FINAL REPORT

Fort Hunter/Carman Road Neighborhood Transportation Plan

Submitted by:

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in association with
The LA Group, P.C.

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ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates
50 Years

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I. INTRODUCTION

OVERVIEW

The purpose of this study is to develop a comprehensive transportation plan for the Fort Hunter/Carman Road Neighborhood in the Town of Guilderland, NY. Wilbur Smith Associates (WSA) conducted the study with assistance from the LA Group under the direction of a Study Advisory Committee (Committee). The Committee consisted of representatives from the neighborhood, the Town of Guilderland, the Capital District Transportation Committee (CDTC), the New York State Department of Transportation (NYSDOT), the Guilderland Pathways Committee, and the Guilderland Chamber of Commerce. The CDTC funded this study through its Community and Transportation Linkage Program with additional support from the Town of Guilderland.

Figure I-1 shows the Study Area for this project. The study includes a traffic management plan, a bicycle and pedestrian plan, and a streetscape concept plan. The traffic management plan focuses on Carman Road and includes specific recommendations for its intersections with East/West Lydius Streets, Fuller Station/Coons Road, Lone Pine Road, Spawn Road, and East/West Old State Roads. This section also includes recommendations for access management improvements on Carman Road from Western Avenue (NYS Route 20) to its intersection with Fort Hunter Road just north of the I-90 bridge. The bicycle and pedestrian plan recommends a comprehensive and connected network of sidewalks, shared use paths, and road-side bike lanes for the entire study area. The streetscape plan recommends conceptual landscaping, lighting, street furniture and amenities for arterial, collector, and local residential streets.

ORGANIZATION

After this general Introduction, the remainder of this report is organized into five additional sections. The first, the Land Use Plan, identifies known potential for future residential development. It also describes modifications to the pattern of future development that may be more appropriate for the Study Area (Section II). The second presents alternatives and recommendations of the Traffic Management Plan, which presents and evaluates alternatives and makes recommendations (Section III). The third presents the recommended Bicycle and Pedestrian Management Plan for the Fort Hunter neighborhood which examines the bicycle and pedestrian needs in the neighborhood, and then recommends a bicycle and pedestrian system to meet the needs (Section IV). A brief analysis highlights the benefits and challenges presented by each system. The fourth discusses the streetscape options and recommendations for the roadways (Section V). The final section presents implementation options that will help the Town realize the recommendations in this Study (Section VI).

Each of the following sections provides a brief description of the existing conditions and

concerns which are being addressed by the alternatives and recommendations. Appendix A provides a more extensive description and analysis of the existing conditions in the Study Area.

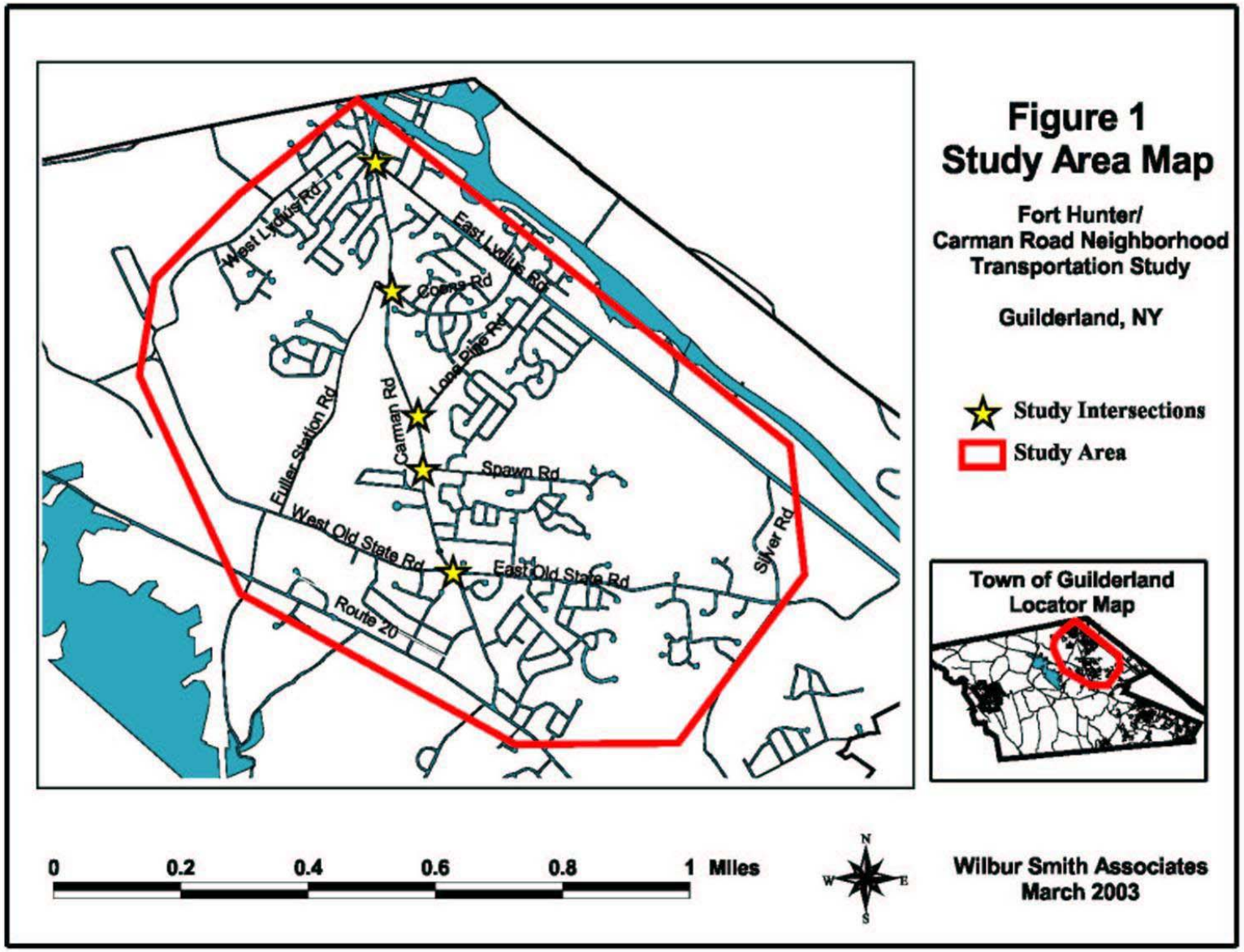

Figure I-1. Study Area

COMPREHENSIVE TOWN PLAN RECOMMENDATION

The *Town of Guilderland Comprehensive Plan 2000* describes transportation corridors within the Town as "both an amenity and a source of continued anxiety." As a result of land use and development patterns within the Fort Hunter and Carman Road community, automobile and truck congestion has been increasing while pedestrian safety and amenities have been decreasing.

The Town Plan describes the Fort Hunter Neighborhood as slightly older and better developed than the adjacent McCormick Corners. Development in both areas, according to the Town Plan, is dispersed and appears to lack any unifying character or theme. The heavy congested traffic on Route 146 divides the neighborhood. Even so, the new homes in the area; the availability of sewer and water; and proximity to the Thruway, Route 20 and the Pine Bush highlight the attractiveness of the area as a place to live.

The Comprehensive Plan calls for the overall strengthening of the sense of community, both in individual neighborhoods and the entire Town. As a means towards that goal, the Plan recommends the development of neighborhood plans, of which this study is one. It also recommends the development of access management and streetscape plans for the Route 146 corridor. Future development and infill potentials should be considered as these plans are developed. The access management and streetscape plans can be used to direct new development. Additionally, the Town Comprehensive Plan recommends the development of a pedestrian access plan to increase connections between residential areas on either side of Route 146 and between the Fort Hunter neighborhood and surrounding areas in the Town. A good pedestrian circulation system is also encouraged as a means of increasing the use of transit opportunities in the neighborhood.

QUALITY COMMUNITIES

According to the *New York State Quality Communities Interagency Task Force*, a quality community is a *place* we want to call *home*. The Task Force found that when communities were asked to define their vision for the future, the same words and phrases were heard over and over: safe family environment; economic vitality; community pride and involvement; environmental integrity and protection of community character. At the National level, the *US Congress's Livable Communities Task Force* has developed policies that help make families healthy, safe and more economically secure such as:

- Provide local communities with the tools to solve their own local problems.
- Promote cheaper, more environmentally friendly solutions to infrastructure problems.
- Encourage multi-objective management choices that have multiple beneficial results.
- Prepare communities to function in a global environment.
- Focus on a wide range of partnerships for funding solutions.

In practice, whether they are called "Quality" or "Livable," these communities typically share similar physical traits. They are "walkable," accommodating pedestrians, encouraging non-motorized mobility and promoting human interaction through the interconnection of neighborhoods, community facilities, and public spaces. They provide residents with opportunities to live or easily commute between their home, job and other activities. Most importantly, they balance a multitude of issues related to economic development, the environment, agriculture, and open space by encouraging compact, mixed-use development patterns, in and around existing centers or at identified priority growth areas, linked to more cost-efficient infrastructure and public services.

The application of these quality communities' concepts is critical to the Town of Guilderland and in particular the Ft. Hunter/Carman road corridor as accelerating suburbanization, and subsequent changes in traffic levels and patterns affect quality of life, sense of place and economy. In response to these pressures, the Town, corridor residents and stakeholders are now examining ways to retain those traits that make the Ft. Hunter/Carman Road area a place people want to call home.

The Town of Guilderland, through the development of the Ft. Hunter/Carman Road Corridor Study, will seek to focus investments in transportation infrastructure to create a quality community by developing a multi-modal transportation system for the area that integrates context sensitive community enhancements as part of these investments. These investments will strive to balance the transportation needs of the corridor with preserving and enhancing community character, quality of life and environmental quality, all the while encouraging compact, mixed-use development patterns, in and around existing centers or at identified priority growth areas.

Transportation is, in and of itself, a land use. Roads, airports, bus stations, bike paths, railways, train stations and other transportation components comprise a significant portion of Guilderland's public space and investment. As such, these spaces should reflect the values of the community. Decisions on how they are designed and utilized should reflect the multi-use of this space. Interconnections, access management, traffic calming, aesthetic controls and multi-use corridors are all means to maximize use of these spaces for the benefit of the community.

Additionally, Context Sensitive Solutions (CSS) are being incorporated routinely in transportation improvements around the State. The Department of Transportation has embraced CSS as a means of designing transportation projects in harmony with the community. Project designs advanced under this philosophy involve the community in identifying the environmental, scenic, aesthetic, cultural, natural resources, community and transportation service needs and developing solutions within the context of the project. The goal is to build and maintain safe, sustainable transportation projects that contribute to community character and quality of life.

Through the development of the Ft. Hunter/Carman Road Corridor Study, local governments and citizens have become involved early in the planning and design process to assure that CSS are incorporated into any future roadway improvement designs and that these projects contribute to the overall community character and enhancement. This concept of multi-objective, multi-modal planning should be a part of all infrastructure and land use decisions. By using CSS "Quality Communities" can be created in a timely manner and funded at a reasonable cost with public/private partnerships. The following discussion offers some further insight into implementing CSS principals in a corridor such as Ft. Hunter/Carman Road.

II. LAND USE PLAN

Based on estimates provided by the Town of Guilderland, there are a total of 595 potential new housing units in the study area that could be constructed within the ten year planning horizon. **Table II-1** summarizes the status and **Figure II-1** shows the location of these housing units. Of the 595 potential housing units, 340 are located west of Carman Road and 255 east of Carman Road.

Table 1. Status of Potential New Housing Units in Study Area

Status	Number of Housing Units
Approved Permit But Not Yet Built	249
Pending Permit Approval	86
Vacant Lots Likely To be Converted to Housing Units	260
Total	595

Overall, the current land use complexion of the Fort Hunter/Carman Road study area is illustrative of a typical suburban fringe community comprised of a primary transportation spine, numerous residential neighborhoods and a road mix of commercial and retail businesses accessed by motor vehicle that serve the existing population as Figure II-2 shows. Future land use considerations along Carman Road should be included in any future roadway improvement project considered or recommended by this plan. As such the following future land use recommendations are meant to complement and in many circumstances assist the proposed roadway improvements suggested.

For the vast majority of the study area, the existing residential zoning district locations and controls are adequate to meet and respond to current and projected development trends. Given this forecast and the nature of the existing transportation infrastructure in the neighborhood, one can perceive additional conflicts caused by the increase in vehicle traffic generated by new residential homes. However with appropriate mitigation measures and improvements to the road network as recommended in this plan, the impacts can be lessened. As such, the current land use classifications appear not to substantially contribute to future, anticipated conflicts and should generally be maintained. In addition, future subdivisions should be designed so as to provide vehicular and pedestrian interconnections between existing neighborhoods and commercial nodes along Carman Road where possible.

However several recommendations come to light with regards to controlling existing and future commercial activity within the corridor, and may require modification to some existing district boundaries. These recommendations, shown in Figure II-3, are as follows:

- Modify the commercial/retail area within the existing Local Business District (LB) and the Business Non-Retail Professional District (BN-RP) located just north of the Fuller Station Road intersection with Carman Road, and bounded by the old rail road grade by compressing the existing LB district to include all

existing identified parcels southeast of the railroad grade crossing with Carman Road. All of the parcels within the current district configuration located along the west side of Carman Road and north of the rail road grade to Ronald Place should be eliminated. Additionally, the LB district could be modified to allow more mixed use and residential uses.

- The justification for compressing this district lies in the fact that reducing the commercial area would further concentrate retail/commercial activity around an existing controlled intersection (Fuller Station Road), allowing better vehicular access in conjunction with improved access management strategies outlined in this plan. This action would further assist in the development of a defined node of commercial activity in close proximity to surrounding residential neighborhoods and public facilities (Pinebush Elementary School), and augment pedestrian access to commercial locations, and further create a gateway definition into the northern end of the corridor.

- The existing LB-zoned parcels currently located along the northern side of Western Avenue and extending east to Highland Drive should be maintained as those parcels are too small to accommodate the more intense uses allowed in the GB district. Given the current nature of existing commercial businesses in this area, and their scale and intensity, further concentrating such moderately scaled commercial uses would further define this area as a primary commercial node to the corridor, to commuter traffic, and to the surrounding residential neighborhoods. The immediate area is also emerging as the de facto center of municipal government and commerce for all of western Guilderland and as such should be allowed to expand to meet current demands. In addition adequate public infrastructure and facilities exist to support this proposed change in land use.

- There are several vacant parcels of land in and around the corridor that could lend themselves suitable for commercial or more intense residential development. One such location is the 17 acre parcel located on the east side of Carman Road between Lone Pine Road and Spawn Road. Currently zoned General Business (GB), consideration should be given to changing the zoning of this large parcel to Local Business (LB) for the development of a small scale, pedestrian oriented, commercial/retail "village", or for the development of a senior apartment/townhouse village.

- Given the existing zoning classifications, the LB district would be the preferred alternative due to the fact that limiting the amount of commercial activity outside of the commercial nodes along the corridor would lessen traffic impacts to the area. However, in an effort to further respond to regional market trends, consideration should also be given by the Town for the creation of a new, "Traditional Neighborhood Development District" (TNDD) for this and other transitional areas of the corridor. It is envisioned that a new TNDD would allow

for more of a pedestrian friendly, neighborhood scale, mix of small-sized local commercial uses interspersed with and/or incorporating a secondary mix of on-site residential uses. This new district designation would in many ways mirror the more traditional Planned Development Districts (PDD) found in larger parcel developments, but would provide for smaller-scaled, context sensitive, in-fill development in areas physically limited by existing/adjacent development.

- Access to and from the site should also be restricted to Lone Pine and Spawn Roads, further reducing the amount of traffic directly impacting Carman Road. All proposed future development of this site should also be required to provide pedestrian connection to the existing Timothy Lane/Joelle Drive neighborhood.

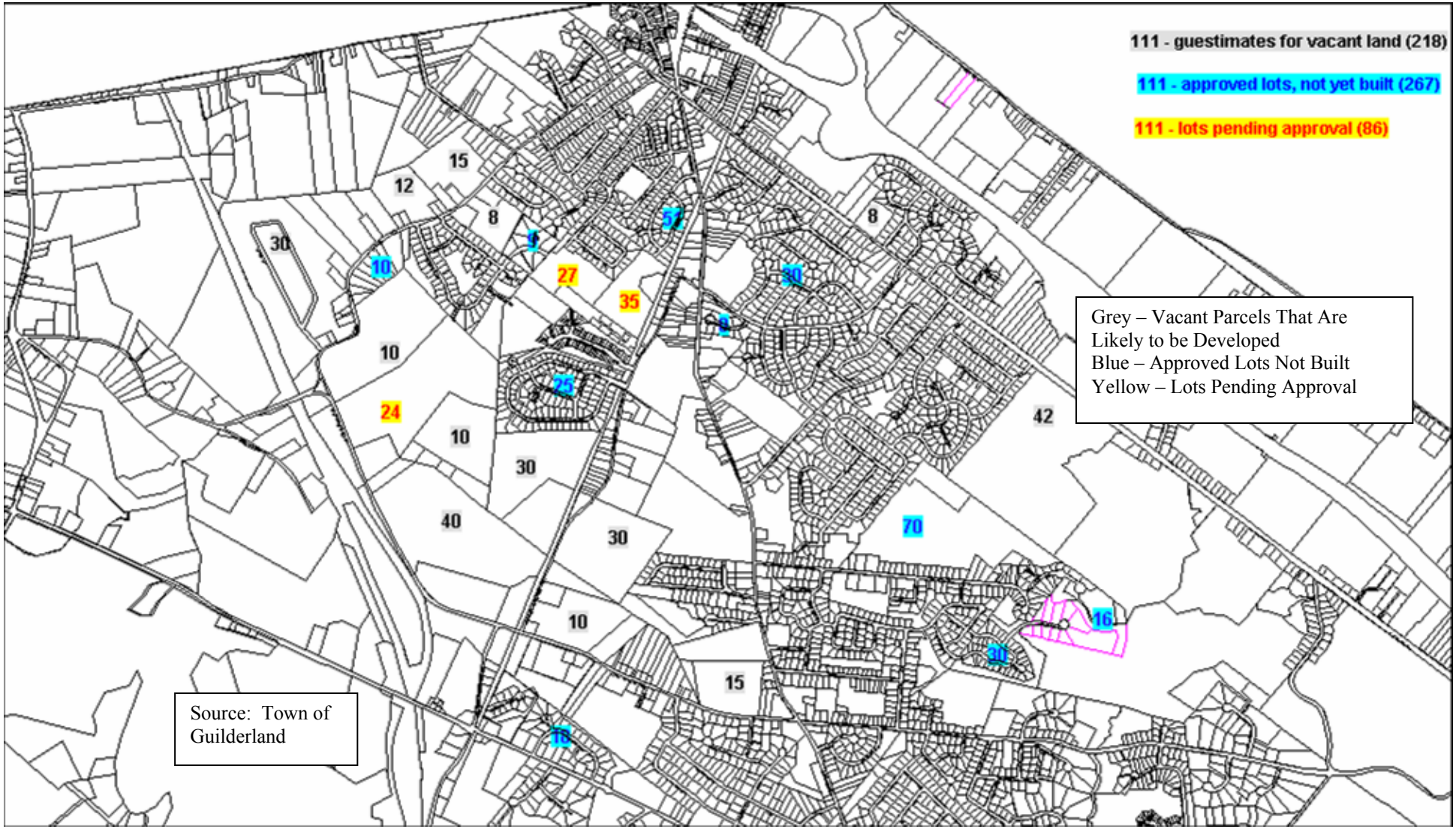

Figure II-1. Potential New Housing Development

III. TRAFFIC MANAGEMENT PLAN

OVERVIEW

The traffic management plan of the Fort Hunter/Carman Road Neighborhood Transportation Plan presents:

- Traffic projections for the year 2012;
- Evaluation of 2012 intersection performance with existing lane geometry and control;
- Plans and assessments of different intersection design alternatives;
- Recommended intersection improvement alternatives;
- Assessment of access management issues;
- Recommended access improvements; and
- Identification of miscellaneous highway improvements.

As the project began, the Town indicated that it wanted to find ways to address the increase in traffic other than widening Carman Road to four lanes. Appendix B presents Future Traffic Projections, which help to understand what the future issues and problems may be at the intersections along the Corridor.

INTERSECTION DESIGN ALTERNATIVES

This section presents alternatives to address the issues raised in the 2012 capacity analysis and in the existing conditions analysis. For the most part, the alternatives consist of additional turn lanes, new traffic signals and a roundabout. All of the alternatives include provisions for pedestrians. The analyses below assume that pedestrians will cross an approach with a cross-walk every ten minutes during the AM and PM peak hours at all but the Fuller Station/Coons Road intersection. Because of its proximity to the Pine Bush Elementary School, a pedestrian crossing was assumed every five minutes at the Fuller Station/Coons Road intersection. These assumptions are conservative but ensure that adequate provisions for pedestrians are considered.

EAST/WEST LYDIUS STREETS

Summary of Issues Related to a Do Nothing Alternative (Existing Conditions)

- Poor level of service and excessive queues on the East Lydius, West Lydius, and Carman Road northbound approaches are projected in 2012;
- Continuous curb cuts exist on each side of Carman Road at its southbound approach to the intersection; and
- The skewed angle between Carman Road and East/West Lydius Street creates difficult

turning radii and design challenges.

Note: After the initiation of this study, NYSDOT installed crosswalks on both approaches of Carman Road and East Lydius Road at this intersection and will be installing an on-call protected pedestrian signal, as well as left turn signals for Carman Road. The analysis presented here is based on the signals as they were at the start of this study and still are at its conclusion.

Alternative 1: Implement a Split Phase Timing Plan

Features

- The purpose of this alternative is to address existing delays on the East and West Lydius Street approaches to Carman Road by providing a split phase. The following assessment has been conducted for existing conditions only. The 2012 projected LOS shown in **Tables III-1 and III-2** assumed that traffic signal timings have been optimized. These tables demonstrate that traffic signal timing optimization will not address projected traffic congestion at this intersection under 2012 conditions. Therefore, this alternative is being analyzed as a short term solution only.

Table III-1. Carman Road with East and West Lydius Streets 2012 AM Peak Hour

AM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	F	B	D	D	D
Delay (Seconds)	88	16	47	37	46
Queue (Feet)	150	54	292	222	Not Applicable

Table III-2. Carman Road with East and West Lydius Streets 2012 PM Peak Hour

PM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	F	D	A	D	C
Delay (Seconds)	128	38	9	37	35
Queue (Feet)	75	44	113	255	Not Applicable

- The split phase timing plan consists of the following three phases:

Phase 1: West Lydius Street receives the green light while all other approaches

are red;

Phase 2: East Lydius Street receives a green light while all other approaches are red; and
Phase 3: Carman Road northbound and southbound receive a green light and are permitted to move at the same time while East and West Lydius Street are red.

Performance

Tables III-3 and III-4 present the results of this alternative:

Table III-3. Carman Road with East and West Lydius Streets 2002 AM Peak Hour – Existing Timing versus East/West Lydius Split Phase

AM Peak Hour	W. Lydius		E. Lydius		Carman Rd Northbound		Carman Road Southbound		Average Intersection	
	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase
Level of Service	E	E	C	F	C	C	C	C	C	D
Delay (Seconds)	56	62	20	151	24	30	25	31	29	52
Average Queue (Feet)	182	194	41	53	342	327	311	303	Not Applicable	

Table III-4. Carman Road with East and West Lydius Streets 2002 PM Peak Hour– Existing Timing versus East/West Lydius Split Phase

PM Peak Hour	W. Lydius		E. Lydius		Carman Rd Northbound		Carman Road Southbound		Average Intersection	
	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase	Existing Timing	Split Phase
Level of Service	D	D	C	D	A	B	B	B	B	C
Delay (Seconds)	48	46	30	54	8	18	11	32	15	30
Average Queue (Feet)	120	100	104	81	273	263	519	360	Not Applicable	

Qualitative & Overall Assessments

- During the 2002 AM peak hour, the split phase for East and West Lydius Streets results in level of service dropping from "C" to "F" on the East Lydius Street approach. Delays are increased slightly on all other approaches.

- During the PM peak hour, the split phase increases delays and vehicle queues slightly

on all approaches.

- The split phase has a negative impact on the overall operation of this intersection.

Alternative 2: Add Turn Lanes to Each Approach

Features (See **Figure III-1**)

- Add exclusive left turn lanes to the West Lydius, Carman Road southbound, and Carman Road northbound approaches;
- Add exclusive right-turn lane to the East Lydius Street approach;
- Add cross walks to the East Lydius, West Lydius and Carman Road northbound and southbound approaches with "on-call pedestrian buttons";
- Provide islands on the northwest and southeast corners to channelize right-turning traffic and reduce pedestrian crossing distance by providing a pedestrian refuge island; and
- Create a one-way in, well defined driveway to the pharmacy located in the northeast corner. Provide an exit to Lillian Road through a new driveway.

Performance

- Acceptable LOS is projected for all approaches in the 2012 AM and PM peak hours as **Tables III-5 and III-6** show.

Table III-5. Carman Road with East and West Lydius Streets 2012 AM Peak Hour with Alternative 1

AM Peak Hour	W. Lydius		E. Lydius		Carman Rd Northbound		Carman Road Southbound		Average Intersection
	Left	Through-Right	Right	Through-Left	Left	Through-Right	Left	Through-Right	
Level of Service	C	B	C	B	A	B	B	A	B
Delay (Seconds)	31	18	25	18	5	15	14	10	17
Queue (Feet)	84	22	33	14	3	201	12	127	Not Applicable

Table III-6. Carman Road with East and West Lydius Streets 2012 AM Peak Hour with Alternative 1

PM Peak Hour	W. Lydius		E. Lydius		Carman Rd Northbound		Carman Road Southbound		Average Intersection
	Left	Through-Right	Right	Through-Left	Left	Through-Right	Left	Through-Right	
Level of Service	C	C	C	C	A	A	A	B	B
Delay (Seconds)	27	26	26	27	5	7	6	11	11
Queue (Feet)	30	14	27	0	6	89	15	137	Not Applicable

Qualitative & Overall Assessments

- The realignment necessary to accommodate the additional turning lanes will impact the parking lots to the pharmacy and the church located in the northeast quadrant of the intersection.

- This alternative improves safety and mobility for pedestrians.
- The access management improvements will improve traffic safety and efficiency.

Alternative 3: Single Lane Modern Roundabout

Features (See **Figure III-2**)

- Single lane on all four approaches;
- 120 foot inscribed diameter;
- Includes a mountable apron around the center island to accommodate school buses and trucks; and
- Includes cross walks.

Performance

- During the 2012 PM peak hour, a single lane roundabout is projected to provide acceptable levels of service on all approaches, and minimizes vehicle queues as **Table III-7** shows.

- During the 2012 AM peak hour, the East Lydius approach is projected to operate at LOS F with excessive vehicle queues. Excessive vehicle queues are also projected on the Carman Road northbound approach as **Table III-8** shows.

Table III-7. Carman Road with East and West Lydius Streets 2012 AM Peak Hour Performance with Alternative 2 - Roundabout

AM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	F	B	A	C
Delay (Seconds)	19	100	19	9	26
Queue (Feet)	148	650	505	97	Not Applicable

Table III-8. Carman Road with East and West Lydius Streets 2012 PM Peak Hour Performance with Alternative 2 - Roundabout

PM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	B	B	A	B
Delay (Seconds)	18	16	11	10	11
Queue (Feet)	64	67	142	187	Not Applicable

Qualitative & Overall Assessment

- The advantages of a roundabout include:
    - The opportunity to create a gateway to the Fort Hunter/Carman Road Neighborhood;
    - The ability to slow traffic as it enters the neighborhood; and
    - Roundabouts have been shown to improve safety. Crashes are reduced by 51%, injuries by 73% and property damage by 32%.
- The disadvantaged of roundabouts include:
    - Difficultly for pedestrians to cross the road because traffic yields rather than stops as it enters the roundabouts;
    - Difficulty for bicyclists because after being on a road shoulder or in a bike lane, they are forced to merge with traffic in the roundabout. This however, is the safest way to travel in a roundabout;
    - Roundabouts present special challenges for the elderly and persons with disabilities. Blind pedestrians have difficulty locating crossings and determining crossing gaps.
- The roundabout alternative will encroach upon the house in the southwest corner and the pharmacy in the northeast corner.
- The single lane roundabout functions well during the PM peak hour with minimal delay and vehicle queues. However, during the AM peak hour the single lane roundabout does not provide enough capacity resulting in LOS F and long vehicle queues on East Lydius Street and long vehicle queues on northbound Carman Road.

