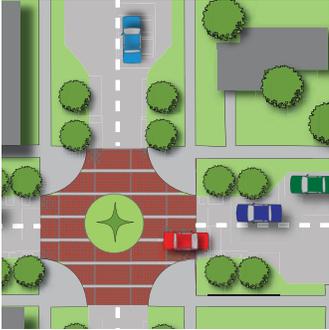


CIRCULATION PLAN



Contents

- Introduction
- General Street Design Principles
- Other Transportation Facilities
- Traffic Analysis
- The Street Regulating Plan
- Roadway Cross-Sections and Traffic Control
- Inventory of Traffic Improvements
- Pedestrian Improvement Plan
- Auburn Road Transportation Plan

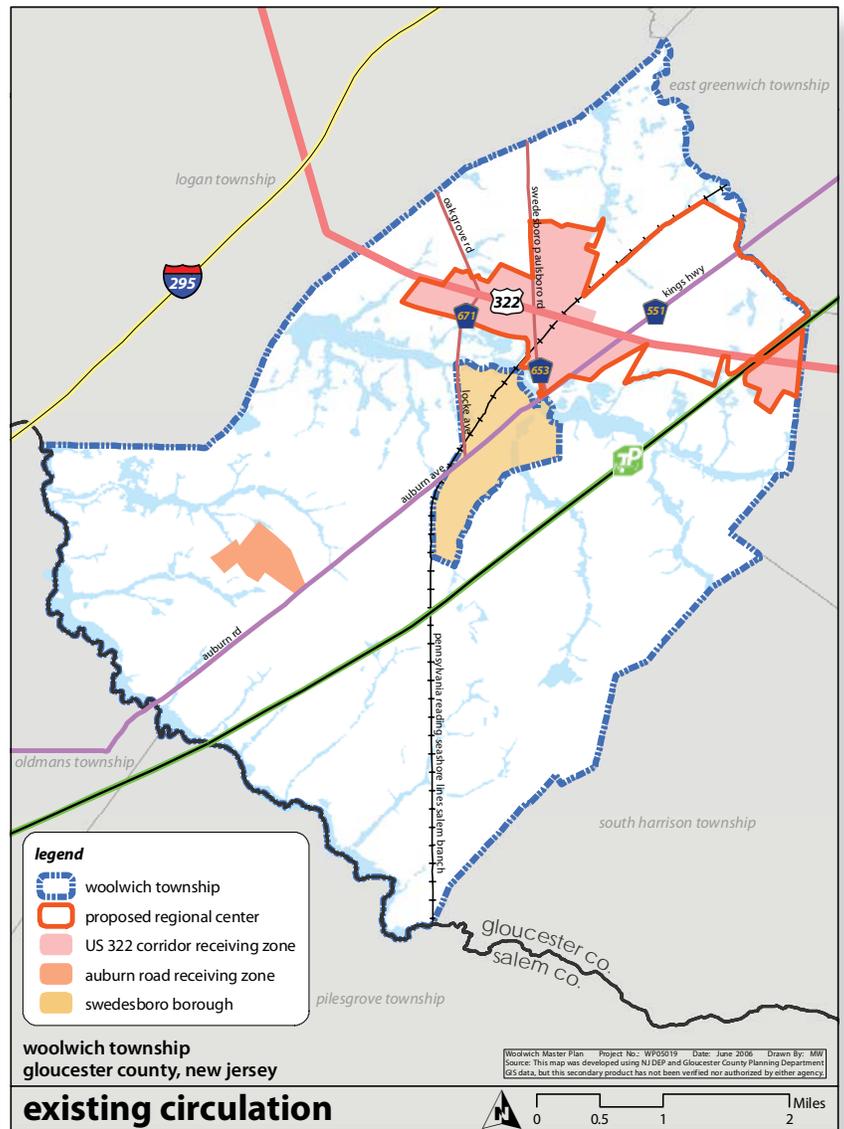
Introduction

“Restore human legs as a means of travel. Pedestrians rely on food for fuel and need no special parking facilities.”

Lewis Mumford

“The street is the river of life of the city, the place where we come together, the pathway to the center.”

William Whyte



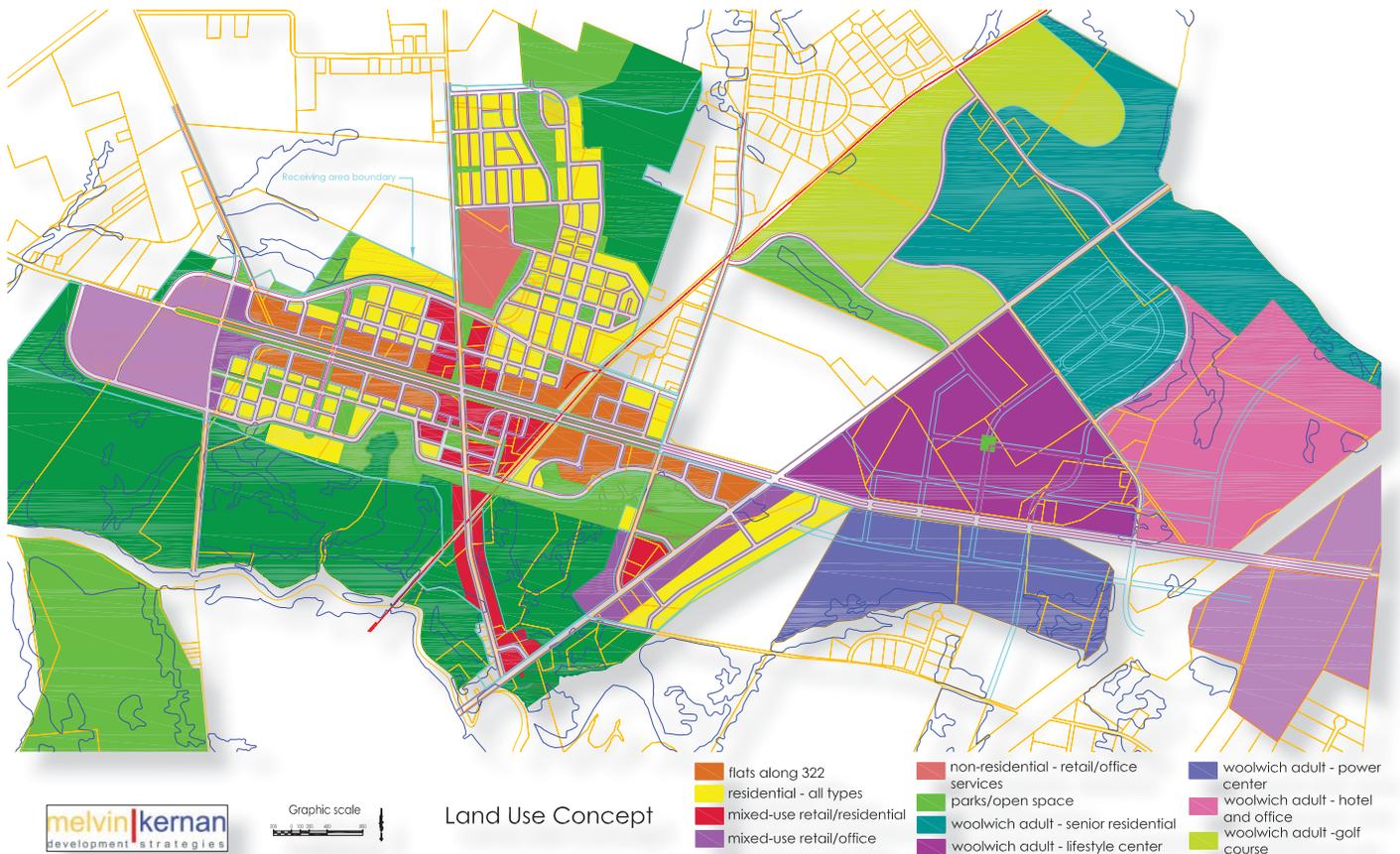
Woolwich Township is seeking to preserve more of the prime agricultural lands in the Township by authorizing the transfer of development rights from identified agriculturally based “sending zones” to two identified growth or “receiving” zones in the Township.

The chief receiving zone located along the US 322 Corridor north of Raccoon Creek, will consist of two non-contiguous areas separated by 750 acres owned by Woolwich Adult, LLC.

The larger of the two areas is called Woolwich New Town. The receiving zone is part of a larger Regional Center (See Chapter 5 for further description of the proposed Regional Center) that Woolwich Township has proposed as part of its Plan Endorsement package submitted to the State Planning Commission. Woolwich Regional Center includes not only the receiving zone, but also the properties owned by Woolwich Adult and Kingsway Regional School District. The receiving zone comprises roughly 745 acres. The Regional Center is 2.65 square miles in size.

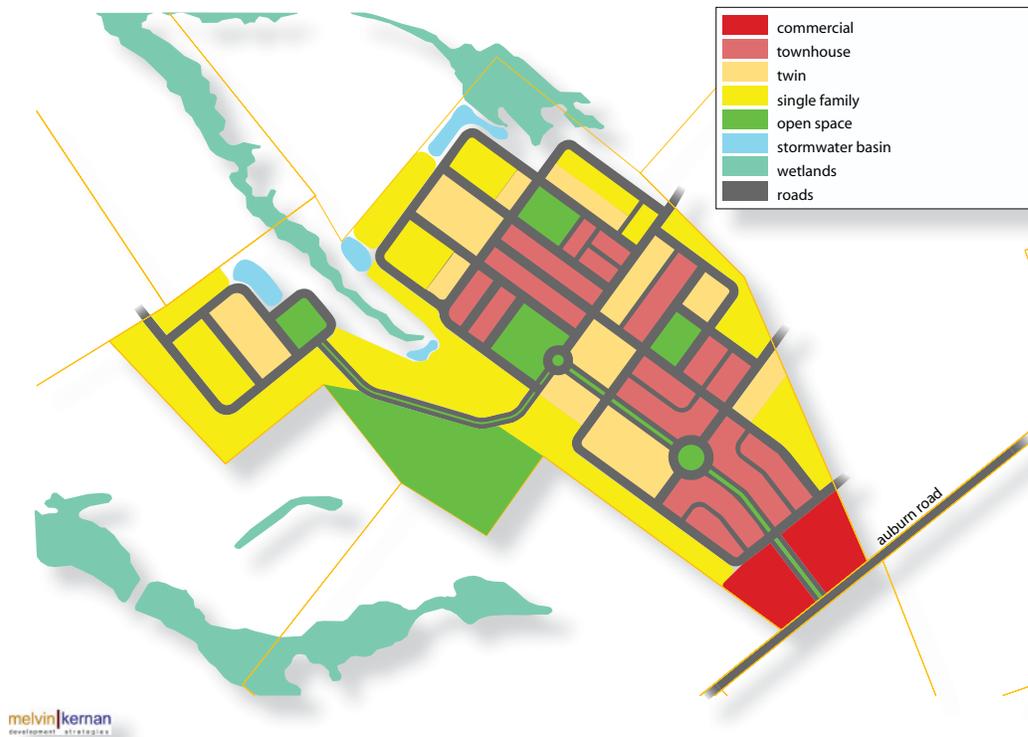


Woolwich New Town will contain a mix of housing, shops, offices, parks and civic buildings. High densities, housing diversity, a mix of uses and a connected system of streets, sidewalks and paths will function collectively to create a true town center – a place where residents can live, work, socialize and/or recreate. When fully realized, it will contain up to 3,217 mixed housing types, 3.6 million square feet of commercial space and 195 acres of public spaces.



WOOLWICH REGIONAL CENTER

Woolwich Township has also designated a second receiving zone. The Auburn Road Receiving Zone called Auburn Road Village, approximately 125 acres, which is located south of the Weatherby development along Auburn Road. When fully built out, it will contain 502 mixed housing types, 50,000 square feet of commercial space, and public open spaces.



AURBURN ROAD VILLAGE CENTER

To accommodate additional growth in the Regional Center, Woolwich Township proposes to create a sustainable land plan that features a multi-modal circulation system.

This transportation plan lays out a local transportation structure for Woolwich Township required to support the proposed growth in Woolwich New Town and throughout the Woolwich Regional Center and Auburn Road Village. It analyzes the potential traffic impacts associated with that growth and makes recommendations regarding how growth and development can occur in a fashion that will give greater priority to the use of public transportation and human powered transportation – walking and biking – thereby reducing total trip making and total vehicle travel.

In analyzing the potential transportation impacts of growth along the US 322 Corridor, it is important to remember that growth will occur with or without the transfer of development rights. However, fragmented, spread out development of low density housing across the farmland of Woolwich Township will necessitate greater use of automobiles for travel purposes, since other travel modes are not practical at low densities, and will require longer average trip distances, increasing the total amount of vehicle miles traveled. As a result, although traffic impacts from the Regional Center may be concentrated, they should be less than what would result under previous zoning.

GENERAL STREET DESIGN PRINCIPLES

This Plan Element encourages the development of a network of interconnecting streets that work to disperse traffic while connecting and integrating neighborhoods with the fabric of the environs. Equally as important, this Plan Element encourages the development of a network of sidewalks and bicycle lanes that provide an attractive and safe mode of travel for pedestrians and cyclists.

It is the intent of this plan to build streets that are integral components of community design. Streets shall be detailed to compliment neighborhoods and commercial centers and shall be pedestrian in scale. Streets are encouraged to be designed with on-street parking. All streets shall be landscaped. In an effort to protect this investment, Woolwich Township views streets as the most important public space and therefore, has developed a set of principles which permit this space to be used by both cars and people. These principals are as follows:

- Streets shall interconnect within a development and with adjoining development. Street stubs should be provided with development adjacent to open land to provide for future connections per the Street Regulating Plan.
- Streets shall be designed as public space and shall be scaled to the pedestrian.
- Streets shall be bordered by sidewalks or multi-purpose paths on both sides per this plan and the Open Space Linkages Plan Element.
- Streets shall be designed with street trees planted in a manner appropriate to their function. On a per block basis street tree species shall adhere to the Open Space Plan Element. Commercial streets shall have trees which compliment the face of the buildings and which shade the sidewalk. Residential streets shall provide for an appropriate canopy, which shades both the street and sidewalk, and serves as a visual buffer between the street and the home.
- Wherever possible, street locations should account for difficult topographical conditions, paralleling excessive contours to avoid excessive cuts and fills and the destruction of significant trees and vegetation outside of street-rights-of-way on adjacent lands.
- All streets shall permit public access whether by easement or by public dedication. Closed or gated streets are prohibited.
- All streets shall permit on-street parking, unless otherwise noted in the Street Regulating Plan.
- All on-street parking provided shall be parallel. Curb or angle parking is permitted upon approval of the Planning Board and Township Committee.
- The use of traffic calming devises such as raised intersections, landscaping bulb-outs, and traffic circles are encouraged as alternatives to conventional traffic control measures.
- Streets shall provide and support opportunities for transits through the creation of pull-outs for bus service and bus shelter locations with adequate lighting.

Minor variations and exceptions to street cross-sections for Township roads may be permitted with approval of the Township Planner or its designee. Such exceptions include variations to the pavement width, tree planting areas, street grade, and centerline radii in accordance with principles above. Right-of-way widths should be preserved for continuity. All new streets shall be classified in accordance with the street hierarchy detailed in this Plan Element.

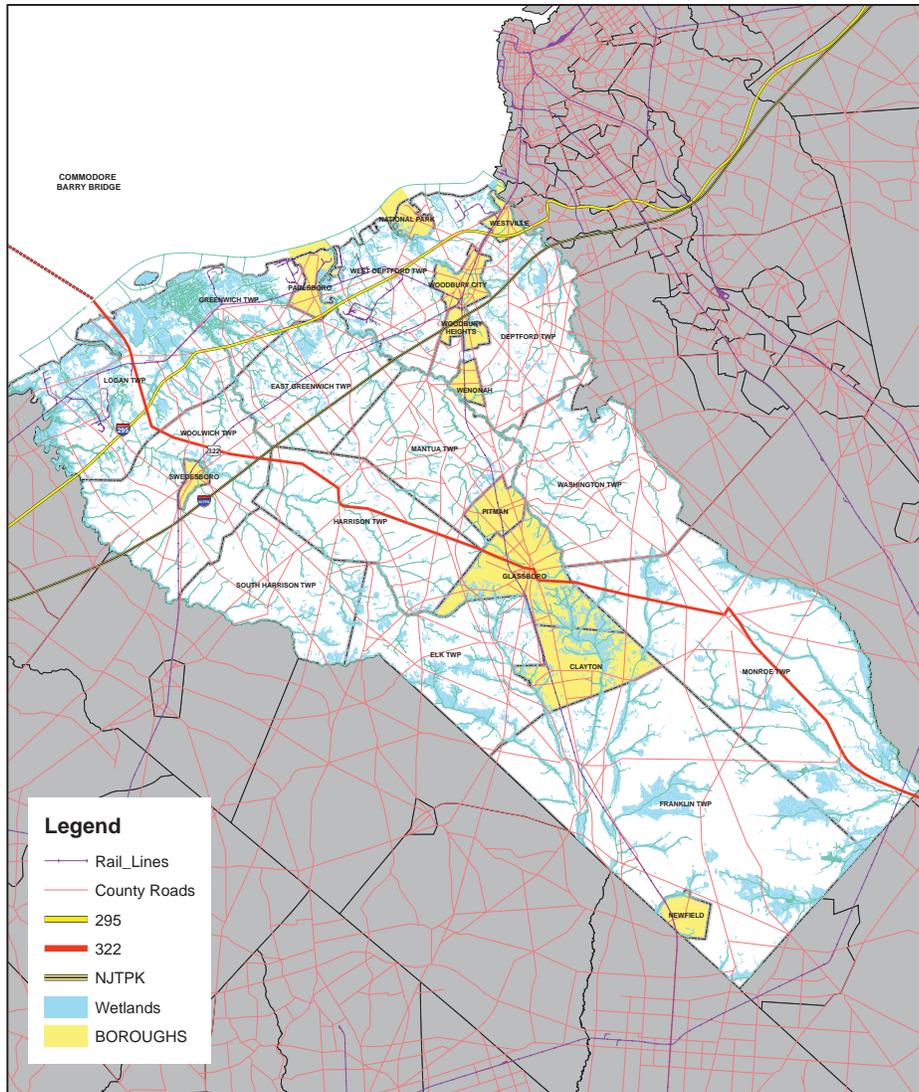
322 REGIONAL CENTER TRANSPORTATION PLAN

INVENTORY OF CURRENT TRAVEL SYSTEM:

This section of the report summarizes the current transportation infrastructure in Woolwich Township and Swedesboro serving the proposed Regional Center.

HIGHWAY INVENTORY

PRINCIPAL ARTERIAL ROADWAYS



322 CORRIDOR GLOUCESTER COUNTY

WOOLWICH TOWNSHIP GLOUCESTER COUNTY, NJ

ROUTE 322 CORRIDOR STUDY
 Project No.: WP04034
 Date: January 2005
 Drawn By: RT
 Source: This plan was developed using NJ DEP GIS data, but this secondary product has not been verified by NJDEP and is not state authorized

melvin|kernan
 development strategies



US 322 is a principal arterial highway that extends from the Commodore Barry Bridge over the Delaware River, through Gloucester County to the Black Horse Pike – NJ Route 42. From there US 322 continues as the Black Horse Pike to Atlantic City. US 322 is one of three east-west arterial highways in southern New Jersey south of the Atlantic City Expressway, all of which have limited vehicular capacity.

