips, thereby reducing the demand for parking, reducing traffic congestion, and reducing tailpipe emissions. Given the fact that nearly 20% of workers that live in Bridgewater work in the local area, there is a high potential for use of walking and bicycling during good weather conditions, provided the connections are present.

Provides new opportunities for passive recreation.

Reduces potential conflicts between pedestrians/bicyclists and vehicles, thereby improving safety.

In several areas of the Township of Bridgewater, sidewalks are provided on at least one side of the street, and roadways are wide enough to accommodate bicycles. However, along arterial and collector roadways, there is a need to provide continuous sidewalks on both sides of the street. Requiring sidewalks on arterial roadways will necessitate ordinance amendment. As well, there are some opportunities to provide direct connections between residential areas, community facilities, and employment locations. Further, there is a need to provide safe means of crossing freeways and principal arterial roadways. Below is an outline of the specific improvements that should be addressed:

8.1 Sidewalks Along Arterials/Collectors

It is intended that any reconstruction efforts along arterial roadways and or collector roadways should include sidewalks. Some of the following roads have sidewalk gaps, sidewalks on one side only, or do not have sidewalks, making them priority roadways for sidewalks:

- Washington Valley Road, Martinsville
- Foothill Road
- Bridgewater Promenade (County Route 685)
- East Main Street (County Route 533)
- Finderne Avenue (County Route 533)
- North Bridge Street
- Garretson Road
- Woodlawn Avenue
- Commons Way
- Milltown Road
- Old York Road (Route 567)
- Easton Turnpike (Route 28)

- Union Avenue (NJ Route 28)
- County Club Road
- Vanderveer Road
- Downey Road
- Meadow Road

Local roads that provide access to public destinations

- Nimitz Street (access to Torpey Athletic Complex)
- Loeser Avenue (access to Torpey Athletic Complex)
- Talamini Road
- Cedarbrook Drive
- Traci Road

8.2 Integrated and Delineated Path System

Trails can be developed along natural or manmade corridors. Stream corridors can provide opportunities for trails, as well as rail lines, utility corridors and roadways. Trails can be developed as regional facilities or as local connectors among neighborhoods.

Below are some of the opportunities for trails in Bridgewater.

- Trail along active NJ Transit Raritan Valley Line, with extensions to Bridgewater Towne Center and Vanderhaven Farms (Somerville, Raritan, Bridgewater)
- Trail connecting Foothill Road (Bridgewater-Raritan Middle School) to N. Bridge Street crossing behind Vocational Technical High School property and parallel with the Route 287 corridor
- Trail connecting Garretson Road/ Woodlawn Avenue to Prince Rodgers Avenue east of Route 287; included in Linkage Improvement Concept B1
- Trail following existing footpath from E. Main Street near Route 287 underpass to Bridgewater Promenade
- Trail through Bridgewater Promenade
- Trail accessing Torpey Athletic Complex from Finderne Avenue
- Trail along Cuckles Brook from Chimney Rock Road to Route 22
- Trail connecting Adamsville Elementary School with Sunny Slope Road to potentially eliminate the need for hazard busing
- Trail adjacent to Route 22, proposed as part of Route 22 redesign
- Utility corridor

8.3 General Bicycle and Pedestrian Circulation Improvements

- Dedicated bicycle lanes should be developed where conditions allow; the exceptions are low-volume, low-speed, local access streets.

- Bike lanes should in general be a minimum of 5’ and 4’ where there is no curb. Less than the recommended minimum may be considered in special situations where the safety of bicyclists is best served.

- The use of shared lane markings (“sharrows”) should be considered where there is inadequate space for designated bicycle lanes.

- All signalized intersections should include countdown pedestrian signals, high visibility crosswalks, and curb ramps, especially on roadways designated as part of the Conceptual Greenways System.

- The use of high visibility crosswalks may be considered on unsignalized intersections along the designated Conceptual Greenways System.