East/West Lydius Street Intersection Recommendation

Implementation of a split phase timing plan increases delays on all approaches and is not recommended for existing or future conditions.

Alternative 2 is recommended for the long term. The benefits of this alternative include:

- Ability to accommodates projected traffic volumes with acceptable delays and average vehicle queue lengths;
- Improvement in pedestrian mobility and safety by providing cross-walks, pedestrian refuge islands and on-call pedestrian signals;
- Improvement in access safety and efficiency to the surrounding commercial property; and

- Minimal impact to surrounding property.

FULLER STATION AND COONS ROAD

Summary of Issues Related to a Do Nothing Alternative (Existing Conditions)

- Performance is projected to remain at acceptable limits in 2012 with existing lane geometry and optimized traffic signal timing plans; and

- No cross-walks or pedestrian signals currently exist even though the intersection is adjacent to the Pine Bush Elementary School.

Alternative 4: Add Cross Walks and "On-Call" Pedestrian Button

Features (See **Figure III-3**)

- Add cross walks across Coons Road, northbound and southbound Carman Road and Fuller Station Road and provide an "on-call" pedestrian button; and
- No vehicle lanes are added.

Performance

- Projected 2012 LOS and vehicle queues are acceptable on all approaches during the AM and PM peak hours and would not change significantly from the results presented in **Tables III-9 and III-10**.

Table III-9. Carman Road with Fuller Station and Coons Road 2012 AM Peak Hour

AM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	B
Delay (Seconds)	34	23	6	8	12
Queue (Feet)	42	15	76	87	Not Applicable

Table III-10. Carman Road with Fuller Station and Coons Road 2012 PM Peak Hour

PM Peak Hour	Fuller Station Road	Coons Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	D	D	A	A	B
Delay (Seconds)	36	35	5	9	11
Queue (Feet)	31	21	72	122	Not Applicable

Qualitative and Overall Assessment

- Cross-walks with on-call pedestrian service from the traffic signal can be accommodated with little or no impact to traffic flow.

- These pedestrian improvements will improve safety for children walking to school and other pedestrians.

Alternative 5: Add Cross Walks with an Exclusive Pedestrian Phase

Features

- Add cross walks across Coons Road, northbound and southbound Carman Road, and Fuller Station Road and include an exclusive pedestrian phase in the traffic signal timing that stops all vehicles while pedestrians cross the street. The exclusive pedestrian phase will occur in every cycle of the traffic signal.
- No vehicle lanes are added.

Performance

- During the 2012 AM peak hour, projected level of service remains acceptable as **Table III-11** shows.

- During the 2012 PM peak hour, the Fuller Station Road approach is projected to operate at LOS E as **Table III-12** shows.

Table III-11. Carman Road with Fuller Station and Coons Road 2012 AM Peak Hour With Exclusive Pedestrian Phase

AM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	D	C	B	C	C
Delay (Seconds)	36	26	12	16	17
Queue (Feet)	53	20	98	113	Not Applicable

Table III-12. Carman Road with Fuller Station and Coons Road 2012 PM Peak Hour with Exclusive Pedestrian Phase

PM Peak Hour	Fuller Station Road	Coons Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	E	D	A	B	C
Delay (Seconds)	56	53	7	13	23
Queue (Feet)	38	29	77	134	Not Applicable

Qualitative and Overall Assessment

- The purpose of this alternative was to test the intersection's ability to accommodate traffic and an exclusive, protected pedestrian phase. An exclusive pedestrian phase is reasonable at this location because it provides complete protection for pedestrians crossing the intersection which will include children from the Pine Bush Elementary School.

- Without additional capacity, the exclusive pedestrian phase results in LOS E on the Fuller Station Road approach in the PM peak hour.

Alternative 6: Add exclusive left turn lanes to Carman Road Northbound and Southbound Approaches.

Features (See **Figure III-4**)

- Exclusive left turn lanes added to northbound and southbound Carman Road;

- Add cross walks across Coons Road, northbound and southbound Carman Road, and Fuller Station Road and include an exclusive pedestrian phase in the traffic signal timing that stops all vehicles while pedestrians cross the street. The exclusive pedestrian phase will occur in every cycle of the traffic signal.

Performance

- LOS is acceptable for all lanes and the intersection during AM and PM peak hours, as **Tables III-13 and III-14** show.

Table III-13. Carman Road with Fuller Station and Coons Road 2012 AM Peak Hour – With Alternative 6 – Left Turn Lanes on Carman Road and Exclusive Pedestrian Phase

AM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound		Carman Road Southbound		Average Intersection
	Left-Thru-Right	Left-Thru-Right	Left	Thru-Right	Left	Thru-Right	
Level of Service	D	C	A	B	A	B	B
Delay (Seconds)	47	27	5	11	9	11	16
Queue (Feet)	36	13	1	76	11	66	Not Applicable

Table III-14. Carman Road with Fuller Station and Coons Road 2012 PM Peak Hour – With Alternative 6: Left Turn Lanes on Carman Road and Exclusive Pedestrian Phase

PM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound		Carman Road Southbound		Average Intersection
	Left-Thru-Right	Left-Thru-Right	Left	Thru-Right	Left	Thru-Right	
Level of Service	C	C	A	A	A	B	B
Delay (Seconds)	31	31	5	8	6	10	12
Queue (Feet)	26	17	1	67	10	87	Not Applicable

Qualitative and Overall Assessment

- This alternative provides maximum safety for pedestrians and accommodates traffic.

- Because this alternative requires adding lanes, the widening will have minor impacts to adjacent properties.

Fuller Station/Coons Road Intersection Recommendation

Alternative 4 is recommended. The benefits of this alternative include:

- Ability to accommodate traffic volumes with acceptable delays and average vehicle queue lengths without adding new turning lanes or other widening;
- Available reserve capacity to accommodate additional traffic that may pass through this intersection as a result of the new local connector road proposed between West Lydius Street and Fuller Station Road;
- Improvement in pedestrian mobility and safety by providing cross-walks and on-call pedestrian signals; and
- No impact to surrounding property.

LONE PINE ROAD

Summary of Issues Related to a Do Nothing Alternative (Existing Conditions)

- LOS and vehicle queues are acceptable in 2002. Left turns from Lone Pine Road are projected to have a level of service E; other LOS levels and queus are acceptable for 2012 projected conditions;

- Lone Pine Road is a collector street that serves several local residential streets. Lone Pine Road also provides a connection between Carman Road and East Lydius Street.

- Lack of cross-walks.

Alternative 7: Add Exclusive Right and Left Turn Lanes to Lone Pine Road

Features (See **Figure III-5**)

- Widen the Lone Pine Road approach to include exclusive right and left turn lanes; and
- Add cross-walks on Lone Pine Road and on Carman Road southbound.

Performance

- LOS and vehicle queues remain acceptable during the AM peak hour as **Table III-15** shows.

- During the PM peak hour an LOS E is projected for left turns from Lone Pine Road as **Table III-16** shows.

Table III-15. Carman Road with Lone Pine Road 2012 AM Peak Hour – Alternative 7: Turn Lanes on Lone Pine Road

AM Peak Hour	Lone Pine Road Left	Lone Pine Right	Carman Rd Southbound Left	Average Intersection
Level of Service	D	B	A	A
Delay (Seconds)	30	13	1	2
Queue (Feet)	23	4	2	Not Applicable

Table III-16. Carman Road with Lone Pine Road 2012 PM Peak Hour – Alternative 7: Turn Lanes on Lone Pine Road

PM Peak Hour	Lone Pine Road Left	Lone Pine Right	Carman Rd Southbound Left	Average Intersection
Level of Service	E	B	A	A
Delay (Seconds)	40	14	1	2
Queue (Feet)	35	5	2	Not Applicable

Qualitative and Overall Assessment

- Increases crossing distance for pedestrians on Lone Pine Road;
- Reduces delay for right turning vehicles from Lone Pine Road but does not improve service for left turning vehicles;
- The widening of Lone Pine Road will have a minor impact on adjacent property.

Alternative 8: Add Turn Lanes to all Approaches

Features (See **Figure III-6**)

- Add left turn lane to Carman Road Southbound;
- Add right turn lane to Carman Road Northbound;
- Provide exclusive left and right turn lanes on Lone Pine Road; and
- Provide a cross walk across Lone Pine Road

Performance

- Projected 2012 AM peak hour LOS is acceptable for all approaches as **Table III-17** shows.

- Projected 2012 PM peak hour LOS remains at "E" for left turns but is improved to "B" for right turns as **Table III-18** shows.

Table III-17. Carman Road with Lone Pine Road 2012 AM Peak Hour – Alternative 8: Turn Lanes on all Approaches

AM Peak Hour	Lone Pine Road Left	Lone Pine Right	Carman Rd Southbound Left	Average Intersection
Level of Service	D	B	A	A
Delay (Seconds)	30	13	9	2
Queue (Feet)	23	4	2	Not Applicable

Table III-18. Carman Road with Lone Pine Road 2012 PM Peak Hour – Alternative 8: Turn Lanes on all Approaches

PM Peak Hour	Lone Pine Road Left	Lone Pine Right	Carman Rd Southbound Left	Average Intersection
Level of Service	E	B	A	A
Delay (Seconds)	36	13	9	2
Queue (Feet)	33	5	2	Not Applicable

Qualitative and Overall Assessment

- The additional turn lanes on Carman Road have both a potential positive and negative effect on safety. The turn lanes could prevent rear-end collisions between northbound and southbound through vehicles and vehicles waiting to make a left turn, or slowing to make a right turn. At the same time, providing exclusive through lanes could encourage higher speeds on Carman Road.

- The additional lanes on Lone Pine Road reduce delay for right turning vehicles but do not reduce delay for left turning vehicles.

- The additional lanes increase pedestrian crossing distance on Lone Pine Road and on Carman Road. Safety for pedestrians is also reduced due to the potential for increased speeds described above.

- The additional lanes will have a minor impact on adjacent property.

Alternative 9: Install Traffic Signal

Features (See **Figure III-7**)

- Add traffic signal;
- Add cross walk across Lone Pine and Carman Road with "On-Call" pedestrian button; and
- Keep current lane configurations.

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Traffic Signal Warrant Analysis

Traffic signals should not be installed unless one or more of the warrants in the Manual on Uniform Traffic Control Devices (MUTCD) are met. The MUTCD includes eight traffic signal warrants that are intended for application under different situations. The warrants applicable to Lone Pine Road and Spawn Road are:

- Warrant #2, the Four-Hour Vehicular Volume warrant, is applied when the intersection volume is the principal reason for considering a traffic signal; and

- Warrant #8, the Roadway Network warrant, is applied when it is desirable to encourage concentration and organization of traffic flow on a highway network.

As shown in **Table III-19**, the Four-Hour Vehicular signal warrant is satisfied under estimated 2012 traffic volumes at the Lone Pine intersection with Carman Road. Estimated 2012 traffic volumes for four hours of a typical weekday are shown for the major street (Carman Road) and minor street (Lone Pine Road). Traffic volumes for the 7:00-8:00 AM and 4:00-5:00 PM hours are taken directly from the 2012 traffic volume projections developed above. The traffic volumes for the 6:00-7:00 AM and 3:00-4:00 PM hours were developed based on the hourly traffic variations found along Carman Road as shown in **Figure A-14** in the Existing Conditions section of this study. **Table III-19** indicates whether or not the traffic volumes for a particular hour exceed the MUTCD thresholds for an intersection with one lane on each approach and posted speed limits greater than 40 miles per hour.

Table III-19. Warrant 2 - Four Hour Traffic Signal Warrant Analysis for Lone Pine Road in 2012

Time Period	Vehicles per Hour in Both Directions on Major Street (Carman Road)	Vehicles Per Hour in One Direction on Minor Street(Lone Pine)	Is MUTCD Volume Threshold Exceeded (See Note 1)
7:00 – 8:00 AM	1,157	70	Yes
8:00 – 9:00 AM	1,099	67	Yes
3:00 - 4:00 PM	1,233	71	Yes
4:00 - 5:00 PM	1,325	76	Yes

Note 1: The volume thresholds are defined by the curves contained in Figure 4C-2 of 2000 MUTCD.

Projected conditions in 2012 also satisfy the Roadway Network warrant. This warrant requires that traffic volume entering an intersection during the peak hour of a typical weekday exceeds 1,000 vehicles per hour and that one or more of Warrants 1, 2, or 3 are met during a typical

weekday. **Table III-19** above demonstrates that Warrant 2 is satisfied under projected conditions. **Table III-20** below demonstrates that under both existing and projected conditions, the entering volume during the AM and PM peak hours exceeds 1,000 vehicles per hour.

Table III-20. Traffic Entering the Lone Pine/Carman Road Intersection

	2002 Entering Volume	2012 Entering Volume
AM Peak Hour	1,086	1,292
PM Peak Hour	1,228	1,465

This analysis demonstrates that future traffic conditions at the Lone Pine/Carman Road intersection, as developed in this study, satisfy two of the MUTCD warrants for traffic signals.

Performance

- Projected 2012 AM and PM peak hour LOS and queues are acceptable on all approaches as **Tables III-21 and III-22** show.

Table III-21. Carman Road with Lone Pine Road 2012 AM Peak Hour – Alternative 9: Add Traffic Signal

AM Peak Hour	Lone Pine Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	B	B	B
Delay (Seconds)	10	15	15	15
Queue (Feet)	8	98	113	Not Applicable

Table III-22. Carman Road with Lone Pine Road 2012 PM Peak Hour – Alternative 9 Add Traffic Signal

PM Peak Hour	Lone Pine Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	B	B	B
Delay (Seconds)	15	14	11	13
Queue (Feet)	13	133	124	Not Applicable

Qualitative and Overall Assessment

- This alternative accommodates projected traffic with little delay and minimal vehicle queues without requiring the addition of turn lanes.

- Pedestrian safety and mobility will be enhanced by providing on-call pedestrian phases and by minimizing roadway crossing width.

- Providing a traffic signal at Lone Pine Road will enhance the overall neighborhood network by providing a protected exit for vehicle trips from the connecting local residential streets.

Recommendation for Lone Pine Road Intersection

Alternative 9, installing a traffic signal without additional turn lanes, is the recommended alternative. The benefits of this alternative include:

- Improvements to pedestrian safety and mobility by minimizing crossing distance, providing cross-walks, and providing on-call pedestrian signals;
- Improving the overall street network by providing a protected exit to Carman Road for residential streets that connect to Lone Pine Road;
- Minimal impact to adjacent property; and
- Ability to accommodate future year traffic volumes with minimal delay and vehicle queues.

SPAWN ROAD

Summary of Issues Related to a Do Nothing Alternative (Existing Conditions)

- LOS F is projected on the Spawn approach during the 2012 PM peak hour;
- LOS and vehicle queues are acceptable at all other time periods; and
- Lack of cross-walks.

Alternative 10: Add Exclusive Right and Left Turn Lanes to Spawn Road

Features (See **Figure III-8**)

- Widen the Spawn Road approach to include exclusive right and left turn lanes; and
- Add cross-walks on Spawn Road and on Carman Road southbound.

Performance

- LOS and vehicle queues remain acceptable during the AM peak hour as **Table III-23** shows.

- During the PM peak hour an LOS F is projected for left turns from Spawn Road as **Table III-24** shows.

Table III-23. Carman Road with Spawn Road 2012 AM Peak Hour – Alternative 10: Turn Lanes on Spawn Road

AM Peak Hour	Spawn Road Left	Spawn Road Right	Carman Rd Southbound Left	Average Intersection
Level of Service	D	B	A	A
Delay (Seconds)	30	13	1	3
Queue (Feet)	33	16	2	Not Applicable

Table III-24. Carman Road with Spawn Road 2012 PM Peak Hour – Alternative 10: Turn Lanes on Spawn Road

PM Peak Hour	Spawn Road Left	Spawn Road Right	Carman Rd Southbound Left	Average Intersection
Level of Service	F	B	A	A
Delay (Seconds)	70	15	3	4
Queue (Feet)	65	8	9	Not Applicable

Qualitative and Overall Assessment

- Increases crossing distance for pedestrians on Spawn Road;
- Reduces delay for right turning vehicles from Lone Pine Road but does not improve service for left turning vehicles;
- The widening of Spawn Road will have a minor impact on adjacent property.

Alternative 11: Add Turn Lanes to all Approaches

Features (See **Figure III-9**)

- Add left turn lane to Carman Road southbound;
- Add right turn lane to Carman Road northbound;
- Provide exclusive left and right turn lanes on Spawn Road; and
- Provide a cross walk across Spawn Road.

Performance

- Projected 2012 AM peak hour LOS is acceptable for all approaches as **Table III-25** shows.

- Projected 2012 PM peak hour LOS remains at "F" for left turns but is improved to "B" for right turns as **Table III-26** shows.

Table III-25. Carman Road with Spawn Road 2012 AM Peak Hour – Alternative11: Turn Lanes on all Approaches

AM Peak Hour	Spawn Road Left	Spawn Right	Carman Rd Southbound Left	Average Intersection
Level of Service	D	B	A	A
Delay (Seconds)	30	13	9	3
Queue (Feet)	33	15	2	Not Applicable

Table III-26. Carman Road with Spawn Road 2012 PM Peak Hour – Alternative 11: Turn Lanes on all Approaches

PM Peak Hour	Spawn Road Left	Spawn Right	Carman Rd Southbound Left	Average Intersection
Level of Service	F	B	A	A
Delay (Seconds)	43	14	10	3
Queue (Feet)	68	8	9	Not Applicable

Qualitative and Overall Assessment

- The additional turn lanes on Carman Road have both a potential positive and negative effect on safety. The turn lanes could prevent rear-end collisions between northbound and southbound through vehicles and vehicles waiting to make a left turn, or slowing to make a right turn. At the same time, providing exclusive through lanes could encourage higher speeds on Carman Road.

- The additional lanes on Spawn Road reduce delay for right turning vehicles but do not reduce delay for left turning vehicles.

- The additional lanes will have a minor impact on adjacent property; and

- The additional lanes increase the amount of roadway a pedestrian must cross.

Alternative 12: Install Traffic Signal

Features (See **Figure III-10**)

- Add traffic signal;
- Add cross walk across Spawn Road and Carman Road with "On-Call" pedestrian button; and
- Do not add additional lanes.

Traffic Signal Warrant Analysis

As shown in **Table III-27**, the Four-Hour Vehicular signal warrant is satisfied under estimated 2012 traffic volumes at the Spawn Road intersection with Carman Road. The traffic volumes were estimated using the same methodology described under the Lone Pine traffic signal warrant analysis section above. **Table III-27** indicates whether or not the traffic volumes for a particular hour exceed the MUTCD thresholds for an intersection with one lane on each approach and posted speed limits greater than 40 miles per hour.

Table III-27. Warrant 2 - Four Hour Traffic Signal Warrant Analysis for Spawn Road in 2012

Time Period	Vehicles per Hour in Both Directions on Major Street (Carman Road)	Vehicles Per Hour in One Direction on Minor Street(Spawn Road)	Is MUTCD Volume Threshold Exceeded (See Note 1)
6:00 - 7:00 AM	1,101	157	Yes
7:00 - 8:00 AM	1,046	150	Yes
3:00 - 4:00 PM	1,337	91	Yes
4:00 - 5:00 PM	1,438	98	Yes

Note 1: The volume thresholds are defined by the curves contained in Figure 4C-2 of 2000 MUTCD.

Projected conditions in 2012 also satisfy the Roadway Network warrant. This warrant requires that traffic volume entering an intersection during the peak hour of a typical weekday exceeds 1,000 vehicles per hour and that one or more of Warrants 1, 2, or 3 are met during a typical weekday. **Table III-27** above demonstrates that Warrant 2 is satisfied under projected conditions. **Table III-28** below demonstrates that under both existing and projected conditions, the entering volume during the AM and PM peak hours exceeds 1,000 vehicles per hour.

Table III-28. Traffic Entering the Spawn Road/Carman Road Intersection

	2002 Entering Volume	2012 Entering Volume
AM Peak Hour	1,071	1,322
PM Peak Hour	1,2971	1,605

This analysis demonstrates that future traffic conditions at the Spawn Road/Carman Road intersection, as developed in this study, satisfy two of the MUTCD warrants for traffic signals.

Performance

- Projected 2012 AM peak hour LOS and queues are acceptable on all approaches as **Table III-29** shows.
- Projected 2012 PM peak hour LOS is acceptable on all approaches as **Table III-30** shows.

Table III-29. Carman Road with Spawn Road 2012 AM Peak Hour – Alternative 12: Add Traffic Signal

AM Peak Hour	Spawn Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	B	B	B
Delay (Seconds)	14	10	13	12
Queue (Feet)	14	78	121	Not Applicable

Table III-30. Carman Road with Spawn Road 2012 PM Peak Hour – Alternative 12: Add Traffic Signal

PM Peak Hour	Spawn Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	B	B	B	B
Delay (Seconds)	18	13	28	20
Queue (Feet)	17	154	193	Not Applicable

Qualitative and Overall Assessment

- The traffic signal accommodates the traffic with little delay and minimal vehicle queues.

- Pedestrian safety and mobility will be enhanced by providing on-call pedestrian phases and by minimizing roadway crossing width.

- Providing a traffic signal at Spawn Road will enhance the overall neighborhood network by providing a protected exit for vehicle trips from the connecting local residential streets.

Recommendation for Spawn Road Intersection

Alternative 12, installing a traffic signal without additional turn lanes, is the recommended alternative. The benefits of this alternative include:

- Improvements to pedestrian safety and mobility by minimizing crossing distance, providing cross-walks, and providing on-call pedestrian signals;
- Improving the overall street network by providing a protected exit to Carman Road for residential streets that connect to Spawn Road;
- Minimal impact to adjacent property; and
- Ability to accommodate future year traffic volumes with minimal delay and vehicle queues.

EAST AND WEST OLD STATE ROADS

Summary of Issues Related to a Do Nothing Alternative (Existing Conditions)

- By 2012 the projected LOS worsens to "E" on the West Old State and East Old State Road approaches during the PM peak hour;
- No cross-walks or pedestrian signals currently exist;
- Continuous curb cuts on Carman Road and East Old State Road provide access to a restaurant in the northeast corner of the intersection.

Alternative 13: Add Turn Lanes and Cross Walks

Features (See **Figure III-11**)

- Add left turn lane to Carman Road northbound;
- Add right turn lane to West Old State Road;
- Add cross walks with on-call pedestrian buttons; and
- Replace the continuous curb cut for the restaurant with a one-way in entrance from Carman Road and a two-way driveway with access to East Old State Road.

Performance

- Projected LOS and vehicle queues are acceptable for all approaches and lanes during the AM and PM peak hours as **Tables III-31 and III-32** show.

Table III-31. Carman Road with East and West Old State Roads 2012 AM Peak Hour – Alternative 13: Additional Lanes

AM Peak Hour	West Old State Road		East Old State Road	Carman Road Northbound		Carman Road Southbound	Average Intersection
Lane or Approach	Thru – Left	Right	Left-Thru-Right	Left	Thru-Right	Left-Thru-Right	
Level of Service	C	C	C	A	A	A	B
Delay (Seconds)	23	24	24	6	6	9	13
Queue (Feet)	53	0	44	13	55	105	Not Applicable

Table III-32. Carman Road with East and West Old State Roads 2012 PM Peak Hour – Alternative 13: Additional Lanes

PM Peak Hour	West Old State Road		East Old State Road	Carman Road Northbound		Carman Road Southbound	Average Intersection
Lane or Approach	Thru – Left	Right	Left-Thru-Right	Left	Thru-Right	Left-Thru-Right	
Level of Service	C	C	C	A	A	A	B
Delay (Seconds)	24	24	29	5	7	7	10
Queue (Feet)	25	0	41	23	99	78	Not Applicable

Qualitative and Overall Assessment

- Pedestrian safety and mobility will be enhanced by the cross walks and on-call pedestrian phases.
- The additional lanes accommodate traffic with little delay and minimal queues.
- The additional lanes will have minor impact on adjacent property.

Alternative 14: Realign East and West Old State Roads
(See **Figure III-12**)

Features

- Realign East and West Old State Roads to approach Carman Road at a ninety-degree angle and incorporate the same lane geometry proposed in Alternative 1 which includes:
  - Add left turn lane to Carman Road northbound; and
  - Add right turn lane to West Old State Road.

Performance

- Projected vehicle delays and queues will be identical as those presented for Alternative 13 shown in **Tables III-31 and III-32** because the lane geometry is the same. Therefore, the projected LOS and vehicle queues are acceptable for all approaches and lanes during the AM and PM peak hours.
- Turning radii are improved for all movements making it easier for buses and trucks to turn without increasing crossing distance for pedestrians.

Qualitative and Overall Assessment

- The realignment will have a slight negative impact on the property located on the southeast corner of the intersection by encroaching upon their corner;
-
- The realignment will have a moderately negative impact on the property located on the southwest corner. Although there are no buildings or other structures that would be affected, an access road would have to be reconfigured.

- The realignment would create an opportunity to enhance further the access management recommendations described in Alternative 1 for the restaurant on the northeast corner of the intersection;

- The realignment would result in reduced pedestrian crossing distances which are increased on East and West Old State Roads due to the existing skewed intersection.

Recommendation for East/West Old State Road Intersection

Alternative 13, additional lanes with cross-walks, on-call pedestrian signals, and access management improvements is recommended. The benefits of this alternative include:

- Ability to accommodate traffic volumes with acceptable delays and average vehicle queue lengths;
- Improvement in pedestrian mobility and safety by providing cross-walks and on-call pedestrian signals;
- Improvement in access safety and efficiency to the surrounding commercial land use; and
- Minimal impact to the surrounding land use.

CORRIDOR ALTERNATIVES

Develop and Maintain a Well-Connected Local Street System

The most compelling argument for a well connected street network is dispersal - its ability to spread traffic over many streets - rather than focus it all onto small "bottleneck" links or single subdivision or commercial site entrances. With the connected street system, motorists are able to travel to their daily destinations (which comprise almost two-thirds of all travel) on local streets. Drivers need not contend with traffic on arterial roadways for their daily travel needs, an increasingly important advantage for older and inexperienced drivers, and visitors. The large volume of short trips and associated turning movements on arterial roads such as Carman Road is also greatly reduced, freeing arterials for their intended purpose of longer-distance mobility. A well-connected street network is a powerful factor in creating destination patterns of neighborhood commercial and village centers, rather than those arrayed in a strip development fashion along major roads.

There are five major principles that lead to well connected local streets:

- Maintain existing connecting streets
- Provide multiple entrances into and out of large residential developments
- Avoid cul-de-sacs and dead end streets in subdivisions
- Create additional connections with new minor roadways (when opportunities are available)
- Manage traffic and high vehicular speed through neighborhood traffic calming programs.

Create Livable Streets

Livable streets provide for the well being of those who use them, and the formula for this is simple. Safe, comfortable streets are *shaped, shaded, traffic-calmed, connected, and interesting.* A livable street incorporates many factors that contribute to a "traditional neighborhood street." It takes into account environmental conditions, safety, comfort, a community feeling while maintaining a balance between the needs of pedestrians, cyclists, and vehicles. General attributes of livable streets are:

- Provide travel mode choice having access to a variety of transportation services provides people with a sense of independence and freedom.
- Support regional multi-modal travel - a local transportation system should provide access to and integrate the larger scale regional transportation system.
- Create pedestrian and bicycle accessibility-this contributes to the notion of travel mode choices and allows people to travel around a community safely by whatever means chosen.
- Support public social contact - a sense of community is strengthened by the ability to interact with neighbors socially at events such as festivals and/or open air markets; these events need a designated space.
- Provide orientation and identity to the region - creating a road system that has a distinguishable identity gives residents a sense of place in the larger picture.
- Provide a safe environment-people like to have the feeling that they can walk around without concern for danger; this is accomplished by limiting traffic, pollution, crime and other undesirable impacts.
- Provide for physical comfort-a community's attractive appearance supports peoples' desire to be outside in the community.
- Provide spatial definition by orienting buildings to the street-spatial definition supports walking and pedestrian accessibility and promotes social contact as well as enhances the economic value of the community.
- Provide high quality of construction and design-quality construction contributes to attractiveness, comfort, safety, and economic value.
- Maintain the quality of the environment- The quality of man-made and natural environments is a major factor in the overall quality of an area and its sense of place or character. It is essential to preserve and enhance the environment to create a quality community

Strengthen Inter-governmental Relationships

Strengthening inter-governmental relationships helps to coordinate planning objectives and speeds the permit approval process; both agencies and applicants benefit. Jurisdictional impacts of different agencies and municipalities can be reduced with cooperation and coordination. Shoulder widths, consistent adjacent land uses, corridor management, regional traffic patterns, capital improvements, and comprehensive planning are just a few of the items that can be part of the discussion.