US 322 from the Black Horse Pike to the boundary of Woolwich and Logan Township consists of a two lane arterial highway with shoulders in most sections. In Logan Township US 322 has been widened to four lanes with a center grass median from the township boundary to I-295 and again from US 130 to the Commodore Barry Bridge.

Perpendicular to the US 322 Corridor on either side of the Regional Center are the New Jersey Turnpike and I-295. These two freeways are the most intensely traveled highways in the region, carrying high volumes of regional, statewide and national traffic.

As a result of its location, Woolwich New Town and the entire Regional Center promise excellent vehicular connections to the rest of New Jersey, to Philadelphia, PA and Wilmington, DE, as well as to the rest of the northeastern portion of the nation.

CR 551	A secondary highway that extends from Carney’s Point in Salem County to the City of Camden. From Swedesboro north to Woodbury, CR 551 is known as Kings Highway and follows the alignment of the colonial Kings Highway, which at one time extended from Burlington, NJ to Salem, NJ.
CR 620	South of Swedesboro CR 551 becomes Auburn Road. The portion of the colonial Kings Highway between Swedesboro and Salem has been designated County Route 620 in both Gloucester and Salem Counties.
CR 653	Paulsboro-Swedesboro Road extends from Swedesboro to Paulsboro and has an interchange with I-295 just south of Paulsboro.
CR 671	Locke Avenue provides a diagonal connection between US 322 and Swedesboro. Locke Avenue and Kings Highway provide the only crossings of the Raccoon Creek between the New Jersey Turnpike and I-295. North of US 322 CR 671 is known as Oak Grove Road and parallels US 322 to the village of Bridgeport in Logan Township. This portion of the road is classified as a local road by NJDOT.
CR 538	Franklinville Road extends from Swedesboro to NJ 55 south of Clayton, then passes through Franklinville and continues due east until it meets US 322 just west of the Atlantic County boundary. CR 538 serves as alternative to US 322, especially for trips between the Delaware River and NJ 55. Just east of Swedesboro, CR 538 intersects CR 694 (Monroeville Rd). At this intersection, CR 538 bears onto Monroeville Rd, which is called Glen Echo Road in Swedesboro, and CR 694 bears right onto Franklinville Road, which is called Franklin Street in Swedesboro.

As indicated, Kings Highway, Swedesboro-Paulsboro Road and Locke Avenue will all serve to integrally link the Regional Center with the Borough of Swedesboro.

OTHER SIGNIFICANT ROADS

US 322 is intersected by additional county and municipal roads that augment travel options through the Regional Center. These include from west to east:

- Stone Meetinghouse Road (CR 669): south of US 322 this road turns into Berkeley Street, a municipal street that provides access to warehouse developments in Woolwich and Logan Township and has no outlet
- Garwin Road – a municipal street linking US 322 with Kings Highway and extending north to Hendrickson Mill Road
- Pancoast Road (CR 672) – a diagonal road that links US 322 near the NJ Turnpike with Kings Highway. Repaupo Road (CR 684) intersects Kings Highway 0.2 miles northeast of the Pancoast Road intersection and runs from Kings Highway to US 130.

OTHER TRANSPORTATION FACILITIES

TRANSIT NETWORK

Swedesboro and Woolwich Township currently are served by one NJ TRANSIT bus route -- #401 -- which operates between Philadelphia and Salem.

NJ Transit operates additional north-south bus routes to

FREIGHT RAIL

Freight rail service is provided by the Conrail Shared Asset Operations (CSAO) on the Salem Secondary. The Salem Secondary is a single track freight railroad that is located parallel to and approximately 2,000 feet west of Kings Highway in the vicinity of Woolwich New Town. The Salem Secondary largely parallels the route of the NJ Transit #401 bus line.

CSAO also operates the Penn's Grove Secondary, a more active freight line that runs parallel to US 130 between Pennsville and Camden.

COMMUTING PATTERNS

The development of the Regional Center will increase the number of residents living in Woolwich who will commute to jobs in the township and beyond its borders. To project where these future residents might travel to jobs, commuter patterns in the year 2000 reported by the U.S. Census Bureau were evaluated for Woolwich and Swedesboro.

WHERE DID PEOPLE WORK?

Of the workers the US Census surveyed in 2000 who lived in Woolwich or Swedesboro:

- Nearly one in five also worked in one of the two municipalities
- Half worked within Gloucester County
- Outside of Gloucester County, the most attractive work locations were Camden and Salem Counties in New Jersey and Delaware and Philadelphia Counties in Pennsylvania
- Far fewer workers traveled to more distant work locations such as Atlantic City, northern New Jersey or the State of Delaware, although some did

Townships surrounding Woolwich were found to have similar commutation patterns.

This commutation pattern can be expected to continue in the future -- that is, a large percentage of workers will seek to work in Woolwich, Swedesboro or nearby municipalities within Gloucester County.

WORKPLACE LOCATION FOR WORKERS LIVING IN SWEDESBORO OR WOOLWICH

WORKPLACE LOCATION	
Swedesboro/Woolwich	18%
Logan	8%
Eastern Gloucester	10%
Northern Gloucester	15%
Burlington County	4%
Camden County	8%
Salem County	6%
Remainder NJ	2%
Delaware County	9%
Philadelphia	10%
Other Pennsylvania	5%
Delaware State	4%
Other States	1%

Source: US Census Bureau, 2000 Census Transportation Planning Package

HOW DID WORKERS TRAVEL TO JOB?

The census data indicates that in the year 2000:

- 84% of Woolwich residents who worked drove alone to work
- 10% rode as passengers in private vehicles
- 6% worked at home.

According to the Census, in 2000 no Woolwich residents commuted to work by walking, riding a bicycle or riding a bus.

RECENT TRAFFIC VOLUME GROWTH ON AREA ROADWAYS

Traffic counts from the Delaware Valley Regional Planning Commission (DVRPC) were analyzed to determine growth patterns on area roadways. In areas where development has been concentrated - especially along Center Square Road - traffic has grown at a high rate - 8% to as high as 20% per year. These high growth rates largely reflect the impact of introducing development into an agricultural community, where prior to development there was little traffic on farm-to-market roads. Growth in this area is largely the result of a development known as Weatherby, currently under construction. When fully built out, it will contain 4,500 homes, several schools, and 250,000 square feet of commercial space.

Within the Regional Center, traffic growth has been slower and on some roads, such as Kings Highway, DVRPC data indicates that traffic has actually declined.

In general, growth of traffic in the future:

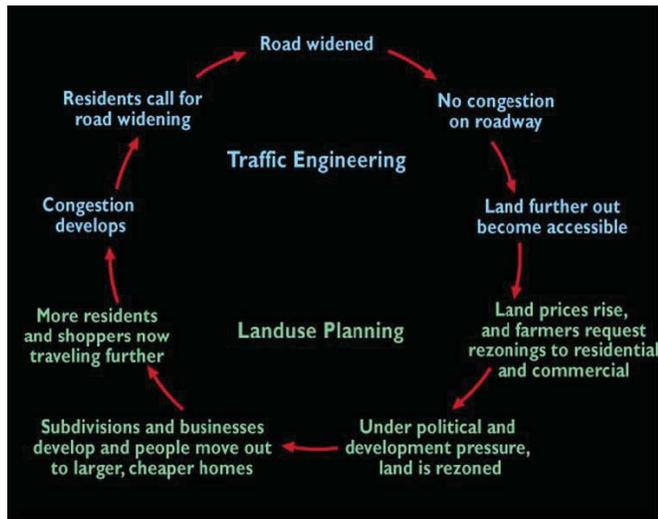
- Will be most consistent on principal aerial highways serving long distance trips and which will respond to the general pattern of growth in the state and the larger region
- Will be closely associated with surrounding development activity on minor arterials and collector roads
- In percentage terms growth will be highest on rural roads with little existing traffic; however, as the base volume of traffic on these roads rises, the growth rates will decline

SYNERGY BETWEEN LAND USE AND TRANSPORTATION GROWTH

Since World War II there has been little coordination between land use planning and transportation infrastructure investment. The lack of coordination has frequently resulted in unintended consequences.

Highways were extended and enlarged throughout New Jersey to address capacity restrictions or to improve travel flow.

WHY IT'S HAPPENING "SPRAWL FACTOR"



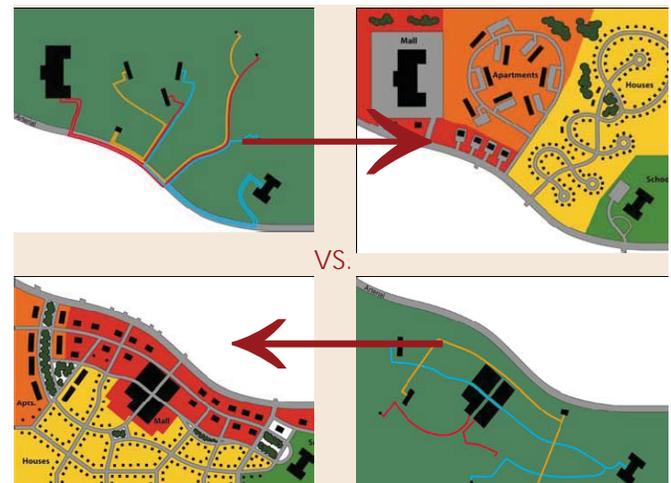
The new capacity and reduced travel times created by highway investments attracted developers who constructed new homes, stores and offices near the highways. This new development added travel demand. Eventually, travel demand once again exceeded transportation capacity, prompting another cycle of highway expansion and widening. According to the New Jersey Department of Transportation, this approach provides five to six years of added capacity at best before it fills up once again. And the cost of doing so is simply unsustainable.

Land development tended to occur in large blocks of uniform land uses – single family residential here, apartments there, retail some place else and employment development – offices and industrial sites – in a other areas.

The resulting separation of land uses, and the large parking lots provided to accommodate automobile travel, resulted in decreased development densities, longer travel distances and a great increase in dependence upon automobiles to complete any trip.

However, development does not have to occur in that fashion. By integrating land development planning and transportation infrastructure investment, governments can create synergy between land uses and thereby reduce trip distances, increase use of alternative travel modes and reduce total travel time. The "bad" street system in the figure below results in separated land uses while the "good" street system results in an integrated road system.

SEPARATED AND SPREAD LAND USES



SUPPORTIVE STREET NETWORK FOR PROPOSED LAND DEVELOPMENT

Street grids that provide redundancy in travel routing options and more direct travel linkages can reduce total travel demand by making trip distances shorter. An interconnected street grid can also allow drivers to choose between alternative routes, reducing the amount of traffic that any one road must serve and thus reducing cart-way widths per roadway.

Most importantly, if parallel local collector streets are constructed as part of new development, these streets can be used to serve local traffic, thereby leaving the arterial road capacity for longer distance trips. When local traffic must use through highways, the local drivers both consume capacity on the main highway, but more importantly must enter and leave the arterial highway frequently, creating increased turning demands at intersections. The congested intersections that result are usually the chief location of traffic congestion along an arterial highway corridor and are also the location for most vehicle crashes. Local collector streets, which will generally have less traffic and slower speeds, can also be designed to support alternative travel modes – walking and bicycling.

SUPPORTIVE LAND DEVELOPMENT PROGRAM FOR AVAILABLE NETWORK

A given transportation network can support only so much travel demand. As a result, the land development program for an area needs to respect the capacity of the available system. However, since most trips are local – shorter than five miles – effective use of available and new transportation resources can support economic development in targeted locations provided that the planning for all systems is integrated.

Center-oriented land development, in which uses are mixed and densities are kept high, can further reduce congestion by allowing more travel to occur by alternative travel modes.

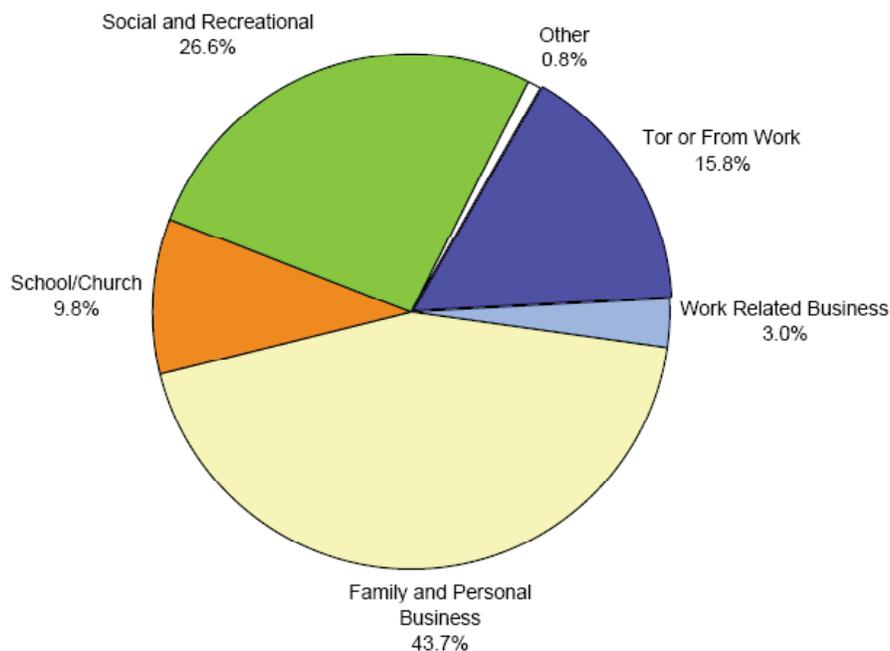
Ten percent of workers in Woolwich and Swedesboro in the year 2000 worked in Philadelphia. As a result, it should be possible to attract at least these workers to transit provided that an efficient transit system exists. If residences are concentrated, as proposed in Woolwich New Town, it will be possible to collect most transit riders at just a few transit stops. Conversely, if development is spread out across many square miles at low densities, residents will have to drive to a park-and-ride lot to take a bus. Once a person warms up the car and starts driving, it becomes much more difficult to get the person out of the car.

THE IMPORTANCE OF NON-WORK TRAVEL

Much focus is placed on the trip to work, because it occurs during a concentrated time period and data regarding such trips are relatively easy to collect. However, the trip to work in 2001 accounted for only one in six daily trips, according to the National Personal Transportation Study.

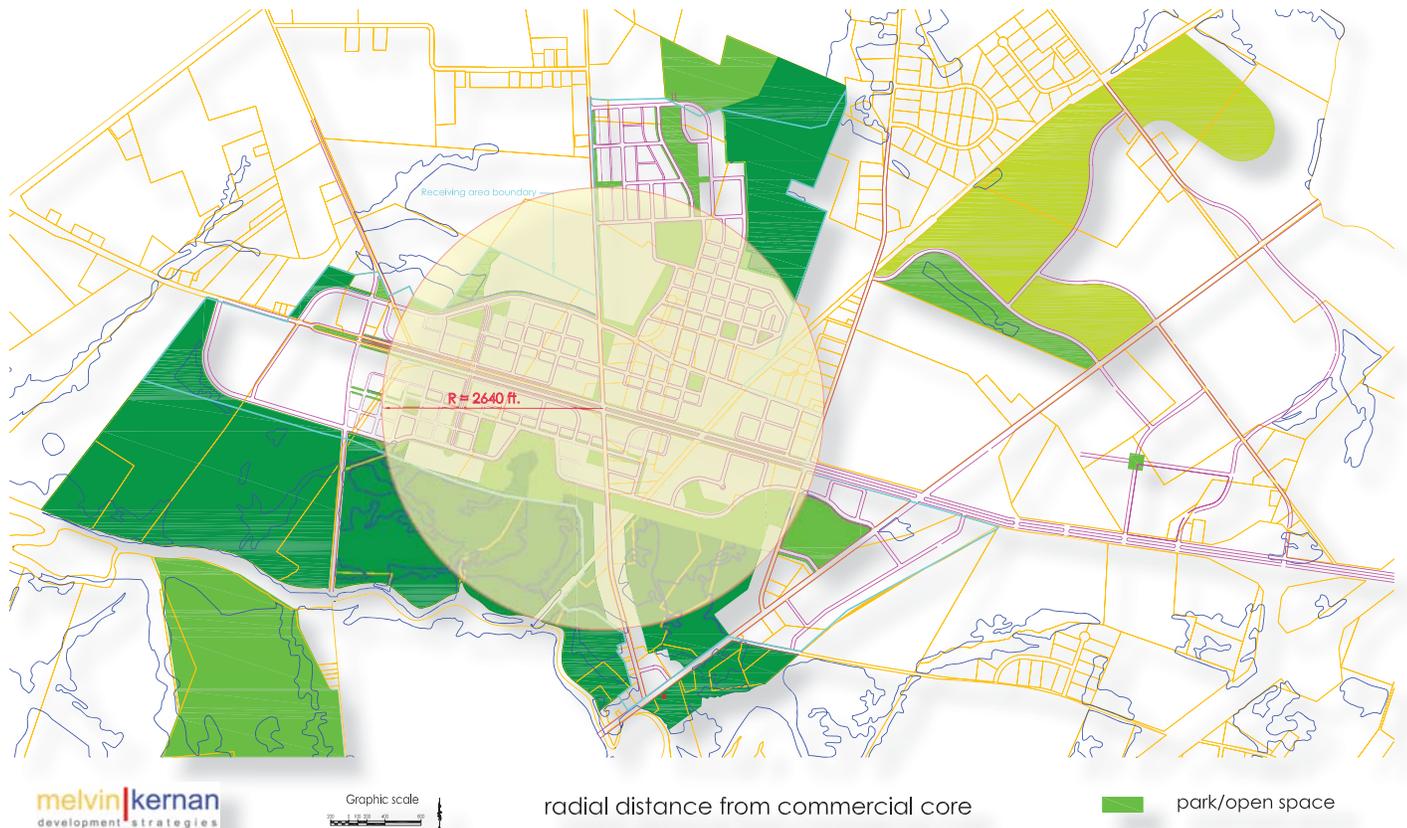
Non-work trips thus constitute the large majority of trips that people make on a daily basis. Many of these trips occur close to home or work and can be readily made by alternative travel modes or by driving on local streets, provided that the opportunity to make trips in those ways is provided. Within a mixed use development area, trips to school, to shop, for entertainment or to visit friends are likely to be short, making alternative travel modes feasible.

Distribution of Person Trips by Trip Purpose



SOURCE: 2001 National Personal Household Transportation Study -- Summary of Travel Trends
Table 10 -- Person Trips per Person by Trip Purpose and Gender, p. 20

Trips of less than half a mile -2640 feet – a ten minute walk – can be easily made by walking. If a community is designed to encourage such walking trips, many residents will choose to walk more frequently, reducing reliance on cars for short trips.