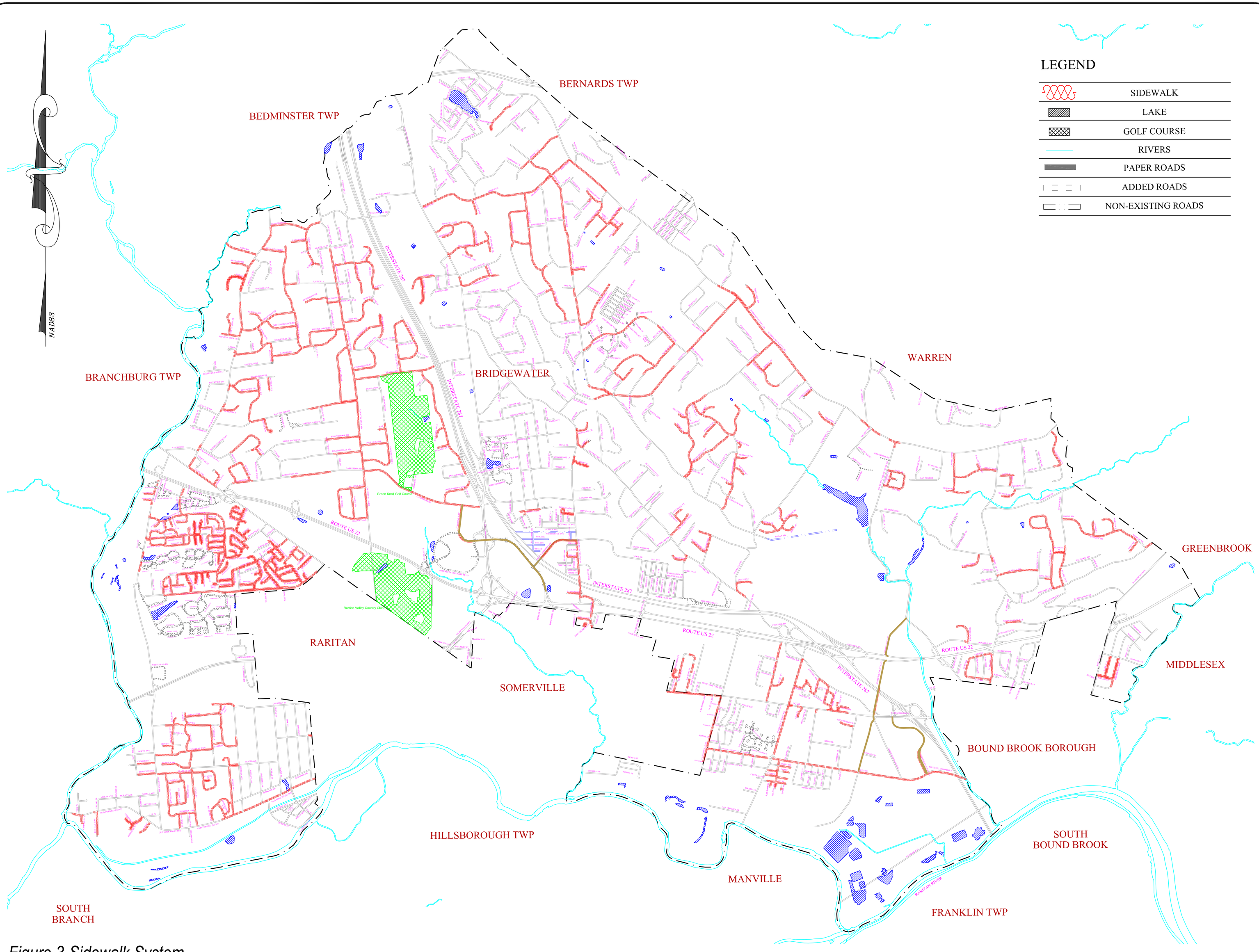

Figure 3-Sidewalk System

PLANS PREPARED FOR:

TOWNSHIP OF BRIDGEWATER

BRIDGEWATER TOWNSHIP

SOMERSET COUNTY

NEW JERSEY

NOT FOR CONSTRUCTION

The RBA Group

ENGINEERS • ARCHITECTS • PLANNERS
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REVISIONS

NO.	DATE	COMMENTS

GORDON E. METH, P.E.
NEW JERSEY LICENSE NO. 42257

SIDEWALK PLAN

DATE:	01-26-2010
JOB NUMBER:	J4253.00
SCALE:	N.T.S. (UNLESS INDICATED)
DRAWN BY:	TJK
CHK. BY:	GEM

SHEET NUMBER

of 1

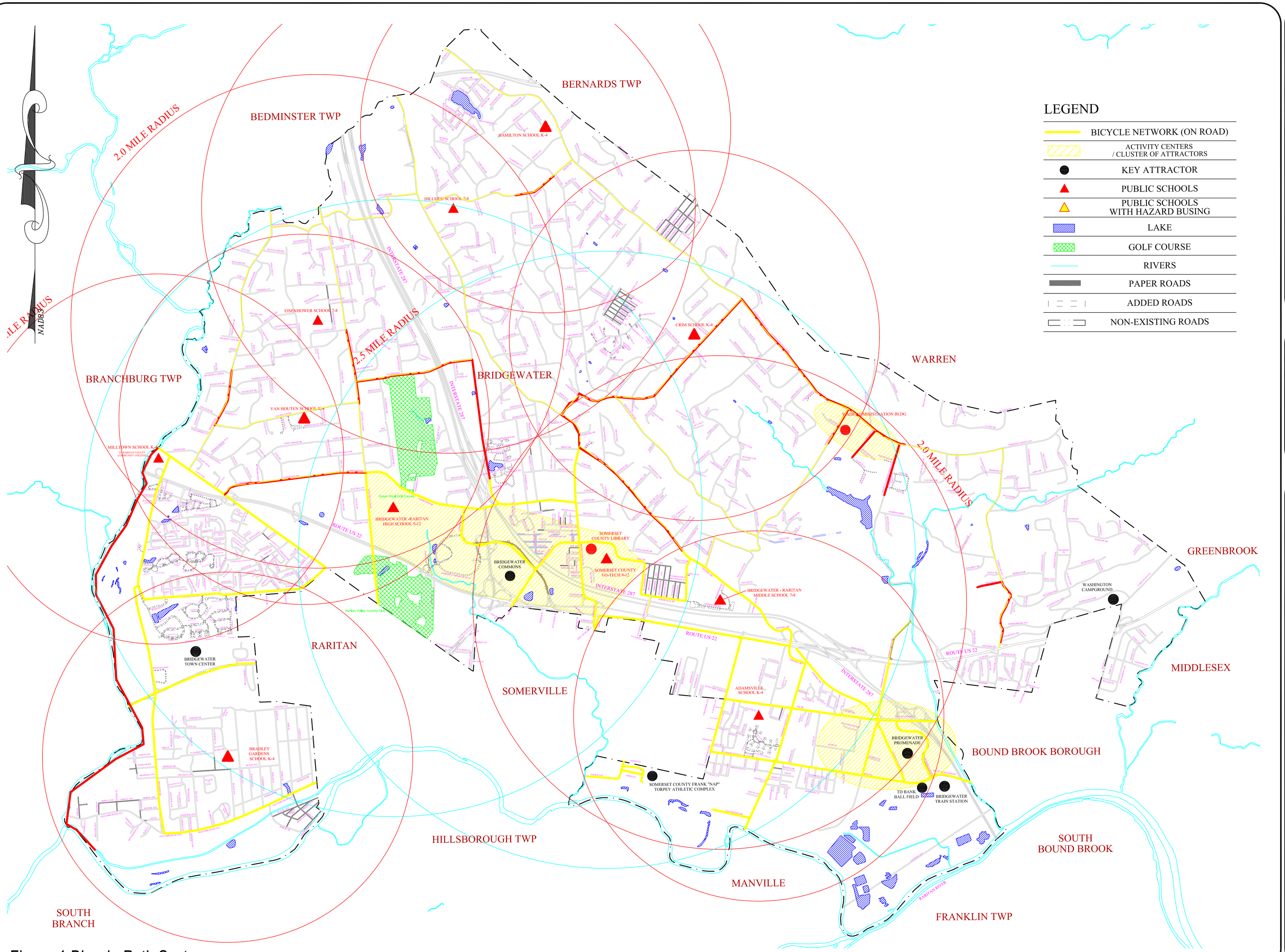

Figure 4-Bicycle Path System

PLANS PREPARED FOR:

TOWNSHIP OF BRIDGEWATER

BRIDGEWATER TOWNSHIP

SOMERSET COUNTY

NEW JERSEY

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REVISIONS

NO.	DATE	COMMENTS

GORDON E. METH, P.E.
NEW JERSEY LICENSE NO. 42257

PROPOSED BICYCLE CIRCULATION NETWORK

DATE:	01-26-2010
JOB NUMBER:	J4253.00
SCALE:	N.T.S. (UNLESS INDICATED)
DRAWN BY:	TJK
CHK. BY:	GEM

SHEET NUMBER

of 1