Access Management

Effective access management of the Fort Hunter/Carman Road corridor requires planning as well as regulatory solutions. The Town of Guilderland has already established a policy framework that supports access management in it's comprehensive plan. The Town has also taken the next step in preparing this corridor plan for a specific problem area of the community and to encourage good site planning techniques. Land development and subdivision regulations should be amended accordingly and Guilderland may also consider developing a separate access management ordinance. NYSDOT should be consulted and involved in the development of any access management decisions that would affect Carman Road.

Major thoroughfares such as Carman Road, serve as the primary network for moving people and goods. These transportation corridors also provide access to businesses and homes and have served as the focus for commercial and residential development. If access systems are not properly designed, these thoroughfares will be unable to accommodate the access needs of development and unable to retain their primary transportation function. Therefore, access management needs to balance the right of reasonable access to private property with the right of citizens to safe and efficient travel.

Residents, business owners and commuters within the corridor indicated their concern with the lack of consistent and safe vehicular access to and from existing homes and business along Carman Road. As the pattern of residential and commercial development spread throughout and directly along Carman Road, motorists through this corridor have had to adapt to the constant difficulties imposed by vehicles frequently seeking to access multiple, adjacent destination access points.

To identify existing specific access management issues on Carman Road, WSA conducted a windshield survey of commercial driveways along the corridor in May of 2003. The identification of access management issues considered the following three criteria:

- Well defined edges. Driveways should be designed with clearly defined borders that safely channel traffic from the street to a parking area. Wide open curb cuts cause confusion by mixing entering and exiting traffic, creating additional conflict points, and often obscuring sidewalks.

- Adequate spacing between driveways, and between driveways and intersections. Adequate spacing of driveways provides the distance and time necessary for drivers to react to vehicles entering or exiting a driveway.

- Limiting the number of driveways per parcel. Under ideal situations, one driveway per parcel is desirable to help reduce the number of curb cuts and the associated conflict points.

In addition to addressing the specific needs of the intersections, the following options and recommendations will help the overall operation and appearance of the corridor.

In general, poor access management is not yet a widespread issue on Carman Road. The locations with access management problems are isolated to a few locations, including the East/West Lydius Street intersection, the East/West Old State Road, Greulich's Market, and the Fort Hunter Fire Station. **Table III-33** lists these and additional locations along Carman Road with access management issues and describes recommended improvements. These access management improvement recommendations have been incorporated with the conceptual sketches for the intersection recommendations.

Two areas along Carman Road detail, the area near the Okara Drive/Hannaford Access Drive, and Greulich's Market were mentioned in particular by numerous individuals. This report, accordingly, looks in more detail at these two areas. The access to Greulich's Market could be more tightly defined to limit confusion and conflict for motorists. **Figure III-13** shows one such recommendation which creates one access point with a second right turn only exit at the opposite end of the lot.

The area of Carman Road between the Hannaford's entrance and Route 20 has the heaviest concentration of commercial uses and in general has well defined adequately spaced driveways. That section of Carman Road includes a two-way-left-turn lane. The two-way-left-turn lane converts to an exclusive left turn lane for northbound vehicles turning from Carman Road into Hannaford's. The transition begins just north of Okara Drive. The result is a confusing situation for southbound vehicles turning left to Okara Drive. It is further confused by two entrances to a bank across from and just north and south of Okara Drive.

Two alternatives have been developed to address the Okara Drive issue. Alternative 1 involves realigning Okara Drive to create a four-way intersection with the Hannaford's entrance. Alternative 2 involves consolidating the two bank driveways into one that aligns with Okara Drive. Opposing left turn lanes would be provided into the bank and Okara Drive. A traffic operational analysis has not been conducted for either one of these alternatives because traffic volumes were not available. The length of storage lanes, particularly for Alternative 2, should be verified to determine if there is enough room to accommodate the left turn lanes to Hannaford and to Okara Drive. Lane configurations should also be verified. Alternative 1

would be more effective than Alternative 2 at improving access and safety, but would also be disruptive and expensive. It requires using private land, but the design is tied to incorporate some incentives for the landowner to cooperate overall. There is an increase in the number of parking spaces. Alternative 2 could be implemented in a shorter time frame and would allow Alternative 1 to be built in the longer term. Either alternative should be combined with the creation of connection between adjacent parking lots on both sides of Carman Road.

Figures III-14, III-15 and III-16 provide concept sketches for Greulich's Market, the Okara Drive intersection, and connections between commercial parking lots near the Carman Road/Route 20 intersection.

Table III-33. Access Management Issues and Recommendations

Location	Access Management Issues	Recommendation
East/West Lydius Street Intersections	• Undefined, continuous curb cuts for the Pharmacy on the northeast corner of the intersection • Inadequate spacing between commercial driveways and the intersection	• Close one of three driveways to the gas station and better define the remaining two driveways with curbing • Create a one-way in entrance from Carman Road to the pharmacy and a new exit to Lillian Road • Incorporate changes with the overall intersection improvements. See East/West Lydius Street concept plan Alternative 2
Greulich's Market	• Continuous curb cut along entire parcel road frontage creates a confusing entering and exiting situation.	• Define entrance and exit and reconfigure parking as shown in **Figure III-13**.
Fort Hunter Fire Station	• Continuous curb cut along entire parcel road frontage	• The Fire Station has plans to define the entrance and exits
East/West Old State Road	• Poorly defined entrance and exit at the restaurant	• Provide one-way entrance from Carman Road and entrance/exit on East Old State Road and reconfigure parking lot • Define entrance with curbing and provide a green strip • Incorporate changes with the overall intersection improvements. See East/West Old State Road concept plan Alternative 13
Okara Drive/Carman Road Intersection	• A two-way-left-turn lane creates a confusing situation for vehicles turning left from Carman Road to Okara Drive. • Two separate driveways to the bank across from Okara Drive complicate the intersection	• Alternative 1 – Realign Okara Drive with the Hannaford's Entrance. **Figure III-14** • Alternative 2 – Create one entrance for the bank that aligns with Okara Drive. Add a left turn lanes into Okara Drive and the consolidated bank entrance. **Figure III-15.**

Parking lots between Hannaford and Route 20	• Each parking lot has its own entrance to Carman Road. • Some parking lots have two or more entrances to Carman Road and Route 20	• Close select driveways and create connections between parking lots as shown in **Figures III-14, III-15 and III-16**.

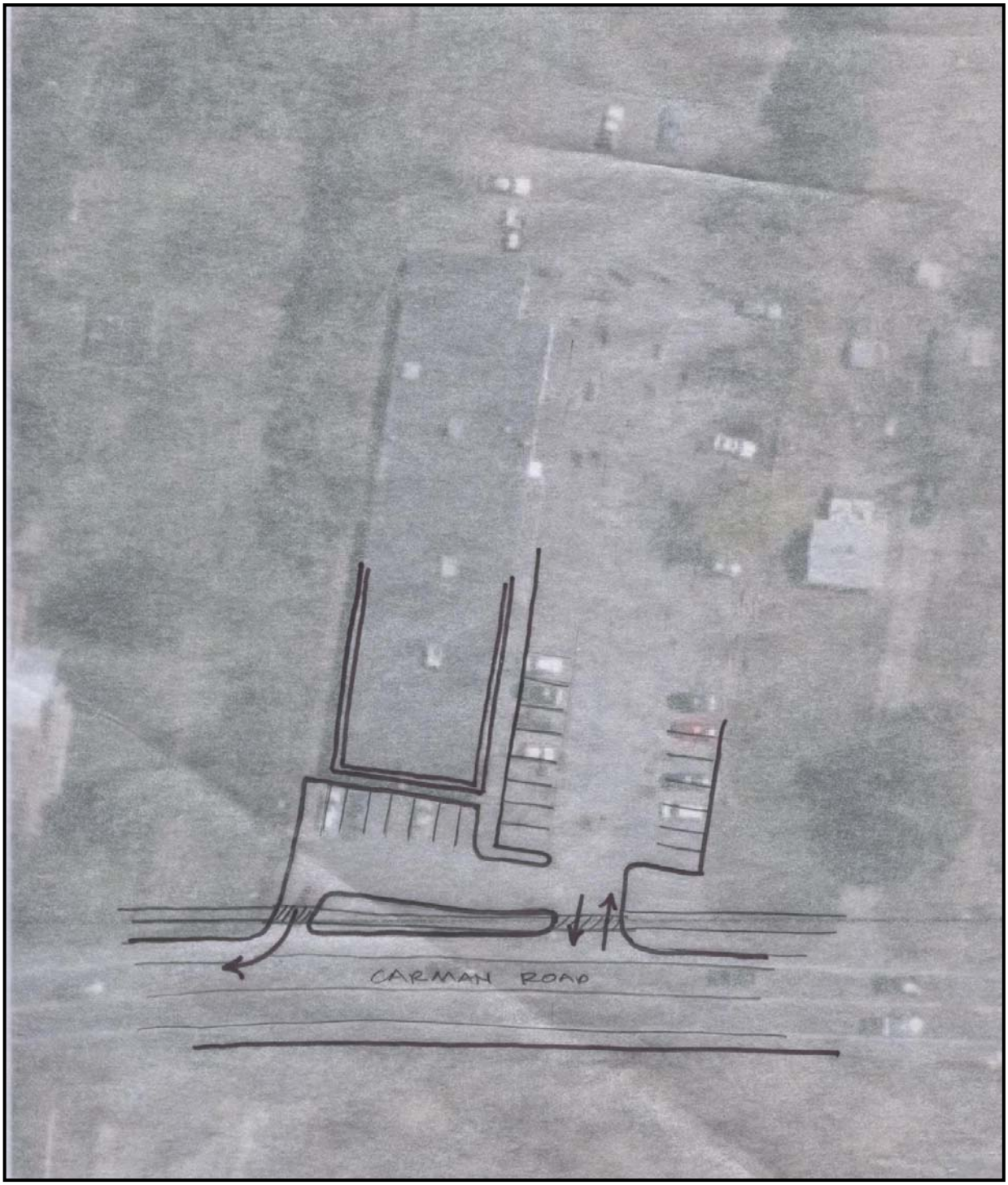


Figure III-13 Access Management Concept at Greulich's Market

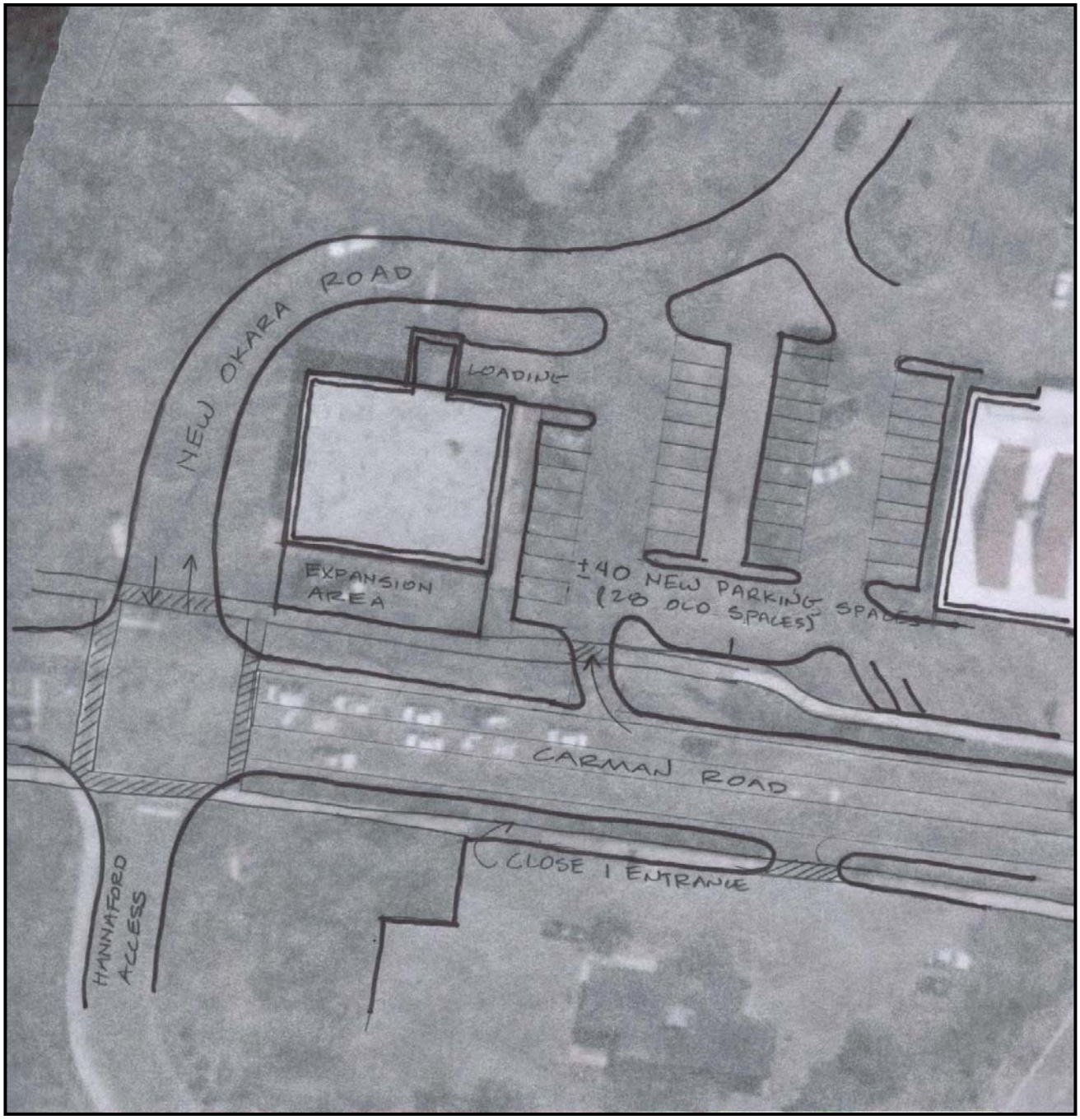


Figure III-14. Okara Drive Alternative 1

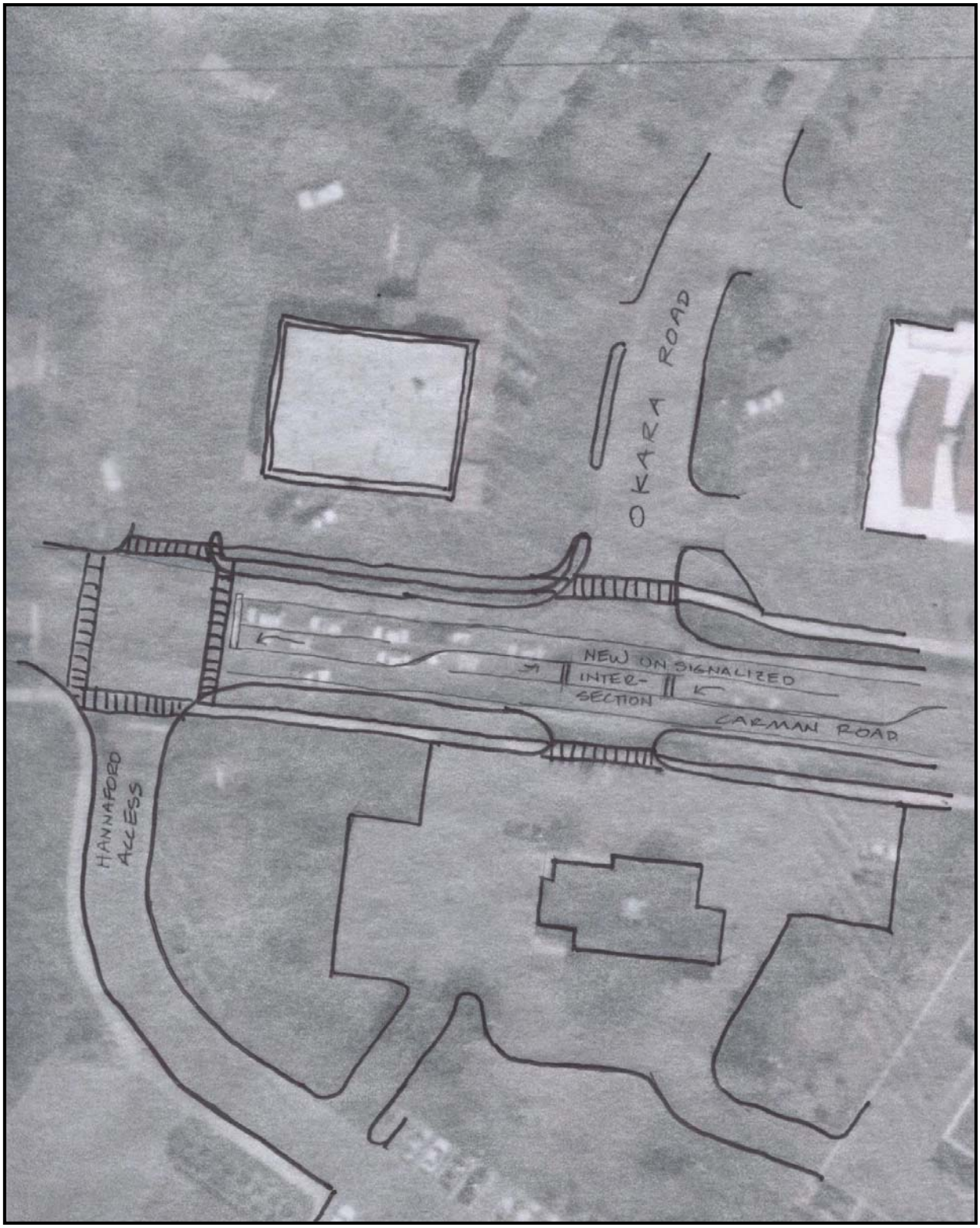


Figure III-15. Okara Drive Alternative 2

Figure III-16. Proposed Parking Lot Connections near the Route 20/Carman Road Intersection

Other Traffic Management Issues and Recommendations

With the exception of the curve north of Greulich's Market, a passing zone currently exists on Carman Road between the East/West Lydius Street intersection and the Fuller Station/Coons Road intersection. This passing zone is likely a left-over feature of Carman Road before it became the major street of a residential neighborhood. The existing level of traffic and the turning movements that occur at Greulich's Market make passing unsafe. Therefore, the passing zone should be eliminated.

Access Management Policy

To maintain the current access conditions, a coordinated access management strategy should be developed in conjunction with the Town's site plan review process for all future development proposals in/along this and other busy Town corridors. Consideration should be given to:

- Requiring shared driveways and parking lots.
- Requiring interconnections between parking lots on adjacent properties.
- Encouraging rear or side access driveways.
- Eliminate multiple curb cuts.
- Restrict curb cuts within at least 100 feet of an intersection.
- Maintain at least 100 feet between driveways.

Traffic Management Plan Recommendations Summary

Table III-34 summarizes recommended traffic management improvements along Carman Road. Costs and time frame are presented in the implementation chapter.

Table III-34. Recommended Traffic Management Plan

Location:	Description
East/West Lydius Streets Intersection with Carman Road	• Add exclusive left turn lanes to the West Lydius, Carman Road southbound, and Carman Road northbound approaches; • Add exclusive right-turn lane to the East Lydius Street approach; • Add cross walks to the East Lydius, West Lydius and Carman Road northbound and southbound approaches with "on-call pedestrian buttons"; and • Create a one-way in, well defined driveway to the pharmacy located in the northeast corner. Provide an exit to Lillian Road through a new driveway or shared access with the adjacent church.
Carman Road between East/West Lydius Street and Fuller Station Coons Road	• Eliminate passing zone
Greulich's Market Entrance	• Define entrance and exit and reconfigure parking
Fuller Station/Coons Road Intersection with Carman Road	• Add cross walks across Coons Road, northbound Carman Road and Fuller Station Road and provide an "on-call" pedestrian button; and • No vehicle lanes are added.
Lone Pine Road Intersection with Carman Road	• Add traffic signal; • Add cross-walks on Lone Pine and Carman Road with "On-Call" pedestrian button; and • Do not add additional lanes.
Spawn Road Intersection with Carman Road	• Add traffic signal; • Add cross-walks on Spawn Road and Carman Road with "On-Call" pedestrian button; and • Do not add additional lanes.
East/West Old State Roads Intersection with Carman Road	• Add left turn lane to Carman Road northbound; • Add right turn lane to West Old State Road; • Add cross walks with on-call pedestrian buttons; and • Replace the continuous curb cut for the restaurant with a one-way in entrance from Carman Road and a two-way driveway with access to East Old State Road.
Okara Drive/Carman Road Intersection	• Short Term – Provide southbound left turn lane to Okara Drive and realign with consolidated bank entrance • Long Term – Realign Okara Drive with the Hannaford's Entrance
Parking lots between Hannaford and Route 20	• Close select driveways and create connections between parking lots

IV. BICYCLE AND PEDESTRIAN MANAGEMENT

This section describes the pedestrian and bicycle circulation needs in the neighborhood, as determined by field observation, review of existing and proposed development in the area and discussions with residents. It also describes a potential pedestrian and bicycle system that can be created to facilitate easier circulation by bicyclist and pedestrians within the neighborhoods.

CIRCULATION NEEDS

Pedestrian System

The segmented sidewalk system along Carman Road does not encourage or even allow easy pedestrian travel. See **Figure IV-1.** The current level of use at the bus stops along the road, as well as evidence of foot traffic along the edge of the road and observations by residents all indicate that a complete pedestrian sidewalk system that allows easy pedestrian travel along Carman Road is needed. To integrate the system into the existing neighborhood, "feeder" sidewalks are also needed, to make it easy to get to Carman Road from the surrounding areas, such as the sidewalk that now exists along Coons Road. The lesser traveled residential streets can be used to reach the feeders.

The analysis of the area indicates that Carman Road is the focus of pedestrian activity and should thus serve as the center of the pedestrian system.

Bicycle System

Bicycle travel is less restricted than pedestrian travel because of the existence of paved shoulders on several of the roads in the neighborhoods. Even so, there is not a complete system in the neighborhood that makes it easy for bicyclists of all levels of experience to reach the various local destinations, such as parks, schools, churches and stores.

The bicycle system does not need to focus on Carman Road, but rather should serve as a general means of circulating around the neighborhood, with easy east west and north south means of travel.

Suggested Pedestrian System

Summary of Issues related to a Do Nothing Alternative (Existing Conditions)

- The existing disconnected system of sidewalk sections along Carman Road does not allow easy movement of pedestrians in the roadway corridor.

- There is no easy way for pedestrians to reach the existing bus stops.

- It is not easy to cross Carman Road.

There are no pedestrian connections between neighborhoods that do not involve traveling on the major roadways in the neighborhood

Carman Road Sidewalk Spine

- Features (See **Figure IV-2**) Sidewalks along both sides of Carman Road between Old Carman Road and Route 20;

- Sidewalks along one side of West Lydius (to Gari Road), East Lydius, Lone Pine Road, Spawn Road, East Old State Road, West Old State Road (to Fuller Station Road), Regina Drive and Fuller Station Road (from Carman Road to the entrance to the proposed subdivision then in the new subdivision to West Lydius Road). . **Figure V-3** shows how sidewalks could look if added to West Old State Road.

- Sidewalks or well marked shoulders on Gregory Road/Dibella Road.

- Crosswalks at each intersection of the roads having sidewalks with each other and as shown on **Figure IV-2**.

- Shared use paths that are also part of the bicycle system and are described in more detail in the next section.

Overall Assessment

- The completion of the sidewalks on Carman Road is challenged by existing utility poles, fire hydrants, numerous old trees and shrubs, and topography in a few locations.

- It appears as if there is only one area of potential wetland adjacent to the west side of Carman Road, north of Spawn Road, which could hinder completion of the sidewalk system.

- There may be a need to address drainage along both sides of the southern portions of Carman Road, where the drainage ditches are fairly pronounced.

- With the exception of Lone Pine Road, most buildings are far enough from the edge of the roads designated for sidewalks to allow relatively easy placement of a sidewalk without disrupting front yards (not withstanding the placement of hedges in the right-of-way).

- A sidewalk on Lone Pine Road could require the removal of numerous trees and would place the sidewalk close to several older residences.

- Several recommended sidewalks go through existing neighborhoods so that a complete system can be created. Alternate facilities other than sidewalks could be provided by creating 4-foot wide shoulders through the addition of striping but such a facility is not as desirable as a sidewalk.

Suggested Bicycle Systems

Summary of Issues related to a Do Nothing Alternative (Existing Conditions)

- Only experienced bicyclists feel comfortable riding on or crossing Carman Road.
- There are only a limited number of share the road signs in the neighborhood, and often, on roads where they are installed, they only face in one direction.
- There are no bicycle connections between neighborhoods that do not involve traveling on the major roadways in the neighborhood; these roads typically are not signed as bicycle routes or do not remind motorists to share the road.
- A significant potential shared use path along the old rail bed will not be developed.

On Road/Off Road Network

Features (See **Figure IV-2**)

- A shared use path along or close to the old railroad alignment west of Fuller Station Road, between the Thruway and Route 20. **Figure IV-3** shows a typical cross-section of a shared use path.
- A shared use path between DiCaprio Park (starting at East Lydius Road) and Lone Pine Park (ending at the proposed subdivision at the end of Timothy Lane).
- Approximately three east west bicycle routes, one each through the northern, central and southern sections of the neighborhood as shown on **Figure IV-2**.
- A north south bicycle route on the east side of Carman Road starting at Lone Pine Park, using Timothy Lane, Spawn Road, Pinyon Drive, Loeber Road, Sunset Lane and Shave Road.
- Connections between neighborhoods, such as between Williamsburg Drive and Empire Avenue.
- Crosswalks where the shared use paths cross roadways.

Overall Assessment

- The bicycle routes are located primarily on the roads with lower average daily traffic volumes.

- Bicycle routes should be identified with appropriate frequent signage in both directions on the designated roadways.

- Widening some of the roadway to create an adequate paved shoulder, as shown in **Table IV-1**, would increase the viability of the proposed bicycle route system. The widening needs to include clear shoulder delineation to minimize the appearance of wider roadways, which could encourage higher speeds by motorists. Drainage modifications and vegetation removal and replacement must also be considered. **Figure IV-3** shows a typical cross section for a road with a paved shoulder. Roads not included in **Table IV-1** are not recommended for widening or designation as a bicycle route.

- Future connections to the west of Carman Road should be planned as either shared use paths or a combination of sidewalks and on-road bicycle routes.

- The proposed system is meant to provide adequate means of bicycle circulation into and around the neighborhood without requiring the use of Carman Road.

- Carman Road would need to be widened by a minimum of 2 feet on either side to provide adequate paved shoulders for bicycle facilities.

The addition of paved shoulders can be implemented most cost-effectively when undertaken as a part of general roadway upgrades and not pursued as a stand-alone project.

Table IV-1. Possible Modifications to Roadway Widths to Accommodate Bicycle Routes

Road	Existing Lane Width	Existing Shoulder Width	Total Existing Width	Upgraded Lane Width	Upgraded Shoulder Width	Total Upgraded width
East Lydius Street	10'-0"	0-6"	21'	10'-0"	3'-0"	26'
West Lydius Street	10'-6"	1'-6"	24'	10'-0"	3'-0"	26'
Coons Road	15'	0	30'	11'-0"	4'-0"	30'
Spawn Road	12'-0" to 10'-6"	None	21' to24'	10'-0"	3"-0"	26'
East Old State Road	11'-0" to 12'-0"	2'-0" to 0'-6"	24' to 28'	11'-0"	3'-0"	26'
West Old State Road	10'-0" to 10'-6"	0"-6"	20 to 22'	11'-0"	3'-0"	26'

V. STREETSCAPING

SIDEWALKS

Identified as a significant weakness in and throughout the Ft. Hunter/Carman Road corridor was the lack of an integrated, cohesive and safe system of pedestrian sidewalks and walkways both directly in the Carman Road corridor and connecting the corridor to adjacent residential and commercial areas. This lack of a coordinated pedestrian system has also been expressed by the Guilderland Pathways Committee reports and was outlined in the Town's 2001 Comprehensive Plan as a transportation-related goal.

As such, this corridor study has recommended the inclusion of sidewalks and planting strips in its pedestrian plan element. Locations are to include both sides of Carman Road and at several other locations along intersecting side roads such as East and West Lydius Street, Fuller Station Road, Lone Pine, Spawn and Old State Roads. The following general outline should provide the basis for all new sidewalks within the corridor:

General Sidewalk Guidelines

- Five foot minimum width
- Eight to fifteen feet in main street commercial areas
- At least five feet back from curb as possible to separate walkers from traffic and road spray and allow room for street trees and snow storage,
- Meet Americans with Disabilities Act requirements (ADA)
- At least on one side in residential areas with 1 to 4 units per acre.
- Optional one side or wide shoulder in areas with less than 1 unit per acre.