ENCOURAGING ALTERNATIVE TRAVEL MODES

The Regional Center will integrate land use and transportation development to encourage and support alternative travel modes, in particular walking, bicycling, and transit. This will be accomplished in the following ways:

ENCOURAGING WALKING AND BICYCLING

- Developing a “Main Street” along the Paulsboro-Swedesboro Road to serve local shopping and service needs of future residents
- Locating most residences in Town Center within half a mile of the intersection of Paulsboro-Swedesboro Road with US 322, making walk trips to the Main Street destinations reasonable
- Providing a smaller neighborhood shopping area along Locke Avenue to capture convenience shopping trips in the western portions of the corridor
- Encouraging walking trips to the Kingsway Regional School complex on Kings Highway; high school and junior high school students living in Town Center will live within 1.5 miles of the Kingsway Regional Schools campus, and most will live within one mile
- Constructing streets with cross-sections that include comfortable sidewalks, multi-purpose paths, on-road bicycle lanes, shade trees and other amenities for pedestrians and bicyclists
- Providing frequent and safe methods of crossing arterial roads and collector streets especially US 322 so that walking routes do not become prohibitively long and hazardous
- Providing high quality east-west walking corridors, bicycle lanes and/or multi-purpose paths both north and south of US 322
- Require the provision of bicycle racks and all weather storage.



ENCOURAGING TRANSIT

- Working with NJ Transit to increase the frequency of bus service to Philadelphia through Woodbury
- Working with NJ Transit to establish subscription express bus service to Philadelphia and perhaps New York City using the New Jersey Turnpike
- Evaluating markets for transit service along US 322 between Glassboro and Delaware County, PA
- Reserving the right-of-way of the Salem Secondary rail line should it be abandoned to preserve the potential for future operation of passenger rail service



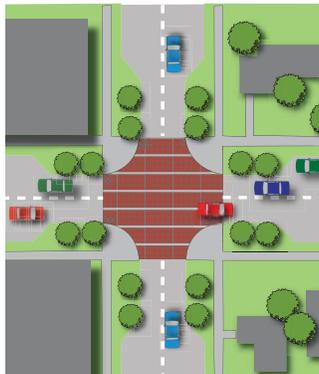
CALMING TRAFFIC

Town Center will provide a grid of streets that will be much more convenient than typical suburban developments that limit traffic options. However, suburban developments with cul-de-sacs and loop streets evolved in large part to provide homeowners with relief from the negative impacts of traffic – high vehicle speeds and thoughtless drivers.

Traffic calming refers to a combination of roadway devices that can slow traffic and enhance the quality of the street for all roadway users, including users of abutting properties.

Traffic calming devices slow vehicles by introducing horizontal or vertical deflections that have a very low design speed. Traffic calming can also consist of measures that limit traffic volumes through the use of traffic diversion devices. Selection of the most appropriate traffic calming device at a specific location depends upon the context of the street in question – the volume of traffic, the function of the street and the nature of surrounding land uses.

Traffic calming devices include the following:



Speed Table

Speed Tables or Raised Intersections: Similar to a raised pedestrian crossing except that the entire intersection area is elevated, including all crosswalk areas.

Roundabouts: Roundabouts are circular intersections that:

- Require vehicles to travel counter-clockwise around an interior circular island
- Require drivers entering the circle to yield to vehicles already in the circle and
- Provide “splitter” islands on roadway approaches to separate entering and exiting traffic and to provide refuge for crossing pedestrians



Roundabouts

Like neighborhood circles, roundabouts introduce horizontal deflections to reduce vehicle speeds and require drivers to be prepared to yield to pedestrians and other drivers. They have been demonstrated to result in substantially fewer pedestrian and vehicle crashes compared to traffic signals or stop signs and reduce the severity of crashes that do occur.



Center Islands Narrowing Refuges

Center Islands Narrowing and Refuges: Short raised islands at crosswalks that provide pedestrians with a refuge so that they can cross a street in two separate movements. A variety of design techniques can be used when providing refuge islands to enhance pedestrian and vehicular safety. Raised medians on local collector streets can soften the visual character of a residential collector or minor arterial street. Medians can also be introduced and then removed from block to block to introduce horizontal deflections similar to a chicane.



Combined Measures

Neighborhood Traffic Circle and/or Raised Pedestrian Crossing: Similar to a speed hump, with 4 inch deflections in roadway, but incorporating a level platform for use by pedestrians and marked as a crosswalk. A raised pedestrian crossing helps to assure that drivers are operating at a speed that will allow them to yield to pedestrians seeking to cross the road. The raised crossing can also make pedestrians more conspicuous. Small circular intersections that force drivers to travel at slow speed around a central island. On low volume residential streets, neighborhood traffic circles may be designed to permit vehicles to turn left in front of the traffic circle rather than passing counter-clockwise around the circle. Many neighborhood circles have landscaped center islands that define the island and also interrupt the continuous view of straight streets, making the streets appear to be shorter.

TRAFFIC ANALYSIS

This section outlines the process that was used to project traffic flow from the Regional Center.

INTERSECTION COUNTS

In 2000, as part of the NJDOT US 322 Corridor Study, Urban Engineers conducted morning and afternoon peak hour traffic counts at fourteen intersections along US 322 between the Commodore Barry Bridge and Glassboro, including the following five intersections in Woolwich:

- CR 669 Stone Meetinghouse Road/Berkley Drive
- CR 671 Locke Avenue/Oak Grove Road
- CR 653 Paulsboro-Swedeseboro Road
- CR 551 Kings Highway
- Interchange 2 ramps to the New Jersey Turnpike

Urban Engineers conducted additional counts of the Kings Highway intersection in 2004 as part of an intersection improvement study. Those counts indicated that morning traffic volumes had grown substantially while evening traffic had declined. However, the variations observed are within the typical variations experienced as a result of daily and monthly fluctuations in traffic and therefore may not be that meaningful.

AADT's

Daily highway traffic counts were used to augment the intersection traffic counts. There were two sources:

- DVRPC web based map of available traffic volumes
- NJDOT Straight Line Diagram data

TRAVEL PROJECTIONS

As part of the NJDOT US 322 Corridor Study, traffic projections were developed by Urbitrans/Garmen for the same 14 intersections along US 322 for which Urban Engineers developed traffic counts.

These traffic counts provided an indication of how background regional growth would affect traffic on roads in the corridor. We were not able to find a methodological report that could describe the assumptions used in developing these traffic projections, but the calculated growth rates appear to be reasonable and were therefore used as a control total.

CREATION OF BASE TRAFFIC CORRIDOR VOLUMES

AADT traffic volumes from the DVRPC were used as a guide for estimating intersection counts at each major cross-road, along with the 2004 intersection count provided by Urban Engineers. A set of flowing traffic volumes was developed for both the AM and PM peak period. The older 2000 traffic counts provided by Urban Engineers were used as a control.

Traffic flows on roadway segments were then calculated based on these flows and converted to daily traffic volumes and compared to the AADT volumes reported by NJDOT or DVRPC. A reasonable fit was developed.

BACKGROUND TRAFFIC GROWTH

Development in the area around the Regional Center will continue to occur even with transfer of development rights from the remaining agricultural lands in Woolwich. The approved Weatherby development, single family housing developments in Harrison Township and commercial development in Logan Township will assure some growth of through traffic, especially on arterial roads such as US 322, the New Jersey Turnpike and the Interchange 2 ramp, and Kings Highway.

To project future background traffic, a growth rate of 1% per year was assumed. The resulting traffic volumes were compared to the 2020 intersection volumes prepared by Urbitrans/Garmen for NJDOT and were found to be similar but somewhat higher. They were therefore kept as a conservative control volume.

TRIP GENERATION

Land use assumptions for the purpose of traffic analysis were based on the proposed Regional Center land use plan. Square footage for retail and employment development were calculated based on the per acre yield permitted by the proposed land use densities. Revisions of the development plan and the resulting development yield will likely change over time as the Regional Center is constructed. Even after all development has occurred, the actual land uses within it will change and evolve.

Traffic to be generated from the proposed land uses was projected using trip rates published by the Institute of Transportation Engineers in Trip Generation – 7th Edition.

TRIP DISTRIBUTION

The vehicle trips projected using the ITE Trip Generation formulae were assigned to area roadways using a three step process.

INTERNAL TRIPS BETWEEN SIMILAR LAND USES

For many land uses, ITE trip formulae project a reduction in rate of trip production as the size of a development increases. This reduction most likely results from the internal capture of an increasing number of trips as the size of a development increases. For example, garbage trucks and postal vehicles serving 100 homes in five 20 home developments on cul-de-sac streets must enter and leave those development streets five times. In contrast, in a 100 home subdivision with an interconnected street system, these same service vehicles must enter and exit the development only once, resulting in an 80% reduction in these service vehicle trips.

In analyzing the future traffic patterns, trips were projected for each travel zone by land use category. Then the same formulae were used to project trips by land use for the entire Regional Center. The differences in the trips

projected by land use were assumed to result from internal travel between these land uses. An internal-to-internal trip table was created based on these internal trips.

PASS-BY TRIPS

The Trip Generation Handbook published by ITE includes guidance regarding the percentage of trips entering and exiting a retail development that are attracted from the passing flow of vehicles on a roadway.

For example, most drivers entering a gas station were already driving past the gas station and elected to enter the station because they needed fuel. Those trips would be considered pass-by trips. They do not represent new trips on the roadway, but do reflect new trip ends – that is, new turning movements off of and then returning to the road. However, some drivers will recognize that they need fuel and will therefore make a separate trip to the gas station to purchase fuel. Those trips would be considered newly generated trips or primary trips. The Trip Generation Handbook reports that fewer than 20% of trips entering a gas station during the afternoon peak hour consist of primary trips.

Pass-by trips to and from retail land uses in the Regional Center were calculated. These trips were added to side streets that would provide access to the retail developments but were not added to the through traffic volumes entering and leaving the Regional Center.

REGIONAL ACTIVITY CENTER SYNERGISTIC TRIPS

The Regional Center will have a mix of land uses, and as a result there will be a natural flow of trips between land uses that have a natural attraction to each other.

National Cooperative Highway Research Program (NCHRP) Report #323, Travel Characteristics at Large-Scale Suburban Activity Centers, analyzed travel patterns at numerous mixed use developments throughout the United States to determine the level of travel between different types of land uses within such centers.

Based on that research, capture rates were estimated for different types of land uses and a balanced set of trip tables were developed to reflect travel between and within travel zones in the TDR Center.

EXTERNAL TRIPS

The internal trips between similar and synergistic land uses were removed from the trip generation calculations in order to identify the total number of external trips that would travel to and from the Regional Center in the future.

Because of the synergistic nature of the land uses proposed for the Regional Center, the application of these procedures projected that a substantial percentage of trips generated within the Regional Center would consist of internal trips, as follows:

	AM Peak Hour	PM Peak Hour
Total Trips Generated	7,812	17,526
Net External Trips	3,034	6,490
% Internal Trips	61%	63%
% External Trips	39%	37%

External trips were distributed based on the following procedures.

- Residential trips – distribution of trips to work locations as reported in the 2000 Census
- Office and other employment trips – distribution of trips to jobs in Woolwich and Swedesboro reported by the 2000 Census
- Retail trips – distribution of housing units located within ten miles of the Regional Center. Three attraction bands were assigned, with housing units close to the Regional Center, such as in Swedesboro or Weatherby, given a much higher attraction to the Regional Center compared to units located further away. Phantom weights were assigned to I-295 and the New Jersey Turnpike so that the limited flow of traffic to and from these highways could be recognized

EXTERNAL TRIPS

External trips entering or leaving the Regional Center were assigned to the following roadways:

- US 322 east of the Harrison Twp boundary
- US 322 west of I-295
- New Jersey Turnpike
- I-295 north and south the Raccoon Creek
- Paulsboro-Swedesboro Road north of the Logan Twp boundary
- Kings Highway north of the East Greenwich Twp boundary
- Other areas south of Woolwich Township making use of one of these roadways:
 - Franklinton Road (CR 538)
 - Woodstown Road (CR 605)
 - Auburn Road (CR 646)
 - Pennsville Road (CR 551)

FUTURE TRAFFIC VOLUMES

Background traffic volumes and development traffic volumes were totaled to develop projections of future development traffic along US 322 and along the major roadways leaving the study area.

MODAL ANALYSIS

A formal mode split analysis was not performed. However, one can readily conclude that design standards and a street network alignment that facilitate walking will assure that a larger portion of the internal trips in the Regional Center will be made on foot.

The Regional Center will approximately double the number of trips to work originating in residences in Woolwich and Swedesboro compared to the trips that occurred in 2000. When combined with the added trips generated by surrounding residential growth, it would appear that a market for express bus travel to Camden and Philadelphia could evolve in the future.

A smaller concentration of trips will exist to Delaware County in Pennsylvania. With the development of a Regional Center with transit supporting land densities, it may become feasible for NJ Transit and SEPTA to initiate a joint service between Chester, PA and Glassboro, NJ.

FUTURE CONDITIONS ON US 322

Traffic on US Route 322 is projected to grow to approximately 30,000 vehicles per day at the Logan Township boundary by the year 2025. Traffic volumes would range between 25,000 and 30,000 vehicles per day along most of US 322 within Woolwich Township. The highest traffic volumes were projected to occur between Kings Highway and the concentration of retail development proposed between the New Jersey Turnpike and Kings Highway.

The types of volumes projected for US 322 would require a four lane roadway to accommodate traffic demand in 2025. However, this traffic level would not be reached until late in the development of the Regional Center. During most of the period a two lane roadway would continue to provide adequate capacity.

FUTURE CONDITIONS ON COUNTY ROADS

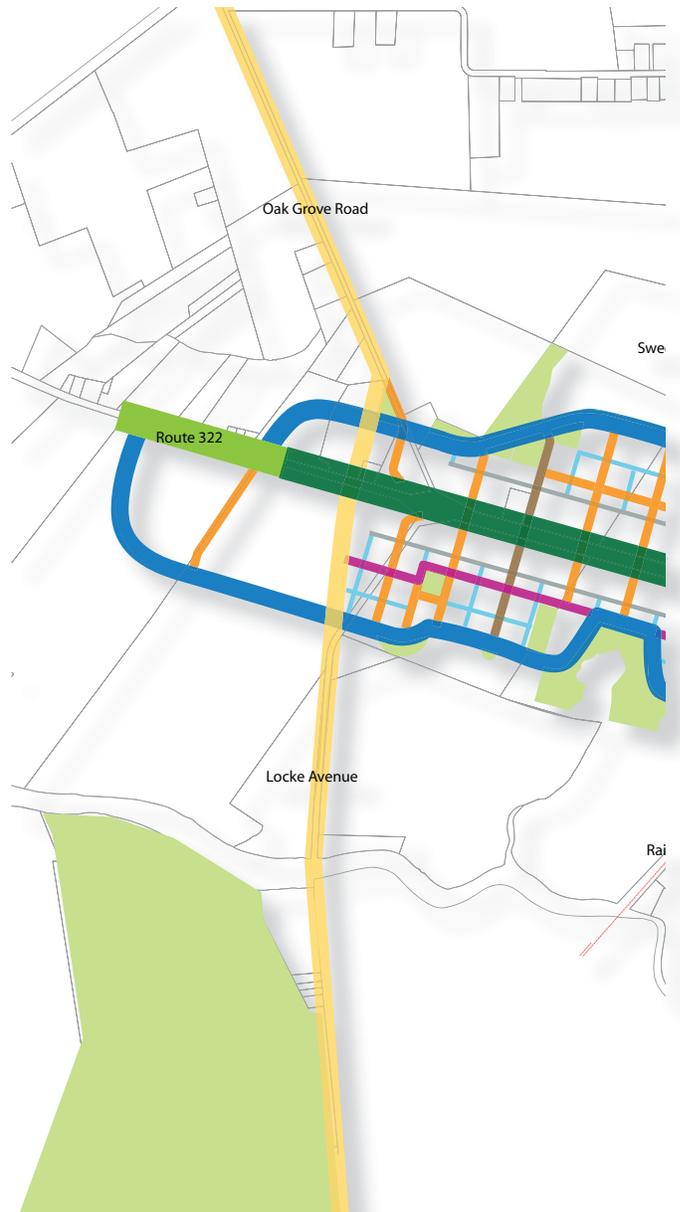
Most county roads crossing US 322 would operate with traffic volumes that could be accommodated with a single lane of traffic in each direction. Kings Highway and the Paulsboro-Swedesboro Road would have the highest traffic volumes, as they do today, but volumes would remain below 20,000 vehicles per day except for the roadway segments leading into Swedesboro.

Swedesboro itself will serve as a long term constraint to traffic growth, since the existing roadway width cannot be readily widened within the borough.

The bridge over Raccoon Creek will experience the most concentrated north-south traffic flow in the area because roads both north and south of the creek funnel traffic to the bridge – in particular, Swedesboro-Paulsboro Road (CR 653) just north of the bridge and Glen Echo Avenue (CR 538) just south of the bridge. Approximately 35,000 vehicles per day could seek to cross the Raccoon Street Bridge in the future based upon the traffic analysis.

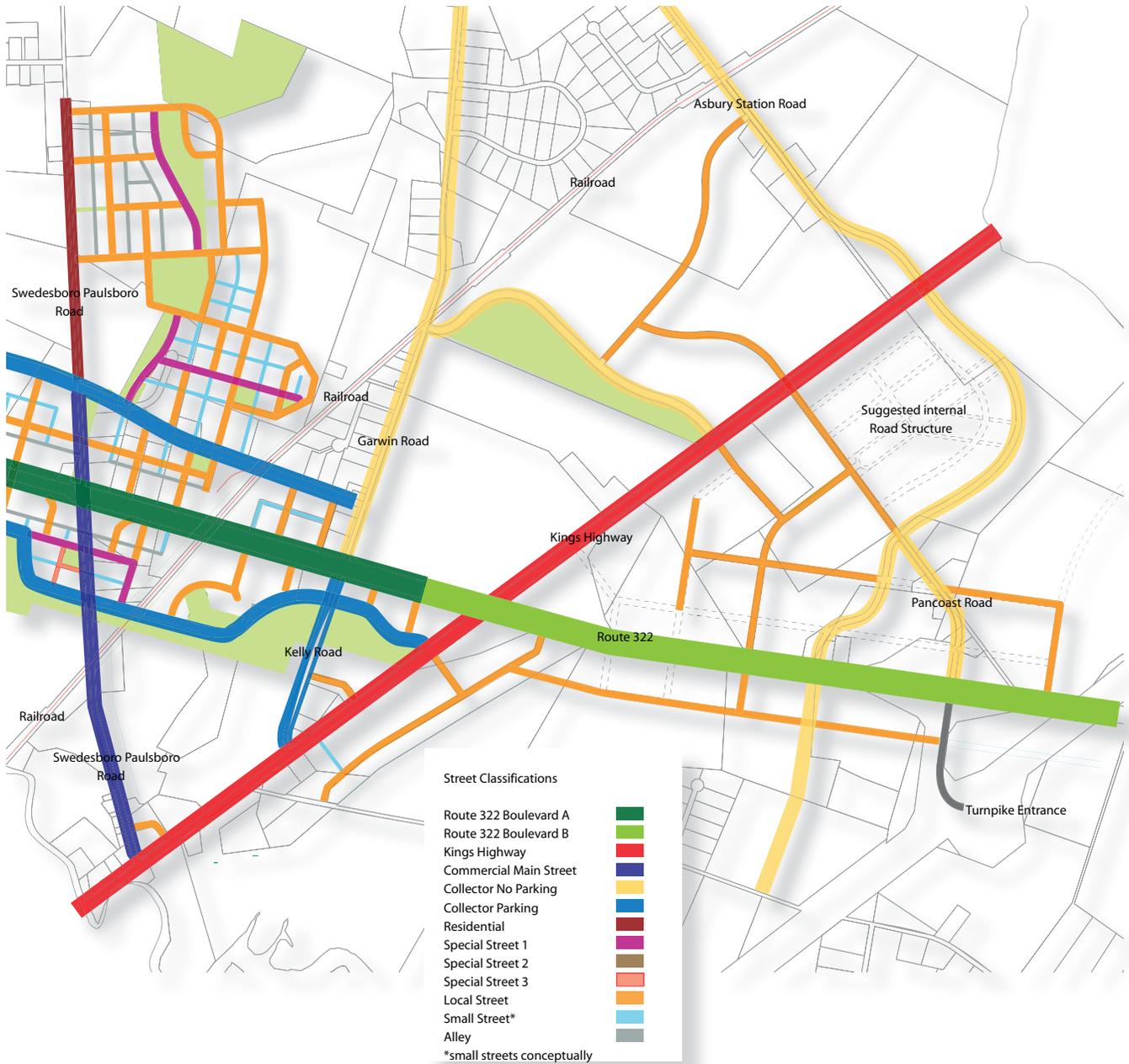
The capacity of roadways and intersections in Swedesboro would prohibit that many vehicles from using the bridge. As a result, actual future traffic volumes would be less. Drivers will seek to use alternative roadways such as Locke Avenue or will attempt to by-pass the area entirely. Drivers using CR 538 in particular will seek to use alternative roads to reach either US 322 or the retail developments between Kings Highway and the Turnpike.

THE STREET REGULATING PLAN



The Woolwich Regional Center Street Regulating Plan is a Master Plan circulation element establishing the location and configuration of streets by type or classification. The Plan as presented is a requirement of development.

The Plan is the result of extensive analysis of local and regional conditions, input from stakeholders including: New Jersey Department of Transportation, New Jersey Department of Community Affairs, and New Jersey Department of Environmental Protection.



In an effort to address the goals of various stakeholders and to effectuate the vision of a sustainable, mixed use, walkable community based on TDR, the Plan expresses the following elements:

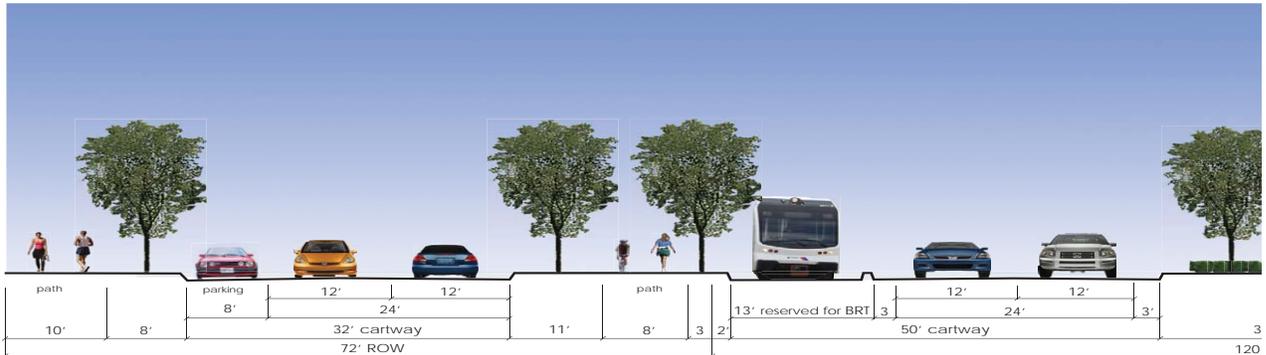
PLAN ELEMENTS

- Driveway curb cuts are prohibited on US Route 322, CR 551, CR 653, CR 671 and CR 672 in an effort to minimize conflicts and to maximize roadway capacity.
- Gateway elements along Route 322 at Locke Avenue and at the New Jersey Turnpike entrance are required to signal to motorists a sense of arrival to the Center.
- A parallel roadway system along Route 322 is required to provide access to properties without the need of curb cuts onto the state highway.
- A Boulevard cross section for Route 322 is provided to reinforce the sense of PLACE and to provide safe refuse for pedestrian crossings.
- The Land Use Plan is designed to minimize conflicts on Route 322 – thus the commercial Main Street runs perpendicular to Route 322 along Swedesboro-Paulsboro Road and residential uses line the Route 322 parallel roadways.
- On-street parking is permitted on most streets; including Swedesboro-Paulsboro Road.

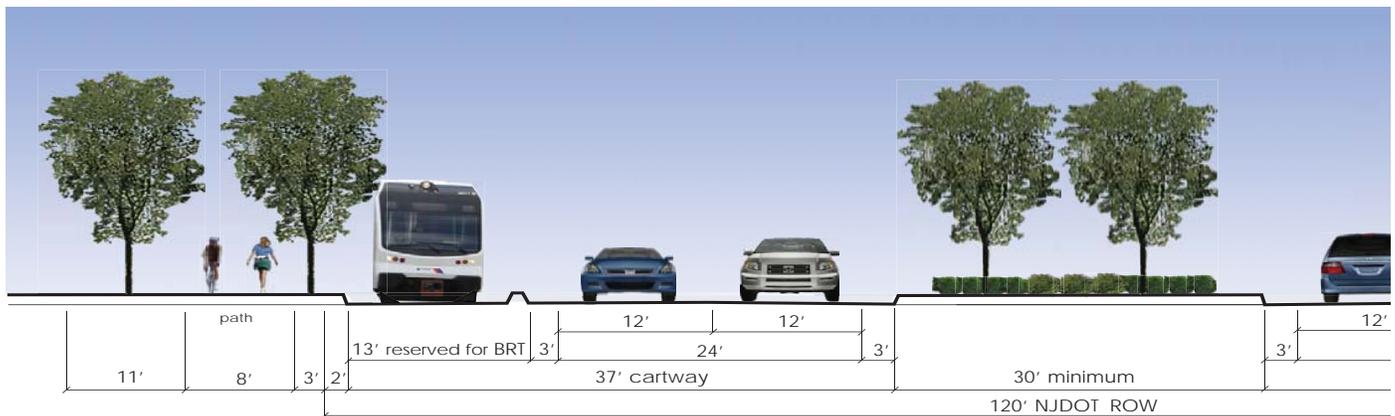
- A block structure based on the most flexible community design configuration yet devised — The GRID — is required.
- All streets must be built as shown except for “small streets”. Small streets are conceptually shown and may be oriented north/south or east/west on a case by case basis during the site plan/subdivision plan process as needed to break up the block structure established by local streets and collectors.
- Curb cuts are prohibited unless noted otherwise in the Zoning Regulations and Design Standards. Accordingly unless otherwise noted, all service, parking and vehicle access is through rear alleys. The number and locations of alleys on the Street Regulation Plan are conceptual. Actual locations are to be determined at site plan/subdivision.
- Physical connections to Swedesboro to promote positive synergies between the Borough and Regional Center.
- A comprehensive pedestrian circulation system that includes interconnected sidewalks and paths, bicycle lanes and pedestrian friendly intersections at strategic locations to promote automobile independence throughout the Center and into the environs.

ROADWAY CROSS-SECTIONS AND TRAFFIC CONTROL

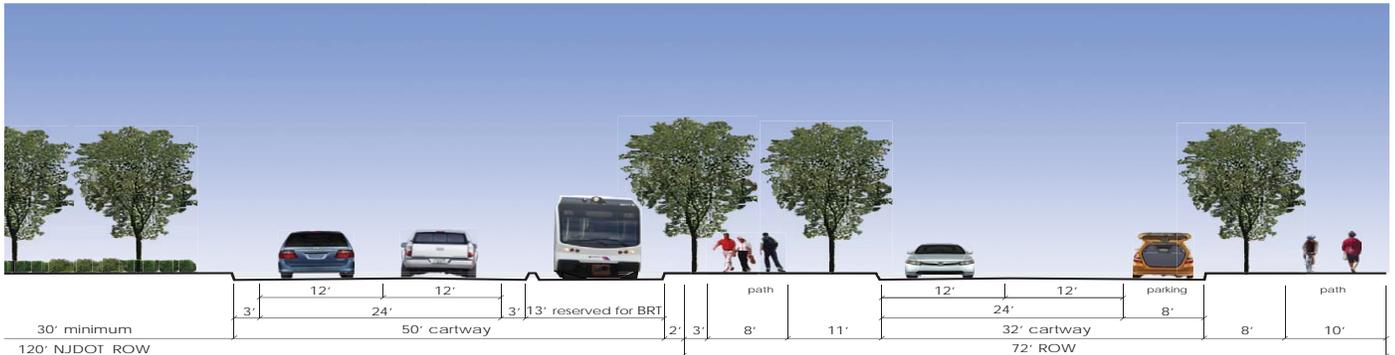
A hierarchical street system has been proposed for Town Center. For each class of roadway, a cross-section has been developed that assures adequate vehicle movement capability while protecting other users of the roadway corridor, including abutting property owners.



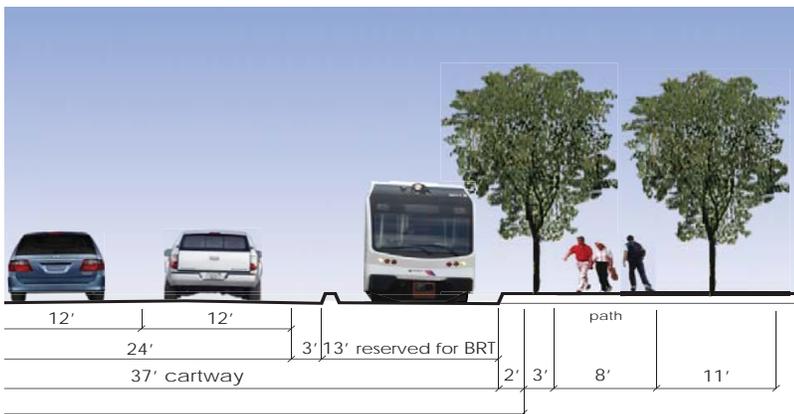
- Notes: Boulevard 'A':*
- Found along US Route 322 from Locke Avenue to Kings Highway to serve the mixed use New Town.
 - Allowance for future bus rapid transit if needed.
 - 30 foot center median with trees and landscaping to provide identity to the center and safe pedestrian refuge.
 - Signalized intersections to have bump-outs and textured crosswalks to aid pedestrian safety.
 - 24 foot wide outer landscape barge with trees and multi-purpose path to provide park like buffer and linear path system.
 - Inner serve road to provide FRONTAGE and access to local land use development. Buildings must front inner service road.
 - Left turn lanes on Route 322 at intersections.
 - No driveway curbcuts.
 - All utilities underground.



Route 322 Boulevard 'B'

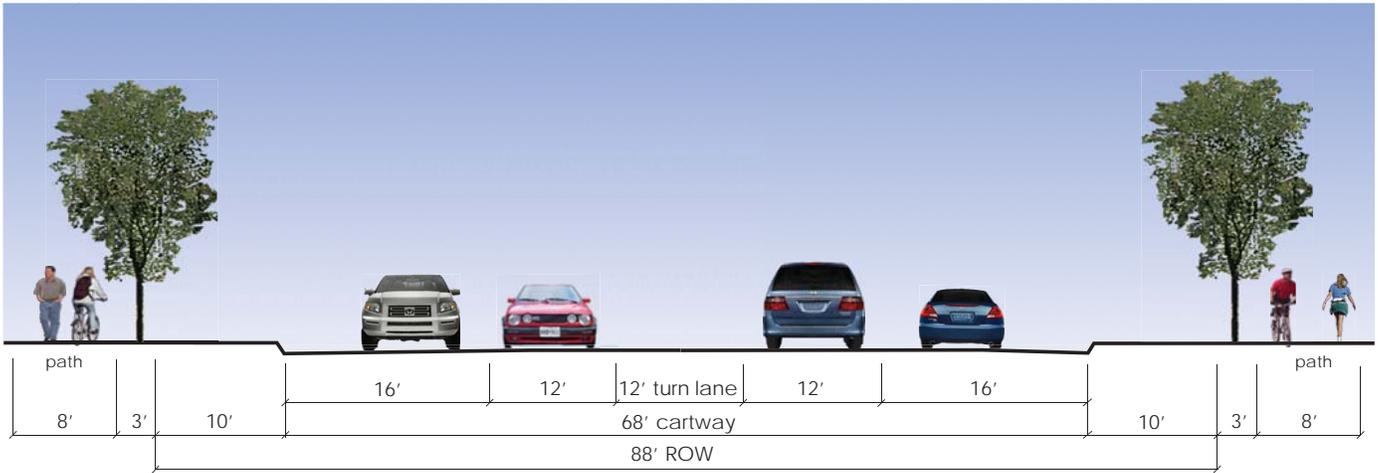


Route 322 Boulevard 'A'



Notes Boulevard 'B':

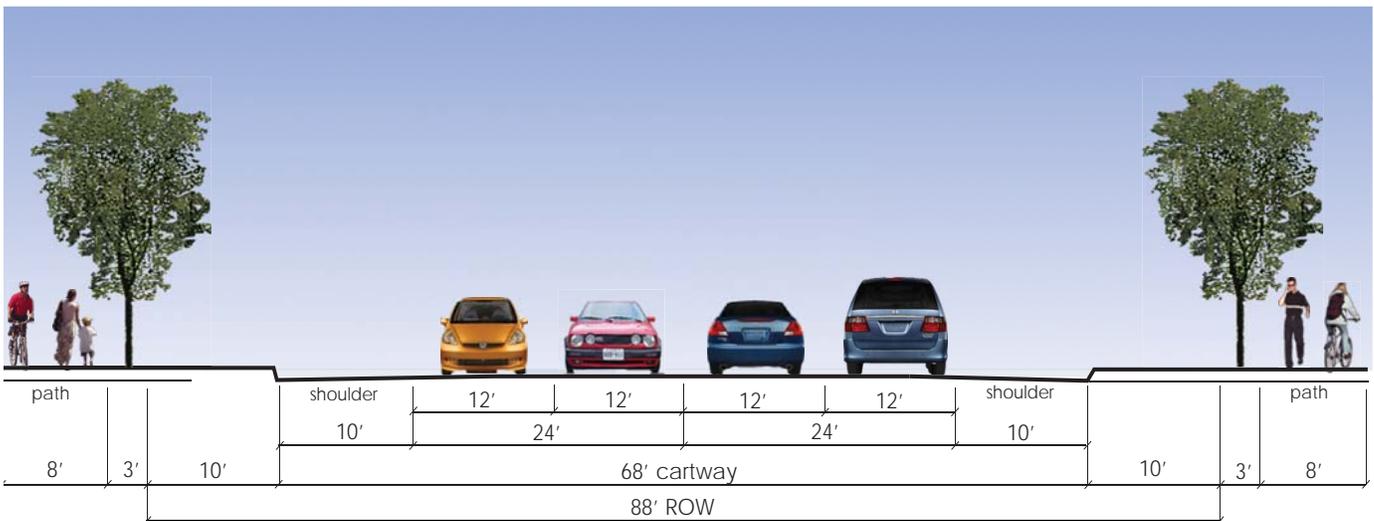
- Found along US Route 322 from Kings Highway to N.J. Turnpike entrance.
- Allowance for future bus rapid transit - if needed.
- 30 foot center median with trees and landscaping to provide identity to the center and safe pedestrian refuge.
- Signalized intersections to have bump-outs and textured crosswalks to aid pedestrian safety.
- Multi-purpose path and double allee of trees to provide pedestrian linkage.
- Left turn lanes on Route 322 at intersections.
- No driveway curbcuts.
- All utilities underground.



Kings Highway - Intersection

Notes Kings Highway Intersection:

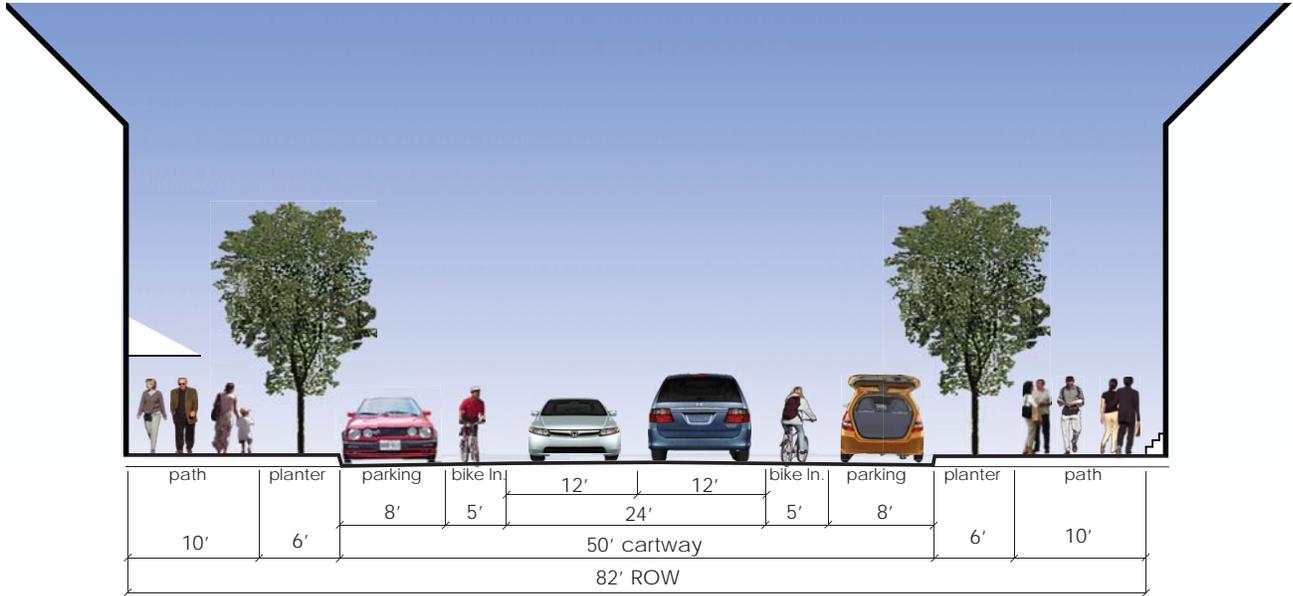
- *Center left turn lanes to be provided as needed.*
- *Bump outs at corners to minimize distance of pedestrian crossing.*



Kings Highway

Notes Kings Highway:

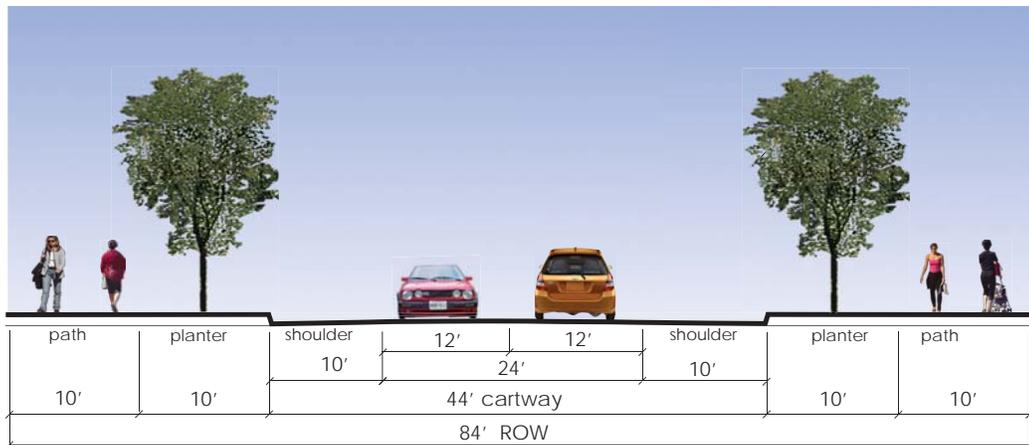
- *Cross section to allow for 4 moving lanes of traffic plus shoulders.*
- *Trees set back 10 feet from edge of pavement to provide buffer for multi-purpose pedestrian path.*
- *No driveway curb cuts.*
- *All utilities underground.*



Commercial Main Street

Notes Commercial Main Street:

- *Primary commercial mixed-use Main Street in the New Town Section of the Regional Center. Located on Swedesboro Paulsboro Road from the northern parallel road south to Kings Highway.*
- *Designed as a shopping street with shop fronts at the sidewalk on-street parking and bike lanes.*
- *No driveway curb cuts.*
- *Rear alley access.*
- *All utilities underground.*



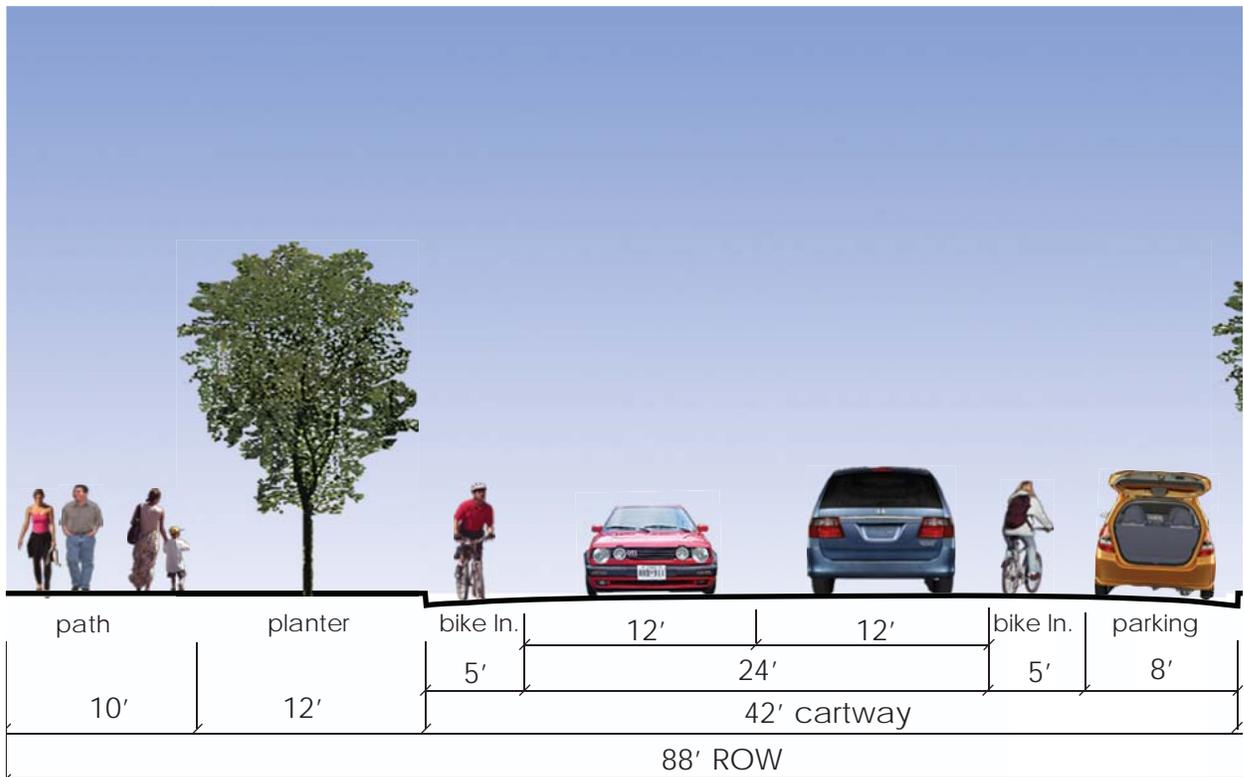
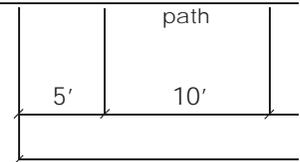
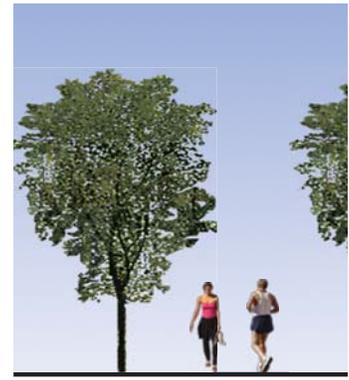
Collector - No Parking

Notes Collector No Parking:

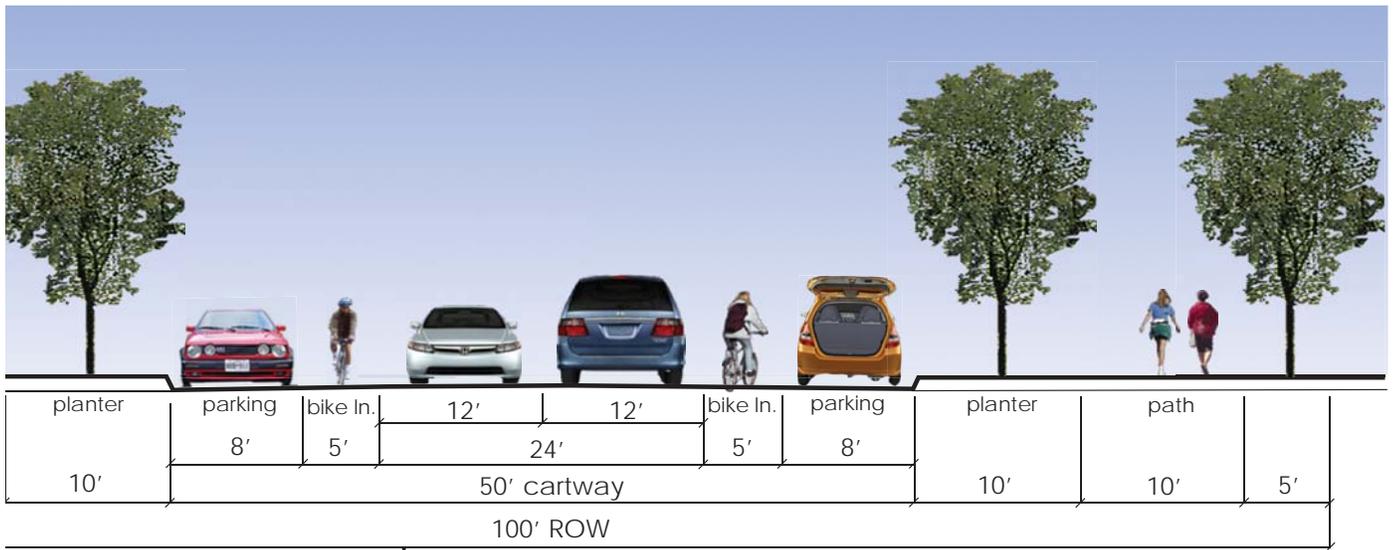
- *Found on Oak Grove Road, Locke Avenue, Asbury Station Road and portions of Pancoast Road.*
- *Provides major north/south circulation with minimal friction.*
- *Driveway curb cuts prohibited in the Regional Center.*
- *Left turn lanes at intersections as needed.*
- *Ten foot wide multi-purpose path on each side of road set 10 feet off cartway.*
- *All utilities underground.*

Notes Collector On-Street Parking:

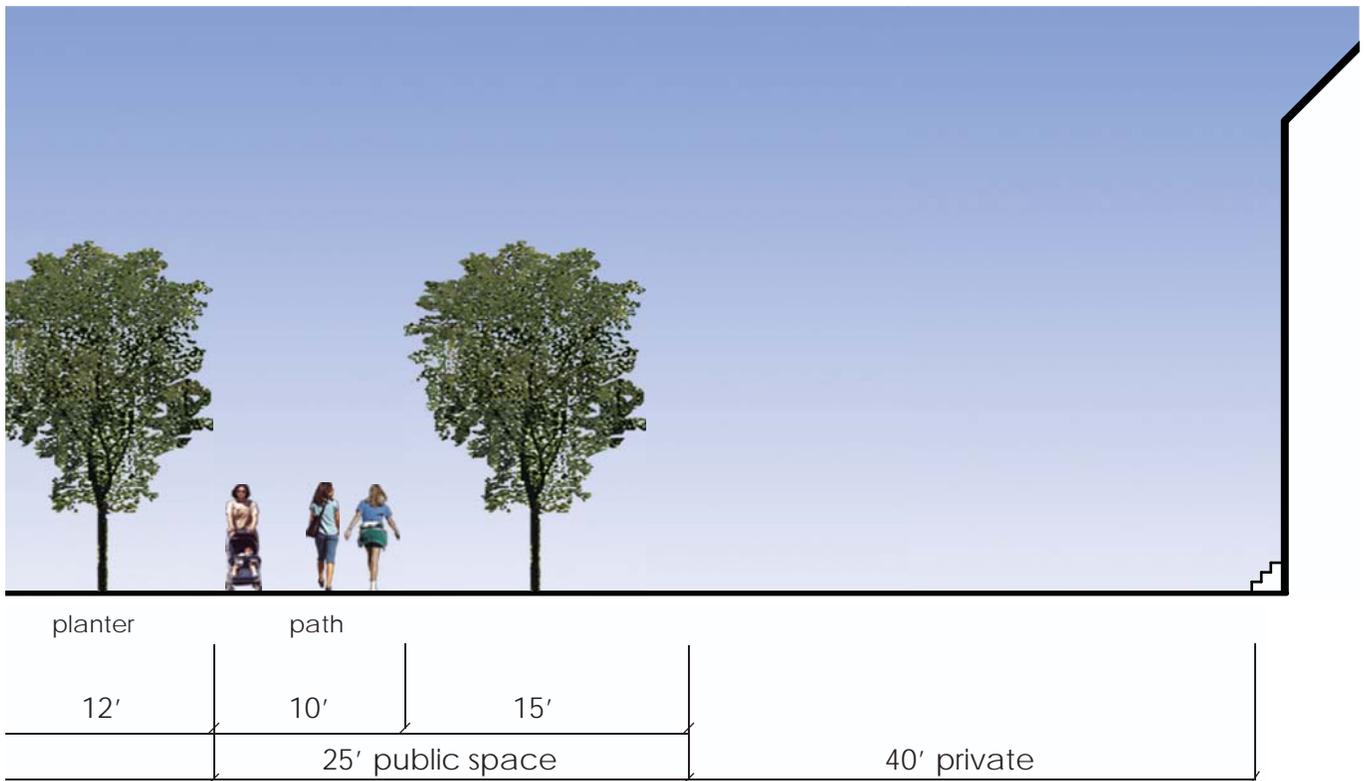
- *Located on the northerly and southerly side of Route 322 to provide the Regional Center with east/west circulation without the need to use Route 322.*
- *In-road bike lanes and multi-purpose paths provided.*
- *Double allee of trees provides park-like character.*
- *Driveway curb cuts prohibited except as noted in the Zoning Code and Design Standards.*
- *Rear alley access as noted in Zoning Code and Design Standards.*
- *All utilities underground.*



Residential Street

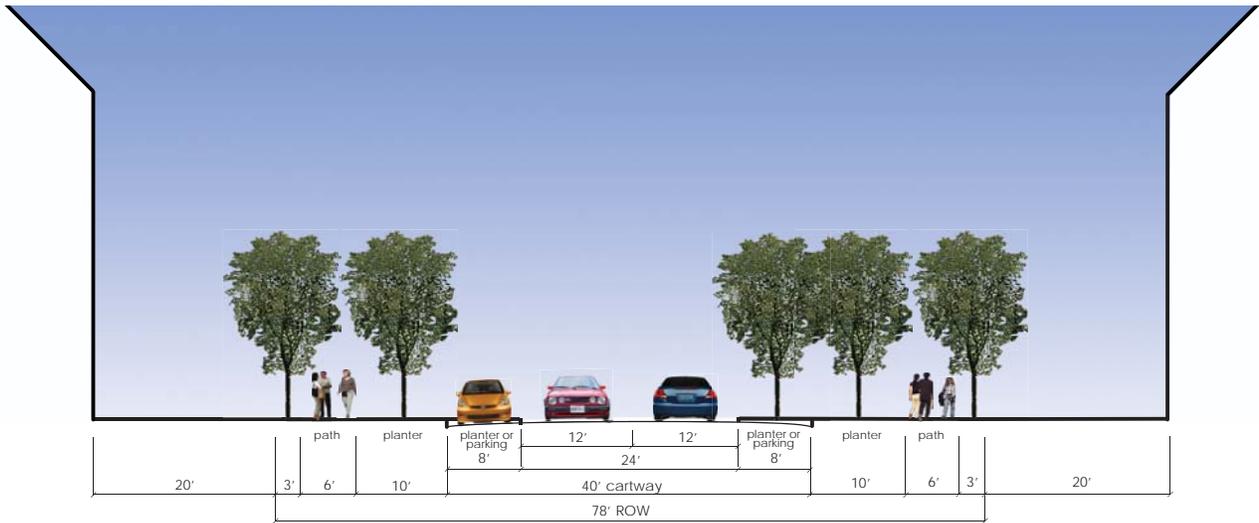


Collector On-Street Parking



Notes Residential Street:

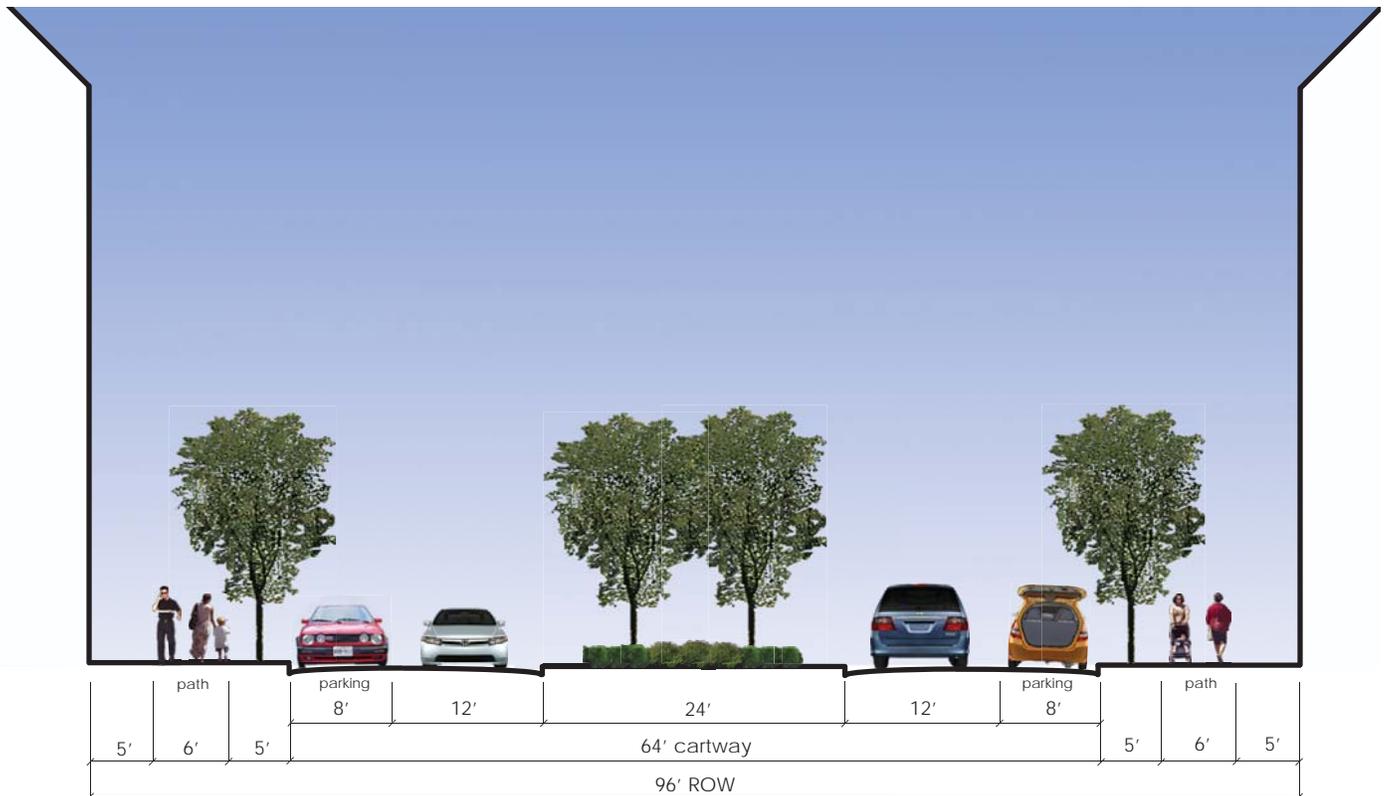
- Found on Swedesboro-Paulsboro Road north of the commercial Main Street.
- Parking permitted on east side of street to serve single-family residence proposed facing the street.
- Bike lanes in the street.
- Ten foot wide multi-purpose paths provided on either side of street to link into commercial core.
- Driveway curb cuts on east side of street prohibited. Land uses to be served via alley system.
- Double allee of trees on east side to act as buffer and provide park-like approach to Main Street commercial core.
- Driveway curb cuts on east side of street prohibited. Land uses to be served via alley system.
- Double allee of trees on east side to act as buffer and provide park-like approach to Main Street commercial core.
- Utilities under ground.