CROSSWALKS

Currently most pedestrian crosswalks within the Ft. Hunter/Carman Road Corridor are not adequately designated or marked. As a result, the potential and frequency for pedestrian/vehicle conflicts is substantial. This is particularly acute in areas near the Pine Bush Elementary School and the Lynnwood Reformed Church, where there is an increased demand for safe pedestrian crossing amenities to and from adjacent residential neighborhoods. Additionally, other areas of the corridor are effectively cut off from pedestrian traffic due to the lack of protected pedestrian crossing elements to nearby commercial and retail sites.

To rectify this situation, it is recommended that all signalized intersections along Carman Road or those that may eventually have sidewalks on them be retrofitted with striped cross walks as possible. At least one mid block sections of Carman Road near the Catholic church should also be studied for potential installation of a crosswalk and pedestrian actuated crosswalk signal or other amenities as well. This crossing could eventually serve as a link between shared use paths on either side of the road as well as a link between senior housing with the church. Other locations may also be considered due

to the distance between the intersection recommended to have crosswalks. The location of these non-intersection crosswalks should be developed in conjunction with the bicycle/pedestrian plan to maximize interconnection of adjacent residential and commercial areas along the corridor.

STREET TREES

As outlined in several of the corridor concept renderings, the inclusion of street trees as a design element should be required. There currently exist several locations along Carman Road where there are no street trees adjacent to the roadway. The plan should require the planting of native species of street trees along the corridor where necessary to further define and separate the roadway from the pedestrian. It is recommended that the planting of new or infill street trees be located when possible behind the sidewalk area to ensure survivability and to provide for ease of maintenance.

In locations where there are overhead power lines, trees with smaller mature heights that will not create future maintenance problems should be used.

GATEWAY CONCEPT

To promote a sense of place and identity within the corridor, it is suggested that several key locations or intersections be identified as "gateways" and landscaped appropriately. One such location identified in the Traffic Management Plan concept renderings is the intersection of Carman Road and East/West Lydius Streets. Due in part to its northern proximity within the corridor and its high plane of visibility for motorists, locations directly adjacent to this intersection would be ideal for the development of an appropriately scaled, landscaped gateway amenity. The final design of such a gateway should be as a result of significant public input, but design elements for such a gateway might include stone walls integrated into the landscape with some limited, non-illuminated signage affixed to them. To further define this point as a gateway, the features could be enhanced with decorative, ornamental plantings. **Figure V-1** shows one possible option for this north side gateway.

Other locations for such gateway definition might include the southern end of the corridor where Carman Road meets Route 20. A Town-sponsored, neighborhood, design charrette or gateway design competition would be a good forum to develop the final gateway design elements for this corridor.

STREET LIGHTING

A preliminary assessment of the existing street light amenities with the corridor reveals that there is no defined style or consistency of fixtures from one end of the corridor to the other. Presently, the only existing street lighting fixtures found along Carman Road are the standard "cobra" head fixtures affixed to poles that are attached to existing utility

poles. These fixtures can be found at several of the signalized intersections and are sporadically distributed along the remaining portions of the roadway. They are neither pedestrian scaled nor do they provide adequate, consistent or safe lighting for pedestrians moving through/along these areas.

It is recommended that pedestrian-scaled, attractive street lights and poles be placed along the corridor at all intersection locations, gateway areas, pedestrian crossings, primary entryways to residential and/or commercial locations and other identified locations. As design options for such amenities are numerous, it is suggested that final lighting designs be consistent throughout the corridor to further define the corridor's identity, and be practical in their application so as to not make purchasing and maintaining such fixtures cost prohibitive. It is suggested that the Town work directly with Niagara Mohawk as they can provide a choice of ornamental street lighting fixtures as well as assist in the installation and maintenance of the units. In addition to providing ornamental street lights, it is recommended that a similar design be incorporated into a replacement schedule for all traffic signal poles throughout the corridor.

STREET FURNITURE

In keeping with the preferred design elements of the corridor's street lighting, the Town is encouraged to provide ornamental street furniture elements of a consistent design throughout the corridor. Specific elements to consider include benches, trash receptacles, planters, news print receptacles and street signs.

BUS SHELTERS

Currently the only public transit-related amenities within the corridor are bus route signs placed along the roadside at sporadic locations. There are no provisions for protecting or sheltering pedestrians who might rely on or otherwise use mass transit. As a result, ridership within the corridor is reduced. To increase and encourage ridership of the existing bus route, it is suggested that bus shelters that blend with the neighborhood be placed a several key locations along Carman Road. Criteria used to determine bus shelter locations should include proximity to residential areas, commercial or retail centers, and community facilities such as schools, churches, assisted living centers, and civic organizations.

To further assist this amenity, bus turnouts should be considered adjacent to each new shelter/ bus stop to augment the safe loading and unloading of passengers and to prevent any disruption in the flow of traffic along Carman Road. Turn outs should be designed so as to provide enough room for busses to maneuver in and out of traffic and be constructed with harden pads to prevent rapid deterioration of the road surface due to excessive static weight loads exhibited during extended stopping times.

To further enhance the development of the Carman Road corridor as a viable and safe

pedestrian and transportation amenity for residents and commuters, it is suggested that an intermodal transit center be designed and placed along the corridor. It is envisioned that the center would be placed in an area of the corridor where pedestrian and commuter traffic is heaviest, and where space is available to build such a facility. A likely site suitable for such an amenity might be along the access road from West Old State Road to the Carman Plaza. The center would consist of an enhanced bus shelter structure adjacent to a small scale (6-10 space) parking lot. The new shelter might include amenities for temporary bicycle storage, as well as interpretive signage for public transportation riders. The purpose of the transit center would be to act as a means of protecting public transportation users, encouraging commuters to use public transportation and provide a safe pedestrian amenity at a high volume intersection. **Figure V-2** provides a visual representation of what such a facility might look like.

WORK GROUP

To tie all of these streetscaping elements together under a common theme, a final recommendation of this plan is to create a Streetscape Amenities Work Group to discuss and develop all of the identified elements described above. The group should be comprised of corridor residents, business owners, the Town Planner, and a landscape architect, NYSDOT, the CDTC and the CDTA.

VI. IMPLEMENTATION

This section of the Fort Hunter/Carman Road Neighborhood Transportation Plan describes the tools and techniques, responsible party, and funding sources necessary to implement the recommendations contained in the traffic management plan, bicycle and pedestrian plan, and streetscape concept plan. Order of magnitude cost estimates are provided for the traffic management and bicycle and pedestrian recommendations. Cost estimates are not provided for the streetscape concept plan because the recommendations are general in scope.

Each recommendation is listed in the implementation charts presented in **Tables VI-2, VI-3 and VI-4** at the end of this section. The implementation chart includes the following major sections, explained in more detail below:

- Capital Costs Estimates.
- Tools and Techniques.
- Responsibility.
- Financing.
- Time Frame.

CAPITAL COST ESTIMATES

Order of magnitude cost estimates for the traffic management recommendations, which primarily consist of modifications to the study area intersections, access management improvements at select locations, and other minor modifications, are based on unit costs applied to an approximation of quantities taken from the conceptual sketches presented in Section III. The unit costs are based on WSA experience in other studies. Cost estimates for intersections include sidewalks along the length of the assumed limits of construction (generally 200 to 300 feet along each leg of the intersection). The cost estimates assume replacement of existing traffic signals at the Carman Road intersections with East/West Lydius Street, Fuller Station/Coons Road and East/West Old State Road. New traffic signals are included at the intersections of Carman Road with Spawn Road and Lone Pine Road. Engineering costs are included as well as a 20% contingency.

Right-of-way acquisition is not included in the cost estimate. These costs can vary significantly, depending on:

- How much land is needed for the improvement project from each individual parcel,
- What portion of each individual lot is left after the right-of way acquisition;
- How the remaining land is configured and accessed; and
- What the current assessed value of the parcel is before and after the right-of-way acquisition.

The information provided for each recommended project does discuss generally how much additional right-of-way may be needed for implementation.

These cost estimates provide a general concept of what the cost of the improvement may be. They are based on schematic plans drawn on aerial photos and can therefore not be presumed to be as detailed and precise as cost estimates prepared from detailed design and/or construction drawings.

Bicycle and pedestrian facility costs are based on averages of engineering, administration and construction costs for typical facilities. **Table VI-1** outlines what is included in each type of facility.

Table VI-1. Bicycle and Pedestrian Facility Unit Costs

Facility	Components	Cost
Five Foot Concrete Sidewalk	12 inch sub-base material with 5-inch thick reinforced concrete	$96 per Linear Foot
Ten Foot Bituminous Shared Use Path	6 inches of sand, 12 inches of gravel sub-base material with 2-inch thick lift of bituminous concrete.	$115 per Linear Foot longer than ½ mile; $125 per Linear Foot shorter than ½ mile.
Bicycle Route	Widening of roadway to meet width standards	Varies

The cost of creating a bicycle route (bicyclists share the road with vehicles) varies tremendously, depending on how the community implements the work. Costs will vary from $30 to $60 per foot to add three feet of shoulder to each side of the roadway as a standalone project. This approach would bring roads up to the ideal standards for bicycle routes. The widening could be done for much less if it was done as part of an overall rehabilitation project for the roadway itself and it is recommended that the work be done this way if at all possible. Additionally, for those roads that are close to or meet the ideal standards for bicycle routes, as presented in Table 27 in the Existing Conditions section of this plan, the cost could be limited to the cost of erecting signs indicating the bicycle route and instructing motorists and bicyclist to "Share the Road."

The maximum cost for implementing bicycle routes is $60 per foot. This applies to creating ideal cross sections for East and West Lydius Streets, Lone Pine Road and West Old State Road. Lesser amounts would apply to East Old State Road, where the cross section needs much less widening to create the ideal situation. The cost for Spawn Road would be limited to partial widening in some locations, re-striping and new signs.

TOOLS AND TECHNIQUES

A tool or technique is the mechanism or process through which a recommendation will be implemented. These methods include:

- Comprehensive Plan

- Zoning
- Subdivision Regulations
- Official Town Map
- CDTC Transportation Improvement Program
- NYSDOT Annual Maintenance Programs and Capital Budget
- Private/Voluntary Actions

Comprehensive Plans

Community Comprehensive Plans represent not only a vision for the future of the communities, but serves as the basis for all local actions to revise land use, adjust local operating structures and implement a capital program. The *Town of Guilderland Comprehensive Plan 2000* is the legal basis for creating zoning and subdivision regulations that may be needed to achieve the objectives of this study. This plan should be modified as needed to provide the basis for significant changes to the Town's policies or zoning ordinance. One option for making changes to the Comprehensive Plan that specifically address the recommendations of this study is for the Town to adopt this report as an addendum to the Comprehensive Plan.

Zoning

Zoning is the legal mechanism to implement desired land use and development practices in the corridor, and to implement the vision in the Comprehensive Plan. Because it controls private development practices, it has a direct impact on the traffic generation in the corridor.

Subdivision Regulation

Subdivision regulations can be used to implement specific design standards for vehicular circulation and access and to assure high standards of pedestrian and bicycle access are provided in new subdivisions.

Official Town Map

The Town of Guilderland can adopt an official town map that identifies future highways, bike paths, sidewalks and parks. This technique will be particularly useful as a tool to implement the bike and pedestrian plan. Developers can be required to provide sections of a bike path or sidewalk if it has been identified on the map. The bicycle and pedestrian network recommended in this plan can be combined with the recommendations contained in the Preliminary Sidewalk Master Plan recently completed by the Guilderland Pathways Committee to create an official town-wide bicycle and pedestrian map.

CDTC Transportation Improvement Program (TIP)

Projects seeking to use federal transportation funds must be included on the CDTC's Transportation Improvement Program (TIP). The TIP is a staged, multi-year program of transportation improvements that implements planning process recommendations. Conceptual recommendations, such as those included in this plan, if placed on the TIP will receive the funds necessary to finalize design and cost, identify and mitigate for resource impacts, acquire right-of-way, and carry out construction or provided a new transportation service. The TIP is both an implementation technique and a conduit for federal transportation funds. The Tip currently includes construction of new sidewalks along Carman Road from Coons Road to Maple Leaf. Funding is from the STP Flex program with Federal funding at 80 percent, with a maximum of $42,200 available.

NYSDOT Annual Programs

Annual NYSDOT programs that may be used to implement the recommendations include annual pavement marking replacement and traffic signal retiming. Other NYSDOT programs will help with continued monitoring of the corridor such as the traffic count program, analysis of locations with safety concerns, and pavement condition inventories.

Private/Voluntary Actions

Some of the recommendations will depend on voluntary actions from private land owners. Examples include providing an easement for a new bike path or individual agreements to share driveway access, and to connect parking areas in the rear of buildings.

RESPONSIBILITY

This section of the implementation charts identifies the partners most likely to be involved throughout implementation. It identifies the party who will lead the project and other partners who will be involved in different stages of implementation. Designating a lead was based on ownership and authority to change regulations. As a result, NYSDOT and the Town of Guilderland are identified as leads for almost all of the recommendations. The one exception is the bus/intermodal centers, which has CDTA designated as a lead.

FINANCING

Transportation projects in Guilderland and services are funded with federal, State, local and private funds. More often than not, a project draws upon all of these sources.

Federal Transportation Funding

Surface Transportation Program (STP) funds have the most flexible uses of any federal

transportation funds. STP funds may be used for highway, transit, and non-motorized facility construction and improvements. Facilities must be classified by the CDTC and State as eligible for federal aid, although sidewalks on local roads that are not on the federal aid system may also be eligible for STP funding. Non-federal match requirement is 20 percent. Carman Road is eligible, but this funding source is extremely competitive.

Enhancement Program funds are another typical source of federal funds. Enhancement funds may be used for a variety of non-highway related projects such as bike paths, sidewalks, and streetscapes. Generally, enhancement funding awards are made once per year through a competitive process. Applications are submitted for review by the CDTC. The CDTC evaluates all applications within its TIP area and identifies a short list of high priority projects, which NYSDOT compares with submissions from across the State in selecting projects for funding. The CDTC has funded additional enhancement projects beyond those approved by NYSDOT through its "Second Chance" enhancement program and by "flexing" additional funds from the STP program. The CDTC has also used federal funds for its Bicycle and Pedestrian Spot Improvement Program. Enhancement projects require a 20 percent non-federal match.

Other federal programs include:

- The Recreational Trails Program is available for trail projects for both motorized and non-motorized trails. These funds could be used for the rail-trail, and shared use paths;

- Urbanized Area Formula Grants and Capital Investment Grants for Transit are used for improving bicycle and pedestrian access to transit facilities. These funds could be used for the sidewalks, bicycle routes, shared use paths leading to Carman Road and potentially transit stop facilities; and

- The Transit Enhancement Activity program provides funds for pedestrian and bicycle access to transit facilities, bicycle storage facilities and equipment for transporting bicycles on mass transportation vehicles. These funds could be used for the sidewalks, bicycle routes, shared use paths leading to Carman Road, and transit stop facilities for pedestrians and bicyclists.

State Sources of Funding

NYSDOT may completely fund and implement projects on facilities it owns (such as Carman Road) or may assist locals in funding their non-federal match for projects using the Consolidated Highway Improvement Program System (CHIPS) or Marchiselli funding. CHIPS provides support for improvements to roads and bridges with expected life spans of seven to ten years or more and is typically used for pavement rehabilitation and bridge repairs. Marchiselli funding covers 75 percent of the local share of federally-funded projects leaving the local municipality responsible for 25 percent of the non-

federal match (25 percent of 20 percent is 5 percent). Guilderland already receives funding from these two sources and can decide if they wish to allocate any of it to these projects.

State funding sources for transportation related projects or services are available from State agencies other than NYSDOT. For example, the Governor's Traffic Safety Committee and the New York State Department of Health's Bureau of Injury Prevention offer funding programs to support safety education. Funds are also available for walking and bicycle trails from the New York State Office of Parks, Recreation and Historic Preservation (OPRHP).

State funding of transportation projects or services may also be provided through legislative member items from State Senate or Assembly representatives. State funding sources are also very competitive.

Local Sources of Funding

A portion of the non-federal match will often come from local sources. If significant enough, these funds may be identified in a municipal capital program. Smaller and less costly projects that do not use federal or State sources may be funded through a local highway public works or parks department annual budget. Town's also have the option to establish special assessment tax districts, that raise funds for a specific purposes such as sidewalks or roadway repairs.

Special Grants

There are several special grant programs available for specific local transportation projects that become available from time to time. The Town should contact NYSDOT and CDTC when they are looking for funding for specific projects to see what is currently available.

Public-Private Partnership Options

As transportation needs have grown in recent years at a rate that has outpaced public funding availability, particularly at the local level, innovative approaches to paying for transportation projects have emerged. One such approach entails creative partnerships between the public and private sectors. In New York State, these types of arrangements have often involved roadway intersection and capacity improvements associated with commercial developments, as well as new interchanges on area freeways. The common thread in any public-private partnership is that all involved parties receive some benefit from their resource contribution. While these partnerships could not fund 100 percent of the Corridor Plan's implementation, they could represent an important piece of the overall funding framework.

Options that could be explored in this regard include:

- Identifying and working with business owners and developers in the corridor to co-underwrite the costs of access management, pedestrian amenities and traffic controls that facilitate safe and efficient access to those businesses and developments;

- Formation of a non-profit neighborhood group focused on development of the bike path network in the Corridor and neighborhood that seeks and pursues grant funding from foundations and other non-public sources of money; and/or

- Local tax incentives for businesses and developers that plan and construct new buildings and facilities in a manner explicitly supportive of this Corridor Plan and the associated bike/pedestrian network.

This is not an exhaustive list of options for designing public-private partnerships targeted at implementing the Corridor Plan. Many other arrangements may be possible, and, in light of continuing constraints on public funding sources, the Town should aggressively pursue such arrangements to add another tool to the Town's funding "toolkit."

Impact Fees

Impact fees are a specific means by which a municipality may raise funds to support the services and infrastructure needs of new development. Transportation impact fees may include a cost per new vehicle trip generated or could be a lump sum per new dwelling unit. Impact fees are established through a rational process that connects a specific set of improvements with a certain level of development. Impact fees may be established through a Generic Environmental Impact Statement process or through a Comprehensive Plan.

Private Development

Sidewalks, bike paths, bike lanes, and streetscape improvements can be funded by developers within residential and commercial subdivisions as long as the requirements have been incorporated into the subdivision regulations.

TIMING

In general, the timing indicates when a recommendation could be complete. For projects involving new facilities or reconstruction of existing facilities, the timing considers the overall need, the amount of time necessary for planning, project development, and construction. For non-capital projects, such as the recommendation to initiate a streetscape committee, the schedule indicates the earliest possible start date.

It is also possible to separate some of the components of the various recommendations from each other if partial funding is available. For example, the installation of crosswalks at an intersection shown for upgrading more than five years in the future could be done sooner as part of the sidewalk installation work or as a stand-alone project.

Actions	Capital Cost	Tools and Techniques						Responsibility L = Lead P = Partner					Financing Options							Timing			
		Comprehensive Plan	Zoning	Subdivision Regulations	CDTC TIP	NYSDOT Annual Programs	Private/Voluntary Actions	New York State DOT	CDTC	Town of Guilderland	CDTA	Private	Federal Funds - CDTC TIP	Local	State	Special Grants	Private/Public Partnership	Impact Fees	Private Development	Immediate	Short Term (1-5) yrs.	Mid-Term (5-10 Years)	Long- Term (More Than 10 Years)
East\West Lydius Intersection Modifications	$ 520,000				X			L	P	P			X	X			X	X			X		
Fuller Station\Coons Road Intersection Modifications	$ 250,000				X			L	P	P			X	X			X	X			X		
Lone Pine Road Intersection Modifications	$ 230,000				X			L	P	P			X	X			X	X				X	
Spawn Road Intersection Modifications	$ 230,000				X			L	P	P			X	X			X	X				X	
East\West Old State Road Intersection Modifications	$ 260,000				X			L	P	P			X	X			X	X					X
Eliminate Carman Road passing zone between Lydius Street and Fuller Station/Coons Roads	$ 7,100					X		L							X					X			
Okara Drive Reconfiguration	$ 30,000			X	X		X	P		L		P	X	X			X	X	X			X	
Access Modifications at Gruelichs Store	$ 30,000			X	X		X	P		L		P	X	X			X	X	X		X		
Parking Lot Connections	$ 61,500		X	X			X			L		P			X	X	X		X		X		
Incorporate Access Management Guidelines into subdivision regulations	$ 20,000			X				P		L				X							X		

Table VI-2. Traffic Management Plan Implementation Chart

Actions	Capital Cost	Tools and Techniques							Responsibility L = Lead P = Partner					Financing Options							Timing			
		Comprehensive Plan	Zoning	Subdivision Regulations	Official Town Map	CDTC TIP	NYSDOT Annual Programs	Private/Voluntary Actions	New York State DOT	CDTC	Town of Guilderland	CDTA	Private	Federal Funds - CDTC TIP	Local	State	Special Grants	Private/Public Partnership	Impact Fees	Private Development	Immediate	Short Term (1-5) yrs.	Mid-Term (5-10 Years)	Long- Term (More Than 10 Yea
Sidewalks on Carman Road	$2,140,800			X	X	X		X	L	P	P		P	X	X			X				X		
Sidewalks on Existing Local Streets					X	X		X		P	L		P	X	X		X	X	X		X	X	X	X
East Lydius	$892,800																							
West Lydius	$55,680																							
Gregory Street	$403,200																							
Lone Pine Road	$175,680																							
Spawn Road	$113,280																							
Extension	$69,120																							
East Old State Road	$500,736																							
West Old State Road	$268,800																							
School Street	$52,800																							
Rail Trail	$1,288,000	X			X	X		X	P	P	L		P	X			X	X					X	X
Shared Use Paths		X		X	X	X			P	P	L		P	X	X		X	X	X	X	X	X	X	
Old State ST. to Abbey Road	$312,500																							
Williamsburg Dr./Georgetwon Sq. to S	$162,500																							
West Side Connector	$322,000																							
Church to RR ROW	$162,500																							
Gregory Drive to Seniors	$203,750																							
Lone Pine Pk to DiCaprio Pk	$448,500																							
Lone Pine Pk to Spawn	$312,500																							
Lone Pine Pk to Timothy	$125,000																							
Spawn Road to Pine Barren	$312,500																							
Local Park to RR ROW	$162,500																							
Spawn Road Extension	$93,750																							
Lynnwood School to Fuller Street	$262,500																							
Sidewalks on Proposed Connector Road	$374,400	X		X	X						L		P					X	X	X	X	X		
Bicycle Routes on Existing Roads					X	X		X		P	L			X	X			X	X		X	X		
Coons Road	$0																							
West Lydia Road (4 ft)	$382,500																							
West Old State Street (6 ft)	$672,000																							
East Old State St (2 ft or less)	$156,600																							
Pinyon/Loeber/Sunset/Shave (4 ft est.)	$207,000																							
Spawn Road (2 ft or less)	$75,000																							
Timothy Lane (4 ft est)	$33,750																							
Gregory/Dibella (2 ft est)	$126,000																							
Bicycle Routes on New Roads		X		X	X						L							X	X	X	X	X		

Table VI-3. Bicycle and Pedestrian Plan Implementation Chart

Actions	Capital Cost	Tools and Techniques						Responsibility L = Lead P = Partner					Financing Options							Timing			
		Comprehensive Plan	Zoning	Subdivision Regulations	CDTC TIP	NYSDOT Annual Programs	Private/Voluntary Actions	New York State DOT	CDTC	Town of Guilderland	CDTA	Private	Federal Funds - CDTC TIP	Local	State	Sepcial Grants	Private/Public Partnership	Impact Fees	Private Development	Immediate	Short Term (1-5) yrs.	Mid-Term (5-10 Years)	Long- Term (More Than 10 Years)
Streetscape Amenities Work Group	Not Applicable						X			L				X						X			
Sidewalks		X		X						L		P	X	X		X			X		X		
Crosswalks				X	X			P		L			X	X		X			X		X	X	
Street Trees		X		X			X	P		L		P		X		X	X		X		X		
Gateway Development		X		X			X	P		L		P	X	X		X	X		X		X		
Street Lighting		X		X				P		L			X	X		X	X		X		X		
Street Furniture		X		X			X	P		L		P		X		X	X		X	X	X		
Bus/Intermodal Centers					X			P	P	P	L		X	X		X	X				X		
Develop & Adopt Community Roadway Design Standards		X	X	X						L				X						X			

Table VI-4. Streetscape Concept Plan Implementation Chart

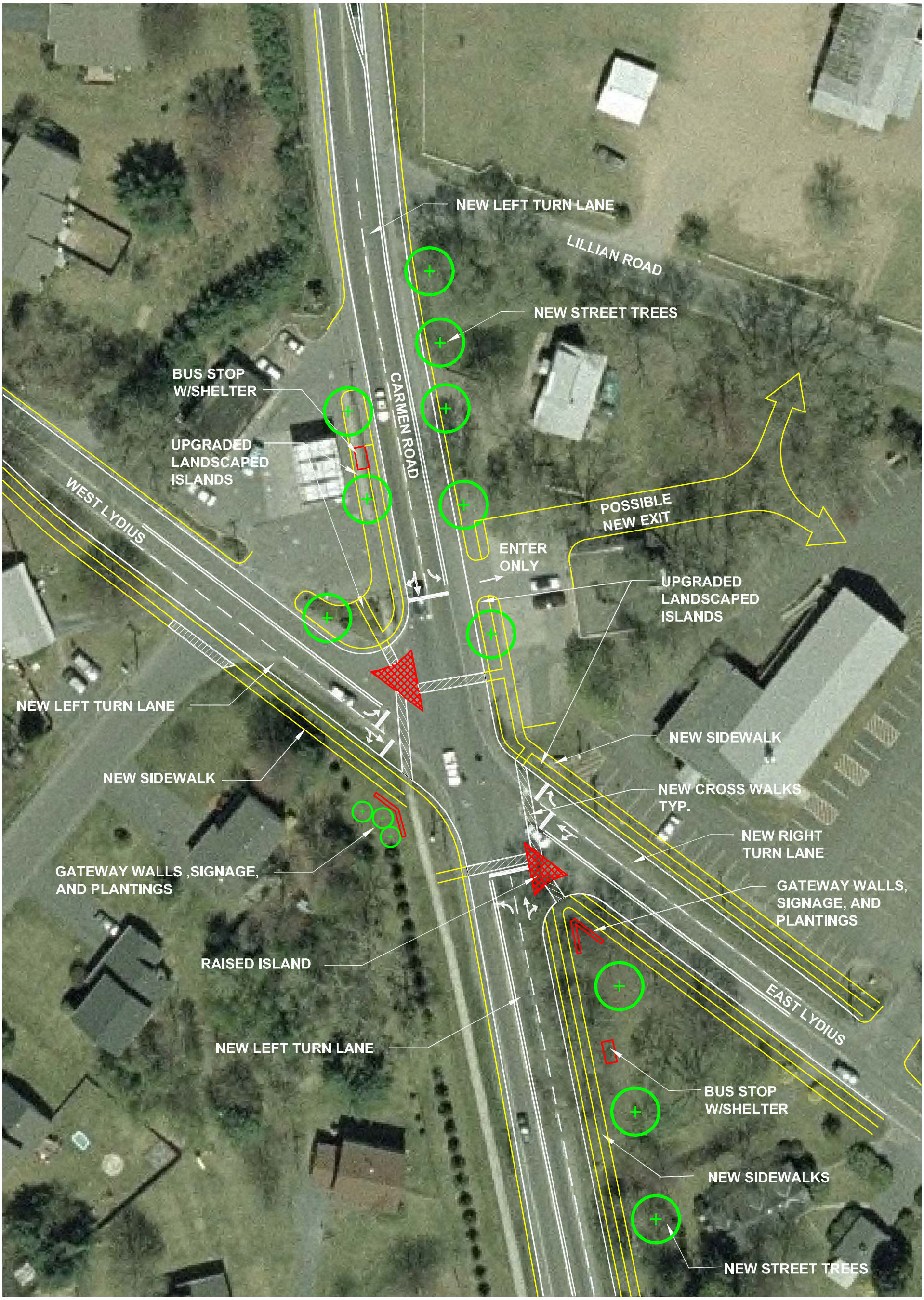


Figure III-1

EAST / WEST LYDIUS STREETS

Alternative 2 (Recommended)

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-8

SPAWN ROAD

Alternative 10

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-7

LONE PINE ROAD

Alternative 9 (Recommended)

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-6

LONE PINE ROAD

Alternative 8

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-5

LONE PINE ROAD

Alternative 7

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-4

FULLER STATION AND COONS ROAD

Alternative 6

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-3

FULLER STATION AND COONS ROAD

Alternatives 4 & 5 (Recommended)

SCALE:1"=50'-0"

0' 25' 50' 100'

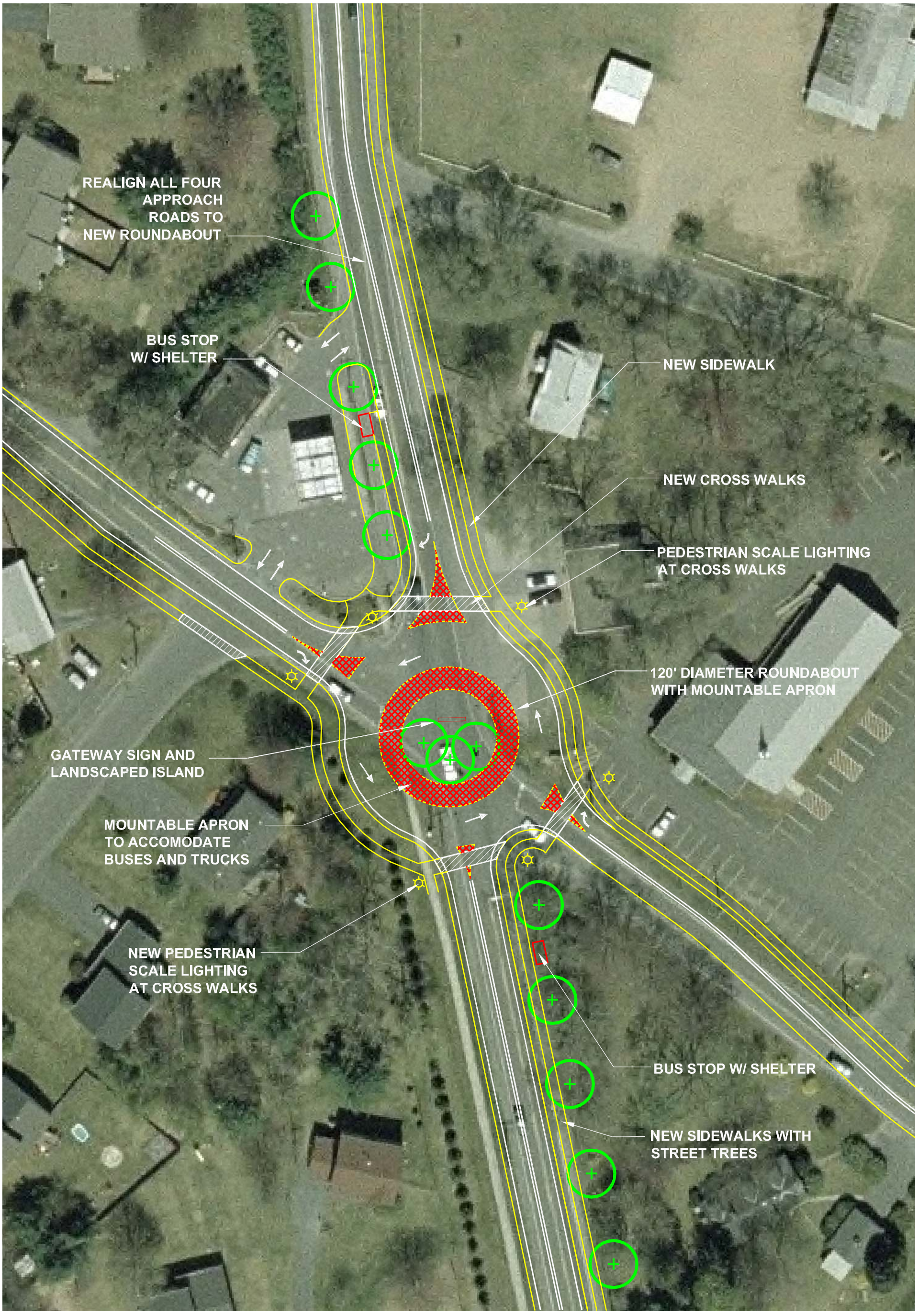


Figure III-2

EAST / WEST LYDIUS STREETS

Alternative 3

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-9

SPAWN ROAD

Alternative 11

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-10

SPAWN ROAD

Alternative 12 (Recommended)

SCALE:1"=50'-0"

0' 25' 50' 100'

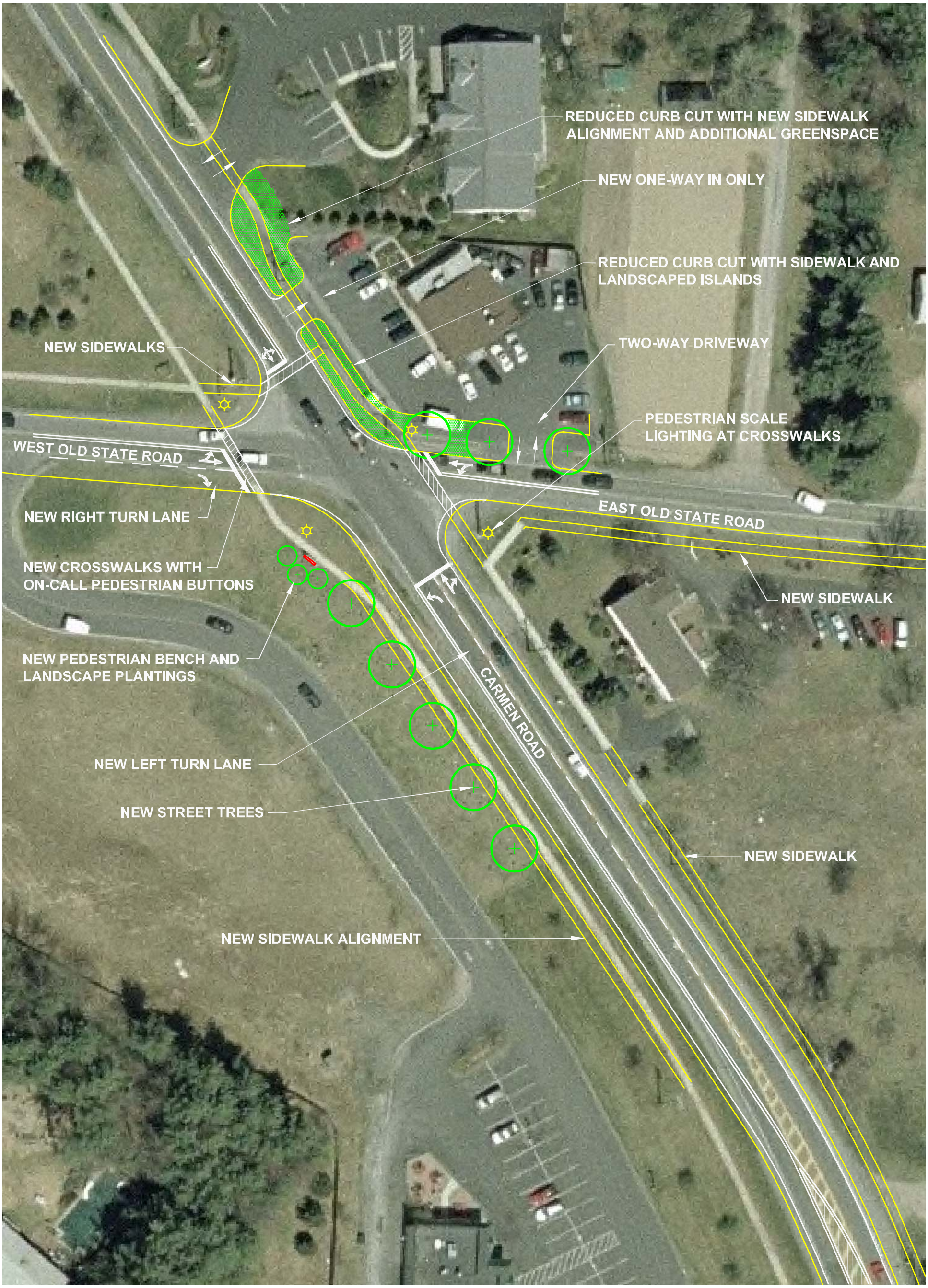


Figure III-11

EAST & WEST OLD STATE ROAD

Alternative 13 (Recommended)

SCALE:1"=50'-0"

0' 25' 50' 100'

Figure III-12

EAST & WEST OLD STATE ROAD

Alternative 14

SCALE:1"=50'-0"

0' 25' 50' 100'

Fort Hunter/ Carman Road Neighborhood Transportation Study

Existing Conditions
May 2003

Wilbur Smith Associates
& The LA Group

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

N
W E
S

West Lydius Rd
East Lydius Rd
Coons Rd
Lone Pine Rd
Bridge Closed
Spawn Rd
Fuller Station Rd
West Old State Rd
Siver Rd
East Old State Rd
Fuller Station Rd
Carman Rd

Legend

- Study Area
- Wetlands
- Existing Bus Stops
- Existing Sidewalks
- Existing Bicycle Route

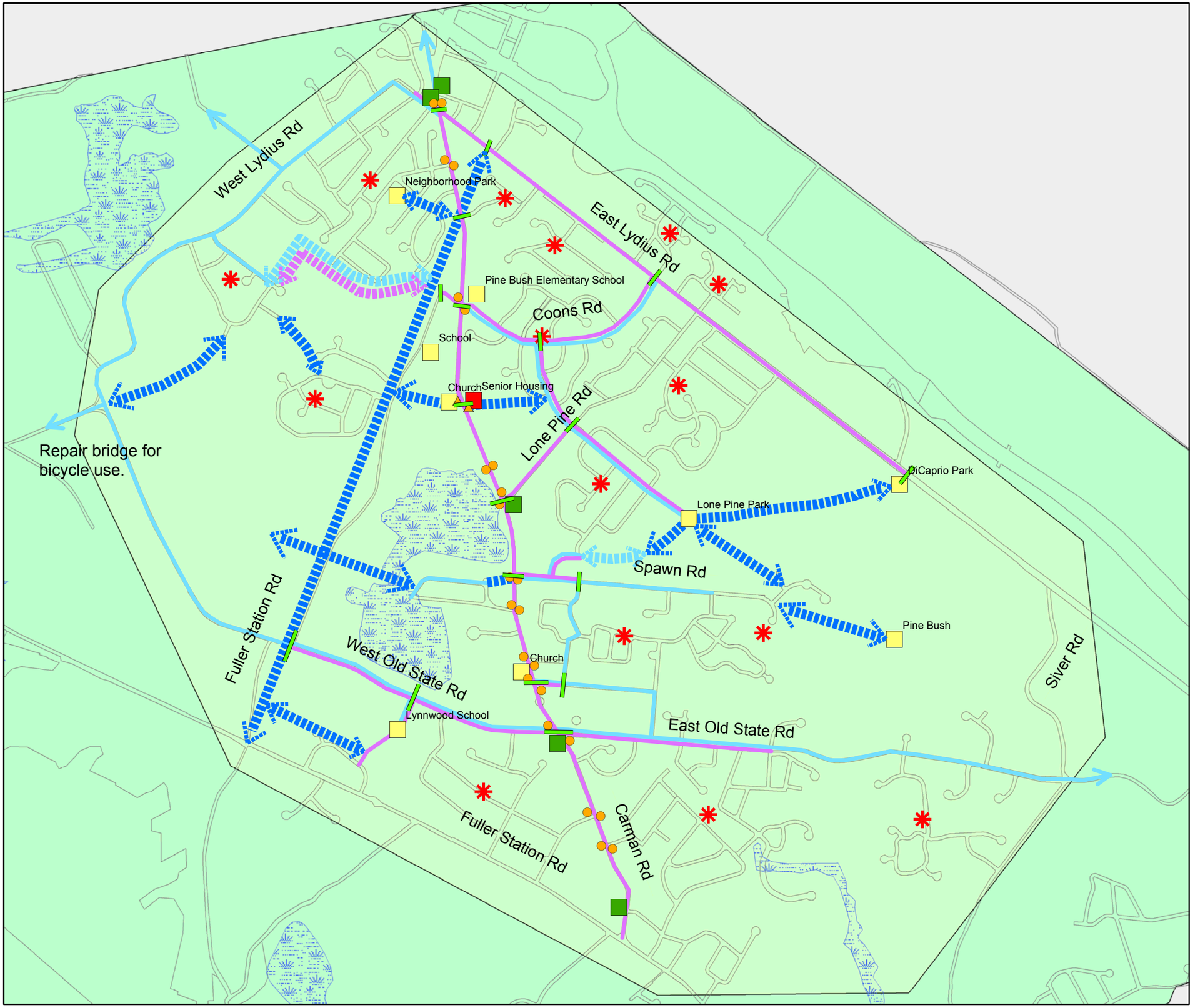
NOTE:
-Map not to scale.

Figure IV-1

Fort Hunter/ Carman Road Neighborhood Transportation Study

Proposed
Bicycle - Pedestrian System
September 2003

Wilbur Smith Associates
& The LA Group



Wilbur Smith Associates — Engineers, Planners, Economists

N
W E
S

Legend

- Study Area
- Wetlands
- Crosswalks
- Neighborhoods
- Senior Housing
- Existing Bus Stops
- Proposed Bus Stops
- Public or Institutional Destinations
- Commercial Destinations
- Sidewalk System
- Sidewalk System (locations to be determined)
- Designated Bike Routes
- Shared Use Path (locations to be determined)
- Bike Route Connections (locations to be determined)

NOTES:
-Map not to scale.
-Carman Road should have sidewalks on both sides.

Figure IV-2

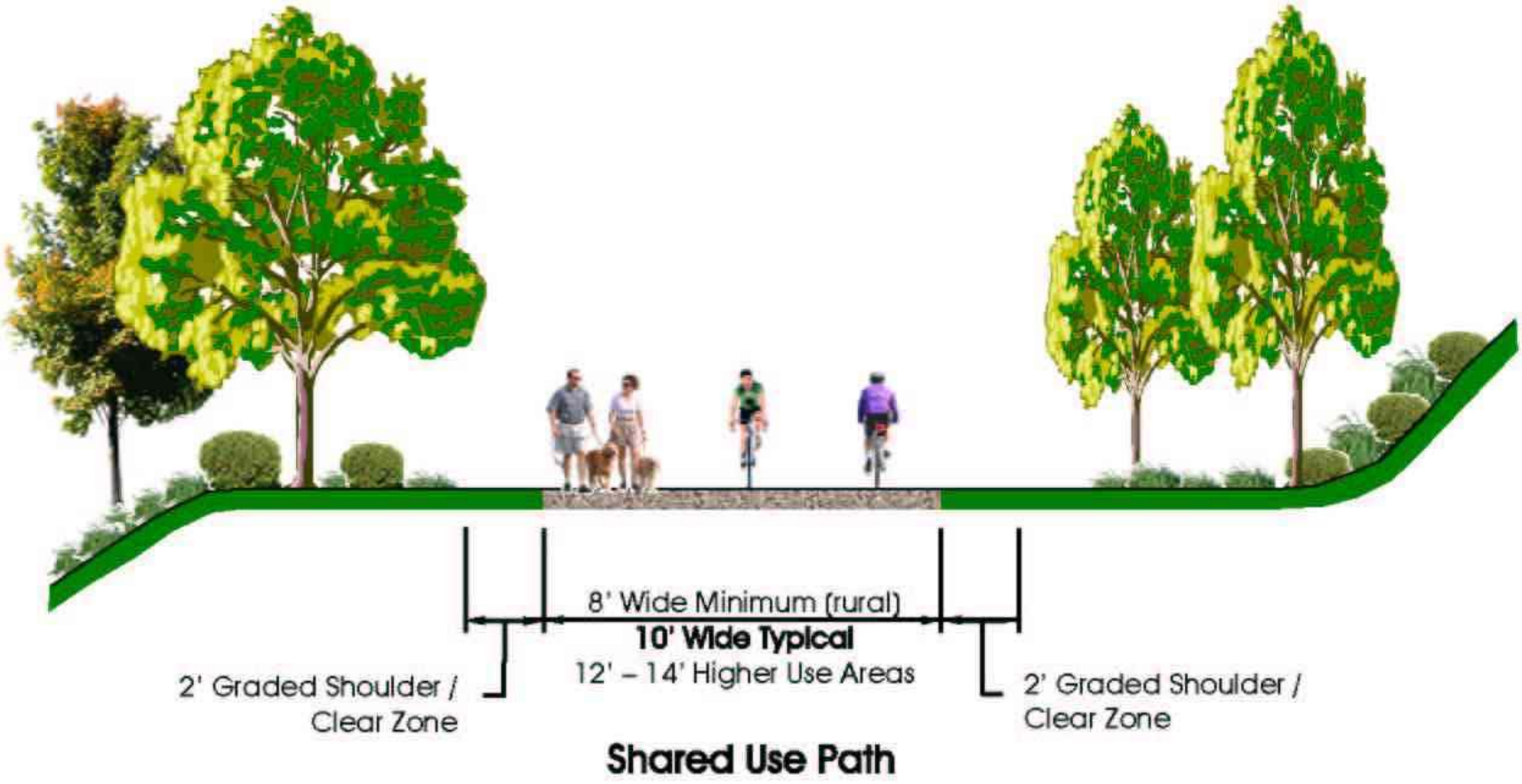


Figure IV-3 Typical Shared-Use Path Cross-Section

LYDIUS - CARMEN ROAD INTERSECTION

figure 5-1

OLD STATE ROAD AND CARMEN ROAD INTERSECTION

figure 5-2

LYNNWOOD SCHOOL

figure 5-3

APPENDIX A

EXISTING CONDITIONS

This section of the study documents existing conditions for the Fort Hunter/Carman Road Neighborhood Transportation Plan. It identifies existing issues and opportunities based on an assessment of available data and field observations by the Wilbur Smith Associates Team and input received at a public workshop held on April 16, 2003 at the Lynwood Reformed Church on Carman Road. The study area is shown in **Figure I-1**.

The assessment begins with a summary of how the Guilderland Comprehensive Plan addressed the Fort Hunter/Carman Road area and summarizes the results related to transportation improvements from a town-wide survey. A description of land use in the study area is followed by general description of Carman Road and the important collector roads in the study area. The general description summarizes observations on roadway characteristics, road condition, and pedestrian and bicycle facilities.

A detailed traffic and safety analysis focusing on Carman Road is provided. Traffic volumes and travel patterns are documented and discussed. Congestion is quantified at the study intersections of Carman Road with East/West Lydius Street, Fuller Station/Coons Road, Lone Pine Road, Spawn Road, and East/West Old State Road. Level of service is also provided for Carman Road as a single highway facility based on travel time surveys conducted by the Capital District Transportation Committee (CDTC). Crash statistics from 1998-2000 are summarized and analyzed.

Information on transit service is provided and bus stops assessed. Existing sidewalks are located and the overall pedestrian environment is assessed for the entire study area.

COMPREHENSIVE TOWN PLAN RECOMMENDATION

The *Town of Guilderland Comprehensive Plan 2000* describes transportation corridors within the Town as "both an amenity and a source of continued anxiety." As a result of land use and development patterns within the Fort Hunter and Carman Road community, automobile and truck congestion has been increasing while pedestrian safety and amenities have been decreasing.

The Town Plan describes the Fort Hunter Neighborhood as slightly older and better developed than the adjacent McCormick Corners. Development in both areas, according to the Town Plan, is dispersed and appears to lack any unifying character or theme. The heavy congested traffic on Route 146 divides the neighborhood. Even so, the new homes in the area; the availability of sewer and water; and proximity to the Thruway, Route 20 and the Pine Bush highlight the attractiveness of the area as a place to live.

The Comprehensive Plan calls for the overall strengthening of the sense of community, both in individual neighborhoods and the entire Town. As a means towards that goal, the Plan recommends the development of neighborhood plans, of which this study is one. It

also recommends the development of access management and streetscape plans for the Route 146 corridor. Future development and infill potentials should be considered as these plans are developed. The access management and streetscape plans can be used to direct new development. Additionally, the Town Comprehensive Plan recommends the development of a pedestrian access plan to increase connections between residential areas on either side of Route 146 and between the Fort Hunter neighborhood and surrounding areas in the Town. A good pedestrian circulation system is also encouraged as a means of increasing the use of transit opportunities in the neighborhood.

Existing Local Opinion on Transportation in the Town of Guilderland

The 1999 survey of the Town residents, completed as part of the development of the *Town of Guilderland Comprehensive Plan 2000*, provides an indication of their priorities for the Town's future. Among other things, the survey asked the residents to rate the priority of eight different actions, five of which are related to transportation improvements. The results of the survey placed the protection of drinking water as the highest priority with 88% of the respondents ranking it as a high priority. Slightly more than half of the respondents rated the preservation of open space and the expansion of Town water and sewer lines as a high priority. **Tables A-1 and A-2** show how the residents ranked transportation improvements based on the phone and mail in surveys. Guilderland residents ranked the expansion of mass transportation services as the most important transportation related action.

The second, third and fourth priorities, increasing road capacity, putting in more sidewalks and putting in more bike paths, each ranked fairly close to each other, with none greatly rated below the increase in mass transportation services. This ranking generally indicates that numerous improvements to the entire transportation system are desired, rather than a single minded approach that focuses solely on roadway expansion.

Table A-1. Guilderland's Transportation Priorities (Phone Survey)

Priorities	High Priority	Moderate Priority	Low Priority
Expand Mass Transportation Services	46.3%	36.8%	16.8%
Increase Road Capacity for Roads and Trucks	44.1%	32.3%	23.7%
Putting in More Sidewalks	37.9%	33.7%	28.4%
Putting in More Bike Paths	31.6%	49.0%	19.4%
Putting in More Park & Ride Lots	20.8%	35.4%	43.8%

Table A-2. Guilderland's Transportation Priorities (Mail Survey)

Priorities	High Priority	Moderate Priority	Low Priority
Expand Mass Transportation Services	41.2%	38.2%	20.8%
Increase Road Capacity for Roads and Trucks	36.3%	36.5%	27.2%
Putting in More Sidewalks	32.1%	35.7%	32.2%
Putting in More Bike Paths	29.9%	39.3%	31.4%
Putting in More Park & Ride Lots	18.4%	37.7%	44.0%

Some skepticism was expressed at the March 6, 2003 public meeting about transit being considered a high priority in the Fort Hunter/Carman Road neighborhood. The town-wide priorities indicated in **Tables A-1 and A-2** are, in general, consistent with priorities expressed within the zip-codes specific to the Fort Hunter/Carman Road neighborhood (12303 and 12306) as shown in **Table A-3**. **Table A-3** presents a score based on a scale from 0 to 100. A higher score indicates a higher priority. The one difference between the town-wide and Fort Hunter/Carman road results is that bike paths are ranked as a higher priority than sidewalks.

Table A-3. Transportation Priorities within Zip Codes Specific to the Forth Hunter Carman Road Neighborhood

Priorities	Zip Code 12303	Zip Code 12306	Low Priority
Expand Mass Transportation Services	57	50	53.5
Increase Road Capacity for Roads and Trucks	54	49	51.5
Putting in More Bike Paths	49	47	48.0
Putting in More Sidewalks	46	38	42.0
Putting in More Park & Ride Lots	34	29	31.5

For more detailed information on the results of the survey, refer to the *Town of Guilderland Comprehensive Plan 2000.*

STUDY AREA LAND USE

Historically, the Fort Hunter area developed from rural farmland into a collection of residential neighborhoods beginning in the early 1960's and 70's. This pattern of development within the corridor was further spurred by its proximity to the I-90 Interstate system and Exit 25, and has continued to this day limited only by access to municipal utilities and the presence of the Pine Bush Preserve on the eastern side of the corridor. As a result of these existing natural and constructed constraints, residential and commercial development has steadily progressed in a southward direction along Carman Road, resulting in the blurring of any neighborhood distinctions from the Fort Hunter / McCormack Corners areas.

The corridor is served by numerous community resources such as the Fort Hunter Fire station, a new Western Turnpike Rescue Squad station, the Pine Bush and Lynnwood elementary schools, the St. Madeleine Sophie School, five churches, an assisted living facility, the Fort Hunter, Volunteer Fireman's and Fusco Parks, the New York State Power Pool facility, as well as the Guilderland Town Hall and Public Safety Building.

In terms of defining the overall land use characteristics within the corridor, residential developments far exceed commercial uses. In addition to the older residential neighborhoods that traditionally developed along the eastern half of the corridor, newer subdivisions have begun to appear on once open farmlands on the western side of the corridor, especially northwest of Fuller Station Road. Other areas of the corridor that

have experienced significant residential growth in recent years include the area around Lynnwood Elementary School, and along the western end of Lydius Street.

Commercial activity within the Fort Hunter/Carman Road corridor is primarily centered around the McCormack Corners area which forms at the intersection of Carman Road (NYS Route 146) and Western Avenue (NYS Route 20). At this intersection, several more intense commercial uses can be found such as the Hannaford Supermarket Shopping Plaza, a CVS Pharmacy, several gasoline/service stations, a beverage center, as well as other smaller scale, retail strip centers. Commercial uses west of the McCormack Corners area along Route 20 decrease significantly once past the Guilderland Town Hall. However several interspersed commercial/retail/office uses can be found along Carman Road as one proceeds in a northerly direction. There are also several smaller nodes of clustered commercial/retail activity along this section of the corridor such as at the intersections of Carman with East/West Old State Road, and East/West Lydius Street.

In terms of existing land use conflicts, commercial development has not significantly infringed upon the residential neighborhoods along the Fort Hunter/Carman Road corridor. As noted in the 2001 Comprehensive Plan, most of this newer development has been more sensitive to the complexion of the corridor and has undergone a more thorough site plan review process.

GENERAL DESCRIPTION OF STUDY AREA ROADS

Carman Road (New York State Route 146)

Carman Road, also known as Route 146 East, runs in a north-south direction through the study area. Carman Road is officially classified as an urban principal arterial. However, it functions more like a minor arterial because it also provides access to abutting property in addition to serving through traffic. New York State Route 146 originates south of Guilderland in the Town of Gallupville, and terminates north of Guilderland in the Town of Mechanicville. Route 146 connects the Town of Guilderland to Rotterdam and Schenectady. Carman Road serves as a primary corridor connecting the Town of Guilderland with the New York State Thruway (I-90). Carman Road also serves as primary

Figure A-2. Carman Road (Route 146)

Figure A-3. Different Commercial and Residential Setbacks on Carman Road

access for many residential homes and subdivisions located throughout the community.

Carman Road contains a mix of commercial, residential, and office land uses. Commercial uses are intensified near the Western Avenue (Route 20) intersection. This intersection is marked by two gas stations, a chain drugstore, a grocery store, and other commercial uses. This intersection has a traffic signal that includes pedestrian signals. However, pedestrian crossings are discouraged by large crossing distances, traffic volumes, and continuous right-turn movements from US 20 to Carman Road.

Residential uses consist of single family residential units as well as multifamily housing developments. One multifamily development, Mallards Pond, contains garages for approximately 56 units with its only entrance leading to Carman Road.

In addition to residential and commercial uses, there are two schools located on Carman Road. The Pine Bush Elementary School and St Madeleine School are both located near the intersection of Carman Road and Coons Road.

As shown in **Figure A-3**, building setbacks along Carman Road are not standardized. While some residential uses are built to the front lot line, many commercial and office uses along the road have setbacks of between 30 and 40 feet to allow for parking or front yards.

Many vacant parcels are also located along Carman Road, with the majority available for sale. General land use becomes less dense approaching Lydius Street.

North of Western Avenue, Carman Road has traffic signals at its intersections with Hannaford Drive, East/West Old State Road, Fuller Station/Coons Road and East/West Lydius Street.

Hannaford Drive serves the shopping center on the northwest corner of Carman Road and Western Avenue.

The East/West Old State Road intersection is surrounded by a mix of commercial uses and vacant land. East/West Old State Road intersects Carman Road at a skewed angle making right turns difficult.

The land use at the intersection of Carman Road with Fuller Station and Coons Roads is dominated by both the Pine Bush School and by residential uses. The absence of crosswalks at this intersection creates a potentially dangerous environment for pedestrians attempting to reach the school. Fuller Station Road intersects with Carman Road at a skewed angle making right turns from the south difficult.

The intersection of Carman Road with East and West Lydius Streets is surrounded by a mix of residential and commercial uses. Additionally, the numerous streets bisecting Lydius Street in close proximity to this intersection can potentially create traffic concerns and confusion. Similar to the other two signalized intersections, East and West Lydius

Streets intersect Carman Road at a skewed angle making right turns from Carman Road difficult.