Special Street 1

Notes Special Street 1:

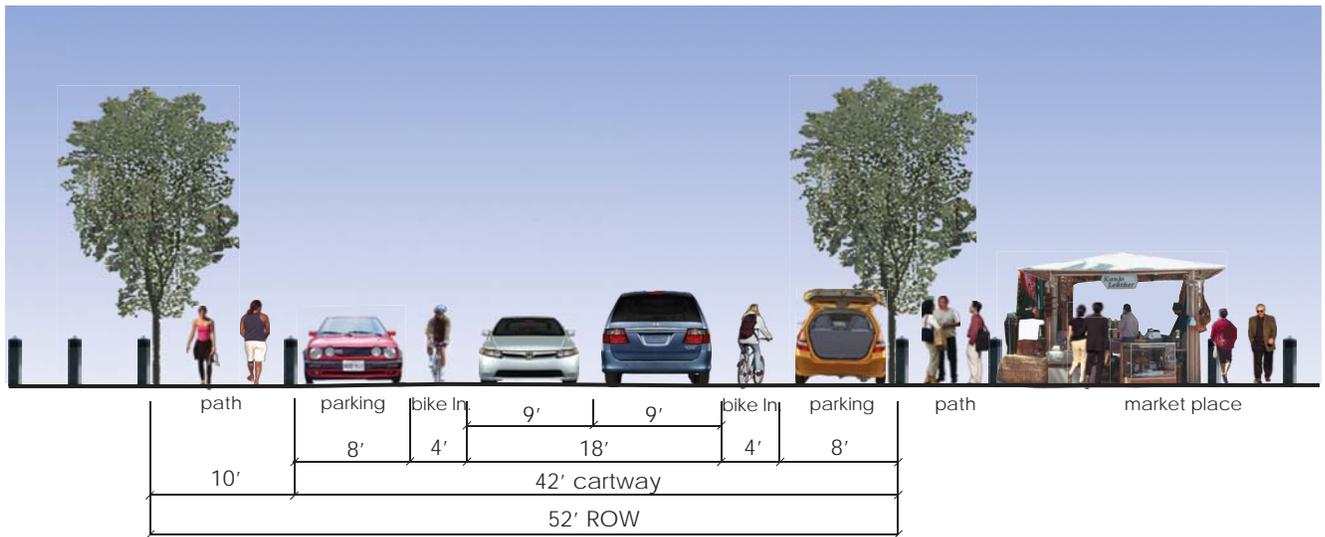
- Found as part of internal grid pattern.
- To provide park-like connectivity internal to the Regional Center - often connecting larger parks and public spaces.
- Provides special character to neighborhoods.
- On-street parking.
- Rear alley access.
- All utilities underground.
- Part of stormwater management plan.



Special Street 2

Notes Special Street 2:

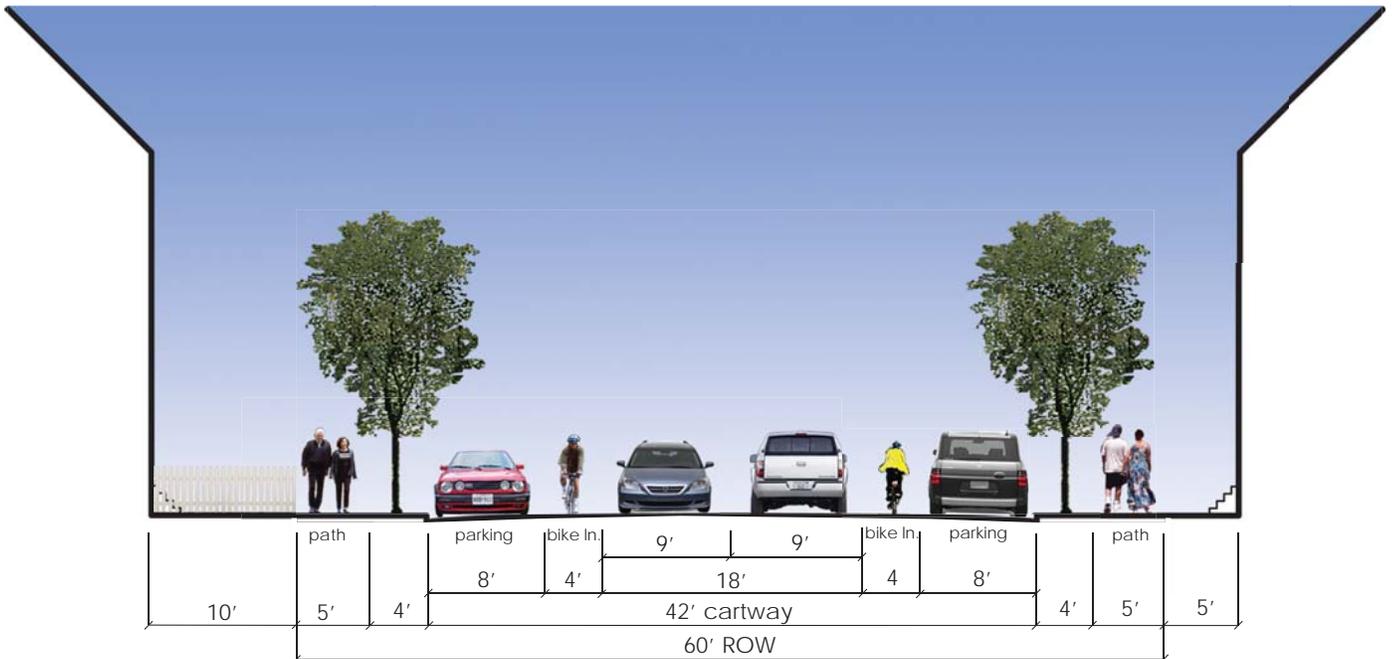
- Found in higher density on potential secondary commercial street section of Regional Center.
- Connect neighborhoods north and south of Route 322.
- Stormwater management opportunity.
- On-street parking.
- Rear alley access.
- Driveway curbcuts prohibited.
- Potential traffic signal at Route 322.
- Underground utilities.
- 11' to 16' wide sidewalk - subject to land use.



Special Street 3

Notes Special Street 3:

- Found along the commercial Main Street in the commercial core.
- "Liveable" street - it serves slow moving traffic and pedestrians in what is both a street and a plaza.
- No curb.
- Porous pavement - edges defined by bollards.
- Flexible use of space for farmers markets, public events.
- On-street parking.
- Under ground utilities.
- Landuses served by alleys.



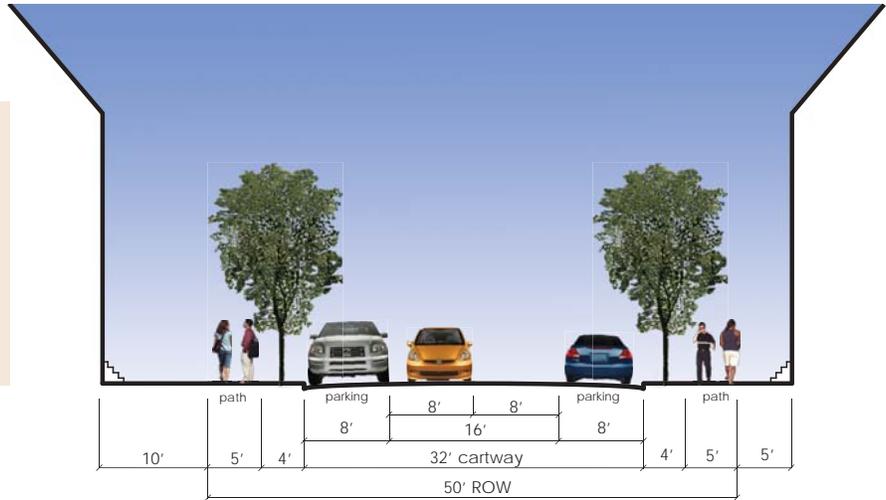
Local Street

Notes Local Street:

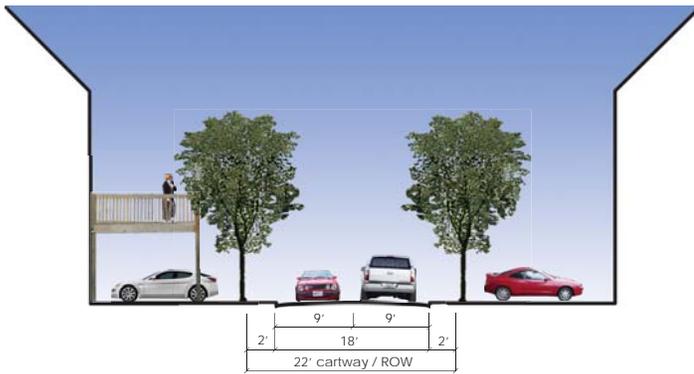
- Primary street type found in residential areas.
- Provides primary grid structure.
- On-street parking.
- Driveway curb cuts prohibited.
- Rear alley access.
- To be combined with "small streets" and alleys.
- Under ground utilities.

Notes Small Street:

- Found serving residential neighborhoods.
- Locations to be determined during site plan/ subdivision to best serve intended uses subject to design standards.
- On-street parking.
- Driveway curbcuts prohibited.
- Rear alley access.
- Underground utilities.



Small Street



Alley

Notes Alley:

- Found everywhere.
- Serves all uses as noted in zoning code and design standards.
- Locations to be determined during site plan/ subdivision process.
- No on-street parking.
- Driveway cuts permitted.

THE BOULEVARD

US 322 will continue to function as an important principal arterial highway in the future, serving county and state-wide travel patterns. A substantial volume of trucks will seek to use the road, both to travel through the Regional Center and to bring supplies to businesses in Swedesboro and the Regional Center. As a result, it will be strategically important to assure that appropriate facilities are provided to serve both local and through traffic. At the same time, US 322 will divide the Regional Center and could become a barrier between development areas north and south of the center.

Given these conditions, US 322 should in the future be widened to provide a divided, four lane cross-section with a relatively wide median provided at signalized intersections to provide pedestrians with a comfortable waiting area.

A classic boulevard cross-section is recommended along the corridor, with two directional service roads provided north and south of the state highway. These service roads would function as local streets, providing access to abutting properties. The service roads should be designed to terminate prior to meeting major signalized cross streets in order to reduce conflicts near traffic signals and to keep traffic flow on the service roads local. A boulevard parkway would extend the length of the center providing an east-west multi-use trail/walkway.



Example found in Florida.

GATEWAYS

Gateways to the Regional Center should be provided at the following locations:

- At the eastern gateway - intersection of US 322 with relocated Pancoast Road and the NJ Turnpike ramps
- At the western gateway - intersection of US 322 with Locke Avenue and Oak Grove Road

Gateways could consist of any of the following treatments:

- A pronounced widening of the median with sculpted landscaping to create a sense of arrival
- A "monumental" signalized traffic circle with an interior landscaped circular island having a diameter greater than 200'; traffic signals should include phases allowing pedestrians to traverse through the central island in order to reduce walking distances
- A "monumental" square created by providing a 200' wide median or greater on the intersecting street as well as a 100' wide median on US 322

Since mid-block capacity will be adequate until half of the commercial development is occupied, the focus of improvements initially should be placed on providing additional capacity at intersections and designing these intersections in a fashion that allows pedestrians to safely and easily cross the highway.

Techniques for controlling or eliminating left turns from the state highway could increase the capacity available at intersections. The provision of median refuge islands that can protect and harbor pedestrians crossing the highway will also help make intersections function better.

Additional evenly spaced signalized intersections within the Regional Center will:

- Permit implementation of an efficient signal progression system that can control vehicle speeds to a moderate pace
- Provide a porous system that offers motorists multiple opportunities to cross the highway, thereby reducing demand at individual intersections
- Provide pedestrians more opportunities to safely cross the road
- Allow signalized mid-block crosswalks at strategic locations
- Improve the utility of parallel east-west collector roads for local traffic by increasing the connectivity of the total grid system

At least four additional signalized street intersections are recommended, one at the existing unsignalized intersection of Garwin Road and three more at the following new cross-streets: Mid-way between Locke Avenue and Paulsboro-Swedesboro Road. Two streets between Kings Highway and the NJ Turnpike exit.

The resulting interactions will have a relatively even spacing of approximately 1,500 feet between traffic signals.

On the west, the Center will end half a mile to the east of the existing divided four lane roadway at Stone Meetinghouse Road. A required off-site improvement will consist of widening the dual roadway from its current terminus to Locke Avenue.

KINGS HIGHWAY

Kings Highway provides an important linkage between the Kingsway Regional School complex and Swedesboro. It also functions as the front door to the school and will provide an important access for the Woolwich Adult community on the east side of Kings Highway.

Because of its arterial function, it is appropriate to improve the roadway over time so that it can continue to serve the important function of linking town and village centers that have long existed along the ancient roadway.

The stretch of Kings Highway between US 322 and Swedesboro needs to be designed so that it will create a transition between the more open roadway north of US 322 and the urban context of Swedesboro.

RACCOON CREEK BRIDGE

The Kings Highway bridge over Raccoon Creek must serve a concentrated flow of traffic. North of the creek, CR 653 and Garwin Road join Kings Highway. South of the creek, CR 538, Kings Highway, Auburn Road and other county roads bring traffic to the bridge.

A critical issue will be to efficiently manage the concentrated flow of traffic across Raccoon Creek between the intersection of Paulsboro-Swedesboro Road to the north and the intersection of Franklinton Road to the south.

Roundabouts at the intersection of Kings Highway with CR 653 north of the bridge and CR 538 south of the bridge would enhance traffic flow and safety and would result in the least delay. In the future one of two options will be necessary. One option is to widen the bridge to provide a four lane cross-section with a center median and improved pedestrian walkways.

Alternatively, consideration could be given to constructing one or more additional crossings of Raccoon Creek to allow some traffic to bypass this bottleneck.

PAULSBORO-SWEDESBORO ROAD

Paulsboro-Swedesboro Road is intended to function as the Main Street for Town Center. Projected traffic volumes for the road are consistent with the volumes on typical Main Streets in town centers.

The road will be able to support on-street parking in its commercial core. At signalized intersections, left turn lanes should be provided to assure adequate intersection function. Opportunities for pedestrians to safely cross the street should be provided frequently – at least every 400 feet, preferably more frequently.

Some of the traffic projected to use Paulsboro-Swedesboro Road will also make use of Locke Avenue and Oak Grove. More through drivers will likely shift to Locke Avenue and collector streets in Town Center in order to travel around the main downtown street.

LOCKE AVENUE/OAK GROVE ROAD

Locke Avenue and Oak Grove Road will serve an increasingly important role as a relief road for traffic currently using Paulsboro-Swedesboro Road. Allowing this relief function to occur will be desirable since it will help to spread out traffic flows.

The volume of traffic on Locke Avenue should be sufficient to help support neighborhood retail shops that would primarily cater to nearby residents.

South of Raccoon Creek, it would be desirable to provide a connector road linking Locke Avenue with High Top Road. This connection would provide traffic from the Weatherby and Beckett developments with a by-pass around Swedesboro, relieving traffic congestion in Swedesboro and would help reduce traffic volumes on Kings Highway at the Raccoon Creek bridge.

TOWN CENTER COLLECTOR ROADS

A key function of Town Center's roadway network will be a pair of collector streets running east-west and parallel to US 322. These roads will be used primarily by residents and persons with business in the center. But they will also serve as a relief route for some of the through routes and particularly for drivers who must transition from a north-south roadway to an east-west roadway.

The roads do not necessarily have to provide a continuous east-west alignment so long as the ability to travel from one end of the Center to the opposite end is reasonably convenient. Indeed, some friction is desirable to assure that through drivers on US 322 do not divert to these other roads in order to avoid traffic signals or other constraints.

The collector roads, with less traffic on them, will be important pedestrian corridors and will provide residents with a calmer environment for bicycle travel.

SCHOOL TRIP MANAGEMENT

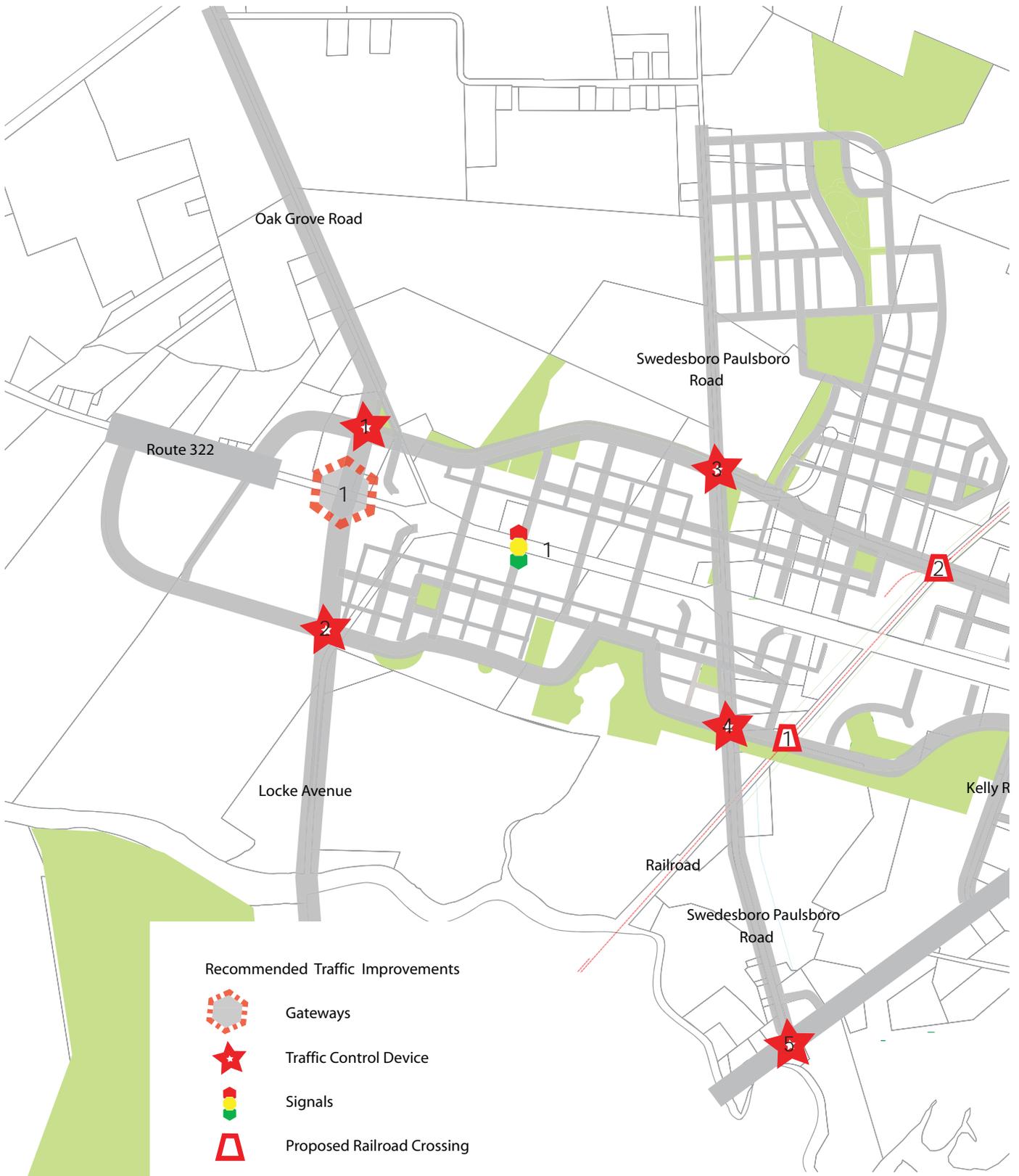
National data indicates that school and church related trips account for 10% of daily household trips. Some studies have indicated that school trips can compose up to 20% of traffic volume in the morning peak hour.