Overall, Carman Road features few pedestrian amenities. Although the street is striped to create shoulders, there are no bike lanes, and in many places, the shoulder is very narrow. Sidewalks along Carman Road are sporadic and do not connect to each other or to services. The sidewalks that do exist along Carman Road typically stretch three to four lots in length. There are only two crosswalks located along Carman Road, both located in front of St. Madeleine Sophie School, crossing to the eastern side of Carman Road. Although the Pine Bush Elementary School is located nearby, there are no crosswalks present to serve the pedestrian needs of those using the school facilities.

Public transportation is provided via CDTA Route 63 bus service along the entire Carman Road corridor within the study area. While there are numerous bus stops along Carman Road, there are no bus shelters (only bus stop signs). The lack of bus shelters, combined with the absence of sidewalks and the presence of narrow shoulders, results in a situation requiring pedestrians to stand in the street to wait for the bus to arrive.

Western Avenue (New York State Route 20)

Western Avenue, with four lanes to the east of Carman Road and two lanes to the west, is formally classified as a principal arterial. Western Avenue begins in Albany, travels through Guilderland at the southern portion of the study area, and then continues to Buffalo. At this section, Western Avenue is in good condition and is well lined.

Within the study area, there are a variety of uses represented along Western Avenue. While the majority of these uses are residential and commercial in nature, there are also vacant lands, community services, recreational lands, and conservation lands located along the corridor. Additionally, a significant amount of agricultural land is located along the southern side of Western Avenue between Vosburg Road and Frenchs Mill Road. As mentioned previously, commercial uses are concentrated at the intersection of Western Avenue and Carman Road. The Guilderland Town Hall is located along Western Avenue in close proximity to this intersection.

Figure A-4. Pedestrians on Western Avenue

Few streets have direct access to Western Avenue, with Carman Road being the most significant traffic corridor. While two private roads connect to Western Avenue, most roads exiting onto the corridor connect to other roadways and developments and do not dead-end. As a result, traffic congestion in this area is alleviated. These roadways

contain older homes and neighborhoods. The intersection with Carman Road is the only location at which there is a traffic signal along this portion of Western Avenue.

Sidewalks are located along both sides of Western Avenue east of the intersection with Carman Road. After the intersection, sidewalks continue on the northern side of the road only, terminating at Town Hall. Bike paths span the entire Western Avenue corridor within the study area. The CDTA Route 63 bus service exists along Western Avenue but only east of the intersection with Carman Road. There is no public transportation service west of Carman Road. There is one bus shelter on Western Avenue near the intersection with Carman Road. There are no crosswalks along Western Avenue.

Figure A-5. Lydius Street

East & West Lydius Streets

This two-lane urban collector street begins at East Old State Road in the Pine Bush Preserve, enters the neighborhood from the southeast and runs northwest to cross Carman Road. The street then continues southwest toward the Conrail tracks before turning south and becoming Old State Road. The road is in good condition, showing only minor signs of winter heaving. The overall condition of the street deteriorates heading west.

Figure A-6. Subdivision exiting onto Lydius Street

Lydius Street is dominated by single family residential uses. Primarily, these residential uses are found in subdivisions extending from Lydius Street and terminating in cul-de-sacs and dead ends. As a result of this configuration, most residents living in these subdivisions are required to use Lydius Street whenever making trips between subdivisions or to other destinations.

The most significant intersection along Lydius Street is Carman Road. The Carman Road intersection is controlled by the only traffic signal on Lydius Street and is configured in a way that could create difficulty traveling through the intersection. Other significant intersections along Lydius Street are Coons Road and Lone Pine Road, both which connect Lydius Street to Carman Road.

Figure A-7. Old State Road at intersection with Carman Road

There are no bike lanes or shoulders indicated along Lydius Street. Additionally, there are no sidewalks, crosswalks, or any other amenities designed to encourage pedestrian traffic along Lydius Street.

East and West Old State Roads

This two-lane urban collector street continues where Lydius Street ends, and runs southward, crossing Carman Road. After crossing Carman Road, Old State Road continues east toward the Pine Bush Preserve to connect with the beginning of Lydius Street. The road is in good condition and is striped with narrow shoulders.

Land use along Old State Road is primarily residential, consisting of single-family homes located on lots fronting the roadway. Vacant lots are also located along Old State Road, with the largest vacant lot located along the western portion of the roadway where it meets West Lydius Street in the northwest portion of the study area. Agricultural lands are similarly located along Old State Road in several areas, with the largest concentration of agricultural lands located where West Old State Road turns eastward and intersects with Fuller Station Road. A small area of conservation land / public park is located along Old State Road east of Carman Road, but is surrounded by residential uses. The Lynnwood Elementary School is located off of Old State Road. Lot sizes along Old State Road are large at the western start of the roadway and become progressively smaller approaching the eastern portion of the study area.

Figure A-8. Pedestrian on Old State Road

East of Lynnwood Elementary School, an increasing number of local streets exit onto Old State Road. The majority of these streets serves residential uses and connect with other streets leading to collectors and minor arterials throughout the community. The only traffic signal along this road is located at the intersection with Carman Road.

Figure A-9. Fuller Station Road

Beyond its intersection with Carman Road, there are no pedestrian amenities along Old State Road. Despite the Lynnwood School being located along this corridor, there are no crosswalks or sidewalks located anywhere throughout the corridor. Additionally there are no shoulders, bike paths, or public transportation routes/amenities along this corridor with the exception of the intersection with Carman Road.

Fuller Station Road

This two-lane urban collector road starts at the southern portion of the study area and continues northward, terminating at the intersection of Carman Road and Coons Road. The road is striped with narrow shoulders and is in good condition.

Land uses along this corridor represent a mix of uses. In addition to vacant lands, the corridor is composed largely of residential and agricultural uses. Furthermore, conservation lands are located at the southern portion of the road and at the northern portion of the roadway with residential uses arrayed in a conservation subdivision design. Public services, related to the Watervliet Reservoir, are found at the southern end of Fuller Station Road while the St. Madeline Sophie School is located near the intersection of Fuller Station Road with Carman Road. The old railroad grade right-of-way runs parallel to Fuller Station Road, representing an opportunity for a recreational corridor.

With only two roadways exiting onto Fuller Station Road, the corridor acts primarily as a connection between the northern and southern portions of the study area. These two roadways serve the residential subdivisions and do not connect to any other roadways.

There are no pedestrian amenities along Fuller Station Road. Sidewalks, bike paths, and crosswalks are absent from the corridor despite the school and residential uses.

Lone Pine Road

This two-lane urban collector road travels north from Carman Road and terminates at Lydius Street. The road is in good condition and is lined with narrow shoulders.

Lone Pine Road consists primarily of residential uses. Most residential units in this area are older homes located on small lots. There is a gas station and convenience store located at the Lone Pine intersection with Carman Road. A concentration of vacant land is located along the northern side of Lone Pine Road between Carman Road and Gregory Lane. Several collectors and local streets exit onto Lone Pine Road.

Despite the dominance of residential uses, there are no pedestrian amenities on Lone Pine Road. Sidewalks and crosswalks are absent, as well as bike paths. Public transportation is only available at the intersection with Carman Road.

Figure A-10. Intersection of Carman Road and Coons Road

Coons Road

This two-lane urban collector road travels

east from Carman Road to Lydius Street. The road is in good condition and is lined with narrow shoulders.

Uses along Coons Road are primarily residential, with several vacant parcels. One concentration of vacant parcels is located along Patrick Road and Coffee Drive and has already been configured for a subdivision terminating in a cul-de-sac. The Pine Bush Elementary School is located at the intersection of Coons Road with Fuller Station Road and Carman Road.

With the exception of Tansy Court, all streets exiting onto Coons Road are local streets or connector roads. These streets connect to other streets, leading to other portions of the neighborhood.

Coons Road is the only roadway in the study area with continuous sidewalks on both sides of the road. Crosswalks, however, are absent from the roadway despite the presence of the elementary school. There are also no bike paths along the roadway. Public transportation is only available at the Carman Road intersection.

All other roadways and streets

These two-lane local streets are in fair to good condition. The majority of these streets are located in subdivisions. While there are interconnections between subdivision, a large portion of these local streets dead-end in cul-de-sacs.

Figure A-11. Typical Local Street - Ronald Place

Land uses along these streets are primarily residential. Subdivisions consist of larger houses located on smaller lots, while older residential uses are located on larger lots and tend to be smaller in size. Small public parks and conservation lands are scattered throughout much of the residential development. A great deal of these conservation lands are the result of conservation subdivision design.

Figure A-12. Typical Local Street - Gregory Lane

There is also a great deal of vacant land located throughout the community. This land is located both in large contiguous parcels as well as smaller subdivided parcels throughout the community. Commercial uses are primarily concentrated along the Carman Road and Western Avenue corridors.

These streets do not have pedestrian amenities. There are no sidewalks, bike paths, or crosswalks indicated. Shoulders on these roads are either narrow or non-existent.

General Issues

Overall, the community is not pedestrian friendly. There are serious pedestrian issues including the absence of crosswalks and sidewalks, which forces pedestrians to walk in the street. Contributing to these concerns is the presence of bus stops with few shelters or sidewalks leading towards them or, requiring pedestrians to wait for the bus dangerously close to the roadway. The absence of bike paths discourage alternative forms of transportation and recreation throughout the community. Pedestrian measures that are present within the community do not connect and are too sporadic to be effectual.

Street configurations throughout the study area contribute to greater traffic congestion concerns. Newer subdivisions do not connect to one another and instead have only one outlet onto Carman Road, Western Avenue, or Lydius Street. To go between subdivisions, one must go out onto the minor arterial and then back into another subdivision, creating unnecessary traffic along these corridors. Additionally, the closed bridge at the southern portion of Frenchs Mill Road limits the use of the roadway as a linkage to other parts of Guilderland, further requiring residents to use one of the minor arterials for travel. (FIRST TIME Mentioned.)

The proliferation of single-use development, rather than mixed-use development, requires most residents throughout the community to drive to their destination. Since sidewalks, bike paths, and public transportation do not exist throughout the majority of the study area, personal automobile traffic is encouraged.

With respect to lot size and composition, smaller lots tend to be located east of Carman Road while larger lots are located south and west of Carman Road. With a significant amount of large-lot, vacant and agricultural lands located south and west of Carman Road, future small-lot subdivision on these lands could create potential traffic and environmental concerns throughout the community.

ROADWAY GEOMETRY

Table A-4 provides additional detail on cross sections for Carman Road and the major collector roads in the corridor. According to "A Policy on Geometric Design of Highways and Streets 2001" (American Association of State Highway and Transportation Officials) an 11 foot travel lane is acceptable for an urban arterial such as Carman Road and a 10 foot travel lane is acceptable for an urban collector. The lane widths on Carman Road and the major collector streets listed in **Table A-3** satisfy these standards with the exception of Fuller Station Road.

Figure A-13 shows the typical cross section along Carman Road. Where sidewalks are present, they are often separated from the travel lanes by a green strip that varies from nothing to 18 feet wide. The most common green strip width is 12 feet. The total width of the cross section shown in **Figure A-13** is 45 feet suggesting that the available right-of-way along Carman Road is at least as much. It is common for roads to have a 3-Rod Right-of-Way which equates to 49 feet. Assuming 49 feet is available, bike lanes, sidewalks, and green strips could be added to Carman Road without having to acquire significant amounts of new right-of-way.

Table A-4. Typical Cross Section Features for Study Area Roads

Road	Posted Speed Limit	Lane Width (Feet-Inches)	Shoulder Width (Feet-Inches)	Sidewalk Width (1)	Notes
Carman Road	40	11'-6"	2'-0" to 3'-6"	4 – 5 Feet	12 foot greenspace between sidewalks and road
East Lydius Street	30	10'-0	0 – 6"	None	
West Lydius Street	30	10'-6"	1'-6"	None	12 foot lanes with 2'-6" shoulders from Carman Road to bend in road
Coons Road	30	12'-0	2'-9"	5 foot asphalt walk north/ 3 foot greenspace 5 foot concrete walk south / 6 foot greenspace	The shoulder is sloped for drainage.
Fuller Station Road	30	9'-6"	0 – 4"	None	
Spawn Road	30	12'-0 to 10'-6"	None	None	
Lone Pine Road	30	10'-0	0'-0"to 0'-6"	None	
East Old State Road	30	11'-0" to 12'-0"	2'-0" to 0'-6"	None	
West Old State Road	30	10'0" to 10'-6"	0'- 6"	4 foot concreted sidewalk with 18'-6" greenspace	

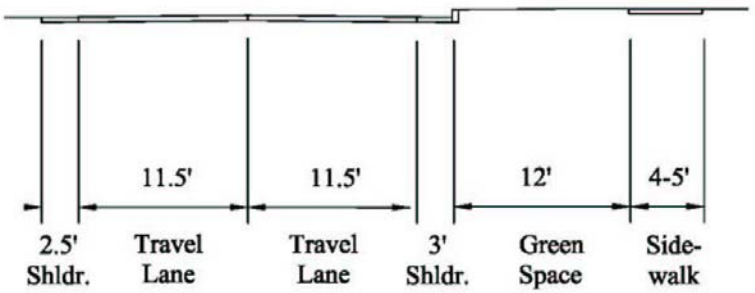
Table A-5 summarizes an assessment of turning radii at the study intersections for passenger cars and school buses. The southbound right-turn from Carman Road to East Lydius and West Old State Roads are potentially deficient for passenger cars. With the exception of the Spawn Road intersections, inadequate turning radii exist at all of the study intersections for school buses. This assessment needs to be balanced with the needs of pedestrians crossings at the intersections. Any increase in turning radii to accommodate buses or other vehicles will increase the length of roadway that a pedestrian must cross.

Table A-5. Assessment of Turning Radii at Study Intersections

Intersection	Passenger Car (24' radius)	School Bus (39' radius)
East Lydius	Northbound right-turn onto East Lydius has potential turning radius deficiencies	Southbound right-turn onto West Lydius has potential turning radius deficiencies
West Lydius	No deficiencies	Southbound right-turn onto West Lydius has marginal turning radius deficiencies
Fuller Station	No deficiencies	Southbound right-turn onto Fuller Station has potential turning radius deficiencies
Coons	No deficiencies	Northbound right-turn onto Coons has potential turning radius deficiencies
Lone Pine	No deficiencies	Westbound right-turn onto Carman Road has potential turning radius deficiencies
Spawn	No deficiencies	No deficiencies
East Old State	No deficiencies	Northbound right-turn onto East Old State has potential turning radius deficiencies
West Old State	Southbound right-turn onto West Old State has potential turning radius deficiencies	Southbound right-turn onto West Old State has potential turning radius deficiencies

Figure A-13. Existing Carman Road Cross Section

Note: Sidewalks are not continuous down the corridor and alternate on either side of Carman Road. The green spaces vary from road edge to 18' wide and the road shoulders vary from 2' to 4' wide.



CARMAN ROAD TYPICAL CROSS SECTION
2 lanes, shoulder, green space, sidewalk

Carman Road Transportation Study	Guilderland, New York	March 2003	Wilbur Smith Associates

CARMAN ROAD TRAFFIC PERFORMANCE AND SAFETY ANALYSIS

As shown in **Table A-6**, Carman Road carries between 12,000 and 13,000 vehicles per day south of Lydius Street, and more than 16,000 vehicles per day north of Lydius Street. These average annual daily traffic data are based on counts performed by NYSDOT and include Saturdays and Sundays. Traffic flows Monday through Friday may be approximately 10 - 13% higher than the numbers shown below. As shown in **Table A-7**, traffic volumes are significantly less on the major collector roads in the study area.

Figure A-14 shows how traffic volumes vary throughout a weekday. As would be expected for a commuter corridor, there are two distinct peak periods occurring during the morning and afternoon. Traffic peaks between 7:00 and 8:00 AM in the morning and between 5:00 and 6:00 PM in the afternoon. Of the two peak periods, traffic volumes are slightly higher during the afternoon.

Table A-6. 2002 Average Annual Daily Traffic on Carman Road

Section	Vehicles Per Day
Fort Hunter Road to East & West Lydius Streets	16,330
East & West Lydius Streets to Lone Pine	12,900
Lone Pine Road to Old State Road	12,250

Table A-7. Estimated 2002 Average Annual Daily Traffic for Collector Streets

Road	Vehicles Per Day
West Lydius Street	4,170
East Lydius Street	3,390
Fuller Station Road	1,500
Coons Road	2,070
Lone Pine Road	1,880
Spawn Road	1,470
West Old State Road	2,470
East Old State Road	2,950

Origins and Destinations

Figure A-15 shows direction of traffic flow by percentage during the AM and PM peak hours. During the AM peak hour, a definitive outbound traffic flow can be observed on East and West Lydius Streets, Fuller Station Road, Lone Pine Road, and Spawn Road. This outbound traffic is expected because people are leaving home and traveling to work and other destinations. However, north and south bound traffic flow on Carman Road is nearly equal suggesting that an equal number of work and non-work destinations are north and south of the study area. During the PM peak hour the reverse traffic flow can be observed although it is less definitive than during the AM peak hour. Inbound traffic accounts for the higher share of traffic on West Lydius Street, Fuller Station Road, Lone Pine Road, Spawn Road and East Old State Road. During the PM peak hour there is a greater diversity of trip purposes as people travel for shopping, social reasons, after school events, in addition to the work to home trip. As a result, the direction of traffic flows are somewhat more balanced on the collector streets as people travel to and from a

diversity of locations. Traffic flows remain balance on Carman Road during the PM peak hour, as mentioned above, because final destinations are evenly disbursed north and south of the study area.

Data from the CDTC's regional transportation model was used to estimate the percentage of through trips occurring on Carman Road during the PM peak hour. Approximately 35% of the southbound vehicles entering Carman Road at the Lydius Street intersection and 33% of the northbound vehicles entering Carman Road at the Old State Road intersection are through trips. These vehicles do not have an origin or destination in the study area.

Figure A-14. Hourly Traffic Variations on Carman Road

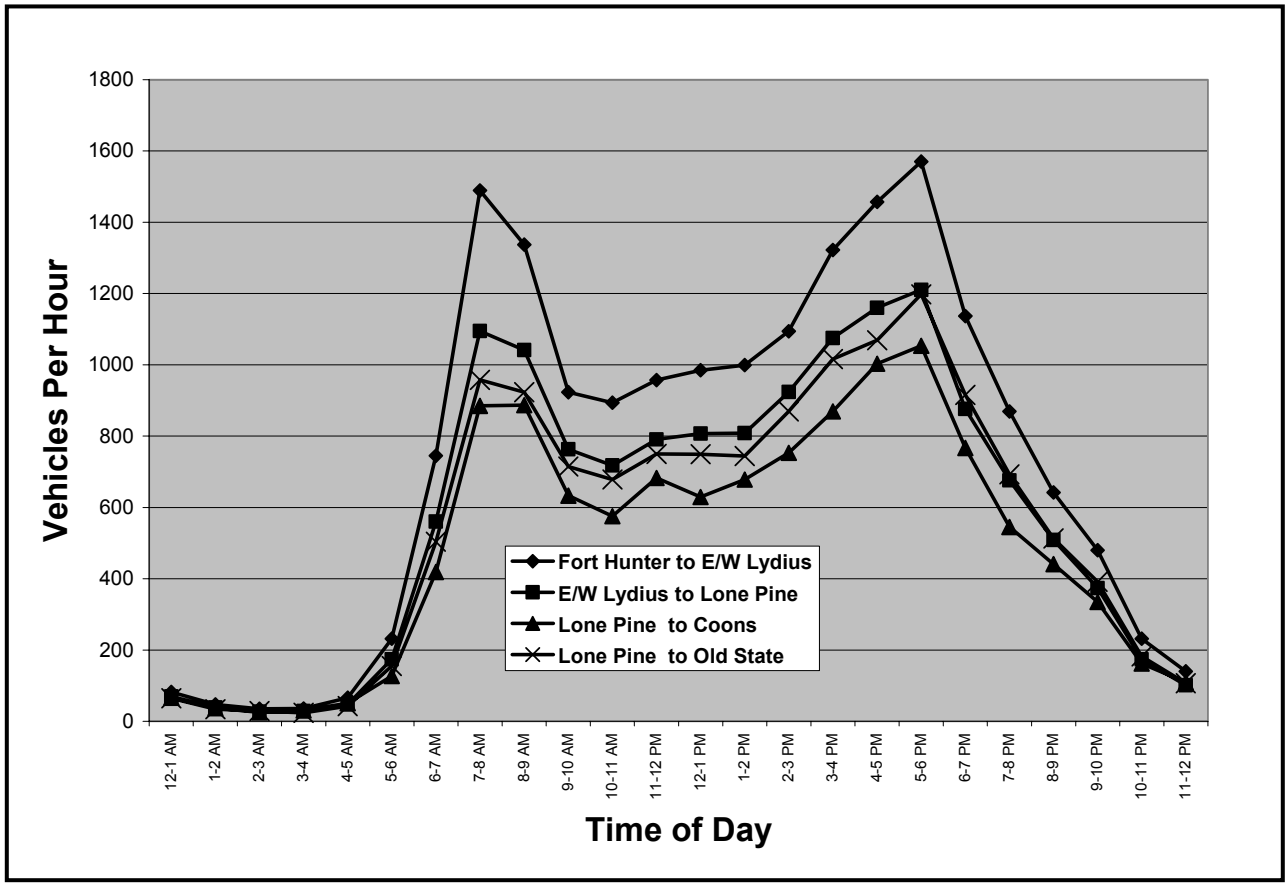
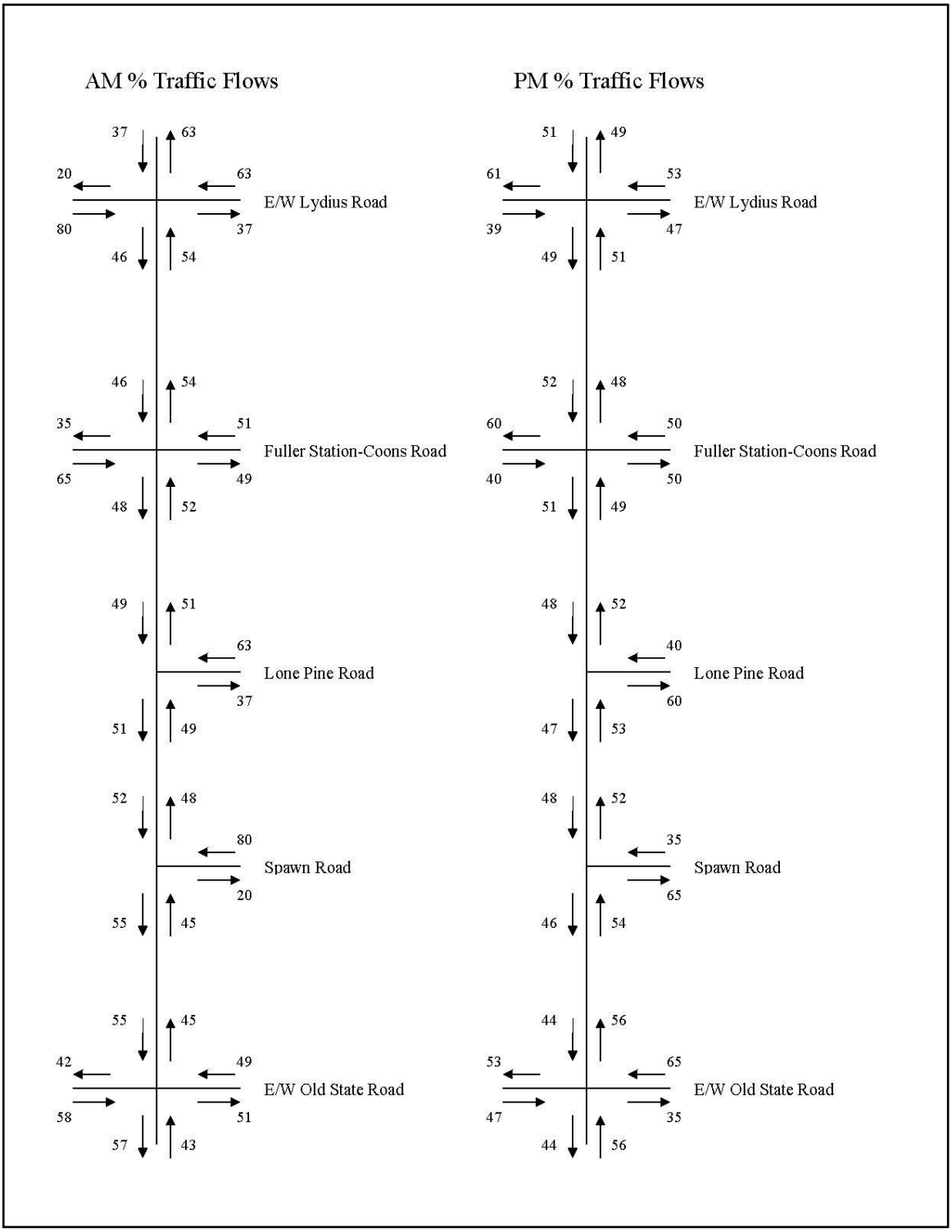


Figure A-15. Traffic Flow Distribution on Carman Road



Congestion Methodology

Congestion has been measured for the year 2002 based on ground counts conducted by NYSDOT on the dates shown in **Table A-8**. According to the CDTC, October is a reasonable representation of typical traffic conditions in the corridor. Therefore, no adjustments have made to account for seasonal variations in the congestion analysis presented below.

Table A-8. Study Intersection Control Type and Count Date

Carman Road Intersection	Control Type	AM Count Date	PM Count Date
East & West Lydius Streets	Traffic Signal	Thursday 10-03-2002	Wednesday 10-02-2002
Fuller Station & Coons Road	Traffic Signal	Wednesday 10-09-2002	Wednesday 10-09-2002
Lone Pine Road	Stop Sign	Friday 10-18-2002	Monday 10-21-2002
Spawn Road	Stop Sign	Thursday 10-25-2002	Tuesday 10-22-2002
East & West Old State Road	Traffic Signal	Tuesday 10-15-2002	Tuesday 10-15-2002

Level of service (LOS) is the standard measure used to quantify the operational performance of highway facilities as perceived by the user. The grades A, B, C, D, E and F are the five possible LOS ratings where "A" indicates excellent conditions with free flow, "E" indicates intolerable conditions with unstable flow, and "F" indicates that demand exceeds capacity. **Table A-9** summarizes the qualitative differences between the LOS ratings

.

Table A-9. Qualitative Level of Service Descriptions

Level of Service	Traffic Operations
LOS A	Free flow conditions, vehicles are completely unimpeded, and minimal delay at intersections
LOS B	The ability to maneuver in a traffic stream is only slightly restricted and there are insignificant delays at intersections.
LOS C	Traffic flow is stable but the ability to maneuver and change lanes is more restricted than LOS B. Vehicle begin to back-up at intersections.
LOS D	A small increase in traffic may cause substantial increases in delay at intersections and decreases of travel speeds on road segments.
LOS E	Significant delays at intersections with road segment travel speeds at approximately 1/3 of the posted speed.
LOS F	Extremely slow travel speeds, high delays, and extensive vehicle back-ups at intersections

Level of service for both signalized and stop-controlled intersections is measured in terms of average delay per vehicle. The delay, referred to as control delay, includes the time required to slow down when approaching an intersection, the time a vehicle is stopped, the time required for a line of vehicles (the queue) to move up to the intersection, and the time required to accelerate. **Table A-10** presents the relationship between LOS and control delay. As indicated below, the 2000 Highway Capacity Manual (HCM) has lower delay thresholds for stop-controlled intersections. The HCM explains this difference by arguing that drivers at signalized intersections are able to relax during red cycles while drivers at stop-controlled intersections must stay alert and be ready to move

when gaps in opposing traffic are large enough. Furthermore, stop-controlled intersections are smaller volume facilities and drivers therefore expect less delay. And finally, there is greater variability in delay encountered at stop-controlled intersections compared to pre-timed signals.

Table A-10. Level of Service Criteria for Signalized and Stop Controlled Intersections

LOS	Characteristics	Stop Controlled Delay (Seconds)	Traffic Signal Delay (Seconds)
A	Little or no delay	< 10	< 10.0
B	Short delays	> 10 and < 15	> 10 and < 20
C	Average delays	>15 and < 25	>20 and < 35
D	Long delays	> 25 and < 35	> 35 and < 55
E	Very Long delays	> 35 and < 50	> 55 and < 80
F	Extreme delays	> 50	> 80

Level of Service for two lane highways in a suburban area is measured with average travel speed as indicated in **Table A-11**. The relationship between level of service and average travel speed depends upon the urban street functional design category as defined by the 2000 Highway Capacity Manual. Carman Road meets most of the criteria for a class II urban street including location in a suburban area, low density driveway access, no on-street parking, 1-5 traffic signals per mile, posted speed limits ranging from 40-45 miles per hour, little pedestrian activity, and low to medium density roadside development.

Table A-11. Level of Service Criteria for a Class II Urban Street

LOS	Average Travel Speed (miles per hour)
A	Greater Than 35
B	28 - 35
C	22 - 28
D	17 - 22
E	13 - 17
F	Less Than 13

There is almost universal agreement that levels of service A, B and C are acceptable and LOS F is not. Because Level of Service ratings attempt to measure how well a facility is operating as perceived by the driver, the acceptability of LOS D varies by the location of the facility and the policies of state department of transportations, municipal, and regional organizations involved in transportation planning. On rural highway facilities where speeds are often higher and drivers expect a higher level of mobility, LOS D may not be acceptable. On the other hand, in urban areas and activity centers where drivers expect and are accustomed to greater delays, an LOS D is often considered acceptable and is often wide spread. In some cases, LOS E may be acceptable in urban areas and activity centers

Tables A-12-A-17 provide level of service, the associated average delay per vehicle, and average vehicle queues for each study intersection controlled by a traffic signal. The performance measures are presented for each approach and for the intersection as a whole. The analysis is based on the existing timing plans at the East/West Lydius and

East/West Old State Road intersections. Timing plan information was not available for the Fuller Station/Coons Road intersection. That intersection was analyzed assuming the same cycle length as the other two intersections (90 seconds) and optimized splits. The three signalized intersections run independently from each other (they are not part of a coordinated traffic control system). The Fuller Station/Coons Road and East/West Old State Road intersections have simple two-phase timing plans. This type of timing plan provides green time to north and south bound traffic on Carman Road at the same time followed by green time for east and west bound traffic on the side streets. The same type of two phase timing plan exists for the East/West Lydius Street intersection during the morning rush hour. During the afternoon rush hour, this intersection has a three phase timing plan that allows southbound traffic to move through the intersection first, followed by a northbound/southbound combination, and finally an eastbound/westbound combination.

Tables A-18-A-21 provide level of service, the associated delay, and the estimated vehicle queues for the stop-controlled intersections at Lone Pine and Spawn Roads. For stop-controlled intersections the critical movements are (1) the approaches controlled by the stop sign and (2) the left turn movements from the main street to the side streets. Average intersection level of service is not meaningful at stop-controlled intersections. The mainline traffic is often much higher than the minor street traffic, and operates with little or no delay because it has the right-of-way. As a result, average intersection delay and level of service will be greatly affected by the main street traffic and may mask problems on the side streets.

Congestion Analysis Results

As indicated in **Tables A-12-A-21** the only location with an existing congestion problem is the East/West Lydius Street intersection. The average intersection level of service is acceptable during the AM and PM peak hours at LOS C and B respectively. However, the West Lydius Street approach operates at LOS E during the AM peak and LOS D during the PM peak. Average vehicle queues are significant on Carman Road northbound and southbound.

All of the other intersections have acceptable levels of service for each approach and minimal vehicle queues. As indicated in **Tables A-22-A-25**, average travel speeds are also acceptable during the AM and PM Peak hours along Carman Road resulting in levels of service of A or B for the entire roadway between Old State Road and Lydius Streets.

Table A-12. Carman Road with East and West Lydius Streets 2002 AM Peak Hour

AM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	E	C	C	C	C
Delay (Seconds)	56	20	24	25	29
Average Queue (Feet)	182	41	342	311	Not Applicable

Table A-13. Carman Road with East and West Lydius Streets 2002 PM Peak Hour

AM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	D	C	A	B	B
Delay (Seconds)	48	30	8	11	15
Average Queue (Feet)	120	104	273	519	Not Applicable

Table A-14. Carman Road with Fuller Station and Coons Road 2002 AM Peak Hour

AM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	B
Delay (Seconds)	28	30	5	7	8
Average Queue (Feet)	27	15	54	74	Not Applicable

Table A-15. Carman Road with Fuller Station and Coons Road 2002 PM Peak Hour

AM Peak Hour	Fuller Station Road	Coons Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	A
Delay (Seconds)	28	30	5	8	9
Average Queue (Feet)	15	18	51	90	Not Applicable

Table A-16. Carman Road with East and West Old State Roads 2002 AM Peak Hour

AM Peak Hour	West Old State Road	East Old State Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	B
Delay (Seconds)	32	29	8	8	15
Average Queue (Feet)	74	53	79	97	Not Applicable

Table A-17. Carman Road with East and West Old State Roads 2002 PM Peak Hour

AM Peak Hour	West Old State Road	East Old State Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	B
Delay (Seconds)	23	26	9	6	11
Average Queue (Feet)	28	50	105	64	Not Applicable

Table A-18. Carman Road with Lone Pine Road 2002 AM Peak Hour

AM Peak Hour	Lone Pine Road	Carman Rd Southbound Left	Average Intersection
Level of Service	C	A	A
Delay (Seconds)	21	1	2
Average Queue (Feet)	22	2	Not Applicable

Table A-19. Carman Road with Lone Pine Road 2002 PM Peak Hour

AM Peak Hour	Lone Pine Road	Carman Rd Southbound Left	Average Intersection
Level of Service	D	A	A
Delay (Seconds)	26	1	2
Average Queue (Feet)	31	2	Not Applicable

Table A-20. Carman Road with Spawn Pine Road 2002 AM Peak Hour

AM Peak Hour	Spawn Road	Carman Rd Southbound Left	Average Intersection
Level of Service	C	A	A
Delay (Seconds)	17	1	2
Average Queue (Feet)	22	2	Not Applicable

Table A-21. Carman Road with Spawn Road 2002 PM Peak Hour

AM Peak Hour	Spawn Road	Carman Rd Southbound Left	Average Intersection
Level of Service	D	A	A
Delay (Seconds)	31	2	2
Average Queue (Feet)	28	4	Not Applicable

Table A-22. Average AM Peak Hour Northbound Speeds for Carman Road

Starting Time	Average Overall Speed	Average Running Speed	Total Stopped Delay
25-Nov-02	(mph)	(mph)	(seconds)
7:25 AM	39	40	3
7:46 AM	24	35	106
8:08 AM	25	31	82
8:22 AM	40	40	0
8:33 AM	40	40	0
Average	34	37	38
LOS	B	A	

Table A-23. Average AM Peak Hour Southbound Speeds for Carman Road

Starting Time	Average Overall Speed	Average Running Speed	Total Stopped Delay
25-Nov-02	(mph)	(mph)	(seconds)
7:33 AM	38	38	5
7:56 AM	35	38	25
8:15 AM	33	33	0
8:26 AM	40	40	0
Average	37	37	8

LOS	A	A	

Table A-24. Average PM Peak Hour Northbound Speeds for Carman Road

Starting Time	Average Overall Speed	Average Running Speed	Total Stopped Delay
26-Nov-02	(mph)	(mph)	(seconds)
4:25 PM	27	34	85
4:45 PM	32	32	0
5:00 PM	28	32	43
5:19 PM	32	32	0
Average	30	33	32
Level of Service	B	B	

Table A-25. Average PM Peak Hour Southbound Speeds For Carman Road

Starting Time	Average Overall Speed	Average Running Speed	Total Stopped Delay
26-Nov-02	(mph)	(mph)	(seconds)
4:20 PM	38	38	0
4:35 PM	26	31	72
4:53 PM	30	30	0
5:10 PM	26	30	50
5:30 PM	29	36	75
Average	30	33	39
Level of Service	B	B	

CARMAN ROAD SAFETY ANALYSIS

Tables A-26 and A-27 present an analysis of crash data at study intersections and road segments along Carman Road. The total number of crashes and the crash rate is shown. The crash rate is useful because it normalizes the number of crashes by the amount of vehicles passing through an intersection or along a road segment. The crash rate allows an "apples to apples" comparison between locations with varying amounts of traffic. The predominant collision type is also noted to help identify any potential patterns. If a particular type of crash occurs five or more times per year, additional investigation would be recommended to determine whether or not the cause was related to a geometric feature or the type of traffic control.

The intersections of Carman Road with Lone Pine Road and Spawn Road had the highest crash rate of the five study intersections. Both of these intersections are stop-controlled. The Fuller Station/Coons Road intersection had the smallest crash rate. There were no critical collision patterns occurring at any of the study intersections.

The highest road segment crash rates along Carman Road occurred north of Lone Pine

Road. Half of the crashes between Fuller Station Road and Lydius Street were related to left turns. This section of Carman Road contains many residential drives and some commercial drives that may be contributing to this pattern. Despite this predominant pattern, there were no specific patterns that exceeded the threshold of 5 or more crashes per year.

There were no fatalities during the three year period for which data were provided. Only one crash involved a bicyclist. No pedestrians were involved in any crashes.

Based on a spot speed study conducted in 1998, 80 to 90% of the vehicles on Carman Road were traveling over the posted speed limit of 40 miles per hour. A common response to the results of spot speed studies, which are conducted during off peak time periods in order to measure travel speeds unrestricted by congestion, is to raise the speed limit. The rationale is that drivers are traveling at a safe and reasonable speed based on their judgment of road conditions. However, this rationale does not account for the way speeds affect the safety and environment of non-motorists using the facility. People on foot, on bicycles, or trying to enter and exit driveways will have a different perception of a safe and reasonable speed than motorists traveling through.

Table A-26. Intersection Crash Summary for 1998 through 2000 (3 Years)

Carman Road Intersection	Total Crashes	Number of Injuries / Deaths	Crash Rate (Crashes per Million Vehicles)	Predominant Collision Type	Notes
East/West Lydius Streets	11	3 / 0	0.56	4 Right Angle	
Fuller Station/Coons Roads	4	1 / 0	0.26	No Patterns	
Lone Pine Road	11	6 / 0	0.78	No Patterns	
Spawn Road	10	5 / 0	0.70	4 Rear End	1 crash involved a bicyclist
East/West Old State Roads	11	6 / 0	0.66	5 Right Angle (< 2 per year)	

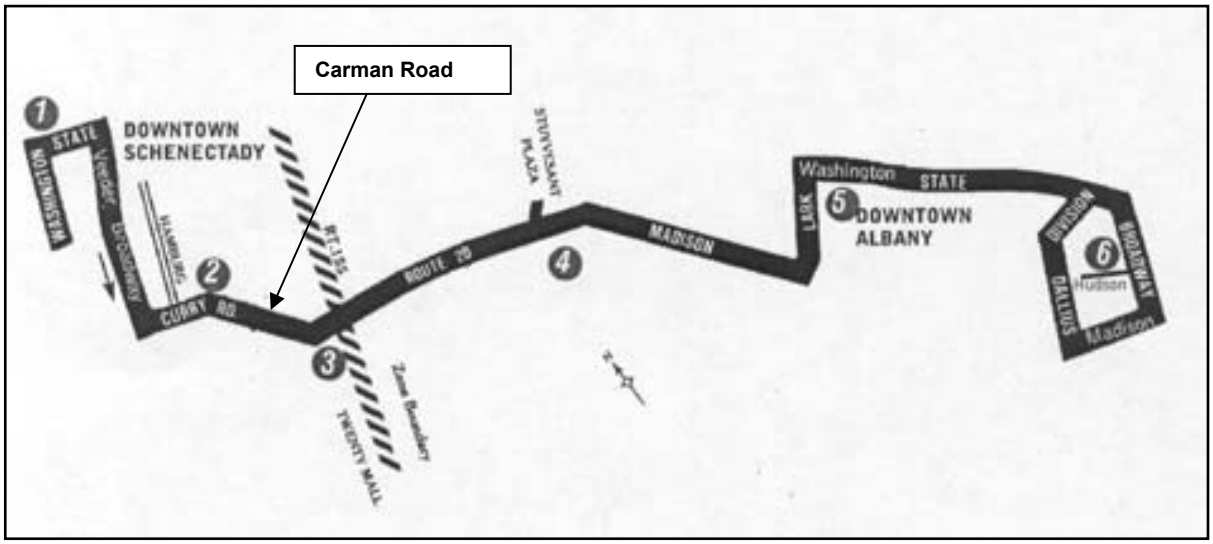
Table A-27. Carman Road Segment Crash Summary for 1998 to 2000 (3 Years)

Carman Road Segment	Total Crashes	Number of Injuries / Deaths	Crash Rate (Crashes per Million Vehicle Miles)	Predominant Collision Type
Lydius to Fuller Station	22	7 / 0	2.39	11 left turn with other car (< 4 per year)
Fuller Station to Lone Pine	22	6 / 0	2.58	8 side swipes (< 3 per year)
Lone Pine to Spawn	2	2 / 0	0.57	No Patterns
Spawn to Old State	13	7 / 0	1.76	No Patterns

TRANSIT SERVICE

Bus route #63 of the Capital District Transportation Authority's (CDTA) fixed route bus service serves the Carman Road corridor with three trips in the morning and three trips in the evening. As shown in **Figure A-16**, this route travels between Downtown Albany and Schenectady via Washington Ave, Route 20, Route 146 and Curry Road. This route is a component of the 44 regular routes that cover 150 square miles of urbanized area in the greater Albany area. The base fare is $1.00 and there is a zone charge of $ 0.25 between Albany and Troy and a zone charge of $ 0.35 between Albany and Schenectady.

Figure A-16. Bus Route 63



All of the bus stops in the study area are located at the intersection of Carman Road with side streets. The signs include a CDTA logo sign with the number 63 in large type. There are ten stops on each side of Carman Road between E/W Lydius Street and E/W Old State Road. Overhead lighting exists on the telephone poles along the entire corridor, alternating between the right and left sides of the road. **Figures A-17 and A-18** show the typical bus stop signs on a metal pole and telephone pole. Approximately half of the twenty bus stops are located next to a sidewalk as shown in **Figure A-17.**

Figure A-17. Bus Stop with Sidewalk

Figure A-18. Bus Stop without Sidewalk

The paratransit services, or STAR (Special Transit Available by Request), exist for all areas and times served by the CDTA fixed route service, within ¾ mile from the fixed route stops that are normally taken. This service is for those individuals with disabilities that prevent them from using the accessible fixed route buses.

Although there are no definitive plans for service changes or new shelters in the Fort Hunter/Carman Road neighborhood, CDTA will be conducting a comprehensive route restructuring study within the following year from the date of this study. Service within suburban corridors and "cross town" routes, such as the Route 146/Carman Road route, will be included in the assessment. CDTA acknowledges the challenge to providing service in the Fort Hunter/Carman Road neighborhood due to its low density and the lack of sidewalks. The route restructuring study will consider the demographics of likely transit riders and will in general be considering a trunk-feeder system. Carman Road is a potential candidate for service from a feeder bus route that connects to the NY 5 rapid transit corridor.

BYCYLE AND PEDESTRIAN FACILITY ASSESSMENT

While there are separate sections of sidewalks throughout the Fort Hunter neighborhood, it lacks an overall cohesive pedestrian sidewalk system. **Figure IV-1** shows the location of existing sections of sidewalks. As the figure shows, sidewalks are scarce in the Fort Hunter Neighborhood. With the exception of the sidewalks on Coons Road, there are no continuous sidewalks along the neighborhood streets. The only extensive portions of sidewalk, other than Coons Road, lie irregularly on either side of Carman Road and are discontinuous.

The sidewalks in the neighborhood are typically five feet wide and in relatively good shape. The sidewalks as they currently exist do not facilitate easy pedestrian movement between the various residential areas on either side of Carman Road, or between the residential areas and the commercial establishments at the southern end of the Study Area. Although the sidewalks generally exist near bus stops directly along Carman Road, they do not provide access to the bus stops from the surrounding neighborhoods or street network.

Bicycle travel within the neighborhood is solely along the sides of the roadways and streets. The ease of bicycling in the neighborhood is a function of the width of the road and shoulder, the amount of vehicular traffic on road and the speed at which it is traveling. **Table A-28** presents an assessment of bicycle travel along Carman Road and the major collector streets based on these factors. In general, the residential streets provide the least stressful riding situation, while Carmen Road and the busier streets, East Lydius Street, Fuller Station Road, Lone Pine Road and Old State Road are the most stressful to ride.

Within the Study Area, the Town's Pathways Committee has identified Pine Bush

Elementary School, Lynnwood Elementary School and DiCaprio Park as "attractions" while the Pine Bush Preserve and Guilderland Public Library are nearby "attractions" outside of the neighborhood. These five attractions, shown in **Figure A-19**, can be considered destinations for pedestrian and bicycle trips, from within and beyond the Fort Hunter neighborhood. While these destinations have Town wide significance, there are other destinations in the neighborhood to which bicycle or pedestrian travel should also be encouraged.

As important as determining the destinations is the determination of the origins of bicycle and pedestrian trips. The origins include the various residential areas within the neighborhood but can also include the destination areas as well.

Figure A-19 provides an overview of the location and type of origins and destinations that have been identified in the Fort Hunter Neighborhood. These locations were identified with assistance from the neighborhood residents who attended the March 6, 2003 public meeting. The layout of these origins and destinations helps to identify where bicyclists and pedestrians will want to go, which in turn helps to identify where pedestrian and bicycle paths should be located.

Within the neighborhood, several different types of bicyclist may be using bicycle facilities. In conducting this study, the consultants assumed that bicycle and pedestrian facilities in the neighborhood should be available to all types of potential users. **Table A-28** lists the potential different users of the bicycle and pedestrian facilities in the Fort Hunter Neighborhood and presents the basic differences between the different users. This information helps in the evaluation of the origins and destinations discussed in this study.

Table A-28. Assessment of Ease of Bicycle Use along Carman Road and Major Collector Streets

Road	Posted Speed Limit	Average Annual Daily Traffic	Lane Width (Feet-Inches)	Shoulder Width (Feet-Inches)	Easy Use by Bicyclist	Ideal Lane and Shoulder Widths for Bicyclist
Carman Road	40	12,250 to 12,900	11'-6"	2'-0" to 3'-6"	Minimal	11'/4'
East Lydius Street	30	3,390	10'-0	0 – 6"	No	11'/3'
West Lydius Street	30	4,170	10'-6"	1'-6"	No	11'/3'
Coons Road	30	2,070	12'-0	2'-9"	Minimal	11'/3'
Fuller Station Road	30	1,500	9'-6"	0 – 4"	No	10'/3'
Spawn Road	30	1,470	12'-0 to 10'-6"	None	Yes	10'/2'
Lone Pine Road	30	1,880	10'-0	0'-0"to 0'-6"	No	10'/3'
East Old State Road	30	2,950	11'-0" to 12'-0"	2'-0" to 0'-6"	Minimal	11'/3'
West Old State Road	30	2,470	10'0" to 10'-6"	0'- 6"	No	11'/3'

Table A-29. Alternative Transportation Facilities Users

Type of User	Destinations	Ability Level	Comfort Level	Comments
Pedestrian				
Pre-School	Very Close to Home	Basic	Low to no other Nearby Vehicular traffic	Needs supervision and an isolated sidewalk or path
Grade School	Close to Home	Basic	Low nearby vehicular traffic levels acceptable	Separated sidewalks or paths preferred.
H. School/Adult	Town Wide	Intermediate to Advanced	High nearby vehicular Traffic levels potentially acceptable	Can use shoulders or trails
Elderly	Variable	Intermediate to Advanced	Variable	Elderly need more time for crossing the street.
Bicyclist				
Basic Skills	One Mile Radius	Variable	Some adjacent Vehicular Traffic Volumes Acceptable	Usually Younger Riders – Only Separated paths or Very wide shoulder appropriate
Intermediate	Town wide	Intermediate	Variable	Separated paths or 4-foot wide shoulders appropriate
Skilled	Regional	Advanced	High Adjacent Vehicular Traffic Volumes Acceptable	Narrower Shoulders and All types of facilities acceptable

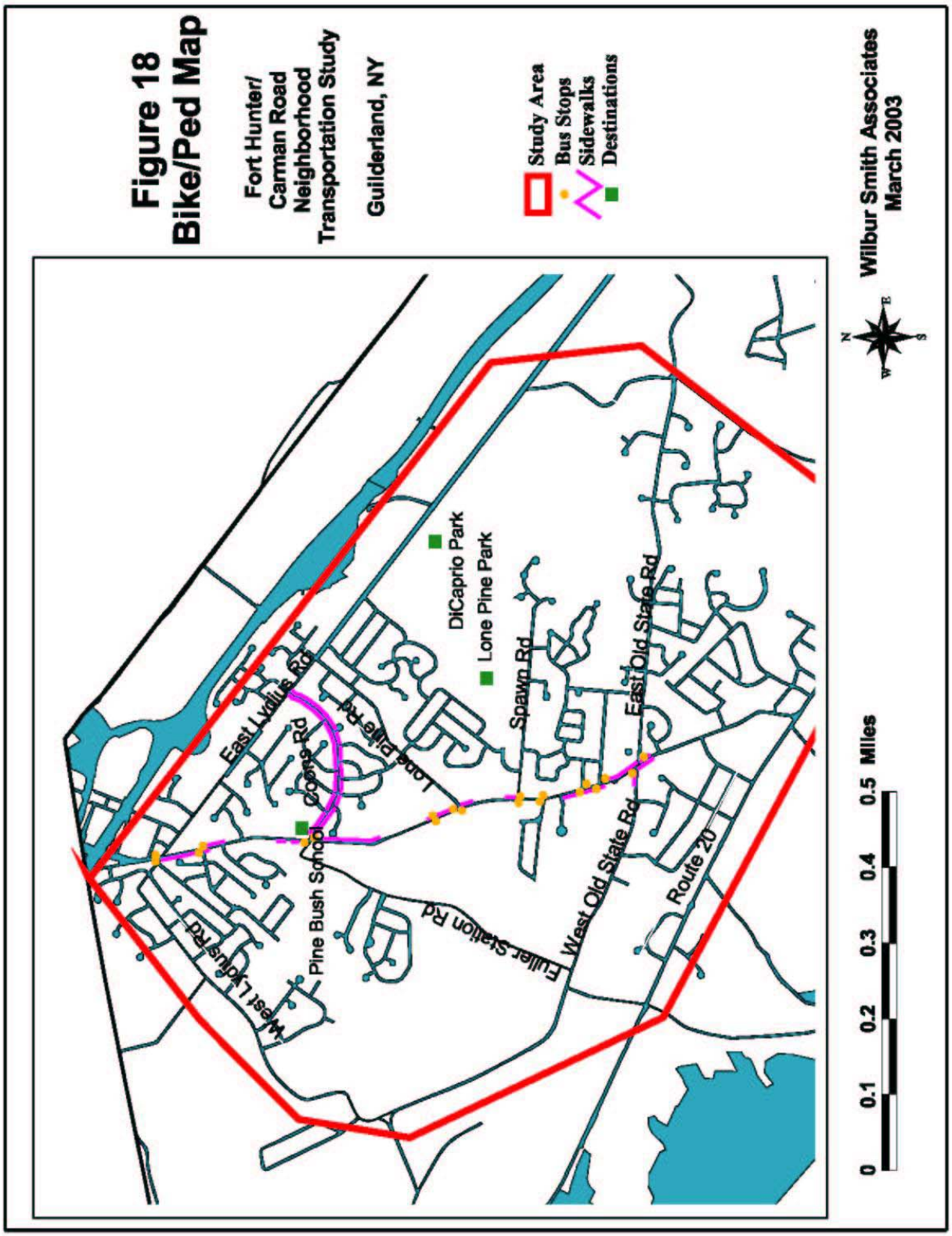


Figure A-19 Bicycle/Pedestrian Map

Public Input on Existing Conditions

A public work session was on March 6, 2003 to gather input from local residents on transportation issues and potential ideas in the Fort Hunter/Carman Road neighborhood. Over thirty neighborhood residents attended the meeting. The Wilbur Smith Associates team made a presentation that summarized the purpose of the study and the results of the preliminary assessment of existing conditions. The participants were broken into four smaller groups, facilitated by the consultant team, and were asked to address the following questions:

- Highway System Congestion and Safety**.** Tell us about congestion or safety problems on the highway system and where you think improvements are necessary?
- Transit System. Does the transit system meet your needs? What could be improved about the transit system?
- Bicycle and Pedestrian Facilities. Help us identify origins and destinations for pedestrians and bicyclists. Where should sidewalks, bike paths, crosswalks or other amenities be provided?
- Land Use and Development. What types of land use (development) should be encouraged, and what types should be discouraged, in the study area?
- Natural Resources. What natural or cultural features/resources in the study area should be protected?

Workshop facilitators summarized the responses to these questions at the end of the evening to give all participants the opportunity to hear and comment on the work of other groups. A specific list of responses for each group is contained **Appendix B**. Common issues and ideas raised among the breakout groups are summarized below:

Highway System Congestion and Safety

Common Issues:

- Congestion is most severe at the intersection of East and West Lydius Streets with Carman Road.
- Long delays are also experienced at the Lone Pine Road and Spawn Road stop-controlled approaches to Carman Road.
- Congestion causes potential safety problems. For example, left tuning vehicles create a temporary left turn lane as they by-pass through vehicles on the West Lydius Street approach to Carman Road.
- The lack of connectivity between neighborhood streets results in increases in local neighborhood traffic on Carman Road.
- Speeding traffic is a concern on Carman Road.

Suggested Projects of Improvements

- Provide information to help people avoid congestion such as a clear map of neighborhood streets which are already connected.
- Include turn lanes at intersections.

- Coordinate traffic signals.
- Install more traffic signals to help create gaps in the traffic stream to allow vehicles to exit side streets.

Transit System

Common Issues

- The existing bus service is slow (due to the many stops it makes) and is therefore not competitive with the auto.
- Pedestrian access to bus stops is poor.
- Senior citizens could benefit from improved transit service.

Suggested Improvements

- Provide express service with limited stops including a new park and ride lot near I-90 Exit 25.
- Provide midday bus service to provide for senior citizen travel and to provide flexibility for commuters who may need to return home during the day.
- Create local shuttles that neighborhood circulation and connect to express transit service.

Bicycle and Pedestrian Facilities

Common Issues and Comments

- Participants identified the likely origins and destinations for pedestrians and bicyclists including schools, neighborhoods, recreation areas, natural areas such as the Pine Bush Preserve, and commercial areas. These locations are identified in the Bicycle and Pedestrian plan.
- General support for expanding bike and pedestrian facilities throughout the neighborhood.
- Lack of continuous sidewalks and safe bikeways in the neighborhood.
- Bikes are trapped within subdivisions.
- The primary users of the bike and pedestrian facilities will be families and children.
- Safety is a key concern for design of bike paths and bike lanes along roadways.

Suggested Projects and Improvements

- Educate bikers and drivers.
- Provide cross walks at signalized intersections.
- Provide cross walks between signalized intersections – especially between the Omni Senior Center and Saint Madeline's Church.
- Rehabilitate the bridge West Old State Road bridge over the railroad for use by pedestrians and bicyclists.
- Start with walks on one side of the street and bike lanes on the other side.

Land Use and Development

Common Issues & Suggestions

- Support for mixing commercial, retail, and residential land uses,
- Maintain the rural/suburban character of the neighborhood.
- Preserve open spaces.
- New subdivisions do not interconnect.
- Need more parks on the west side of Carman Road.
- Need for diverse and affordable housing in the neighborhood.
- Do it right in the future – which suggests support for continuous planning and the concepts contained in the master plan.

Natural Resources

Common Issues and Suggestions

- Protect major streams.
- Preserve wetlands in the study area.
- Pine Bush Preserve is a valuable resource.
- Open space and fields are valuable resources.

Summary of Issues

Transportation Related

- Town residents favor improvements to all modes of transportation, rather than a single minded approach that focuses only on roadway expansion.
- Dead end street configurations throughout the study area limit travel route choices. Newer subdivisions do not connect to one another and often have only one access point to Carman Road, Western Avenue, or Lydius Streets. Traffic counts indicate that neighborhood residents are traveling to a diversity of destinations. Providing additional travel routes can improve the efficiency of the entire network.
- Travel lane widths satisfy AASHTO standards on Carman Road and all of the major collectors with the exception of Fuller Station Road. There appears to be adequate right-of-way along Carman Road to accommodate additional bike lanes and sidewalks.
- Approximately 35% of PM peak hour traffic on Carman Road is traveling through and approximately 80-90% of vehicles travel above the posted speed limit. These data suggest that the roadway design and its surrounding environment encourage faster speeds making Carman Road an attractive route for through travel. Reducing speeds along Carman Road, through roadway design, would help improve the quality of life along the corridor by slowing traffic and reducing through travel.
- Unacceptable levels of congestion are limited to the Carman Road intersection with East and West Lydius Streets. Level of service at the other intersections along Carman Road

are all well within acceptable ranges. This excess capacity creates an opportunity to accommodate pedestrian phases with minimum impacts to traffic flow. This excess capacity also creates an opportunity to accommodate additional traffic from new development and background growth by optimizing traffic signal timings rather than adding new lanes.