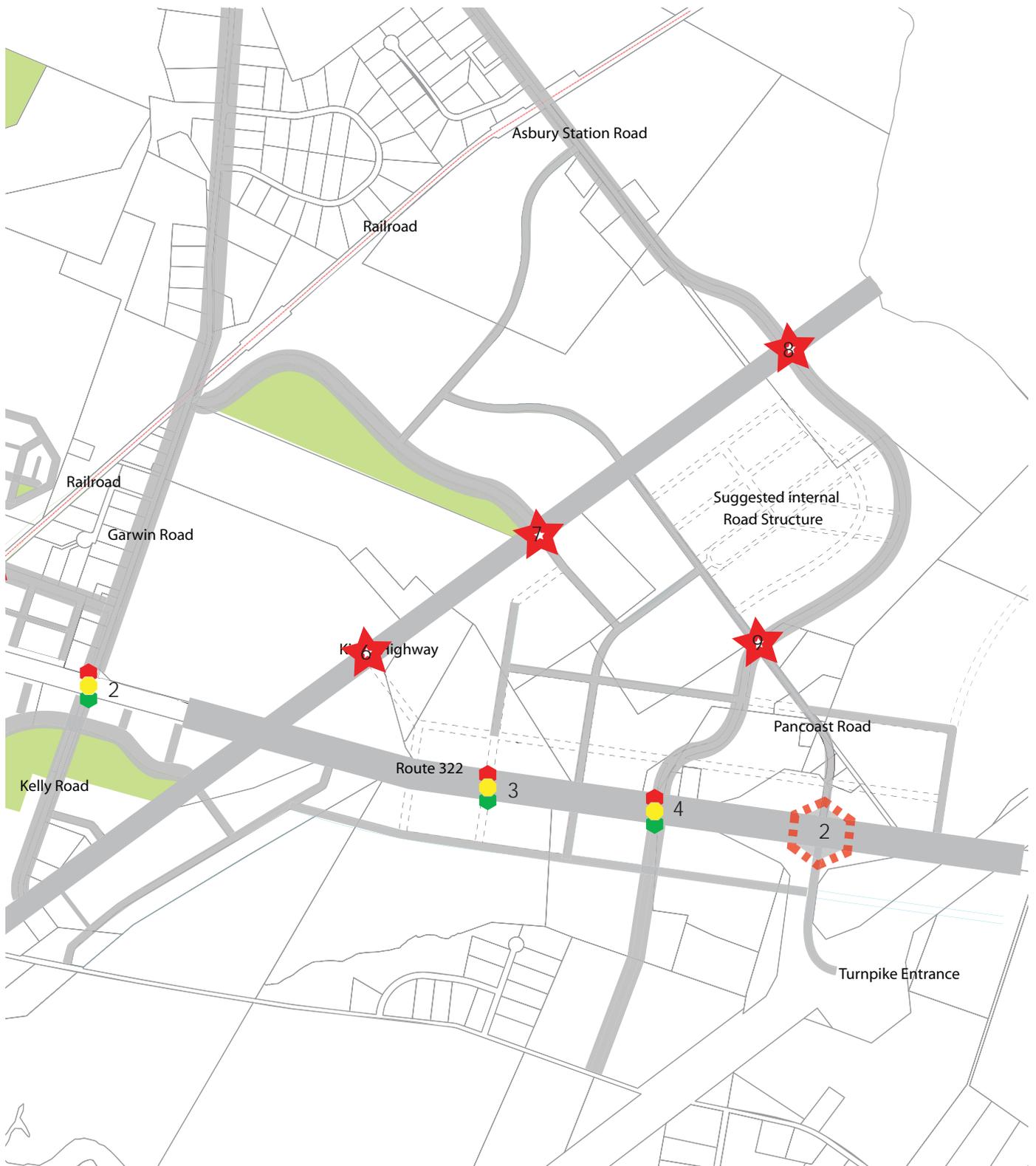
Managing school traffic to reduce both the number of trips to a school and the length of school trips can be one effective method of reducing peak hour traffic requirements.

As the region served by Kingsway Regional School District continues to grow, it may become appropriate to consider the construction of a second school complex south of Raccoon Creek. Because of the concentrated residential development in Beckett in Logan Township, in 2000, approximately 60% of high school students in the regional district lived south of the creek. As a result of the Weatherby development in Woolwich and the larger homes being constructed south of the creek in all municipalities, the number of students living south of the creek will continue to grow. The provision of a separate school complex to serve these students would substantially reduce the number of vehicles needing to drive through Swedesboro and cross Raccoon Creek. If located near the boundary between Woolwich and Logan Townships, a southern school complex would also allow many additional students walk or bicycle to the complex rather than ride in buses.

Alternatively, methods should be sought to assure that a high percentage of students living south of the creek in fact use available school buses rather than travel to the school complex by car. One option to consider would be to modify the railroad bridge over the creek so that it could also serve school buses, thereby creating a bus rapid transit route for only school buses.

INVENTORY OF RECOMMENDED TRAFFIC IMPROVEMENTS





US 322

SIGNALIZATION PLAN

New signalized intersections at:

- Garwin Road
- Relocated intersection of Locke Avenue/Oak Grove Road
- Two new street crossing between Kings Highway and the Turnpike interchange
- One new street crossing between Paulsboro-Swedeseboro Road and Locke Avenue
- Reconstructed intersection at the intersection of the Interchange 2 access road with a relocated Pancoast Road to serve as the north leg

A computerized traffic control system should be provided to permit the two-directional flow of traffic using a speed of progression no greater than the desired operating speed along the highway.

GATEWAYS

Gateway intersections shall be provided at the relocated Locke Avenue intersection to the west and the reconstructed Interchange 2/Pancoast Road interchange to the east.

RECONSTRUCTED ROADWAY AT INTERSECTIONS

Reconstruct US 322 at each intersection to provide a landscaped median 30 feet to 100 feet wide to serve as a refuge for pedestrians.

Provide curving approaches to intersections based on a desired operating speed of 30 MPH at intersections.

DUALIZATION

In future, provide continuous landscaped median minimum 30 feet wide and two traffic lanes in each direction through Town Center, with width of median increasing at signalized intersections.

SERVICE ROADS

Provide local service roads to serve abutting land use to bring traffic to specified signalized intersection. Direct driveway access to Route 322 from adjacent land use development is prohibited.

BOULEVARD PARKWAYS

Provide landscaped boulevard parkway on each side of highway corridor incorporating a multi-use pathway system.

MID-BLOCK PEDESTRIAN CROSSINGS

Provide signalized pedestrian crossings at locations where north-south streets in the street grid meet the boulevard

alignment.

Incorporate separate pedestrian crossing phases into the signal progression pattern of the state highway in each direction.

Textured pavement cross walks and/or intersections to be provided at signalized intersections with Route 322.

RESERVE LAND WITHIN ROUTE 322 CROSS SECTION FOR POTENTIAL FUTURE BUS RAPID TRANSIT.

Take action to set aside land area for a future bus rapid transit system so as not to unreasonably disrupt existing land uses in the future.

KINGS HIGHWAY (CR 551) (SUBJECT TO COUNTY APPROVAL)

NORTH OF US 322

Widen Kings Highway to provide two through traffic lanes in each direction plus a shoulder and a 16' center median with left turn lanes at intersections.

Provide multi-purpose paths on each side of roadway.

Provide roundabouts or other traffic control devices at major intersections in front of school complex, at Pancoast Road and at Repaupo Road.

Provide mid-block crosswalks with pedestrian refuge islands at convenient walking access points to school complex.

SOUTH OF US 322

Reduce roadway cross-section width to create transition prior to entering Swedesboro.

Provide multi-purpose paths on each side of roadway.

Construct roundabout or other traffic control device at Paulsboro-Swedeseboro Road intersection.

PAULSBORO-SWEDESBORO ROAD (CR 653) (SUBJECT TO COUNTY APPROVAL)

Reconstruct to provide Main Street cross-section.

Provide roundabouts or other traffic control devices at the following intersections:

- Most northern intersection in Town Center to serve as gateway
- At northern loop road intersection
- At southern loop road intersection
- At Kings Highway (see above)

LOCKE AVENUE/OAK GROVE ROAD (CR 671)

Reconstruct to provide Main Street type cross-section or construct two one-way streets.

Provide roundabout type intersections or other traffic control devices at northern loop road and at southern loop road to serve as gateways.

PANCOAST ROAD (CR 672)

Relocate to intersect US 322 opposite Interchange 2 access road.

Provide roundabouts at Asbury Station Road intersection providing access to Woolwich Adult shopping district.

GARWIN ROAD

Provide roundabouts at northern loop road and at intersection just south of the railroad grade crossing.

Provide mid-block crosswalks with pedestrian refuge islands at convenient crossing locations for Kingsway Middle and Senior High Schools.

TOWN CENTER LOCAL AND COLLECTOR STREETS

Provide frequent neighborhood traffic circles or chicane like horizontal diversions in area west of railroad tracks.

WOOLWICH ADULT RETAIL SHOPPING AREAS

Provide traffic control or calming devices along each of the service roads parallel to US 322 at intersections with north-south roads that cross US 322.

Provide raised pedestrian crosswalk at the central intersection in both the northern and southern shopping district.

PEDESTRIAN IMPROVEMENTS

Safe pedestrian movement throughout the 322 Regional Center is critical to the health and prosperity of the community. It is important to note that communities thrive on movement – the movement of goods and services, - the movement of vehicles – the movement of people – the movement of ideas.

In a diverse mixed use Center, like the one proposed in the plan, multi modal transportation options must be accommodated. As a result, the right-of-ways associated with roadways must be designed for the shared needs of automobiles, bicycles and pedestrians. Roadways must be able to accommodate the movement of traffic, but they must not act as barriers to pedestrian movement, thereby dividing the community into walled precincts.

Both the Street Regulating Plan section of this document and the Public Spaces Plan Element address the multi modal accommodations for vehicles, bicycles and pedestrians with the cross section of each street classification.

This section focuses on intersections. The diagram below identifies those intersections deemed essential to the implementation of the Pedestrian System.

Intersections were chosen for one or more of the following criteria:

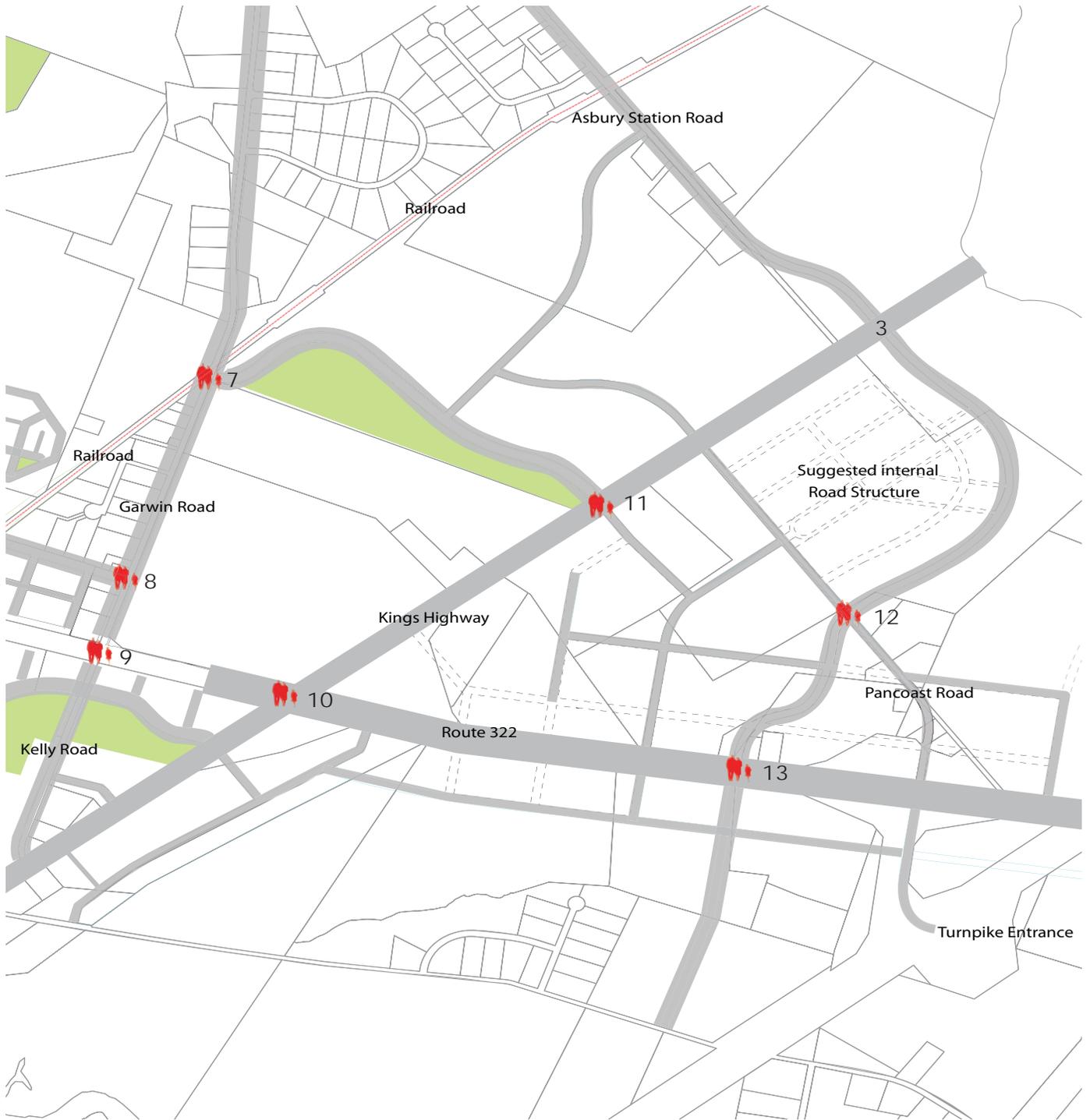
- Proximity to Kingsway Regional High school;
- Proximity to proposed population or activity center;
- Key location on the proposed mixed use main street;
- Route to Locke Avenue Park; and
- North/south neighborhood connectors along Route 322.

Recommended improvements:

- All intersections identified should provide textured crosswalks with crosswalks a minimum of 10 feet wide. Key intersections identified as 4, 5, 6 and 13 in the diagram should be fully improved with textured pavement. Textured crosswalks are required on all corners of the intersection to alert motorists of the presence of pedestrians.
- Intersections identified as 1, 3, 5, 9, 10 and 13 should provide refuge islands a minimum of 30 feet wide within the cross section of U.S. Route 322.
- Intersections identified as “existing” or “proposed” signalization should incorporate pedestrian movement into the signal design and timing.
- All intersections identified must provide bulb-outs in order to minimize the amount of automobile travelway that must be crossed by pedestrians. Minimizing the amount of travelway crossing is important for safety from both an actual and perceptual perspective.

PEDESTRIAN IMPROVEMENT PLAN





NEXT STEPS

When a coordinated land use and transportation plan has been developed and accepted by the various parties involved, a more detailed and quantitative transportation study should be initiated that can be used to:

- Monitor the implementation of the Regional Center
- Make fine tuning adjustments to the proposed net work
- Adjust to changes in the land development program permitted and facilitated by municipal ordinances
- React to initiatives in neighboring municipalities that could impact Woolwich
- Adjust to changes in the use of transportation resources as a result of changes in demographic patterns and technology
- Evaluate fair-share funding requirements for individual developments

Detailed traffic control plans and traffic calming plans should be prepared as part of each development approval reviewed under the provisions of the Regional Center plan.

AUBURN ROAD VILLAGE TRANSPORTATION PLAN

INTRODUCTION

Woolwich Township is seeking to preserve more of the prime agricultural lands in the township by authorizing the transfer of development rights (TDR) from identified agriculturally based "sending zones" to identified growth or "receiving zones" in the Township.

This report analyzes the traffic impacts associated with development of a satellite TDR receiving zone – called Auburn Road Village - located on the south side of Woolwich Township adjacent to the Weatherby Planned Development.

The receiving zone consists of a 125-acre parcel located on the west side of Auburn Road, immediately south of the Four Seasons age restricted residential development, which is a component of Weatherby.

Auburn Road Village is projected to yield the following amount of development provided that sufficient development rights are transferred into the zone:

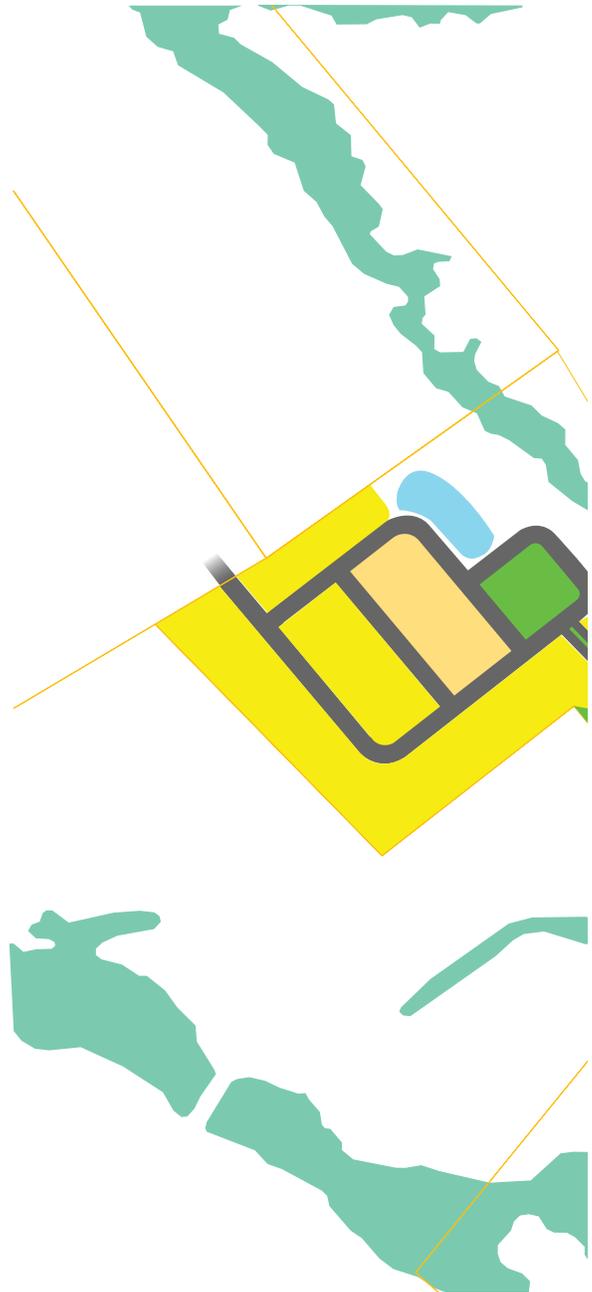
RESIDENTIAL DEVELOPMENT

Single family units	130
Twin units	162
Townhouses	210

COMMERCIAL DEVELOPMENT

Square feet	50,000
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This level of development will create a large hamlet or small village having a population of roughly 1,147 people.