- Bus service is limited to the AM and PM peak hours in the study area. While this service may meet the demands of commuters, it does not serve other trips that occur throughout the day.
- There is a lack of continuous sidewalks to connect the high density neighborhoods with the bus route along Carman Road. The bus stops do not provide shelters or a place to sit for transit users. Some of the bus stops can become inaccessible due to snow.
- The limited sidewalk system does not encourage walking as a means of traveling between subdivisions, to the schools, or to the commercial areas along Carman Road.
- Existing travel lane and shoulder widths do not provide a safe place for bicycle travel along Carman Road or the major collector streets. As a result, bicycle travel beyond the sub-divisions is not convenient or safe. In effect, bicyclists are trapped within the subdivisions. However, the Fort Hunter/Carman Road neighborhood has many origins and destinations within a reasonable biking distance of each other. Furthermore, most of the roadways in the neighborhood, including Carman Road and the major collector streets, have gentle grades that are ideal for biking. The proximity of origins and destinations combined with the gentle grades of neighborhood street create an opportunity to increase the role of bicycle travel if safe facilities are provided.
- Commercial, institutional, and residential land uses are segregated and separated by distances that make walking or biking inconvenient and unlikely choices when compared to the travel time and convenience offered by the automobile.
- There is a significant amount of vacant land located to the west of Carman Road in the southern part of the study area that may be developed as additional residential sub-divisions. This potential redevelopment would generate additional traffic and may have other impacts. However, the potential development also creates the opportunity to develop interconnected neighborhoods, mixed with other non-residential uses that include adequate pedestrian and bicycle facilities.
- Residents favor neighborhood scale commercial development concentrated at appropriate locations along Carman Road.

APPENDIX B

In order to direct future Land Use in the direction of a Livable Community, the following actions Can be considered:

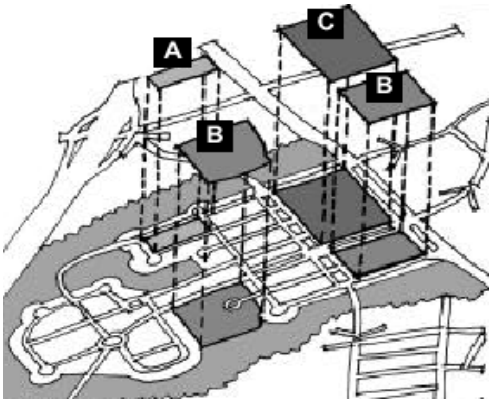
Reclaim Existing and Avoid Traditional Commercial Strips
Stop the spread of strip commercial zones and begin to reclaim existing strips into more contained sub-centers. Limit length to walkable distances - approximately one-half mile, add depth, encourage mixed uses including residential, build out to the street, and allow infill. Create physical connections with sidewalks, frontage roads, and shared driveways and parking. Create visual connections with landscaping, street trees, planted medians, and architectural details.

Source: Dutchess County Greenway Connections

Avoid Strip Subdivisions.
Build new housing in the countryside off side roads or shared driveways, screened from public view. In addition to eliminating multiple curb cuts, it provides easier school and transit service points, preserves viewsheds, and connects habitats.

Avoid strip subdivisions - settle them into the countryside on shared access road(s)

Embrace Neighborhood Design



Neighborhood Design

- *Has a variety of street sizes and public open spaces;*
- *Connects adjacent neighborhoods; and*
- *Integrates land uses*

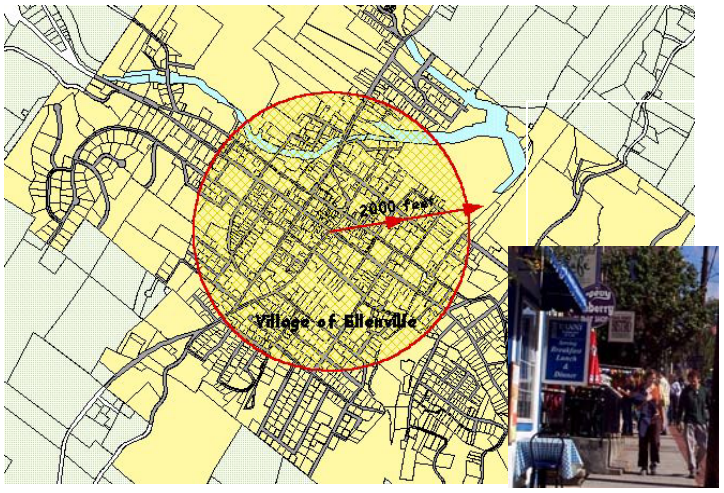
Key

A. Residential blocks
B. Community facilities and parks
C. Community commercial or mixed-use

Neighborhood Design plays a key role not only in transportation demand but also quality of life issues. Over and over again people express a great appreciation for vital community centers characterized by appropriate scaled settlement, narrow streets, public parks and mixed uses which allow residents to live within easy walking distance of shops, restaurants, commercial districts, employment centers and public transportation. This pattern in many instances runs counter to that established by applying existing zoning statutes. As a result many communities are rediscovering the planning and design practices responsible for creating the traditional development patterns.

Become a Pedestrian Friendly Community

Pedestrians account for one out every four traffic fatalities in New York. Implementing pedestrian-friendly streets can reduce this figure. To encourage walking for short trips a continuous pedestrian network within about 2,000 feet, an easy 10-minute walk, should interconnect neighborhoods, businesses, and public facilities, especially school and parks. Sample elements should involve the following:



- *Conduct a walking tour*
- *Photograph your streets*
- *Locate important destinations - schools, parks, senior centers*
- *Map existing pedestrian system & proposed sidewalk extensions*
- *Prioritize projects working with local groups*
- *Adopt pedestrian zones and enforce them*
- *Stripe new crosswalks*
- *Include pedestrian amenities as part of site plan approvals*

Become a Transit-Oriented Community

Transit-oriented includes design changes in shopping plazas and community buildings that insure

transit access can be accommodated through parking lots and where possible allow drop-off from the adjoining street. Sidewalk connections and building location adjacent to the street are also important, as are interconnections to adjoining developments. Communities can use their zoning power and site plan approval powers to insure these design issues are addressed. A transit checklist should be provided to developers. Parking requirements should reflect availability of transit services. In addition, developments should be expected to provide or allow bus shelters and information kiosks. System operators should provide bike racks that permit multi-modal transfers. Other critical considerations include parking facilities at transfer sites, higher densities and mixed uses where transit is available.

Transit -Oriented Policies

- Predesignate a future system of transit corridors.
- Modify policies to include transit as an element of land development
- Provide mixed land use including housing, office, retail, light industrial and recreational uses.
- Relate design to market.
- Provide variety within the district.
- Separate transit-oriented and auto-oriented land uses.
- Establish transit service zones along existing arterials.
- Explore public/private opportunities for transit stop joint development.
- Design for a phase implementation of transit corridors.
- Zoning should encourage transit-sensitive land use design through the designation of Transit Corridor Districts (TCDs) .
- Provide for transit-sensitive review of site plans and development proposals.
- Accommodate multiple developers and development patterns.
- Utilize appropriate land use adjacencies.
- Provide recreational opportunities and amenities.
- Relate the design and connections of adjacent developments
- Develop a program to encourage shared parking facilities.
- Minimize the distance between building entrances and transit stops; provide logical connections between buildings and transit.

Develop Corridor Management Plans

Corridor management combines right-of-way preservation, advance acquisition, land use planning, community enhancements, multi-modal transportation facilities and access management techniques to provide a balance of smooth traffic flow and access to adjacent land use. Corridor management helps assure that transportation facilities will be adequate to serve existing and planned development and contribute to and enhance community character. It benefits communities by:

- Reducing property damage and displacement of homes and businesses Minimizing environmental, social, and economic impacts of the highway system

Locate buildings at the street edge to define the corridor

- Preventing foreclosure of desirable locations by defining access, permitted land uses and transportation enhancements along a corridor prior to the existence of a transportation problem
- Permitting orderly project development
- Reducing the costs of transportation facilities.

Corridor management takes a holistic approach to managing the transportation system in a community by including access management, land use, motorized and non-motorized transportation needs (including bicycle and

pedestrian facilities), community and environmental enhancements and landscape design. Through the proper management of all of these factors, it is possible to create a well-balanced travel corridor with few conflicting uses.

The Ft. Hunter Corridor Study initiatives, as with most corridor management plans can best be achieved as a result of designating such corridors through local comprehensive planning initiatives consistent with quality community policy. Compatible development is identified and promoted along designated corridors in the Town's 2001 Comprehensive Plan. Therefore, the Town recognizes that the best way to manage its corridors is to prepare corridor management plans for critical locations and then incorporate the plan recommendations into all phases of the zoning process, land use codes, regulations, ordinances and site plan review. Corridor overlay zones are another technique that can be used to implement corridor plan recommendations. A corridor management ordinance can also coordinate land use and transportation to enhance a community.

Create Livable Streets
Livable streets provide for the well being of those who use them, and the formula for this is simple. Safe, comfortable streets are ***shaped, shaded, traffic-calmed, connected, and interesting.*** A livable street incorporates many factors that contribute to a "traditional neighborhood street." It takes into account environmental conditions, safety, comfort, a community feeling while maintaining a balance between the needs of pedestrians, cyclists, and vehicles. Attributes of livable streets are:

Provide travel mode choice
Having access to a variety of transportation services provides people with a sense of independence and freedom.

Support regional multi-modal travel
A local transportation system should provide access to and integrate the larger scale regional transportation system.

Create pedestrian and bicycle accessibility
This contributes to the notion of travel mode choices and allows people to travel around a community safely by whatever means chosen.


Road corridors can be safe for pedestrians, cyclists, and vehicles

Support public social contact
A sense of community is strengthened by the ability to interact with neighbors socially at events such as festivals and/or open air markets; these events need a designated space.

Provide orientation and identity to the region
Creating a road system that has a distinguishable identity gives residents a sense of place in the larger picture.

Provide a safe environment
People like to have the feeling that they can walk around without concern for danger; this is accomplished by limiting traffic, pollution, crime and other undesirable impacts.

Provide for physical comfort
A community's attractive appearance supports peoples' desire to be outside in the community.

Provide spatial definition by orienting buildings to the street
Spatial definition supports walking and pedestrian accessibility and promotes social contact as well as enhances the economic value of the community.

Provide high quality of construction and design
Quality constructs contributes to attractiveness, comfort, safety, and economic value.

L*andscaped raised median, period light fixtures, wide sidewalks, buildings to the street line*

Maintain the quality of the environment
The quality of man-made and natural environments is a major factor in the overall quality of an area and its sense of place or character. It is essential to preserve and enhance the environment to create a quality community

Strengthen Inter-governmental Relationships
Strengthening inter-governmental relationships helps to coordinate planning objectives and speeds the permit approval process; both agencies and applicants benefit. Jurisdictional impacts of different agencies and municipalities can be reduced with cooperation and coordination. Shoulder widths, consistent adjacent land uses, corridor management, regional traffic patterns, capital improvements, and comprehensive planning are just a few of the items that can be part of the discussion.

Adopt Community Roadway Design
Traditional roadway design seeks to accommodate the highest potential traffic volume. This often means straightening and widening a road; encouraging higher speeds. Use of a hierarchy of road design standards consistent with existing and proposed land uses, intended purpose of the roadway, and community goals and character helps insure that form and function of the roadway are consistent. One technique that can be applied in Guilderland is use of the "new old-fashioned country road" concept that seeks to restore safely the multi-modal function of historical country roads, balancing community interests and preserving valued rural character. Design philosophy for these roads uses the following principals:

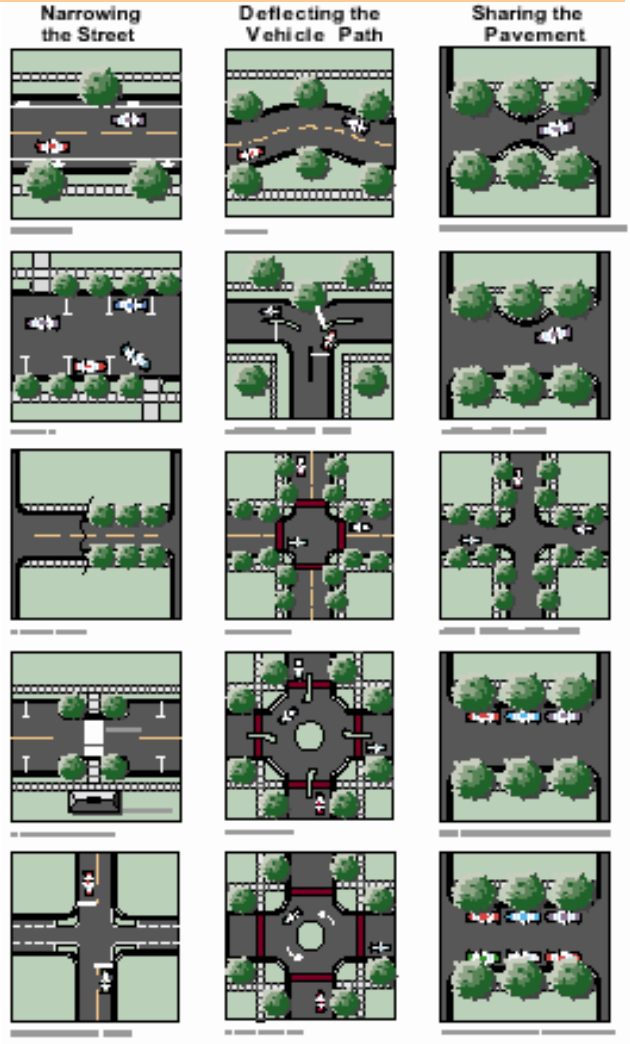
Safety for all users
Narrow travel lanes with close roadside features
Curving roads conforming to natural landscape
Slow traffic speeds

Implement Traffic Calming

To insure that neighborhood streets function for the neighborhood a variety of techniques known as traffic calming can be applied. The Institute of Transportation Engineers defines traffic calming as the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Road widths are not specified allowing local jurisdictions to develop a design using an "outside-in" approach, focusing first on the needs of children, bicyclists, and pedestrians, and then on people driving motorized vehicles.

Traffic Calming Techniques

- **Narrowing the street** reduces the speed that most drivers find reasonable and comfortable (the design speed). Reducing the pavement width, adding on-street parking, or adding a median is actual narrowing. Speed reduction (the effect of narrowing) can be accomplished with street trees along the curb, a tree canopy in the median, and buildings placed closer to the street.
- **Deflecting the vehicle path** causes drivers to slow and pay more attention to the task of driving. Deflection is done through changing the automobile's route slightly. Some measures apply at mid-block locations, while others are appropriate for intersections.
- **Changing the pavement surface** demands attention from drivers and reduces speed. Speed humps, speed tables, and special pavement materials are common methods for changing the pavement surface.
- **Sharing the pavement** with other vehicles slows vehicles and raises the attention level of drivers. Long a feature of traditional local streets, shared-use can be reintroduced into other streets by selective short sections of narrow pavement, either at mid-block locations or near intersections.
- **Diverting the driver's route** makes vehicular access more difficult, and encourages the driver to use another route. Diagonal street closures, one-way streets, median closings, and turning movement restrictions are primary examples.
- **Traffic control devices** slow traffic through regulation. STOP signs, traffic signals, and posted speed limits are frequently used to calm



Source: Collier County Mobility Manual

APPENDIX C

Future Traffic Projections

Traffic projections have been developed for a ten year planning horizon. The estimate of ten year AM and PM peak hour traffic volumes includes background traffic growth and traffic generated by anticipated housing development in the study area. Background traffic growth during the PM peak hour between 2000 and 2010 was estimated by the CDTC using its regional transportation model. As shown in **Table C-1**, the total ten-year background growth estimated for Carman Road is 6.1%.

Table C-1. CDTC Transportation Model Traffic Forecasts in the PM peak Hour 2000 to 2010

Carman Road Segment		Model Estimated Traffic Volumes (Vehicles per Hour)		Ten Year Percent Increase	Ten Year Absolute Increase
From	To	Year 2000	Year 2010		
Fort Hunter	Lydius Street	1,699	1,799	5.9%	100
Lydius Street	Coons Road	1,274	1,363	7.0%	89
Lone Pine	Old State Road	1,144	1,205	5.3%	61
		Average Ten-Year Background Growth for Carman Road			**6.1%**

In order to estimate the traffic impact of the housing units shown in **Figure C-1**, it is necessary to estimate the amount of traffic they would generate during the peak hours and how much of that traffic passes through the study intersections. **Table C-2** presents the estimated number of vehicle trips that would be generated by the 595 potential housing units during the AM and PM peak hours. Vehicle trip generation was calculated using the formulas contained in the Institute of Transportation Engineer's *Trip Generation Manual 6th Edition*. This estimate assumes that all of the new housing units are single family units.

Table C-2. Vehicle Trip Generation Estimate for 595 Single Family Detached Housing Units

Time Period	Total Vehicle Trips	Entering Vehicles	Exiting Vehicles
AM Peak Hour	502	125	376
		25%	75%
PM Peak Hour	652	418	235
		64%	36%

Traffic generated from the potential housing units was assigned to the highway network and distributed to each intersection consistent with existing traffic patterns (See **Figure A-15** of the Existing Conditions technical memorandum.) Overall, the traffic assignment assumes that 50%

of the vehicle trips begin or end to the north of the study area and 50% begin or end to the south of the study area.

Tables C-3 and C-4 show how the background and new housing development traffic have been added to 2002 traffic volumes to a create the 2012 forecast. These tables summarize specific intersection turning movements which are contained in **Attachment A. Tables C-3 and C-4** show the resulting percent increase ranges from 13 to 21% in the AM peak hour and 14 to 26% in the PM peak hour, depending on the intersection. This increase equates to annual growth rates ranging from 1.2% to 1.9% in the AM and 1.3% to 2.3% in the PM. Based on counts conducted by NYSDOT, traffic on Carman Road grew by 4.7% per year between 1993 and 2001. It is reasonable to expect a slower rate of growth in traffic over the 2002-2012 planning horizon because (1) according to the Town, residential growth in the study area is leveling off as the area approaches build-out and (2) the percent increase for the 2002-2012 planning horizon is calculated relative to a larger base year traffic volume number.

Table C-3. Development of 2012 AM Peak Hour Intersection Traffic Volumes (Vehicles per Hour)

Carman Road Intersection With:	Year 2002 Intersection Traffic Volume	Ten Year Background Traffic Growth	Traffic from Potential Housing Development	Total 2012 Intersection Traffic Volume	Percent Increase 2002 to 2012
East & West Lydius Streets	1951	117	238	2306	18%
Fuller Station & Coons Road	1315	79	172	1566	19%
Lone Pine Road	1086	65	76	1227	13%
Spawn Road	1071	64	122	1257	17%
East and West Old State Roads	1499	90	228	1817	21%

Table C-4. Development of 2012 PM Peak Hour Intersection Traffic Volumes (Vehicles per Hour)

Carman Road Intersection With:	Year 2002 Intersection Traffic Volume	Ten Year Background Traffic Growth	Traffic from Potential Housing Development	Total 2012 Intersection Traffic Volume	2002 to 2012 Percent Increase
East & West Lydius Streets	1,755	105	308	2,168	24%
Fuller Station & Coons Road	1,374	82	229	1,685	23%
Lone Pine Road	1,228	74	100	1,402	14%
Spawn Road	1,297	78	162	1,537	18%
East and West Old State Roads	1,467	88	298	1,853	26%

Future Intersection Performance

Figure C-2 on the next page shows 2012 forecasted level of service and average vehicle queues on the approaches for each study intersection during the AM and PM peak hours. The analysis assumes that timing plans at the signalized intersections of East/West Lydius Streets, Fuller Station/Coons Road and East/West Old State Road are optimized using the existing traffic signal hardware. **Tables C-5-C-14** provide additional detail on the level of service, the associated delay, and the estimated vehicle queues for all of the intersections.

- Overall. **Figure C-2** shows that unacceptable levels of service or excessive queues are

projected on at least one approach at three out of five study intersection during the PM peak hour. During the AM peak hour, unacceptable performance is limited to the East/West Lydius Streets intersection.

- East/West Lydius Streets. This is the only intersection with unacceptable performance in 2002. In 2002, the West Lydius Street approach operates at an LOS E during the morning rush hour and there are excessive vehicle queues existing on the Carman Road northbound and southbound approaches during both the AM and PM peak hours. By 2012, the projected LOS is "F" on the West Lydius Street. Projected vehicle queues during the 2012 AM peak hour remain excessive on the Carman Road approaches. Level of Service is projected to worsen from "D" in 2002 to "F" in 2012 on the West Lydius Street approach during the PM peak hour.

- Fuller Station and Coons Road. LOS and vehicle queues are projected to remain within acceptable limits during the 2012 AM and PM peak hours.

- Lone Pine Road. The critical movements for this intersection are the Lone Pine approach controlled by a stop sign and the Carman Road southbound left turn movement. Projected LOS remains acceptable for all movements in 2012.

- Spawn Road. The critical movements for this intersection are the Spawn Road approach controlled by a stop sign and the Carman Road southbound left turn movement. In 2002, all of these critical movements operate at LOS D or better. Projected 2012 AM peak hour LOS remains acceptable. Projected 2012 PM peak hour LOS worsens to "F" on Spawn Road. The projected 2012 LOS for the southbound left turn movements remains acceptable during the AM and PM peak hours.

- East/West Old State Roads. In 2002, the level of service and vehicle queues on all approaches during the AM and PM peak hours are acceptable. By 2012 the projected LOS worsens to "E" on the West Old State and East Old State Road approaches during the PM peak hour.

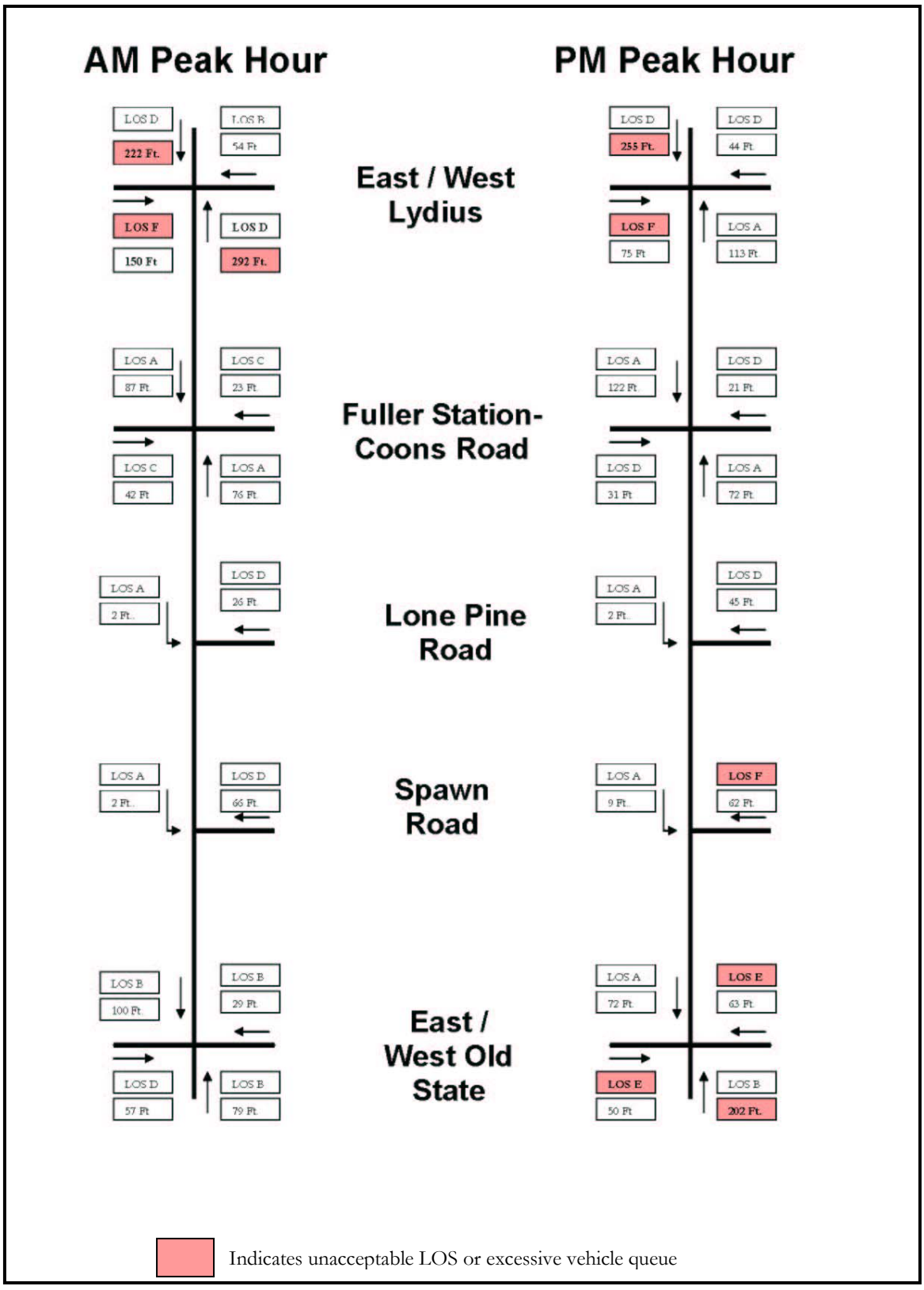


Figure C-2. Projected 2012 Level of Service and Average Vehicle Queues by Carman Road Intersection Approach with Existing Lanes and Traffic Control

Table C-5. Carman Road with East and West Lydius Streets 2012 AM Peak Hour

AM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	F	B	D	D	D
Delay (Seconds)	88	16	47	37	46
Queue (Feet)	150	54	292	222	Not Applicable

Table C-6. Carman Road with East and West Lydius Streets 2012 PM Peak Hour

PM Peak Hour	W. Lydius	E. Lydius	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	F	D	A	D	C
Delay (Seconds)	128	38	9	37	35
Queue (Feet)	75	44	113	255	Not Applicable

Table C-7. Carman Road with Fuller Station and Coons Road 2012 AM Peak Hour

AM Peak Hour	Fuller Station Road	Coons Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	C	C	A	A	B
Delay (Seconds)	34	23	6	8	12
Queue (Feet)	42	15	76	87	Not Applicable

Table C-8. Carman Road with Fuller Station and Coons Road 2012 PM Peak Hour

PM Peak Hour	Fuller Station Road	Coons Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	D	D	A	A	B
Delay (Seconds)	36	35	5	9	11
Queue (Feet)	31	21	72	122	Not Applicable

Table C-9. Carman Road with East and West Old State Roads 2012 AM Peak Hour

AM Peak Hour	West Old State Road	East Old State Road	Carman Road Northbound	Carman Road Southbound	Average Intersection
Level of Service	D	B	B	B	C
Delay (Seconds)	51	19	12	12	20
Queue (Feet)	57	29	79	100	Not Applicable

Table C-10. Carman Road with East and West Old State Roads 2012 PM Peak Hour

PM Peak Hour	West Old State Road	East Old State Road	Carman Rd Northbound	Carman Road Southbound	Average Intersection
Level of Service	E	E	B	A	C
Delay (Seconds)	79	65	20	6	25
Queue (Feet)	50	63	202	72	Not Applicable

Table C-11. Carman Road with Lone Pine Road 2012 AM Peak Hour

AM Peak Hour	Lone Pine Road	Carman Rd Southbound Left	Average Intersection
Level of Service	D	A	A
Delay (Seconds)	26	1	2
Queue (Feet)	30	2	Not Applicable

Table C-12. Carman Road with Lone Pine Road 2012 PM Peak Hour

PM Peak Hour	Lone Pine Road	Carman Rd Southbound Left	Average Intersection
Level of Service	D	A	A

Delay (Seconds)	35	1	2
Queue (Feet)	45	2	Not Applicable

Table C-13. Carman Road with Spawn Pine Road 2012 AM Peak Hour

AM Peak Hour	Spawn Road	Carman Rd Southbound Left	Average Intersection
Level of Service	D	A	B
Delay (Seconds)	26	1	4
Queue (Feet)	66	2	Not Applicable

Table C-14. Carman Road with Spawn Road 2012 PM Peak Hour

PM Peak Hour	Spawn Road	Carman Rd Southbound Left	Average Intersection
Level of Service	F	A	A
Delay (Seconds)	62	3	5
Queue (Feet)	91	9	Not Applicable