As proposed, an integrated and hierarchical street pattern is proposed that would have a main residential collector street constructed as a divided parkway intersecting Auburn Road approximately one mile south of Center Square Road.

A north-south minor residential collector street crosses the main access road at a T-intersection. This and at least two other residential access streets are proposed to extend into the Four Seasons development and intersect

Amesbury Boulevard which is the principal collector road for that development. Amesbury Boulevard intersects Center Square Road opposite Frederick Boulevard, also a residential collector street that continues north through the Weatherby development to High Hill Road.

Additional local streets extending into the Four Seasons development are proposed in the southwest corner of the Auburn Road Receiving Zone integrally linking the two developments.



INVENTORY OF CURRENT TRAVEL SYSTEM

This section of the report summarizes the current transportation infrastructure that will serve Auburn Road Village.

HIGHWAY NETWORK

The southern half of Woolwich Township is served by the following county highways that provide convenient connections to most travel destinations, including the following roadways:

CR 551	<p>A secondary highway that extends from Carney's Point in Salem County to the City of Camden. From Swedesboro north to Woodbury, CR 551 is known as Kings Highway and follows the alignment of the colonial King's Highway. South of Swedesboro CR 551 follows Auburn Road.</p> <p>Gloucester County classifies all of CR 551 as a minor arterial. NJDOT has classified CR 551 south of US 322 as an urban collector road or as a major collector road in areas designated as rural.</p>
CR 620	<p>Center Square Road (also known as Old Ferry Road) runs east-west between Logan Township and CR 551. Just east of CR 551, at the intersection with Woodstown Road, CR 620 turns right and follows the route of the colonial Kings Highway.</p> <p>The Center Square Road portion of CR 620 is classified by Gloucester County as a minor arterial. The Kings Highway section is classified as a collector road.</p> <p>NJDOT has classified the Center Square Road as an urban collector road and the Kings Highway portion as a major rural collector.</p> <p>A portion of Center Square Road in Logan Township just east of I-295 is divided with two lane roadways in each direction. All of the road in Woolwich is two-lane.</p>
CR 602	<p>Oldman's Creek Road is a rural road that both Gloucester County and NJDOT have classified as a rural local road. NJDOT calls the road the Pedricktown-Harrisonville Road, demonstrating the connecting function that the rural road serves.</p>

TRANSIT NETWORK

There are no transit services immediately adjacent to the proposed Auburn Road TDR receiving area.

TRAFFIC ANALYSIS

This section outlines the process that was used to project traffic flow from the TDR Center.

BACKGROUND TRAFFIC

The Weatherby Traffic Circulation Study, prepared in 1998 by Horner & Canter Associates, updated in July 2004, was used as a base for analyzing traffic impacts associated with the Receiving Zone.

Background growth in traffic was projected using a background growth rate of 1% for a period of twenty years. Traffic from the Weatherby development was then added to these volumes to produce a future build year set of traffic counts.

TRIP GENERATION

Land use assumptions for the purpose of traffic analysis were based on the proposed land use plan for Auburn Road Village. The commercial square footage proposed for the site was assumed to be retail.

Traffic to be generated from the proposed land uses in Auburn Road Village was projected using trip rates published by the Institute of Transportation Engineers in Trip Generation – 7th Edition.

TRIP DISTRIBUTION

The vehicle trips projected using the ITE Trip Generation formulae were assigned to area roadways using a two step process.

PASS-BY TRIPS

The Trip Generation Handbook published by ITE was used to project the number of trips to and from the proposed retail development that would be captured from traffic already moving past the development.

Pass-by trips to and from retail land uses in the Auburn Road TDR Receiving Zone were calculated. These trips were shown to turn onto and off of Auburn Road, but were not treated as new through trips on Auburn Road.

REGIONAL ACTIVITY CENTER SYNERGISTIC TRIPS

The commercial area within Auburn Road Village will be especially attractive to residents of the Village and to residents of the Four Seasons development.

It was assumed that approximately 25% of the trips to and from the commercial zone would be attracted from residents of the Receiving Zone and of Weatherby. All of these trips were assigned to Amesbury and Frederick Boulevard, even though most would remain local.

EXTERNAL TRIPS

External trips were distributed based on the following procedures.

- Residential trips – distribution of trips to work locations as reported in the 2000 Census
- Retail trips – distribution of housing units located within ten miles of the Receiving Zone. Three attraction bands were assigned, with housing units close to Auburn Road Village, such as in Swedesboro or Weatherby, given a much higher attraction to the Village compared to units located further away. I-295 and the New Jersey Turnpike fall into the outer reaches of these bands.

EXTERNAL TRIPS

External trips entering or leaving Auburn Road Village were assigned to the following screen line locations:

- Center Square Road at the Logan Township boundary
- Woodstown Road at the NJ Turnpike
- Auburn Road south of Oldmans Creek Road
- Auburn Road north of Center Square Road
- Oldmans Creek Road on either side of Auburn Road

FUTURE TRAFFIC VOLUMES

Background traffic volumes and development traffic volumes were totaled to develop projections of future development traffic along Auburn Road and Center Square Road.

MODAL ANALYSIS

A formal mode split analysis was not performed. All trips projected using the ITE formulae were assumed to be produced onto the highway network.

In reality, a small portion of trips to and from the commercial area will be drawn from the residential component of Auburn Road Village and from the Four Seasons development will occur on foot or bicycle, not automobile.

FUTURE CONDITIONS ON AUBURN ROAD

The Weatherby development and Auburn Road Village will each produce as many trips on Auburn Road as existed in 2004 from background sources. Despite this doubling in traffic on Auburn Road, the volume will be substantially less than the capacity of a two-lane roadway.

The capacity of the intersection of the main access road to the Receiving Zone with Auburn Road was calculated

and found to operate as an unsignalized intersection with little delay. Even though the analysis showed the road to function acceptably without provision of a north-bound left turn lane, such a lane is recommended for safety reasons.

Provision of a left turn lane at the intersection will also allow the construction of a median refuge island on the north leg of the intersection. The Weatherby development is providing the Swedesboro-Woolwich School District with a site for an additional school within walking distance of the Receiving Zone. Providing a median refuge island will enhance safety for school students walking to the school.

FUTURE CONDITIONS ON CENTER SQUARE ROAD

The Weatherby development will continue to generate the greatest increase in traffic volume on this road. Traffic volumes calculated as part of this analysis overstate traffic volumes on this roadway because they double count traffic from the portions of Weatherby that were already occupied by 2004.

The analysis indicates that west of Township Line Road in Logan Township, future traffic volumes may require widening of Center Square Road to four lanes, ideally as an extension of the existing divided, four lane roadway that exists in Logan Township.

In Woolwich, a two lane road with turn lanes at intersections would provide adequate capacity for a road having an AADT with as much as 25,000 vehicles per day, considerably more than the 12,000 vehicles per day projected. Consideration could be given to reconstructing the road to provide a raised landscaped median separating a pair of 17' wide, one lane roadways with shoulders.

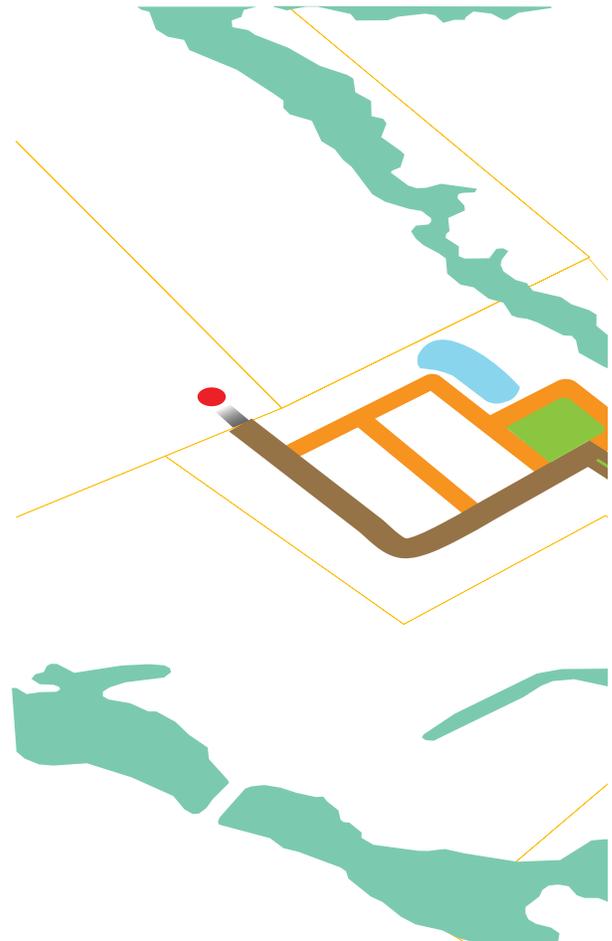
AUBURN ROAD STREET REGULATING PLAN

The 322 Regional Center Street Regulating Plan is a Master Plan circulation element establishing the location and configuration of streets by type or classification. The Plan as presented is a requirement of development.

The Plan is the result of extensive analysis of local and regional conditions, input from stakeholders including; New Jersey Department of Transportation, New Jersey Department of Community Affairs, New Jersey Department of Environmental Protection, Gloucester County, Woolwich Township and local property owners.

In an effort to address the goals of various stakeholders and to effectuate the vision of a sustainable, mixed use, walkable community based on TDR, the Plan expresses the following elements:

- The prohibition of driveway curb cuts on US Route 322, CR 551, CR 653, CR 671 and CR 672 in an effort to minimize conflicts and to maximize road way capacity.
- Gateway elements along Route 322 at Locke Avenue and at the New Jersey Turnpike entrance to signal to motorists a sense of arrival to the Center.
- A parallel roadway system along Route 322 to provide access to properties without the need of curb cuts onto the state highway.
- A Boulevard cross section for Route 322 to reinforce the sense of PLACE and to provide safe refuge for pedestrian crossings.
- A Landuse Plan designed to minimize conflicts on Route 322 – thus the commercial Main Street runs perpendicular to Route 322 along Swedesboro-Paulsboro Road and residential uses line the Route 322 parallel roadways.
- On-street parking on most streets; including Swedesboro-Paulsboro Road.
- A block structure based on the most flexible community design configuration yet devised – The GRID.
- Physical connections to Swedesboro to promote positive synergies the two Community Centers.
- A comprehensive pedestrian circulation system that includes interconnected sidewalks and paths, bicycle lanes and pedestrian friendly intersections at strategic locations to promote automobile independence throughout the Center and into the environs.



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development strategies

to travel directly to Center Square Road, thereby bypassing the intersection of Auburn Road with Center Square Road.

The aforementioned connection provides additional benefits. It serves as an alternate route for students from Auburn Road Village who can walk or bike to the Governor Stratton School without having to travel on Auburn Road. Similarly, in the future, there may be opportunities to connect Auburn Road Village to the future elementary school sites via an alternate route to Auburn Road, providing an extended route for children living not only in the Village but also in Weatherby.

Equally importantly, such a connection will allow residents of the Four Seasons development to travel directly to the commercial area in Auburn Road Village. Without a connection, these residents must first drive onto Auburn Road and then turn back off of the roadway. In this scenario, a trip to the retail area requires four turning movements onto and off of the county road if no local connection is provided; with a local connection, no trips onto the county road are required.

This connection is important in creating a future residential village that is integrally linked together rather than a set of developments that are isolated from each other.

Because the connection of the collector roadway to Amesbury Boulevard increases the amount of longer dis-

DEVELOPMENT STREETS

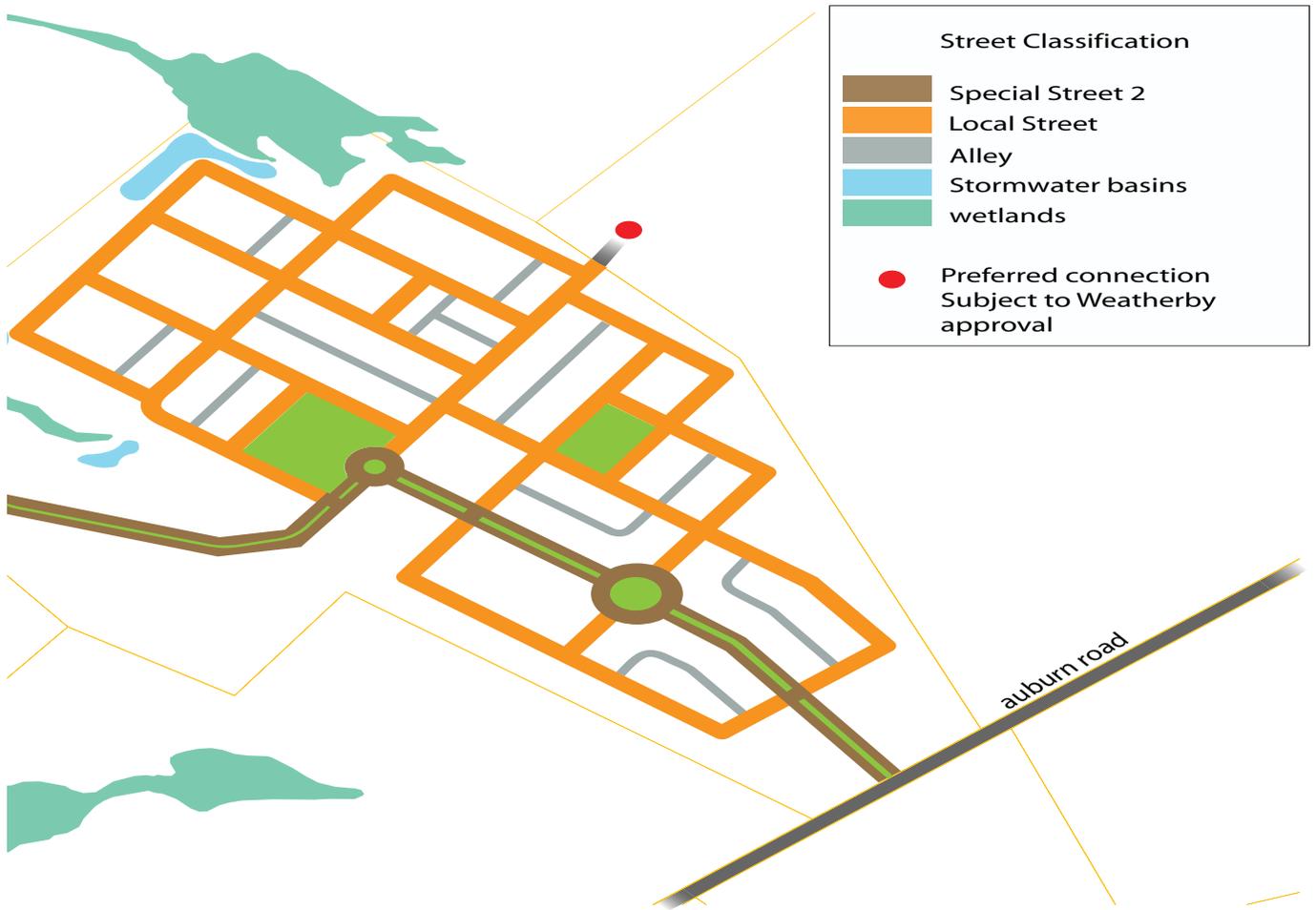
The conceptual hierarchical street network is appropriate for the proposed residential village that will be created in Auburn Road Village.

Most blocks are short yet interconnected. Appropriate traffic circles and roadway alignments have been employed to control traffic speeds as needed for a residential village.

CONNECTIONS TO THE FOUR SEASONS DEVELOPMENT

A key element of the conceptual design for Auburn Road Receiving Zone is a street connection into the Weatherby development. (Please note this report acknowledges that Weatherby has an approved Urban Development Plan and Four Seasons has an approved subdivision and therefore, a new road connection may not take place without the consent of the property owner)

The connection consists of a north-south street that intersects Amesbury Boulevard and extends the residential collector street system already assumed for the Four Seasons. This roadway allows traffic from the receiving zone



tance trips on that roadway, additional traffic calming measures are suggested on that roadway. Roundabouts with 100' diameter inside circles, heavily landscaped, and with a relatively narrow circular roadway (17') are recommended at the following intersections:

- Somerfield Road -- the first four way intersection south of Center Square Road.
- The minor residential collector street that serves the southwest portion of the Four Seasons development
- The proposed minor collector street extending through Auburn Road Village

In addition, consider providing a chicane or other speed control device at the crossing of the Indian Brook tributary to Oldmans Creek.

AUBURN ROAD

Traffic volumes on Auburn Road in the future will be substantially less than its capacity as a two-lane road.

At the intersection of the main access road, a northbound left turn lane should be provided with a raised median refuge island provided on the north leg of the intersection to shelter the turning traffic and provide pedestrians with a better crossing.

Access to loading bays and parking lots for the commercial zone should be provided via the internal street system rather than additional access points on Auburn Road.

Auburn Road should be widened to provide a 12' travel lane and 6' shoulder in each direction.

Right-of-way of 44' from the center line of the existing roadway should be dedicated to Gloucester County. The county's official map calls for a future right-of-way of 88'.

CENTER SQUARE ROAD

Traffic volumes on Auburn Road in the future will be substantially less than its capacity as a two-lane road.

No improvement requirements to this road would result from the development of the Auburn Road Receiving Zone. However, as part of this analysis, traffic capacity was evaluated at the intersections of Center Square Road with Auburn Road and King's Highway. That analysis indicated that one lane roundabouts at each intersection would provide excellent level of service, resulting in minimal delays on all entry legs. Average delays during peak travel periods would be between five and ten seconds.

AUBURN ROAD (CR 551) TRAFFIC IMPROVEMENTS

WIDENING AND RIGHT-OF-WAY DEDICATION

- Future right-of-way of 88' per county official map
- Widen to provide one 12' travel lane and one 6' shoulder in each direction

RECEIVING ZONE ACCESS ROAD

- Provide northbound left turn lane
- Provide raised median refuge island on north leg opposite the left turn lane

ACCESS CONTROL

- Prohibit additional driveways from receiving zone onto Auburn Road

CENTER SQUARE ROAD (CR 620) TRAFFIC IMPROVEMENTS (SUBJECT TO COUNTY APPROVAL)

Provide roundabouts in lieu of traffic signals at the intersections with:

- Auburn Road
- King's Highway

AMESBURY BOULEVARD TRAFFIC IMPROVEMENTS (SUBJECT TO FOUR SEASONS APPROVAL)

Provide three landscaped roundabouts to calm traffic at the following locations:

- Somerfield Road (first intersection on north)
- Minor collector road leading to SW section of Four Seasons
- Intersection with collector road leading to Receiving Zone

Provide a chicane or similar speed reduction device at crossing over tributary to Oldmans Creek.

INTERNAL COLLECTOR STREETS

Provide circular intersections and curvilinear alignments as depicted in conceptual land plan for Receiving Zone.

RESIDENTIAL ACCESS STREETS

Provide for residential access streets that are consistent with the proposed design and layout of streets for Auburn Village to include narrow cartways, no on-street parking and alley access to garages.

MID-BLOCK PEDESTRIAN CROSSING

Provide mid-block pedestrian crossing to link the two sides of the commercial development, using the median as a pedestrian refuge